

## Description

The SL54 Series is a high input voltage, low quiescent current, low-dropout linear regulator able to provide 300mA load current

The LDO features very fast response against line voltage transient and load current transient, and ensures no overshoot voltage during the LDO start up and short circuit recovery.

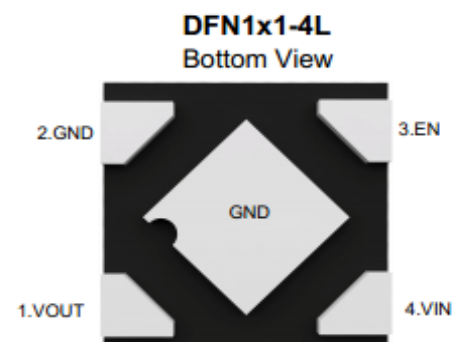
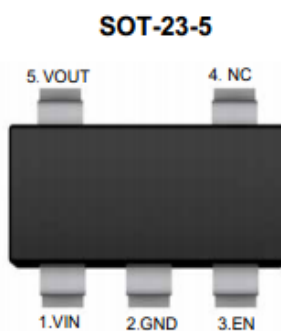
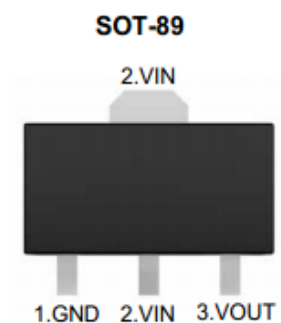
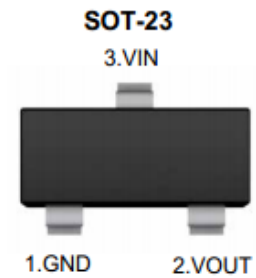
The device features integrated short-circuit and thermal shutdown protection.

## Features

- Low Quiescent Current: 2.1uA
- High Input Voltage Rating: Up to 55V
- Maximum Output Current: 350mA
- Low Dropout : 350mV @ 100mA
- High PSRR: 85dB at 1KHz
- Fixed Output Voltages: 1.8V, 2.8V, 3V, 3.3V, 5V
- Fast Transient Response
- Current Limiting Protection
- Thermal Shutdown Protection
- Available Packages: SOT-23, SOT-23-3, SOT-89, SOT-23-5 and DFN1x1-4L Packages

## Applications

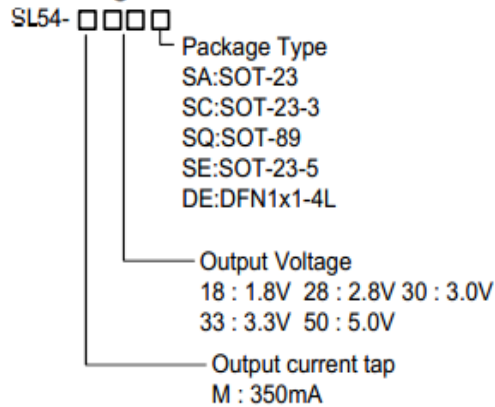
- Battery-Powered Equipment
- Smoke Detector and Sensor
- Micro Controller Applications



## Functional Pin Description

Pin Name	Pin Function
EN	Chip Enable (Active High). Note that this pin is high impedance
NC	NO Connected
GND	Ground
VOUT	Output Voltage
VIN	Power Input Voltage

