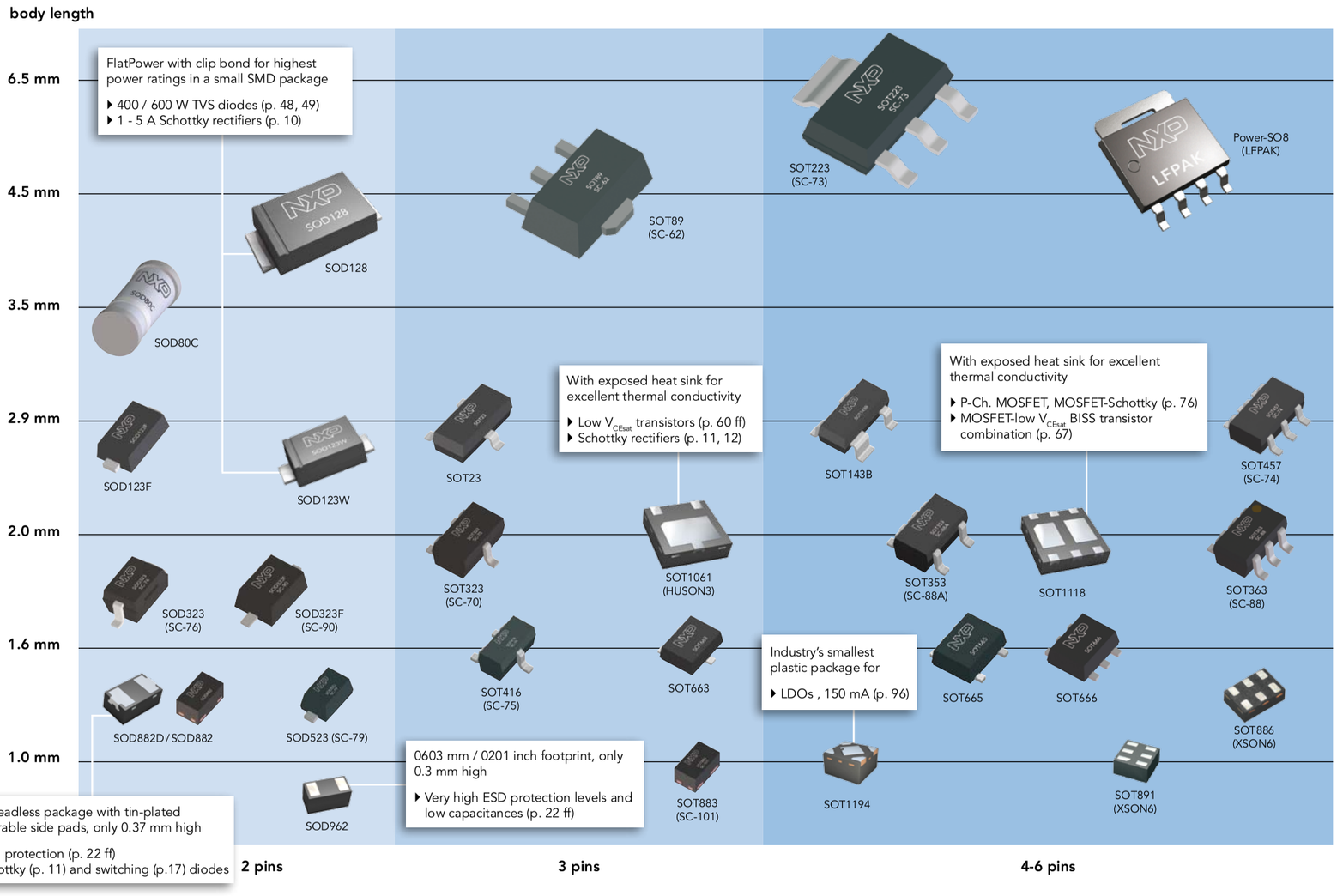
Discrete Semiconductors Selection Guide 2011

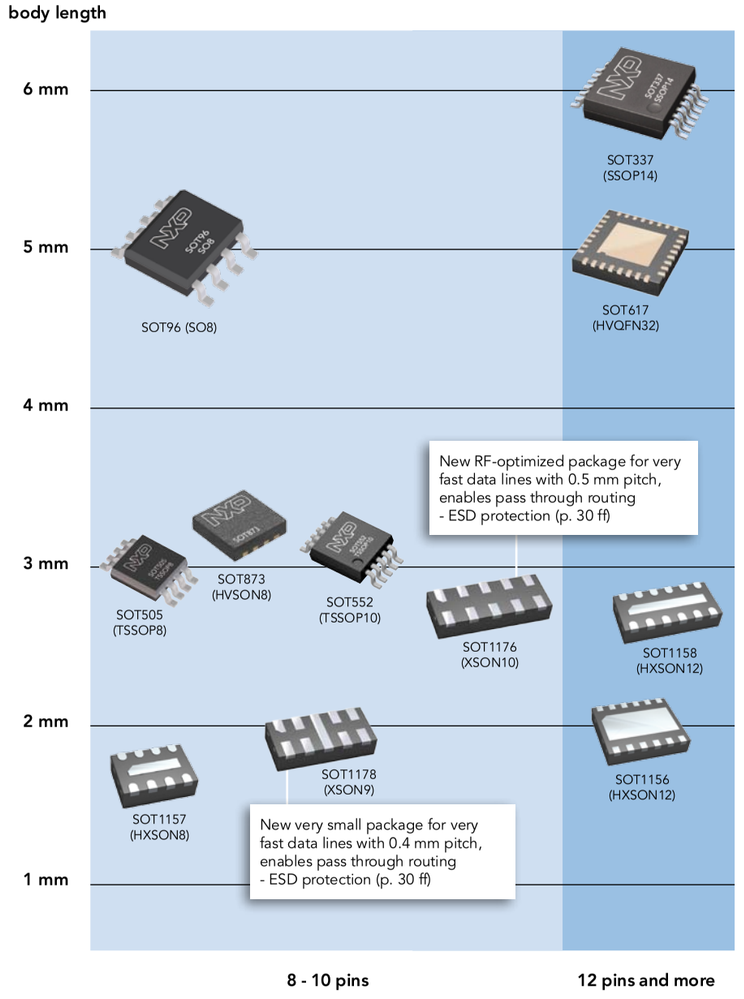
Diodes, protection and signal conditioning devices, bipolar transistors, MOSFETs, thyristors

Discrete Semiconductors packages – portfolio and highlights

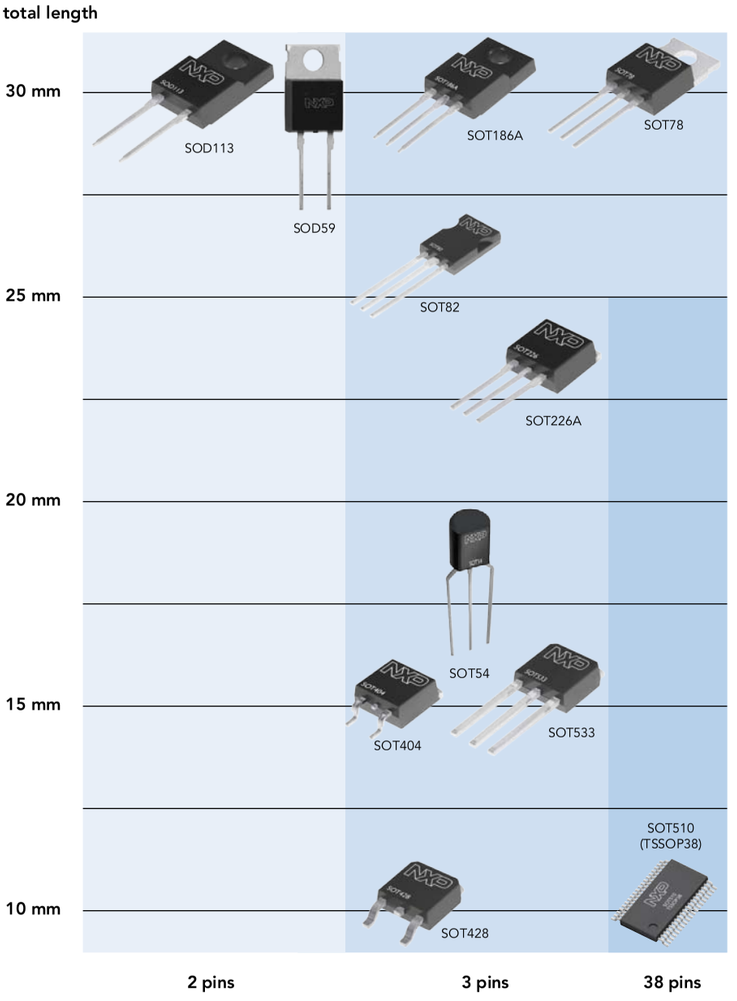
Small SMD packages with 2 - 6 pins



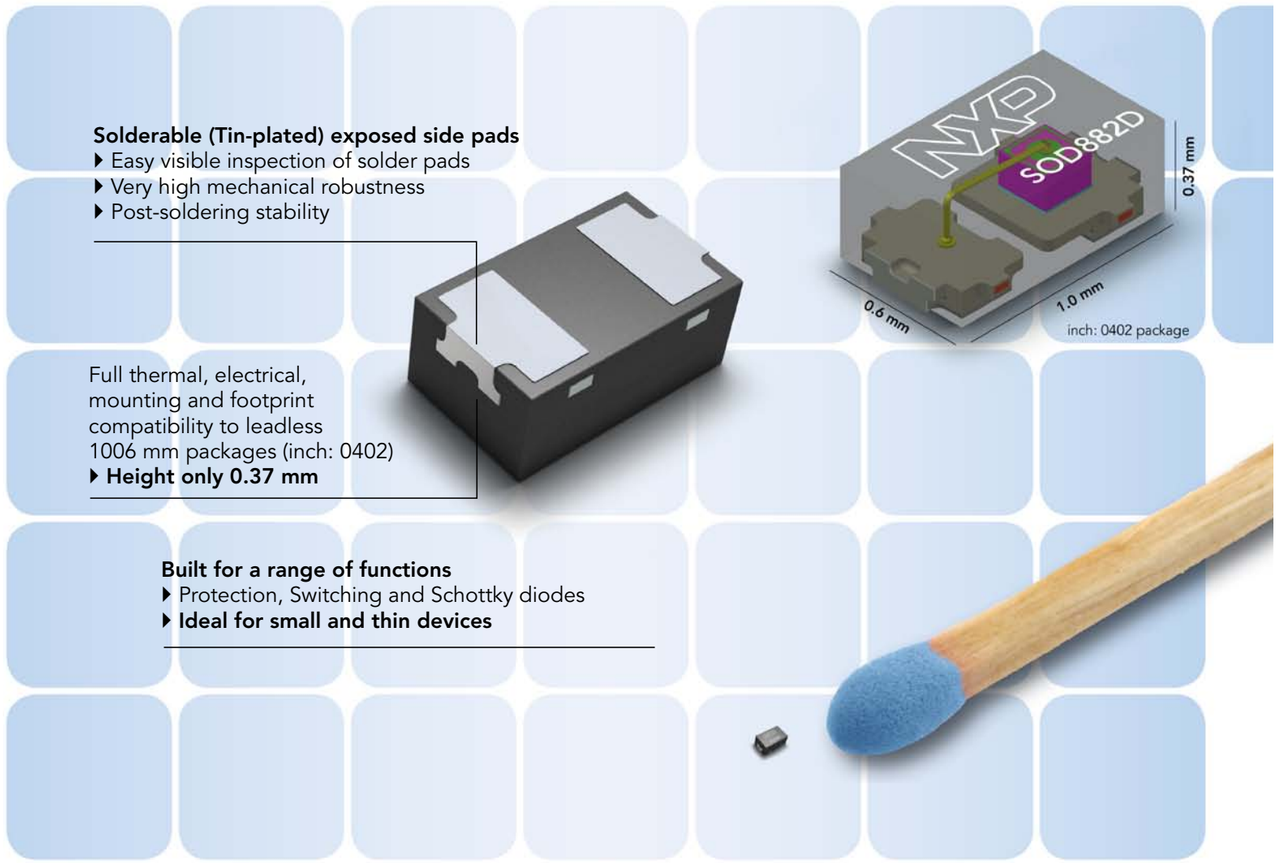
Small SMD packages with 8 pins and more



Through-hole and SMD packages with total length of + 9 mm



The first leadless package with solderable side pads



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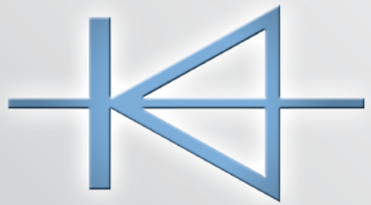


Diodes

Schottky barrier diodes and rectifiers

General purpose Schottky diodes ≤ 250 mA

types in **bold** represent new products

I_F max (mA)	V_R max (V)	V_F max (mV)	@ I_F (mA)	I_R max (µA)	@ V_R (V)	Package	SOD80C (MiniMelf)	SOD68 (DO-34)	SOT23	SOT143B		SOD123F	SOT323 (SC-70)	SOT363 (SC-88)	SOD323F (SC-90)	SOD323 (SC-76)	SOT666	SOT416 (SC-75)	SOD523 (SC-79)	SOD882/ SOT883 (SC-101)
						Size (mm)	3.5 x 1.5 x 1.5	3.04 x 1.6 x 0.55	2.9 x 1.3 x 1.0	2.9 x 1.3 x 1.0		2.6 x 1.6 x 1.1	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.7	1.7 x 1.25 x 0.95	1.6 x 1.2 x 0.55	1.6 x 0.8 x 0.77	1.2 x 0.8 x 0.6	1.0 x 0.6 x 0.5
						P_{tot} (mW)	300	500	250	250		830	250	300	550	400	300	150	500	250
70	70	750	10	0.1	50	single			BAS70			BAS70H	BAS70W			1PS76SB70			1PS79SB70	BAS70L
						dual series			BAS70-04				BAS70-04W							
						dual c.c.			BAS70-05				BAS70-05W							
						dual c.a.			BAS70-06				BAS70-06W							
						dual isolated				BAS70-07				BAS70-07S			BAS70-07V			
						triple isolated											BAS70VV			
						quad 2x series								BAS70XY						
120	40	370	1	0.5	30	single										RB751V40			RB751S40	RB751CS40
		500	10	1	30	single			BAS40			BAS40H	BAS40W			1PS76SB40			1PS79SB40	BAS40L
						dual series			BAS40-04				BAS40-04W							
						dual c.c.			BAS40-05				BAS40-05W					1PS75SB45		
						dual c.a.			BAS40-06				BAS40-06W							
						dual isolated				BAS40-07							BAS40-07V			
						quad c.c./c.c.								1PS88SB48			BAS40-05V			
						quad 2x series								BAS40XY						
200	30	300	10	30	10	single													1PS79SB31	
		340	10	2	25	single			BAT754											
						dual series			BAT754S											
						dual c.c.			BAT754C											
						dual c.a.			BAT754A											
						triple isolated								BAT754L						
						single	BAS85	BAT85	BAT54			BAT54H	BAT54W		BAT54J	1PS76SB10		BAT54T	1PS79SB10	BAT54L
						dual series			BAT54S				BAT54SW							
						dual c.c.			BAT54C				BAT54CW							BAT54CM
						dual c.a.			BAT54A				BAT54AW							
						dual isolated				BAT74				BAT74S			BAT74V			
						triple isolated											BAT54VV			
						quad c.c./c.c.											BAT54CV			
						quad 2x series								BAT54XY						
		500	200	30	10	single													RB521S30	**RB521CS30L**
		600	200	1	10	single													RB520S30	**RB520CS30L**
	40	300	10	15	30	single			BAT721							1PS76SB21				
						dual series			BAT721S											
						dual c.c.			BAT721C											
						dual c.a.			BAT721A											
		360	10	0.5	25	single													1PS79SB30	
		420	30	0.5	25	single							BAT854W							
						dual series							BAT854SW							
						dual c.c.							BAT854CW							
						dual c.a.							BAT854AW							
	50	450	10	5	40	single	BAS86	BAT86												
250	100	850	250	4	75	single						**BAT46WH**			**BAT46WJ**					

single	dual series	dual c.c.	dual c.a.	dual isolated	triple isolated	quad c.c./c.c.	quad 2x series
brb122	brb124	brb125	brb126	brb127	brb129	brb130	brb131
brb123				brb128			
1, 2 5, 6 3, 4 mhd834							

Low capacitance Schottky diodes

I_F max (mA)	V_R max (V)	V_F max (mV)	@ I_F (mA)	C_d max (pF) @ V_R = 0 V	Package	SOT23	SOT323 (SC-70)	SOT363 (SC-88)	SOD323 (SC-76)	SOT666	SOD523 (SC-79)	SOD882
					Size (mm)	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.95	1.6 x 1.2 x 0.55	1.2 x 0.8 x 0.6	1.0 x 0.6 x 0.5
					P_{tot} (mW)	250	250	300	400	300	500	250
30	4	450	1	1	single	BAT17			1PS76SB17		1PS79SB17	
					triple isolated					1PS66SB17		
					dual series	PMBD353 PMBD354 [1]						
	15	340	1	1	single		1PS70SB82					1PS10SB82
					triple isolated			1PS88SB82		1PS66SB82		
					dual series		1PS70SB84					
					dual c.c.		1PS70SB85					
					dual c.a.		1PS70SB86					

[1] Diodes have matched capacitance

Schottky barrier diodes and rectifiers

Medium power low V_F Schottky rectifiers single ≥ 200 mA

types in **bold** represent new products

I_F max (A)	V_R max (V)	V_F max (mV) @ I_F max	I_R max (mA) @ V_R max	Package	SOD128	SOT457 (SC-74)	SOT23	SOD123W	SOD123F		SOT1061	SOT323 (SC-70)	SOD323F (SC-90)	SOD323 (SC-76)	SOT666	SOD523 (SC-79)	SOD882	SOD882D
				Size (mm)	3.8 x 2.5 x 1.0	2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.6 x 1.7 x 1.0	2.6 x 1.6 x 1.1		2.0 x 2.0 x 0.65	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.7	1.7 x 1.25 x 0.95	1.6 x 1.2 x 0.55	1.2 x 0.8 x 0.6	1.0 x 0.6 x 0.5	1.0 x 0.6 x 0.37
				P_{tot} (mW) @ 1 cm²	1050	540	420	950	830		1000	250	830	570	570	450	250	250
				Optimization														
0.2	30	480	0.04	low V_F									PMEG3002EJ			PMEG3002AEB	PMEG3002AEL	**PMEG3002AELD**
	40	600	0.01	low I_R									PMEG4002EJ			PMEG4002EB	PMEG4002EL	**PMEG4002ELD**
	60	600	0.1	low V_F									PMEG6002EJ			PMEG6002EB		
0.5	20	390	0.2	low V_F			PMEG2005ET		PMEG2005EH				PMEG2005EJ	PMEG2005AEA	PMEG2005AEV			
		440	1.5	low V_F													PMEG2005AEL	**PMEG2005AELD**
		480	0.01	low I_R												PMEG2005EB		
		500	0.03	low I_R													PMEG2005EL	**PMEG2005ELD**
	30	430	0.15	low V_F			PMEG3005ET		PMEG3005EH				PMEG3005EJ	PMEG3005AEA	PMEG3005AEV			
		500	0.5	low V_F												PMEG3005EB	PMEG3005EL	**PMEG3005ELD**
	40	470	0.1	low V_F			PMEG4005ET		PMEG4005EH				PMEG4005EJ	PMEG4005AEA	PMEG4005AEV			
		550	0.1	low V_F			BAT720					1PS70SB20						
1.0	20	340	1	low V_F				PMEG2010ER										
		375	1.9	low V_F							PMEG2010EPA							
		430	0.2	low V_F			PMEG2010AET		PMEG2010AEH									
		450	0.05	low I_R				PMEG2010BER										
		500	0.2	low V_F			PMEG2010ET		PMEG2010EH				PMEG2010EJ	PMEG2010BEA	PMEG2010BEV			
		550	0.07	low I_R									PMEG2010AEJ	PMEG2010EA BAT760	PMEG2010EV BAT960			
		620	1.5	low V_F												PMEG2010AEB		
		450	1.0	low V_F		1PS74SB23												
	30	360	1.5	low V_F	PMEG3010EP			PMEG3010ER										
		450	0.05	low I_R	PMEG3010BEP			PMEG3010BER										
		520	0.05	low I_R					PMEG3010CEH				PMEG3010CEJ					
		560	0.15	low V_F			PMEG3010ET		PMEG3010EH				PMEG3010EJ	PMEG3010BEA	PMEG3010BEV			
		680	0.5	low V_F												PMEG3010EB		
	40	490	0.05	low V_F	PMEG4010EP			PMEG4010ER										
		640	0.1	low V_F			PMEG4010ET		PMEG4010EH				PMEG4010EJ	PMEG4010BEA	PMEG4010BEV			
		570	0.05	low I_R					PMEG4010CEH				PMEG4010CEJ					
	60	530	0.06	low V_F	PMEG6010EP			PMEG6010ER										
		650	0.35	low V_F		PMEG6010AED												
		660	0.05	low I_R					PMEG6010CEH				PMEG6010CEJ					
1.5	20	660	0.07	low I_R					PMEG2015EH				PMEG2015EJ	PMEG2015EA	PMEG2015EV			
	30	550	1.0	low V_F					PMEG3015EH				PMEG3015EJ		PMEG3015EV			
2.0	10	460	3.0	low V_F					PMEG1020EH				PMEG1020EJ	PMEG1020EA	PMEG1020EV			
	20	420	1.9	low V_F							PMEG2020EPA							
		525	0.2	low V_F					PMEG2020EH				PMEG2020EJ	PMEG2020AEA				
	30	360	3.0	low V_F	PMEG3020EP													
		420	1.5	low V_F	PMEG3020CEP			PMEG3020ER										
		450	0.1	low I_R	PMEG3020BEP													
		470	2.5	low V_F							PMEG3020EPA							
		520	0.05	low I_R	PMEG3020DEP			PMEG3020BER										
		620	1.0	low V_F					PMEG3020EH				PMEG3020EJ					
	40	490	0.1	low V_F	PMEG4020EP			PMEG4020ER										
		535	0.1	low V_F							PMEG4020EPA							
	60	530	0.15	low V_F	PMEG6020EP			PMEG6020ER										
		575	0.25	low V_F							PMEG6020EPA							
3.0	10	530	3.0	low V_F					PMEG1030EH				PMEG1030EJ					
	30	360	5.0	low V_F	**PMEG3030EP**													
		450	0.15	low I_R	**PMEG3030BEP**													
	40	490	0.2	low V_F	**PMEG4030EP**													
		540	0.1	low I_R				**PMEG4030ER**										
	60	530	0.2	low V_F	**PMEG6030EP**													
5.0	30	360	8.0	low V_F	**PMEG3050EP**													
		450	0.25	low I_R	**PMEG3050BEP**													
	40	490	0.3	low V_F	**PMEG4050EP**													

In the Spotlight

Low V_F (MEGA) Schottky rectifiers in new leadless SOD882D

- Ultra low package height of only 0.37 mm typ
- Tin-plated solderable side pads
- Ultra small dimensions 1.0 x 0.6 mm
- Portfolio of five low V_F (MEGA) Schottky diodes (I_F up to 0.5 A)
- AEC-Q101 qualified

Medium power low V_F Schottky rectifiers dual ≥ 200 mA

types in **bold** represent new products

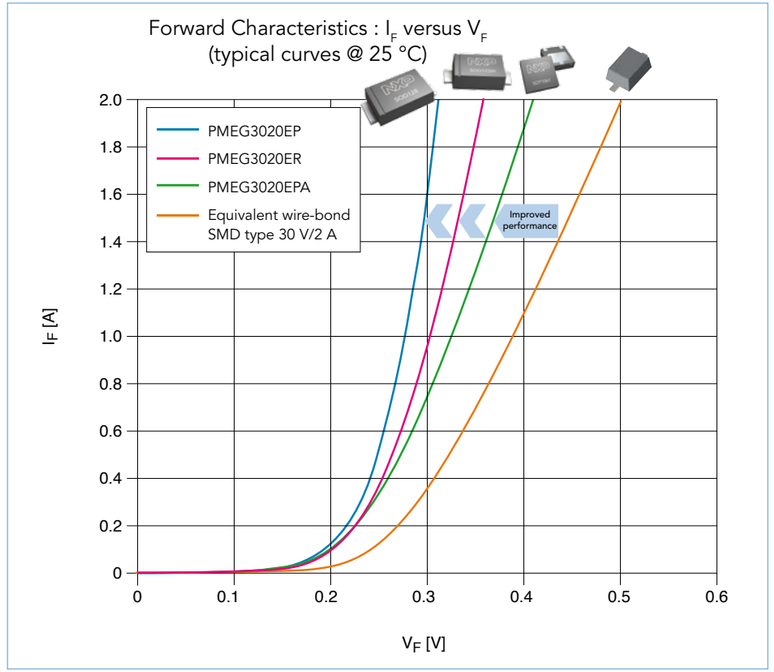
I_F max (A)	V_R max (V)	V_F max (mV) @ I_F max	I_R max (mA) @ V_R max	Optimization	Package	SOT223 (SC-73)	SOT23	SOT1061	SOT666
					Size (mm)	6.5 x 3.5 x 1.65	2.9 x 1.3 x 1.0	2.0 x 2.0 x 0.65	1.6 x 1.2 x 0.55
					P_{tot} (mW)	1500	250	1000	300
0.2	30	480	0.03	low V_F	dual isolated				PMEG3002TV
	60	600	0.1	low V_F					PMEG6002TV
0.5	20	390	0.2	low V_F	dual c.c.		PMEG2005CT		
	30	430	0.15	low V_F			PMEG3005CT		
	40	470	0.1	low V_F			PMEG4005CT		
1.0	25	450	1.0	low V_F	dual series	BAT120S			
				low V_F	dual c.c.	BAT120C			
				low V_F	dual c.a.	BAT120A			
	40	500	0.05	low V_F	dual c.c.			**PMEG4010CPA**	
	60	540	0.06	low V_F	dual c.c.			**PMEG6010CPA**	
		650	0.35	low V_F	dual series	BAT160S			
				low V_F	dual c.c.	BAT160C			
				low V_F	dual c.a.	BAT160A			
2.0	20	420	1.0	low V_F	dual c.c.			**PMEG2020CPA**	
	30	440	2.0	low V_F	dual c.c.			**PMEG3020CPA**	

In the Spotlight

Medium power single and dual Schottky rectifiers in SOT1061

- Small (2 x 2 x 0.65 mm) leadless medium power package SOT1061
- Exposed heat sink for excellent thermal and electrical performance (P_{tot} > 1 W)
- High forward-current capability (I_F up to 2 A) with low forward voltage drop
- High reverse voltage (V_F up to 60 V)
- AEC-Q101 qualified

Improved forward characteristics of (MEGA)[1] Schottky rectifiers in new packages



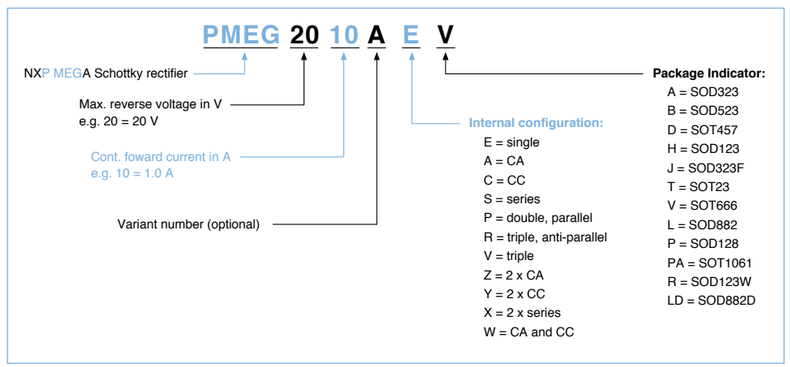
[1] Maximum Efficiency General Application

In the Spotlight

3 and 5 A low V_F (MEGA) Schottky rectifiers in SOD123W and SOD128

- Small FlatPower packages SOD123W/128, only 1 mm high
- Very low forward voltage drop V_F down to 340 mV
- Low reverse current I_R down to 0.05 mA
- High power capability due to clip-bonding technology and optimized die design
- AEC-Q101 qualified

Nomenclature of low V_F (MEGA) Schottky rectifiers



General purpose Zener diodes

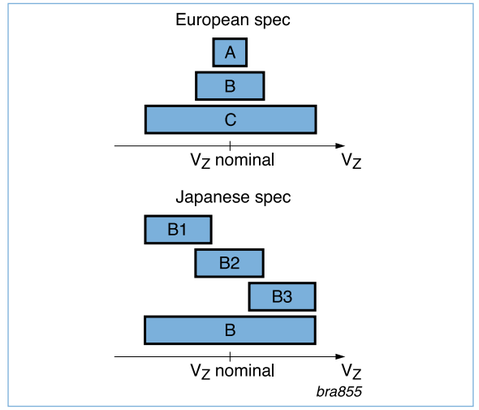
types in **bold** represent new products

I_F max (mA)	P_{ZSM} (W)	V_Z nom (V)	V_Z tolerance	Note	Configuration	Series	Package	Size (mm)	P_{tot} (mW)
500	-	3.3~24	C	Eur	single	1N47xxA series	SOD66 (DO-41)	4.8 x 2.6 x 0.81	1000
	60	3.6~75				BZV85 series			
250	-	2.4~36	about 2%	special	single	NZX series	SOD27 (DO-35)	4.25 x 1.85 x 0.56	400
	40	2.4~75	B, C	Eur		BZX79 series			
400	40	2.4~75	C	Eur	single	BZV90 series	SOT223 (SC-73)	6.5 x 3.5 x 1.65	1500
250	40	2.4~75	C	Eur	single	BZV49 series	SOT89 (SC-62)	4.5 x 2.5 x 1.5	1000
250	40	2.4~75	B, C	Eur	single	BZV55 series	SOD80C (MiniMelf)	3.5 x 1.5 x 1.5	300
200	40	2.4~75	B, C	Eur	dual c.a.	BZB84 series	SOT23	2.9 x 1.3 x 1.0	250
			A, B, C		single	BZX84 series			
250	30	5~6.8	0.2 V	Ave		PLVA600A series			
			0.2 V	Ave	dual c.a.	PLVA2600A series			
250	-	3.0~30	about 2.5%	special	single	NZH series	SOD123F	2.6 x 1.6 x 1.1	830
	40	2.4~75	B, C	Eur		BZT52H series			
200	40	2.7~24	B2	Jap	dual isolated	PZUxDB2 series	SOT353 (SC-88A)	2.0 x 1.25 x 0.95	300
200	40	2.4~15	C	Eur	dual c.a.	BZB784 series	SOT323 (SC-70)	2.0 x 1.25 x 0.95	350
200	30	100	C	Eur	back-to-back	BZB100A	SOD323 (SC-76)	1.7 x 1.25 x 0.95	300
	40	2.4~36	B2	Jap	single	PDZ-B series			
250	40	2.4~75	B, C	Eur		BZX384 series			
200	40	2.4~36	B, B1, B2, B3	Jap		PZUxBA series			
200	60	100	C	Eur	single	BZX100A	SOD323F (SC-90)	1.7 x 1.25 x 0.7	550
200	40	2.4~36	B, B1, B2, B3	Jap		PZUxB series			
250	40	2.4~75	B, C	Eur		BZX84J series			
200	40	2.4~15	C	Eur	dual c.a.	BZB984 series	SOT663	1.6 x 1.2 x 0.55	350
200	40	2.4~75	B, C	Eur	single	BZX585 series	SOD523 (SC-79)	1.2 x 0.8 x 0.6	300
200	40	2.4~75	B, C	Eur	single	BZX884 series	SOD882	1.0 x 0.6 x 0.5	250
		2.4~36	B, B2	Jap		PZUxBL series			
250	180	5.6	C	Eur	single	**TDZ5V6J**	SOD323F	1.7 x 1.25 x 0.7	500

Notes:
Jap: B selection: app. 5% V_z tolerance, B1, B2, B3 selections: app. 2% V_z tolerance in sequential intervals
Eur: A selection: app. 1% V_z tolerance, B selection: app. 2% V_z tolerance, C selection: app. 5% V_z tolerance; the selections are in overlapping intervals
Ave: low voltage avalanche regulator diodes
dual c.a.: dual common anode

Zener diodes specifications

Differences in Zener specifications



Japanese spec (PZU, PDZ)

y =	B-series	B1-series	B2-series	B3-series
	± 5%	± 2%	± 2%	± 2%
	V_z (V)	V_z (V)	V_z (V)	V_z (V)
PZU2.4y	2.3 - 2.6	-	-	-
PZU2.7y	2.5 - 2.9	2.5 - 2.75	2.65 - 2.9	-
PZU3.0y	2.8 - 3.2	2.8 - 3.05	2.95 - 3.2	-
PZU3.3y	3.1 - 3.5	3.1 - 3.35	3.25 - 3.5	-
PZU3.6y	3.4 - 3.8	3.4 - 3.65	3.55 - 3.8	-
PZU3.9y	3.7 - 4.1	3.7 - 3.97	3.87 - 4.1	-
PZU4.3y	4.01 - 4.48	4.01 - 4.21	4.15 - 4.34	4.28 - 4.48
PZU4.7y	4.42 - 4.9	4.42 - 4.61	4.55 - 4.75	4.69 - 4.9
PZU5.1y	4.84 - 5.37	4.84 - 5.04	4.98 - 5.2	5.14 - 5.37
PZU5.6y	5.31 - 5.92	5.31 - 5.55	5.49 - 5.73	5.67 - 5.92
PZU6.2y	5.86 - 6.53	5.86 - 6.12	6.06 - 6.33	6.26 - 6.53
PZU6.8y	6.47 - 7.14	6.47 - 6.73	6.65 - 6.93	6.86 - 7.14
PZU7.5y	7.06 - 7.84	7.06 - 7.36	7.28 - 7.6	7.52 - 7.84
PZU8.2y	7.76 - 8.64	7.76 - 8.1	8.02 - 8.36	8.28 - 8.64
PZU9.1y	8.56 - 9.55	8.56 - 8.93	8.85 - 9.23	9.15 - 9.55
PZU10y	9.45 - 10.55	9.45 - 9.87	9.77 - 10.21	10.11 - 10.55
PZU11y	10.44 - 11.56	10.44 - 10.88	10.76 - 11.22	11.1 - 11.56
PZU12y	11.42 - 12.6	11.42 - 11.9	11.74 - 12.24	12.08 - 12.6
PZU13y	12.47 - 13.96	12.47 - 13.03	12.91 - 13.49	13.37 - 13.96
PZU14y	-	-	13.7 - 14.3	-
PZU15y	13.84 - 15.52	13.84 - 14.46	14.34 - 14.98	14.85 - 15.52
PZU16y	15.37 - 17.09	15.37 - 16.01	15.85 - 16.51	16.35 - 17.09
PZU18y	16.94 - 19.03	16.94 - 17.7	17.56 - 18.35	18.21 - 19.03
PZU20y	18.86 - 21.08	18.86 - 19.7	19.52 - 20.39	20.21 - 21.08
PZU22y	20.88 - 23.17	20.88 - 21.77	21.54 - 22.47	22.23 - 23.17
PZU24y	22.93 - 25.57	22.93 - 23.96	23.72 - 24.78	24.54 - 25.57
PZU27y	25.1 - 28.9	-	-	-
PZU30y	28 - 32	-	-	-
PZU33y	31 - 35	-	-	-
PZU36y	34 - 38	-	-	-

European spec (BZV, BZX, BZB, 1N47)

y =	C-series	B-series	A-series
	± 5%	± 2%	± 1%
	V_z (V)	V_z (V)	V_z (V)
BZX84-y2V4	2.2 - 2.6	2.35 - 2.45	2.37 - 2.43
BZX84-y2V7	2.5 - 2.9	2.65 - 2.75	2.67 - 2.73
BZX84-y3V0	2.8 - 3.2	2.94 - 3.06	2.97 - 3.03
BZX84-y3V3	3.1 - 3.5	3.23 - 3.37	3.26 - 3.34
BZX84-y3V6	3.4 - 3.8	3.53 - 3.67	3.56 - 3.64
BZX84-y3V9	3.7 - 4.1	3.82 - 3.98	3.86 - 3.94
BZX84-y4V3	4 - 4.6	4.21 - 4.39	4.25 - 4.35
BZX84-y4V7	4.4 - 5	4.61 - 4.79	4.65 - 4.75
BZX84-y5V1	4.8 - 5.4	5 - 5.2	5.04 - 5.16
BZX84-y5V6	5.2 - 6	5.49 - 5.71	5.54 - 5.66
BZX84-y6V2	5.8 - 6.6	6.08 - 6.32	6.13 - 6.27
BZX84-y6V8	6.4 - 7.2	6.66 - 6.94	6.73 - 6.87
BZX84-y7V5	7 - 7.9	7.35 - 7.65	7.42 - 7.58
BZX84-y8V2	7.7 - 8.7	8.04 - 8.36	8.11 - 8.29
BZX84-y9V1	8.5 - 9.6	8.92 - 9.28	9 - 9.2
BZX84-y10	9.4 - 10.6	9.8 - 10.2	9.9 - 10.1
BZX84-y11	10.4 - 11.6	10.8 - 11.2	10.8 - 11.11
BZX84-y12	11.4 - 12.7	11.8 - 12.2	11.88 - 12.12
BZX84-y13	12.4 - 14.1	12.7 - 13.3	12.87 - 13.13
BZX84-y15	13.8 - 15.6	14.7 - 15.3	14.85 - 15.15
BZX84-y16	15.3 - 17.1	15.7 - 16.3	15.84 - 16.16
BZX84-y18	16.8 - 19.1	17.6 - 18.4	17.82 - 18.18
BZX84-y20	18.8 - 21.2	19.6 - 20.4	19.8 - 20.2
BZX84-y22	20.8 - 23.3	21.6 - 22.4	21.78 - 22.22
BZX84-y24	22.8 - 25.6	23.5 - 24.5	23.76 - 24.24
BZX84-y27	25.1 - 28.9	26.5 - 27.5	26.73 - 27.27
BZX84-y30	28 - 32	29.4 - 30.6	29.70 - 30.30
BZX84-y33	31 - 35	32.3 - 33.7	32.67 - 33.33
BZX84-y36	34 - 38	35.3 - 36.7	35.64 - 36.36
BZX84-y39	37 - 41	38.2 - 39.8	38.61 - 39.39
BZX84-y43	40 - 46	42.1 - 43.9	42.57 - 43.43
BZX84-y47	44 - 50	46.1 - 47.9	-
BZX84-y51	48 - 54	50 - 52	50.49 - 51.51
BZX84-y56	52 - 60	54.9 - 57.1	-
BZX84-y62	58 - 66	60.8 - 63.2	-
BZX84-y68	64 - 72	66.6 - 69.4	-
BZX84-y75	70 - 79	73.5 - 76.5	74.25 - 75.75

