Description

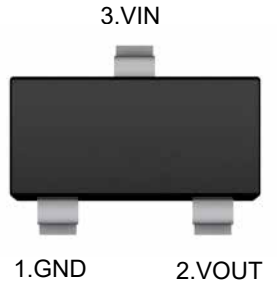
The LB54 Series is a high input voltage,low quiescent current,low-dropout linear regulator able to provide 300mA load current; It offers EN pin to enable and disable the LDO output, EN pin can take 45V input voltage.

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.

SOT-23

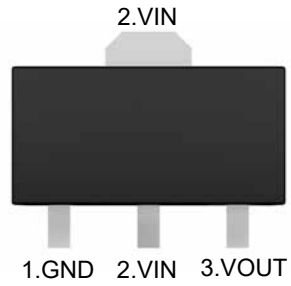
SOT-23-3



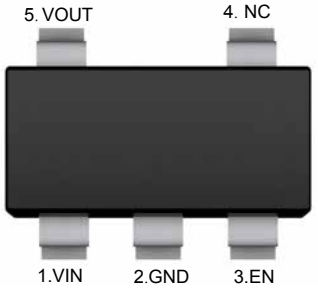
Features

- 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,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

SOT-89



SOT-23-5



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

LB54- □□□□

Package Type
SA:SOT-23
SC:SOT-23-3
SQ:SOT-89
SE:SOT-23-5

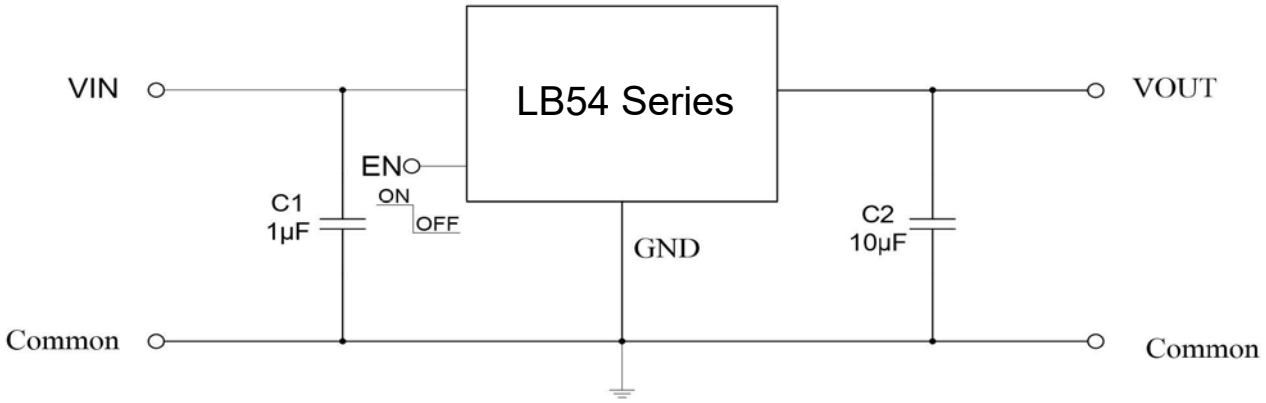
Output Voltage
18 : 1.8V 30 : 3.0V 33 : 3.3V
50 : 5.0V