## Ordering Information

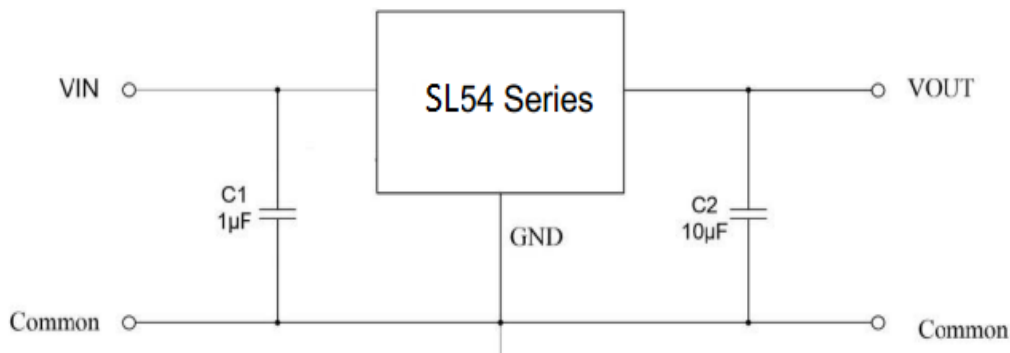


## Marking Code Note

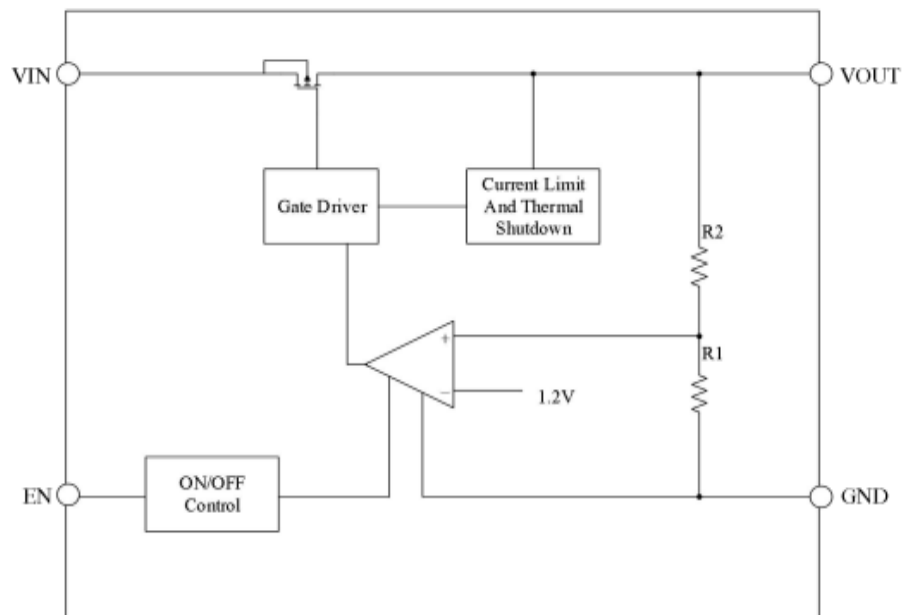
Output Voltage	Package	Marking Code
1.8V~5V	SOT-23	54XX
1.8V~5V	SOT-23-3	54XXC
1.8V~5V	SOT-23-5	54XXE
1.8V~5V	SOT-89	54XX
1.8V~5V	DFN1x1-4L	54XX

**Note** . XX : Output Voltage e.g . 30:3.0V 33:3.3V

## Typical Application Circuit



## Function Block Diagram



## Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Value	Unit
VIN to GND Voltage	-0.3 ~ +55	V
VOUT to GND Voltage	-0.3 ~ +6	V
VOUT to VIN Voltage	-55 ~ +0.3	V
EN to GND Voltage	-0.3 ~ +55	V
Output Current	Internally limited	--
Power Dissipation	SOT-23	300 mW
	SOT-23-3	400 mW
	SOT-89	600 mW
	SOT-23-5	400 mW
	DFN1x1-4L	400 mW
Thermal Resistance, Junction-to-Ambient	SOT-23	380 °C/W
	SOT-23-3	300 °C/W
	SOT-89	180 °C/W
	SOT-23-5	300 °C/W
	DFN1x1-4L	300 °C/W
Operating Ambient Temperature	-40 ~ +85	°C
Junction temperature	150	°C
Storage temperature range	-40 ~ +150	°C

