

Low Dropout Regulators

Description

The SL51 series is a low dropout low power linear regulator with enable function for input voltages up to 15V, quiescent current of 1 μ A, high PSRR, and maximum output current of 500mA.

The SL51 series offers fast response to input voltage transients and load current transients, and ensures that the SL51 series has no overshoot voltage during startup and short-circuit recovery.

The SL51 series features short-circuit protection, current limit protection, and over-temperature protection.

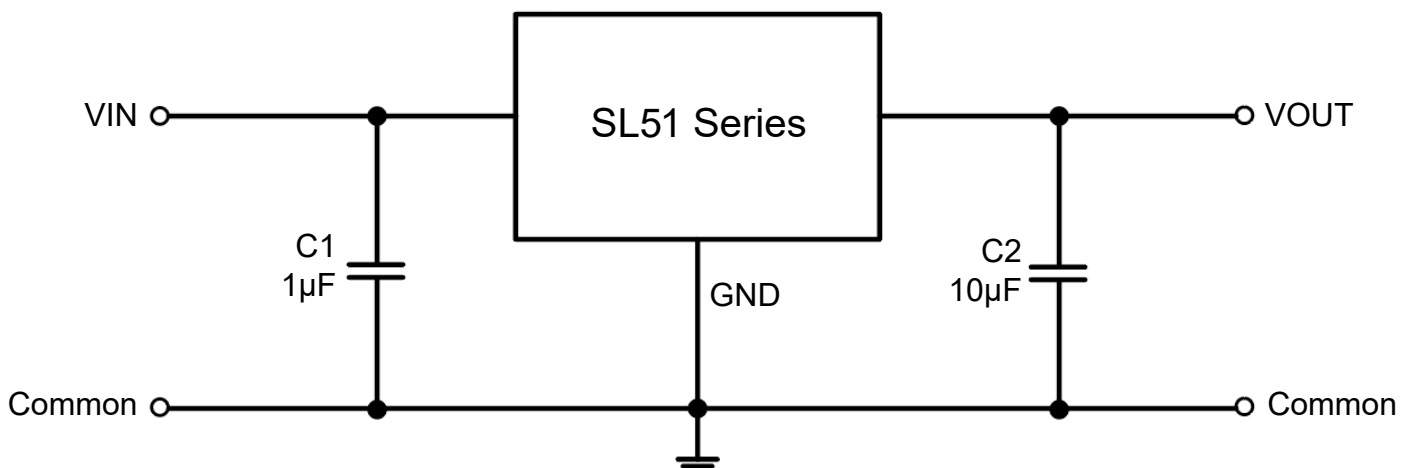
Features

- High Input Voltage Rating: Up to 15V
- Maximum Output Current: 500mA
- Standard Fixed Output Voltage Options: 1.8V, 2.5V, 2.8V, 3.0V, 3.3V, 3.6V, 4.0V, 5.0V
- Low Quiescent Current: 1 μ A
- PSRR=80dB@1KHz
- Low Dropout: 120mV @ 100mA
- Low Output Voltage Accuracy: $\pm 2\%$
- Fast Transient Response
- Short Circuit Protection
- Current Limiting Protection
- Thermal Shutdown Protection
- Available Packages: SOT-23-3, SOT-89, SOT-23-5

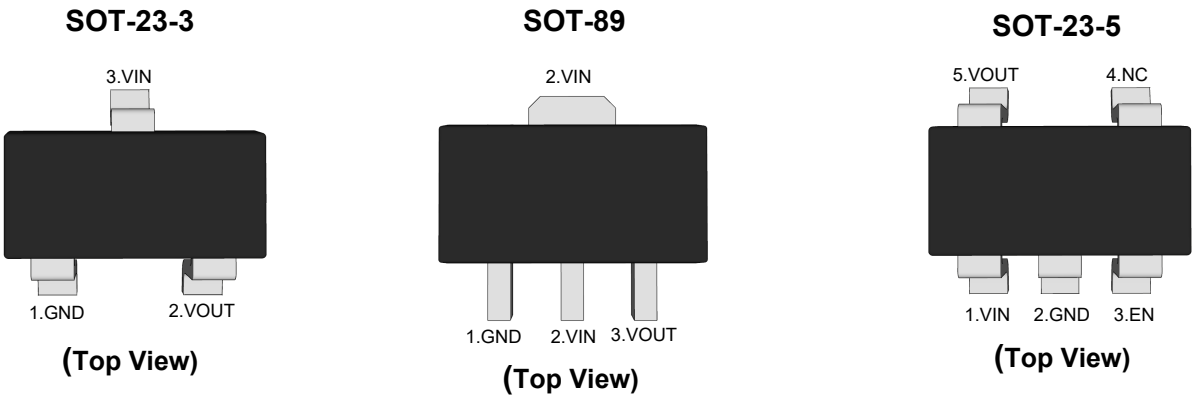
Applications

- Battery-Powered Equipment
- Gas, Electricity, and Water Meters
- Micro Controller Applications

