Current 1A　High Voltage 40V　Low Power LDO

SSP7903

General Description

The SSP7903 series is a group of positive voltage output, three-pin regulators, that provide a high current even when the input/output voltage differential is small. Low power consumption and high accuracy is achieved through CMOS and laser trimming technologies.

The SSP7903 consists of a high-precision voltage reference, an error amplification circuit, and a current limited output driver. Transient response to load variations have improved in comparison to the existing series.

SOT89-3L　　SOT223　　TO252

Features

- Low Quiescent Current: typical 1.6μA
- Temperature Stability: ±50ppm/℃
- High input voltage: 40V
- Output voltage accuracy: tolerance ±2%
- Low temperature coefficient
- Dropout Voltage: 20mV@IOUT=10mA
- Maximum Output Current: 1A
- The chip has the functions of overheat protection, over current protection and output short circuit protection
- Packages:SOT89-3L，SOT223 and TO252

Applications

- Industrial control
- Smart meters, instruments and meters
- Battery supply set
- Wireless communication equipment
- Automotive electronics

Order information

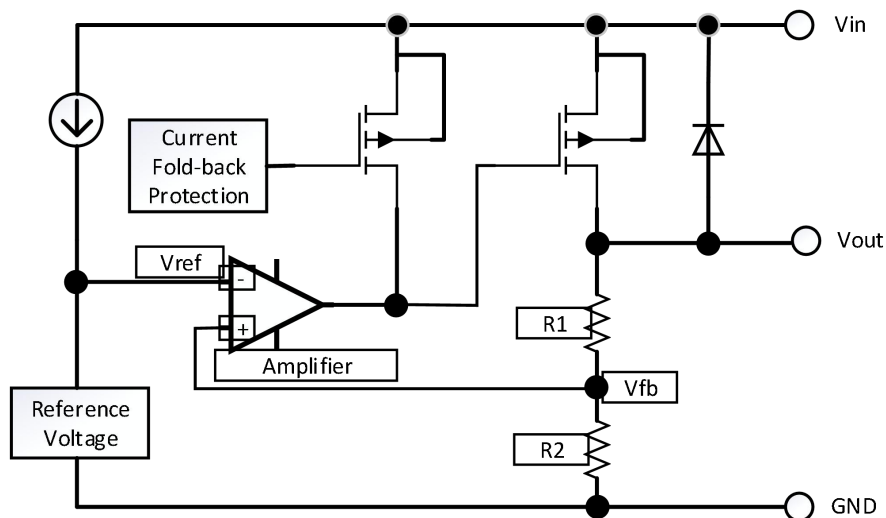| Product model	Package	Manner of packing	Minimum packing quantity
SSP7903PxxPx	SOT89-3L	Reel	1000
SSP7903PxxPBx	SOT89-3L(B)		1000
SSP7903PxxFx	SOT223		2500
SSP7903PxxFBx	SOT223(B)		2500
SSP7903PxxJx	TO252	Tube	2500

Selection Guide Table

SSP7903P①②③④
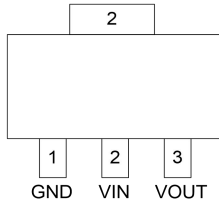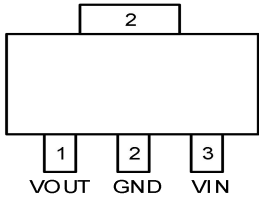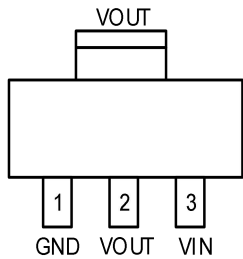
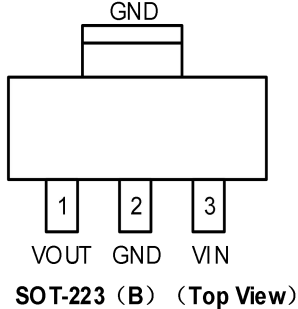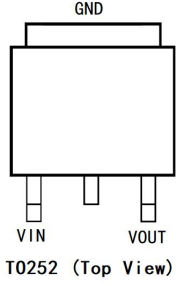| Designator	Symbol	Description	Remarks
①②	Integer	Output Voltage(3.0V~12.0V)	For example, if the output voltage is 5.0V, ①② will be 50.
③	P	Package:SOT89-3L	The encapsulated pin definition is described in the pin assignment below.
	PB	Package:SOT89-3L(B)	
	F	Package:SOT223	
	FB	Package:SOT223(B)	
	J	Package: TO252	
④	R	RoHS / Pb Free	
	G	Halogen Free	

Note:"①②" stands for output voltages. The regular output voltage is 3V, 3.3V, 3.6V, 4.0V, 5.0V, 12V. Other voltages can be specially customized.