NZX-series in SOD27

	V_z (V)		V_z (V)		V_z (V)
NZX2V4A	2.3 - 2.5	NZX6V2D	6.1 - 6.4	NZX14B	13.5 - 14
NZX2V4B	2.4 - 2.6	NZX6V2E	6.3 - 6.6	NZX14C	13.8 - 14.3
NZX2V7A	2.5 - 2.7	NZX6V8A	6.4 - 6.7	NZX15A	14.1 - 14.7
NZX2V7B	2.6 - 2.8	NZX6V8B	6.6 - 6.9	NZX15B	14.5 - 15.1
NZX2V7C	2.7 - 2.9	NZX6V8C	6.7 - 7	NZX15C	14.9 - 15.5
NZX3V0A	2.8 - 3	NZX6V8D	6.9 - 7.2	NZX15X	14.35 - 15.09
NZX3V0B	2.9 - 3.1	NZX7V5A	7 - 7.3	NZX16A	15.3 - 15.9
NZX3V0C	3 - 3.2	NZX7V5B	7.2 - 7.6	NZX16B	15.7 - 16.5
NZX3V3A	3.1 - 3.3	NZX7V5C	7.3 - 7.7	NZX16C	16.3 - 17.1
NZX3V3B	3.2 - 3.4	NZX7V5D	7.5 - 7.9	NZX18A	16.9 - 17.7
NZX3V3C	3.3 - 3.5	NZX7V5X	7.07 - 7.45	NZX18B	17.5 - 18.3
NZX3V6A	3.4 - 3.6	NZX8V2A	7.7 - 8.1	NZX18C	18.1 - 19
NZX3V6B	3.5 - 3.7	NZX8V2B	7.9 - 8.3	NZX20A	18.8 - 19.7
NZX3V6C	3.6 - 3.8	NZX8V2C	8.1 - 8.5	NZX20B	19.5 - 20.4
NZX3V9A	3.7 - 3.9	NZX8V2D	8.3 - 8.7	NZX20C	20.2 - 21.2
NZX3V9B	3.8 - 4	NZX9V1A	8.5 - 8.9	NZX22A	20.9 - 21.9
NZX3V9C	3.9 - 4.1	NZX9V1B	8.7 - 9.1	NZX22B	21.6 - 22.6
NZX4V3A	4 - 4.2	NZX9V1C	8.9 - 9.3	NZX22C	22.3 - 23.3
NZX4V3B	4.1 - 4.3	NZX9V1D	9.1 - 9.5	NZX24A	22.9 - 24
NZX4V3C	4.2 - 4.4	NZX9V1E	9.3 - 9.7	NZX24B	23.6 - 24.7
NZX4V3D	4.3 - 4.5	NZX10A	9.5 - 9.9	NZX24C	24.3 - 25.5
NZX4V7A	4.4 - 4.6	NZX10B	9.7 - 10.1	NZX24X	22.61 - 23.77
NZX4V7B	4.5 - 4.7	NZX10C	9.9 - 10.3	NZX27A	25.2 - 26.6
NZX4V7C	4.6 - 4.8	NZX10D	10.2 - 10.6	NZX27B	26.2 - 27.6
NZX4V7D	4.7 - 4.9	NZX11A	10.4 - 10.8	NZX27C	27.2 - 28.6
NZX5V1A	4.8 - 5	NZX11B	10.7 - 11.1	NZX27X	26.99 - 28.39
NZX5V1B	4.9 - 5.1	NZX11C	10.9 - 11.3	NZX30A	28.2 - 29.6
NZX5V1C	5 - 5.2	NZX11D	11.1 - 11.6	NZX30B	29.2 - 30.6
NZX5V1D	5.1 - 5.3	NZX12A	11.4 - 11.9	NZX30C	30.2 - 31.6
NZX5V6A	5.2 - 5.5	NZX12B	11.6 - 12.1	NZX30X	29.02 - 30.51
NZX5V6B	5.3 - 5.6	NZX12C	11.9 - 12.4	NZX33A	31.2 - 32.6
NZX5V6C	5.4 - 5.7	NZX12D	12.2 - 12.7	NZX33B	32.2 - 33.6
NZX5V6D	5.5 - 5.8	NZX12X	11.44 - 12.03	NZX33C	33.2 - 34.5
NZX5V6E	5.6 - 5.9	NZX13A	12.4 - 12.9	NZX36A	34.2 - 35.7
NZX6V2A	5.7 - 6	NZX13B	12.6 - 13.1	NZX36B	35.3 - 36.8
NZX6V2B	5.8 - 6.1	NZX13C	12.9 - 13.4	NZX36C	36.4 - 38
NZX6V2C	6 - 6.3	NZX14A	13.2 - 13.7	NZX36X	35.36 - 37.19

Switching diodes

General purpose switching diodes ≤ 100 V

types in **bold** represent new products

V_R max (V)	V_F max (V)	@ I_F (mA)	I_R max (nA)	@ V_R (V)	t_{rr} max (ns)	Package	SOD27 (DO-35)	SOD68 (DO-34)	SOD80C (MiniMelf)	SOT23	SOT143B	SOD123F		SOT323 (SC-70)	SOT363 (SC-88)	SOD323 (SC-76)	SOD323F (SC-90)	SOT666	SOT416 (SC-75)	SOD523 (SC-79)	SOD882	SOT883 (SC-101)	SOD882D
						Size (mm)	4.25 x 1.85 x 0.56	3.04 x 1.6 x 0.55	3.5 x 1.5 x 1.5	2.9 x 1.3 x 1.0	2.9 x 1.3 x 1.0	2.6 x 1.6 x 1.1		2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.95	1.7 x 1.25 x 0.7	1.6 x 1.2 x 0.55	1.6 x 0.8 x 0.77	1.2 x 0.8 x 0.6	1.0 x 0.6 x 0.5	1.0 x 0.6 x 0.5	1.0 x 0.6 x 0.37
						P_{tot} (mW)	500	500	500	250	250	830		200	300	400	550	180	170	500	250	250	250
50	1	50	100	50	4					BAL74													
										BAV74													
70	1	50	1000	70	4					BAL99													
75	1	10	25	20	4			1N4531															
		50	1000	75	4						BAS28												
		100	5000	75	4				BAS32L														
90	1	50	500	80	4					BAW56				BAW56W					BAW56T			BAW56M	
															BAW56S								
															BAV756S								
100	1	10	25	20	4		1N4148																
		50	500	80	4							BAS16H				BAS316	BAS16J						
										BAS16				BAS16W					BAS16T				
																				BAS516	BAS16L		**BAS16LD**
															BAS16VY			BAS16VV					
										BAV70				BAV70W					BAV70T			BAV70M	
															BAV70S								
										BAV99				BAV99W									
															BAV99S								

General purpose switching diodes > 100 V

V_R max (V)	V_F max (V)	@ I_F (mA)	I_R max (nA)	@ V_R (V)	t_{rr} max (ns)	Package	SOD27 (DO-35)	SOD80C (MiniMelf)	SOT457 (SC-74)	SOT23	SOT143B	SOD123F	SOT323 (SC-70)	SOT363 (SC-88)	SOD323 (SC-76)	SOD323F (SC-90)	SOD523 (SC-79)
						Size (mm)	4.25 x 1.85 x 0.56	3.5 x 1.5 x 1.5	2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.9 x 1.3 x 1.0	2.6 x 1.6 x 1.1	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.95	1.7 x 1.25 x 0.7	1.2 x 0.8 x 0.6
						P_{tot} (mW)	500	300	500	250	250	830	350	300	400	550	500
150	1	100	100	150	50		BAV20										
≥200	1	100	100	150	50		BAV21	BAV103				BAS21H			BAS321		
				200	50					BAS21			BAS21W				
											BAV23						
										BAV23A			BAS21AW				
										BAV23C							
										BAV23S			BAS21SW				
									BAS21VD								
300	1.1	100	150	250	50											BAS21J	BAS521
										BAS101							
										BAS101S							
											BAW101						
														BAW101S			

Controlled avalanche switching diodes

V_R max (V)	V_F max (V)	@ I_F (mA)	I_R max (nA) @ V_R max	I_{FSM} max (A)	I_{FRM} max (mA)	C_d max (pF)	t_{rr} max (ns)	Package	SOT23	SOT143B
								Size (mm)	2.9 x 1.3 x 1.0	2.9 x 1.3 x 1.0
								P_{tot} (mW)	250	250
60	1	200	100	9	600	2.5	6			BAS56
90	1	200	100	10	600	35	50		BAS29	
									BAS31	
									BAS35	

Low leakage current switching diodes

V_R max (V)	V_F max (V)	@ I_F (mA)	I_R max (nA) @ V_R max	t_{rr} max (µs)	Package	SOD80C (MiniMelf)	SOD68 (DO-34)	SOT23	SOD123F	SOT323 (SC-70)	SOD323 (SC-76)	SOT416 (SC-75)	SOD523 (SC-79)
					Size (mm)	3.5 x 1.5 x 1.5	3.04 x 1.6 x 0.55	2.9 x 1.3 x 1.0	2.6 x 1.6 x 1.1	2.0 x 1.25 x 0.95	1.7 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.2 x 0.8 x 0.6
					P_{tot} (mW)	300	500	250	830	250	400	170	500
75	1	10	5	3					BAS116H		BAS416		BAS716
								BAS116				BAS116T	
								BAV199		BAV199W			
								BAW156					
								BAV170					
125	1	100	1	1.5 typ		BAS45AL	BAS45A						

Ultrafast recovery power diodes

types in **bold** represent new products

V_{RRM} (V)	$I_{F(AV)}$ (A)	V_F (typ) @ 150C (V)	@ I_F (A)	t_{rr} (typ) @ 25C (ns)	SOD59 (TO220AC)	SOD113 (2-pin SOT186A)	SOT78 (TO220AB)	SOT186A (isolated TO220AB)	SOT223	SOT226 (I^2PAK)	SOT404 (D^2PAK)	SOT428 (DPAK)
100	8	0.8	8	20	BYW29E-100							
	2 x 10	0.72	8	20			BYV32E-100					
150	2 x 0.75	0.5	0.5	10					BYV40E-150			
	8	0.8	8	20	BYW29E-150							
	2 x 10	0.72	8	20			BYV32E-150					
	2 x 15	0.78	15	20			BYV42E-150					
200	8	0.8	8	20	BYW29E-200	BYW29EX-200						BYW29ED-200
	2 x 5	0.8	5	15			BYQ28E-200	BYQ28X-200				BYQ28ED-200
	14	0.83	14	20	BYV79E-200							
	2 x 8	0.84	8	20			BYQ30E-200					
	2 x 10	0.72	8	20			BYV32E-200			**BYV32G-200**	BYV32EB-200	
	2 x 15	0.78	15	20			BYV42E-200			**BYV42G-200**	BYV42EB-200	
300	2 x 5	0.95	5	50			BYT28-300					
400	9	0.9	8	50	BYV29-400							
	2 x 10	0.87	10	50			BYV34-400					
500	9	0.9	8	50	BYV29-500	BYV29X-500					BYV29B-500	
	2 x 5	0.95	5	50			BYT28-500					
	15	0.9	15	50	BYT79-500							
	2 x 10	0.87	10	50			BYV34-500					
	2 x 15	0.95	15	50			BYV44-500					
600	5	0.97	5	50		BYV25X-600				BYV25G-600		BYV25D-600
	8	1.07	8	60	BYR29-600	BYR29X-600						
	9	0.97	8	50	BYV29-600	BYV29X-600				BYV29G-600	BYV29B-600	
	15	1	15	50	BYT79-600	BYT79X-600						
	2 x 10	0.92	10	50			BYV34-600	BYV34X-600		BYV34G-600		
	5	1.1	5	17.5		**BYV25FX-600**	**BYV25F-600**				**BYV25FB-600**	**BYV25FD-600**
	9	1.25	8	17.5		BYV29FX-600	**BYV29F-600**				**BYV29FB-600**	**BYV29FD-600**
	2 x 10	1.3	10	20			BYV410-600	BYV410X-600				
800	8	1.07	8	60	BYR29-800	BYR29X-800						

Hyperfast power diodes

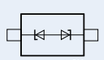
types in **bold** represent new products

V_{RRM} (V)	$I_{F(AV)}$ (A)	V_F (typ) @ 150C (V)	@ I_F (A)	t_{rr} (typ) @ 25C (ns)	SOD59 (TO220AC)	SOD113 (2-pin SOT186A)	SOT78 (TO220AB)	SOT404 (D^2PAK)
600	5	1.4	5	19	BYC5-600	BYC5X-600		BYC5B-600
	8	1.4	8	19	BYC8-600	BYC8X-600		BYC8B-600
	8	1.4	8	19	**BYC8D-600**	**BYC8DX-600**		
	8	2	8	12.5		BYC58X-600		
	10	1.4	10	19	BYC10-600	BYC10X-600		BYC10B-600
	2 x 5	1.4	5	19			BYC10-600CT	
	15	1.4	15	19	BYC15-600	BYC15X-600		
	20	1.4	20	19	BYC20-600	BYC20X-600		

Protection and signal conditioning

Standard ESD protection devices

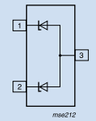
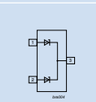
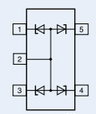
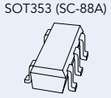
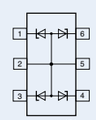
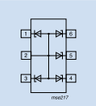
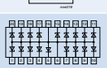
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{PP} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
1	0	3.3	207	300	150	30	2		PESD3V3S1UL	SOD882 	1.0 x 0.6 x 0.5
		5	152	200	150	30	1		PESD5V0S1UL		
		12	38	75	150	30	0.05		PESD12VS1UL		
		15	32	70	150	30	0.05		PESD15VS1UL		
		24	23	50	150	23	0.05		PESD24VS1UL		
		5	152	200	150	30	1		**PESD5V0S1ULD**	SOD882D 	1.0 x 0.6 x 0.37
		12	38	75	150	30	0.05		**PESD12VS1ULD**		
		15	32	70	150	30	0.05		**PESD15VS1ULD**		
		24	23	50	150	23	0.05		**PESD24VS1ULD**		
		3.3	207	300	330	30	2		PESD3V3S1UB	SOD523 (SC-79) 	1.2 x 0.8 x 0.6
		5	152	200	260	30	1		PESD5V0S1UB		
		12	38	75	180	30	0.05		PESD12VS1UB		
		15	32	70	160	30	0.05		PESD15VS1UB		
		24	23	50	160	23	0.05		PESD24VS1UB		
		5	480	530	890	30	4		PESD5V0S1UA	SOD323 (SC-76) 	1.7 x 1.25 x 0.95
		12	160	180	600	30	0.1		PESD12VS1UA		
		24	23	50	160	23	0.05		**PESD24VS1UA**		
		5	480	530	890	30	4		PESD5V0S1UJ	SOD323F (SC-90) 	1.7 x 1.25 x 0.7
		12	160	180	600	30	0.1		PESD12VS1UJ		
		2.5	229	300	260	30	6		PESD5Z2.5	SOD523 (SC-79)	1.2 x 0.8 x 0.6
		3.3	172	200	260	30	0.05		PESD5Z3.3		
		5	89	150	180	30	0.05		PESD5Z5.0		
		6	78	150	180	30	0.01		PESD5Z6.0		
		7	69	150	180	30	0.01		PESD5Z7.0		
		12	35	75	200	30	0.01		PESD5Z12		
		5	68	75	150	30	1		PESD9X5.0L	SOD882 	1.0 x 0.6 x 0.5
		7	62	70	150	30	1		PESD9X7.0L		
0	1	5	35	45	130	30	0.1		PESD5V0S1BL		
		5	35	45	130	30	0.1		**PESD5V0S1BLD**	SOD882D 	1.0 x 0.6 x 0.37
		5	35	45	130	30	0.1		PESD5V0S1BB	SOD523 (SC-79) 	1.2 x 0.8 x 0.6
		5	35	45	130	30	0.1		PESD5V0S1BA	SOD323 (SC-76) 	1.7 x 1.25 x 0.95
		5.5	35	45	100	30	0.1		**PESD5V0S1BSF**	SOD962 	0.6 x 0.3 x 0.3

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

Standard ESD protection devices

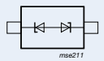
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{PP} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
2	1	3.3	200	275	150	23	3		PESD3V3S2UQ	SOT663 	1.6 x 1.2 x 0.55
		5	150	215	150	30	0.3		PESD5V0S2UQ		
		12	38	100	150	30	0.03		PESD12VS2UQ		
		15	32	70	150	30	0.05		PESD15VS2UQ		
		24	23	50	150	23	0.05		PESD24VS2UQ		
		3.3	207	300	330	30	2		PESD3V3S2UT	SOT23 	2.9 x 1.3 x 1.0
		5.2	152	200	260	30	1		PESD5V2S2UT		
		12	38	75	180	30	1		PESD12VS2UT		
		15	32	70	160	30	1		PESD15VS2UT		
		24	23	50	160	23	1		PESD24VS2UT		
		36	17	35	160	30	1 (@ 30 V)		PESD36VS2UT		
		3.3	207	300	330	30	2		PESD3V3S2UAT		
		5	152	200	260	30	1		PESD5V0S2UAT		
		12	38	75	180	30	0.05		PESD12VS2UAT		
		15	32	70	160	30	0.05		PESD15VS2UAT		
		24	23	50	160	23	0.05		PESD24VS2UAT		
4	3	5.5	45	60	-	15	0.1	-	**IP4342CX5/LF**	CSP5, staggered compressed	1.06 x 0.76 x 0.61
		5.5	30	40	-	15	0.1		**IP4042CX5/LF**	CSP5, staggered compressed	1.28 x 0.91 x 0.65
		3.3	110	300	110	30	1 (@ 3 V)		PESD3V3S4UF	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		5	85	220	110	30	0.1 (@ 4.3 V)		PESD5V0S4UF		
		3	107	125	-	8	1		BZA956A	SOT665	1.6 x 1.2 x 0.55
		4	90	105	-	8	0.5		BZA962A		
		4.3	78	90	-	8	0.1		BZA968A		
		3	200	240	-	8	2		BZA856A	SOT353 (SC-88A) 	2.0 x 1.25 x 0.95
		3	107	125	-	8	1		BZA856AL		
		4	165	200	-	8	0.7		BZA862A		
		4	90	105	-	8	0.5		BZA862AL		
		4.3	145	180	-	8	0.2		BZA868A		
		4.3	78	90	-	8	0.1		BZA868AL		
		15	37	50	-	8	0.1		BZA820A		
		3	200	240	-	8	2		BZA456A	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		4	165	200	-	15	0.7		BZA462A		
		14	37	48	-	8	0.075		BZA418A		
		15	37	48	-	8	0.1		BZA420A		
		3.3	215	300	200	30	0.8		PESD3V3S4UD		
		5	165	220	200	30	0.2		PESD5V0S4UD		
		12	73	100	200	30	0.015		PESD12VS4UD		
		15	60	90	200	30	0.015		PESD15VS4UD		
		24	40	70	200	23	0.015		PESD24VS4UD		
5	4	3.3	215	300	200	30	0.8		PESD3V3S5UD		
		5	165	220	200	30	0.2		PESD5V0S5UD		
		12	73	100	200	30	0.015		PESD12VS5UD		
		15	60	90	200	30	0.015		PESD15VS5UD		
		24	45	70	200	23	0.015		PESD24VS5UD		
0	4	5	45	75	-	15	0.1		BZA408B		
18	17	5.2	100	120	-	8	2		BZA100	SOT163 (SO20) 	12.8 x 7.5 x 2.65

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

Low capacitance ESD protection devices

types in **bold** represent new products

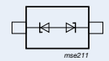
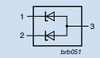
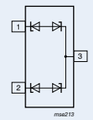
Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{PP} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
1	0	3.3	34	40	45	30	0.3		PESD3V3L1UL	SOD882 	1.0 x 0.6 x 0.5
		5	25	30	42	26	0.1		PESD5V0L1UL		
		5	25	30	42	26	0.1		**PESD5V0L1ULD**	SOD882D 	1.0 x 0.6 x 0.37
		3.3	34	40	45	30	0.3		PESD3V3L1UB	SOD523 (SC-79) 	1.2 x 0.8 x 0.6
		5	25	30	42	26	0.1		PESD5V0L1UB		
		3.3	34	40	45	30	0.3		PESD3V3L1UA	SOD323 (SC-76) 	1.7 x 1.25 x 0.95
		5	25	30	42	26	0.1		PESD5V0L1UA		
		3.3	2.6	3.1	-	9	0.1 (@ 3 V)		PESD3V3U1UL	SOD882 	1.0 x 0.6 x 0.5
		5	2	2.6	-	9	0.1		PESD5V0U1UL		
		3.3	2.6	3.1	-	9	0.1 (@ 3 V)		PESD3V3U1UB	SOD523 (SC-79) 	1.2 x 0.8 x 0.6
		5	2	2.6	-	9	0.1		PESD5V0U1UB		
		3.3	2.6	3.1	-	9	0.1 (@ 3 V)		PESD3V3U1UA	SOD323 (SC-76) 	1.7 x 1.25 x 0.95
		5	2	2.6	-	9	0.1		PESD5V0U1UA		
0	1	3.3	101	-	500	30	2		PESD3V3L1BA		
		5	75	-	500	30	1		PESD5V0L1BA		
		12	19	-	200	30	0.05		PESD12VL1BA		
		15	16	-	200	30	0.05		PESD15VL1BA		
		24	11	-	200	23	0.05		PESD24VL1BA		
		5.5	12	15.4	35	30	0.1		**PESD5V0L1BSF**	SOD962 	0.6 x 0.3 x 0.3
		5	11	13	45	30	0.01		PESD5V0V1BL	SOD882 	1.0 x 0.6 x 0.5
		5	11	13	45	30	0.01		**PESD5V0V1BLD**	SOD882D 	1.0 x 0.6 x 0.37
		5	11	13	45	30	0.01		PESD5V0V1BB	SOD523 (SC-79) 	1.2 x 0.8 x 0.6
		5	11	13	45	30	0.01		PESD5V0V1BA	SOD323 (SC-76) 	1.7 x 1.25 x 0.95
		5.5	3.5	4.5	8	15	0.1		**PESD5V0V1BSF**	SOD962 	0.6 x 0.3 x 0.3
		15	8	10	-	15	0.1		**IP4302CX2/A**	CSP2	0.7 x 0.52 x 0.40

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

Low capacitance ESD protection devices

Low capacitance ESD protection devices

types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{PP} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
0	1	5	2.9	3.5	-	10	0.1		PESD5V0U1BL	SOD882 	1.0 x 0.6 x 0.5
		5	2.9	3.5	-	10	0.1		**PESD5V0U1BLD**	SOD882D 	1.0 x 0.6 x 0.37
		5	2.9	3.5	-	10	0.1		PESD5V0U1BB	SOD523 (SC-79) 	1.2 x 0.8 x 0.6
		5	2.9	3.5	-	10	0.1		PESD5V0U1BA	SOD323 (SC-76) 	1.7 x 1.25 x 0.95
2	1	3.3	22	28	30	15	0.3		PESD3V3L2UM	SOT883 (SC-101) 	1.0 x 0.6 x 0.5
		5	16	19	30	15	0.025		PESD5V0L2UM		
		5	38	46	70	30	0.09 (@ 4 V)		PESD5V0L2UU	SOT323 (SC-70) 	2.0 x 1.25 x 0.95
		6	34	40	60	30	0.018 (@ 4.3 V)		PESD6V0L2UU		
0	2	3.3	101	-	350	30	2		PESD3V3L2BT	SOT23 	2.9 x 1.3 x 1.0
		5	75	-	350	30	1		PESD5V0L2BT		
		12	19	-	200	30	0.05		PESD12VL2BT		
		15	16	-	200	30	0.05		PESD15VL2BT		
		24	11	-	200	23	0.05		PESD24VL2BT		
		5	35	45	130	30	0.1		PESD5V0S2BT		
		5	2.9	3.5	-	10	0.1		PESD5V0U2BT		
		5	2.9	3.5	-	10	0.1		PESD5V0U2BM	SOT883 (SC-101) 	1.0 x 0.6 x 0.5
		15	13	15	-	15	0.1	-	IP4303CX4/P	CSP4 	0.76 x 0.76 x 0.40

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

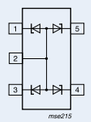
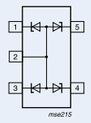
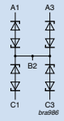
In the Spotlight

New innovative ultra-small package SOD882D

- Ultra-low package height of only 0.37 mm typ.
- Tin plated solderable side pads
- Fully compatible with standard 0402 inch / 1006 mm packages
- AEC-Q101 qualified
- Portfolio of 10 ESD diodes covering all applications and segments

Low capacitance ESD protection devices

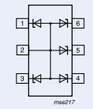
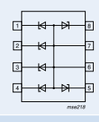
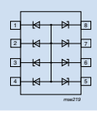
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{pp} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
3	0	5.5	3	4	-	15	0.1	-	**IP4059CX5/LF**	CSP5, staggered compressed	1.34 x 0.96 x 0.65
4	3	3.3	22	28	30	20	0.3		PESD3V3L4UF	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		5	16	19	30	20	0.025		PESD5V0L4UF		
		3.3	22	28	30	20	0.3		PESD3V3L4UW	SOT665 	1.6 x 1.2 x 0.55
		5	16	19	30	20	0.025		PESD5V0L4UW		
		3.3	22	28	30	20	0.3		PESD3V3L4UG	SOT353 (SC-88A) 	2.0 x 1.25 x 0.95
		5	16	19	30	20	0.025		PESD5V0L4UG		
		3.3	13	17	25	10	1		PESD3V3V4UK	SOT891 (XSON6) 	1.0 x 1.0 x 0.5
		5	12	15	25	15	0.3		PESD5V0V4UK		
		9	6.5	10	28	8	0.1		PESD9V0V4UK		
		3.3	15	18	16	12	0.3		PESD3V3V4UF	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		5	12	15	16	12	0.025		PESD5V0V4UF		
		3.3	15	18	16	12	0.3		PESD3V3V4UW	SOT665 	1.6 x 1.2 x 0.55
		5	12	15	16	12	0.025		PESD5V0V4UW		
		3.3	15	18	16	12	0.3		PESD3V3V4UG	SOT353 (SC-88A) 	2.0 x 1.25 x 0.95
		5	12	15	16	12	0.025		PESD5V0V4UG		
		5.5	18	20	-	15	0.1	-	**IP4142CX5/LF**	5 ball CSP, staggered compressed	1.28 x 0.91 x 0.65
0	4	5.5	18	20	-	15	0.1		**IP4343CX5/LF**	5 ball CSP	1.06 x 0.76 x 0.61
		5.5	18	20	-	15	0.1		IP4043CX5/LF	5 ball CSP	1.12 x 1.12 x 0.65

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

Low capacitance ESD protection devices

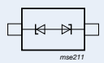
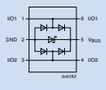
Low capacitance ESD protection devices

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{pp} [1] max (W)	ESD rating [2] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional										
0	4	5	2.9	3.5	-	10	0.1		PESD5V0U4BF	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		5	2.9	3.5	-	10	0.1		PESD5V0U4BW	SOT665 	1.6 x 1.2 x 0.55
5	4	3.3	20	24	28	15	2		PESD3V3L5UK	SOT891 (XSON6) 	1.0 x 1.0 x 0.5
		5	18.5	22	30	20	0.5		PESD5V0L5UK		
		3.3	22	28	25	20	0.3		PESD3V3L5UF	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		5	16	19	25	20	0.025		PESD5V0L5UF		
		3.3	22	28	25	20	0.3		PESD3V3L5UV	SOT666 	1.6 x 1.2 x 0.55
		5	16	19	25	20	0.025		PESD5V0L5UV		
		3.3	22	28	25	20	0.3		PESD3V3L5UY	SOT363 (SC-88) 	2.0 x 1.25 x 0.95
		5	16	19	25	20	0.025		PESD5V0L5UY		
0	5	5	2.9	3.5	-	10	0.1		PESD5V0U5BF	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		5	2.9	3.5	-	10	0.1		PESD5V0U5BV	SOT666 	1.6 x 1.2 x 0.55
6	5	5	16	19	35	20	0.025		PESD5V0L6US	SOT96 (SO8) 	4.9 x 3.9 x 1.75
0	7	5	8	10	35	10	0.025		PESD5V0L7BS		

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5 [2] acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	ESD rating [1] max (kV)	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional								
1	0	5	1.55	1.75	15		**PESD5V0X1ULD**	SOD882D 	1.0 x 0.6 x 0.37
		5	0.95	1.15	8		**PESD5V0X1UALD**		
		5	0.95	1.15	8		**PESD5V0X1UB**	SOD523 (SC-79) 	1.2 x 0.8 x 0.6
		5	1.55	1.75	15		**PESD5V0X1UAB**		
		16	0.83	0.98	8		PESD16VX1UL	SOD882 	1.0 x 0.6 x 0.5
		5.5	1	1.5	8		PRTR5V0U1T	SOT23 	2.9 x 1.3 x 1.0
		80	0.6	0.75	30		NUP1301		
		80	0.6	0.75	30		**NUP1301U**	SOT323 	2.0 x 1.25 x 0.95
0	1	5.5	0.4	0.55	10		PESD5V0F1BL	SOD882 	1.0 x 0.6 x 0.5
		16	0.5	0.65	8		**PESD16VF1BL**		
		3.3	1.3	1.6	9		PESD3V3X1BL		
		5	0.9	1.3	9		PESD5V0X1BL		
		5.5	0.25	0.3	28		**PESD5V0F1BSF**	SOD962 	0.6 x 0.3 x 0.3
2	1	5	0.9	1.3	9		PESD5V0X1BQ	SOT663 	1.6 x 1.2 x 0.55
		5	0.9	1.3	9		PESD5V0X1BT	SOT23 	2.9 x 1.3 x 1.0
	0	5.5	1	1.5	8		PRTR5V0U2X	SOT143B 	2.9 x 1.3 x 1.0
		5.5	1.8	-	12		PRTR5V0U2AX		
		5.5	1	1.5	8		PRTR5V0U2K	SOT891 (XSON6) 	1.0 x 1.0 x 0.5
		5.5	1	1.5	8		PRTR5V0U2D	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		5.5	1	1.5	8		PRTR5V0U2F	SOT886 (XSON6) 	1.45 x 1.0 x 0.5

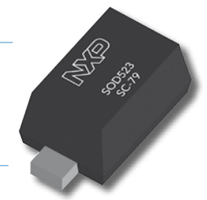
[1] acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

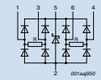
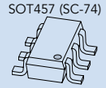
In the Spotlight

Ultra low clamping ESD protection diodes in SOD523

- Ultra-low clamping voltage of V_{CL} = 10 V
- Ultra-low capacitance of C_d = 0.95 / 1.8 pF (high robustness version)
- Ultra-low dynamical resistance r_{dyn} = 0.25 / 0.15 Ω
- IEC 61000-4-2; level 4 (ESD)
- AEC-Q101 qualified



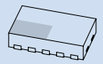
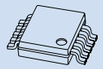
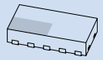
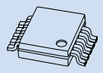
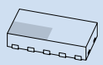
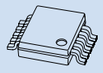
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	ESD rating [1] max (kV)	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional								
2	0	5.5	2	-	15		IP4234CZ6	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		5.5	0.7	-	8		IP4282CZ6	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		5.5	1.3	-	15		IP4359CX4/LF	CSP4 	0.76 x 0.76 x 0.61
3	2	5.5	1.4	1.5	15	-	**IP4356CX4**		
4	0	5.5	1.4	1.5	15	-	**IP4319CX10**	CSP10, staggered compressed	1.56 x 1.05 x 0.61
		5.5	1	-	8		IP4220CZ6	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		5.5	1	-	8		IP4221CZ6-S	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		5.5	1	-	8		IP4221CZ6-XS	SOT891 (XSON6) 	1.0 x 1.0 x 0.5
		5.5	1	-	8		**IP4233CZ6**	SOT363 (SC-88) 	2.0 x 1.25 x 0.95

[1] acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

types in **bold** represent new products

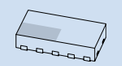
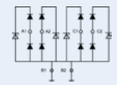
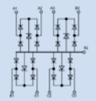
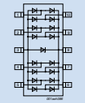
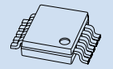
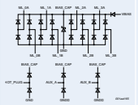
Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	ESD rating [1] max (kV)	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional								
		5.5	1	-	8		PRTR5V0U4D	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		5.5	1	-	8		PRTR5V0U4Y	SOT363 (SC-88) 	2.0 x 1.25 x 0.95
		5.5	0.8	-	12		**IP4285CZ9-TBB**	SOT1178 (XSON9) 	1.0 x 2.1 x 0.5
		5.5	0.7	-	8		IP4280CZ10	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		5.5	0.6	-	8		**IP4283CZ10-TBA**	SOT1165 (XSON10) 	1.0 x 2.5 x 0.5
4	0	5.5	0.6	-	8		**IP4283CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		5.5	0.6	-	8		IP4283CZ10-TT	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		5.5	0.5	-	8		**IP4284CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		5.5	0.5	-	8		**IP4284CZ10-TT**	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		5.5	0.6	-	8		**IP4286CZ6-TBF**	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		5.5	0.6	-	8		**IP4286CZ6-TTY**	SOT363 (SC-88) 	2.0 x 1.25 x 0.95

[1] acc. to IEC 61000-4-2 (contact discharge)

ESD protection for very high-speed interfaces (< 2 pF)

ESD protection for very high-speed interfaces (< 2 pF)

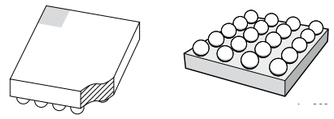
types in **bold** represent new products

Number of protected lines		V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	ESD rating [1] max (kV)	I_R max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
Unidirectional	Bidirectional									
4	0	5.5	0.5	-	8	-		**IP4292CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
5	0	5.5	1.3	-	15	-		**IP4358CX6**	CSP 	0.76 x 1.16 x 0.61
8	0	5.5	1.3	-	15	-		**IP4309CX9**	CSP 	1.16 x 1.16 x 0.61
		5.5	1	-	8	-		PRTR5V0U8S	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
11	0	5.5	0.7	-	8	-		IP4790CZ38	SOT510 (TSSOP38) 	9.7 x 4.4 x 1.1

[1] acc. to IEC 61000-4-2 (contact discharge)

NXP Wafer-Level Chip Scale Package (WL-CSP)

- Smallest possible solution for ESD and EMI circuits, saving maximum of space
- Lowest parasitic inductance to GND contact, ensures best performance
- High mechanical robustness



Audio interfaces

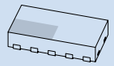
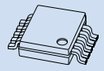
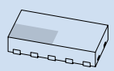
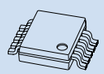
types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents		Digital interface clock speed (MHz)	Remark	Type	Package	Size (mm)
		R_{line}	C_{line} (pF)					
Audio	2	0.9 Ω	290	-	Low-ohmic speaker (< ~8 Ω)	IP4047CX6/LF	6 ball CSP	1.56 x 1.01 x 0.65
		10 Ω	200	-	Low-ohmic speaker (> ~8 Ω)	IP4048CX5/LF	5 ball CSP	0.91 x 1.28 x 0.65
		68 Ω	110	-	Single-ended or differential microphone	IP4049CX5/LF		
		470 Ω	35	-	Single-ended or differential microphone	IP4055CX6/LF	6 ball CSP	1.56 x 1.03 x 0.65
		470 Ω	20	-	Single-ended or differential microphone	IP4355CX6/LF		1.16 x 0.76 x 0.65
		50 Ω / 2.2 kΩ	2000	-	Single-ended to quasi-differential microphone channel with integrated biasing network	IP5002CX8/LF	8 ball CSP	1.67 x 1.67 x 0.65
		0.25 Ω, 3 nH	-	-	Inductive, low-ohmic differntial channel LC filter	**IP3047CX6**	6 ball CSP	1.60 x 1.15 x 0.65
		0.25 Ω, 3 nH	-	-	Inductive, low-ohmic differntial channel LC filter	**IP3048CX5**	5 ball CSP	1.51 x 1.15 x 0.65
	6	40 Ω / 1450 Ω / 10 Ω	50 / 20 / 200	-	Fully integrated audio interface protection for differential microphone and differential speaker, including EMI filtering and pull up resistors	IP4027CX20/LF	20 ball CSP	1.91 x 2.52 x 0.65

ESD protection acc. to IEC 61000-4-2 (level 4)

Video interfaces

types in **bold** represent new products

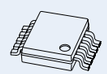
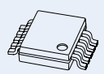
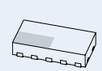
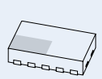
Baseband interface	Number of protected lines	C_{line} (pF)	Remark	Type	Package	Size (mm)
Display port	4	0.6	ESD protection for ultra high-speed interfaces	IP4283CZ10-TBR	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	IP4283CZ10-TT	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		0.5	ESD protection for ultra high-speed interfaces	IP4284CZ10-TBR	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		0.5	ESD protection for ultra high-speed interfaces	**IP4284CZ10-TT**	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		0.5	ESD protection for ultra high-speed interfaces	**IP4292CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		0.8	ESD protection for ultra high-speed interfaces	**IP4285CZ9-TBB**	SOT1178 (XSON9) 	1.0 x 2.1 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TBF	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
			ESD protection for ultra high-speed interfaces	IP4286CZ6-TTY	SOT363 (SC-88) 	2.0 x 1.25 x 0.95
	11	0.7	ESD protection for display port	IP4790CZ38	SOT510 (TSSOP38) 	9.7 x 4.4 x 1.1

ESD protection acc. to IEC 61000-4-2 (level 4)

Application-specific ESD and ESD/EMI solutions

Video interfaces

types in **bold** represent new products

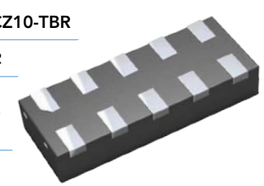
Baseband interface	Number of protected lines	C_{line} (pF)	Remark	Type	Package	Size (mm)
HDMI	2	0.7	ESD protection for ultra high-speed interfaces	IP4282CZ6	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
	4	0.7	ESD protection for ultra high-speed interfaces	IP4280CZ10	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		0.6	ESD protection for ultra high-speed interfaces	**IP4283CZ10-TBA**	SOT1165 (XSON10) 	1.0 x 2.5 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	**IP4283CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	**IP4283CZ10-TT**	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TBF	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TTY	SOT363 (SC-88) 	2.0 x 1.25 x 0.95
		0.5	ESD protection for ultra high-speed interfaces	**IP4284CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		0.8	ESD protection for ultra high-speed interfaces	**IP4285CZ9-TBB**	SOT1178 (XSON10) 	1.0 x 2.1 x 0.5

ESD protection acc. to IEC 61000-4-2 (level 4)

In the Spotlight

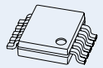
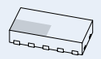
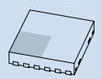
HDMI: High-speed 4 channel ESD protection – IP4283CZ10-TBR

- Low capacitance 4 channel ESD protection array: IP4283CZ10-TBR
- Optimized for high level ESD protection of HDMI ports
- Straight through routing → best signal integrity
- 10 pin QFN package with exposed leads (SOT1176)



Video interfaces

types in **bold** represent new products

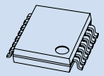
Baseband interface	Number of protected lines	Buffer	Level shifter	C_{line} (pF)	Resistor (Ω)	Remark	Type	Package	Size (mm)
HDMI	4	-	-	0.5	-	ESD protection for ultra high-speed interfaces	IP4284CZ10-TT	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		-	-	0.5	-	ESD protection for ultra high-speed interfaces	**IP4292CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
	5	-	-	10	1.75 k, 100 k	HDMI, DDC, CEC, hot plug ESD protection and biasing	**IP4310CX8/P**	8 ball CSP 	1.16 x 1.16 x 0.61
		yes	yes	-	internal	Fully integrated solution for HDMI low-speed signals, buffer and level shifter for DDC, CEC, HP	**IP4791CZ12**	SOT1156 	2.5 x 2.1 x 0.5
	8	-	-	1.3	-	HDMI, TMDS line ESD protection	**IP4309CX9**	9 ball CSP 	1.16 x 1.16 x 0.61
	12	-	yes	0.7	-	ESD protection and level shifting for a complete HDMI port	IP4776CZ38		
		yes	yes	0.7	-	ESD protection, DDC buffering, noise reduction and hot plug application for a complete HDMI source port	IP4777CZ38	SOT510 (TSSOP38)	9.7 x 4.4 x 1.1
		yes	yes	0.7	-	ESD protection, DDC buffering, noise reduction and hot plug application for a complete HDMI sink port	IP4778CZ38		
	13	yes	yes	100 Ω differential impedance	internal	Fully integrated HDMI solution with current limiter, buffer and level shifter for DDC, CEC, HP	**IP4786CZ32**	SOT617 	5.0 x 5.0 x 1.0
LVDS	2	-	-	30	10	EMI filter with ESD protection for MIPI or MDDI	**IP3348CX5**	CSP5, staggered compressed	0.76 x 1.06 x 0.61
	4	-	-	30	10	EMI filter with ESD protection for MIPI or MDDI	**IP3348CX10**	CSP10, staggered compressed	1.56 x 1.06 x 0.61
	6	-	-	30	10	EMI filter with ESD protection for MIPI or MDDI	**IP3348CX15**	CSP15, staggered compressed	2.36 x 1.06 x 0.61
	8	-	-	30	10	EMI filter with ESD protection for MIPI or MDDI	**IP3348CX20**	CSP20, staggered compressed	3.16 x 1.06 x 0.61

ESD protection acc. to IEC 61000-4-2 (level 4)

Application-specific ESD and ESD/EMI solutions

Video interfaces

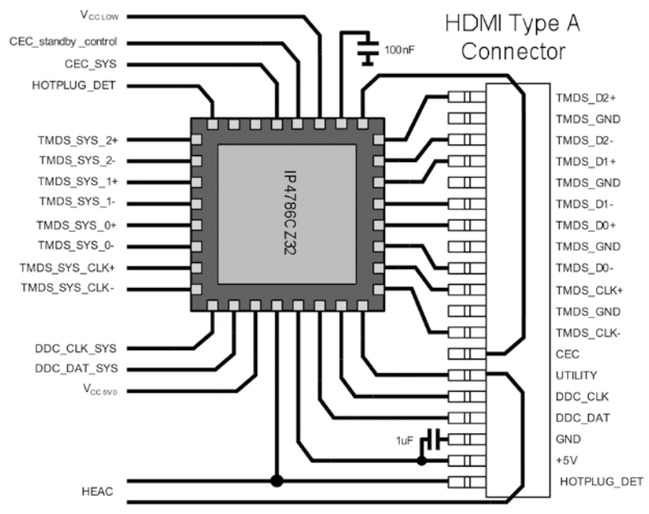
types in **bold** represent new products

