Description

The MST53XXB series is a high voltage，ultralow-power，low dropout voltage regulator. The device can deliver 100mA output current with a dropout voltage of 300mV and allows an input voltage as high as 35V. The typical quiescent current is only 1.6μA. The device is available in fixed output voltages of 1.8, 2.5, 3.0, 3.3, 3.6, 4.0, 4.2 and 5.0V.

The device features integrated short-circuit and thermal shutdown protection.

Although designed primarily as fixed voltage regulators, the device can be used with external components to obtain variable voltages.

Application

- Battery-powered equipment
- Smoke detector and sensor
- Microcontroller Applications
- Home Appliance

Features

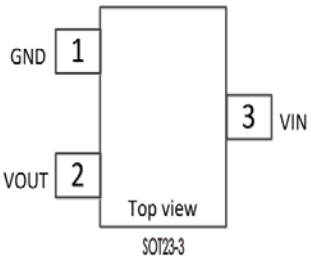
- Low Quiescent Current：1.6μA
- High Input Voltage： Up to 35V
- High Output Current：≥200mA
- Low Dropout Voltage：
  30mV@10mA
  300mV@100mA
  600mV@200mA
- Fixed Output Voltages：1.8, 2.5, 3.0, 3.3, 3.6，4.0，4.2 and 5.0V
- High-accuracy Output Voltage
- MST 53XXB ±2%
- Good Transient Response
- Integrated Short-Circuit Protection
- Integrated Thermal Protection
- Available Packages：

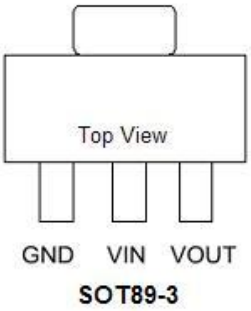
MST53XXBTE	SOT23-3
MST53XXBTG	SOT23-5
MST53XXBTS	SOT89-3
MST53XXBTY	TO92

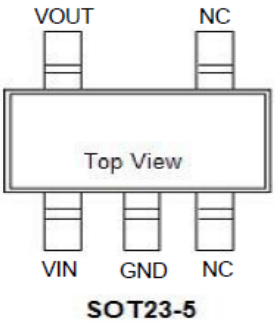
Pin Descriptions

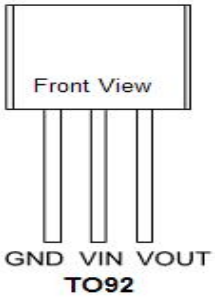
Pin Number			Pin Name	Description
SOT23-3	SOT89-3/TO92	SOT23-5		
1	1	2	GND	Ground pin
2	3	5	VOUT	Regulator output pin
3	2	1	VIN	Regulator input supply pin