Functional Block Diagram

Pin Assignment (TOP VIEW)

SSP7903PxxPx		
NO.	**Description**	
1	GND	
2	VIN	
3	VOUT	
MARK	03Pxx YWH	

SSP7903PxxPBx		
NO.	**Description**	
1	VOUT	
2	GND	
3	VIN	
MARK	03PBxx YWH	

SSP7903PxxFx		
NO.	**Description**	
1	GND	
2	VOUT	
3	VIN	
MARK	03Fxx YWH	

SSP7903PxxFBx

NO.	Description	
1	VOUT	
2	GND	
3	VIN	
MARK	03FBxx YWH	

SOT-223（B）（Top View）

VOUT GND VIN
1   2   3
GND

SSP7903PxxJx

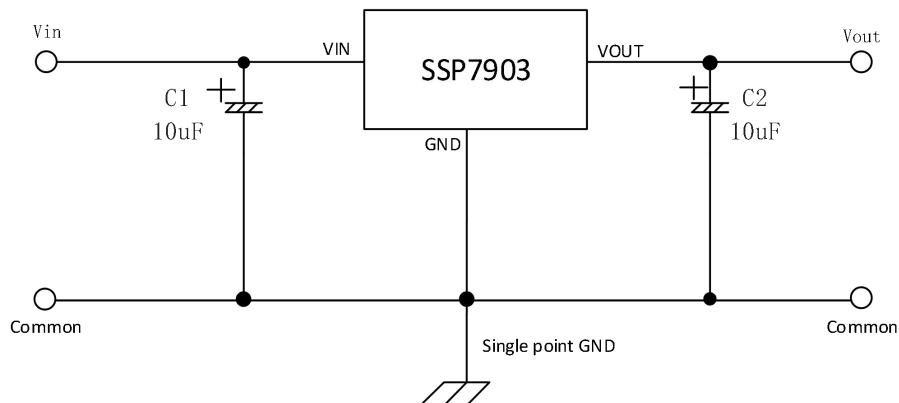| NO.	Description	
1	VIN	
2	GND	
3	VOUT	
MARK	03Jxx YWH	

GND

VIN   VOUT
TO252 (Top View)

Note: xx:Output Voltage,"33" stands for 3.3V

Y: The Year of manufacturing,"1" stands for year 2021;

W: The week of manufacturing. "20" stands for week 20;

H: Factory Code;

Application Circuits

Absolute Maximum Ratings

(Unless otherwise indicated：T$_a$=25℃)

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Voltage	V$_{IN}$	-0.3	40	V
Output Voltage	V$_{OUT}$	Vss-0.3	VIN+0.3V	
Power Dissipation	P$_{D（1）}$		SOT 89 1000 TO 252 1800 SOT 223 1500	mW
Operating Ambient Temperature	T$_{opr}$	-40	85	℃
Storage Temperature	T$_{stg}$	-40	125	
ESD Protection	ESD HBM		2000	V

Note:These are just the limit parameters.Beyond the range specified in the Absolute Maximum Ratings may cause serious damage to the equipment.Long exposure to extreme conditions may affect the reliability of the device.

　　(1)Increasing the welding area of package is beneficial to increase power consumption

Electrical Characteristics

SSP7903 Series (Unless otherwise indicated：T$_a$=25℃)

| PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Output Voltage[1]	V$_{OUT(S)}$	V$_{IN}$= V$_{OUT(S)}$+2V，I$_{OUT}$=10mA		V$_{OUT(S)}$ x0.98	V$_{OUT(S)}$	V$_{OUT(S)}$ x1.02	V
Dropout Voltage[2]	V$_{DROP}$	I$_{OUT}$=1mA			4	8	mV
		I$_{OUT}$=1A			1000	1500	
Line Regulation	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \times V_{OUT}}$	V$_{OUT(S)}$+2V≤V$_{IN}$≤40V I$_{OUT}$ =1mA			0.01	0.02	％/V
Load Regulation	ΔV$_{OUT2}$	V$_{IN}$=V$_{OUT(S)}$+2V 1mA≤I$_{OUT}$≤300mA	V$_{OUT(S)}$≤10V		20	80	mV
			V$_{OUT(S)}$>10V		85	150	
Temperature Stability	$\frac{\Delta V_{OUT}}{\Delta Ta}$	V$_{IN}$ = V$_{OUT(S)}$+2V，I$_{OUT}$=10mA -40℃≤Ta≤85℃			±50		ppm/℃
Quiescent Current	Iq	no load	V$_{OUT(S)}$<5.0V	0.8	1.6	2	μA
			V$_{OUT(S)}$≥5.0V	1.5	3	3.6	
Input Voltage	V$_{IN}$	---		2.2		40	V
Maximum Output Current	I$_{OUTMAX}$					1	A
Current Limit[3]	I$_{LIM}$	V$_{IN}$= V$_{OUT(S)}$+2V,V$_{OUT}$ = 0.9 ×V$_{OUT(S)}$			1.8		A
Short Circuit Current	I$_{SHORT}$	V$_{IN}$=V$_{OUT(S)}$+2V, V$_{OUT}$ and GND is 0Ω			120		mA
PowerSupply Rejection Ratio	PSRR	f=10Hz, V$_{OUT(S)}$=3.6V			73.2		dB
		f=100Hz,V$_{OUT(S)}$=3.6V			72.2		
		f=1kHz, V$_{OUT(S)}$=3.6V			54.5		
Over Temperature Protection	OTP	I$_{OUT}$=10mA			145		℃

Notes:

1. $V_{OUT(S)}$: Output voltage when VIN= Vout +2V, Iout=1 mA.

2. V_{DROP}=Vin1 -（Vout(S)× 0.98）where Vin 1 is the input voltage when Vout = Vout (S)× 0.98.

3. I_{LIM} : Output current when Vin=Vout (S)+2V and Vout = 0.95*Vout (S).

Typical Performance Characteristics
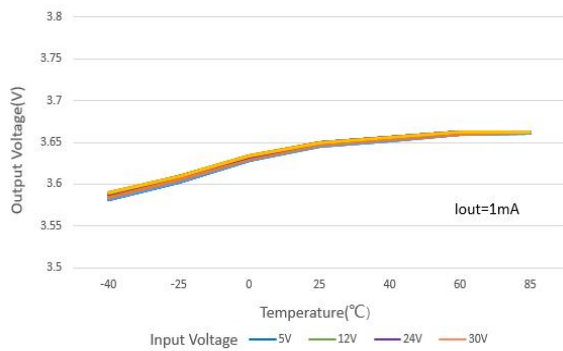
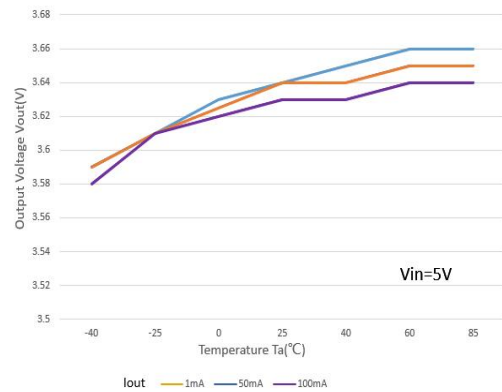Test Conditions: SSP7903P36 CIN=4.7μF, COUT=4.7μF, unless otherwise indicated.
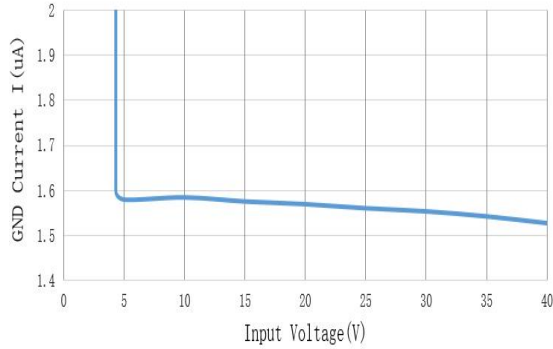
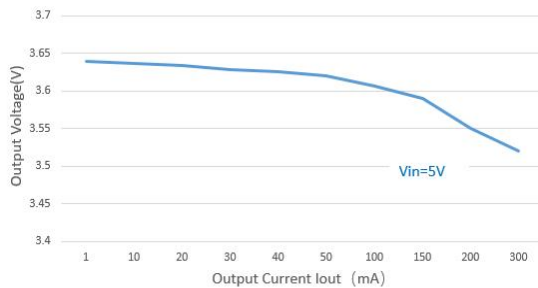GND Current vs Input Voltage
SSP7903P36
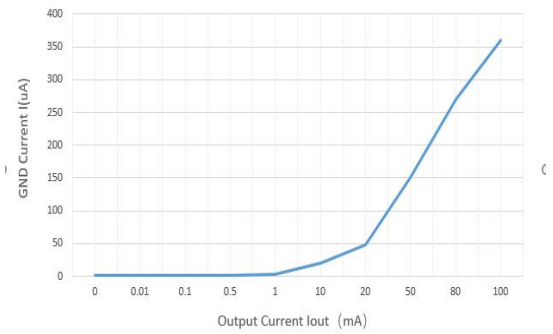
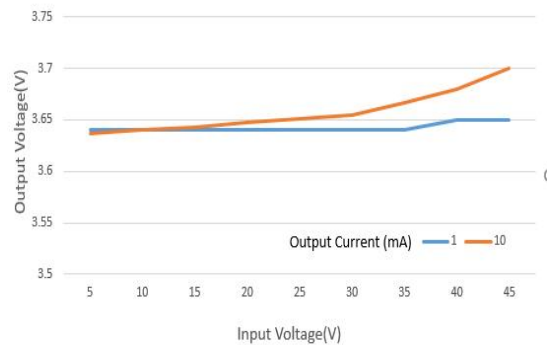GND Current vs Output Current
SSP7903P36