Baseband interface	Number of protected lines	Buffer	Level shifter	C_{line} (pF)	Resistor (Ω)	Remark	Type	Package	Size (mm)
VGA	7	yes	yes	5	55	H&V sync buffer, DDC level shifter	IP4770CZ16	SOT519 (SSOP16) 	4.9 x 3.9 x 1.73
		yes	yes	5	65	H&V sync buffer, DDC level shifter	IP4771CZ16		
		yes	yes	5	10	H&V sync buffer, DDC level shifter	IP4772CZ16		
		yes	no	4	10	VGA receivers and transmitters, H&V sync buffer	IP4773CZ14	SOT337 (SSOP14) 	6.2 x 5.3 x 2.0
		yes	no	4	10	VGA receivers and transmitters, H sync buffer	IP4774CZ14		
		no	yes	4	1.3 - 2.4	VGA receivers and transmitters, DDC level shifter	**IP4769CZ14**	SOT402-1 (TSSOP14) 	5.0 x 4.4 x 1.1

ESD protection acc. to IEC 61000-4-2 (level 4)

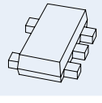
Please find more ESD protection diodes for ultra high-speed interfaces on pages 28 - 31

Transmitter HDMI companion chip IP4786CZ32



Multichannel EMI filters, ESD protection for LCD and camera

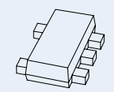
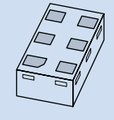
types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	1	75	36	-	~50	155	IP4307CX4/LF	4 ball CSP	0.76 x 0.76 x 0.61
		20	40	-	~50	153	**PEMI1QFN/CT**	SOT883 (SC-101) 	1.0 x 0.6 x 0.5
		20	36	-	~55	170	**PEMI1QFN/CR**		
		20	32	-	~60	185	**PEMI1QFN/CP**		
		20	28	-	~70	218	**PEMI1QFN/CM**		
		20	23	-	~90	264	**PEMI1QFN/CK**		
		20	19	-	~105	317	**PEMI1QFN/CG**		
		20	15	-	~130	397	**PEMI1QFN/CE**		
		45	40	-	~50	145	**PEMI1QFN/HT**		
		45	36	-	~55	161	**PEMI1QFN/HR**		
		45	32	-	~60	175	**PEMI1QFN/HP**		
		45	28	-	~70	206	**PEMI1QFN/HM**		
		45	23	-	~80	249	**PEMI1QFN/HK**		
		45	19	-	~100	300	**PEMI1QFN/HG**		
		45	15	-	~125	376	**PEMI1QFN/HE**		
		65	40	-	~45	139	**PEMI1QFN/LT**		
		65	36	-	~50	155	**PEMI1QFN/LR**		
		65	32	-	~55	168	**PEMI1QFN/LP**		
		65	28	-	~65	197	**PEMI1QFN/LM**		
		65	23	-	~80	239	**PEMI1QFN/LK**		
		65	19	-	~95	288	**PEMI1QFN/LG**		
		65	15	-	~120	361	**PEMI1QFN/LE**		
		100	40	-	~45	131	**PEMI1QFN/RT**		
		100	36	-	~50	145	**PEMI1QFN/RR**		
		100	32	-	~55	159	**PEMI1QFN/RP**		
		100	28	-	~60	187	**PEMI1QFN/RM**		
		100	30	-	~65	200	**IP4256CZ3-M**		
		100	23	-	~75	227	**PEMI1QFN/RK**		
		100	19	-	~90	272	**PEMI1QFN/RG**		
		100	15	-	~115	343	**PEMI1QFN/RE**		
		200	40	-	~40	119	**PEMI1QFN/WT**		
		200	36	-	~45	132	**PEMI1QFN/WR**		
		200	32	-	~50	143	**PEMI1QFN/WP**		
		200	28	-	~55	169	**PEMI1QFN/WM**		
		200	23	-	~70	205	**PEMI1QFN/WK**		
		200	19	-	~80	247	**PEMI1QFN/WG**		
		200	15	-	~105	311	**PEMI1QFN/WE**		
	2	10	35	15	~115	350	**IP3348CX5**	5 ball CSP	0.76 x 1.06 x 0.61
		18	65	40	~60	175	**IP3088CX5**		0.96 x 1.28 x 0.65
		100	45	35	~50	150	**IP3053CX5**		
		20	40	-	~50	153	**PEMI2STD/CT**	SOT665 	1.6 x 1.2 x 0.5
		20	36	-	~55	170	**PEMI2STD/CR**		
		20	32	-	~60	185	**PEMI2STD/CP**		
		20	28	-	~70	218	**PEMI2STD/CM**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

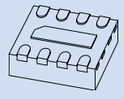
types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	2	20	23	-	~90	264	**PEMI2STD/CK**	SOT665 	1.6 x 1.2 x 0.5
		20	19	-	~105	317	**PEMI2STD/CG**		
		20	15	-	~130	397	**PEMI2STD/CE**		
		45	40	-	~50	145	**PEMI2STD/HT**		
		45	36	-	~55	161	**PEMI2STD/HR**		
		45	32	-	~60	175	**PEMI2STD/HP**		
		45	28	-	~70	206	**PEMI2STD/HM**		
		45	23	-	~80	249	**PEMI2STD/HK**		
		45	19	-	~100	300	**PEMI2STD/HG**		
		45	15	-	~125	376	**PEMI2STD/HE**		
		65	40	-	~45	139	**PEMI2STD/LT**		
		65	36	-	~50	155	**PEMI2STD/LR**		
		65	32	-	~55	168	**PEMI2STD/LP**		
		65	28	-	~65	197	**PEMI2STD/LM**		
		65	23	-	~80	239	**PEMI2STD/LK**		
		65	19	-	~95	288	**PEMI2STD/LG**		
		65	15	-	~120	361	**PEMI2STD/LE**		
		100	40	-	~45	131	**PEMI2STD/RT**		
		100	36	-	~50	145	**PEMI2STD/RR**		
		100	32	-	~55	159	**PEMI2STD/RP**		
		100	30	-	~65	200	IP4256CZ5-W		
		100	28	-	~60	187	**PEMI2STD/RM**		
		100	23	-	~75	227	**PEMI2STD/RK**		
		100	19	-	~90	272	**PEMI2STD/RG**		
		100	15	-	~115	343	**PEMI2STD/RE**		
		200	40	-	~40	119	**PEMI2STD/WT**		
		200	36	-	~45	132	**PEMI2STD/WR**		
		200	32	-	~50	143	**PEMI2STD/WP**		
		200	28	-	~55	169	**PEMI2STD/WM**		
		200	23	-	~70	205	**PEMI2STD/WK**		
		200	19	-	~80	247	**PEMI2STD/WG**		
		200	15	-	~105	311	**PEMI2STD/WE**		
		20	40	-	~50	153	**PEMI2QFN/CT**	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		20	36	-	~55	170	**PEMI2QFN/CR**		
		20	32	-	~60	185	**PEMI2QFN/CP**		
		20	28	-	~70	218	**PEMI2QFN/CM**		
		20	23	-	~90	264	**PEMI2QFN/CK**		
		20	19	-	~105	317	**PEMI2QFN/CG**		
		20	15	-	~130	397	**PEMI2QFN/CE**		
		45	40	-	~50	145	**PEMI2QFN/HT**		
		45	36	-	~55	161	**PEMI2QFN/HR**		
		45	32	-	~60	175	**PEMI2QFN/HP**		
		45	28	-	~70	206	**PEMI2QFN/HM**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

types in **bold** represent new products

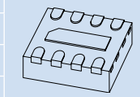
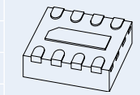
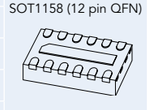
Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	2	45	23	-	~80	249	**PEMI2QFN/HK**	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		45	19	-	~100	300	**PEMI2QFN/HG**		
		45	15	-	~125	376	**PEMI2QFN/HE**		
		65	40	-	~45	139	**PEMI2QFN/LT**		
		65	36	-	~50	155	**PEMI2QFN/LR**		
		65	32	-	~55	168	**PEMI2QFN/LP**		
		65	28	-	~65	197	**PEMI2QFN/LM**		
		65	23	-	~80	239	**PEMI2QFN/LK**		
		65	19	-	~95	288	**PEMI2QFN/LG**		
		65	15	-	~120	361	**PEMI2QFN/LE**		
		100	40	-	~45	131	**PEMI2QFN/RT**		
		100	36	-	~50	145	**PEMI2QFN/RR**		
		100	32	-	~55	159	**PEMI2QFN/RP**		
		100	30	-	~65	200	IP4256CZ6-F		
		100	28	-	~60	187	**PEMI2QFN/RM**		
		100	23	-	~75	227	**PEMI2QFN/RK**		
		100	19	-	~90	272	**PEMI2QFN/RG**		
		100	15	-	~115	343	**PEMI2QFN/RE**		
		200	40	-	~40	119	**PEMI2QFN/WT**		
		200	36	-	~45	132	**PEMI2QFN/WR**		
		200	32	-	~50	143	**PEMI2QFN/WP**		
		200	28	-	~55	169	**PEMI2QFN/WM**		
		200	23	-	~70	205	**PEMI2QFN/WK**		
		200	19	-	~80	247	**PEMI2QFN/WG**		
		200	15	-	~105	311	**PEMI2QFN/WE**		
	4	10	35	15	~115	350	**IP3348CX10**	10 ball CSP	1.56 x 1.06 x 0.61
		18	65	40	~60	175	**IP3088CX10**		1.96 x 1.28 x 0.65
		100	54	-	~30	98	**PEMI4CSP/RW**		1.56 x 1.06 x 0.61
		100	45	35	~20	150	**IP3053CX10**		1.96 x 1.28 x 0.65
		100	41	-	~40	125	**PEMI4CSP/RT**		1.56 x 1.06 x 0.61
		20	40	-	~50	153	**PEMI4QFN/CT**	SOT1157 (8 pin QFN) 	1.7 x 1.2 x 0.5
		20	36	-	~55	170	**PEMI4QFN/CR**		
		20	32	-	~60	185	**PEMI4QFN/CP**		
		20	28	-	~70	218	**PEMI4QFN/CM**		
		20	23	-	~90	264	**PEMI4QFN/CK**		
		20	19	-	~105	317	**PEMI4QFN/CG**		
		20	15	-	~130	397	**PEMI4QFN/CE**		
		45	40	-	~50	145	**PEMI4QFN/HT**		
		45	36	-	~55	161	**PEMI4QFN/HR**		
		45	32	-	~60	175	**PEMI4QFN/HP**		
		45	28	-	~70	206	**PEMI4QFN/HM**		
		45	23	-	~80	249	**PEMI4QFN/HK**		
		45	19	-	~100	300	**PEMI4QFN/HG**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Application-specific ESD and ESD/EMI solutions

Multichannel EMI filters, ESD protection for LCD and camera

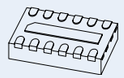
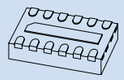
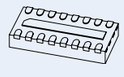
types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	4	45	15	-	~125	376	**PEMI4QFN/HE**	SOT1157 (8 pin QFN) 	1.7 x 1.2 x 0.5
		65	40	-	~45	139	**PEMI4QFN/LT**		
		65	36	-	~50	155	**PEMI4QFN/LR**		
		65	32	-	~55	168	**PEMI4QFN/LP**		
		65	28	-	~65	197	**PEMI4QFN/LM**		
		65	23	-	~80	239	**PEMI4QFN/LK**		
		65	19	-	~95	288	**PEMI4QFN/LG**		
		65	15	-	~120	361	**PEMI4QFN/LE**		
		100	40	-	~45	131	**PEMI4QFN/RT**		
		100	36	-	~50	145	**PEMI4QFN/RR**		
		100	32	-	~55	159	**PEMI4QFN/RP**		
		100	28	-	~60	187	**PEMI4QFN/RM**		
		100	23	-	~75	227	**PEMI4QFN/RK**		
		100	19	-	~90	272	**PEMI4QFN/RG**		
		100	15	-	~115	343	**PEMI4QFN/RE**		
		200	40	-	~40	119	**PEMI4QFN/WT**		
		200	36	-	~45	132	**PEMI4QFN/WR**		
		200	32	-	~50	143	**PEMI4QFN/WP**		
		200	28	-	~55	169	**PEMI4QFN/WM**		
		200	23	-	~70	205	**PEMI4QFN/WK**		
		200	19	-	~80	247	**PEMI4QFN/WG**		
		200	15	-	~105	311	**PEMI4QFN/WE**		
		15	43	12	~60	175	**IP3253CZ8-4-TTL**	SOT1166 (8 pin QFN) 	1.7 x 1.35 x 0.5
		15	50	18	~50	145	**IP3254CZ8-4-TTL**		
		40	18	-	~100	300	**IP4252CZ8-4 -TTL**		
		100	45	-	~40	130	**IP4254CZ8-4-TTL**		
		100	15	-	~110	330	**IP4251CZ8-4-TTL**		
		200	45	-	~35	110	**IP4253CZ8-4-TTL**		
	6	10	35	15	~115	350	**IP3348CX15**	15 ball CSP	2.36 x 1.06 x 0.61
		18	65	40	~60	175	**IP3088CX15**		2.96 x 1.28 x 0.65
		100	60	-	~40	120	IP4053CX15/LF		2.96 x 1.32 x 0.65
		100	60	-	~40	120	IP4353CX15/LF		2.38 x 1.05 x 0.61
		100	54	-	~30	98	**PEMI6CSP/RW**		2.36 x 1.06 x 0.61
		100	45	35	~20	150	**IP3053CX15**		2.96 x 1.28 x 0.65
		100	41	-	~40	125	**PEMI6CSP/RT**		2.36 x 1.06 x 0.61
		100	30	-	~70	210	IP4153CX15/LF		2.91 x 1.28 x 0.65
		20	40	-	~50	153	**PEMI6QFN/CT**	SOT1158 (12 pin QFN) 	2.5 x 1.2 x 0.5
		20	36	-	~55	170	**PEMI6QFN/CR**		
		20	32	-	~60	185	**PEMI6QFN/CP**		
		20	28	-	~70	218	**PEMI6QFN/CM**		
		20	23	-	~90	264	**PEMI6QFN/CK**		
		20	19	-	~105	317	**PEMI6QFN/CG**		
		20	15	-	~130	397	**PEMI6QFN/CE**		
		45	40	-	~50	145	**PEMI6QFN/HT**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Multichannel EMI filters, ESD protection for LCD and camera

types in **bold** represent new products

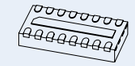
Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	6	45	36	-	~55	161	**PEMI6QFN/HR**	SOT1158 (12 pin QFN) 	2.5 x 1.2 x 0.5
		45	32	-	~60	175	**PEMI6QFN/HP**		
		45	28	-	~70	206	**PEMI6QFN/HM**		
		45	23	-	~80	249	**PEMI6QFN/HK**		
		45	19	-	~100	300	**PEMI6QFN/HG**		
		45	15	-	~125	376	**PEMI6QFN/HE**		
		65	40	-	~45	139	**PEMI6QFN/LT**		
		65	36	-	~50	155	**PEMI6QFN/LR**		
		65	32	-	~55	168	**PEMI6QFN/LP**		
		65	28	-	~65	197	**PEMI6QFN/LM**		
		65	23	-	~80	239	**PEMI6QFN/LK**		
		65	19	-	~95	288	**PEMI6QFN/LG**		
		65	15	-	~120	361	**PEMI6QFN/LE**		
		100	40	-	~45	131	**PEMI6QFN/RT**		
		100	36	-	~50	145	**PEMI6QFN/RR**		
		100	32	-	~55	159	**PEMI6QFN/RP**		
		100	28	-	~60	187	**PEMI6QFN/RM**		
		100	23	-	~75	227	**PEMI6QFN/RK**		
		100	19	-	~90	272	**PEMI6QFN/RG**		
		100	15	-	~115	343	**PEMI6QFN/RE**		
		200	40	-	~40	119	**PEMI6QFN/WT**		
		200	36	-	~45	132	**PEMI6QFN/WR**		
		200	32	-	~50	143	**PEMI6QFN/WP**		
		200	28	-	~55	169	**PEMI6QFN/WM**		
		200	23	-	~70	205	**PEMI6QFN/WK**		
		200	19	-	~80	247	**PEMI6QFN/WG**		
		200	15	-	~105	311	**PEMI6QFN/WE**		
		15	50	18	~50	145	**IP3254CZ12-6-TTL**	SOT1167 (12 pin QFN) 	2.5 x 1.35 x 0.5
		15	43	12	~60	175	**IP3253CZ12-6-TTL**		
		40	18	-	~100	300	**IP4252CZ12-6-TTL**		
		100	45	-	~40	130	**IP4254CZ12-6-TTL**		
		100	15	-	~110	330	**IP4251CZ12-6-TTL**		
		200	45	-	~35	110	**IP4253CZ12-6-TTL**		
	7	70	25	-	~75	220	IP4337CX18/LF	18 ball CSP	1.96 x 1.61 x 0.61
		125	25	60	~60	180	IP3337CX18/LF		2.06 x 1.66 x 0.61
	8	10	35	15	~115	350	**IP3348CX20**	20 ball CSP	3.16 x 1.06 x 0.61
		18	65	40	~60	175	**IP3088CX20**		3.96 x 1.28 x 0.65
		100	54	-	~30	98	**PEMI8CSP/RW**		3.16 x 1.06 x 0.61
		100	50	-	~40	120	IP4088CX20/LF		3.91 x 1.28 x 0.65
		100	45	35	~20	150	**IP3053CX20**		3.96 x 1.28 x 0.65
		100	41	-	~40	125	**PEMI8CSP/RT**		3.16 x 1.06 x 0.61
		20	40	-	~50	153	**PEMI8QFN/CT**	SOT1159 (16 pin QFN) 	3.3 x 1.2 x 0.5
		20	36	-	~55	170	**PEMI8QFN/CR**		
		20	32	-	~60	185	**PEMI8QFN/CP**		
		20	28	-	~70	218	**PEMI8QFN/CM**		
		20	23	-	~90	264	**PEMI8QFN/CK**		
		20	19	-	~105	317	**PEMI8QFN/CG**		
		20	15	-	~130	397	**PEMI8QFN/CE**		

ESD protection acc. to IEC 61000-4-2 (level 4)

Application-specific ESD and ESD/EMI solutions

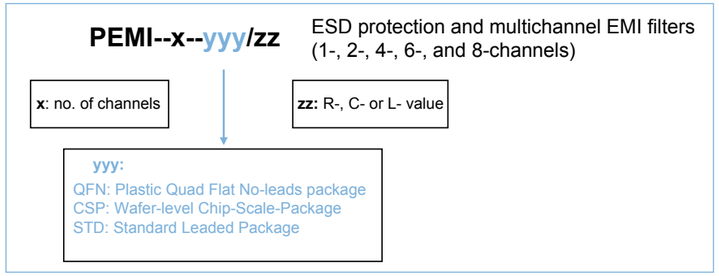
Multichannel EMI filters, ESD protection for LCD and camera

types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents			Digital interface clock speed (MHz)	Insertion Loss S21~ -3 dB (MHz)	Type	Package	Size (mm)
		R_{line} (Ω)	C_{line} (pF)	L_{line} (nH)					
LCD display, camera, keypad	8	45	40	-	~50	145	**PEMI8QFN/HT**	SOT1159 (16 pin QFN) 	3.3 x 1.2 x 0.5
		45	36	-	~55	161	**PEMI8QFN/HR**		
		45	32	-	~60	175	**PEMI8QFN/HP**		
		45	28	-	~70	206	**PEMI8QFN/HM**		
		45	23	-	~80	249	**PEMI8QFN/HK**		
		45	19	-	~100	300	**PEMI8QFN/HG**		
		45	15	-	~125	376	**PEMI8QFN/HE**		
		65	40	-	~45	139	**PEMI8QFN/LT**		
		65	36	-	~50	155	**PEMI8QFN/LR**		
		65	32	-	~55	168	**PEMI8QFN/LP**		
		65	28	-	~65	197	**PEMI8QFN/LM**		
		65	23	-	~80	239	**PEMI8QFN/LK**		
		65	19	-	~95	288	**PEMI8QFN/LG**		
		65	15	-	~120	361	**PEMI8QFN/LE**		
		100	40	-	~45	131	**PEMI8QFN/RT**		
		100	36	-	~50	145	**PEMI8QFN/RR**		
		100	32	-	~55	159	**PEMI8QFN/RP**		
		100	28	-	~60	187	**PEMI8QFN/RM**		
		100	23	-	~75	227	**PEMI8QFN/RK**		
		100	19	-	~90	272	**PEMI8QFN/RG**		
		100	15	-	~115	343	**PEMI8QFN/RE**		
		200	40	-	~40	119	**PEMI8QFN/WT**		
		200	36	-	~45	132	**PEMI8QFN/WR**		
		200	32	-	~50	143	**PEMI8QFN/WP**		
		200	28	-	~55	169	**PEMI8QFN/WM**		
		200	23	-	~70	205	**PEMI8QFN/WK**		
		200	19	-	~80	247	**PEMI8QFN/WG**		
		200	15	-	~105	311	**PEMI8QFN/WE**		
		15	43	12	~60	175	**IP3253CZ16-8-TTL**	SOT1168 (16 pin QFN) 	3.3 x 1.35 x 0.5
		15	50	18	~50	145	**IP3254CZ16-8-TTL**		
		40	18	-	~100	300	**IP4252CZ16-8-TTL**		
		100	45	-	~40	130	**IP4254CZ16-8-TTL**		
		100	15	-	~110	330	**IP4251CZ16-8-TTL**		
		200	45	-	~35	110	**IP4253CZ16-8-TTL**		
	10	70	25	-	~75	220	IP4338CX24/LF	24 ball CSP	1.96 x 2.01 x 0.61
		125	25	60	~60	180	IP3338CX24/LF		2.11 x 2.11 x 0.61
		1000	50	-	~7	22	IP4035CX24/LF		2.41 x 2.41 x 0.65
		80	40	-	~30	100	IP4032CX25/LF	25 ball CSP	2.41 x 2.41 x 0.65
		200	50	-	~35	105	IP4041CX25/LF		

ESD protection acc. to IEC 61000-4-2 (level 4)

PEMI-series nomenclature



SD-, SIM-card and MMC

types in **bold** represent new products

Baseband interface	Number of protected lines	Line small-signal equivalents		Digital interface clock speed (MHz)	Remark	Type	Package	Size (mm)
		R_{line}	C_{line} (pF)					
SIM card	3 + 2	47 Ω / 100 Ω	10	~20	Integrated low capacitance SIM-card passive filter array & USB ESD protection	**IP4365CX11**	11 ball CSP	1.16 x 1.56 x 0.61
	3	47 Ω / 100 Ω	40	~12	Integrated SIM-card EMI filter and ESD protection	IP4044CX8/LF	8 ball CSP	1.46 x 1.49 x 0.65
		47 Ω / 100 Ω	20	~20	Integrated SIM-card EMI filter and ESD protection	IP4064CX8/LF/P		1.41 x 1.41 x 0.65
		47 Ω / 100 Ω	20	~20	Smaller size, integrated SIM-card EMI filter and ESD protection	IP4364CX8/LF/P		1.16 x 1.16 x 0.61
		47 Ω / 100 Ω	10	~20	Smaller size, low capacitance integrated SIM-card EMI filter and ESD protection	IP4366CX8/P		
		47 Ω / 100 Ω	40	~12	Integrated SIM-card EMI filter and ESD protection	IP4264CZ8-40-TTL	SOT1166 (8 pin QFN) 	1.7 x 1.35 x 0.5
		47 Ω / 100 Ω	20	~20	Integrated SIM-card EMI filter and ESD protection	IP4264CZ8-20-TTL		
		47 Ω / 100 Ω	10	~20	Integrated SIM-card EMI filter and ESD protection	**IP4264CZ8-10-TTL**		
		-	1	~240	Quad channel low capacitance ESD protection	IP4221CZ6-S	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
SD-card / MMC	4	47 Ω / 13 kΩ / 56 kΩ	25	~30	MMC ESD protection, pull-up resistors	IP4051CX11/LF	11 ball CSP	1.44 x 1.96 x 0.65
		50 Ω / 75 kΩ / 7 kΩ	18	~50	High-speed MMC ESD protection, pull-up resistors	IP4060CX16/LF	16 ball CSP	1.96 x 1.97 x 0.65
	6	40 Ω	12	>52	(Mini) SD card/trans flash ESD protection, EMI filter	**IP4252CZ12-6-TTL**	SOT1167 (12 pin QFN) 	2.5 x 1.35 x 0.5
	6 + 2	40 Ω	12	>52	(Mini) SD card/trans flash ESD protection, EMI filter	**IP4252CZ16-8-TTL**	SOT1168 (16 pin QFN) 	3.3 x 1.35 x 0.5
	7	40 Ω / 50 kΩ / 25 kΩ	18	~20	(Mini) SD/trans flash card ESD protection, EMI filter, pull-up resistors	IP4052CX20/LF	20 ball CSP	2.54 x 1.96 x 0.65
		-	5	~24	Memory stick PRO ESD protection	IP4067CX9/LF	9 ball CSP	1.46 x 1.52 x 0.65
	6 (+3)	15 Ω / 50 kΩ / 15 kΩ	8	>52	Very low capacitance, low channel resistance (mini) SD card/trans flash ESD protection EMI filter, pull-up resistor	IP4350CX24/LF	24 ball CSP	1.95 x 2.11 x 0.61
		40 Ω / 50 kΩ / 15 kΩ	20	>52	(Mini) SD card/trans flash ESD protection, EMI filter, pull-up resistor	IP4352CX24/LF		2.02 x 2.01 x 0.61
		-	-	>52	(Mini) SD/SDIO memory card level shifter, can be combined with IP4352CX24/LF	IP4852CX25/LF	25 ball CSP	2.01 x 2.01 x 0.61
		40 Ω / 50 kΩ / 15 kΩ	-	>52	(Mini) SD/SDIO memory card level shifter, and voltage regular, incl. ESD and EMI filter	IP4853CX24/P	24 ball CSP	

ESD protection acc. to IEC 61000-4-2 (level 4)

Please find more ESD protection diodes for ultra high-speed interfaces on pages 28 - 31

Battery and charger protection

types in **bold** represent new products

Baseband interface	Number of protected lines	C_{line} (pF)	Diode voltage	Remark	Type	Package	Size (mm)
Battery & charger protection	1	180	Breakdown 16 V	Power diode	IP4085CX4	4 ball CSP 	0.91 x 0.91 x 0.65
		450	Breakdown 7 V	Power diode	IP4385CX4		0.76 x 0.76 x 0.61
		160	Breakdown 16 V	Power diode	**IP4386CX4**		
		290	Breakdown 10 V	Power diode	**IP4387CX4**		
		160	V_{RWM} = 12 V	Power diode with 2 A integrated fuse	**IP4389CX4**		
		160	V_{RWM} = 12 V	Power diode	PESD12VS1UJ	SOD323F (SC-90) 	1.7 x 1.25 x 0.7
		160	V_{RWM} = 12 V	Power diode	PESD12VS1UA	SOD323 (SC-76) 	1.7 x 1.25 x 0.95
		480	V_{RWM} = 5 V	Power diode	PESD5V0S1UJ	SOD323F (SC-90) 	1.7 x 1.25 x 0.7
		480	V_{RWM} = 5 V	Power diode	PESD5V0S1UA	SOD323 (SC-76) 	1.7 x 1.25 x 0.95

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Digital interface clock speed (MHz)	Remark	Type	Package	Size (mm)
USB (CSP package)	2	33 Ω / 1.3 kΩ	30	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4056CX8/LF	8 ball CSP	1.27 x 1.83 x 0.65
		33 Ω / 1.3 kΩ / 10 kΩ	30	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4057CX10/LF	10 ball CSP	1.56 x 1.91 x 0.65
		33 Ω / 1.3 kΩ / 17 kΩ / 15 kΩ	27	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4065CX11/LF	11 ball CSP	1.47 x 1.97 x 0.65
		33 Ω / 1.5 kΩ	35	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4058CX8/LF	8 ball CSP	0.91 x 1.91 x 0.65
		17 Ω / 1.5 kΩ	35	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4158CX8/LF		
		33 Ω	35	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection and impedance matching	IP4078CX6/LF	6 ball CSP	0.91 x 1.41 x 0.65
		-	1.3	~1 GHz	USB2.0 high-speed ESD protection	**IP4359CX4/LF**	4 ball CSP	0.76 x 0.76 x 0.61
	3	-	1.3	~1 GHz	USB2.0 high-speed ESD protection	**IP4356CX4**	4 ball CSP	0.76 x 0.76 x 0.61
	3+2	47 Ω / 100 Ω	10	~20/6	Integrated low capacitance SIM-Card & USB passive filter array with ESD protection	IP4365CX11/P	11 ball CSP	1.16 x 1.56 x 0.61
	4	33 Ω / 1.5 kΩ / 20 kΩ	17	>6	Fully integrated USB low / fullspeed interface with EMI filter, ESD protection, pull-up resistors and impedance matching	IP4368CX9/P	5 ball CSP	1.16 x 1.16 x 0.61
		-	3	>240	USB2.0 high-speed ESD protection	IP4059CX5/LF	5 ball CSP	0.96 x 1.34 x 0.65
			1.3	~1 GHz	USB2.0 high-speed ESD protection	**IP4358CX6**	6 ball CSP	0.76 x 1.16 x 0.41
		-	1.3	~1 GHz	USB2.0 high-speed ESD protection	**IP4319CX10**	10 ball CSP	1.56 x 1.05 x 0.61
USB2.0 (Plastic package)	2	0.5	2	-	>15 kV IEC contact ESD protection with pi-filter	IP4234CZ6	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		-	1.0	-	ESD protection for up to 2 ultra high-speed datalines	PRTR5V0U2X	SOT143B	2.9 x 1.3 x 1.0
		-	1.8	-	ESD protection for up to 2 ultra high-speed datalines with 12 kV ESD robustness	PRTR5V0U2AX		
		-	0.7	-	ESD protection for ultra high-speed interfaces	IP4282CZ6	SOT886 (XSON6)	1.45 x 1.0 x 0.5

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Remark	Type	Package	Size (mm)
USB2.0 (Plastic package)	2	-	1	ESD protection for up to 2 ultra high-speed datalines	PRTR5V0U2K	SOT891 (XSON6) 	1.0 x 1.0 x 0.5
		-	1	ESD protection for up to 2 ultra high-speed datalines	PRTR5V0U2D	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		-	1	ESD protection for up to 2 ultra high-speed datalines	PRTR5V0U2F	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
	3 + 1	-	0.8	USB protection for USB OTG with 5.5 V Vbat protection	**PUSBM5V5X4-TL**	SOT1189 (HXSON6) 	1.6 x 1.6 x 0.5
		-	0.8	USB protection for USB OTG with 12 V Vbat protection	**PUSBM12VX4-TL**		
		-	0.8	USB protection for USB OTG with 15 V Vbat protection	**PUSBM15VX4-TL**		
		-	0.8	USB protection for USB OTG with 27 V Vbat protection	**PUSBM27VX4-TL**		
	4	-	1	Dual ESD protection for USB2.0 high-speed, SD-card, SIM card	IP4220CZ6	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		-	1	Dual ESD protection for USB2.0 high-speed, SD-card, SIM card	PRTR5V0U4D		
		-	1	Dual ESP protection for USB2.0 high-speed, SD-card, SIM card	PRTR5V0U4Y	SOT363 (SC-88) 	2.0 x 1.25 x 0.95
		-	1	ESD protection for USB2.0 high-speed, SD-card, SIM card	IP4221CZ6-S	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		-	1	ESD protection for USB2.0 high-speed, SD-card, SIM card	IP4221CZ6-XS	SOT891 (XSON6) 	1.0 x 1.0 x 0.5
		1	3	>15 kV IEC contact ESD protection with pi-filter	IP4225CZ10	SOT457 (SC-74) 	2.9 x 1.5 x 1.0

ESD protection acc. to IEC 61000-4-2 (level 4)

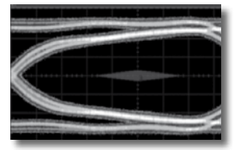
Application-specific ESD and ESD/EMI solutions

USB, SATA, LAN

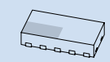
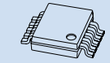
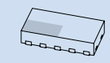
In the Spotlight

USB3.0: Ultra high-speed 4 channel ESD protection – IP4292CZ10-TBR

- Low clamping voltage ensures best protection of the System Chip
- Low Cline and high ESD protecion level
- Straight through routing → best signal integrity
- Clean eye diagrams
- 10 pin QFN package with exposed leads (SOT1176)



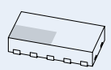
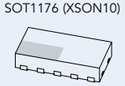
types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Remark	Type	Package	Size (mm)
USB3.0 SuperSpeed USB	4	-	0.5	ESD protection for ultra high-speed interfaces	**IP4284CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		-	0.5	ESD protection for ultra high-speed interfaces	IP4284CZ10-TT	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		-	0.5	ESD protection for ultra high-speed interfaces	**IP4292CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Remark	Type	Package	Size (mm)
Display port	4	-	0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TTY	SOT363 (SC-88) 	2.0 x 1.25 x 0.95
	11	-	0.7	ESD protection	IP4790CZ38	SOT510 (TSSOP38) 	9.7 x 4.4 x 1.1
SATA	2	-	0.7	ESD protection for ultra high-speed interfaces	**IP4282CZ6**	SOT886 (XSON6) 	1.45 x 1.0 x 0.5
		-	0.6	ESD protection for ultra high-speed interfaces	IP4286CZ6-TBF		
					IP4286CZ6-TTY	SOT363 (SC-88) 	2.0 x 1.25 x 0.95
	4	-	0.6	ESD protection for ultra high-speed interfaces	**IP4283CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		-	0.6	ESD protection for ultra high-speed interfaces	IP4283CZ10-TT	SOT552 (TSSOP10)	3.0 x 3.0 x 1.1
		-	0.5	ESD protection for ultra high-speed interfaces	**IP4284CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5
		-	0.5	ESD protection for ultra high-speed interfaces	IP4284CZ10-TT	SOT552 (TSSOP10) 	3.0 x 3.0 x 1.1
		-	0.8	ESD protection for ultra high-speed interfaces	**IP4285CZ9-TBB**	SOT1178 (XSON9) 	1.0 x 2.5 x 0.1
		-	0.5	ESD protection for ultra high-speed interfaces	**IP4292CZ10-TBR**	SOT1176 (XSON10) 	1.0 x 2.5 x 0.5

ESD protection acc. to IEC 61000-4-2 (level 4)

USB, SATA, LAN

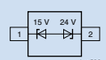
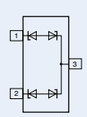
types in **bold** represent new products

Baseband interface	Number of protected lines	R_{line}	C_{line} (pF)	Remark	Type	Package	Size (mm)
LAN	1	-	0.6	Ethernet ESD protection V_{RWM} = 3.3 V	PESD3V3U1UT	SOT23 	2.9 x 1.3 x 1.0
		-	0.6	Ethernet ESD protection V_{RWM} = 5.0 V	PESD5V0U1UT		
		-	0.6	Ethernet ESD protection V_{RWM} = 12 V	PESD12VU1UT		
		-	0.6	Ethernet ESD protection V_{RWM} = 15 V	PESD15VU1UT		
		-	0.6	Ethernet ESD protection V_{RWM} = 24 V	PESD24VU1UT		
	4	-	1	Ethernet ESD protection	IP4220CZ6	SOT457 (SC-74) 	2.9 x 1.5 x 1.0
		-	1	Ethernet line surge ESD protection	**IP4233CZ6**	SOT363 (SC-88) 	2.0 x 1.25 x 0.95

ESD protection acc. to IEC 61000-4-2 (level 4)

Please find more ESD protection diodes for ultra high-speed interfaces on pages 28 - 31

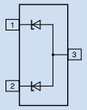
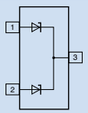
Automotive LIN/CAN/FlexRay

Number of protected lines bidirectional	V_{RWM} (V)	C_{line} typ (pF)	C_{line} max (pF)	P_{PP} [1] max (W)	ESD rating [2] max (kV)	I_R max [µA] @ V_{RWM}	Configuration	Type	Package	Size (mm)
1	15 (diode 1) 24 (diode 2)	13	17	160	23	0.05		PESD1LIN	SOD323 (SC-76) 	1.7 x 1.25 x 0.95
2	24	11	17	200	23	0.05		PESD1CAN	SOT23 	2.9 x 1.3 x 1.0
		25	30	230	30	0.01		PESD2CAN		
		11	17	200	23	0.05		PESD1FLEX		

[1] 8/20 µs surge pulse acc. to IEC 61000-4-5

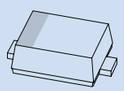
[2] acc. to IEC 61000-4-2 (contact discharge)

TVS diodes, 24 W / 40 W

Power (W) (10/1000 µs waveform) [1]	V_{RWM} (V)	V_{BR} min (V) @ I_R	V_{BR} typ (V) @ I_R	V_{BR} max (V) @ I_R	I_R (mA)	ESD rating [2] max (kV)	C_{line} typ (pF)	V_{CL} max (V) @ I_{PP}	I_{PP} (A)	I_{RM} max (µA) @ V_{RWM}	Configuration	Type	Package	Size (mm)
24	3	5.32	5.6	5.88	20	30	210	8	3	5		MMBZ5V6AL	SOT23 	2.9 x 1.3 x 1.0
	3	5.89	6.2	6.51	1	30	175	8.7	2.76	0.2		MMBZ6V2AL		
	4.5	6.48	6.8	7.14	1	30	150	9.6	2.5	0.3		MMBZ6V8AL		
	6	8.65	9.1	9.56	1	30	155	14	1.7	0.1		MMBZ9V1AL		
	6.5	9.5	10	10.5	1	30	130	14.2	1.7	0.02		MMBZ10VAL		
40	8.5	11.4	12	12.6	1	30	110	17	2.35	0.005		MMBZ12VAL		
	12	14.25	15	15.75	1	30	85	21	1.9	0.005		MMBZ15VAL		
	14.5	17.1	18	18.9	1	30	70	25	1.6	0.005		MMBZ18VAL		
	17	19	20	21	1	30	65	28	1.4	0.005		MMBZ20VAL		
	22	25.65	27	28.35	1	30	48	40	1	0.005		MMBZ27VAL		
	26	31.35	33	34.65	1	30	45	46	0.87	0.005		MMBZ33VAL		
	8.5	11.4	12	12.6	1	30	110	17	2.35	0.005		MMBZ12VDL		
	12.8	14.3	15	15.8	1	30	85	21.2	1.9	0.005		MMBZ15VDL		
	14.5	17.1	18	18.9	1	30	70	25	1.6	0.005		MMBZ18VCL		
	17	19	20	21	1	30	65	28	1.4	0.005		MMBZ20VCL		
	22	25.65	27	28.35	1	30	48	38	1	0.005		MMBZ27VCL		
	26	31.35	33	34.65	1	30	45	46	0.87	0.005		MMBZ33VCL		

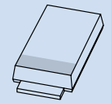
[1] acc. to IEC 61643-321 [2] acc. to IEC 61000-4-2 (contact discharge)

TVS diodes, 400 W

Power (W) (10/1000 µs waveform) [1]	V_{RWM} (V)	V_{BR} min (V) @ I_R	V_{BR} typ (V) @ I_R	V_{BR} max (V) @ I_R	I_R (mA)	V_{CL} max (V) @ I_{PP}	I_{PP} (A)	I_{RM} typ (µA) @ V_{RWM}	I_{RM} max (µA) @ V_{RWM}	Type	Package	Size (mm)
350	3.5	5.20	5.60	6.00	10	8.0	43.8	5	600	PTVS3V3S1UR	SOD123W 	2.6 x 1.7 x 1.0
400	5.0	6.40	6.70	7.00	10	9.2	43.5	5	400	PTVS5V0S1UR		
	6.0	6.67	7.02	7.37	10	10.3	38.8	5	400	PTVS6V0S1UR		
	6.5	7.22	7.60	7.98	10	11.2	35.7	5	250	PTVS6V5S1UR		
	7.0	7.78	8.20	8.60	10	12.0	33.3	3	100	PTVS7V0S1UR		
	7.5	8.33	8.77	9.21	1	12.9	31.0	0.2	50	PTVS7V5S1UR		
	8.0	8.89	9.36	9.83	1	13.6	29.4	0.03	25	PTVS8V0S1UR		
	8.5	9.44	9.92	10.40	1	14.4	27.8	0.01	10	PTVS8V5S1UR		
	9.0	10.00	10.55	11.10	1	15.4	26.0	0.005	5	PTVS9V0S1UR		
	10	11.10	11.70	12.30	1	17.0	23.5	0.005	2.5	PTVS10VS1UR		
	11	12.20	12.85	13.50	1	18.2	22.0	0.005	2.5	PTVS11VS1UR		
	12	13.30	14.00	14.70	1	19.9	20.1	0.005	2.5	PTVS12VS1UR		
	13	14.40	15.15	15.90	1	21.5	18.6	0.001	0.1	PTVS13VS1UR		
	14	15.60	16.40	17.20	1	23.2	17.2	0.001	0.1	PTVS14VS1UR		
	15	16.70	17.60	18.50	1	24.4	16.4	0.001	0.1	PTVS15VS1UR		
	16	17.80	18.75	19.70	1	26.0	15.4	0.001	0.1	PTVS16VS1UR		
	17	18.90	19.90	20.90	1	27.6	14.5	0.001	0.1	PTVS17VS1UR		
	18	20.00	21.00	22.10	1	29.2	13.7	0.001	0.1	PTVS18VS1UR		
	20	22.20	23.35	24.50	1	32.4	12.3	0.001	0.1	PTVS20VS1UR		
	22	24.40	25.60	26.90	1	35.5	11.3	0.001	0.1	PTVS22VS1UR		
	24	26.70	28.10	29.50	1	38.9	10.3	0.001	0.1	PTVS24VS1UR		
	26	28.90	30.40	31.90	1	42.1	9.5	0.001	0.1	PTVS26VS1UR		
	28	31.10	32.80	34.40	1	45.4	8.8	0.001	0.1	PTVS28VS1UR		
	30	33.30	35.10	36.80	1	48.4	8.3	0.001	0.1	PTVS30VS1UR		
	33	36.70	38.70	40.60	1	53.3	7.5	0.001	0.1	PTVS33VS1UR		
	36	40.00	42.10	44.20	1	58.1	6.9	0.001	0.1	PTVS36VS1UR		
	40	44.40	46.80	49.10	1	64.5	6.2	0.001	0.1	PTVS40VS1UR		
	43	47.80	50.30	52.80	1	69.4	5.8	0.001	0.1	PTVS43VS1UR		
	45	50.00	52.65	55.30	1	72.7	5.5	0.001	0.1	PTVS45VS1UR		
	48	53.30	56.10	58.90	1	77.4	5.2	0.001	0.1	PTVS48VS1UR		
	51	56.70	59.70	62.70	1	82.4	4.9	0.001	0.1	PTVS51VS1UR		
	54	60.00	63.15	66.30	1	87.1	4.6	0.001	0.1	PTVS54VS1UR		
	58	64.40	67.80	71.20	1	93.6	4.3	0.001	0.1	PTVS58VS1UR		
	60	66.70	70.20	73.70	1	96.8	4.1	0.001	0.1	PTVS60VS1UR		
	64	71.10	74.85	78.60	1	103.0	3.9	0.001	0.1	PTVS64VS1UR		