■ Packages and Pin Assignments

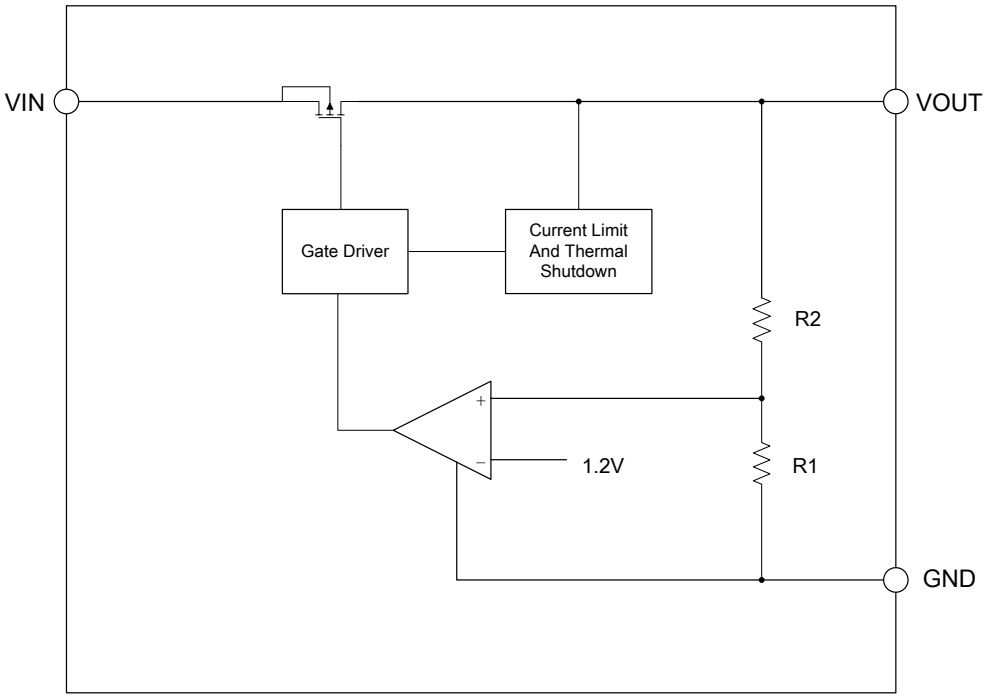








■ Functional Block Diagram



■ Absolute Maximum Ratings

Item	Description	Min	Max	Unit
Voltage	VIN Pin to GND Pin	-0.3	35	V
	VOUT Pin to GND pin	-0.3	6	V
	VOUT Pin to VIN Pin	-35	0.3	V
Current	Peak output	Internally limited		
Temperature	Operating Ambient Temperature	-40	85	℃
	Storage Temperature	-40	150	℃
	Operating virtual junction Temperature	-	150	℃
Thermal Resistance (Junction to Ambient)	SOT89	180		℃/W
	SOT23-3	380		℃/W
	SOT23-5	300		℃/W
	TO92	200		℃/W
Power Dissipation	SOT89	600		mW
	SOT23-3	300		mW
	SOT23-5	400		mW
	TO92	600		mW
Electrostatic discharge rating	Human Body Model (HBM)	4		kV
	Charged Device Model (MM)	100		V

Note：Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device.Functionaloperationofthisdeviceatotherconditionsbeyondthoselistedin thespecificationisnotimpliedandprolongedexposuretoextremeconditions may affectdevicereliability.

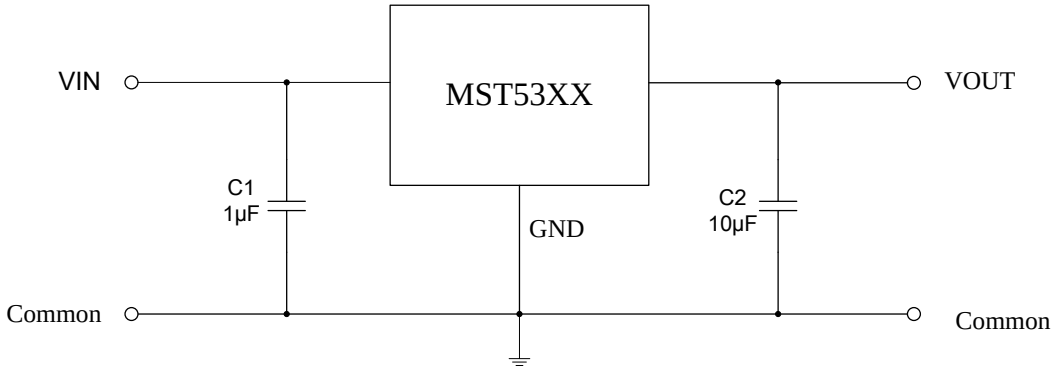
■ Electrical characteristics

(At T_A=25°C, C_{IN}=1uF, V_{IN}=V_{OUTNOM}+1.0V, C_{OUT}=10μF, unless otherwise noted)

