

Product Summary

$V_{(BR)DSS}$	$R_{DS(on) \text{ max}}$	I_D $T_A = +25^\circ\text{C}$
100V	220m Ω @ $V_{GS} = 10\text{V}$	1.6A
	250m Ω @ $V_{GS} = 4.5\text{V}$	1.3A

Features and Benefits

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**
- **An Automotive-Compliant Part is Available Under Separate Datasheet ([DMN10H220LQ](#))**

Description and Applications

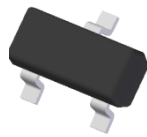
This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(on)}$) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Load Switches

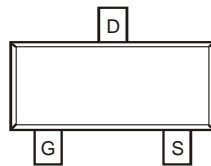
Mechanical Data

- Package: SOT23
- Package Material: Molded Plastic, "Green" Molding Compound
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish—Matte Tin Annealed Over Copper Leadframe.
Solderable per MIL-STD-202, Method 208 **e3**
- Weight: 0.0072 grams (Approximate)

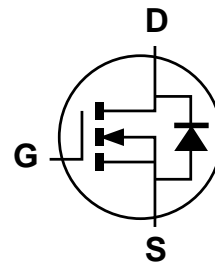
SOT23 (Standard)



Top View



Pin Configuration



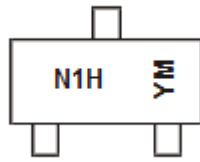
Equivalent Circuit

Ordering Information

Part Number	Compliance	Package	Packing	
			Qty.	Carrier
DMN10H220L-7	Standard	SOT23 (Standard)	3000	Tape & Reel
DMN10H220L-13	Standard	SOT23 (Standard)	10,000	Tape & Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



N1H = Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: I = 2021)
 M = \bar{M} (ex: 9 = September)

Date Code Key

Year	2013	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	A	I	J	K	L	M	N	O	P	R	S

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	± 16	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	(Note 6) $T_A = +25^\circ\text{C}$	I_D	1.6	A
	$T_A = +70^\circ\text{C}$		1.3	
	(Note 5) $T_A = +25^\circ\text{C}$	I_D	1.4	A
	$T_A = +70^\circ\text{C}$		1.1	
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	0.6	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)		I_{DM}	8	A

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	1.3	W
	$T_A = +70^\circ\text{C}$		0.8	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	94	$^\circ\text{C/W}$
	(Note 5)		177	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

- Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1inch square copper plate.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	100	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 100V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	1	—	2.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(on)}	—	160	220	mΩ	V _{GS} = 10V, I _D = 1.6A
			190	250		V _{GS} = 4.5V, I _D = 1.3A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1.1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iSS}	—	401	—	pF	V _{DS} = 25V, V _{GS} = 0V f = 1MHz
Output Capacitance	C _{oss}	—	22	—		
Reverse Transfer Capacitance	C _{rSS}	—	17	—		
Gate Resistance	R _g	—	2.1	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	4.1	—	nC	V _{DS} = 50V, I _D = 1.6A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	8.3	—		
Gate-Source Charge	Q _{gs}	—	1.5	—		
Gate-Drain Charge	Q _{gd}	—	2	—		
Turn-On Delay Time	t _{D(on)}	—	6.8	—	ns	V _{DS} = 50V, V _{GS} = 4.5V, R _G = 6.8Ω, I _D = 1A
Turn-On Rise Time	t _r	—	8.2	—		
Turn-Off Delay Time	t _{D(off)}	—	7.9	—		
Turn-Off Fall Time	t _f	—	3.6	—		
Reverse Recovery Time	t _{rr}	—	17	—	ns	I _F = 1.1A, di/dt = 100A/μs
Reverse Recovery Charge	Q _{rr}	—	9.8	—	nC	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to production testing.