[1] 10/1000 µs acc. to IEC 61643-321

TVS diodes, 600 W

Power (W) (10/1000 µs waveform) [1]	V_{RWM} (V)	V_{BR} min (V) @ I_R	V_{BR} typ (V) @ I_R	V_{BR} max (V) @ I_R	I_R (mA)	V_{CL} max (V) @ I_{PP}	I_{PP} (A)	I_{RM} typ (µA) @ V_{RWM}	I_{RM} max (µA) @ V_{RWM}	Type	Package	Size (mm)
600	3.5	5.20	5.60	6.00	10	8	75	5	600	PTVS3V3P1UP	SOD128 	3.8 x 2.6 x 1.0
	5	6.40	6.70	7.00	10	9.2	65.2	5	400	PTVS5V0P1UP		
	6	6.67	7.02	7.37	10	10.3	58.3	5	400	PTVS6V0P1UP		
	6.5	7.22	7.60	7.98	10	11.2	53.6	5	250	PTVS6V5P1UP		
	7	7.78	8.20	8.60	10	12	50	3	100	PTVS7V0P1UP		
	7.5	8.33	8.77	9.21	1	12.9	46.5	0.2	50	PTVS7V5P1UP		
	8	8.89	9.36	9.83	1	13.6	44.1	0.03	25	PTVS8V0P1UP		
	8.5	9.44	9.92	10.40	1	14.4	41.7	0.01	10	PTVS8V5P1UP		
	9	10.00	10.55	11.10	1	15.4	39	0.005	5	PTVS9V0P1UP		
	10	11.10	11.70	12.30	1	17	35.3	0.005	2.5	PTVS10VP1UP		
	11	12.20	12.85	13.50	1	18.2	33	0.005	2.5	PTVS11VP1UP		
	12	13.30	14.00	14.70	1	19.9	30.2	0.005	2.5	PTVS12VP1UP		
	13	14.40	15.15	15.90	1	21.5	27.9	0.001	0.1	PTVS13VP1UP		
	14	15.60	16.40	17.20	1	23.2	25.9	0.001	0.1	PTVS14VP1UP		
	15	16.70	17.60	18.50	1	24.4	24.6	0.001	0.1	PTVS15VP1UP		
	16	17.80	18.75	19.70	1	26	23.1	0.001	0.1	PTVS16VP1UP		
	17	18.90	19.90	20.90	1	27.6	21.7	0.001	0.1	PTVS17VP1UP		
	18	20.00	21.00	22.10	1	29.2	20.5	0.001	0.1	PTVS18VP1UP		
	20	22.20	23.35	24.50	1	32.4	18.5	0.001	0.1	PTVS20VP1UP		
	22	24.40	25.60	26.90	1	35.5	16.9	0.001	0.1	PTVS22VP1UP		
	24	26.70	28.10	29.50	1	38.9	15.4	0.001	0.1	PTVS24VP1UP		
	26	28.90	30.40	31.90	1	42.1	14.2	0.001	0.1	PTVS26VP1UP		
	28	31.10	32.80	34.40	1	45.4	13.2	0.001	0.1	PTVS28VP1UP		
	30	33.30	35.10	36.80	1	48.4	12.4	0.001	0.1	PTVS30VP1UP		
	33	36.70	38.70	40.60	1	53.3	11.3	0.001	0.1	PTVS33VP1UP		
	36	40.00	42.10	44.20	1	58.1	10.3	0.001	0.1	PTVS36VP1UP		
	40	44.40	46.80	49.10	1	64.5	9.3	0.001	0.1	PTVS40VP1UP		
	43	47.80	50.30	52.80	1	69.4	8.6	0.001	0.1	PTVS43VP1UP		
	45	50.00	52.65	55.30	1	72.7	8.3	0.001	0.1	PTVS45VP1UP		
	48	53.30	56.10	58.90	1	77.4	7.8	0.001	0.1	PTVS48VP1UP		
	51	56.70	59.70	62.70	1	82.4	7.3	0.001	0.1	PTVS51VP1UP		
	54	60.00	63.15	66.30	1	87.1	6.9	0.001	0.1	PTVS54VP1UP		
	58	64.40	67.80	71.20	1	93.6	6.4	0.001	0.1	PTVS58VP1UP		
	60	66.70	70.20	73.70	1	96.8	6.2	0.001	0.1	PTVS60VP1UP		
	64	71.10	74.85	78.60	1	103	5.8	0.001	0.1	PTVS64VP1UP		

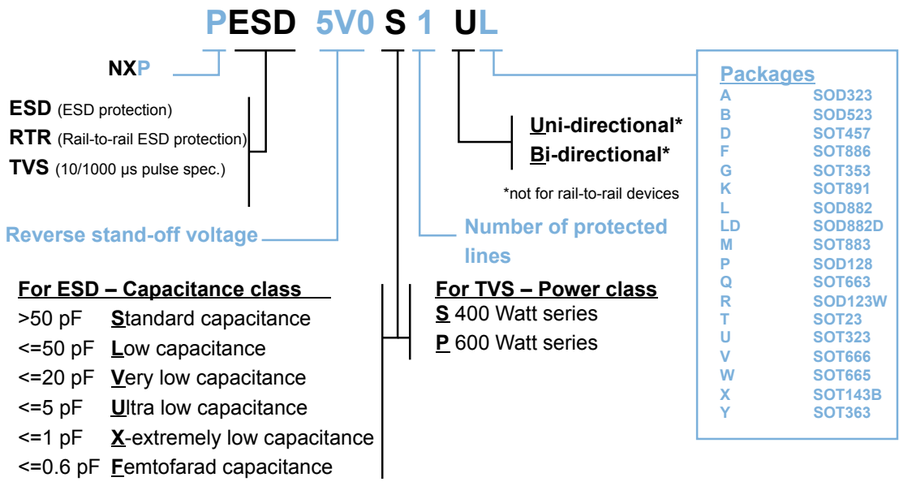
[1] 10/1000 µs acc. to IEC 61643-321

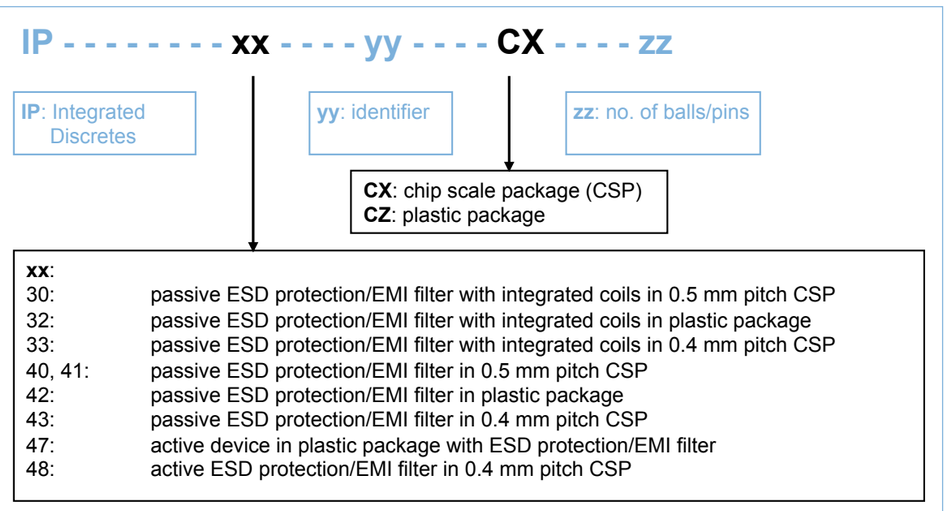
In the Spotlight

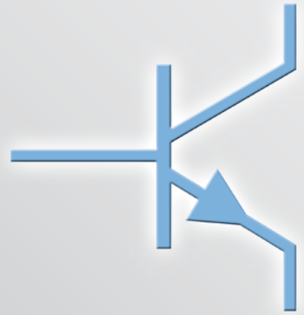
600 / 400 W TVS series – PTVSxP1UP & PTVSxS1UR

- Industry's smallest packages in the 600 / 400 W surge protection class
- Small FlatPower packages SOD123W/128, only 1 mm high
- AEC-Q101 qualified
- Low reverse leakage current (down to 1 nA typical)

Protection and signal conditioning nomenclature







Bipolar transistors

Single transistors NPN

types in **bold** represent new products

Package					SOT23	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
								
Size (mm)					2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)					250	200	150	250
V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)				
25	100	450	1200	100		PMST5089		
30	100	110 - 200	450 - 800	100	BC848B	BC848W		
		350	900	100		PMST5088		
32	100	110 - 420	220 - 800	100	BCW31 / 32 / 33			
		180 - 380	310 - 630	250	BCW60B / C / D			
40	100	120 - 270	270 - 560	100				2PC4617QM / RM
45	100	110 - 420	220 - 800	100	BC847 / A / B / C	BC847W / AW / BW / CW	BC847T / AT / BT / CT	BC847AM / BM / CM
		120 - 380	220 - 630	100	BCX70G / H / J / K			
		110 - 200	220 - 450	100	BCW71 / 72			
		500	1250	100	PMBT6429	PMST6429		
50	100	210 - 290	340 - 460	100 - 150	2PD601ART 2PD601ARL 2PD601ASL	2PD601ARW / SW		
		250	650	100	PMBT6428	PMST6428		
60	100	110 - 200	220 - 450	100	BCV71 / 72			
65	100	110 - 200	220 - 450	100	BC846 / A / B	BC846W / AW / BW	BC846T / AT / BT	
80	100	20	80	60	BSS64			
50	150	120 - 270	270 - 560	100		2PC4081Q / R / S	2PC4617Q / R	
	200	210	340	100	**2PD601BRL**			
		290	460	100	**2PD601BSL**			
45	500	100 - 250	250 - 600	100	BC817 / -16 / -25 / -40	BC817W / -16W / -25W / -40W		
		100	600	100	BCX19			
50	500	85 - 170	170 - 340	140 - 180	2PD602AQL 2PD602ARL 2PD602ASL	2PD1820AR / S		
60	500	50	-	100		PMSTA05		

Single transistors PNP

types in **bold** represent new products

Package					SOT23	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
								
Size (mm)					2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)					250	200	150	250
V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)				
80	500	100	-	100	PMBTA06	PMSTA06		
30	100	125 - 220	500 - 800	100	BC858B	BC858W		
32	100	120 - 215	260 - 500	100	BCW29 / 30			
		180 - 380	310 - 630	100	BCW61B / C / D			
40	100	120 - 270	270 - 560	100				2PA1774QM / RM / SM
45	100	210 - 290	340 - 460	70 - 80	2PB709ART 2PB709ARL 2PB709ASL	2PB709ARW / SW		
		180 - 380	310 - 630	100	BCX71H / J / K			
		120 - 215	260 - 500	100	BCW69 / 70			
		125 - 420	250 - 800	100	BC857 / A / B / C	BC857W / AW / BW / CW	BC857T / AT / BT / CT	BC857AM / BM / CM
60	100	120	260	150	BCW89			
65	100	125 - 200	250 - 475	100	BC856 / A / B	BC856W / AW / BW	BC856T / AT / BT	
100	100	30	-	50	BSS63			
50	150	120 - 270	270 - 560	100		2PA1576Q / R / S	2PA1774Q / R / S	
	200	210	340	100	**2PD601BRL**			
		290	460	100	**2PD601BSL**			
25	500	100	600	80	BCX18			
45	500	100 - 250	250 - 600	80	BC807 / -16 / -25 / -40	BC807W / -16W / -25W / -40W		
		100	600	80	BCX17			
50	500	85 - 170	170 - 340	100 - 140	2PB710ARL 2PB710ASL	2PB1219AQ / R / S		
60	500	100	-	50		PMSTA55		
80	500	100	-	50	PMBTA56	PMSTA56		

Double transistors

Package						SOT457 (SC-74)	SOT363 (SC-88)	SOT666
								
Size (mm)						2.9 x 1.5 x 1.0	2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55
P_{tot} (mW)						600	300	300
Polarity	V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)			
NPN	40	100	120	450	100		PUMX1	PEMX1
	45	100	200	450	100	BC847DS	BC847BS	BC847BV
	65	100	110	-	100		BC846S	
			200	450	100	BC846DS	BC846BS	
	50	150	120	560	100		PUMX2	
	45	500	160	400	80	BC817DS		
PNP	40	100	120	450	100	PIMT1	PUMT1	PEMT1
	45	100	200	450	100		BC857BS	BC857BV
	65	100	110	-	100		BC856S	
			200	450	100		BC856BS	
	45	500	160	400	80	BC807DS		
NPN/PNP	40	100	120	450	100		PUMZ1	PEMZ1
	45	100	200	450	100		BC847BPN	BC847BVN
	50	100	120	560	100	PIMZ2	PUMZ2	
	65	100	200	450	100		BC846BPN	
	12	500	200	-	250/100			PEMZ7
	45	500	160	400	100/80	BC817DPN		

Single and double switching transistors

Package							SOT223 (SC-73)	SOT89 (SC-62)	SOT23	SOT323 (SC-70)	SOT363 (SC-88)	SOT666	SOT883 (SC-101)
													
Size (mm)							6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55	1.0 x 0.6 x 0.5
P_{tot} (mW)							1700	1300	250	200	300	300	250
Configuration							single	single	single	single	double	double	single
Polarity	V_{CEO} (V)	I_C (mA)	h_{FE} min	h_{FE} max	f_T min (MHz)	t_{off} (ns)							
NPN	12	100	40	120	400	20			BSV52				
	40	100	100	300	180	1200			PMBS3904	PMSS3904			
					300	250		PXT2222A					
	15	200	40	120	500	20			PMBT2369	PMST2369			
	40	200	100	300	300	250			MMBT3904				
									PMBT3904	PMST3904	PMBT3904YS	PMBT3904VS	PMBT3904M
	30	600	100	300	250	250			PMBT2222	PMST2222			
	40	600	100	300	250	250	PZT4401	PXT4401	PMBT4401	PMST4401			
					300	250			MMBT2222A				
							PZT2222A		PMBT2222A	PMST2222A			
	40	800	100	300	300	250			BSR14				
PNP	40	100	100	300	150	700			PMBS3906	PMSS3906			
	40	200	100	300	250	300			MMBT3906				
									PMBT3906	PMST3906	PMBT3906YS	PMBT3906VS	PMBT3906M
	40	600	100	300	200	350	PZT4403	PXT4403	PMBT4403	PMST4403			
						365			PMBT2907				
	60	600	100	300	200	300				PMST2907A			
						365			BSR16				
							PZT2907A	PXT2907A	PMBT2907A				
NPN/PNP	40	200	100	300	300/250	250/300					PMBT3946YPN	PMBT3946VPN	

Medium power general purpose transistors

Package						SOT223 (SC-73)	SOT89 (SC-62)
Size (mm)						6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5
P_{tot} (mW)						1700	1300
Polarity	**V_{CEO} (V)**	**I_C (mA)**	**h_{FE} min**	**h_{FE} max**	**f_T min (MHz)**		
NPN	20	1000	85 - 160	375	40	BCP68 / -25	BC868 / -25
	45	1000	63 - 100	160 - 250	100	BCP54 / -10 / -16	BCX54 / -10 / -16
	60	1000	63 - 100	160 - 250	100	BCP55 / -10 / -16	BCX55 / -10 / -16
			100	300	100	BSP41	BSR41
	80	1000	63 - 100	160 - 250	100	BCP56 / -10 / -16	BCX56 / -10 / -16
			40 - 100	120 - 300	100	BSP43	BSR42 / 43
PNP	20	1000	85 - 160	250 - 375	40	BCP69 / -16 / -25	BC869 / -16 / -25
	45	1000	63 - 100	160 - 250	115 [1] - 145 [1]	BCP51 / -10 / -16	BCX51 / -10 / -16
	60	1000	63 - 100	160 - 250	100	BCP52 / -10 / -16	BCX52 / -10 / -16
			40 - 100	120 - 300	100	BSP31	BSR30 / 31
	80	1000	63 - 100	160 - 250	115 [1] - 145 [1]	BCP53 / -10 / -16	BCX53 / -10 / -16
			40 - 100	120 - 300	100	BSP32 / 33	BSR33

[1] typical value

High voltage transistors

Package						SOT223 (SC-73)	SOT89 (SC-62)	SOT457 (SC-74)	SOT23	SOT323 (SC-70)
Size (mm)						6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95
P_{tot} (mW)						1700	1300	600	250	200
Polarity	**V_{CEO} (V)**	**I_C (mA)**	**h_{FE} min**	**h_{FE} max**	**f_T min (MHz)**					
NPN	80	100	20	-	60				BSS64	
	140	100	60	250	100				PMBT5550	PMST5550
	160	300	80	250	100				PMBT5551/BSR19A	PMST5551
	250	100	50	-	60	BF722	BF622		BF822	
	300	100	50	-	60	BF720	BF620		BF820	BF820W
			40	-	50	PZTA42	PXTA42		PMBTA42	PMSTA42
	350	100	40	-	70	BSP19	BST39			
	400	300	50	200	20	PZTA44			PMBTA44	
PNP	100	100	30	-	50				BSS63	
	250	100	50	-	60	BF723				
			50	-	60		BF623		BF823	
	300	100	50	-	60		BF621		BF821	
			40	-	50	PZTA92	PXTA92		PMBTA92	PMSTA92
2 x NPN	300	100	40	-	50			PMBTA42DS		

For high voltage transistors with increased performance please refer to our high voltage low V_{CEsat} (BISS) transistor portfolio on page 66.

Low noise transistors

Package							SOT23	SOT323 (SC-70)
Size (mm)							2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95
P_{tot} (mW)							250	200
Polarity	**V_{CEO} (V)**	**I_C (mA)**	**NF max (dB)**	**h_{FE} min**	**h_{FE} max**	**f_T min (MHz)**		
NPN	30	100	4	200	450	100	BC849B	BC849BW
				420	800	100	BC849C	BC849CW
	45	100	4	200	450	100	BC850B	BC850BW
				420	800	100	BC850C	BC850CW
PNP	30	100	4	220	475	100	BC859B	BC859BW
				420	800	100	BC859C	BC859CW
	45	100	4	220	475	100	BC860B	BC860BW
				420	800	100	BC860C	BC860CW

Matched pair transistors

Package							SOT143B	SOT457 (SC-74)	SOT353 (SC-88A)	SOT363 (SC-88)		SOT666	
Size (mm)							2.9 x 1.3 x 1.0	2.9 x 1.5 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95		1.6 x 1.2 x 0.55	
P_{tot} (mW)							250	380	300	300		300	
Polarity	**V_{CEO} (V)**	**I_C (mA)**	**h_{FE} min**	**h_{FE} max**	**h_{FE1}/h_{FE2}**	**$V_{BE1} - V_{BE2}$ (mV)**							
NPN	30	100	110	800	0.7 [1]	n.a.	BCV61/A/B/C [1]						
	45	100	200	450	0.9 [1]	n.a.	BCM61B [1]						
						2		BCM847DS		BCM847BS		BCM847BV	
					0.95	2			PMP4501G		PMP4501Y		PMP4501V
					0.98	2			PMP4201G		PMP4201Y		PMP4201V
	Configuration												
PNP	30	100	100	800	0.7 [1]	n.a.	BCV62/A/B/C [1]						
	45	100	200	450	0.9 [1]	n.a.	BCM62B [1]						
						2		BCM857DS		BCM857BS		BCM857BV	
					0.95	2			PMP5501G		PMP5501Y		PMP5501V
					0.98	2			PMP5201G		PMP5201Y		PMP5201V
	65	100	200	450	0.9	2		BCM856DS		BCM856BS			
	Configuration												

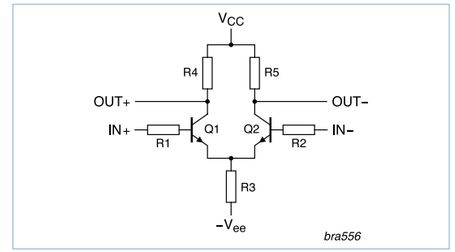
[1] I_{C1}/I_{E2}

Key features
- Current gain matching to 10%, 5% or 2%
- Base-emitter voltage matching to 2 mV
- Choice of standard double transistor pinout or application-optimized pinout
- Common-emitter configuration for 5-pin type
- Range of small, very small and ultra small packages

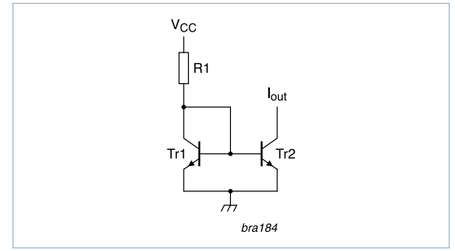
Key benefits
- Improved performance of current mirror and differential amplifier circuits
- Drop-in replacement for standard double transistors (BCM series)
- Simplified board layout (PMP series)
- Eliminates the need for costly additional trimming

Key applications
- Current mirrors
- Differential and instrumentation amplifiers
- Logarithmic amplifiers
- Comparators

Differential amplifier



Current mirror



Darlington transistors

Package					SOT223 (SC-73)	SOT89 (SC-62)	SOT23
							
Size (mm)					6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.3 x 1.0
P_{tot} (mW)					1700	1300	250
Polarity	**V_{CEO} (V)**	**I_C (mA)**	**h_{FE} min**	**f_T min (MHz)**			
NPN	30	500	10000	125			PMBTA13
			20000	125	PZTA14	PXTA14	PMBTA14
				220		BCV29	BCV27
	45	1000	2000	200	BSP50	BST50	
	60	500	10000	220		BCV49	BCV47
		1000	2000	200	BSP51	BST51	
	80	1000	2000	200	BSP52	BST52	
PNP	30	500	20000	125			PMBTA64
				220		BCV28	BCV26
	45	1000	2000	200	BSP60	BST60	
	60	500	10000	220		BCV48	BCV46
		1000	2000	200	BSP61	BST61	
	80	1000	2000	200	BSP62	BST62	

Schmitt trigger

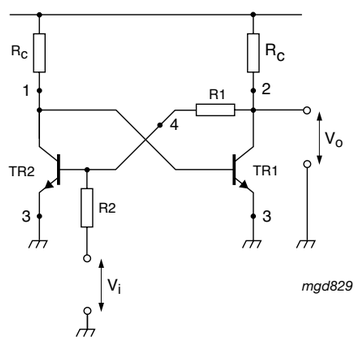
Package							SOT143B
							
Size (mm)							2.9 x 1.3 x 1.0
P_{tot} (mW)							250
Polarity	**V_{CEO} (V) TR1**	**V_{CEO} (V) TR2**	**I_C (mA)**	**h_{FE} min**	**h_{FE} max**	**V_{CEsat} typ (mV)**	
NPN	30	6	100	110	800	250	BCV63 / B
PNP	30	6	100	220	475	250	BCV64B

Key features
- Low current (max. 100 mA)
- Low voltage (max. 30 and 6 V)

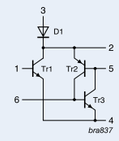
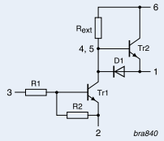
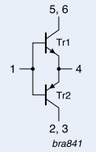
Key benefits
- Reduced component count and pick-and-place costs
- Smaller designs

Key applications
- General purpose switching and amplification
- Schmitt trigger applications

Schmitt trigger



MOSFET driver

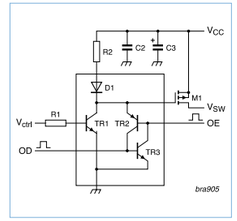
Package			SOT457 (SC-74)			
						
Size (mm)			2.9 x 1.5 x 1.0			
P_{tot} (mW)			400	400		580
Configuration						
Contains	I_C (A)	I_{CM} (A)		R1 = R2 (kΩ)		
General purpose transistors	0.1	0.2	PMD9050D	-	PMD9010D	BCV65 (SOT143B)
				2.2	PMD9001D	
				4.7	PMD9002D	
				10	PMD9003D	
Switching transistors - reduced storage time	0.6	1.0		-		PMD2001D
Low V_{CEsat} (BISS) transistors - Low V_{CEsat}, high h_{FE} and I_C	1.0	2.0		-		PMD3001D

Key features
- Three different configurations
- Types available with standard, switching and low V_{CEsat} (BISS) transistors
- Small footprint packages

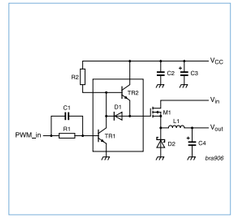
Key benefits
- Reduced component count
- Smaller end products

Key applications
- MOSFET driver
- Bipolar power transistor driver
- Push-pull driver

MOSFET driver with hardware output disable function



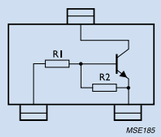
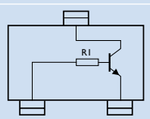
High-side MOSFET driver with level shifter function

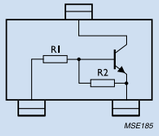
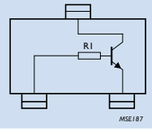


Medium frequency transistors

Package						SOT23	SOT323 (SC-70)
							
Size (mm)						2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95
P_{tot} (mW)						250	200
Polarity	**V_{CEO} (V)**	**I_C (mA)**	**h_{FE} min**	**h_{FE} max**	**f_T typ (MHz)**		
NPN	15	100	40	-	500	BF570	
	20	25	40	85	>275	BFS20	BFS20W
		30	65	225	260	BFS19	
	40	25	67	220	380	BF840	
PNP	30	25	25	50	250	BF824	BF824W
	40	25	50	-	>325	BF550	

RETs 100 mA single

Package					SOT23		SOT323 (SC-70)	
								
Size (mm)					2.9 x 1.3 x 1.0		2.0 x 1.25 x 0.95	
P_{tot} (mW)					250		200	
V_{CEO} (V)	I_C (mA)	Configuration	R1 (kΩ)	R2 (kΩ)	NPN	PNP	NPN	PNP
50	100		1	1		PDTA113ET		PDTA113EU
			2.2	2.2	PDTC123ET	PDTA123ET	PDTC123EU	PDTA123EU
			4.7	4.7	PDTC143ET	PDTA143ET	PDTC143EU	PDTA143EU
			10	10	PDTC114ET	PDTA114ET	PDTC114EU	PDTA114EU
			22	22	PDTC124ET	PDTA124ET	PDTC124EU	PDTA124EU
			47	47	PDTC144ET	PDTA144ET	PDTC144EU	PDTA144EU
			100	100	PDTC115ET	PDTA115ET	PDTC115EU	PDTA115EU
			1	10		PDTA113ZT		PDTA113ZU
			2.2	10	PDTC123YT	PDTA123YT	PDTC123YU	PDTA123YU
			2.2	47	PDTC123JT	PDTA123JT	PDTC123JU	PDTA123JU
			4.7	10	PDTC143XT	PDTA143XT	PDTC143XU	PDTA143XU
			4.7	47	PDTC143ZT	PDTA143ZT	PDTC143ZU	PDTA143ZU
			10	47	PDTC114YT	PDTA114YT	PDTC114YU	PDTA114YU
			22	47	PDTC124XT	PDTA124XT	PDTC124XU	PDTA124XU
			47	10	PDTC144VT	PDTA144VT	PDTC144VU	PDTA144VU
			47	22	PDTC144WT	PDTA144WT	PDTC144WU	PDTA144WU
			2.2	-	PDTC123TT	PDTA123TT	PDTC123TU	PDTA123TU
			4.7	-	PDTC143TT	PDTA143TT	PDTC143TU	PDTA143TU
			10	-	PDTC114TT	PDTA114TT	PDTC114TU	PDTA114TU
			22	-	PDTC124TT	PDTA124TT	PDTC124TU	PDTA124TU
			47	-	PDTC144TT	PDTA144TT	PDTC144TU	PDTA144TU
			100	-	PDTC115TT	PDTA115TT	PDTC115TU	PDTA115TU

Package					SOT416 (SC-75)		SOT883 (SC-101)	
								
Size (mm)					1.6 x 0.8 x 0.77		1.0 x 0.6 x 0.5	
P_{tot} (mW)					150		250	
V_{CEO} (V)	I_C (mA)	Configuration	R1 (kΩ)	R2 (kΩ)	NPN	PNP	NPN	PNP
50	100		1	1		PDTA113EE		PDTA113EM
			2.2	2.2	PDTC123EE	PDTA123EE	PDTC123EM	PDTA123EM
			4.7	4.7	PDTC143EE	PDTA143EE	PDTC143EM	PDTA143EM
			10	10	PDTC114EE	PDTA114EE	PDTC114EM	PDTA114EM
			22	22	PDTC124EE	PDTA124EE	PDTC124EM	PDTA124EM
			47	47	PDTC144EE	PDTA144EE	PDTC144EM	PDTA144EM
			100	100	PDTC115EE	PDTA115EE	PDTC115EM	PDTA115EM
			1	10		PDTA113ZE		PDTA113ZM
			2.2	10	PDTC123YE	PDTA123YE	PDTC123YM	PDTA123YM
			2.2	47	PDTC123JE	PDTA123JE	PDTC123JM	PDTA123JM
			4.7	10	PDTC143XE	PDTA143XE	PDTC143XM	PDTA143XM
			4.7	47	PDTC143ZE	PDTA143ZE	PDTC143ZM	PDTA143ZM
			10	47	PDTC114YE	PDTA114YE	PDTC114YM	PDTA114YM
			22	47	PDTC124XE	PDTA124XE	PDTC124XM	PDTA124XM
			47	10	PDTC144VE	PDTA144VE	PDTC144VM	PDTA144VM
			47	22	PDTC144WE	PDTA144WE	PDTC144WM	PDTA144WM
			2.2	-	PDTC123TE	PDTA123TE	PDTC123TM	PDTA123TM
			4.7	-	PDTC143TE	PDTA143TE	PDTC143TM	PDTA143TM
			10	-	PDTC114TE	PDTA114TE	PDTC114TM	PDTA114TM
			22	-	PDTC124TE	PDTA124TE	PDTC124TM	PDTA124TM
			47	-	PDTC144TE	PDTA144TE	PDTC144TM	PDTA144TM
			100	-	PDTC115TE	PDTA115TE	PDTC115TM	PDTA115TM

RETs 100 mA double

Package					SOT457 (SC-74)		SOT363 (SC-88)			SOT666		
												
Size (mm)					2.9 x 1.5 x 1.0		2.0 x 1.25 x 0.95			1.6 x 1.2 x 0.55		
P_{tot} (mW)					600		300			300		
V_{CEO} (V)	I_C (mA)		R1 (kΩ)	R2 (kΩ)	NPN/NPN	NPN/PNP	NPN/NPN	NPN/PNP	PNP/PNP	NPN/NPN	NPN/PNP	PNP/PNP
50	100	R1 = R2	2.2	2.2			PUMH20	PUMD20	PUMB20	PEMH20	PEMD20	PEMB20
			4.7	4.7			PUMH15	PUMD15	PUMB15	PEMH15	PEMD15	PEMB15
			10	10		PIMD3	PUMH11	PUMD3	PUMB11	PEMH11	PEMD3	PEMB11
			22	22		PIMD2	PUMH1	PUMD2	PUMB1	PEMH1	PEMD2	PEMB1
			47	47			PUMH2	PUMD12	PUMB2	PEMH2	PEMD12	PEMB2
			100	100			PUMH24	PUMD24	PUMB24	PEMH24	PEMD24	PEMB24
		R1 ≠ R2	2.2	47			PUMH10	PUMD10	PUMB10	PEMH10	PEMD10	PEMB10
			4.7	10			PUMH18	PUMD18	PUMB18	PEMH18	PEMD18	PEMB18
			4.7	47			PUMH13	PUMD13	PUMB13	PEMH13	PEMD13	PEMB13
			10	47	PIMH9		PUMH9	PUMD9	PUMB9	PEMH9	PEMD9	PEMB9
			22	47			PUMH16	PUMD16	PUMB16	PEMH16	PEMD16	PEMB16
			47	22			PUMH17	PUMD17	PUMB17	PEMH17	PEMD17	PEMB17
			47/2.2	47/47				PUMD48			PEMD48	
		Only R1	2.2	-			PUMH30	PUMD30	PUMB30	PEMH30	PEMD30	PEMB30
			4.7	-			PUMH7	PUMD6	PUMB3	PEMH7	PEMD6	PEMB3
			10	-			PUMH4	PUMD4	PUMB4	PEMH4	PEMD4	PEMB4
			22	-			PUMH19	PUMD19	PUMB19	PEMH19	PEMD19	PEMB19
			47	-			PUMH14	PUMD14	PUMB14	PEMH14	PEMD14	PEMB14

RETs 500 mA

Package				SOT457 (SC-74)		SOT23	
Size (mm)				2.9 x 1.5 x 1.0		2.9 x 1.3 x 1.0	
P_{tot} (mW)				600		250	
V_{CEO} (V)	I_C (mA)		R1 (kΩ)	R2 (kΩ)	NPN/NPN	NPN/PNP	NPN	PNP
50	500	R1 = R2	1.0	1.0			PDTD113ET	PDTB113ET
			2.2	2.2			PDTD123ET	PDTB123ET
		R1 ≠ R2	1.0	10	PIMN31	PIMC31	PDTD113ZT	PDTB113ZT
			2.2	10			PDTD123YT	PDTB123YT
		Only R1	2.2	-			PDTD123TT	PDTB123TT

Low V_{CEsat} (BISS) RETs

Package						SOT23
						
Size (mm)						2.9 x 1.3 x 1.0
P_{tot} (mW)						250
Polarity	V_{CEO} (V)	I_C (mA)		R1 (kΩ)	R2 (kΩ)	
NPN	40	600	R1 = R2	1	1	PBRN113ET
				2.2	2.2	PBRN123ET
			R1 ≠ R2	1	10	PBRN113ZT
				2.2	10	PBRN123YT
PNP	40	600	R1 = R2	1	1	PBRP113ET
				2.2	2.2	PBRP123ET
			R1 ≠ R2	1	10	PBRP113ZT
				2.2	10	PBRP123YT

Low V_{CEsat} (BISS) transistors

Low V_{CEsat} (BISS) transistors single NPN

Package											SOT223 (SC-73)	SOT89 (SC-62)	SOT457 (SC-74)	SOT23	SOT1061	SOT323 (SC-70)	SOT363 (SC-88)	SOT416 (SC-75)	SOT666	SOT883 (SC-101)
Size (mm)											6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.0 x 2.0 x 0.65	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.6 x 1.2 x 0.55	1.0 x 0.6 x 0.5
P_{tot} (mW)											1700	1650	750	480	1400	350	430	250	500	250
V_{CEO} (V)	I_C (A)	I_{CM} (A)	h_{FE} min/typ	@ I_C (A)	@ V_{CE} (V)	R_{CEsat} typ (mΩ); I_C/I_B = 10	V_{CEsat} typ (mV); I_C = 0.5 A; I_B = 0.05 A	V_{CEsat} max (mV)	@ I_C (A)	@ I_B (A)										
12	5.3	10.6	300/530	0.5	2	27 [1]	18	200	5.3	0.265		PBSS301NX								
	5.8	11.6	300/530	0.5	2	29 [1]	18	235	5.8	0.29	PBSS301NZ									
	6.0	7.0	280/440	0.5	2	33 [1]	20	275	6	0.3					PBSS4612PA					
15	0.5	1.0	200/325	0.01	2	360	-	250	0.5	0.05										PBSS2515M
			200/425	0.01	2	300	200	250	0.5	0.05								PBSS2515E		
20	1.0	3.0	350/470	0.1	2	220	110 [2]	250	1	0.05				PBSS4120T						
	2.0	4.0	220/410	0.5	2	140	70	350	2	0.2									PBSS4220V	
		5.0	220/330	0.1	2	80	45	310	3	0.3				PBSS4320T						
	3.0	5.0	220/390	0.5	2	85	40	310	3	0.3		PBSS4320X								
	4.0	15.0	300/450	0.5	2	50	30	280	4	0.4			PBSS301ND							
	4.3	8.0	300/550	0.5	2	36	21	220	4	0.2				PBSS4021NT						
	5.0	10.0	300/450	0.5	2	32	35	220	5	0.5		PBSS4520X								
	5.3	10.6	300/570	0.5	2	27 [1]	20	200	5.3	0.265		PBSS302NX								
	5.8	10.2	300/570	0.5	2	30 [1]	20	250	5.8	0.29	PBSS302NZ									
	6.0	7.0	280/440	0.5	2	33 [1]	20	275	6	0.3					PBSS4620PA					
	7.0	15.0	300/550	0.5	2	19	12	210	7	0.35		PBSS4021NX								
	8.0	20.0	300/550	0.5	2	14	9	170	8	0.4	PBSS4021NZ									
30	1.0	3.0	300/450	0.5	2	240	120 [2]	270	1	0.05				PBSS4130T						
	2.0	3.0	300/450	0.5	2	120	70	320	2	0.2				PBSS4230T						
	2.6	5.0	300/500	0.5	2	76	80	320	3	0.3				PBSS4032NT [3]						
	3.0	5.0	300/490	0.5	2	80	45	300	3	0.3		PBSS4330X								
	3.0	5.0	300/465	0.5	2	75	40	300	3	0.3					PBSS4330PA					
	3.5	6.0	300/500	0.5	2	50	70	300	4	0.4			PBSS4032ND [3]							
	4.7	10.0	300/500	0.5	2	45	57	250	4	0.4		PBSS4032NX [3]								
	5.1	10.2	300/480	0.5	2	30 [1]	20	220	5.1	0.255		PBSS303NX								
	5.4	10.0	300/500	0.5	2	45	57	340	4.9	0.27	PBSS4032NZ [3]									
	5.5	11.0	300/480	0.5	2	31 [1]	20	240	5.5	0.275	PBSS303NZ									
	6.0	7.0	280/450	0.5	2	35 [1]	21	275	6	0.3					PBSS4630PA					
40	0.5	1.0	200/550	0.01	2	380	200 [2]	250	0.5	0.05										PBSS2540M
			200/350	0.01	2	380	190	250	0.5	0.05								PBSS2540E		
	1.0	3.0	300/ -	0.5	5	150	70	440	2	0.2									PBSS4140V	
		2.0	300/440	0.5	5	240	130	500	1	0.1						PBSS4140U				
			300/510	0.5	5	230	120	500	1	0.1				PMMT491A						
			300/420	0.5	5	150	130	500	1	0.1				PBSS4140T						
	2.0	3.0	300/400	0.5	5	150	70	400	2	0.2									PBSS4240V	
			350/470	0.1	2	120	70	320	2	0.2							PBSS4240Y			
			300/450	0.5	2	120	70	320	2	0.2				PBSS4240T						
	4.0	15.0	300/520	0.5	2	55	35	300	4	0.4			PBSS302ND							
		10.0	300/500	0.5	2	40	21	355	5	0.5		PBSS4540X								
	5.0	10.0	300/500	0.5	2	42	25	355	5	0.5	PBSS4540Z									
50	2.0	5.0	300/495	0.5	2	100	60	260	2	0.2				PBSS4350T						
			300/ -	0.5	2	160	90 [2]	320	2	0.2		PBSS4250X								
	3.0	5.0	200/280	0.5	2	110	65	290	2	0.2			PBSS4350D							
			300/460	0.5	2	75	50	370	3	0.3		PBSS4350X								
			200/280	0.5	2	110	60 [1]	290	2	0.2	PBSS4350Z									
60	1.0	2.0	200/400	0.5	5	200	110	250	1	0.1									PBSS4160V	
			200/420	0.5	5	230	120	280	1	0.1						PBSS4160U				
			200/350	0.5	5	200	110	250	1	0.1				PBSS4160T						
	3.0	6.0	345/570	0.5	2	65	40	260	3	0.3			PBSS303ND							
	3.8	8.0	300/500	0.5	2	46	29	200	3	0.3				PBSS4041NT						
	4.7	9.4	300/520	0.5	2	37 [1]	25	245	4.7	0.235		PBSS304NX								
	5.2	10.4	300/520	0.5	2	39 [1]	25	280	5.2	0.26	PBSS304NZ									
	6.0	7.0	280/440	0.5	2	34 [1]	22	290	6	0.3					PBSS4560PA					
	6.2	15.0	300/500	0.5	2	25	17	230	6	0.3		PBSS4041NX								
	7.0	15.0	300/500	0.5	2	17.5	13	195	7	0.35	PBSS4041NZ									
80	3.0	6.0	240/360	0.5	2	67	40	255	3	0.3			PBSS304ND							
	4.0	10.0	250/400	0.5	2	43 [1]	25	230	4	0.2		PBSS4480X								
	4.6	9.2	300/470	0.5	2	37 [1]	25	240	4.6	0.23		PBSS305NX								
	5.1	10.2	300/470	0.5	2	38 [1]	25	270	5.1	0.255	PBSS305NZ									
	5.6	7.0	270/425	0.5	2	40 [1]	25	320	5.6	0.28					PBSS4580PA					
100	1.0	3.0	150/400	0.25	10	160	80	200	1	0.1							PBSS8110Y			
			150/300	0.25	10	165	70	200	1	0.1				PBSS8110T						
			150/290	0.25	10	160	75	200	1	0.1			PBSS8110D							
			150/290	0.25	10	165	73	200	1	0.1		PBSS8110X								
			150/290	0.25	10	160	73	200	1	0.1	PBSS8110Z									
	3.0	4.0	170/275	0.5	2	72	45	360	4	0.4			PBSS305ND							
	4.5	9.0	200/330	0.5	2	38 [1]	27	245	4.5	0.225		PBSS306NX								
	5.1	10.2	200/330	0.5	2	43 [1]	27	300	5.1	0.255	PBSS306NZ									
	5.2	6.0	180/285	0.5	2	48 [1]	30	340	5.2	0.26					PBSS8510PA					