Symbol	Parameter	Test Conditions	MIN	TYP	MAX	UNIT
V_{IN}	Input Voltage		—	—	35	V
I_{GND}	Quiescent Current	VIN=12V, No load	—	1.6	—	μA
$V_{OUT(MST53XXB)}$	Output Voltage	VIN=12V, I_{OUT}=10mA	-2%		2%	V_{OUT}
I_{OUT_MAX}	Output Current		200	250	—	mA
V_{DROP}	Dropout Voltage*1 (MST5350)	I_{OUT}=10mA , ΔV_{OUT}= - V_{OUTNOM}*2%	—	30	—	mV
		I_{OUT}=100mA , ΔV_{OUT}= - V_{OUTNOM}*2%	—	300	—	mV
		I_{OUT}=200mA , ΔV_{OUT}= - V_{OUTNOM}*2%	—	600	—	mV
	Dropout Voltage*1 (MST5333)	I_{OUT}=100mA , ΔV_{OUT}= - V_{OUTNOM}*2%	—	30	—	mV
		I_{OUT}=100mA , ΔV_{OUT}= - V_{OUTNOM}*2%	—	300	—	mV
		I_{OUT}=200mA , ΔV_{OUT}= - V_{OUTNOM}*2%	—	600	—	mV
ΔV_{OUT}	Load Regulation	1mA≤I_{OUT}≤100mA	—	20	—	mV
ΔV_{OUT} x100/ ΔV_{IN} x V_{OUT}	Line Regulation	I_{OUT}=1mA, V_{IN}=(V_{OUTNOM}+1V) to 35V	—	0.2	—	%/V
I_{LIMIT}	Current Limit	V_{IN}=(V_{OUTNOM}+1V) to 35V R_{LOAD}=V_{OUTNOM}/1A	—	450	—	mA
T_{SHDN}	Thermal Shutdown Threshold		—	125	—	℃

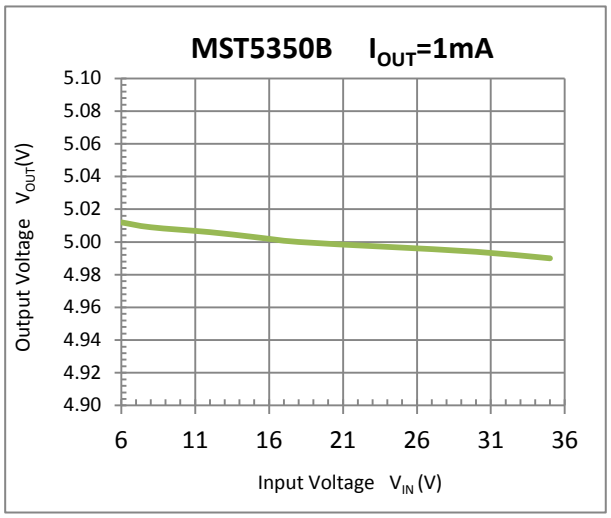
Note : *1 Dropout Voltage is the voltage difference between the input and the output at which the output voltage drops 2% below its nominal value.