Typical Application Circuit



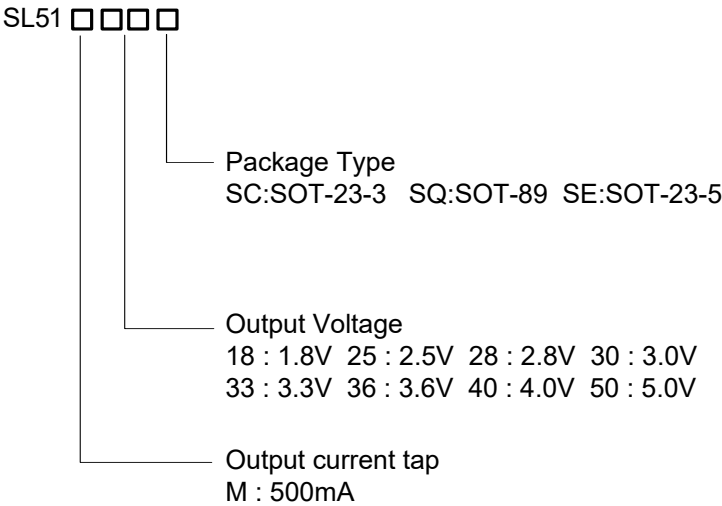
Pin Distribution



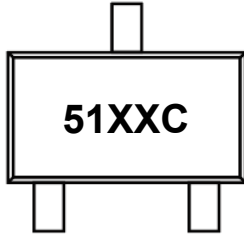
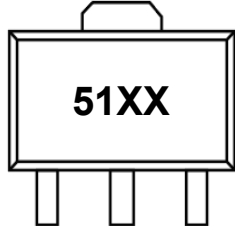
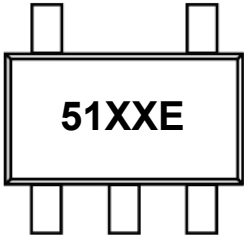
Functional Pin Description