Output current tap
M : 350mA

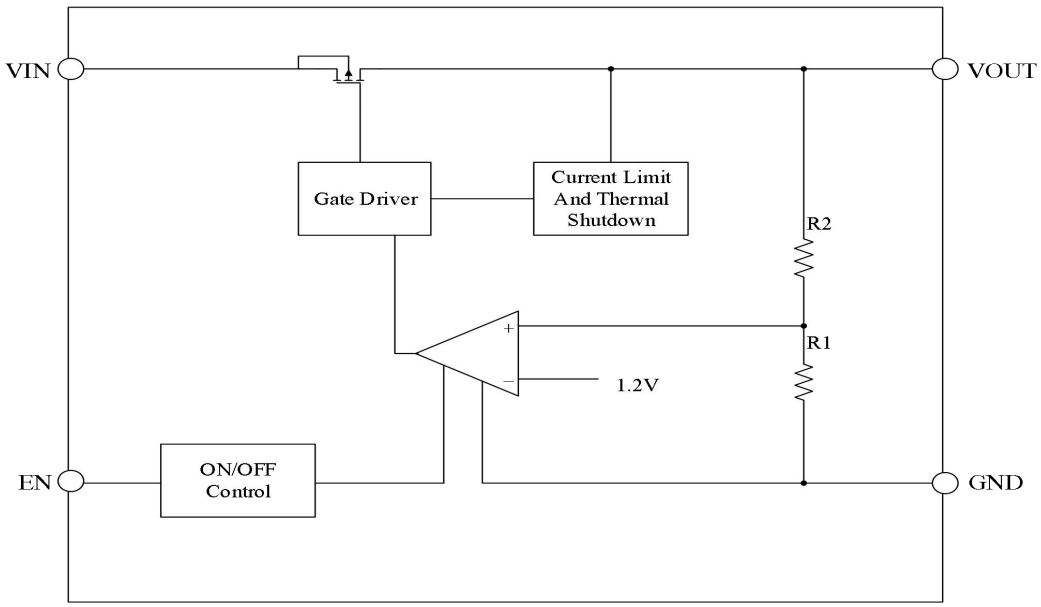
Marking Code

Output Voltage	Package	Marking	Output Voltage	Package	Marking
1.8V	SOT-23	5418	1.8V	SOT-89	5418
3V	SOT-23	5430	3V	SOT-89	5430
3.3V	SOT-23	5433	3.3V	SOT-89	5433
5V	SOT-23	5450	5V	SOT-89	5450
1.8V	SOT-23-3	5418C	1.8V	SOT-23-5	5418E
3V	SOT-23-3	5430C	3V	SOT-23-5	5430E
3.3V	SOT-23-3	5433C	3.3V	SOT-23-5	5433E
5V	SOT-23-3	5450C	5V	SOT-23-5	5450E

Typical Application Circuit



Function Block Diagram



Absolute Maximum Ratings

Ratings at 25℃ 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-23-5	400	mW
	SOT-89	600	mW
Thermal Resistance,Junction-to-Ambient	SOT-23	380	℃/W
	SOT-23-3	300	℃/W
	SOT-23-5	300	℃/W
	SOT-89	180	℃/W
Operating Ambient Temperature		-40~85	℃
Junction temperature		150	℃
Storage temperature range		-40~150	℃

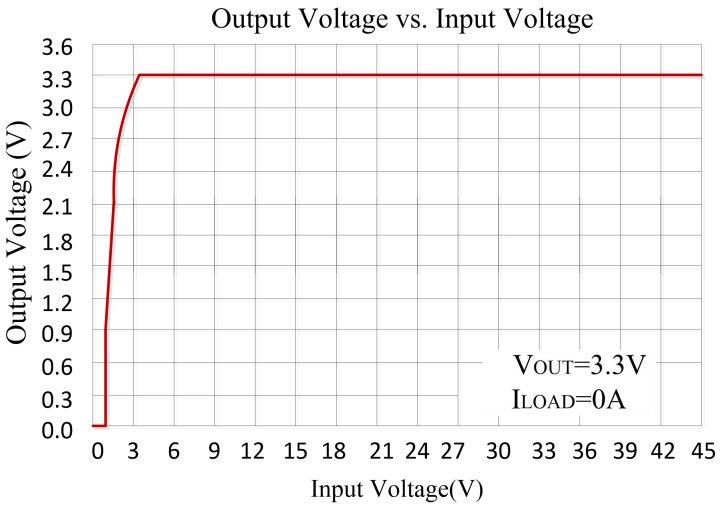
Electrical Characteristics

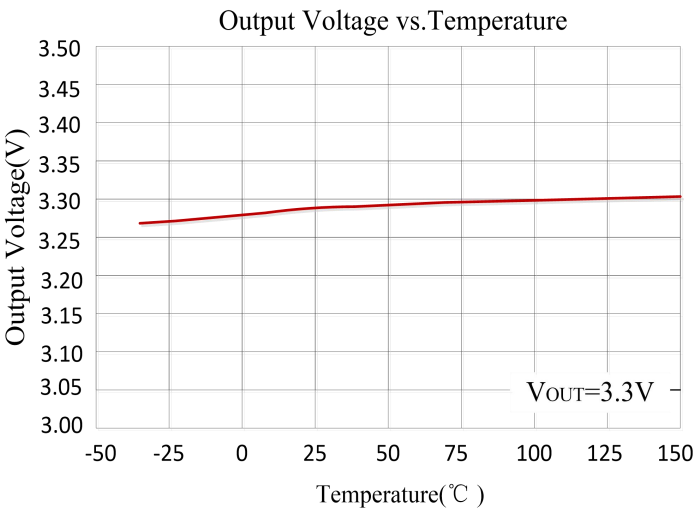
(V_{IN}=V_{OUT}+1, C_{IN}=1μF, C_{OUT}=10μF, T_A=25℃ , unless otherwise noted.)