Application Circuits

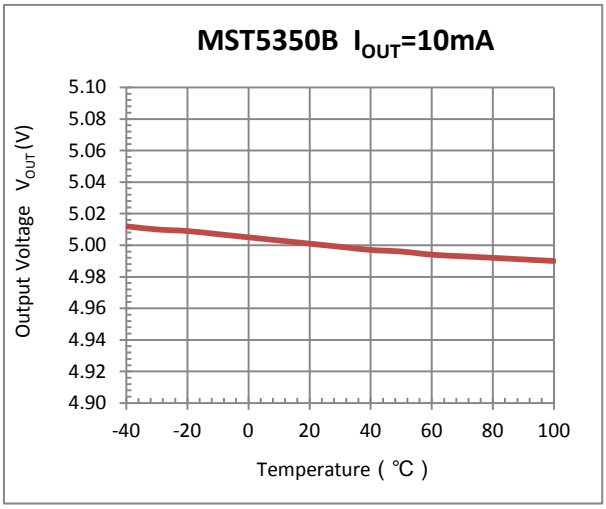


■ Typical Performance Characteristics

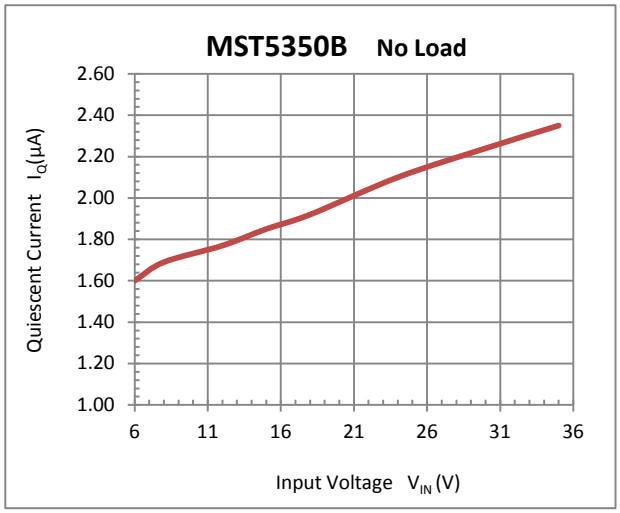
Test Condition: $T_{A=}$25°C, V_{IN}=V_{OUTNOM}+1.0 V,I_{OUT}=1mA, C_{OUT}=10uF, unless otherwise noted.