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



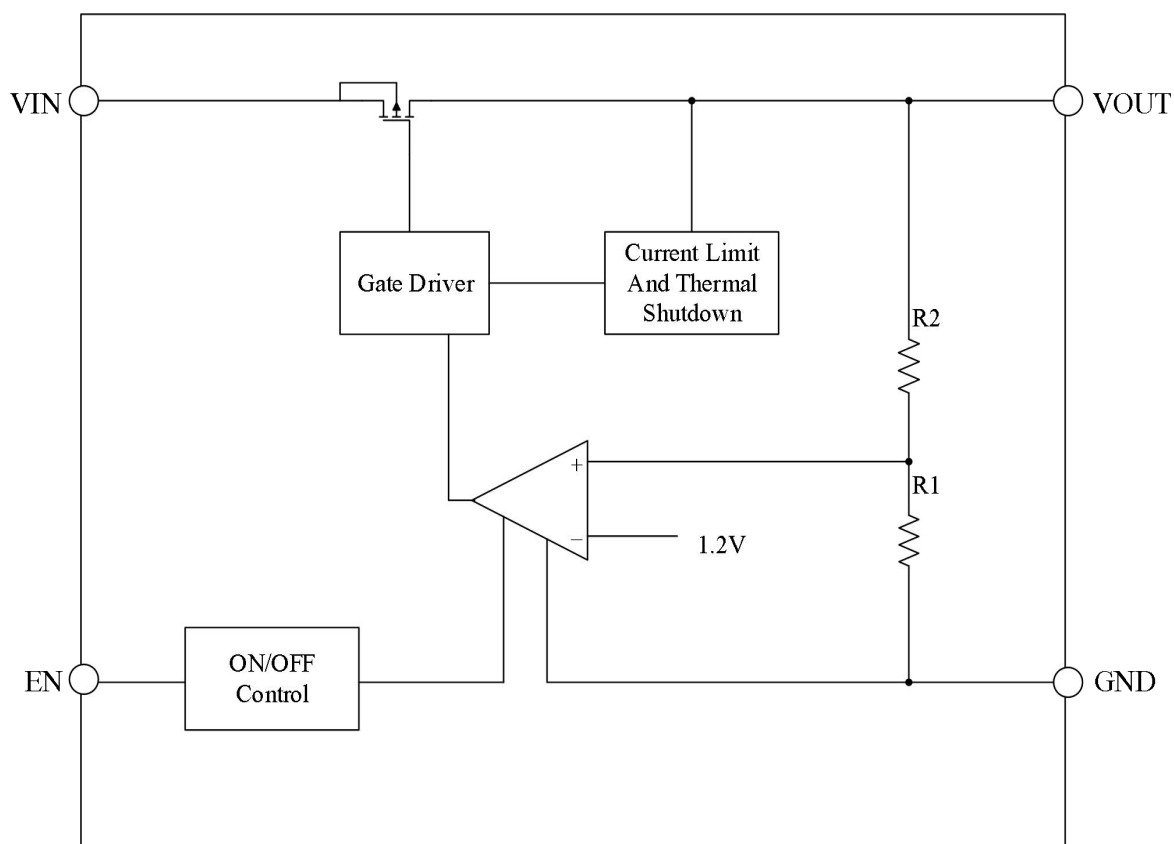
Ordering Information Continue

Orderable Device	Package	Reel (inch)	Package Qty (PCS)	Eco Plan ^{Note1}	MSL Level	Marking Code
SL51M18SC	SOT-23-3	7	3000	RoHS & Green	MSL3	 XX:Output Voltage e.g. 18:1.8V
SL51M25SC						
SL51M28SC						
SL51M30SC						
SL51M33SC						
SL51M36SC						
SL51M40SC						
SL51M50SC						
SL51M18SQ	SOT-89	7	1000	RoHS & Green	MSL1	 XX:Output Voltage e.g. 18:1.8V
SL51M25SQ						
SL51M28SQ						
SL51M30SQ						
SL51M33SQ						
SL51M36SQ						
SL51M40SQ						
SL51M50SQ						
SL51M18SE	SOT-23-5	7	3000	RoHS & Green	MSL3	 XX:Output Voltage e.g. 18:1.8V
SL51M25SE						
SL51M28SE						
SL51M30SE						
SL51M33SE						
SL51M36SE						
SL51M40SE						
SL51M50SE						

Note:

1. RoHS: SL defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials.
Green: SL defines "Green" to mean Halogen-Free and Antimony-Free.

Function Block Diagram



Absolute Maximum Ratings ^{Note2}

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter		Value	Unit
VIN to GND Voltage		-0.3 ~ +18	V
VOUT to GND Voltage		-0.3 ~ +7	V
VIN to VOUT Voltage		-0.3 ~ +18	V
Output Current		Internally limited	--
Power Dissipation ^{Note4}	SOT-23-3	500	mW
	SOT-23-5	500	mW
	SOT-89	770	mW
Thermal Resistance, Junction-to-Ambient	SOT-23-3	200	°C/W
	SOT-23-5	200	°C/W
	SOT-89	130	°C/W
Operating Junction Temperature		-40 ~ +125	°C
Storage temperature range		-40 ~ +150	°C
ESD(Human Body Model, HBM)		4	KV
ESD(Charged Device Model, CDM)		200	V

Note2: Exceed these limits to damage to the device, exposure to absolute maximum rating conditions may affect the reliability of the chip.

Recommended Operating Conditions

Parameter	Value	Unit
VIN to GND Voltage	15	V
Output Current	500	mA
Operating Ambient Temperature	-40 ~ +125	°C