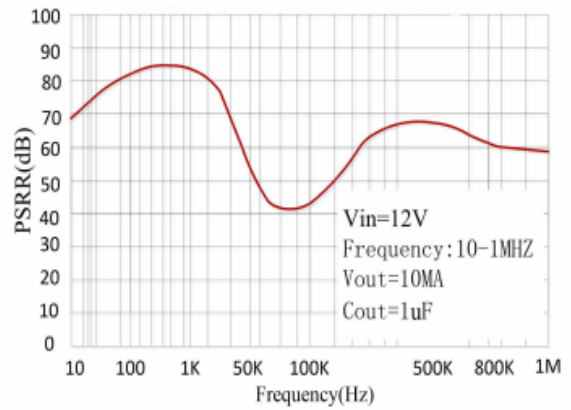
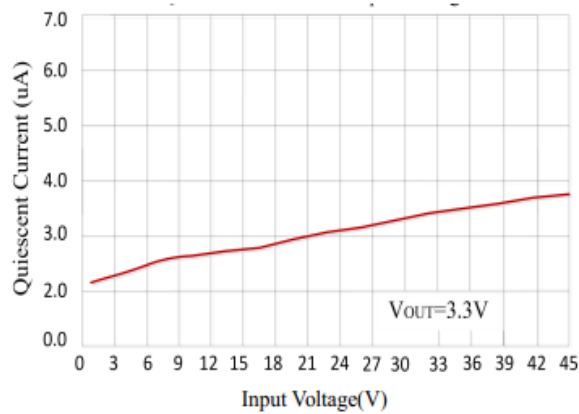
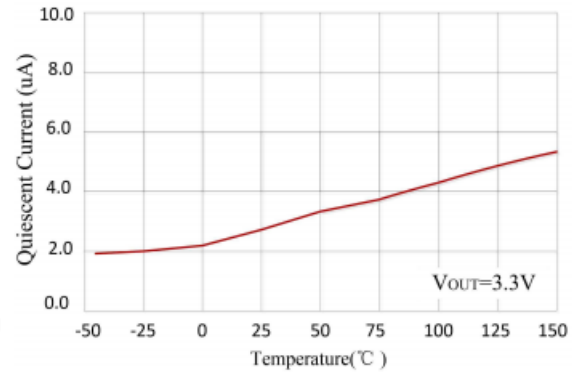
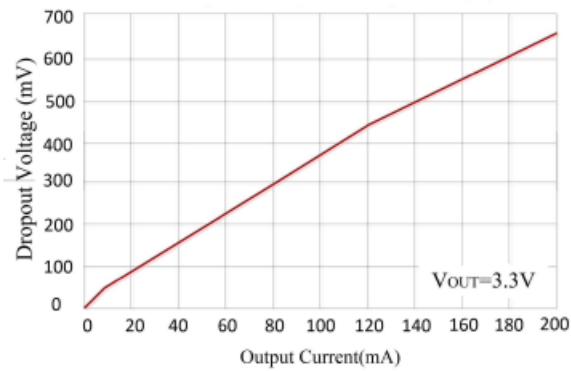
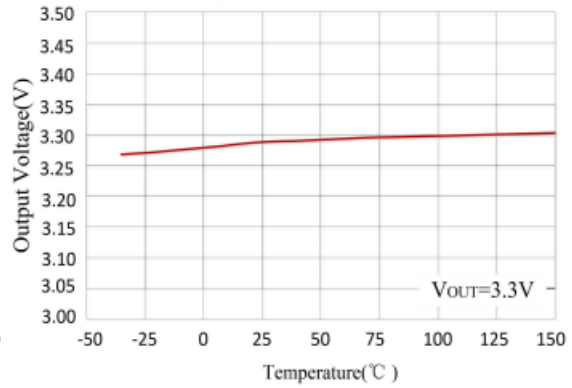
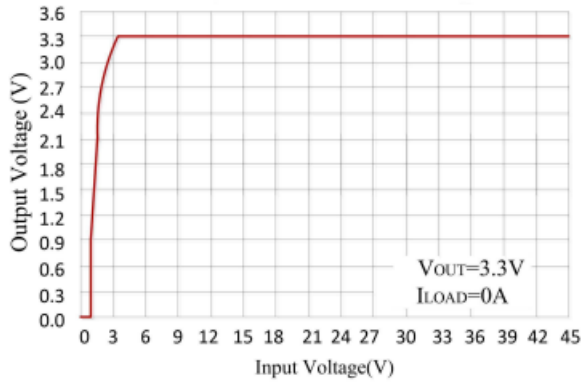
## Electrical Characteristics

( $V_{IN}=V_{OUT}+1$ ,  $C_{IN}=1\mu F$ ,  $C_{OUT}=10\mu F$ ,  $T_A=25^\circ C$ , unless otherwise noted.)