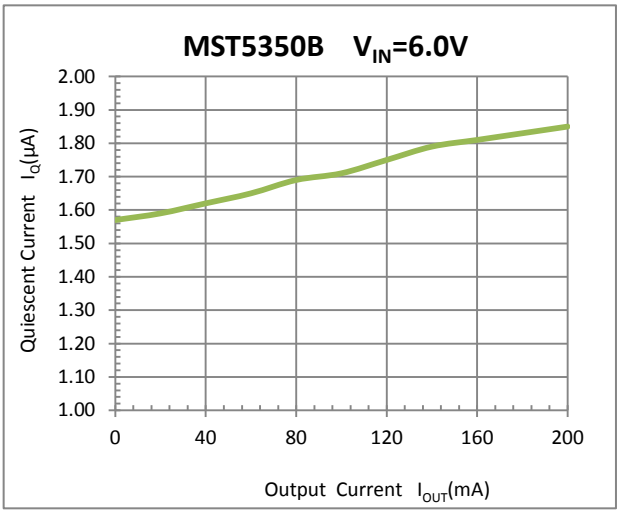
Output Voltage vs. Input Voltage



Output Voltage vs. Temperature



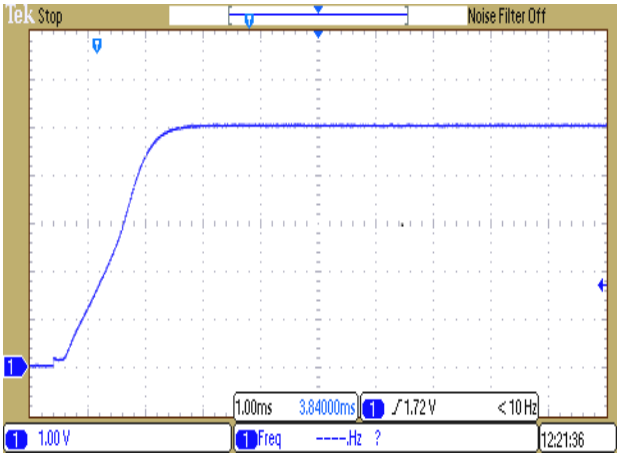
Quiescent Current vs. Input Voltage



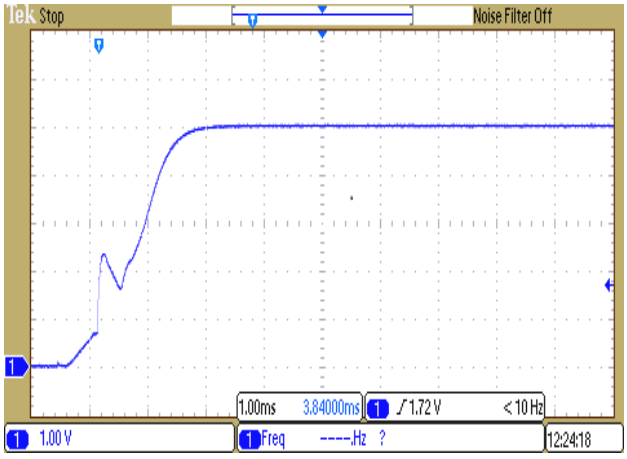
Quiescent Current vs. Output Current

Startup

V_{IN}=6.0V , No Load , C_{OUT}=10uF



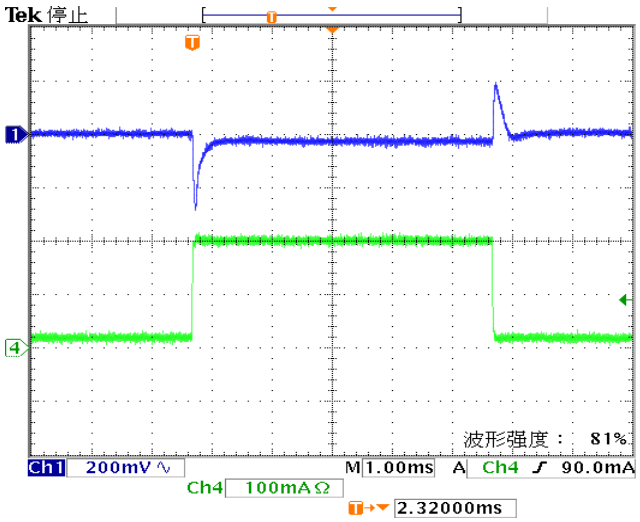
V_{IN}=6.0V ,I_{OUT}=30mA ,C_{OUT}=10uF



Transient Response

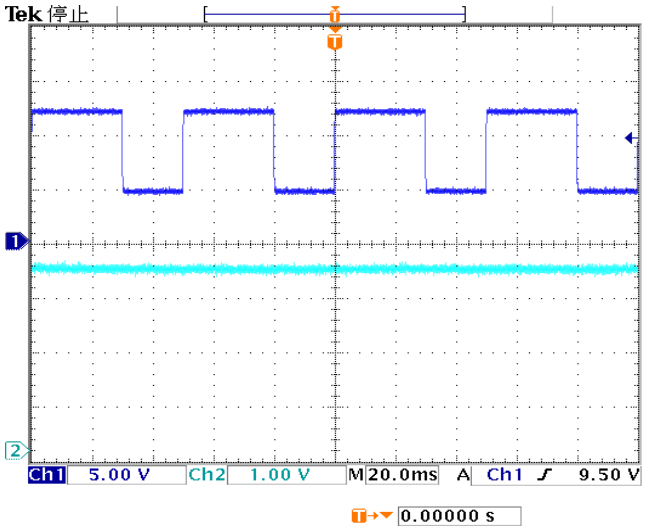
Load Transient

V_{IN}=12.0V, C_{OUT}=10uF, I_{OUT}=10mA to 200mA



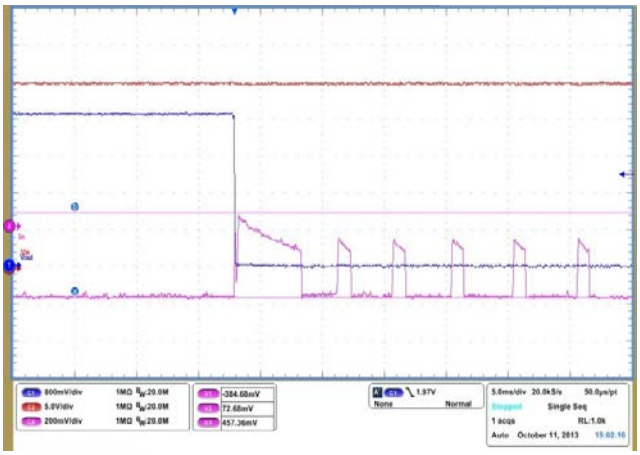
Line Transient

V_{IN}=5.0V to 12.0V, C_{OUT}=10uF, I_{OUT}=1mA