[1] I_C/I_B = 20
[2] V_{CEsat} (max)
[3] optimized for high speed switching

Low V_{CEsat} (BISS) transistors single PNP

Package											SOT223 (SC-73)	SOT89 (SC-62)	SOT457 (SC-74)		SOT23	SOT1061	SOT323 (SC-70)	SOT363 (SC-88)	SOT416 (SC-75)	SOT666	SOT883 (SC-101)
Size (mm)											6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.5 x 1.0		2.9 x 1.3 x 1.0	2.0 x 2.0 x 0.65	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.6 x 1.2 x 0.55	1.0 x 0.6 x 0.5
P_{tot} (mW)											1700	1650	750		480	1400	350	430	250	500	250
V_{CEO} (V)	I_C (A)	I_{CM} (A)	h_{FE} min/typ	@ I_C (V)	@ V_{CE} (V)	R_{CEsat} typ (mΩ); I_C/I_B = 10	V_{CEsat} typ (mV); I_C = 0.5 A; I_B = 0.05 A	V_{CEsat} max (mV)	@ I_C (A)	@ I_B (A)											
12	5.3	10.6	250/400	0.5	2	28 [1]	20	210	5.3	0.265		PBSS301PX									
	5.7	11.4	250/400	0.5	2	30 [1]	20	245	5.7	0.285	PBSS301PZ										
	6.0	7.0	220/335	0.5	2	33 [1]	20	300	6	0.3						PBSS5612PA					
15	0.5	1.0	200/260	0.01	2	300	150	250	0.5	0.05											PBSS3515M
			200/325	0.01	2	300	150	250	0.5	0.05									PBSS3515E		
20	1.0	2.0	300/450	0.1	2	250	125 [2]	250	1	0.05					PBSS5120T						
	2.0	4.0	220/440	0.1	2	140	75	390	2	0.2										PBSS5220V	
		3.0	225/ -	0.5	2	115	80 [2]	225	2	0.2					PBSS5220T						
		5.0	220/420	0.5	2	75	50	210	2	0.2					PBSS5320T						
	3.0	5.0	200/ -	0.5	2	85	80 [2]	400	3	0.3			PBSS5320D								
			220/450	0.5	2	90	50	300	3	0.3		PBSS5320X									
	3.5	8.0	250/400	0.5	2	55	35	375	4	0.2					PBSS4021PT						
	4.0	15.0	250/400	0.5	2	50	35	280	4	0.4			PBSS301PD								
	5.0	10.0	300/430	0.5	2	34	45	270	5	0.5		PBSS5520X									
	5.1	10.2	250/370	0.5	2	32 [1]	25	230	5.1	0.255		PBSS302PX									
	5.5	11.0	250/370	0.5	2	34 [1]	25	265	5.5	0.275	PBSS302PZ										
	6.0	7.0	230/345	0.5	2	39 [1]	25	350	6	0.3						PBSS5620PA					
	6.2	15.0	250/400	0.5	2	23	18	240	6	0.3		PBSS4021PX									
	6.6	20.0	250/400	0.5	2	22	16	240	7	0.35	PBSS4021PZ										
30	1.0	3.0	260/350	0.5	2	220	110	225	1	0.05					PBSS5130T						
	2.0	3.0	300/450	0.1	2	160	70	350	2	0.2					PBSS5230T						
	2.4	5.0	200/320	0.5	2	110	95	330	2	0.2					PBSS4032PT [3]						
	2.7	5.0	200/350	0.5	2	88	87	395	3	0.3			PBSS4032PD [3]								
	3.0	5.0	200/380	0.5	2	80	50	320	3	0.3		PBSS5330X									
	3.0	5.0	200/320	0.5	2	75	45	320	3	0.3						PBSS5330PA					
	4.2	10.0	200/350	0.5	2	58	70	345	4	0.4		PBSS4032PX [3]									
	4.4	10.0	200/350	0.5	2	58	70	400	4	0.2	PBSS4032PZ [3]										
	5.1	10.2	250/400	0.5	2	32 [1]	25	230	5.1	0.255		PBSS303PX									
	5.3	10.6	250/400	0.5	2	35 [1]	25	265	5.3	0.265	PBSS303PZ										
	6.0	7.0	200/335	0.5	2	39 [1]	25	350	6	0.3						PBSS5630PA					
40	0.5	1.0	200/380	0.01	2	440	220	350	0.5	0.05											PBSS3540M
			200/380	0.01	2	440	230	350	0.5	0.05									PBSS3540E		
	1.0	2.0	300/ -	0.1	5	200	120	310	1	0.1										PBSS5140V	
			300/520	0.1	5	230	130	500	1	0.1							PBSS5140U				
			300/800	0.1	5	250	130	500	1	0.1					PMMT591A						
			300/510	0.1	5	230	130	500	1	0.1					PBSS5140T						
	1.8	3.0	300/450	0.1	5	185	100	530	2	0.2										PBSS5240V	
	2.0	3.0	300/ -	0.1	2	200	110 [2]	350	2	0.2								PBSS5240Y			
			300/450	0.1	2	150	70	350	2	0.2					PBSS5240T						
	4.0	15.0	200/310	0.5	2	55	46	300	4	0.4			PBSS302PD								
		10.0	250/370	0.5	2	45	33	375	5	0.5		PBSS5540X									
	5.0	10.0	250/350	0.5	2	55	40 [1]	160	2	0.2	PBSS5540Z										
50	2.0	3.0	200/ -	0.5	2	150	90 [2]	300	2	0.1					PBSS5250T						
		5.0	200/360	0.5	2	90	55	270	2	0.2					PBSS5350T						
			200/ -	0.5	2	160	90 [2]	320	2	0.2		PBSS5250X									
	3.0	5.0	200/300	0.5	2	120	70	300	2	0.2			PBSS5350D								
			200/375	0.5	2	120	70	390	3	0.3		PBSS5350X									
			200/300	0.5	2	120	70	300	2	0.2	PBSS5350Z										
60	1.0	2.0	150/250	0.5	5	220	120	330	1	0.1										PBSS5160V	
			150/250	0.5	5	255	135	340	1	0.1							PBSS5160U				
			150/250	0.5	5	220	120	330	1	0.1					PBSS5160T						
	2.7	8.0	200/300	0.5	2	80	49	360	3	0.3					PBSS4041PT						
	3.0	6.0	180/265	0.5	2	70	55	290	3	0.3			PBSS303PD								
	4.2	8.4	200/295	0.5	2	53 [1]	35	310	4.2	0.21		PBSS304PX									
	4.5	9.0	200/295	0.5	2	59 [1]	35	375	4.5	0.225	PBSS304PZ										
	5.0	6.0	170/260	0.5	2	35 [1]	35	450	5	0.25						PBSS5560PA					
		15.0	200/300	0.5	2	40	30	300	5	0.5		PBSS4041PX									
	5.7	15.0	200/300	0.5	2	29	22	285	6	0.3	PBSS4041PZ										
80	3.0	5.0	155/225	0.5	2	71	55	290	3	0.3			PBSS304PD								
	4.0	5.0	180/265	0.5	2	65 [1]	40	420	4	0.2						PBSS5580PA					
		10.0	200/300	0.5	2	50	35	380	5	0.5		PBSS5480X									
		8.0	200/280	0.5	2	43	36	240	4	0.4		PBSS305PX									
	4.5	9.0	200/280	0.5	2	69 [1]	36	450	4.5	0.225	PBSS305PZ										
100	1.0	3.0	150/ -	0.25	5	170	93	320	1	0.1								PBSS9110Y			
			150/350	0.5	5	170	95	320	1	0.1					PBSS9110T						
			150/350	0.5	5	170	100	320	1	0.1			PBSS9110D								
			150/350	0.5	5	170	90	320	1	0.1		PBSS9110X									
			150/ -	0.5	5	170	90	320	1	0.1	PBSS9110Z										
	2.0	3.0	175/275	0.5	2	88	65	250	2	0.2			PBSS305PD								
	2.7	4.0	180/295	0.5	2	110 [1]	45	450	2.7	0.135						PBSS9410PA					
	3.7	7.4	200/300	0.5	2	52	45	300	4	0.4		PBSS306PX									
	4.1	8.2	200/300	0.5	5	57	45	325	4.1	0.41	PBSS306PZ										

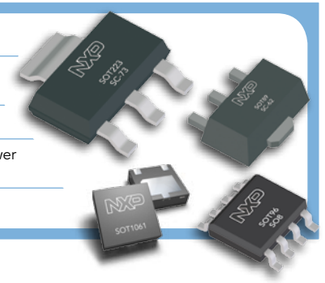
[1] I_C/I_B = 20
[2] V_{CEsat} (max)
[3] optimized for high speed switching

Low V_{CEsat} (BISS) transistors

In the Spotlight

New low V_{CEsat} (BISS) transistors

- Industry's first combination of reduced switching times (down to 125 ns) with minimized saturation voltage (below 50 mV)
- Voltage range from 12 V to 100 V
- Flexible package options, from standard SMD to brand new medium power leadless package SOT1061 (2 x 2 x 0.65 mm)
- Benchmark for reduced on-state-resistance



Low V_{CEsat} (BISS) double transistors

Package										SOT96 (SO8)	SOT457 (SC-74)	SOT363 (SC-88)	SOT666
Size (mm)										4.9 x 3.9 x 1.75	2.9 x 1.5 x 1.0	2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55
P_{tot} (mW)										2000 [2]	750	430	500
V_{CEO} (V)	I_C (A)	Polarity	h_{FE} min	@ I_C (A)	@ V_{CE} (V)	V_{CEsat} typ (mV); I_C = 0.5 A; I_B = 0.05 A	V_{CEsat} max (mV)	@ I_C (A)	@ I_B (A)				
15	0.5	2 x PNP	200	0.01	2	170 [1]	250	0.5	0.05				PBSS3515VS
		NPN/PNP	200	0.01	2	170 [1]	250	0.5	0.05				PBSS2515VPN
		NPN/PNP	200	0.01	2	170 [1]	250	0.5	0.05			PBSS2515YPN	
20	7.5	NPN/NPN	300	0.5	2	15	150	4	0.2	PBSS4021SN			
	6.3	PNP/PNP	250	0.5	2	24	225	4	0.2	PBSS4021SP			
	7.5 / 6.3	NPN/PNP	300/250	0.5	2	15/24	150/225	4	0.2	PBSS4021SPN			
30	5.7	NPN/NPN	300	0.5	2	57	250	4	0.4	PBSS4032SN [3]			
	4.8	PNP/PNP	200	0.5	2	70	390	4	0.4	PBSS4032SP [3]			
	5.7 / 4.8	NPN/PNP	300/200	0.5	2	57/70	250/390	4	0.4	PBSS4032SPN [3]			
40	1.0	NPN/PNP	300/250	0.5	5	130/150	500	1	0.1		PBSS4140DPN		
	2.0	NPN/PNP	300/250	0.5	5	80/100	400/530	2	0.2		PBSS4240DPN		
50	2.7	2 x NPN	300	0.5	2	50	340	2.7	0.27	PBSS4350SS			
		2 x PNP	200	0.5	2	60	370	2.7	0.27	PBSS5350SS			
		NPN/PNP	300/200	0.5	2	50/60	340/370	2.7	0.27	PBSS4350SPN			
60	1.0	2 x NPN	200	0.5	5	115	250	1	0.1		PBSS4160DS		
		2 x PNP	150	0.5	5	120	330	1	0.1		PBSS5160DS		
		NPN/PNP	200/150	0.5	5	115/120	250/330	1	0.1		PBSS4160DPN		
	6.7	NPN/NPN	300	0.5	2	20	190	4	0.2	PBSS4041SN			
	5.9	PNP/PNP	200	0.5	2	35	330	4	0.2	PBSS4041SP			
	6.7 / 5.9	NPN/PNP	300/200	0.5	2	20/35	190/330	4	0.2	PBSS4041SPN			

[1] I_c/I_b=20
[2] Device mounted on a ceramic PCB, Al2O3, standard footprint.
[3] Optimized for high speed switching

Low V_{CEsat} (BISS) load switches

Package				SOT96 (SO8)	SOT457 (SC-74)		SOT363 (SC-88)	SOT666
Size (mm)				4.9 x 3.9 x 1.75	2.9 x 1.5 x 1.0		2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55
P_{tot} (mW)				1500 [1]	750 [1]	600 [1]	300 [2]	300 [2]
V_{CEO} (V)	I_C (A)	V_{CEsat} max (mV); I_C = 0.5 A; I_B = 0.05 A	R1, R2 (kΩ)					
15	0.5	250	2.2				PBLS1501Y	PBLS1501V
			4.7				PBLS1502Y	PBLS1502V
			10				PBLS1503Y	PBLS1503V
			22				PBLS1504Y	PBLS1504V
20	1	150	2.2			PBLS2001D		
			4.7			PBLS2002D		
			10			PBLS2003D		
			22			PBLS2004D		
	1.8	70	2.2		PBLS2021D			
			4.7		PBLS2022D			
			10		PBLS2023D			
			22		PBLS2024D			
	3	75	2.2	PBLS2001S				
			4.7	PBLS2002S				
			10	PBLS2003S				
40	0.5	350	2.2				PBLS4001Y	PBLS4001V
			4.7				PBLS4002Y	PBLS4002V
			10				PBLS4003Y	PBLS4003V
			22				PBLS4004Y	PBLS4004V
			47				PBLS4005Y	PBLS4005V
	1	170	2.2			PBLS4001D		
			4.7			PBLS4002D		
			10			PBLS4003D		
			22			PBLS4004D		
			47			PBLS4005D		
60	1	180	2.2			PBLS6001D		
			4.7			PBLS6002D		
			10			PBLS6003D		
			22			PBLS6004D		
			47			PBLS6005D		
	1.5	100	2.2		PBLS6021D			
			4.7		PBLS6022D			
			10		PBLS6023D			
			22		PBLS6024D			

[1] Device mounted on a ceramic PCB, Al_2O_3, standard footprint
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint

Key features

- Low V_{CEsat} (BISS) transistor and resistor-equipped transistor (RET) in one package
- Low saturation voltage
- Low 'threshold' voltage (<1 V) compared to MOSFET
- Low drive power required
- Range of small, very small and ultra small packages

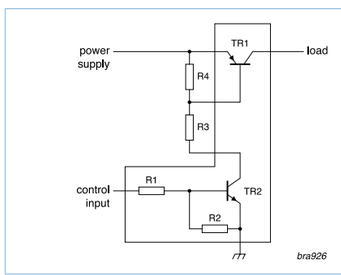
Key benefits

- Smaller end products
- Reduced component count
- Less sourcing effort
- Fewer solder points increase reliability
- Cost reduction
- More efficient, cooler running systems

Key applications

- Supply line switch
- Battery charger
- High-side switch for LEDs, drivers and backlights
- Portable equipment

BISS load switch



High voltage low V_{CEsat} (BISS) transistors

types in **bold** represent new products

Package				SOT223 (SC-73)	SOT89 (SC-62)	SOT23
Size (mm)				6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.3 x 1.0
P_{tot} (mW)				1700	1300	250
Polarity	**V_{CESM} [1]**	**V_{CEO} (V)**	**I_C (A)**			
NPN	-	150	1	PBHV8115Z		PBHV8115T
			2	PBHV8215Z		
		180	1			**PBHV8118T**
	500	400	0.5	PBHV8540Z		PBHV8540T
			1	PBHV8140Z		
		500	0.15			PMBTA45
PNP	-	150	1	PBHV9115Z	PBHV9115X	PBHV9115T
			2	PBHV9215Z		
	500	400	0.25	PBHV9040Z		PBHV9040T
			0.5	PBHV9540Z		
		500	0.15			PBHV9050T
			0.25	PBHV9050Z		

[1] Collector-emitter peak voltage

In the Spotlight

High voltage low V_{CEsat} (BISS) transistors in SOT223 & SOT23

- Voltage V_{CEO} up to 500 V
- Current I_C up to 1 A (continuous), 2 A (peak)
- V_{CEsat} down to 33 mV at I_B = 20 mA
- AEC-Q101 qualified

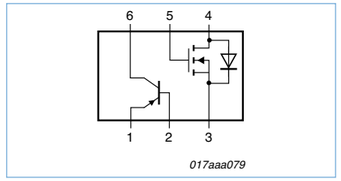
Low V_{CEsat} (BISS) RETs

Package					SOT23	
Size (mm)					2.9 x 1.3 x 1.0	
P_{tot} (mW)					250	
V_{CEO} (V)	**I_C (mA)**		**R1 (kΩ)**	**R2 (kΩ)**	NPN	PNP
40	600	R1 = R2	1	1	PBRN113ET	PBRP113ET
			2.2	2.2	PBRN123ET	PBRP123ET
		R1 ≠ R2	1	10	PBRN113ZT	PBRP113ZT
			2.2	10	PBRN123YT	PBRP123YT

Low V_{CEsat} (BISS) transistor PNP – N-channel MOSFET combination

types in **bold** represent new products

Package											SOT1118
Size (mm)											2.0 x 2.0 x 0.65
P_{tot} (mW)											1300
V_{CEO} (V)	**I_C (A)**	**h_{FE} min**	**h_{FE} max**	**@ I_C (mA)**	**@ V_{CE} (V)**	**R_{CEsat} typ (mΩ)**	**V_{DS} (V)**	**V_{GS} (V)**	**I_D (A)**	**R_{Dson} typ (mΩ)**	
40	2	300	800	100	5	240	30	0.7	0.66	390	**PBSM5240PF**



Combination of Low V_{CEsat} transistor with N-channel MOSFET in the very small and ultra thin leadless package SOT1118

Advantages of low V_{CEsat} (BISS) technology

Our BISS (Breakthrough In Small-Signal) transistors show lowest V_{CEsat} values due to an innovative mesh-emitter technology and further technology improvement. Benefit from:

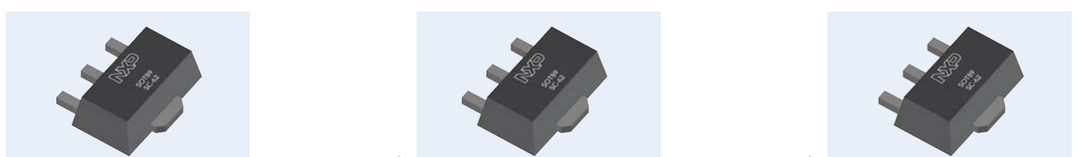
Reduction in board space

- Stable performance at smaller footprint
- I_C = 0.5 A; V_{CEO} = 40 – 45 V

SOT23	SOT416 (SC-75)	SOT883 (SC-101)
8.15 mm²	4.4 mm²	1.17 mm²
BC817xx	PBSS2540E	PBSS2540M
General purpose transistor	BISS transistor technology	BISS transistor technology

Improved collector current capabilities

- 17.87 mm² footprint



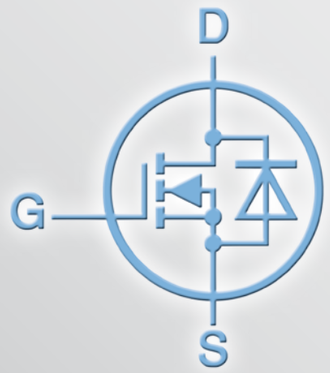
SOT89 (SC-62)	SOT89 (SC-62)	SOT89 (SC-62)
1 A	3 A	6.2 A
BCX51	PBSS5350X	PBSS4021PX
General purpose transistor	BISS transistor technology	BISS transistor technology

High voltage bipolar transistors for lighting, SMPS and industrial applications

types in **bold** represent new products

V_{CESM} (V)	$I_{C(DC)}$ (max) (A)	25 °C ind. t_f (typ) (ns)	@ I_C (A)	h_{FE} (typ)	@ I_C (A)	SOT54 (TO92)	SOT78 (TO220AB)	SOT186A (isolated TO220AB)	SOT404 (D^2PAK)	SOT428 (DPAK)
										
700	1	80	1	7.5	0.8	BUJ100LR				
	1	80	1	7.5	0.8	PHE13003A				
	1	50	1	14	0.75	BUJ100				
	1.5	100	0.5	9	1	PHE13003C				
	1.5	100	0.5	9	1	PHD13003C[1]				
	4	30	2	12.5	3		BUJ103A	BUJ103AX		BUJ103AD
	4	30	2	12.5	3					BUJD103AD[1]
	4	100	2	17	2		PHE13005	PHE13005X		
	4	100	2	17	2		PHD13005[1]			
	8	20	5	11	4		BUJ105A		BUJ105AB	BUJ105AD
	8	20	5	11	4					BUJD105AD[1]
	8	40	5	9	5		PHE13007			
	10	20	5	11	6		BUJ106A			
	12	100	5	6 min - 30 max	8		PHE13009			
850	4	30	2	12.5	3		**BUJD203A**[1]	**BUJD203AX**[1]		**BUJD203AD**[1]
1000	5	145	2.5	12	3		BUJ303A	**BUJ303AX**		**BUJ303AD**
1050	4	520	2	41	0.8		**BUJ302A**	**BUJ302AX**		**BUJ302AD**
	5	200	2.5	10.5	3		BUJ303B			
1200	6	170	2.5	15.5	3		BUJ403A			

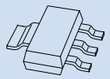
[1] Integrated freewheeling diode



MOSFETs

Small-signal MOSFETs

Small-signal MOSFETs single (N-channel) < 50 V

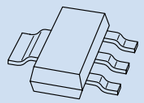
Package													SOT223 (SC-73)		TSOP6 SOT457 (SC-74)	SOT23	SOT363 (SC-88)	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
																				
Size (mm)													6.5 x 3.5 x 1.65		2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)													1700		600	250	300	200	150	250
V_{DS} (V)	V_{GS} (V)	I_D (A)	V_{GS}(th) min (V)	V_{GS}(th) max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} =											
									10 V	4.5 V	2.5 V	1.8 V								
12	8	5.7	0.4	-	23	67	10.1	-	-	28	-	39			PMN28UN					
20	8	tbd	tbd	tbd	tbd	tbd	tbd	-	-	16	tbd	tbd				PMV16UN*				
		6.3	2	4	23	71	10.6	-	-	23	-	37			PMN23UN					
		5.7	0.4	-	23	71	10.6	-	-	27	-	39			PMN27UN					
		tbd	tbd	tbd	tbd	tbd	tbd	-	-	28	tbd	tbd				PMV28UN*				
		5.7	0.45	-	20	66	7.4	-	-	30	-	44				PMV30UN [1]				
		3.76	0.65	-	35	84	5.4	-	-	56	77	-				PMV56XN [1]				
		2.5	0.65	-	35	84	5.4	-	-	56	77	-				SI2302DS				
		1.05	0.4	-	6.5	65	-	-	-	140	-	240				BSH105				
		2.28	0.45	0.95	14.5	23.5	0.89	-	-	250	-	420								PMZ250UN
		1	0.45	1	14.5	23.5	0.89	-	-	280	-	460						PMF280UN	PMR280UN	
	12	tbd	tbd	tbd	tbd	tbd	tbd	-	-	30	tbd	-				PMV30XN*				
		5.9	0.5	1.5	25	37	5.8	-	-	31	44	-				PMV31XN [1]				
		2.15	0.5	1.5	16	17	0.72	-	-	270	440	-								PMZ270XN
		1	0.5	1.5	16	17	0.72	-	-	290	460	-						PMF290XN	PMR290XN	
	15	5.7	1	2	24	35	13.1	-	28	34	-	-			PMN34LN					
		4.1	1	2	24	35	13.1	-	55	70	-	-			PMN55LN					
30	8	4.9	0.45	-	22	60	9.9	-	-	38	-	54			PMN34UN					
		4.9	0.45	-	18	50	9.3	-	-	40	-	55				PMV40UN [1]				
		1.78	0.45	0.95	11.5	22.5	0.89	-	-	390	-	550								PMZ390UN
		0.85	0.4	-	6	27	-	-	-	400 [2]	-	600 [2]				BSH103				
		0.8	0.45	1	11.5	22.5	0.89	-	-	400	-	580						PMF400UN	PMR400UN	
	12	tbd	tbd	tbd	tbd	tbd	tbd	-	-	20	tbd	-				PMV20XN*				
		tbd	tbd	tbd	tbd	tbd	tbd	-	-	250	tbd	-						PMF250XN*		
		1.87	0.5	1.5	16	19.5	0.65	-	-	350	520	-								PMZ350XN
		0.87	0.35	-	16	19.5	-	-	-	370	550	-						PMF370XN		
		0.9	0.5	-	16	19.5	0.65	-	-	370	550	-					PMG370XN		PMR370XN	
	15	5.4	1	2	12	27	13.8	-	32	40	-	-			PMN40LN					
	20	tbd	tbd	tbd	tbd	tbd	tbd	-	tbd	15	tbd	-			PMN15EN*					
		tbd	tbd	tbd	tbd	tbd	tbd	-	tbd	18	tbd	-				PMV18EN*				
		10	1	2.8	18	44	24	-	20	30	-	-	BSP030							
		tbd	tbd	tbd	tbd	tbd	tbd	-	tbd	31	tbd	-				PMV31EN*				
		tbd	tbd	tbd	tbd	tbd	tbd	-	tbd	35	tbd	-			PMN35EN*					
		5.4	1	2	33	44	6.1	-	31	38	-	-			PMN38EN					
		5.2	1	2	33	44	6.1	-	32	42	-	-			PMN45EN					
		5.4	1	2	12	21.5	9.4	-	35	45	-	-				PMV45EN [1]				
		4.6	1	2	8.4	17.8	8.8	-	40	49	-	-			PMN49EN					
		4.7	1	2	12	23.5	9.4	-	47	60	-	-				PMV60EN [1]				
		1.9	1	2	11	41	6.4	-	77	102	-	-				BSH108				
		2.5	1.5	-	12	23.5	4.6	-	74	117	-	-				PMV117EN				
		6	1	2.8	14	36	-	-	80	120	-	-	BSP100							
		1.7	1.5	-	11.5	31	4.6	-	117 [2]	190 [2]	-	-				SI2304DS				

[1] Enhanced thermal capability
[2] Max values
* Products to be released in 2011. For new product information, please check **http://standardproducts.nxp.com/mosfets**

Small-signal MOSFETs

Small-signal MOSFETs single (N-channel) ≥ 50 V

types in **bold** represent new products

Package									SOT223 (SC-73)		SOT89 (SC-62)	SOT23	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
															
Size (mm)									6.5 x 3.5 x 1.65		4.5 x 2.5 x 1.5	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)									1700		1300	250	200	150	250
V_{DS} (V)	V_{GS} (V)	I_D (A)	V_{GS}(th) min (V)	V_{GS}(th) max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} = 10 V	4.5 V	2.5 V	1.8 V					
50	20	0.1	0.4	1.8	2	5	-	-	2800	3800 [3]	-	-			BSN20		
55	8	0.3	0.4	1.3	4	11	1	-	-	2300	2400	3100				BSH121	
	10	0.335	0.4	1.3	4	11	1	-	-	2300	2400	3100			BSH111		
	13	2.5	2	4	-	-	-	2	120	-	-	-	PHT6N06T				
		3.5	1	2	-	-	-	2	-	65	-	-	PHT8N06LT				
		2.5	1	2	-	-	-	2	-	120	-	-	PHT6N06LT				
60	15	0.26	1	3.3	3	9	-	1	2800	3800	-	-				PMF3800SN	
	20	0.25	0.8	3	-	-	-	-	2500	-	-	-			PMBF170		
		0.36	0.9	1.5	5	13	0.72	-	900	1000	-	-			**BSS138P**	**BSS138PW**	
		1.22	1	3	6	7.2	1.05	-	760	1100	-	-					PMZ760SN
		0.57	1	-	6	7.2	-	-	780	1100	-	-				PMF780SN	
		0.55	1	3	6	7.2	1.05	-	780	1100	-	-					PMR780SN
		0.3	1	2.5	7	15	0.6	-	1000	1300	-	-			**2N7002P**	**2N7002PW**	**2N7002PT**
		0.3	1	2.5	11	19	0.5	2	1000	1300	-	-			**2N7002BK**	**2N7002BKW**	**2N7002BKT**	**2N7002BKM**
		0.3	1	2.5	16	60	1.09	3	1100	1300	-	-			**2N7002CK**			
		0.34	1	-	3	9	-	1	2800	3800	-	-			2N7002K			
	30	0.385	1	2.5	2.5	11	0.69	-	780	1200	-	-			2N7002E			
		0.475	1	2.5	2.5	11	0.69	-	780	1200	-	-			2N7002F			
		0.3	1	2.5	2.5	11	-	-	2800	3800	-	-			2N7002			
100	16	3.5	1	2	14	73	-	-	-	200	-	-	PHT4NQ10LT				
	20	3	2	4	-	-	-	-	57	-	-	-	PHT6NQ10T				
		3.5	2	4	21	31	7.4	-	200	-	-	-	PHT4NQ10T				
		0.85	2	4	19	13	4.6	-	400	-	-	-			BSH114		
		0.15	1	2.8	3	12	-	-	3500	-	-	-			BSS123		
		0.19	1	-	3	12	-	-	-	5000	-	-			BST82		
		0.52	1	-	3	12	-	-	-	5000	-	-	BSP110				
	30	1.9	2	4	10.5	12.5	7	-	213	-	-	-			PMV213SN [1]		
200	20	0.4	0.8	2.8	6	49	-	-	1600	-	-	-					
		0.55	0.4	2	10	45	-	-	1700	-	3000	-	BSP122				
240	20	0.375	0.8	2	6	47	-	-	2800	7500 [2]	-	-	BSP89				
250	20	0.35	0.8	2	6	47	-	-	2800	-	-	-	BSP126				
300	20	0.35	0.8	2	6	46	-	-	3700	-	4800	-	BSP130				

[1] Enhanced thermal capability
[2] Max values
[3] @ V_{gs} = 5 V

In the Spotlight

2N7002BKx - 2N7002 ESD-protected 60 V N-channel MOSFET-series in several SMD packages

- ESD protection up to 2 kV in several SMD packages
- Available in single and dual configuration
- Very fast switching
- TrenchMOS technology
- AEC-Q101 qualified

MOSFETs

Small-signal MOSFETs

Small-signal MOSFETs dual (N-channel)

types in **bold** represent new products

Package													SOT363 (SC-88)	SOT666 (SC-88)
Size (mm)													2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55
P_{tot} (mW)													300	300
V_{DS} (V)	V_{GS} (V)	I_D (A)	V_{GS}(th) min (V)	V_{GS}(th) max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} = 10 V	4.5 V	2.5 V	1.8 V		
20	8	0.87	0.45	1	14.5	23.5	-	-	-	280	-	460	PMGD280UN	
	12	0.86	0.5	1.5	16	17	0.72	-	-	290	460	-	PMGD290XN	
30	8	0.71	0.45	1	11.5	22.5	0.89	-	-	400	-	580	PMGD400UN	
	12	0.74	0.5	1.5	17	19.5	0.65	-	-	370	550	-	PMGD370XN	
	15	0.125	0.8	1.5	17	22	0.35	-	-	1800	2900	-	PMGD8000LN	
60	20	0.49	1	-	6	7.2	1.05	-	780	1100	-	-	PMGD780SN	
		0.36	0.9	1.5	5	13	0.72	-	900	1000	-	-	**BSS138PS**	
		0.3	1	2.5	7	15	0.6	-	1000	1300	-	-	**2N7002PS**	**2N7002PV**
		0.3	1	2.5	11	19	0.5	2	1000	1300	-	-	**2N7002BKS**	**2N7002BKV**

In the Spotlight

20 V, 100 mΩ P-channel enhancement mode Field-Effect Transistor (FET) – NX2301P

- Housed in a small SMD plastic package SOT23
- Very fast switching
- TrenchMOS technology
- AEC-Q101 qualified
- 1.8 V R_{DSon} rated for Low Voltage Gate Drive

Small-signal MOSFETs single (P-channel)

types in **bold** represent new products

Package													SOT223 (SC-73)	SOT89 (SC-62)	TSOP6 SOT457 (SC-74)	SOT23	SOT363 (SC-88)	SOT323 (SC-70)	SOT416 (SC-75)	SOT883 (SC-101)
Size (mm)													6.5 x 3.5 x 1.65	4.5 x 2.5 x 1.5	2.9 x 1.5 x 1.0	2.9 x 1.3 x 1.0	2.0 x 1.25 x 0.95	2.0 x 1.25 x 0.95	1.6 x 0.8 x 0.77	1.0 x 0.6 x 0.5
P_{tot} (mW)													1700	1300	600	250	300	200	150	250
V_{DS} (V)	V_{GS} (V)	I_D (A)	V_{GS}(th) min (V)	V_{GS}(th) max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} = 10 V	4.5 V	2.5 V	1.8 V								
12	8	1.52	0.4	-	6.5	65	-	-	-	80	-	140			BSH207					
		0.75	0.4	-	6.5	65	-	-	-	180	-	420				BSH205 [1]				
20	8	tbd	tbd	tbd	tbd	tbd	tbd	-	-	21	tbd	tbd			PMN21UP*					
		tbd	tbd	tbd	tbd	tbd	tbd	-	-	27	tbd	tbd			PMN27UP*	PMV27UP*				
		2	0.5	1.1	7	50	6	-	-	100	-	-				**NX2301P**				
	12	4.8	0.55	0.95	16	117	10	-	-	48	65	-			PMN50XP					
		3.5	0.75	1.25	24	84	8.5	-	-	48	71	-			PMN48XP*	**PMV48XP**				
		3.9	0.55	0.95	28	101	7.6	-	-	65	90	-				PMV65XP [1]				
		3.5	0.75	1.25	tbd	tbd	tbd	-	-	85	tbd	tbd					PMG85XP*			
		3.5	0.75	1.25	tbd	tbd	tbd	-	-	170	tbd	tbd						PMF170XP*		
30	8	0.47	0.4	-	6.5	65	-	-	-	660	-	1100				BSH203				
	20	3	1	2.8	20	50	-	-	220	330	-	-	BSP250							
		0.52	1	-	6.5	65	-	-	630	890	-	-				BSH202				
50	20	0.2	tbd	tbd	tbd	tbd	tbd	1	5300	6000	-	-				BSS84AK*		BSS84AKW*	BSS84AKT*	BSS84AKM*
		0.13	0.8	2	3	7	-	-	6000	-	-	-				BSS84				
60	20	0.3	1	-	6.5	65	-	-	2100	2700	-	-				BSH201				
200	20	0.225	0.8	2.8	5	20	-	-	10000	-	-	-	BSP220							
240	20	0.2	0.8	2.8	5	20	-	-	10000	-	-	-		BSS192						
250	20	0.225	0.8	2.8	5	10	-	-	10000	-	-	-	BSP225							
300	20	0.21	1.95	2.8	5	15	-	-	17000 [2]	-	-	-	BSP230							

[1] Enhanced thermal capability
[2] Max values
* Products to be released in 2011. For new product information, please check **http://standardproducts.nxp.com/mosfets**

Small-signal MOSFET – Schottky combination

types in **bold** represent new products

Package															SOT1118
Size (mm)															2.0 x 2.0 x 0.65
P_{tot} (mW)															1250
Configuration	V_{DS} (V)	V_{GS} (V)	I_D (A)	$V_{GS}(th)$ min (V)	$V_{GS}(th)$ max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	I_F (A)	V_R (V)	V_F typ. (mA)	R_{DSon} typ (mΩ) @ V_{GS} = 4.5 V	2.5 V	1.8 V	
single + schottky	20	8	3.3	0.5	1.5	15	92	4.5	1	2	30	455	58	72	100	**PMFPB6545UP**
			3.3	0.5	1.5	15	92	4.5	1	2.2	30	325	58	72	100	**PMFPB6532UP**

Small-signal MOSFETs dual (P-channel)

types in **bold** represent new products

Package													SOT363 (SC-88)	SOT666 (SC-88)	SOT1118
Size (mm)													2.0 x 1.25 x 0.95	1.6 x 1.2 x 0.55	2.0 x 2.0 x 0.65
P_{tot} (mW)													300	300	1250
V_{DS} (V)	V_{GS} (V)	I_D (A)	$V_{GS}(th)$ min (V)	$V_{GS}(th)$ max (V)	t_{on} typ (ns)	t_{off} typ (ns)	Q_G typ (nC)	ESD protection (kV)	R_{DSon} typ (mΩ) @ V_{GS} = 10 V	4.5 V	2.5 V	1.8 V			
20	8	3.3	0.5	1.5	15	92	4.5	1	-	58	72	100			**PMDPB65UP**
50	20	0.2	tbd	tbd	tbd	tbd	tbd	1	5300	6000	-	-	BSS84AKS*	BSS84AKV*	

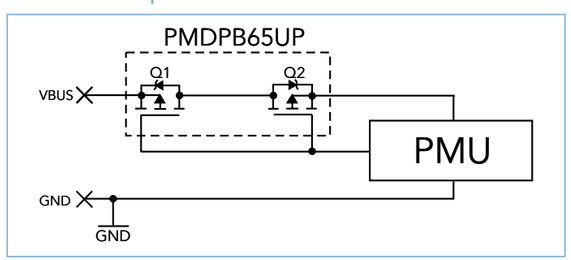
* Products to be released in 2011. For new product information, please check **http://standardproducts.nxp.com/mosfets**

In the Spotlight

Dual P-channel ESD protected MOSFET in small 0.65 mm flat, 2 x 2 mm leadless package (PMDPB65UP)

- ESD protected MOSFET of >1 kV HBM
- Very low R_{DSon} of <70 mΩ at V_{GS} = 4.5 V
- 1.8 V R_{DSon} rating for operation at low voltage gate drive levels
- Best-in-class thermal performance due to extra heatsink
- Smallest 2 x 2 mm leadless package dual P-channel; 0.65 mm package height

USB OTG Vbus protection



12 V - 25 V N-channel MOSFETs

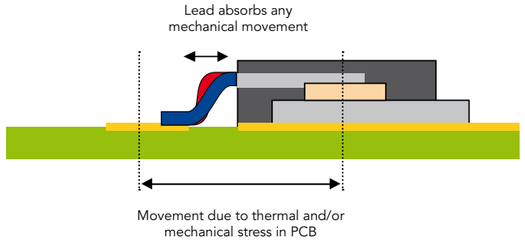
types in **bold** represent new products