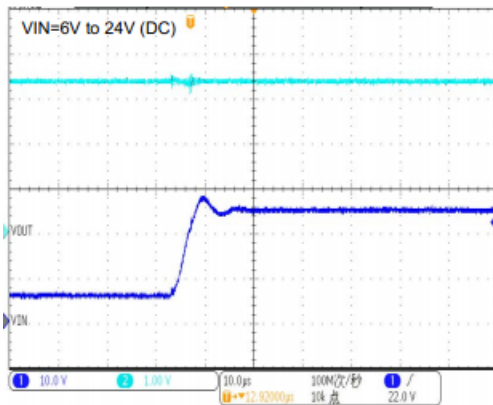
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input Voltage	$V_{IN}$		3	--	45	V
Output Voltage Accuracy	$\Delta V_{OUT}$	$V_{IN}=12V$ , $I_{OUT}=10mA$	-2	--	+2	%
Quiescent Current	$I_Q$	$V_{IN}=12V$ , $I_{OUT}=0mA$	--	2.1	--	$\mu A$
Maximum Output Current	$I_{OUT\_Max}$		300	350	--	mA
Dropout Voltage	$V_{DROP}$	$V_{IN}=V_{OUTNOM}-0.1V$ , $I_{OUT}=10mA$	--	35	--	mV
		$V_{IN}=V_{OUTNOM}-0.1V$ , $I_{OUT}=100mA$	--	350	--	
Line Regulation	$\Delta V_{LINE}$	$V_{OUTNOM}+0.5V \leq V_{IN} \leq 40V$ $I_{OUT}=1mA$	--	0.01	--	%/V
Load Regulation	$\Delta V_{LOAD}$	$V_{IN}=12V$ , $1mA < I_{OUT} < 100mA$	--	0.02	--	%/mA
Current Limit	$I_{LIM}$		--	500	--	mA
EN Input Threshold	Logic Low	$V_{IL}$	--	--	0.4	V
	Logic High	$V_{IH}$	1	--	--	V
Output Noise Voltage	$V_N$	10Hz~100KHz, $C_{OUT}=1\mu F$ $V_{OUT}=3V$	--	110	--	$\mu V_{rms}$
Power Supply Rejection Ratio	PSRR	$V_{IN}=12V$ , $I_{OUT}=10mA$ $f=1KHz$ , $V_{OUT}=3.3V$	--	85	--	dB
Thermal Shutdown Temperature	$T_{SHDN}$	Shutdown, Temp increasing	--	150	--	$^\circ C$
Thermal Reset Temperature	$T_{SHDN}$	Reset, Temp increasing	--	140	--	$^\circ C$

## Typical Characteristic Curves

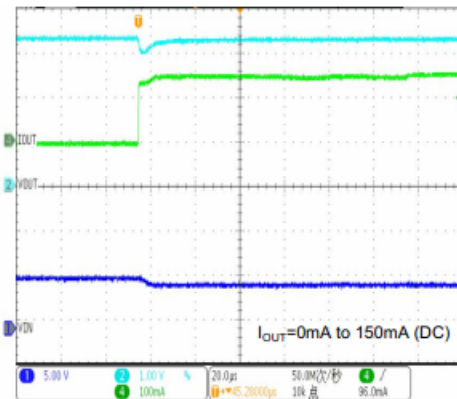
Test Condition:  $T_A=25^{\circ}\text{C}$ ,  $I_{\text{out}}=1\text{mA}$ ,  $C_{\text{OUT}}=10\mu\text{F}$ , unless otherwise noted