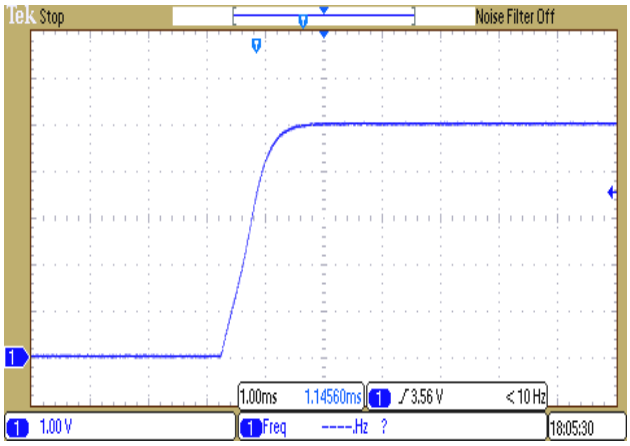


Short Protection

V_{IN}=25.0V , Short Protection Occurred



V_{IN}=25.0V , Short Protection Removed



■ Ordering Information

Part No.	Output Voltage (V)	Marking		
		TO92-3	SOT89-3	SOT23-3/SOT23-5
MST5318BXX	1.8	M5318B XX①XX②		5318B
MST5325BXX	2.5	M5325B XXXX		5325B
MST5330BXX	3.0	M5330B XXXX		5330B
MST5333BXX	3.3	M5333B XXXX		5333B
MST5336BXX	3.6	M5336B XXXX		5336B
MST5340BXX	4.0	M5340B XXXX		5340B
MST5342BXX	4.2	M5342B XXXX		5342B
MST5350BXX	5.0	M5350B XXXX		5350B

① Year(13-99)

② Week(01-53)

■ Marking Information

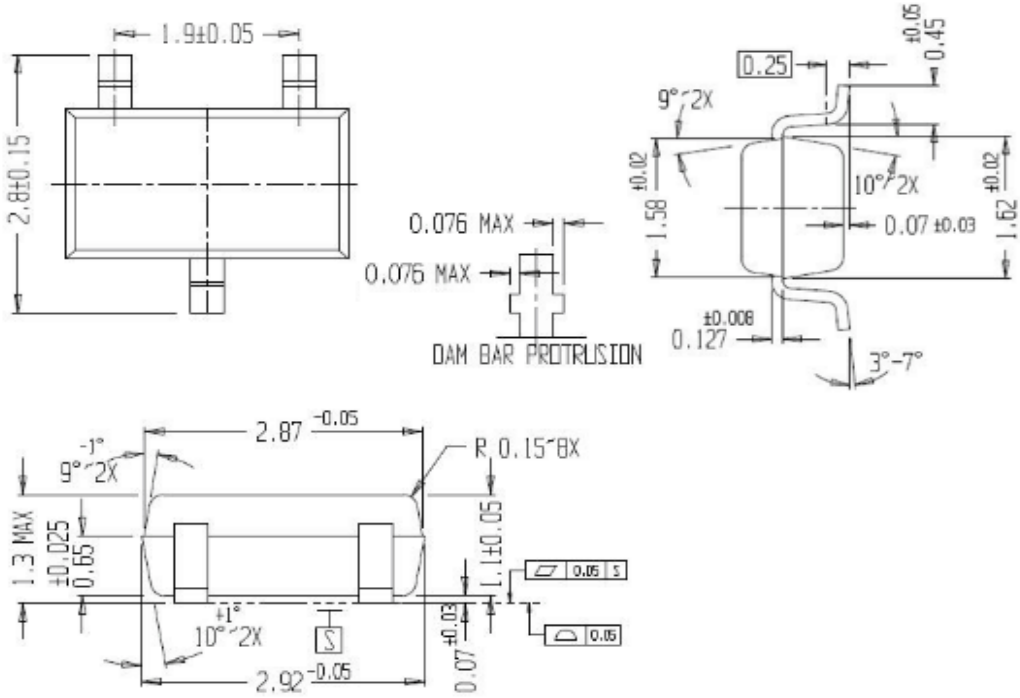
XX: Output Voltage (18,25,30,33,36,40,42,50)