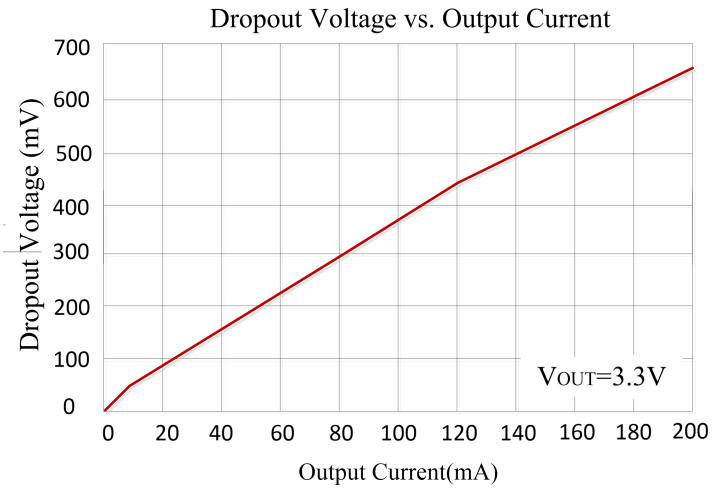
Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input Voltage		V_{IN}		3		45	V
Output Voltage Accuracy		ΔV_{OUT}	V_{IN}=12V, I_{OUT}=10mA	-2		+2	%
Quiescent Current		I_Q	V_{IN}=12V, I_{OUT}=0mA		2.1		μA
Maximum Output Current		I_{OUT_Max}		300	350		mA
Dropout Voltage		V_{DROP}	V_{IN}=V_{OUTNOM}-0.1V, I_{OUT}=10mA		35		mV
			V_{IN}=V_{OUTNOM}-0.1V, I_{OUT}=100mA		350		
Line Regulation		ΔV_{LINE}	V_{OUTNOM}+0.5V≤V_{IN}≤40V I_{OUT}=1mA		0.01		%/V
Load Regulation		ΔV_{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
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		℃
Thermal Reset Temperature		T_{SHDN}	Reset, Temp increasing		140		℃

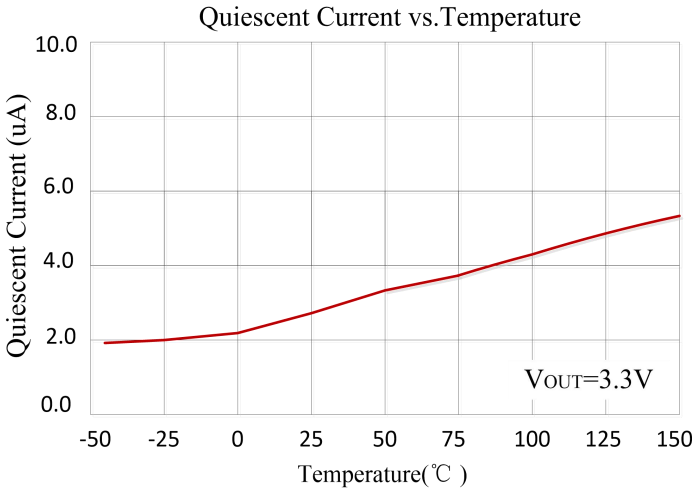
Typical Characteristic Curves

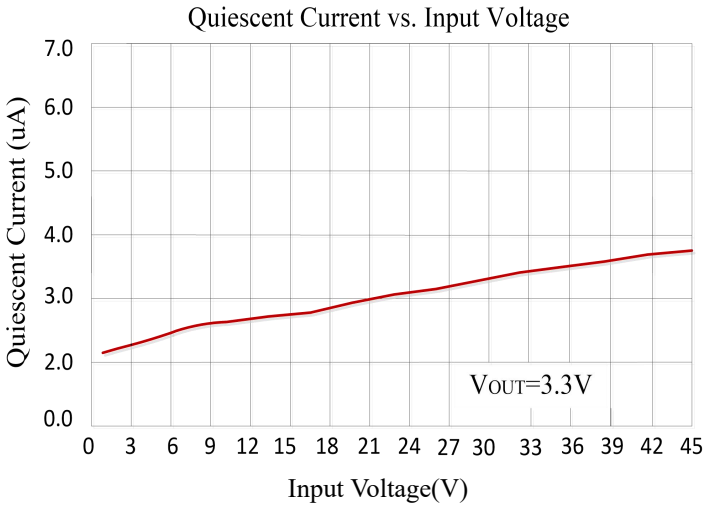
Test Condition: T_A=25°C,Iout=1mA, C_{OUT}=10uF, unless otherwise noted