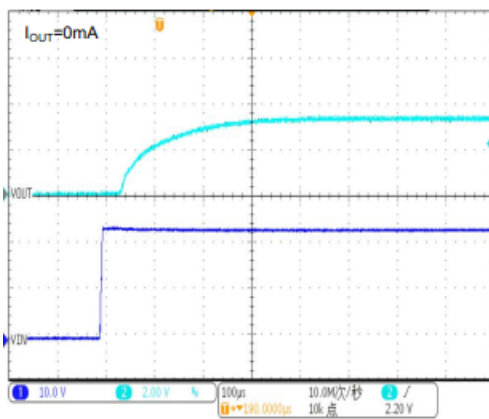
Line transient



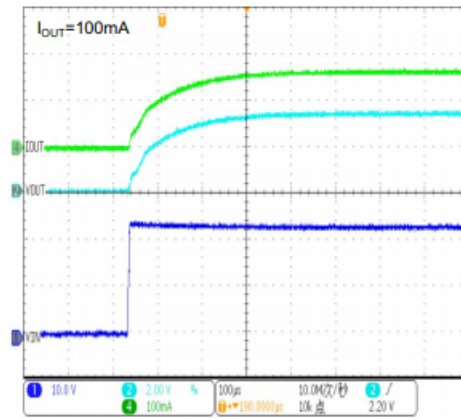
Load transient



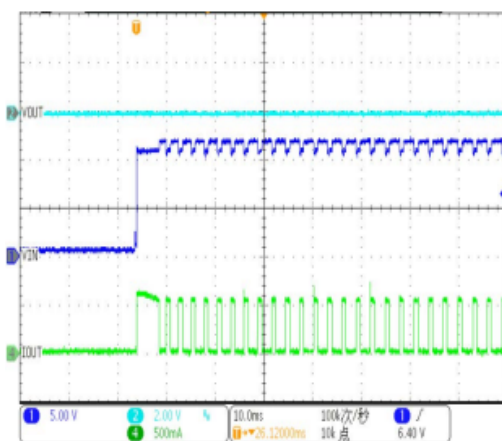
No-load start



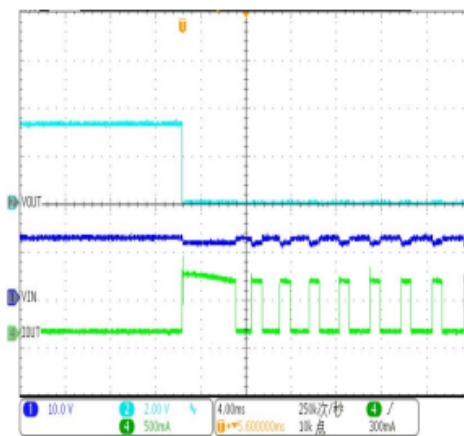
Start with load



Short-circuit Power-on



Power-on short



## Functional Description

### Input Capacitor

A 1 $\mu$ F ceramic capacitor is recommended to connect between VIN and GND pins to decouple input power supply glitch and noise. The amount of the capacitance may be increased without limit. This input capacitor must be located as close as possible to the device to assure input stability and less noise. For PCB layout, a wide copper trace is required for both VIN and GND.

### Output Capacitor

An output capacitor is required for the stability of the LDO. The recommended minimum output capacitance is 1 $\mu$ F, ceramic capacitor is recommended, and temperature characteristics are X7R or X5R. Higher capacitance values help to improve load/line transient response. The output capacitance may be increased to keep low undershoot/overshoot. Place output capacitor as close as possible to VOUT and GND pins.

### EN Pin Operation

The SL54 Series is turned on by setting the EN pin to "H". Since the EN pin is neither pulled down nor pulled up internally, do not set it in floating status. When the EN pin is not used, connect the EN pin with VIN to keep the LDO in operating mode.

### Current Limit and Short Circuit Protection

When output current at VOUT pin is higher than current limit threshold or the VOUT pin is direct short to GND, the current limit protection will be triggered and clamp the output current at a pre-designed level to prevent over-current and thermal damage.