XX：Output Voltage (18,25,30,33,36,40,42,50)
XXXX: D/C

■ Package Information

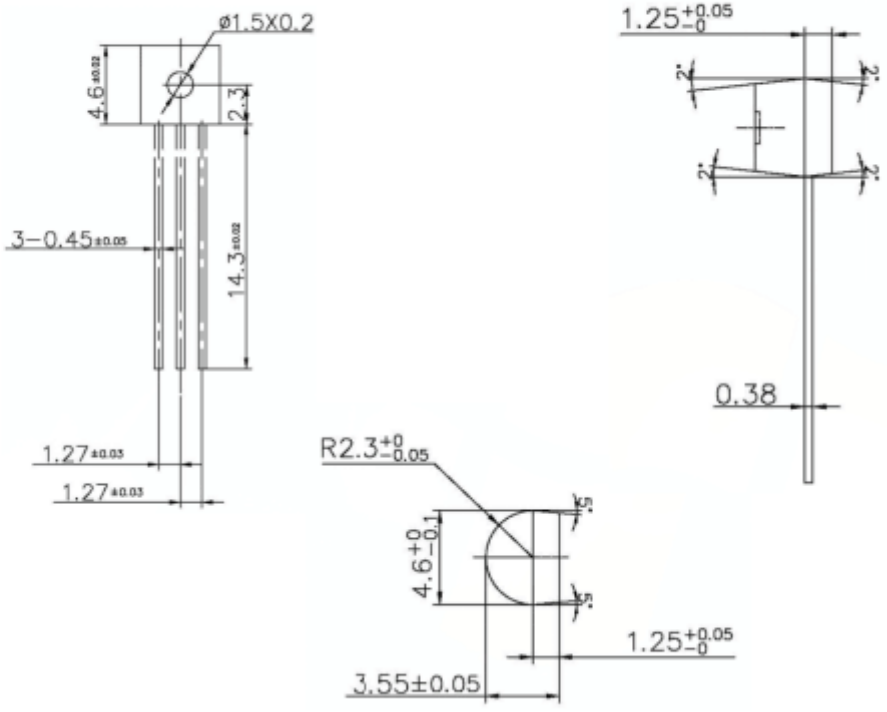
Package Outline

SOT-23-3L POD



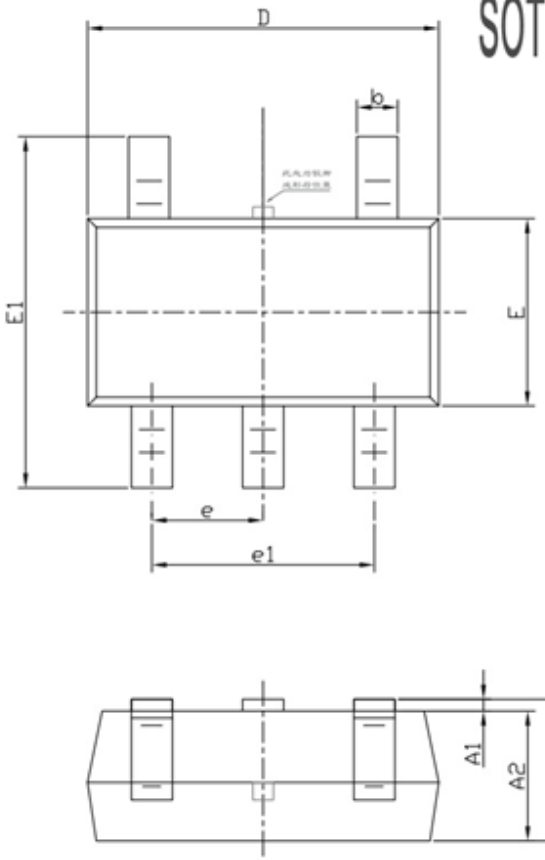
Package Outline

TO-92 POD



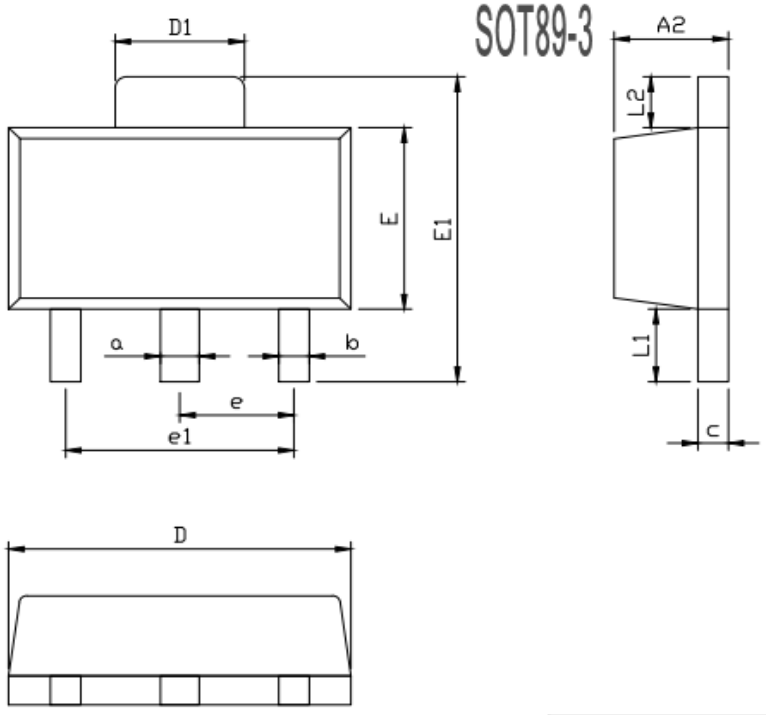
PART NO. 1

SOT23-5



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.85	3.05	0.112	0.120
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

SOT89-3

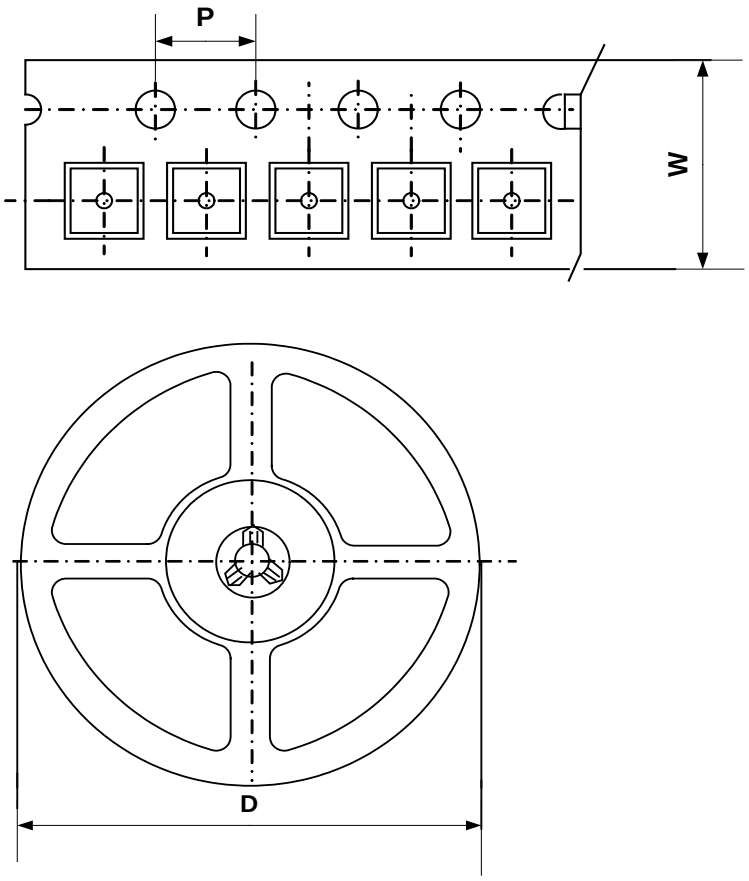


Symbol	Dimensions In Millimeters	
	Min	Max
A2	1.40	1.60
* a	0.45	0.55
b	0.38	0.47
c	0.36	0.46
* D	4.40	4.60
D1	1.60	1.80
E	2.40	2.60
* E1	4.00	4.30
e	1.00	2.00
* e1	2.95	3.05
* L1	0.80	1.00
* L2	0.65	0.75

注:1. 标注“*”尺寸为测量尺寸。

THIRD ANGLE PROJECTION	SCALE		UNIT	mm
	DATE	2015-09-16		
TOLERANCE	DESIGNER	CHECKER	APPROVER	TITLE: SOT89-3L package outline dimensions
0 0.0 0.00 0.000				DWG.NO. QW-034-14-02

Packing information



Type	W(mm)	P(mm)	D(mm)	Qty (pcs)
SOT23-3 SOT23-5	12.0±0.1 mm	8.0±0.1 mm	330±1 mm	3000pcs
SOT89-3	/	/	/	1000pcs
TO92-3	/	/	/	Bag : 1000/bag Box:10000(10 bag)/box