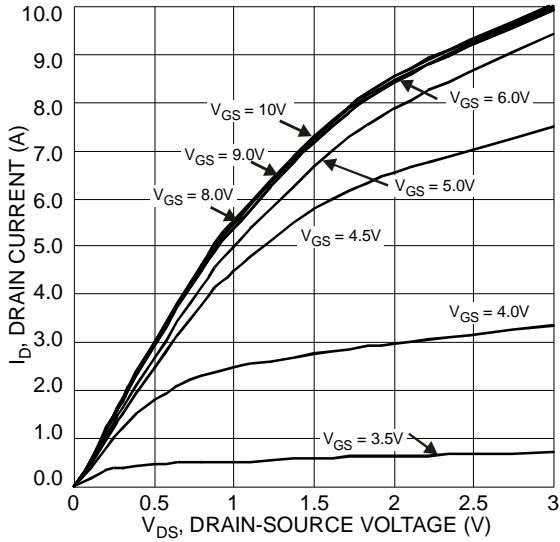


Figure 1 Typical Output Characteristic

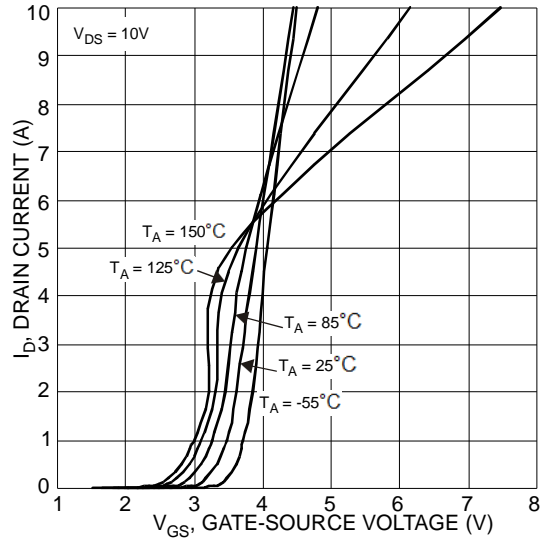


Figure 2 Typical Transfer Characteristics

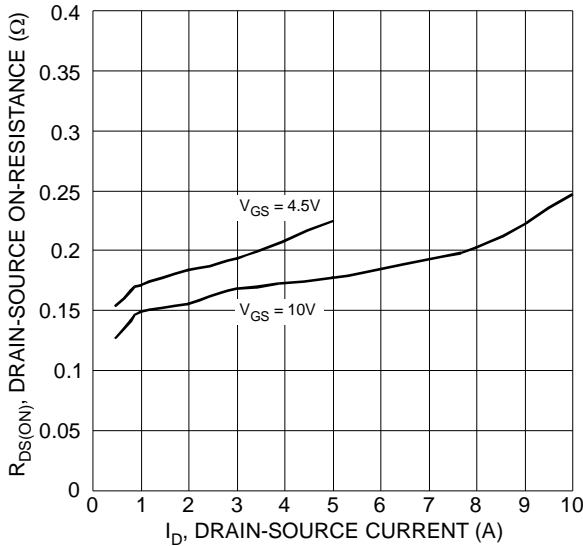


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

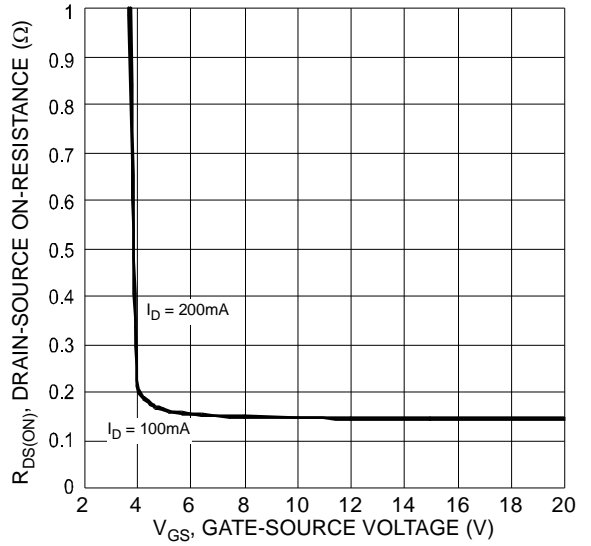


Figure 4 Typical Transfer Characteristic

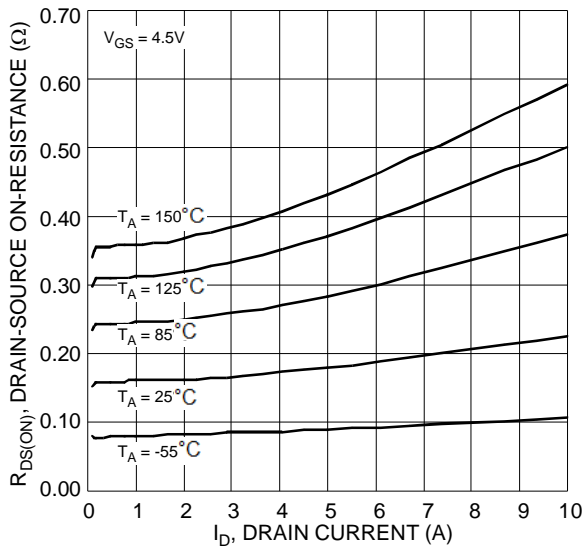


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