V_{OUT} vs Temperature
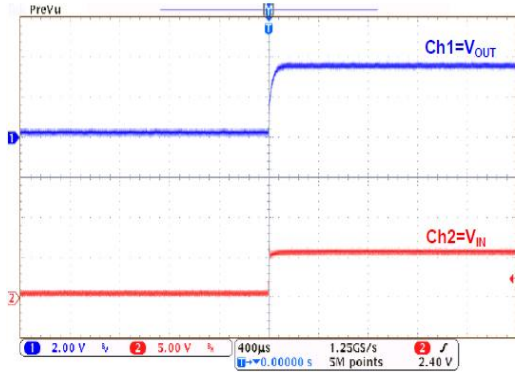SSP7903P36

V_{OUT} vs Temperature
SSP7903P36

V_{OUT} vs Current out
SSP7903P36

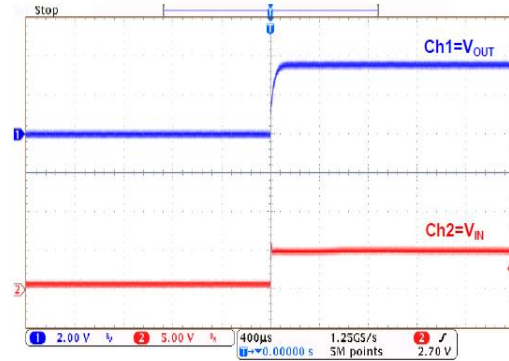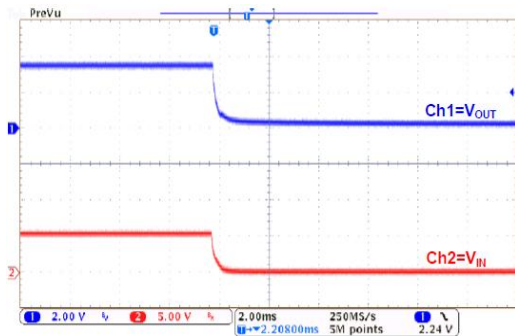V_{OUT} vs Input Voltage
SSP7903P36

Typical Performance Characteristics

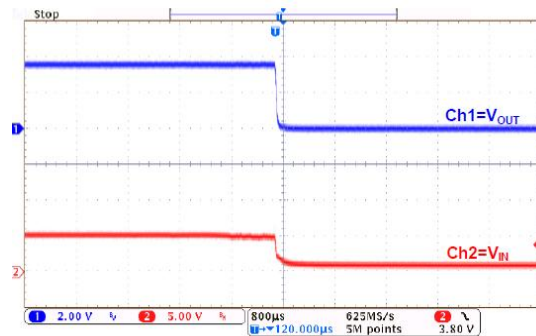Test Conditions: VIN=VOUT+2.0V, CIN=2.2µF, COUT=2.2µF, unless otherwise indicated.