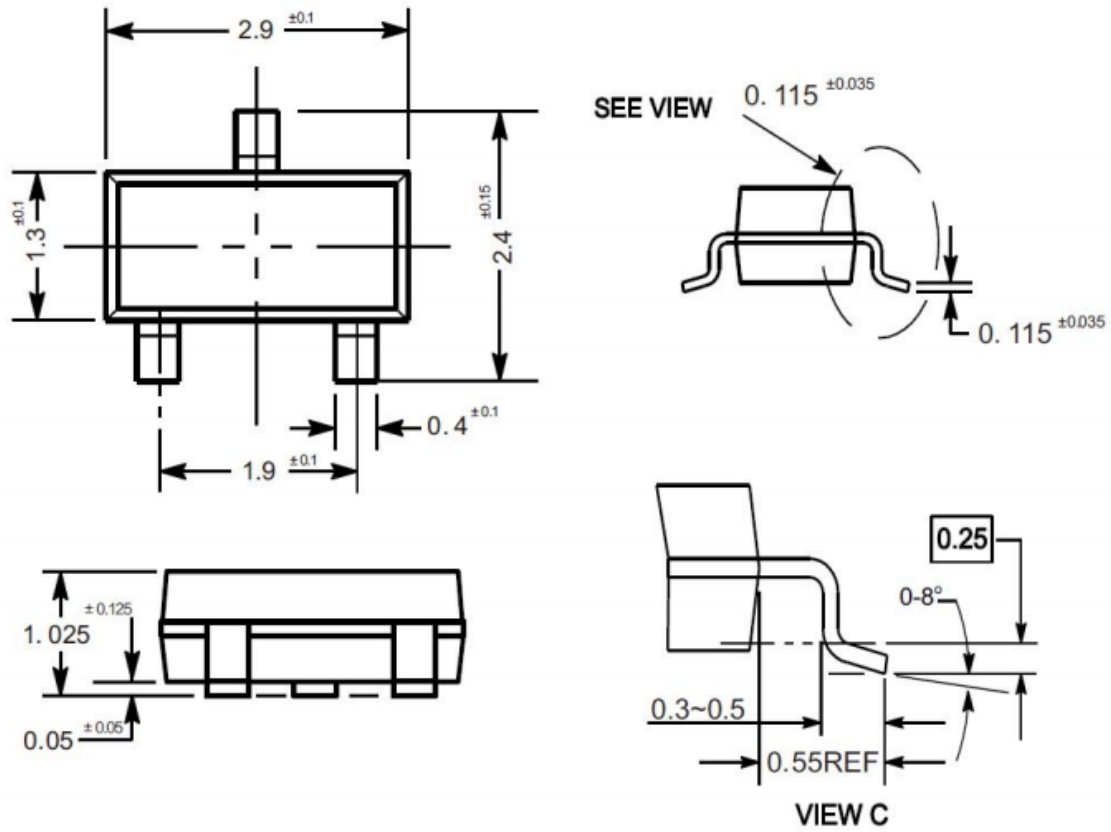
### Thermal Protection

The SL54 Series has internal thermal sense and protection circuits. When excessive power dissipation happens on the device, such as short circuit at the output pin or very heavy load current with a large voltage drop across the device, the internal thermal protection circuit will be triggered, and it will shut down the power MOSFET to prevent the LDO from damage. As soon as excessive thermal condition is removed and the temperature of the device drops down, the thermal protection circuit will lease the control of the power MOSFET, and the LDO device goes to normal operation.