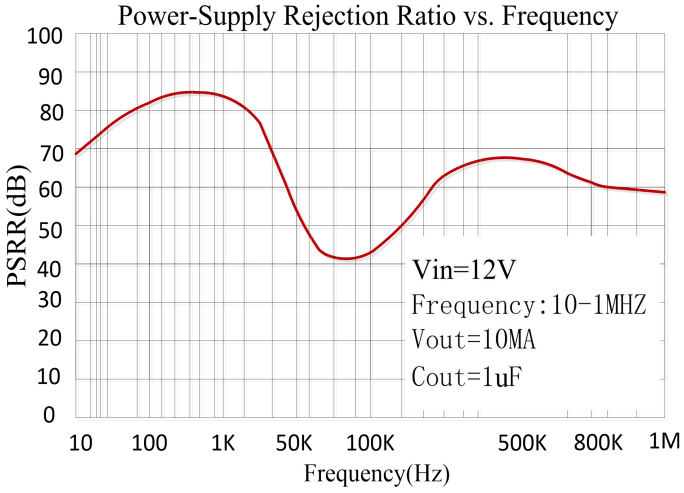












Functional Description

Input Capacitor

A 1μF 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 1μF, 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 LB54 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.

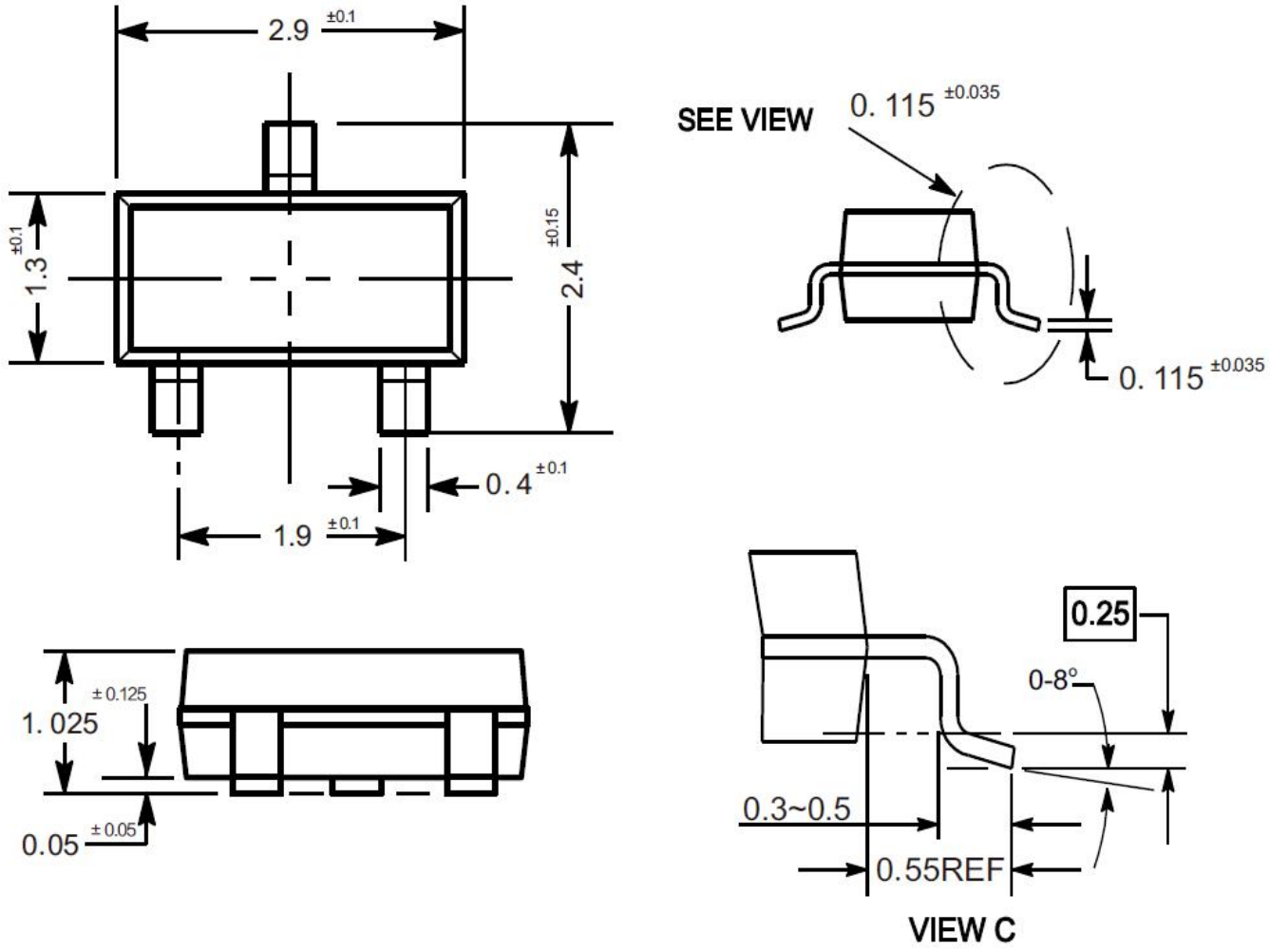
Current Limit and Short Circuit Protection