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D²PAK (SOT404)	PHB66NQ03LT	25	10.5	-	66	12
DPAK (SOT428)	PHD38N02LT	20	-	-	44.7	15.1
	PHD97NQ03LT	25	6.3	10.6	75	11.7
IPAK (SOT533)	PHU97NQ03LT	25	6.6	-	75	-
Power-SO8 (LFPAK)	PH2520U	20	-	2.7	100	78
	PH3120L	20	2.65	3.7	100	48.5
	PH2925U	25	-	3	100	92
	PSMN1R2-25YL	25	1.2	1.85	100	50.6
	PSMN1R5-25YL	25	1.5	2.2	100	36
SO8 (SOT96-1)	PHKD6N02LT	20	-	-	10.9	15.3
	PSMN006-20K	20	-	5	32	32

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

LFPAK for mechanical & thermal ruggedness

NXP LFPAK



LFPAK pins provide compliance and allow for thermal expansion due to temperature difference between the MOSFET & PCB and also mechanical strain due to PCB bending & flexing

30 V N-channel MOSFETs

types in **bold** represent new products

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
DPAK (SOT428)	PHD71NQ03LT	30	10	-	75	13.2
	PHD36N03LT	30	17	22	43.4	18.5
Power-SO8 (LFPAK)	**PSMN1R0-30YLC**	30	1.15	1.4	100	50
	PSMN1R3-30YL	30	1.3	1.95	100	46.6
	PSMN1R5-30YL	30	1.5	1.9	100	36.2
	PSMN1R7-30YL	30	1.7	2.1	100	36.2
	PSMN2R0-30YL	30	2	2.63	100	30
	PSMN2R5-30YL	30	2.4	3.16	100	27
	PSMN3R0-30YL	30	3	4.04	100	21
	PSMN3R5-30YL	30	3.5	4.61	100	19
	PSMN4R0-30YL	30	4	5.25	100	17.6
	PSMN4R5-30YLC	30	4.8	6.1	84	9.6
	PSMN5R0-30YL	30	5	6.7	91	14.1
	PSMN6R0-30YL	30	6	7.87	79	11
	PSMN7R0-30YL	30	7	9.1	76	10
	PSMN9R0-30YL	30	8	11.03	61	8.7
QFN3333 (SOT873-1)	**PSMN3R5-30LL**	30	3.6	5.6	40	18
	PSMN3R8-30LL	30	3.7	5.8	40	38
	PSMN5R8-30LL	30	5.8	8	40	24
	PSMN9R0-30LL	30	9	13	21	20.6
	PSMN013-30LL	30	13	19	21	12.2
	PSMN017-30LL	30	17	25	15	10
SO8 (SOT96-1)	PHK12NQ03LT	30	-	14	11.8	-
	PSMN3R2-30KL	30	3.5	3.8	30	70.3
	PHK31NQ03LT	30	4.4	-	30.4	-
	PSMN005-30K	30	5.5	8	-	34
	PHK28NQ03LT	30	6.5	7.7	23.7	30.3
	PHK18NQ03LT	30	8.9	-	20.3	-
	SI4410DY	30	13.5	20	10	21.5
	PHK13N03LT	30	20	26	13.8	10.7
	PHKD13N03LT	30	20	26	10.4	10.7
	PHN203	30	30	55	6.3	14.6
	PHN210T	30	100	200	3.4	-
TO-220AB (SOT78)	**PSMN1R6-30PL**	30	1.7	2.1	100	101
	PSMN1R8-30PL	30	1.8	2.3	100	83
	PSMN2R0-30PL	30	2.1	2.8	100	55
	PSMN2R7-30PL	30	2.7	3.6	100	32
	PSMN3R4-30PL	30	3.4	4.1	100	31
	PSMN4R3-30PL	30	4.3	6.2	100	19
	PHP36N03LT	30	17	22	43.4	18.5
	PSMN022-30PL	30	22	34	30	4.4

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

40 V - 55 V N-channel MOSFETs

types in **bold** represent new products

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D²PAK (SOT404)	PHB191NQ06LT	55	3.7	4.4	75	95.6
	PHB21N06LT	55	70	-	19	-
	PHB20N06T	55	75	-	20.3	11
DPAK (SOT428)	PHD20N06T	55	77	-	18	11
Power-SO8 (LFPAK)	**PSMN2R6-40YS**	40	2.8	-	100	63
	PSMN3R3-40YS	40	3.3	-	100	49
	PSMN4R0-40YS	40	4.2	-	100	38
	PSMN5R8-40YS	40	5.7	-	90	28.8
	PSMN8R3-40YS	40	8.6	-	70	20
	PSMN014-40YS	40	14	-	46	12
QFN3333 (SOT873-1)	**PSMN7R0-40LS**	40	7	-	40	21.4
TO-220AB (SOT78)	**PSMN2R2-40PS**	40	2.1	-	100	110
	PSMN2R8-40PS	40	2.8	-	100	71
	PSMN4R5-40PS	40	4.6	-	100	35
	PSMN8R0-40PS	40	7.6	-	77	17
	PHP191NQ06LT	55	3.7	4.4	75	95.6
	PHP20N06T	55	75	-	20.3	11

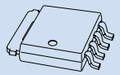
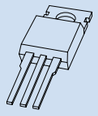
For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

Part numbering for PSMN types

P	S	M	N	1	R	7	-		3	0	Y	S
MOSFET Brand name			**MOSFET type N -ch or P -ch**	**MOSFET on - resistance R_{DSon}**			**-**	**MOSFET voltage BV_{DSS}**			**Package type**	**Gate threshold voltage**
Power Silicon Max			N = N -ch	R95 = 0.95 mΩ			-	25 = 25 V			B = D²PAK SOT404	X = Extremely low
			P = P -ch	1R7 = 1.7 mΩ			-	30 = 30 V			D = DPAK SOT428	L = logic level
			X = Dual N -ch	014 = 14 mΩ			-	40 = 40 V			E = I²PAK SOT226	S = standard level
			X = Dual P -ch	125 = 125 mΩ			-	60 = 60 V			K = SO8 SOT96	
			Z = N -ch + P -ch				-	80 = 80 V			L = QFN3333 SOT873	
							-	100 = 100 V			P = TO220 SOT78	
							-	110 = 110 V			Y = LFPAK SOT669 & SOT1023	

60 V - 80 V N-channel MOSFETs

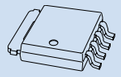
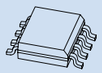
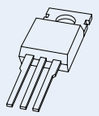
types in **bold** represent new products

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D²PAK (SOT404) 	PSMN004-60B	60	3.6	75	168
	PHB32N06LT	60	37	34	17
	PHB29N08T	75	-	27	19
	PSMN005-75B	75	5	75	165
	PSMN008-75B	75	8.5	75	122.8
	PHB110NQ08T	75	9	75	113.1
Power-SO8 (LFPAK) 	**PSMN5R5-60YS**	60	5.2	100	56
	PSMN7R0-60YS	60	6.4	89	45
	PSMN8R5-60YS	60	8	76	39
	PSMN012-60YS	60	11.1	59	28.4
	PSMN017-60YS	60	15.7	44	20
	PSMN030-60YS	60	24.7	29	13
	PSMN8R2-80YS	80	8.5	82	55
	PSMN011-80YS	80	11	67	45
	PSMN013-80YS	80	12.9	60	37
	PSMN018-80YS	80	18	45	26
	PSMN026-80YS	80	27.5	34	20
	PSMN045-80YS	80	45	24	12.5
QFN3333 (SOT873-1) 	**PSMN014-60LS**	60	14	40	19.6
	PSMN023-80LS	80	23	34	21
TO-220AB (SOT78) 	**PSMN3R0-60PS**	60	3	100	130
	PSMN4R6-60PS	60	4.6	100	70.8
	PSMN7R6-60PS	60	7.8	92	38.7
	PSMN015-60PS	60	14.8	50	20.9
	PHP29N08T	75	-	27	19
	PSMN008-75P	75	8.5	75	122.8
	PHP79NQ08LT	75	16	73	30
	PSMN4R4-80PS	80	4.1	100	112
	PSMN5R0-80PS	80	4.7	100	87
	PSMN6R5-80PS	80	6.9	100	71
	PSMN8R7-80PS	80	8.7	90	52
	PSMN012-80PS	80	11	74	36
	PSMN017-80PS	80	17	50	26
	PSMN050-80PS	80	46	22	9

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

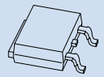
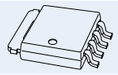
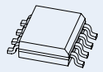
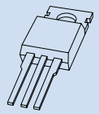
100 V - 110 V N-channel MOSFETs

types in **bold** represent new products

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D²PAK (SOT404) 	PSMN009-100B	100	8.8	75	156
	PSMN015-100B	100	15	75	90
	PHB45NQ10T	100	25	47	61
	PHB47NQ10T	100	28	47	66
	PHB27NQ10T	100	50	28	-
	PHB18NQ10T	100	90	18	-
DPAK (SOT428) 	PSMN025-100D	100	25	47	61
I²PAK (SOT226) 	**PSMN7R0-100ES**	100	6.8	100	125
	PSMN013-100ES	100	13.9	68	59
Power-SO8 (LFPAK) 	**PSMN012-100YS**	100	12	60	64
	PSMN016-100YS	100	16.3	51	54
	PSMN020-100YS	100	20.5	43	41
	PSMN028-100YS	100	27.5	42	33
	PSMN039-100YS	100	39.5	28.1	23
	PSMN069-100YS	100	72.4	17	14
QFN3333 (SOT873-1) 	**PSMN035-100LS**	100	32	27	23
SO8 (SOT96-1) 	PHK12NQ10T	100	28	11.6	35
	PSMN038-100K	100	38	-	43
	PHKD3NQ10T	100	90	3	-
TO-220AB (SOT78) 	**PSMN5R6-100PS**	100	5.6	100	141
	PSMN7R0-100PS	100	6.8	100	125
	PSMN009-100P	100	8.8	75	156
	PSMN9R5-100PS	100	9.6	89	82
	PSMN013-100PS	100	13.9	68	59
	PSMN015-100P	100	15	75	90
	PSMN015-110P	110	15	75	90
	PSMN016-100PS	100	16	96	49
	PHP45NQ10T	100	25	47	61
	PHP45NQ11T	105	25	47	60
	PSMN027-100PS	100	26.8	37	30
	PSMN034-100PS	100	34.5	32	23.8
	PHP27NQ11T	110	50	27.6	30
	PHP23NQ11T	110	70	23	22
	PHP18NQ10T	100	90	18	
	PHP18NQ11T	110	90	18	21

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

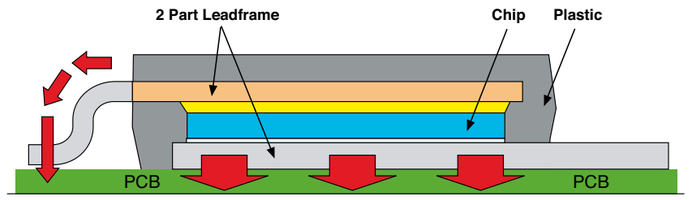
150 V - 300 V N-channel MOSFETs

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
D^2PAK (SOT404) 	PSMN030-150B	150	30	55.5	-
	PSMN035-150B	150	35	50	79
	PHB45NQ15T	150	42	45.1	32
	PSMN057-200B	200	57	39	-
	PSMN070-200B	200	70	35	-
	PHB33NQ20T	200	77	32.7	32.2
	PHB20NQ20T	200	130	20	-
DPAK (SOT428) 	PSMN063-150D	150	63	29	55
	PSMN130-200D	200	130	20	-
	PHD9NQ20T	200	400	8.7	-
Power-SO8 (LFPAK) 	PSMN059-150Y	150	59	43	-
	PSMN102-200Y	200	102	21.5	-
QFN3333 (SOT873-1) 	PML260SN	200	294	8.8	13.3
	PML340SN	220	386	7.3	13.2
SO8 (SOT96-1) 	PHK5NQ15T	150	75	5	29
	PSMN085-150K	150	85	-	40
	PSMN165-200K	200	165	-	40
TO-220AB (SOT78) 	PSMN030-150P	150	30	55.5	-
	PSMN035-150P	150	35	50	79
	PHP30NQ15T	150	63	29	55
	PHP28NQ15T	150	65	28.5	24
	PSMN057-200P	200	57	39	-
	PSMN070-200P	200	70	35	-
	PHP33NQ20T	200	77	32.7	32.2
	PHP20NQ20T	200	130	20	-
	PHP9NQ20T	200	400	8.7	-

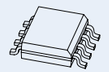
For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

Power-SO8 (LFPAK) Design

- Low Thermal resistance
- Low Electrical resistance
- Low Inductance

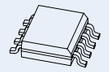


P-channel MOSFETs

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
SO8 (SOT96-1) 	PHK04P02T	-16	-	120	-4.66	-
	PMK50XP	-20	-	50	-7.9	10
	PMK30EP	-30	19	30	-14.9	50
	PMK35EP	-30	19	35	-14.9	42
	PHP225	-30	250	-	-	-

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

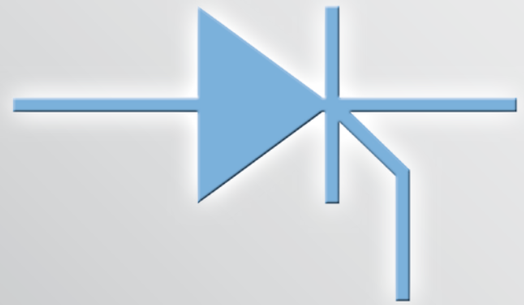
Multi-chip MOSFETs

Package	Typenumber	V_{DS} [max] (V)	R_{DSon} [max] @ V_{GS} = 10 V (mΩ)	R_{DSon} [max] @ V_{GS} = 4.5 V (mΩ)	I_D [max] (A)	$Q_{g(tot)}$ [typ] (nC)
SO8 (SOT96-1) 	PHKD6N02LT	20	-	20 @ 5 V	10.9	dual N-channel
	PHKD13N03LT	30	20	26	10.4	dual N-channel
	PHN203	30	30	-	6.3	dual N-channel
	PHC21025	30, -30	100, 250	-	3.5, -2.3 @ 80 °C	complementary pair
	PHP225	-30	250	-	-2.3 @ 80 °C	dual P-channel
	PHKD3NQ10T	100	90	-	3	dual N-channel

For the most up to date product information, please visit **http://standardproducts.nxp.com/mosfets**

Part numbering for PH types

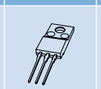
P	H	P	4	4	N	Q	0	3	L	T
MOSFET Brand name		Package type	Current rating I_D (A)		MOSFET type N-ch or P-ch	Q-Trench	MOSFET voltage V_{DSS}		Gate threshold voltage	Trench MOS
PH		B = D^2PAK	44 = 44 A		N = N-ch	Q = low gate charge Q_{GD}	02 = 20 V		'Blank' = Standard level	T = Trench
PH		D = DPAK	33 = 33 A		P = P-ch		03 = 25 - 30 V		L = logic level	
PH		P = TO220AB	20 = 20 A				06 = 55 - 60 V			
PH		T = SOT223	12 = 12 A				08 = 75 - 80 V			
PH		X = SOT186A (isolated TO220AB)					10 = 100 V			
PH		K = SO8					11 = 110 V			
PH		KD = Dual SO8					15 = 150 V			



Thyristors

4-Quadrant Triacs

types in **bold** represent new products

$I_{T(RMS)}$ (A)	V_{DRM} (V)	I_{GT} (max) (mA)	SOT54 (TO92)	SOT78 (TO220AB)	SOT78D (internally insulated TO220AB)	SOT82	SOT186A (isolated TO220AB)	SOT223	SOT404 (D^2PAK)	SOT428 (DPAK)
										
0.6	400	5/5/5/7	MAC97A6							
	600	5/5/5/7	MAC97A8							
	400 / 600	5/5/5/7	BT1306-D							
0.8	400 / 600	5/5/5/7	BT1308-D					BT1308W-D		
	600	5/5/5/7	Z00607MA							
1	600	3/3/3/7						BT131W		
	600 / 800	3/3/3/7	BT131							
	600 / 800	5/5/5/7	BT131-D							
	600 / 800	10/10/10/10	BT131-E							
	600 / 800	3/3/3/5	Z0103MA/NA					Z0103MN/NN		
	600 / 800	5/5/5/7	Z0107MA/NA					Z0107MN/NN		
	600 / 800	10/10/10/10	Z0109MA/NA					Z0109MN/NN		
	600 / 800	3/3/3/5	**Z0103MA0/NA0****					**Z0103MN0/NN0****		
	600 / 800	5/5/5/7	**Z0107MA0/NA0****					**Z0107MN0/NN0****		
	600 / 800	10/10/10/10	**Z0109MA0/NA0****					**Z0109MN0/NN0****		
4	600	5/5/5/10	BT132-D*							
	600	D/E/-/G				BT134				
	800	E/-				BT134				
	600	D/-		BT136			BT136X			BT136S
	600	F					BT136X			BT136S
	600 / 800	E		BT136			BT136X		BT136B	BT136S
	800	F								BT136S
	800	-					BT136X			BT136S
6	600	F/-/G					BT236X			
	800	-/G					BT236X			
8	600	D/-/G		BT137			BT137X			BT137S
	600	E		BT137			BT137X		BT137B	BT137S
	600	F					BT137X		BT137B	BT137S
	800	E		BT137			BT137X			BT137S
	800	F							BT137B	BT137S
	800	-		BT137			BT137X		BT137B	
	800	G							BT137B	BT137S
12	600	D		BT138			BT138X			
	600	-/G		BT138			BT138X		BT138B	
	600	F					BT138X		BT138B	
	600 / 800	E		BT138	BT138Y		BT138X		BT138B	
	800	F					BT138X			
	800	-		BT138			BT138X			
	800	G		BT138						

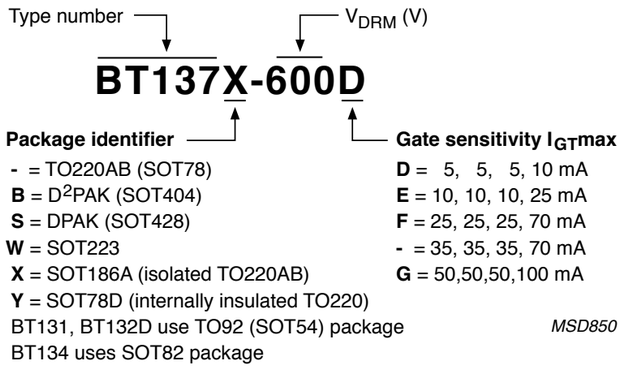
* Large chip / high I_{TSM}
** Enhanced immunity to false triggering

4-Quadrant Triacs

$I_{T(RMS)}$ (A)	V_{DRM} (V)	I_{GT} (max) (mA)	SOT78 (TO220AB)	SOT186A (isolated TO220AB)	SOT404 (D^2PAK)
					
16	600	E/-	BT139	BT139X	BT139B
	600	F		BT139X	BT139B
	600	G		BT139X	BT139B
	800	E	BT139		BT139B
	800	F			BT139B
	800	-	BT139	BT139X	BT139B
	800	G	BT139		BT139B
20	600	50/50/50/75		MAC223A8X	
25	400	50/50/50/75	MAC223A6		
	600 / 800	-	BTA140		

* Large chip / high I_{TSM}
** Enhanced immunity to false triggering

4-Quadrant Triacs part numbering



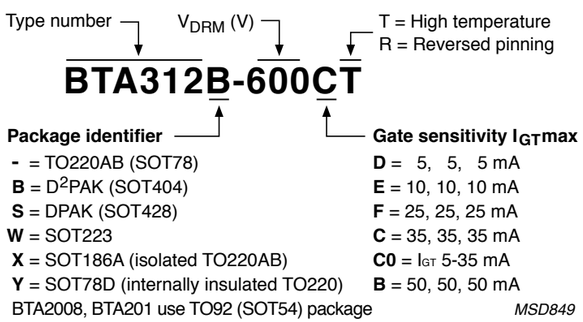
3-Quadrant Triacs

types in **bold** represent new products

$I_{T(RMS)}$ (A)	V_{DRM} (V)	I_{GT} (max) (mA)	SOT54 (TO92)	SOT78 (TO220AB)	SOT78D (internally insulated TO220AB)	SOT186A (isolated TO220AB)	SOT223	SOT404 (D^2PAK)	SOT428 (DPAK)
0.8	600 / 800	D/E	BTA2008						
1	600 / 800	B/E/ER	BTA201						
	600 / 800	E					BTA201W		
2	600 / 800	D/E				BTA202X			
4	600	B/C/D/E/F		BTA204		BTA204X			BTA204S
	800	B/C/E		BTA204		BTA204X			BTA204S
	1000	C				**BTA204X**			**BTA204S**
8	600	B/D/E/F		BTA208		BTA208X			BTA208S
	800	B/E		BTA208		BTA208X			BTA208S
	800	F		**BTA208**		BTA208X			**BTA208S**
	1000	B				BTA208X			
	1000	C				BTA208X		BTA208B	
	1000	5 min - 35 max				BTA208X-1000C0			
12	600	D		BTA312		BTA312X		BTA312B	
	600 / 800	B/C/E		BTA312		BTA312X		BTA312B	
	600 / 800	C			BTA312Y				
	800	ET		BTA312				BTA312B	
	600 / 800	B/C			BTA412Y				
16	600	BT/D		BTA316					
	600 / 800	B/C/E		BTA316		BTA316X		BTA316B	
	600 / 800	ET		**BTA316**					
	800	10 min - 50 max				**BTA316X-800B0**			
	600 / 800	B/C			BTA416Y				
25	600	BT		BTA225					
	600 / 800	B		BTA225				BTA225B	

* Large chip / high I_{TSM}
T: high $T_j$max 150 °C

3-Quadrant Triacs part numbering



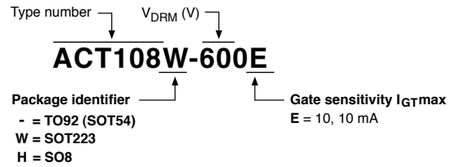
MSD849

AC Thyristors

types in **bold** represent new products

$I_{T(RMS)}$ (A)	V_{DRM} (V)	I_{GT} (max) (mA)	SOT54 (TO92)	SOT223	SO8
0.2	600	D			**ACT102H**
0.8	600	D	**ACT108**	**ACT108W**	
	600	E	ACT108	ACT108W	

AC Thyristors part numbering



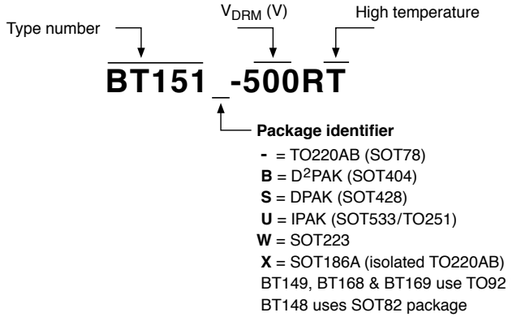
Silicon Controlled Rectifiers

types in **bold** represent new products

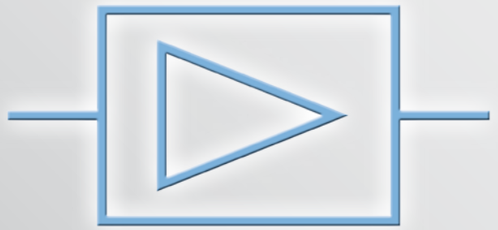
$I_{T(RMS)}$ (A)	V_{DRM} & V_{RRM} (V)	I_{GT} (max) (mA)	SOT54 (TO92)	SOT78 (TO220AB)	SOT82	SOT186A (isolated TO220AB)	SOT223	SOT404 (D^2PAK)	SOT428 (DPAK)	SOT533 (IPAK)
0.8	400	0.012	EC103D1							
	400 (V_{DRM} only)	0.2	NXL0840							
	200 / 400 / 600	0.2	BT149B/D/G							
	200 / 400 / 600	0.2	BT169B/D/G							
	400	0.05	BT169D-L							
	800	0.1	BT169H							
	500 / 600	0.02 min - 0.2 max	BT168E/G							
	200	0.2					MCR08BT1			
1	600	0.02 min - 0.2 max					BT168GW			
	600	0.07 min - 0.45 max					**BT168GWF****			
	600	0.2					BT148W-R*			
4	400 / 500 / 600	0.2			BT148-R					
	600	0.2							BT150S-R	
	500	0.2		BT150-R						
8	800	0.05							BT258S-LT	
	500 / 600 / 800	0.2		BT258-R		BT258X-R				
	600	0.2								BT258U-R
	800	0.2							BT258S-R	
	600	5							BT300S-R	
12	500 / 650	5		BT151-L					BT151S-L	
	500 / 650 / 800	15		BT151-R		BT151X-R			BT151S-R	
	650	15							BTH151S-R	
	500 / 650 / 800	15		BT151-C		BT151X-C				BT151U-C
	500 / 1000	15		BT151-RT						
20	400 / 600 / 800	32		BT152-R		BT152X-R		BT152B-R		
	500	32		BT152-RT						
25	800	35		BT145-R						

* Large chip / high I_{TSM} ** Hi-Com / fast turn-off T: high $T_j$max 150 °C

SCRs part numbering



MSD848



Standard & advanced linear products

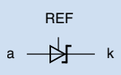
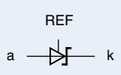
Adjustable shunt voltage regulator TL431

types in **bold** represent new products

Package				SOT23	
Size (mm)				2.9 x 1.3 x 1.0	
P_{tot} (mW)				580	
Pinning configuration				Normal pinning*	Mirrored pinning*
V_{KA} (V)	I_K (mA)	V_{ref}		T_{amb} (°C)		
36	100	2.495	2%	0 to 70	TL431CDBZR [1]	
				-40 to 85	TL431IDBZR [1]	
				-40 to 125	TL431QDBZR [1]	
					TL431FDT [2]	**TL431MFDT [2]**
					TL431SDT [3]	TL431MSDT [3]
			1%	0 to 70	TL431ACDBZR [1]	
				-40 to 85	TL431AIDBZR [1]	
				-40 to 125	TL431AQDBZR [1]	
					TL431AFDT [2]	**TL431AMFDT [2]**
					TL431ASDT [3]	TL431AMSDT [3]
			0.5%	0 to 70	TL431BCDBZR [1]	
				-40 to 85	TL431BIDBZR [1]	
				-40 to 125	TL431BQDBZR [1]	
					TL431BFDT [2]	**TL431BMFDT [2]**
					TL431BSDT [3]	TL431BMSDT [3]

[1] Offers enhanced stability area and very low load capacity requirement
[2] Offers higher ElectroMagnetic Interference (EMI) ruggedness, e.g. for Switch Mode Power Supply
[3] Is designed for standard requirements and linear applications

*Normal pinning vs. mirrored pinning for TL431

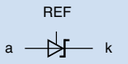
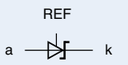
	Pin	Symbol	Description	Simplified outline	Grafic symbol
Normal pinning	1	k	cathode		
	2	REF	reference		
	3	a	anode		
Mirrored pinning	1	REF	reference		
	2	k	cathode		
	3	a	anode		

Adjustable shunt voltage regulator TLVH431

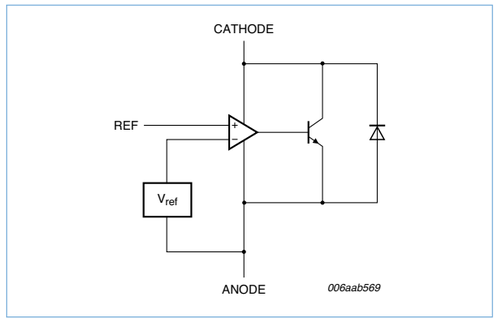
types in **bold** represent new products

Package				SOT23	
Size (mm)				2.9 x 1.3 x 1.0	
P_{tot} (mW)				580	
Pinning configuration				Normal pinning*	Mirrored pinning*
V_{KA} (V)	I_K (mA)	V_{ref}		T_{amb} (°C)		
20	80	1.24	1.5%	0 to 70	**TLVH431CDBZR**	
				-40 to 85	**TLVH431IDBZR**	
				-40 to 125	**TLVH431QDBZR**	**TLVH431MQDBZR**
			1%	0 to 70	**TLVH431ACDBZR**	
				-40 to 85	**TLVH431AIDBZR**	
				-40 to 125	**TLVH431AQDBZR**	**TLVH431AMQDBZR**
			0.5%	0 to 70	**TLVH431BCDBZR**	
				-40 to 85	**TLVH431BIDBZR**	
				-40 to 125	**TLVH431BQDBZR**	**TLVH431BMQDBZR**

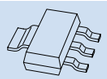
*** Normal pinning vs. mirrored pinning for TLVH431**

	Pin	Symbol	Description	Simplified outline	Grafic symbol
Normal pinning	1	REF	reference		
	2	k	cathode		
	3	a	anode		
Mirrored pinning	1	k	cathode		
	2	REF	reference		
	3	a	anode		

Functional diagram



Discrete voltage regulator

Package					SOT223 (SC-73)	SOT457 (SC-74)
						
Size (mm)					6.5 x 3.5 x 1.65	2.9 x 1.5 x 1.0
P_{tot} (mW)					1300	380
Zener diode		Transistor				
V_{out} (V)	V_z min - V_z max (V) @ I_z = 5 mA	V_{CEO} (V)	I_C (A)	h_{FE} min @ I_C = 100 mA		
2.5	3.23 - 3.37	45	0.1	160	PVR100AZ-B2V5	PVR100AD-B2V5
3.0	3.53 - 3.67	45	0.1	160	PVR100AZ-B3V0	PVR100AD-B3V0
3.3	3.82 - 3.98	45	0.1	160	PVR100AZ-B3V3	PVR100AD-B3V3
5.0	5.49 - 5.71	45	0.1	160	PVR100AZ-B5V0	PVR100AD-B5V0
12.3	12.7 - 13.3	45	0.1	160	PVR100AZ-B12V	PVR100AD-B12V

Key features

- A bipolar transistor and an integrated Zener diode, internally connected to build a voltage regulator
- Output voltage options V_{out}: 2.5 V, 3 V, 3.3 V, 5 V and 12 V

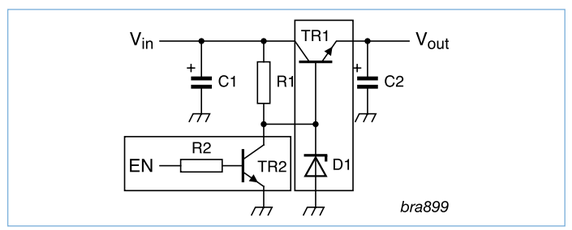
Key benefits

- Component count reduction
- Board space reduction
- Improved reliability

Key applications

- Linear voltage regulation

Discrete voltage regulator. PVR-series already include TR1 and D1, internally connected. A resistor-equipped transistor (RET) adds an output enable function.



Constant current source

Package	SOT353 (SC-88A)						
							
Size (mm)	2.0 x 1.25 x 0.95						
P_{tot} (mW)	335						
Type	PSSI2021SAY						
Description	maximum supply voltage	maximum supply current	typical stabilized output current	minimum stabilized output current	maximum stabilized output current	typical load stability of stabilized output current	typical output current change over ambient temperature
Parameter	V_S max (V)	I_S max (mA)	I_{out} typ (µA)	I_{out} min (mA)	I_{out} max (mA)	$\Delta I_{out}/I_{out}$ typ (%)	$\Delta I_{out}/(I_{out} * \Delta T_{amb})$ typ (%/K)
Condition		@ V_S = 12 V; I_{out} = 15 µA; V_{out} = 1 V to 10 V	@ V_S = 12 V; V_{out} = 1 V to 10 V; R_{ext} = open			@ V_S = 12 V; V_{out} = 1 V to 10 V	@ V_S = 12 V; V_{out} = 1 V; T_{amb} = -55 °C to 150 °C
Value	75	2.2	15	0.015	50	0.5	0.15

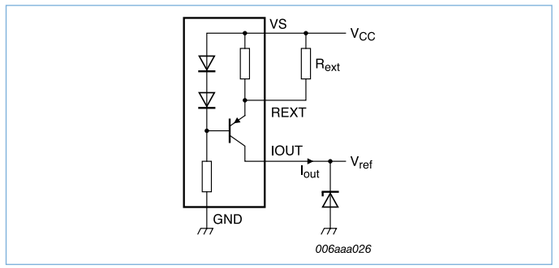
Key features and benefits

- Single-chip constant current source with reduced component count
- Output current set by an external resistor
- Very small footprint package for smaller designs

Key applications

- Constant current LED driver
- Generic constant current source
- Active bias control for audio amplifiers

Voltage reference

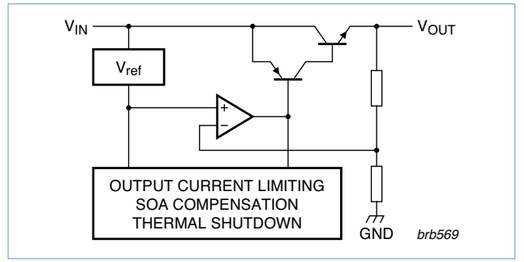


Low-dropout adjustable and fixed linear voltage regulator NX1117

types in **bold** represent new products

Package					SOT223 (SC-73)
					
Size (mm)					6.5 x 3.5 x 1.65
P_{tot} (mW)					1700
V_{max} (V)	I_{max} (A)	V_{out} drop (V) @ 800 mA	V_{out} (V)	V_{out} tolerance	T_{amb} (°C)
					-40 to 125
20	1	1.1	1.25 adj	1%	**NX1117CADJZ**
			1.2		**NX1117C12Z**
			1.5		**NX1117C15Z**
			1.8		**NX1117C18Z**
			1.9		**NX1117C19Z**
			2.0		**NX1117C20Z**
			2.5		**NX1117C25Z**
			2.85		**NX1117C285Z**
			3.3		**NX1117C33Z**
			5.0		**NX1117C50Z**
			12.0		**NX1117C120Z**

Functional diagram: fixed output voltage version



Key applications

- Post regulator for switching DC/DC converter
- High efficiency linear regulators
- Battery charger
- Battery powered instrumentation
- Low voltage micro-controller
- PC motherboard
- LCD TV, set top box
- DVD player

In the Spotlight

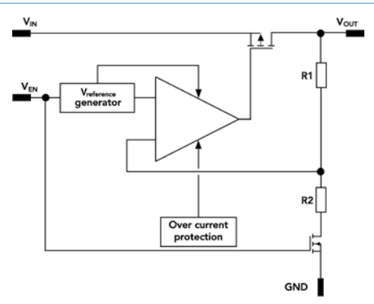
Low-dropout linear voltage regulator NX1117

- Adjustable or fixed output voltage version in SOT223 package
- Output voltage accuracy of 1%
- Wide input voltage range up to 20 V
- Maximum output current of 1 A
- Output current limiting and thermal shutdown
- Temperature range −40 °C to 125 °C

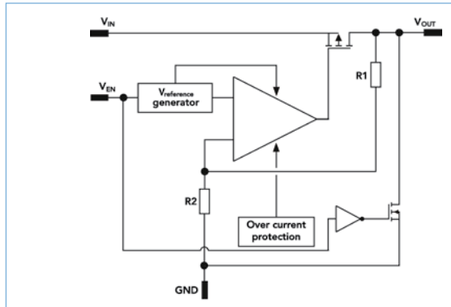
LD6805 Ultra low-dropout voltage regulators – 150 mA

types in **bold** represent new products

Package							SOT1194	
Size (mm)							1.0 x 1.0 x 0.55	
P_{tot} @ °C						mW	400	
V_{in} (V)	I_{out} typ (mA)	Quiescent current (uA)	V_{out} drop @ 150 mA (mV)	output noise µVrms (typ)	PSRR @ 1 kHz dB	Output voltage (V)	V_{OUT_nom} LD6805K/vvH High ohmic output stage	V_{OUT_nom} LD6805K/vvP Pull down output stage
2.3 - 5.5	150	35	250	50	75	1.2	**LD6805K/12H**	**LD6805K/12P**
						1.4	**LD6805K/14H**	**LD6805K/14P**
						1.6	**LD6805K/16H**	**LD6805K/16P**
						1.7	**LD6805K/17H**	**LD6805K/17P**
						1.8	**LD6805K/18H**	**LD6805K/18P**
						2.2	**LD6805K/22H**	**LD6805K/22P**
						2.3	**LD6805K/23H**	**LD6805K/23P**
						2.5	**LD6805K/25H**	**LD6805K/25P**
						2.8	**LD6805K/28H**	**LD6805K/28P**
						2.9	**LD6805K/29H**	**LD6805K/29P**
						3.0	**LD6805K/30H**	**LD6805K/30P**
						3.3	**LD6805K/33H**	**LD6805K/33P**
						3.6	**LD6805K/36H**	**LD6805K/36P**



Remark: Version with high-ohmic (tri-stated) output during disable



Remark: output with pull-down switch for disable

Key features

- High power supply ripple rejection (PSRR)
- Ultra low-dropout voltage and low noise
- Very small package size

Key benefits

- No additional noise bypass capacitor needed
- Very low-dropout voltage for extended battery usage
- Lower power dissipation

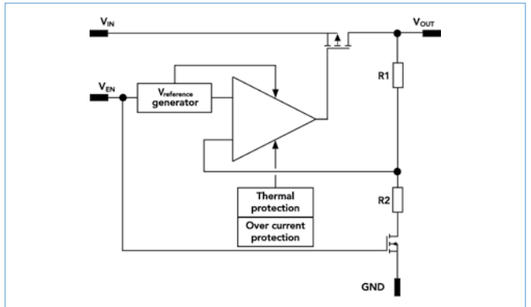
Key applications

- Mobile phone handsets, cordless telephones, personal digital devices (applications requiring component miniaturization)

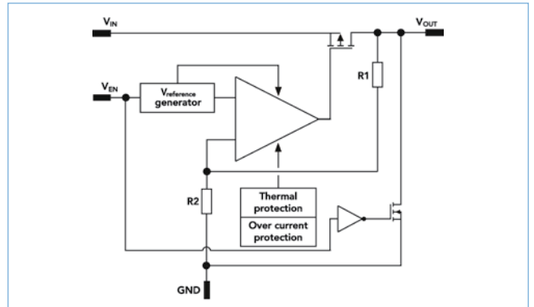
LD6806 Ultra low-dropout voltage regulators – 200 mA

types in **bold** represent new products

Package							SOT886		CSP 4	
Size (mm)							1.45 x 1.0 x 0.5		0.76 × 0.76 × 0.47	
P_{tot} @°C						mW	450		600	
V_{in} (V)	I_{out} typ (mA)	Quiescent current (uA)	V_{out} drop @ 200 mA (mV)	output noise µVrms (typ)	PSRR @ 1 kHz dB	Output voltage (V)	LD6806F/vvH	LD6806F/vvP	LD6806CX4/vvH	LD6806CX4/vvP
2.3 - 5.5	200	70	60	30	55	1.2	**LD6806F/12H**	**LD6806F/12P**	**LD6806CX4/12H**	**LD6806CX4/12P**
						1.4	**LD6806F/14H**	**LD6806F/14P**	**LD6806CX4/14H**	**LD6806CX4/14P**
						1.6	**LD6806F/16H**	**LD6806F/16P**	**LD6806CX4/16H**	**LD6806CX4/16P**
						1.7	**LD6806F/17H**	**LD6806F/17P**	**LD6806CX4/17H**	**LD6806CX4/17P**
						1.8	**LD6806F/18H**	**LD6806F/18P**	**LD6806CX4/18H**	**LD6806CX4/18P**
						2.2	**LD6806F/22H**	**LD6806F/22P**	**LD6806CX4/22H**	**LD6806CX4/22P**
						2.3	**LD6806F/23H**	**LD6806F/23P**	**LD6806CX4/23H**	**LD6806CX4/23P**
						2.5	**LD6806F/25H**	**LD6806F/25P**	**LD6806CX4/25H**	**LD6806CX4/25P**
						2.8	**LD6806F/28H**	**LD6806F/28P**	**LD6806CX4/28H**	**LD6806CX4/28P**
						2.9	**LD6806F/29H**	**LD6806F/29P**	**LD6806CX4/29H**	**LD6806CX4/29P**
						3.0	**LD6806F/30H**	**LD6806F/30P**	**LD6806CX4/30H**	**LD6806CX4/30P**
						3.3	**LD6806F/33H**	**LD6806F/33P**	**LD6806CX4/33H**	**LD6806CX4/33P**
						3.6	**LD6806F/36H**	**LD6806F/36P**	**LD6806CX4/36H**	**LD6806CX4/36P**



Remark: Version with high-ohmic (tri-stated) output during disable



Remark: output with pull-down switch for disable

Key benefits

- Ultra low-dropout voltage (60mV@200mA) for extended battery usage
- No additional noise bypass capacitor needed
- Smallest CSP package
- Lower power dissipation

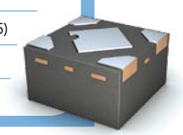
Key applications

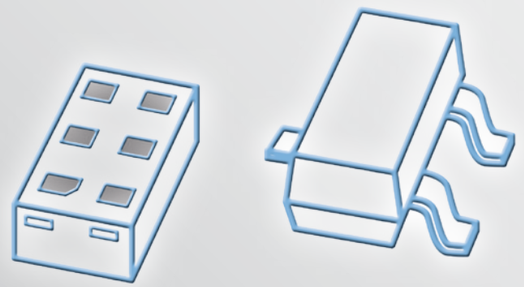
- Mobile phone handsets, cordless telephones, personal digital devices (applications requiring component miniaturization)