**Package Outline**

SOT-23

Dimensions in mm



**Ordering Information**

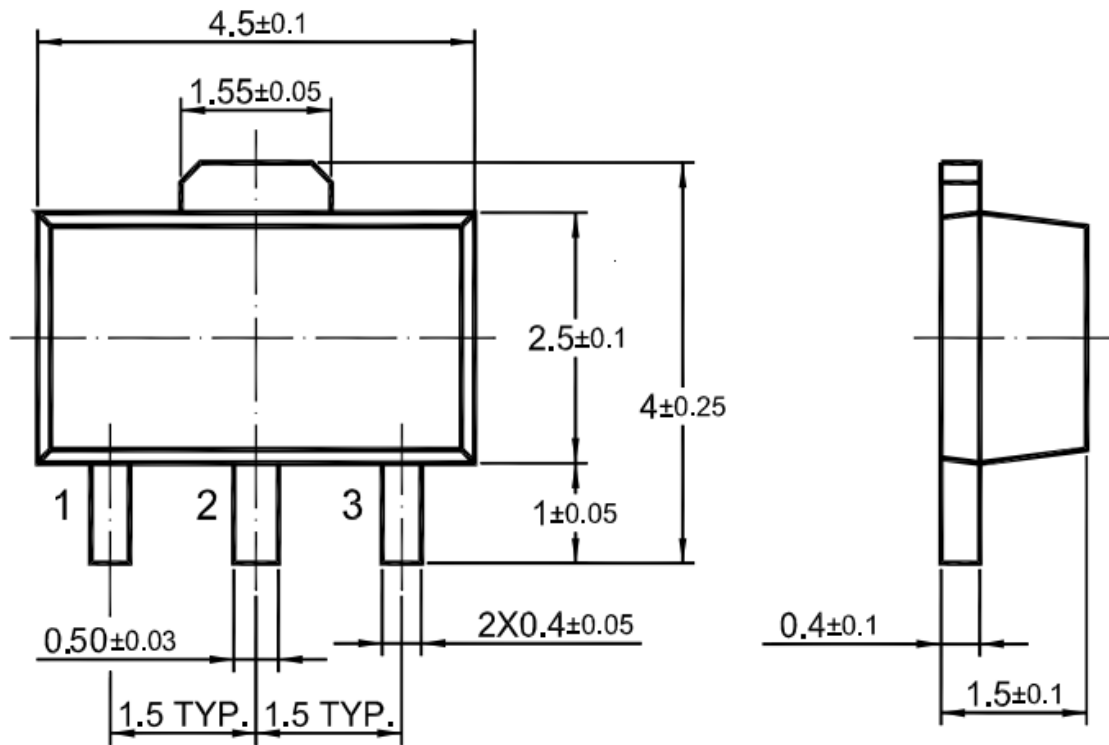
Device	Package	Shipping
SL54 Series	SOT-23	3,000PCS/Reel&7inches