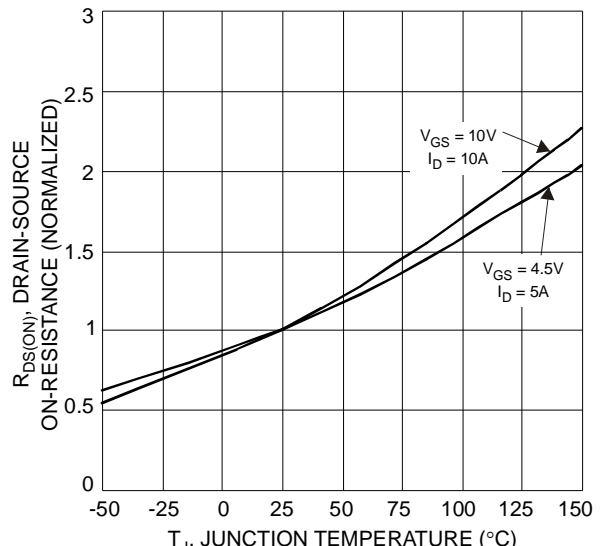


Figure 6 On-Resistance Variation with Temperature

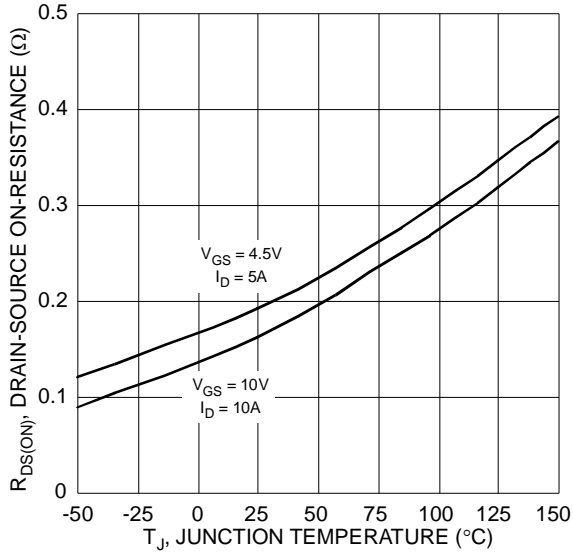


Figure 7 On-Resistance Variation with Temperature

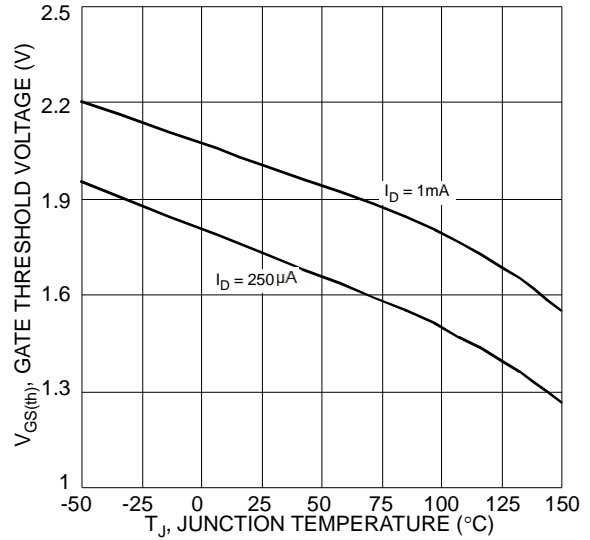


Figure 8 Gate Threshold Variation vs. Ambient Temperature

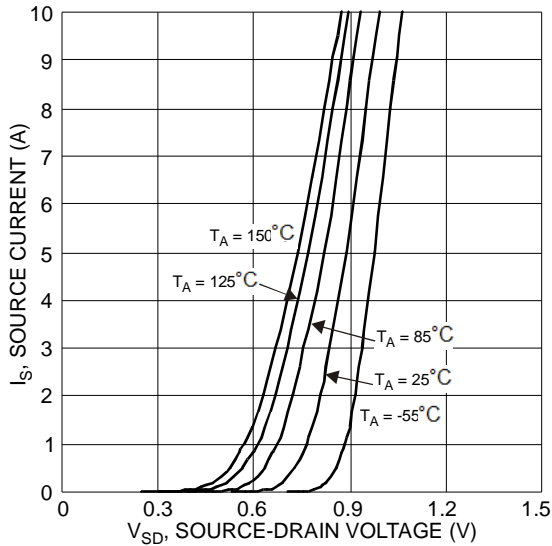


Figure 9 Diode Forward Voltage vs. Current

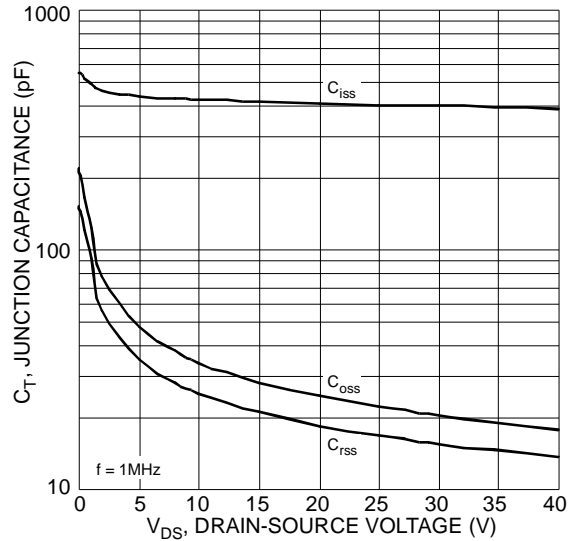


Figure 10 Typical Junction Capacitance