In the Spotlight

Ultra low-dropout voltage regulators – LD680x

- Typical output current 150 mA (LD6805) and 200 mA LDOs (LD6806)
- Ultra low-dropout voltage → 60 mV @ 200 mA (LD6806)
- Ultra high power supply ripple rejection (PSRR): 75 dB (LD6805)
- Low noise → 30 µVrms for LD6806 and 50µVrms for LD6805
- Smallest packages (WLCSP and Plastic SMD)





Packages

Package cross reference

Pins / leads	NXP	Industry standard names	Size (l x w x h) (mm)	P_{tot} (mW)	Package	Competitor synonyms								
						Rohm	Toshiba	ON Semi	Renesas	Infineon	Diodes Inc	KEC	Vishay	Semtech
2	**SOD27**	DO-35	4.25 x 1.85 x 0.56	500		GSD			DO-35		DO-35		DO-204AH	
	SOD66	DO-41	4.8 x 2.6 x 0.81	1300		GSR	DO-41				DO-41		DO-204AL	
	SOD68	DO-34	3.04 x 1.6 x 0.55	500		MSD								
	SOD80C	MiniMelf	3.5 x 1.5 x 1.5	300		LLDS			LLD		MiniMelF		MiniMELF	
	SOD123F	-	2.6 x 1.6 x 1.1	830		PMDU	S-Flat	SOD-123-FL			PowerDI123	SMF		
	SOD123W	-	2.6 x 1.7 x 1.0	900			S-Flat	SOD-123-FL			PowerDI123			
	SOD128	-	3.8 x 2.5 x 1.0	1000		PMDT	M-Flat							
	SOD323	SC-76	1.7 x 1.25 x 0.95	400			USC	SOD-323	URP	SOD323	SOD-323	USC	SOD323	
	SOD323F	SC-90	1.7 x 1.25 x 0.7	830		UMD2	US-Flat				PowerDI323			
	SOD523	SC-79	1.2 x 0.8 x 0.6	500		EMD2	ESC/TESC	SOD-523	UFP	SC79		ESC	SOD523	
	SOD882	-	1.0 x 0.6 x 0.5	250			CTS2			TSLP-2	DFN1006-2			
	SOD882D	-	1.0 x 0.6 x 0.37	250						TSLP-2-7	DFN1006H4-2			
3	**SOT1061**	HUSON3	2.0 x 2.0 x 0.65	1300				WDFN3			DFN2020-3		PowerPAK SC706L	
	SOT23	-	2.9 x 1.3 x 1.0	250		SSD3/SST3		SOT-23		SOT23	SOT-23	SOT-23	SOT23	
	SOT323	SC-70	2.0 x 1.25 x 0.95	200		UMD3/ UMT3	USM	SC-70	CMAK/CM-PAK	SOT323	SOT-323	USM	SC-70 3 leads	
	SOT416	SC-75	1.6 x 0.8 x 0.77	150		EMD3/EMT3	SSM	SC-75	SMPAK	SC75			SC-75A	
	SOT883	SC-101	1.0 x 0.6 x 0.5	250			SS CSP2			TSLP-3-1	DFN1006-3			
	SOT89	SC-62	4.5 x 2.5 x 1.5	1300		MPT3	PW-Mini	SOT-89	UPAK (SOT89)	SOT89		SOT-89		
4	**SOT143B**	-	2.9 x 1.3 x 1.0	250			CP4		MPAK-4R	SOT143	SOT-143			
	SOT223	SC-73	6.5 x 3.5 x 1.65	1700				SOT-223		SOT223	SOT-223	SOT-223	SOT223	
5	**SOT353**	SC-88A	2.0 x 1.25 x 0.95	300		UMD5/ UMT5	USV	SC-88A	CMPAK-5(T)			USV	SOT353	
	SOT665	-	1.6 x 1.2 x 0.55	300		EMD5/EMT5	ESV	SOT-553	VSON-5			TESV		
6	**SOT363**	SC-88	2.0 x 1.25 x 0.95	300		UMD6/ UMT6	US6	SC-88	CMPAK-6	SOT363	SOT-363	US6	SOT363	
	SOT457	SC-74	2.9 x 1.5 x 1.0	750		SMD6/SMT6	SM6	SC-74	TSOP-6	SC74		TSOP6	TSOP-6	
	SOT666	-	1.6 x 1.2 x 0.55	300		EMD6/EMT6	ES6	SOT-563	SMFPAK-6	SOT666	SOT563	TES6	SC89-6lead	
	SOT1118	-	2.0 x 2.0 x 0.65	1300				6 Lead DFN			DFN2020B-6			
	SOT886	XSON6	1.45 x 1.0 x 0.5	250										SLP1510N6
	SOT891	XSON6	1.0 x 1.0 x 0.5	-			CS6							

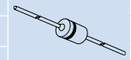
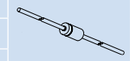
Pins / leads	NXP	Industry standard names	Size (l x w x h) (mm)	P_{tot} (mW)	Package	Competitor synonyms							
						Rohm	Toshiba	ON Semi	Renesas	Infineon	KEC	Vishay	Semtech
8	**SOT505**	TSSOP8	3.0 x 3.0 x 1.1	-				TSSOP-8			TSSOP8		
	SOT96	SO8	4.9 x 3.9 x 1.75	1500		SOP8	FM8	SOIC-8 NB	SOP-8		FLP-8	SO8	
8 + 1	**SOT983**	HXSON8	1.7 x 1.35 x 0.5	-				UDFN 1.7 x 1.35, 0.4P					SLP1713P8
	SOT1157	HXSON8	1.2 x 1.7 x 0.5	-				UDFN8, 1.8 x 1.2, 0.4P					
	SOT1166	HUSON8	1.35 x 1.7 x 0.55	-									SLP1713P8
9	**SOT1178**	XSON9	1.0 x 2.1 x 0.5	-									SLP2010P8T
10	**SOT1165**	XSON10	1.0 x 2.5 x 0.5	-				UDFN10 2.5 x 1, 0.5P		TSLP-9-1			SLP1610P4
	SOT1176	XSON10	1.0 x 2.5 x 0.5	-				UDFN10 2.5 x 1, 0.5P		TSLP-9-1			SLP1610P4
	SOT552	TSSOP10	3.0 x 3.0 x 1.1	-				Micro10		TSSOP10			MSOP-10L
12+1	**SOT984**	HXSON12	2.5 x 1.35 x 0.5	-									SLP2513P12
	SOT1158	HXSON12	1.2 x 2.5 x 0.5	-				UDFN12, 2.5 x 1.2, 0.4P					
	SOT1167	HUSON12	1.35 x 2.5 x 0.55	-				UDFN12, 2.5 x 1.35, 0.4P					SLP2513P12
14	**SOT108**	SO14	8.65 x 3.9 x 1.75	-		SOP14				DSO14			
16 + 1	**SOT985**	HXSON16	3.3 x 1.35 x 0.5	-				UDFN16, 3.3 x 1.35, 0.4P					SLP3313P16
	SOT1159	HXSON16	1.2 x 3.3 x 0.5	-				UDFN16, 3.5 x 1.2, 0.4P					
	SOT1168	HUSON16	1.35 x 3.3 x 0.55	-									SLP3313P16
20	**SOT360**	TSSOP20	6.5 x 4.4 x 1.1	-				TSSOP20		TSSOP20			
38	**SOT510**	TSSOP38	9.7 x 4.4 x 1.1	-						TSSOP38			

Packing methods SMD

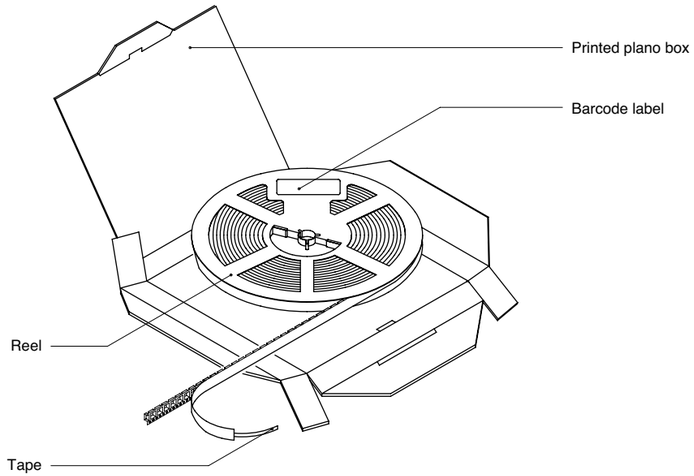
Pins / leads	Package	Packing method and tape dimension	Reel dimension (d x w) (mm)	Taping	Package	Packing quantity and ordering code (12 NC ending)							
						800	1000	2500	3000	4000	8000	9000	10000
2	SOD80C	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-115	-	-	-	-	-
		4 mm pitch, 8 mm tape and reel	330 x 8	-		-	-	-	-	-	-	-	-135
	SOD123F	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
	SOD123W	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
	SOD128	4 mm pitch, 12 mm tape and reel	180 x 12	-		-	-	-	-115	-	-	-	-
	SOD323	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-135
	SOD323F	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
	SOD523	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-315	-	-
		4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-135
	SOD882	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-	-315
	SOD882D	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-	-315
	SOD962	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-315	-
3	SOT23	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-215	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-235
	SOT89	8 mm pitch, 12 mm tape and reel	180 x 12	T1		-	-115	-	-	-	-	-	-
		8 mm pitch, 12 mm tape and reel	330 x 12	T1		-	-	-	-	-135	-	-	-
		8 mm pitch, 12 mm tape and reel	180 x 12	T3		-	-146	-	-	-	-	-	-
		8 mm pitch, 12 mm tape and reel	180 x 12	T4		-	-147	-	-	-	-	-	-
	SOT323	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-135
	SOT404	16 mm pitch, 24 mm tape and reel	330 x 24	-		-118	-	-	-	-	-	-	-
	SOT416	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-135
	SOT428	8 mm pitch, 16 mm tape and reel	330 x 16	-		-	-	-118	-	-	-	-	-
	SOT663	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-115	-	-	-
	SOT883	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-	-315
	SOT1061	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
4	SOT143B	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-215	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	-		-	-	-	-	-	-	-	-235
	SOT223	8 mm pitch, 12 mm tape and reel	180 x 12	-		-	-115	-	-	-	-	-	-
		8 mm pitch, 12 mm tape and reel	330 x 12	-		-	-	-	-	-135	-	-	-

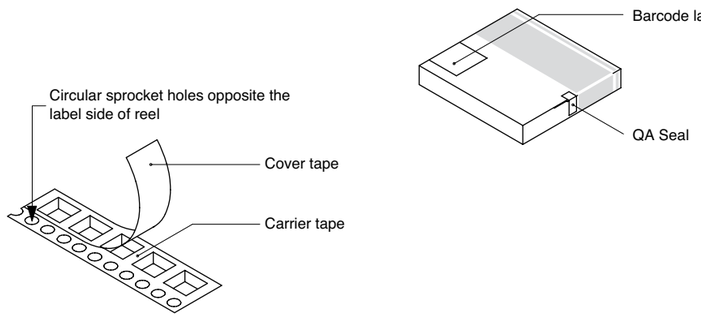
Pins / leads	Package	Packing method and tape dimension	Reel dimension (d x w) (mm)	Taping	Package	Packing quantity and ordering code (12 NC ending)							
						1000	1400	2500	3000	4000	5000	8000	10000
5	SOT353	4 mm pitch, 8 mm tape and reel	180 x 8	T1		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T1		-	-	-	-	-	-	-	-135
		4 mm pitch, 8 mm tape and reel	180 x 8	T2		-	-	-	-125	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T2		-	-	-	-	-	-	-	-165
	SOT665	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-315	-
		4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-115	-	-	-
6	SOT363	4 mm pitch, 8 mm tape and reel	180 x 8	T1		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T1		-	-	-	-	-	-	-	-135
		4 mm pitch, 8 mm tape and reel	180 x 8	T2		-	-	-	-125	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T2		-	-	-	-	-	-	-	-165
	SOT457	4 mm pitch, 8 mm tape and reel	180 x 8	T1		-	-	-	-115	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T1		-	-	-	-	-	-	-	-135
		4 mm pitch, 8 mm tape and reel	180 x 8	T2		-	-	-	-125	-	-	-	-
		4 mm pitch, 8 mm tape and reel	286 x 8	T2		-	-	-	-	-	-	-	-165
	SOT666	2 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-	-	-315	-
		4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-	-115	-	-	-
	SOT1118	4 mm pitch, 8 mm tape and reel	180 x 8	-		-	-	-	-115	-	-	-	-
	SOT886	4 mm pitch, 8 mm tape and reel	180 x 8	T1		-	-	-	-	-	-115	-	-
		4 mm pitch, 8 mm tape and reel	180 x 8	T4		-	-	-	-	-	-132	-	-
	SOT891	4 mm pitch, 8 mm tape and reel	180 x 8	T4		-	-	-	-	-	-132	-	-
8	SOT505	8 mm pitch, 12 mm tape and reel	330 x 12	-		-	-	-118	-	-	-	-	-
	SOT873	8 mm pitch, 12 mm tape and reel	180 x 12	-		-	-118	-	-	-	-	-	-
	SOT96	8 mm pitch, 12 mm tape and reel	180 x 12	-		-115	-	-	-	-	-	-	-
		8 mm pitch, 12 mm tape and reel	330 x 12	-		-	-	-118	-	-	-	-	-

Packing methods glass diodes and through hole packages

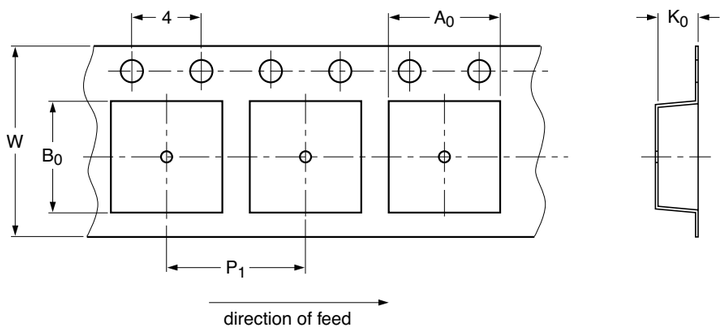
Pins / leads	Package	Packing method and tape/reel/tube dimensions	Package	Ordering code (12 NC ending)	Packing quantity
2	SOD27	26 mm tape ammo pack, axial		-143	5000 pcs
		52 mm tape ammo pack, axial		-133	10000 pcs
		52 mm reel pack, axial		-113	10000 pcs
	SOD59	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOD66	52 mm tape ammo pack, axial		-133	10000 pcs
		52 mm reel pack, axial		-113	10000 pcs
	SOD68	26 mm tape ammo pack, axial		-143	5000 pcs
		52 mm reel pack, axial		-113	10000 pcs
		52 mm tape ammo pack, axial		-133	10000 pcs
	SOD113	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
3	SOT54	Bulk pack, 1000 pcs/carrier		-112	5 carriers x 1000 pcs
		55 mm reel packing, 2000 pcs/reel, reel dimensions = 380 x 55 mm		-116	5 reels x 2000 pcs
		Ammo packing, 18 mm tape, 2000 pcs/carrier, reel dimensions = 350 x 55 mm		-126	5 carriers x 2000 pcs
		Bulk pack, 1000 pcs/carrier		-412	5 carriers x 1000 pcs
	SOT78	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOT78D	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOT82	Rail packing, 50 pcs/tube, tube length = 390 mm		-127	20 tubes x 50 pcs
	SOT186A	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOT226	Rail packing, 50 pcs/tube, tube length = 520 mm		-127	20 tubes x 50 pcs
	SOT533	Rail packing		-127	75 tubes x 50 pcs

Tape and reel pack for SMD packages





Carrier tape - tape and reel

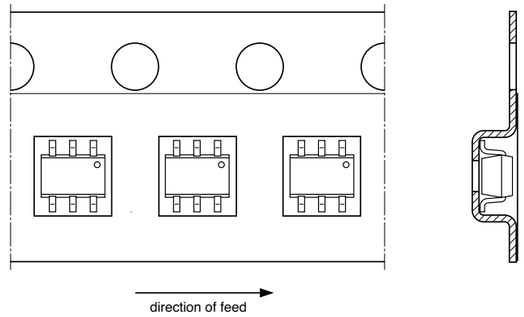


P1 = pitch (see table packing methods)
W = tape width (see table packing methods)

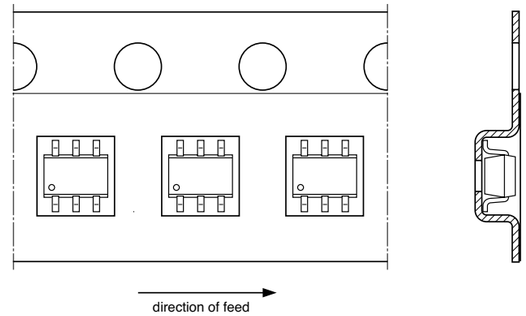
Compartment width (A_0), length (B_0) and depth (K_0) depending on package

Product orientation (tape and reel pack) T1-T4

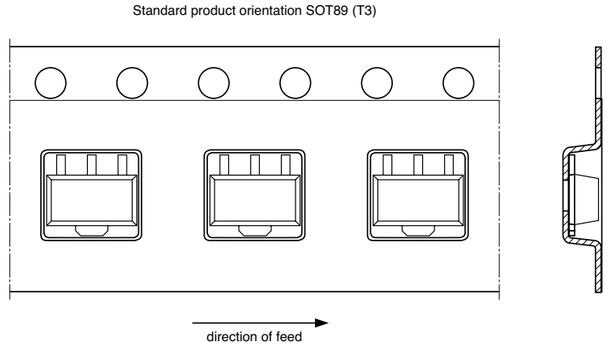
T1 taping



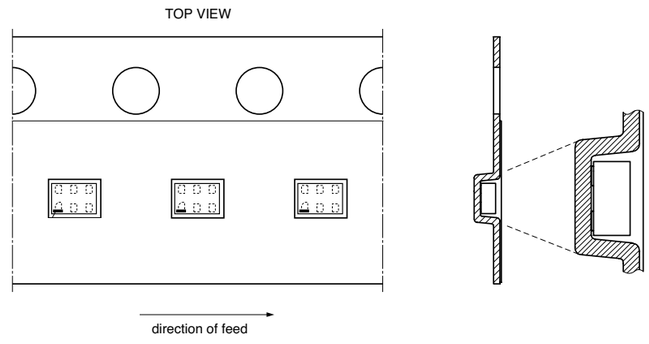
T2 taping



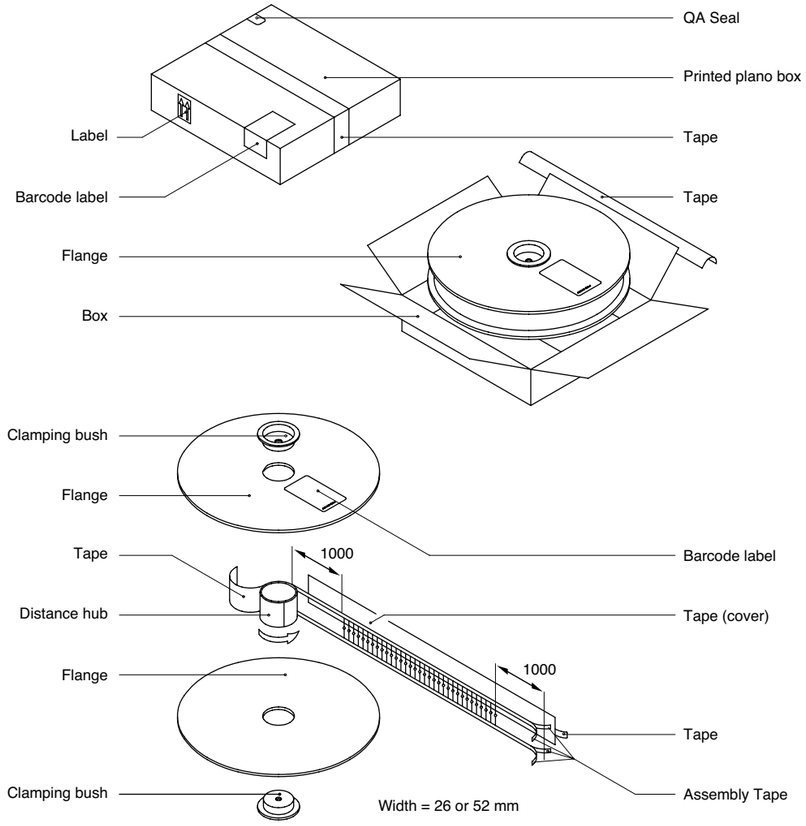
T3 taping

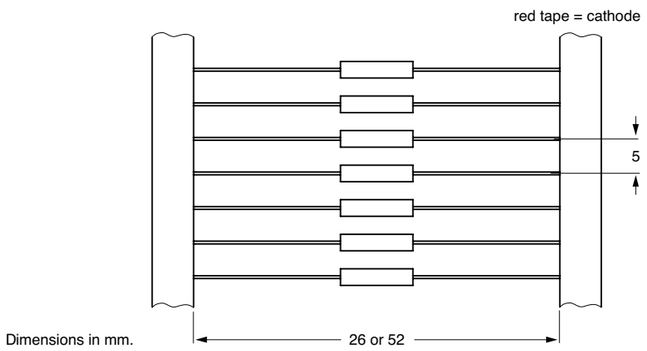


T4 taping

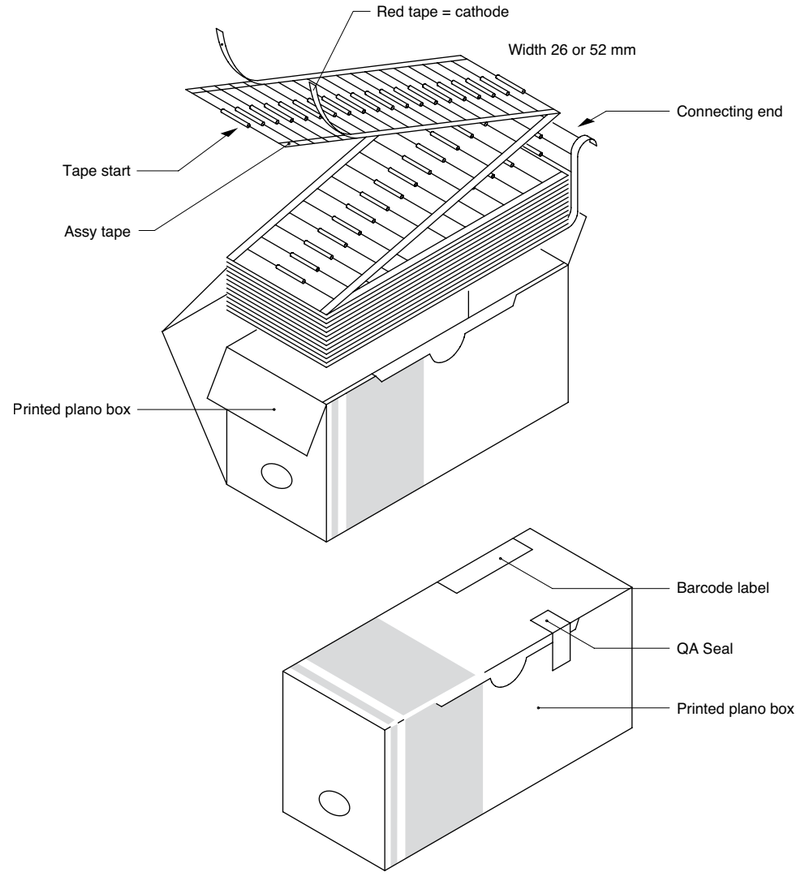


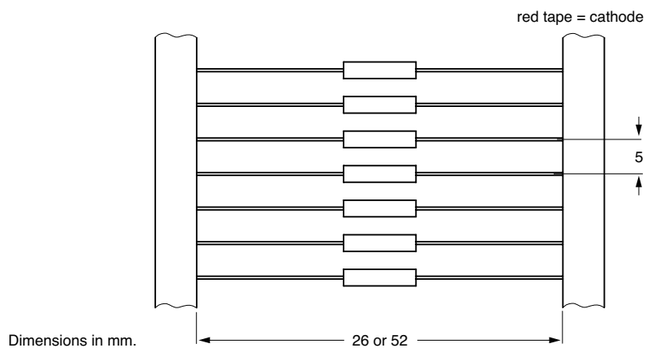
Reel pack axial tape for glass diodes



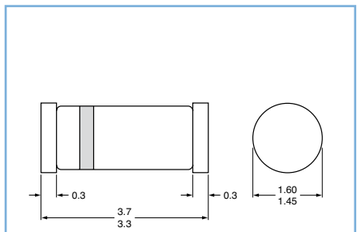


Ammo pack axial tape for glass diodes

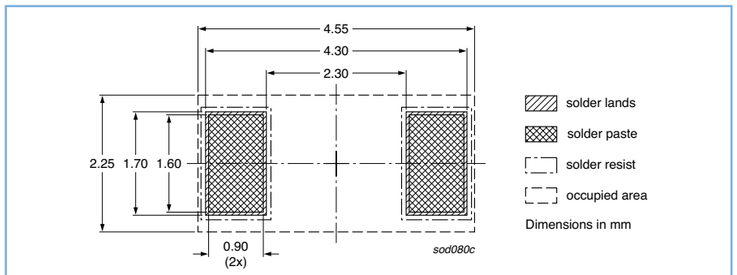




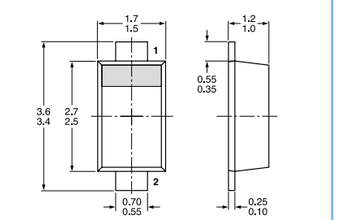
2-Pin SMD Packages



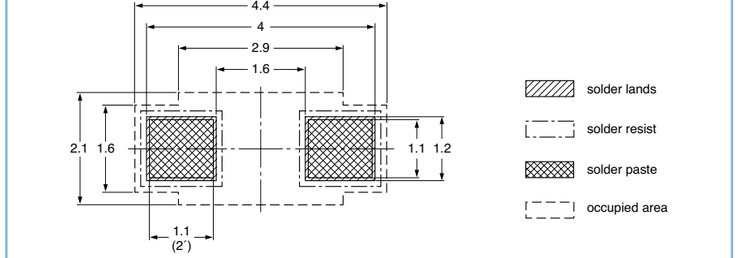
SOD80C



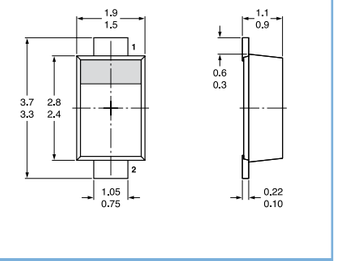
SOD80C



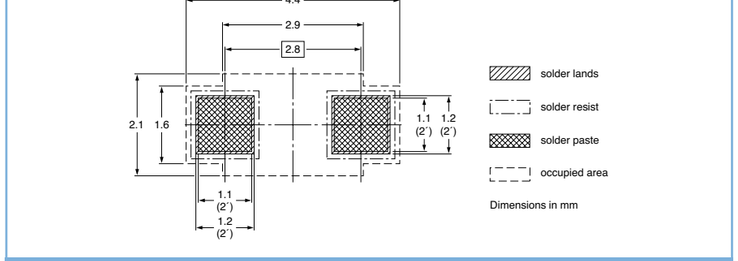
SOD123F



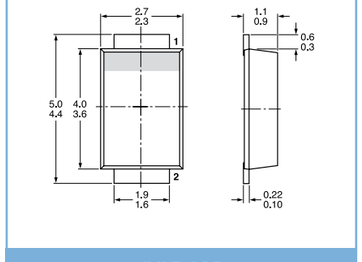
SOD123F



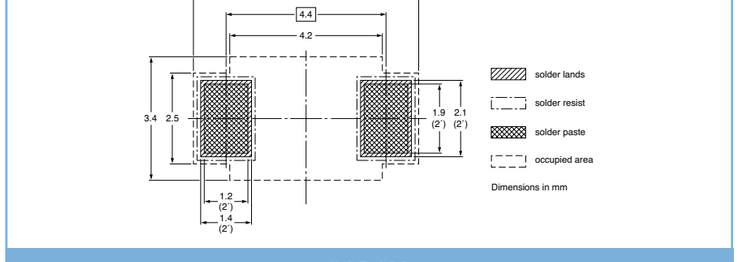
SOD123W



SOD123W

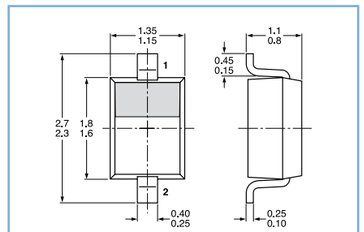


SOD128

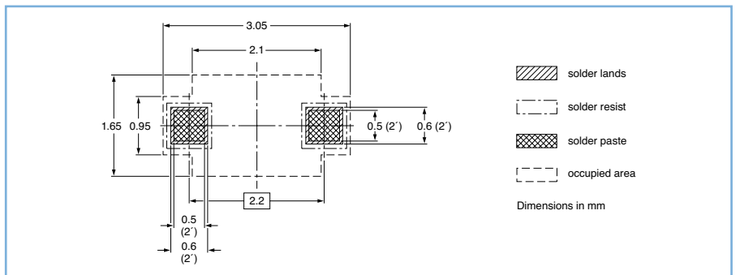


SOD128

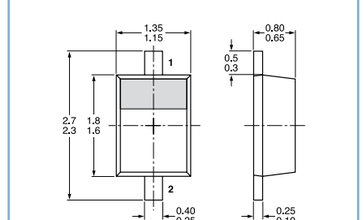
Dimensions in mm



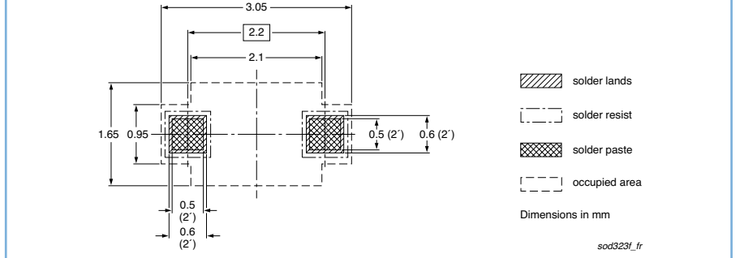
SOD323 (SC-76)



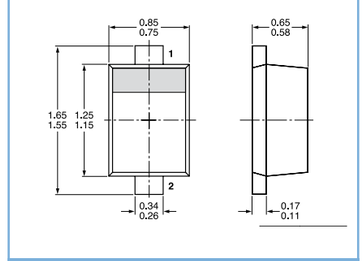
SOD323 (SC-76)



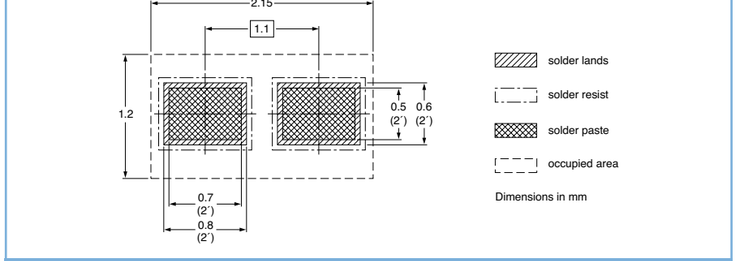
SOD323F (SC-90)



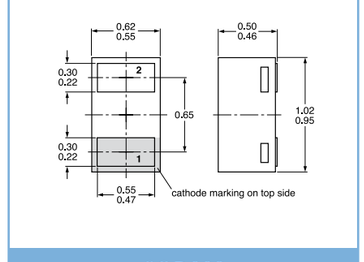
SOD323F (SC-90)



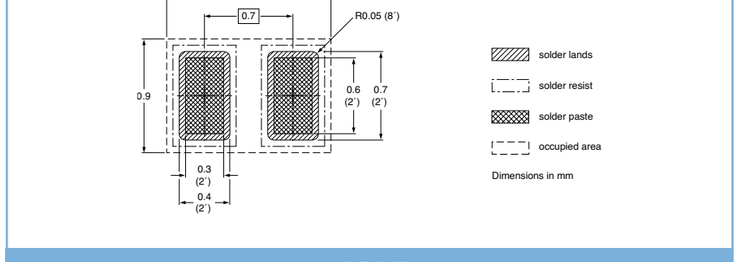
SOD523 (SC-79)



SOD523 (SC-79)



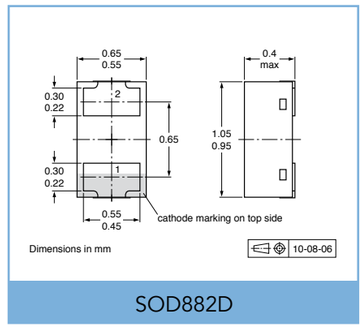
SOD882



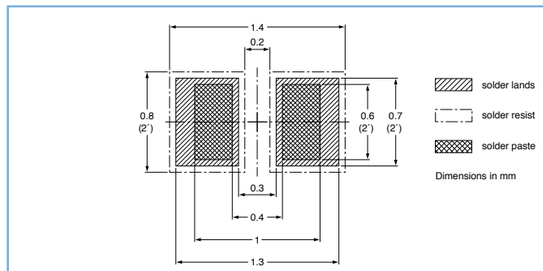
SOD882

Dimensions in mm

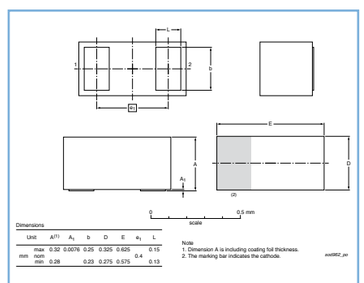
Packages



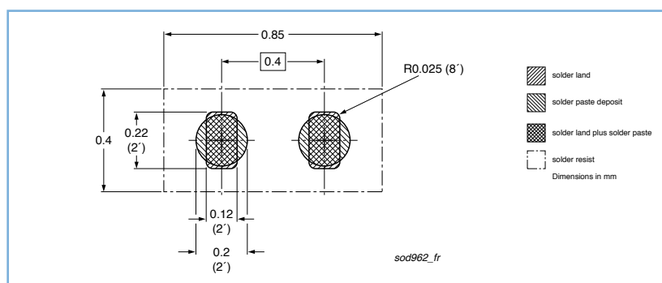
SOD882D



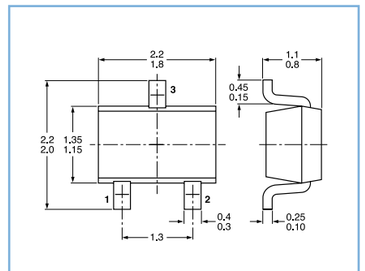
SOD882D



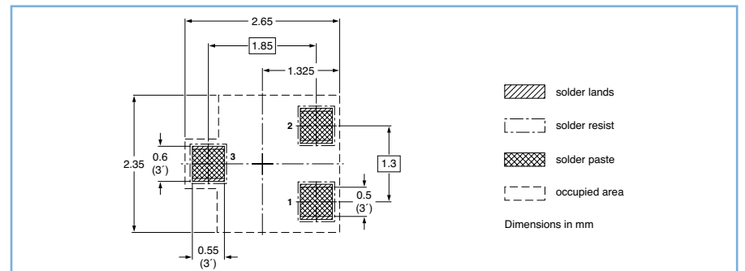
SOD962



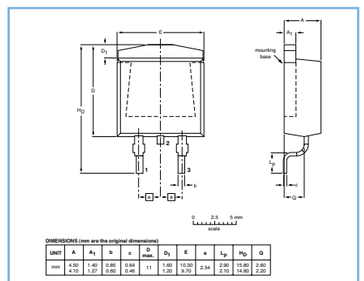
SOD962



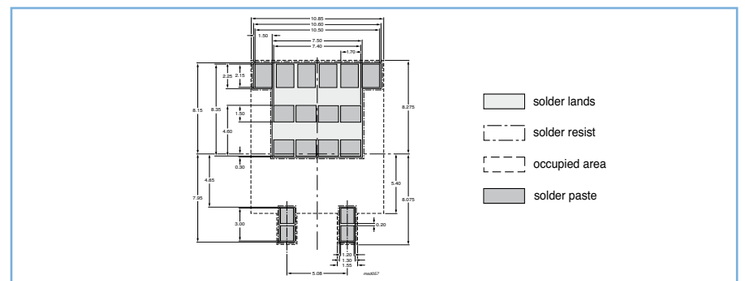
SOT323 (SC-70)



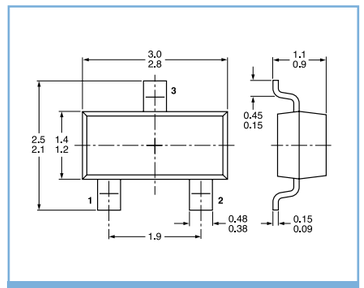
SOT323 (SC-70)



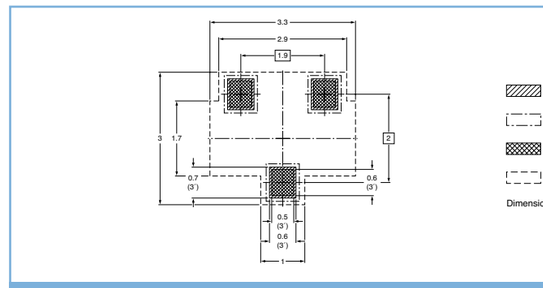
SOT404



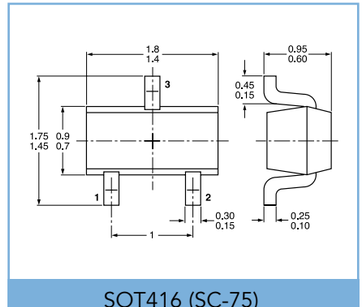
SOT404



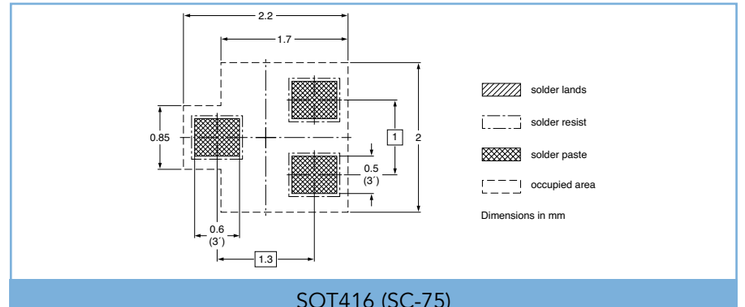
SOT23



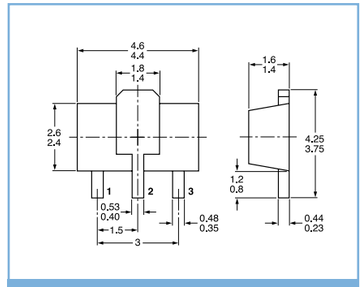
SOT23



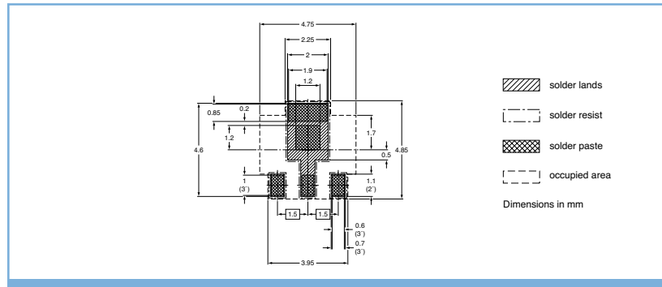
SOT416 (SC-75)



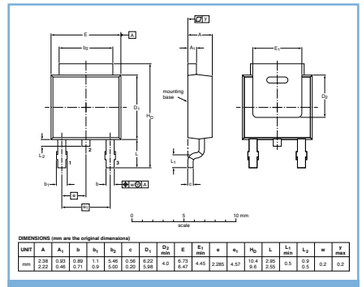
SOT416 (SC-75)



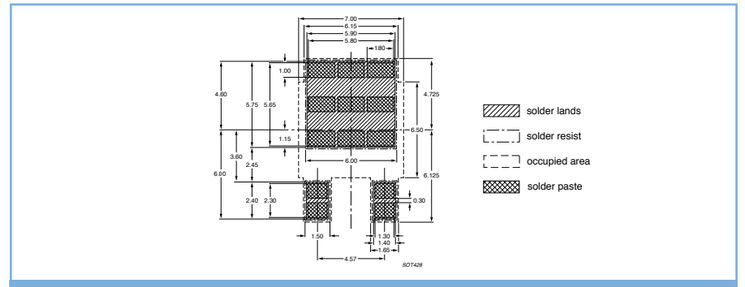
SOT89 (SC-62)



SOT89 (SC-62)