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 LB54 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

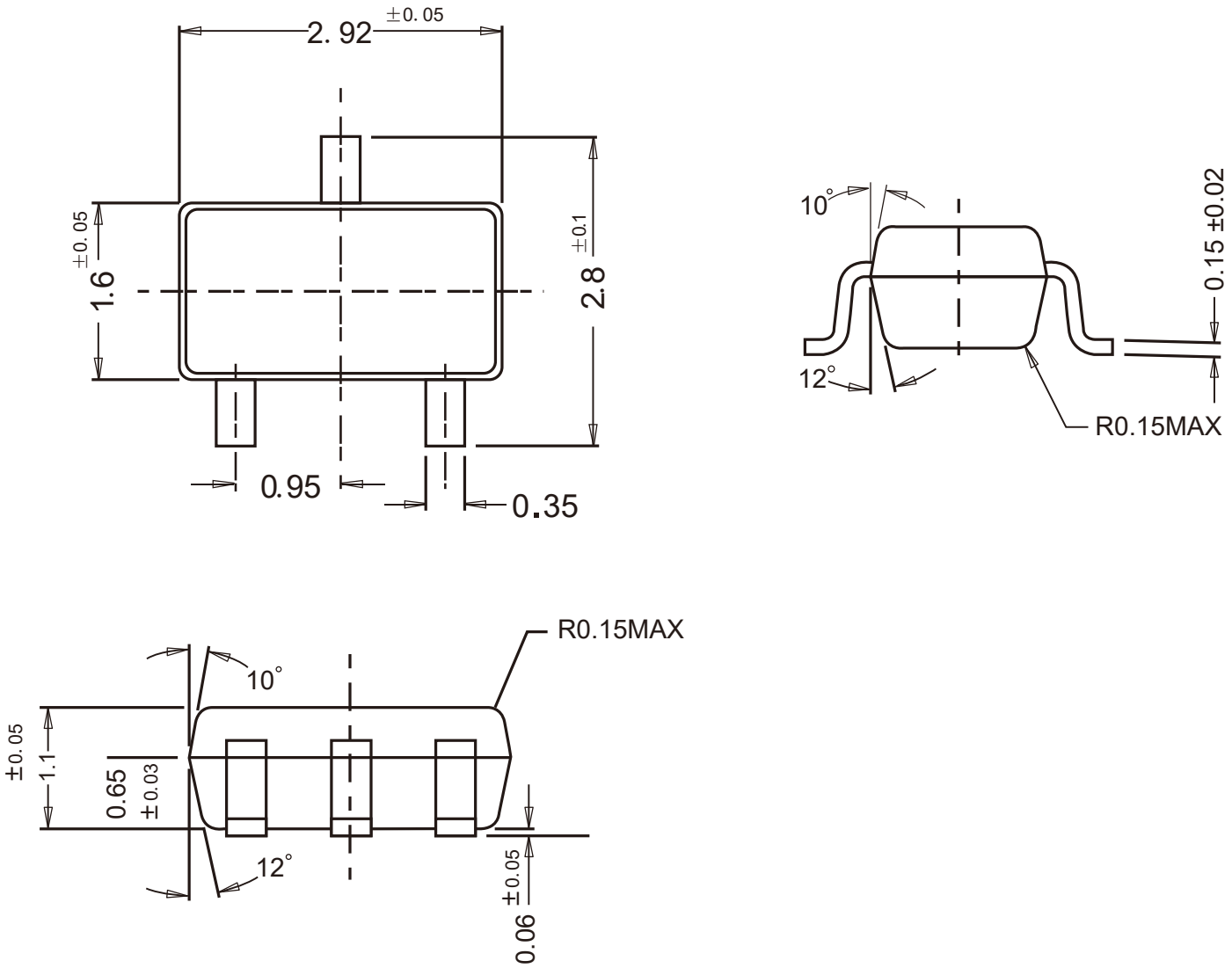


Ordering Information

Device	Package	Shipping