Power-Up at V_{OUT}=3.6V SSP7903P36
(I_{OUT}=0mA)

Power-Up at V_{OUT}=3.6V SSP7903P36
(I_{OUT}=1A)

Power- Down at V_{OUT}=3.6V SSP7903P36
(I_{OUT}=0mA)

Power- Down at V_{OUT}=3.6V SSP7903P36
(I_{OUT}=1A)

Package Information

SOT89-3L Package Outline Dimensions
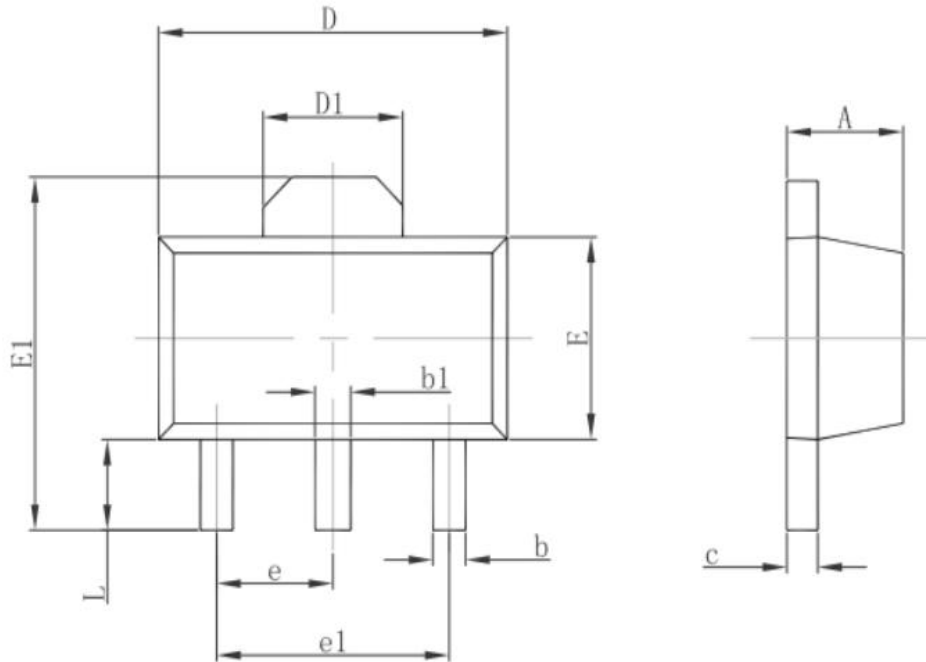
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.400	1.600	0.055	0.063
b	0.320	0.520	0.013	0.020
b1	0.400	0.580	0.016	0.023
c	0.350	0.440	0.014	0.017
D	4.400	4.600	0.173	0.181
D1	1.550 REF		0.061 REF	
E	2.300	2.600	0.091	0.102
E1	3.940	4.250	0.155	0.167
e	1.500 TYP		0.060 TYP	
e1	3.000 TYP		0.118 TYP	
L	0.900	1.200	0.035	0.047

SOT223 Package Outline Dimensions
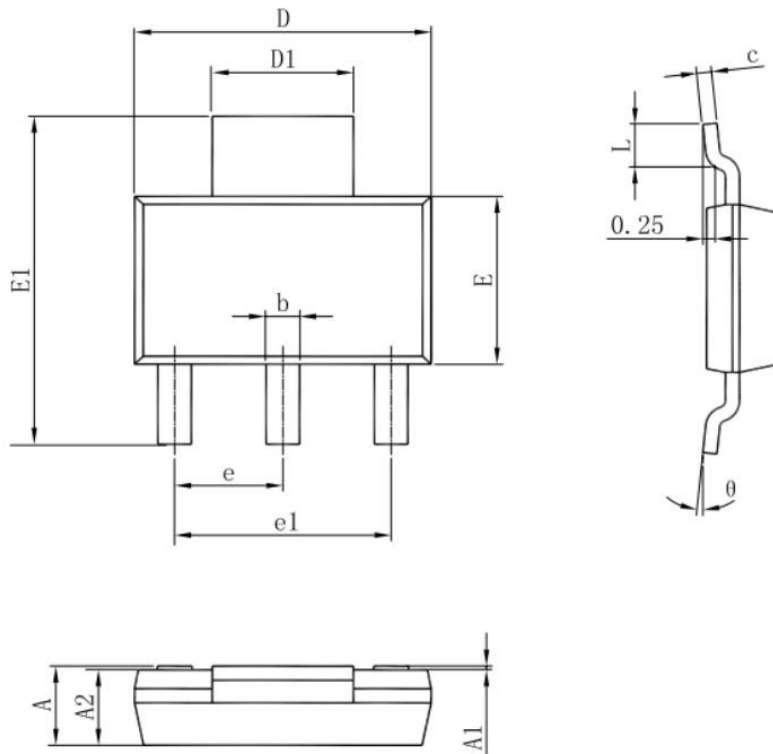
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.520	1.800	0.060	0.071
A1	0.000	0.100	0.000	0.004
A2	1.500	1.700	0.059	0.067
b	0.660	0.820	0.026	0.032
c	0.250	0.350	0.010	0.014
D	6.200	6.400	0.244	0.252
D1	2.900	3.100	0.114	0.122
E	3.300	3.700	0.130	0.146
E1	6.830	7.070	0.269	0.278
e	2.300(BSC)		0.091(BSC)	
e1	4.500	4.700	0.177	0.185
L	0.900	1.150	0.035	0.045
θ	0°	10°	0°	10°