**Package Outline**

SOT-89

Dimensions in mm



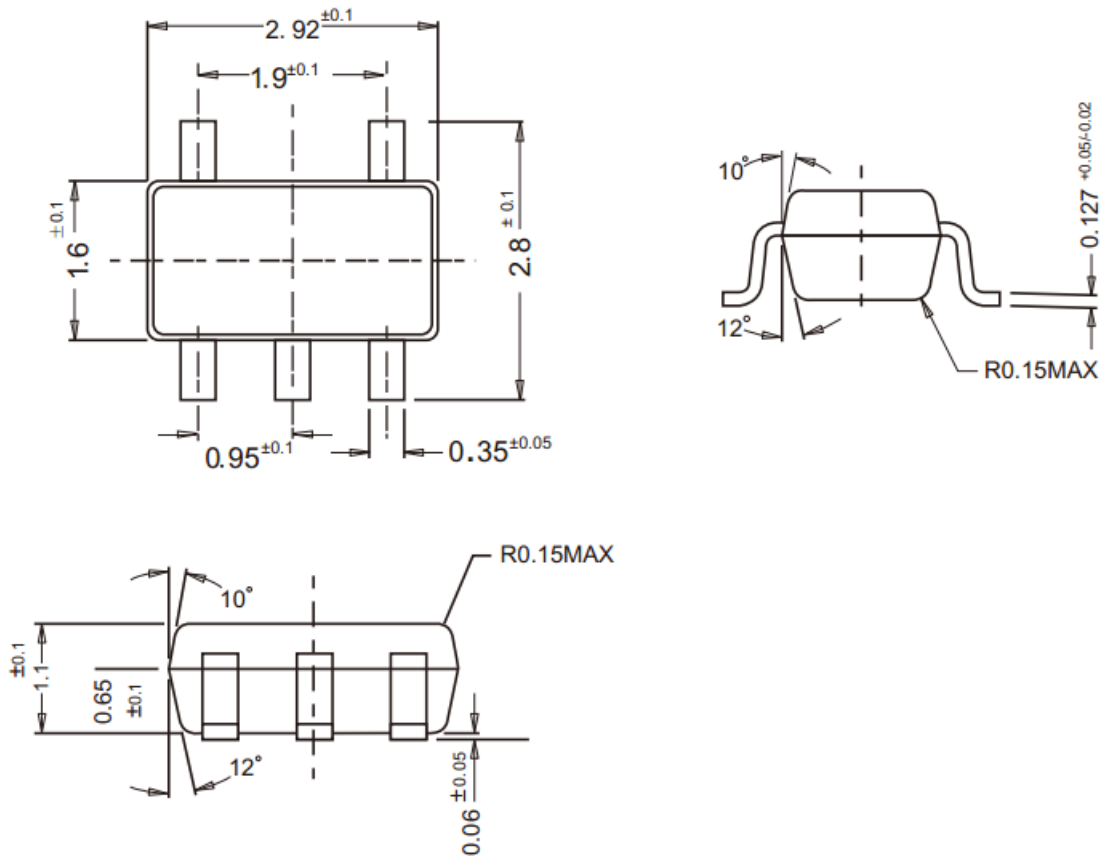
**Ordering Information**

Device	Package	Shipping
SL54 Series	SOT-89	1,000PCS/Reel&7inches
		3,000PCS/Reel&13inches

## Package Outline

SOT-23-5

Dimensions in mm



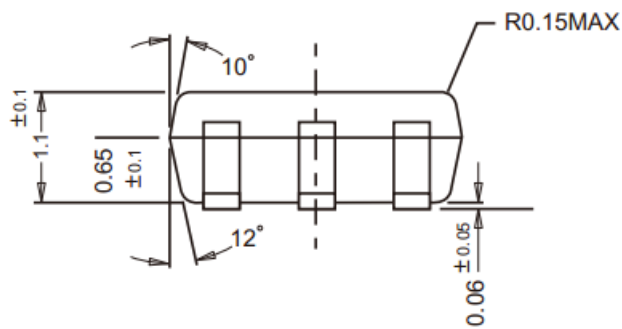
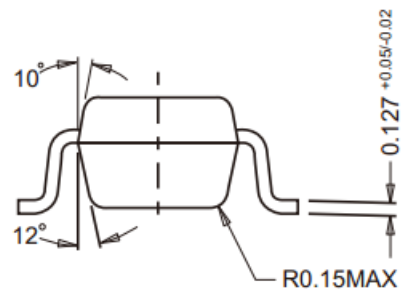
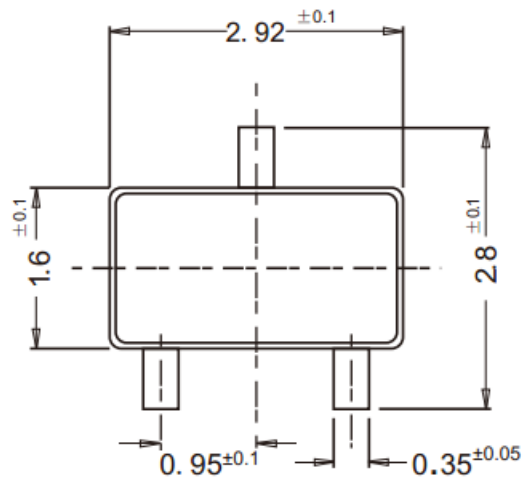
## Ordering Information

Device	Package	Shipping
SL54 Series	SOT-23-5	3,000PCS/Reel&7inches

**Package Outline**

SOT-23-3

Dimensions in mm



**Ordering Information**

Device	Package	Shipping
SL54 Series	SOT-23-3	3,000PCS/Reel&7inches