LB54 Series	SOT-23	3,000/ Tape & Reel (7 inches)

Package Outline

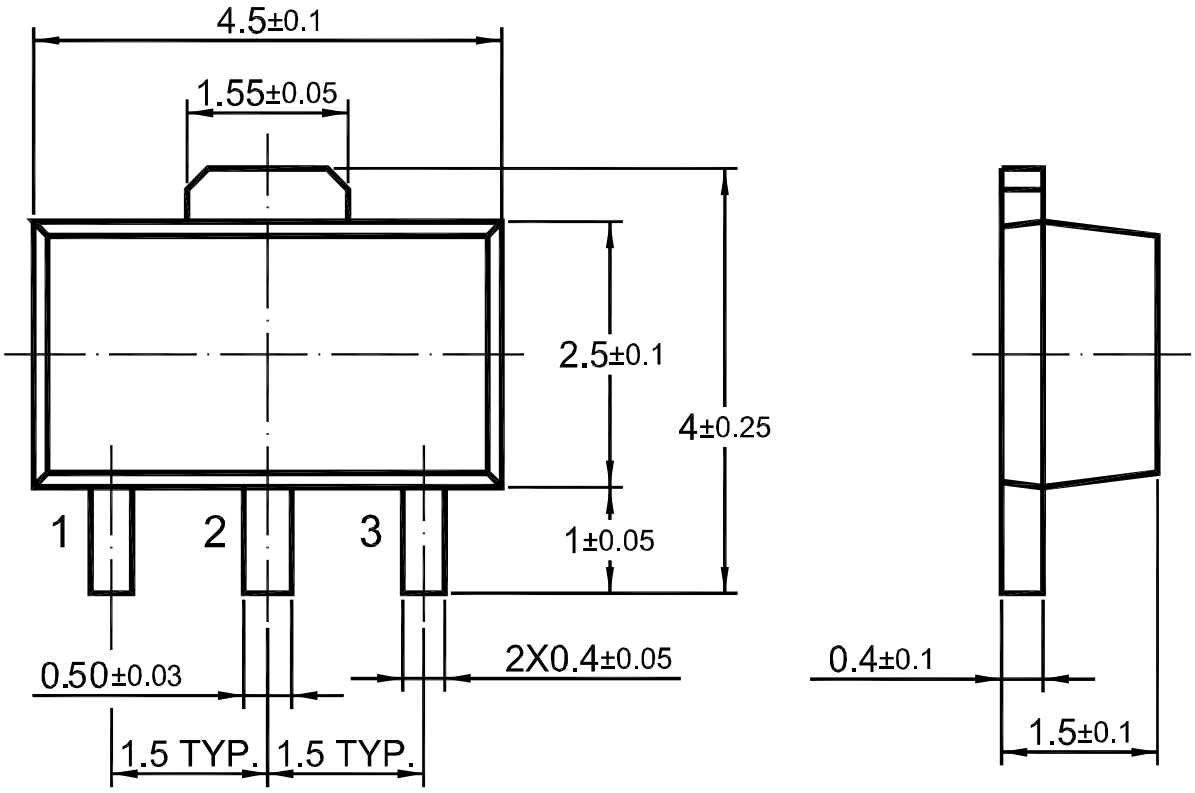
SOT-23-3
Dimensions in mm



Ordering Information

Device	Package	Shipping
LB54 Series	SOT-23-3	3,000/ Tape & Reel (7 inches)