TO252 Package Outline Dimensions
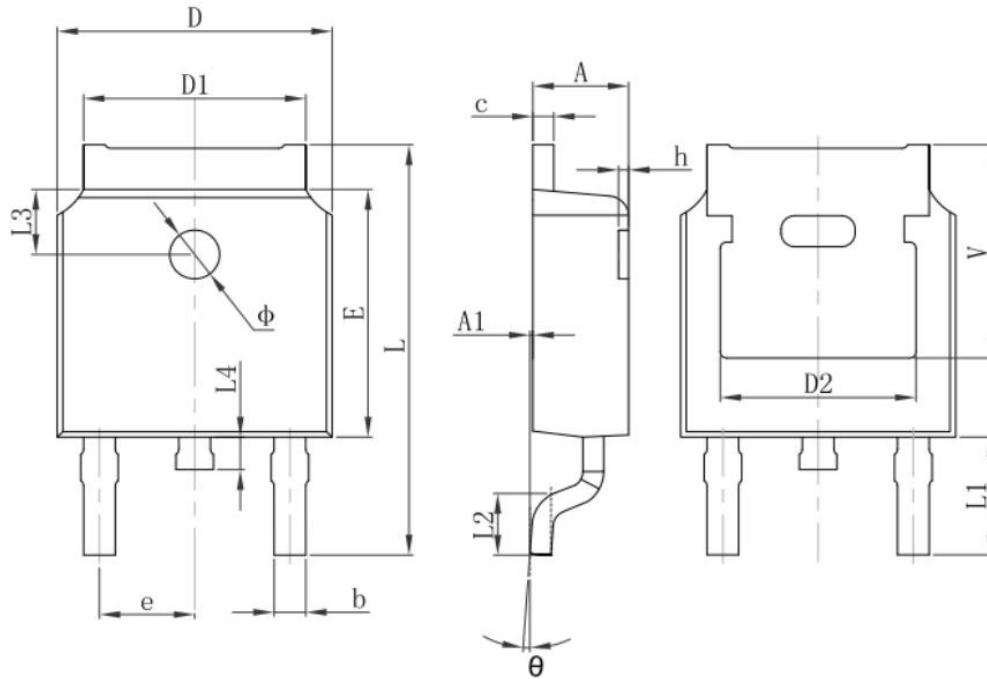
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	4.830 REF		0.190 REF	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 REF		0.114 REF	
L2	1.400	1.700	0.055	0.067
L3	1.600 REF		0.063 REF	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 REF		0.211 REF	

Special Version

The company reserves the right of final interpretation of this specification.

Version Change Description

Versions：V1.2	Writer：Si Yuan Wu	Time：2021.10.29
Modify the record：1. Re-typesetting the manual and checking some data		
Versions：V1.3	Writer：Yang Yang	Time：2022.2.11
Modify the record：1. Update quiescent current data for different output voltages		
Versions：V1.4	Writer：Yang Yang	Time：2022.6.15
Modify the record：1.Add the SOT89(B) and SOT223(B) package pin diagram		
Versions：V1.5	Writer：Yang Yang	Time：2022.7.4
Modify the record：1.Update the SOT223 package pin diagram		
Versions：V1.6	Writer：Yang Yang	Time：2023.6.6
Modify the record：1.Update the description of SOT223 package pin		

The statement

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