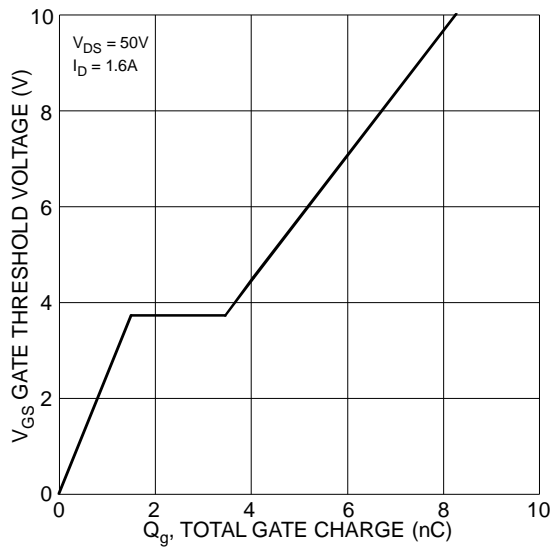


Figure 11 Gate Charge

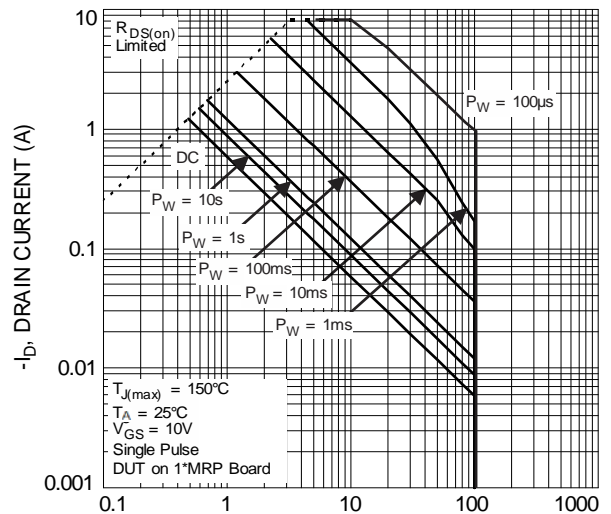
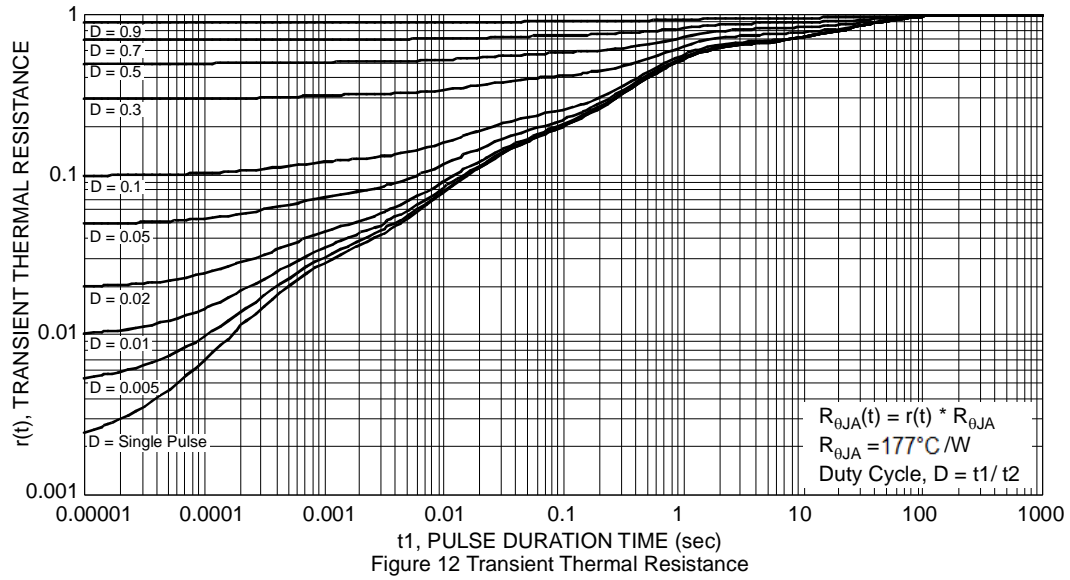
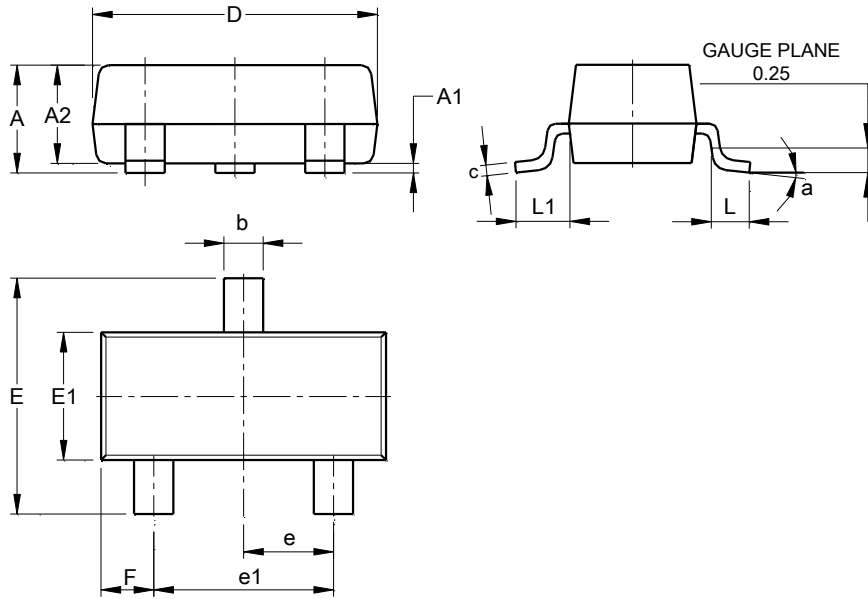


Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

Please see <https://www.diodes.com/design/support/packaging/diodes-packaging/> for the latest version.

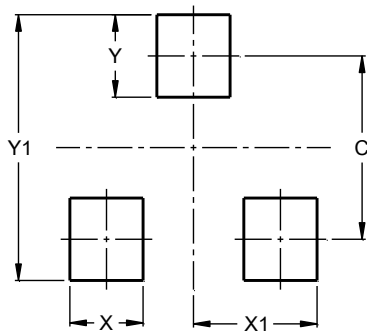


SOT23 (Standard)			
Dim	Min	Max	Typ
A	0.90	1.15	1.025
A1	0.00	0.10	0.05
A2	0.85	1.10	0.975
b	0.30	0.51	0.40
c	0.080	0.202	0.11
D	2.80	3.00	2.90
E	2.25	2.55	2.40
E1	1.20	1.40	1.30
e	0.89	1.03	0.915
e1	1.78	2.05	1.83
F	0.40	0.60	0.535
L1	0.45	0.61	0.55
L	0.25	0.55	0.40
a	0°	8°	--
All Dimensions in mm			

Suggested Pad Layout

Please see <https://www.diodes.com/design/support/packaging/diodes-packaging/> for the latest version.

SOT23 (Standard)



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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