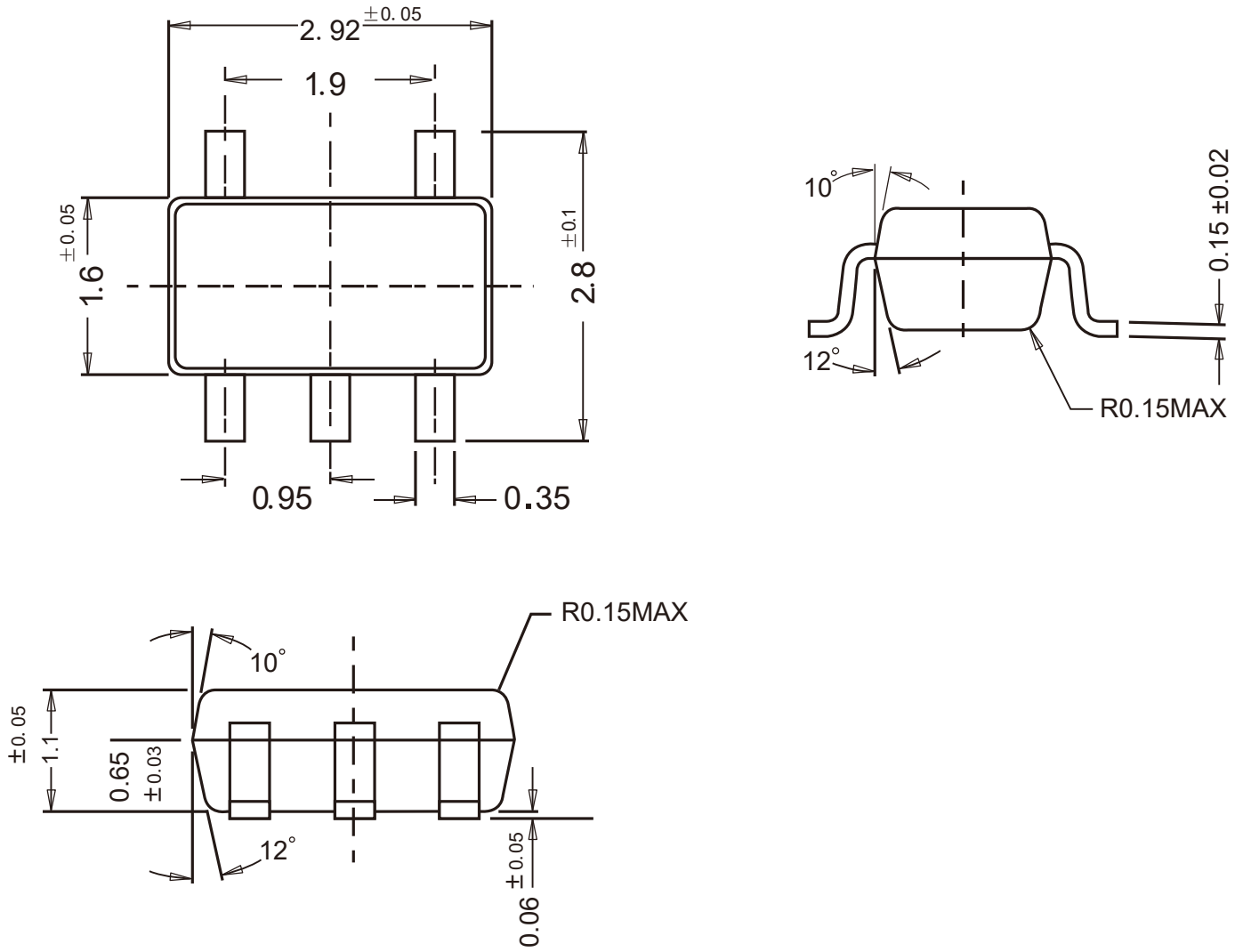
Package Outline
SOT-89
Dimensions in mm



Ordering Information

Device	Package	Shipping
LB54 Series	SOT-89	1,000/ Tape & Reel (7 inches)

Package Outline
SOT-23-5
Dimensions in mm



Ordering Information

Device	Package	Shipping
LB54 Series	SOT-23-5	3,000/ Tape & Reel (7 inches)