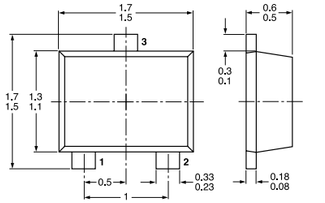
SOT428



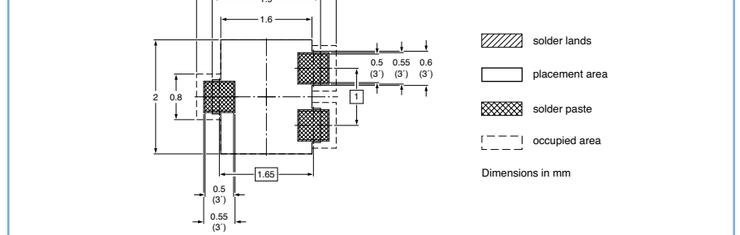
SOT428

Dimensions in mm

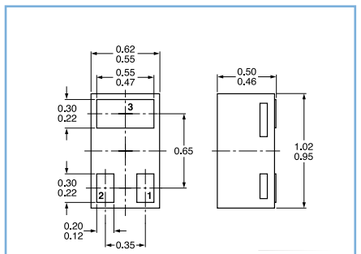
Packages



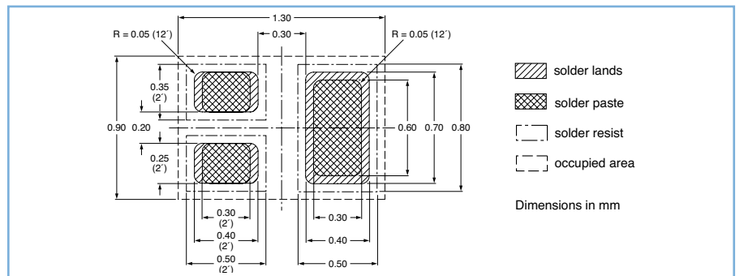
SOT663



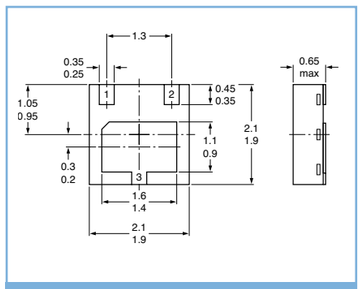
SOT663



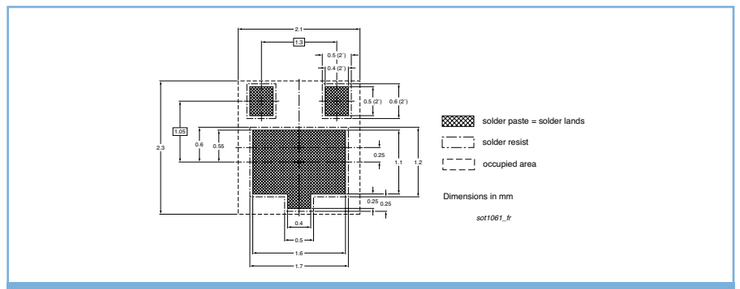
SOT883 (SC-101)



SOT883 (SC-101)

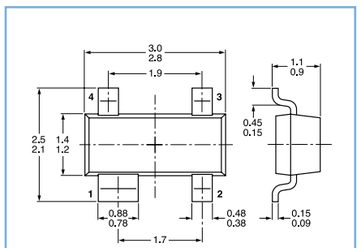


SOT1061

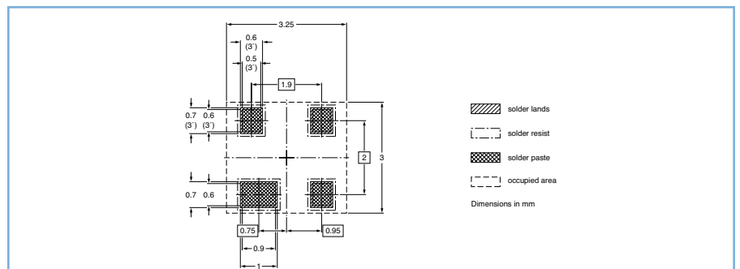


SOT1061

4-/5-Pin SMD Packages

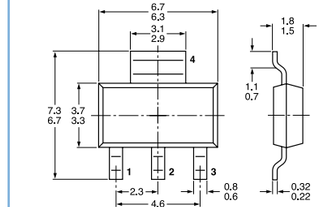


SOT143B

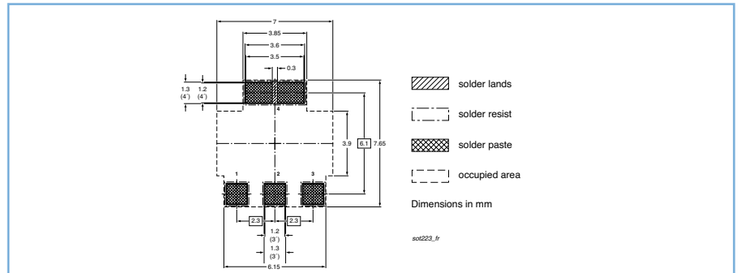


SOT143B

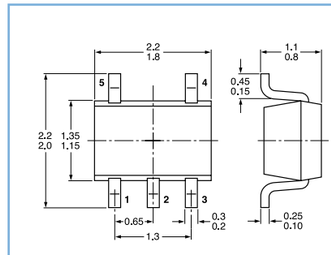
Dimensions in mm



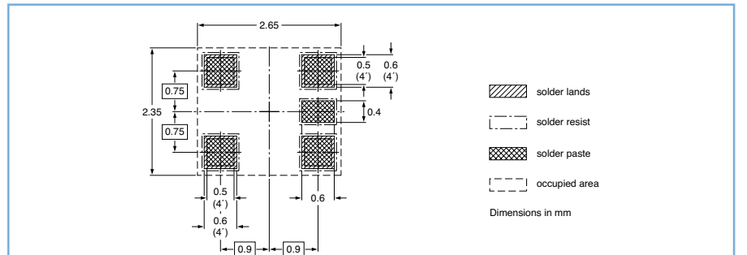
SOT223 (SC-73)



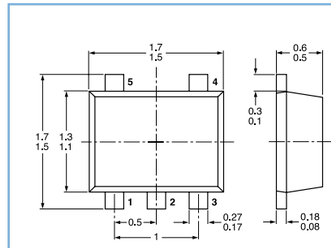
SOT223 (SC-73)



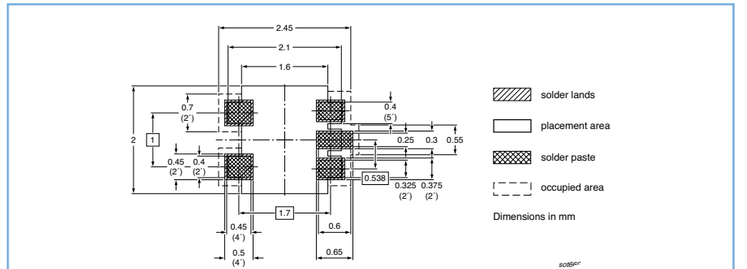
SOT353 (SC-88A)



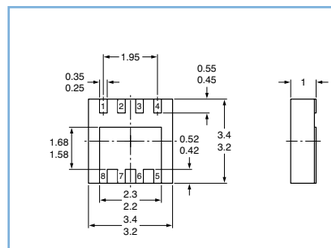
SOT353 (SC-88A)



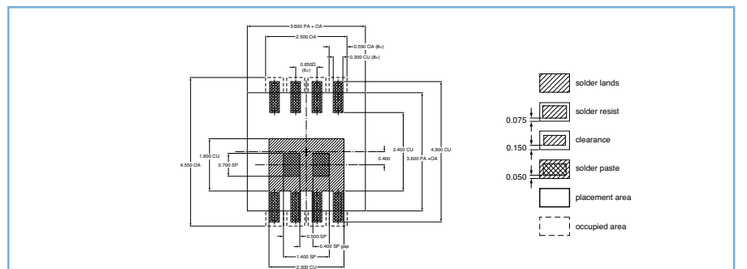
SOT665



SOT665



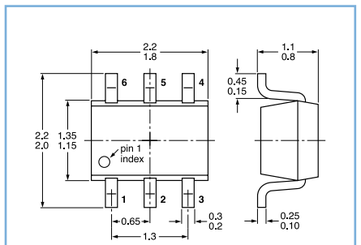
SOT873 (HVSON8)



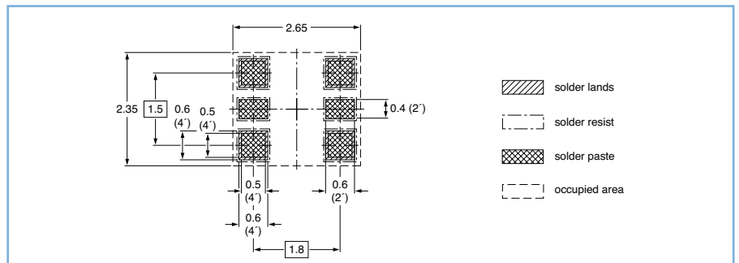
SOT873 (HVSON8)

Dimensions in mm

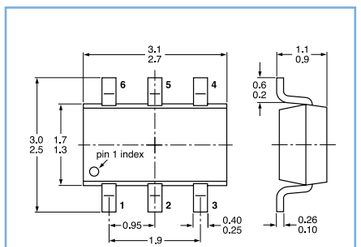
6-Pin SMD Packages



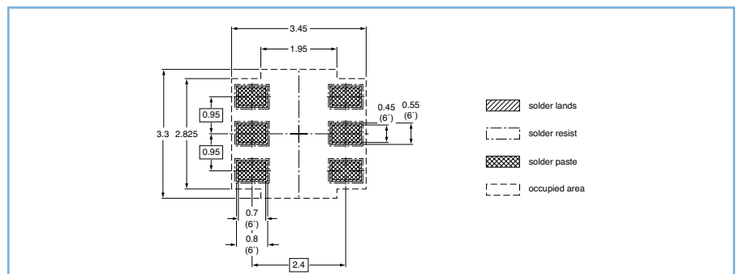
SOT363 (SC-88)



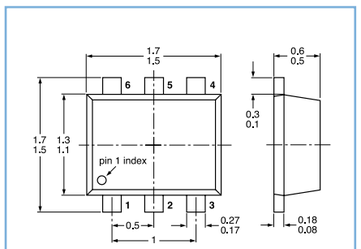
SOT363 (SC-88)



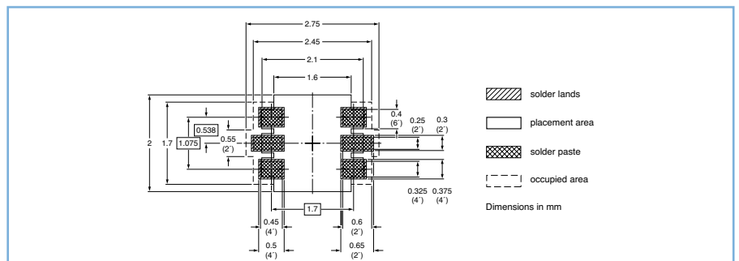
SOT457 (SC-74)



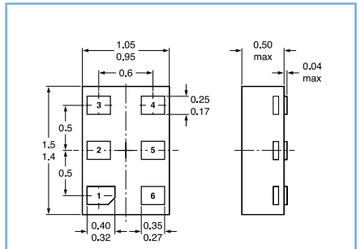
SOT457 (SC-74)



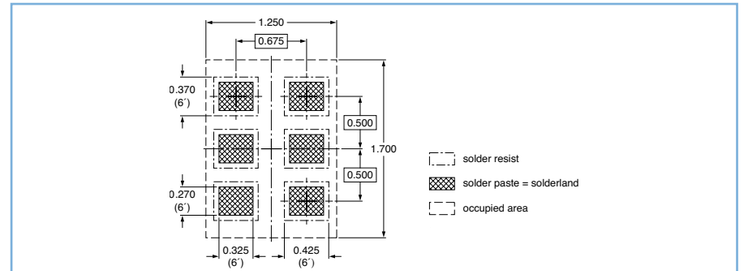
SOT666



SOT666

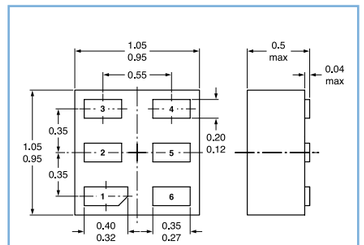


SOT886 (XSON6)

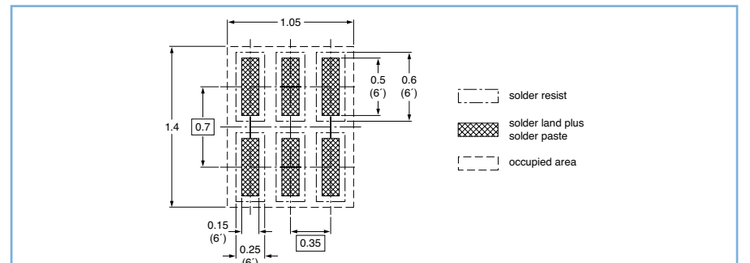


SOT886 (XSON6)

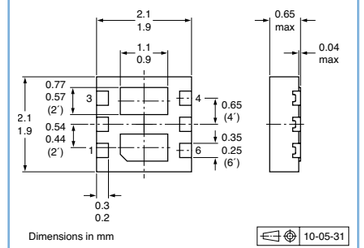
Dimensions in mm



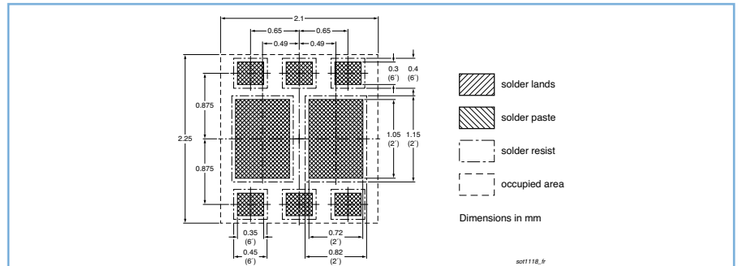
SOT891 (XSON6)



SOT891 (XSON6)

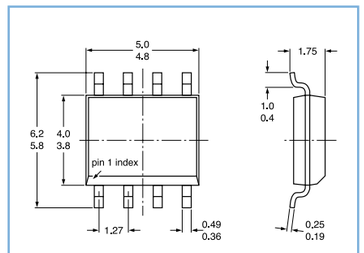


SOT1118

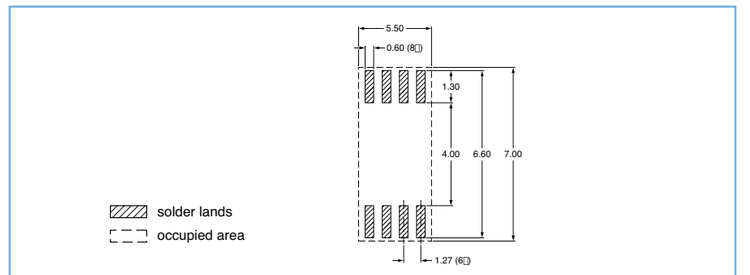


SOT1118

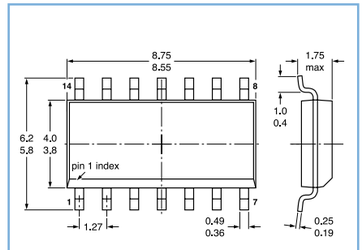
Multi-Pin SMD Packages



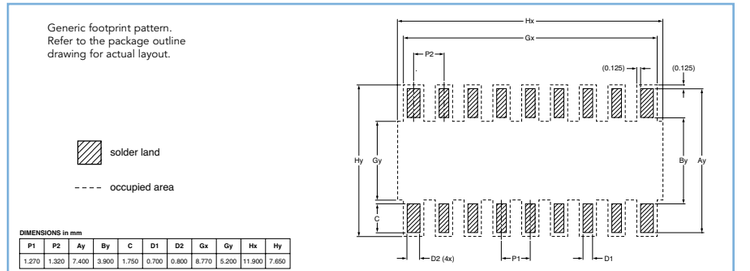
SOT96 (SO8)



SOT96 (SO8)



SOT108 (SO14)

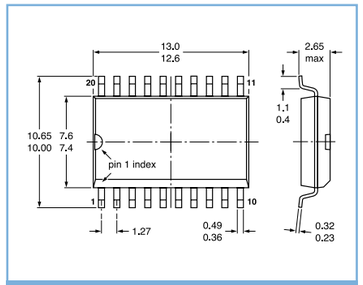


DIMENSIONS in mm

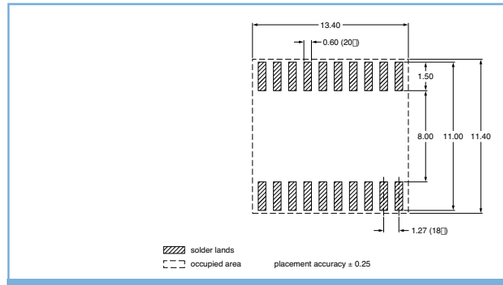
P1	P2	Ay	By	C	D1	D2	Gx	Gy	Hx	Hy
1.270	1.320	7.400	3.900	1.750	0.700	0.800	8.770	5.200	11.900	7.650

SOT108 (SO14)

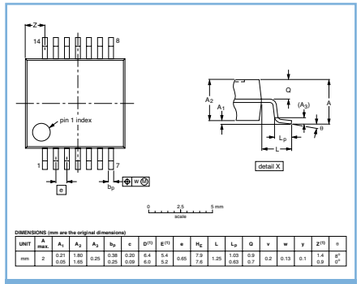
Dimensions in mm



SOT163 (SO20)



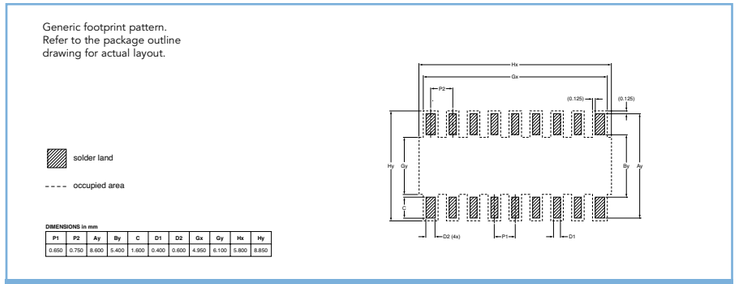
SOT163 (SO20)



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A1	A2	A3	bp	c	D(1)	E(1)	e	HE	L	Lp	Q	v	w	y	Z(1)	θ
mm	2	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	6.4 6.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	1.4 0.9	8° 0°

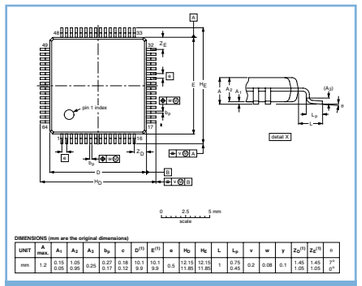
SOT337 (SSOP14)



DIMENSIONS in mm

P1	P2	Ay	By	C	D1	D2	Gx	Gy	Hx	Hy
0.650	0.750	8.600	5.400	1.650	0.400	0.600	4.950	6.100	5.800	8.850

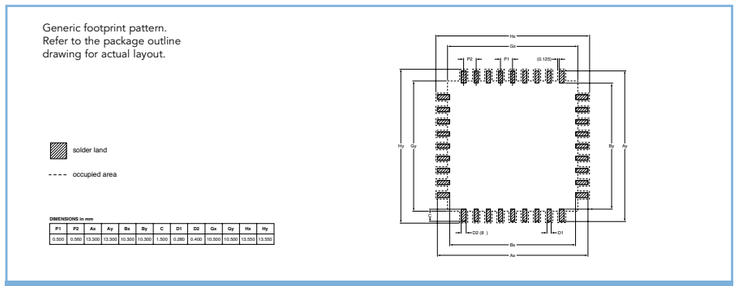
SOT337 (SSOP14)



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A1	A2	A3	bp	c	D(1)	E(1)	e	HD	HE	L	Lp	θ	v	w	y	Z(1)	θ
mm	2.45	0.25 0.05	1.85 0.95	0.25	0.27 0.17	0.18 0.12	10.1 9.9	10.1 9.9	0.5	12.15 11.85	12.15 11.85	1	0.75 0.45	8° 0°	0.2	0.08	0.1	1.45 1.05	7° 0°

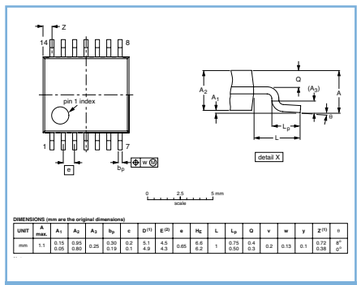
SOT357



DIMENSIONS in mm

P1	P2	Ax	Ay	Bx	By	C	D1	D2	Gx	Gy	Hx	Hy
0.500	0.560	13.300	13.300	10.300	10.300	1.350	0.280	0.400	10.500	13.500	13.500	13.590

SOT357

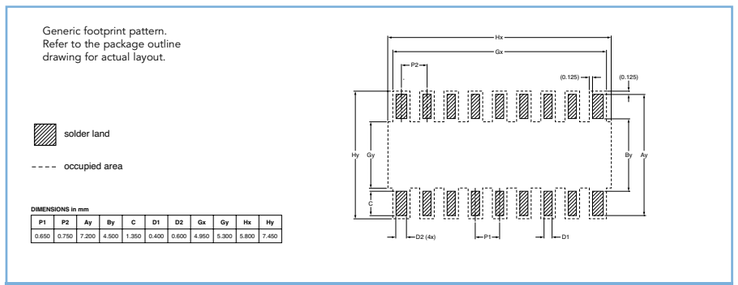


DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A1	A2	A3	bp	c	D(1)	E(2)	e	HE	L	Lp	Q	v	w	y	Z(1)	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.50 0.19	0.2 0.1	5.1 4.9	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.72 0.38	8° 0°

SOT402 (TSSOP14)

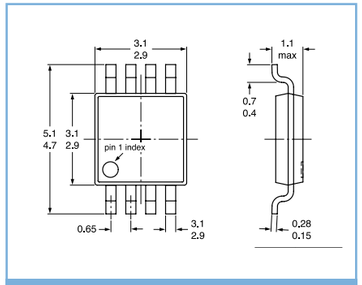
Dimensions in mm



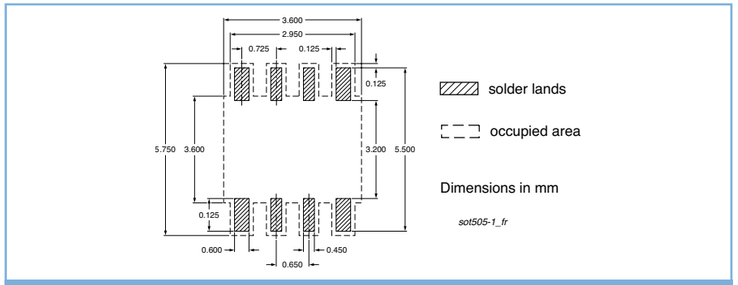
DIMENSIONS in mm

P1	P2	Ay	By	C	D1	D2	Gx	Gy	Hx	Hy
0.650	0.750	7.200	4.500	1.350	0.400	0.600	4.950	5.300	5.800	7.450

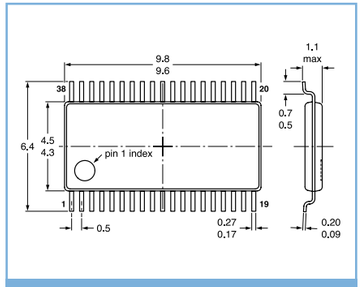
SOT402 (TSSOP14)



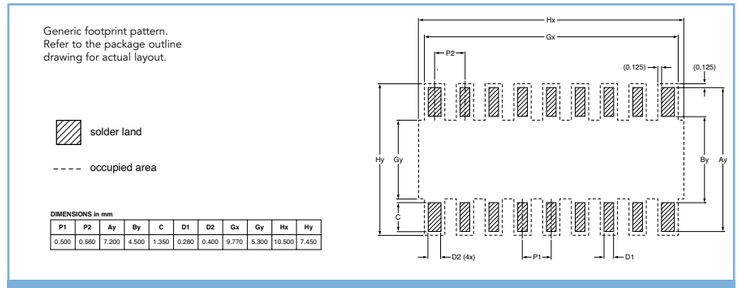
SOT505 (TSSOP8)



SOT505 (TSSOP8)



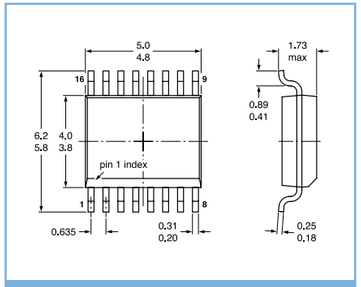
SOT510 (TSSOP38)



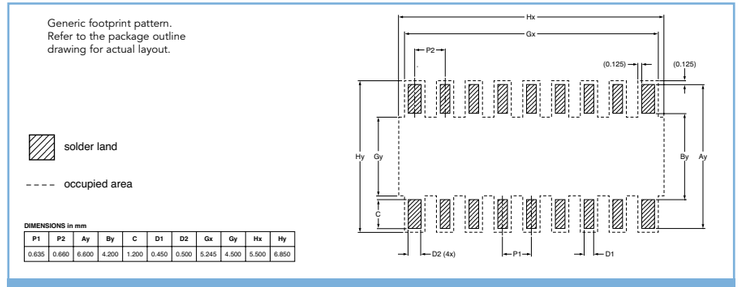
DIMENSIONS in mm

P1	P2	Ay	By	C	D1	D2	Gx	Gy	Hx	Hy
0.500	0.560	7.200	4.500	1.350	0.280	0.400	9.770	5.300	10.500	7.450

SOT510 (TSSOP38)



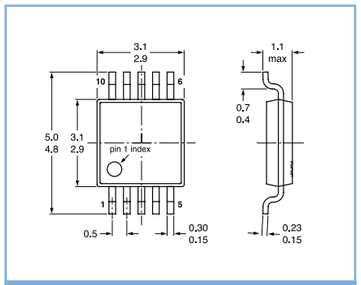
SOT519 (SSOP16)



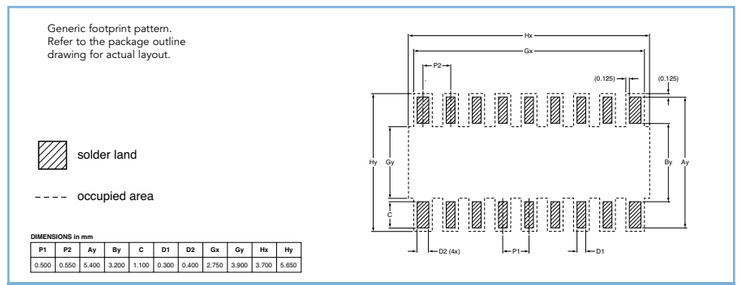
DIMENSIONS in mm

P1	P2	Ay	By	C	D1	D2	Gx	Gy	Hx	Hy
0.635	0.660	6.600	4.200	1.200	0.450	0.500	5.245	4.500	5.500	6.850

SOT519 (SSOP16)



SOT552 (TSSOP10)

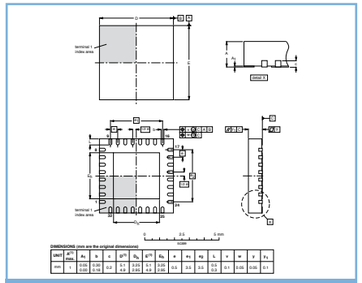


DIMENSIONS in mm

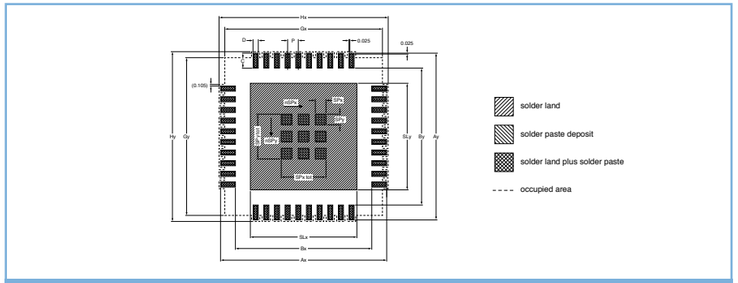
P1	P2	Ay	By	C	D1	D2	Gx	Gy	Hx	Hy
0.500	0.550	5.400	3.200	1.100	0.300	0.400	2.750	3.900	3.700	5.650

SOT552 (TSSOP10)

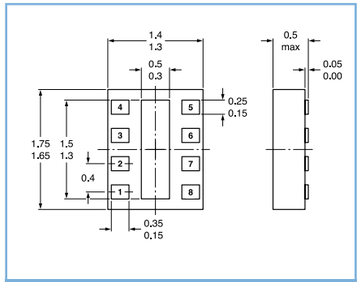
Dimensions in mm



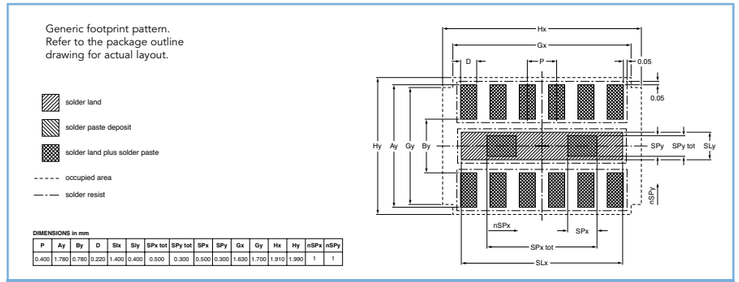
SOT617



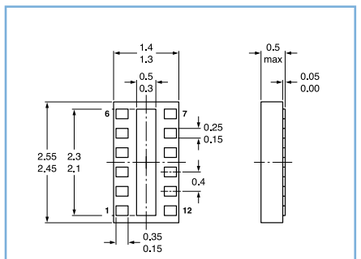
SOT617



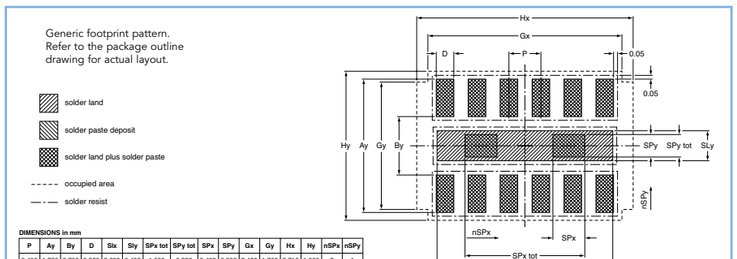
SOT983 (HXSON8)



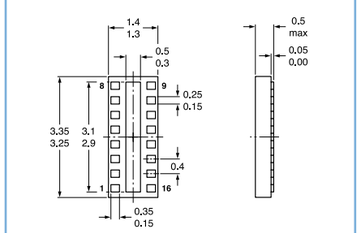
SOT983 (HXSON8)



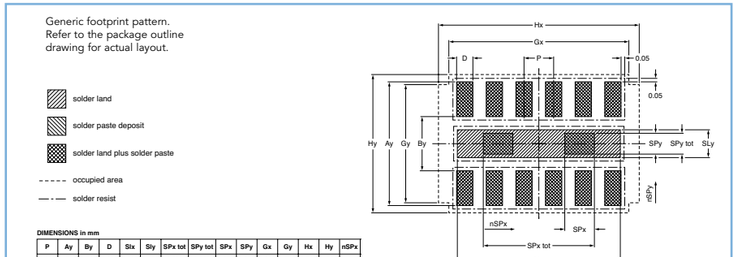
SOT984 (HXSON12)



SOT984 (HXSON12)

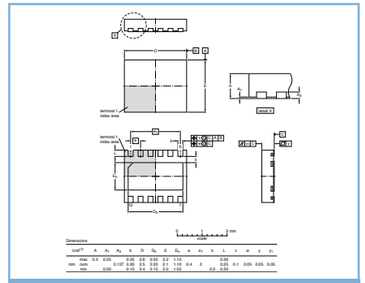


SOT985 (HXSON16)

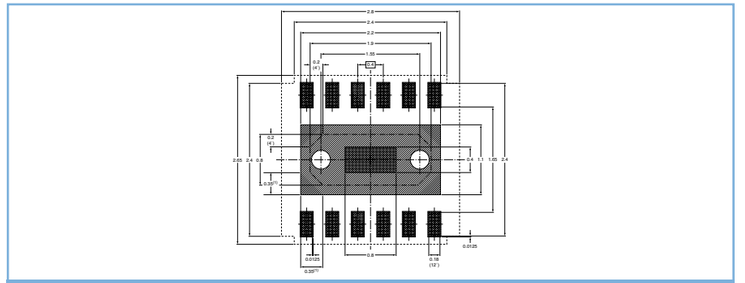


SOT985 (HXSON16)

Dimensions in mm

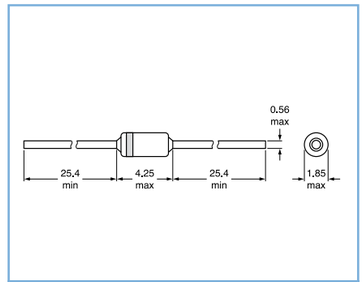


SOT1156

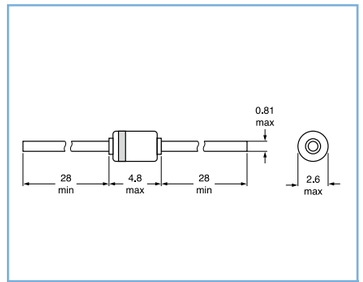


SOT1156

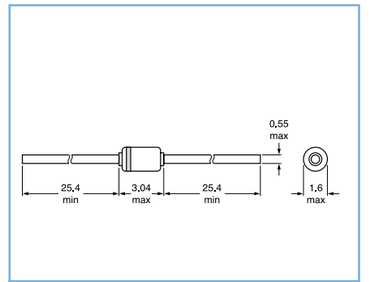
Glass diodes



SOD27 (DO-35)

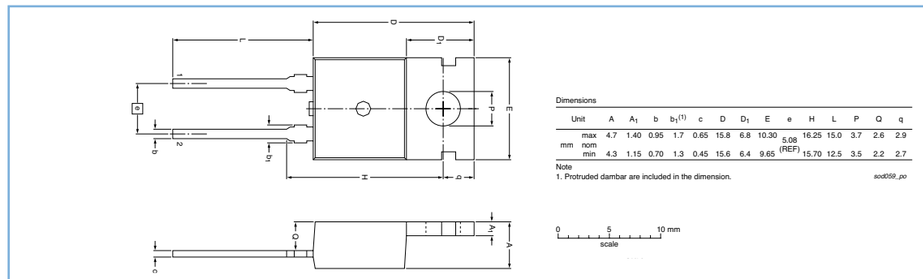


SOD66 (DO-41)

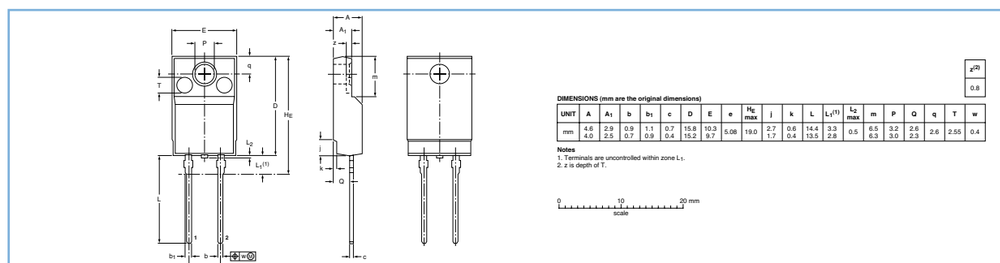


SOD68 (DO-34)

Through Hole Packages

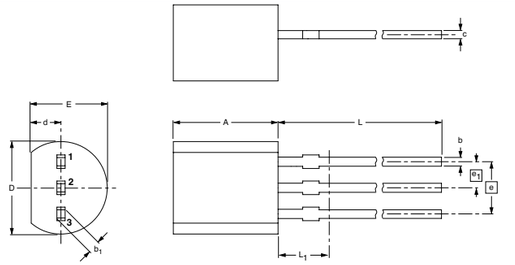


SOD59



SOD113

Dimensions in mm



DIMENSIONS (mm are the original dimensions)

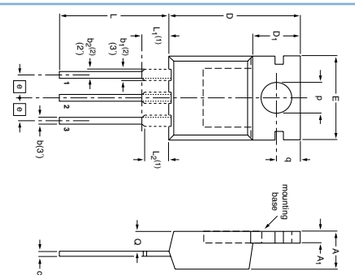
UNIT	A	b	b_1	c	D	d	E	e	e_1	L	L_1 (1) max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

0 2.5 5 mm
scale

SOT54



DIMENSIONS (mm are the original dimensions)

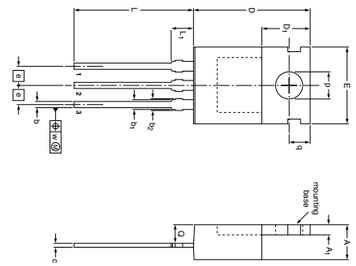
UNIT	A	A_1	b	b_1	b_2	c	D	D_1	E	e	e_1	L	L_1(1)	L_2(1) max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 1.0	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54		15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

Notes

1. Lead shoulder designs may vary.
2. Dimension includes excess dambar.

0 5 10 mm
scale

SOT78



DIMENSIONS (mm are the original dimensions)

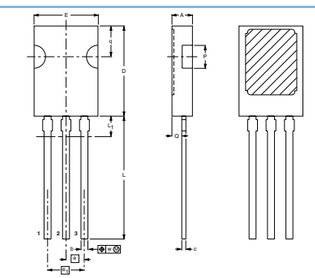
UNIT	A	b	c	D	E	e	e_1	L	L_1 (1) max.	P	Q	q	w
mm	2.8 2.3	0.88 0.65	0.58 0.47	11.1 10.5	7.8 7.2	2.29	4.58	16.5 15.3	2.54	3.1 2.5	1.5 0.9	3.9 3.5	0.254

Note

1. Terminal dimensions within this zone are uncontrolled to allow for body and terminal irregularities.

0 2.5 5 mm
scale

SOT78D

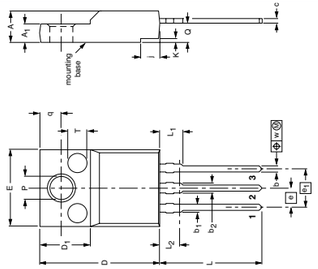


DIMENSIONS (mm are the original dimensions)

UNIT	A	b	c	D	E	e	e_1	L	L_1 (1) max.	P	Q	q	w
mm	4.7 4.3	0.9 0.6	0.4	16.0 15.2	10.3 9.7	2.54	14.0 12.8	3.0	3.7 3.5	2.6 2.2	3.0 2.7	0.2	

0 5 10 mm
scale

SOT82



DIMENSIONS (mm are the original dimensions)

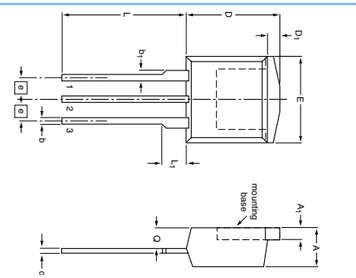
UNIT	A	A_1	b	b_1	b_2	c	D	D_1	E	e	e_1	j	K	L	L_1	L_2 (1) max.	P	Q	q	T (2)	w
mm	4.6 4.0	2.9 2.5	0.9 0.7	1.1 0.9	1.4 1.0	0.7 0.4	15.8 15.2	6.5 6.3	10.3 9.7	2.54	5.08	2.7 1.7	0.6 0.4	14.4 13.5	3.30 2.79	3	3.2 3.0	2.6 2.3	3.0 2.6	2.5	0.4

Notes

1. Terminal dimensions within this zone are uncontrolled.
2. Both recesses are Æ 2.5 ˚ 0.8 max. depth

0 5 10 mm
scale

SOT186A

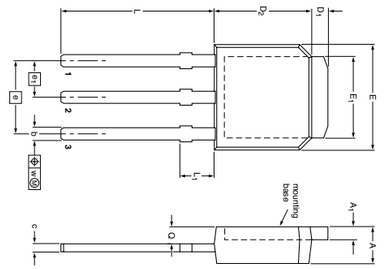


DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1	c	D_1	E	e	e_1	L	L_1	Q
mm	4.5 4.1	1.40 1.27	0.85 0.60	1.3 1.0	0.7 0.4	11	1.6 1.2	10.3 9.7	2.54	15.0 13.5	3.30 2.79	2.6 2.2

0 5 10 mm
scale

SOT226



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	c	D_1	D_2	E	E_1	e	e_1	L	L_1 (2) max	Q	w
mm	2.38 2.22	0.93 0.46	0.89 0.71	0.56 0.46	1.10 0.96	6.22 5.98	6.73 6.47	5.21 5.00	4.57 BSC(1)	2.285 BSC(1)	9.6 9.2	2.7	1.1 1.0	0.3

Notes

1. Basic spacing between centers.
2. Terminal dimensions are uncontrolled within zone L_1.

0 2.5 5 mm
scale

SOT533

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Notes

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