Electrical Characteristics

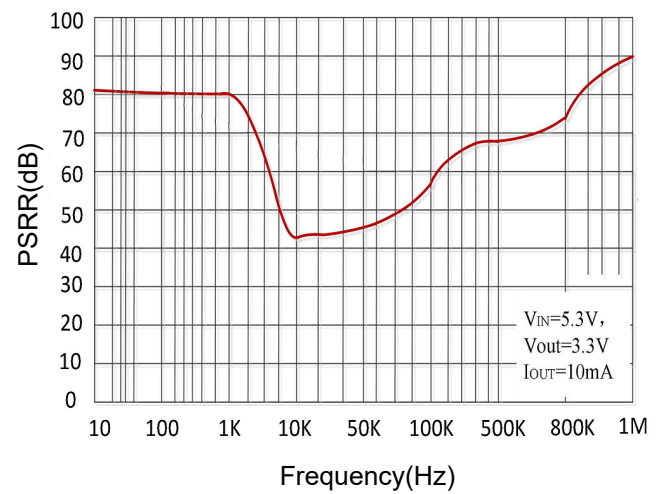
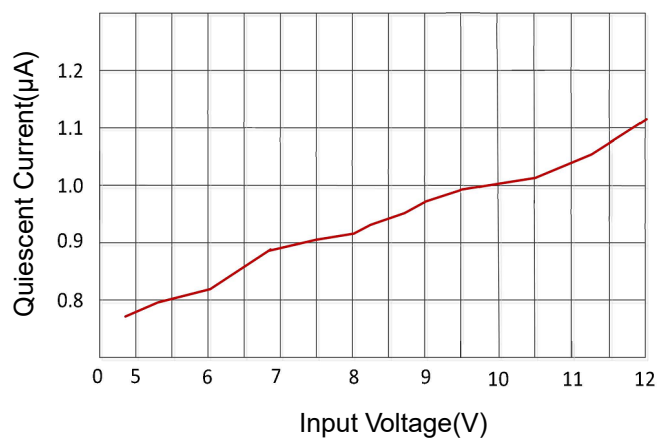
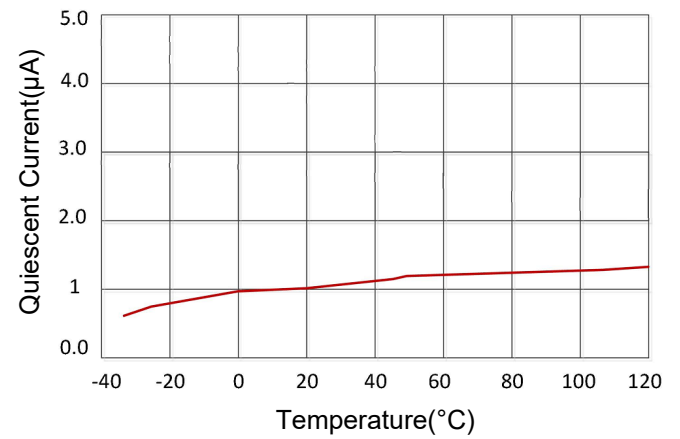
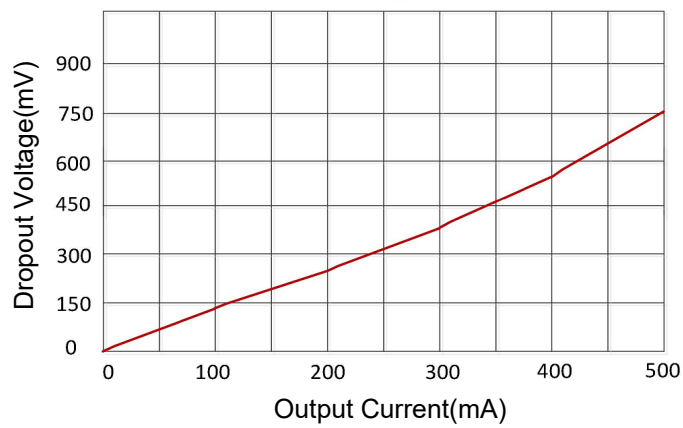
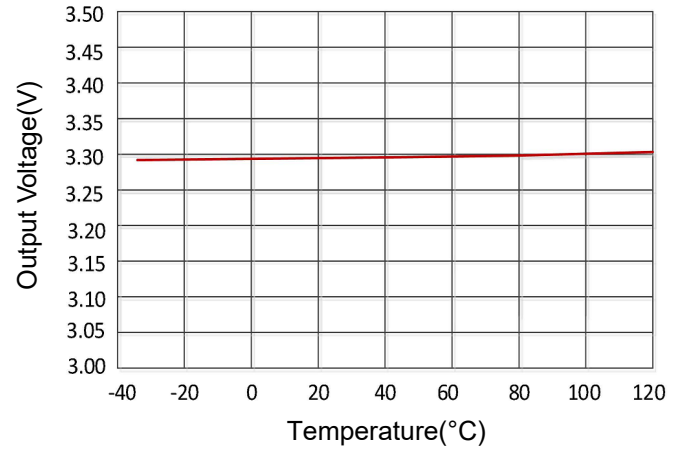
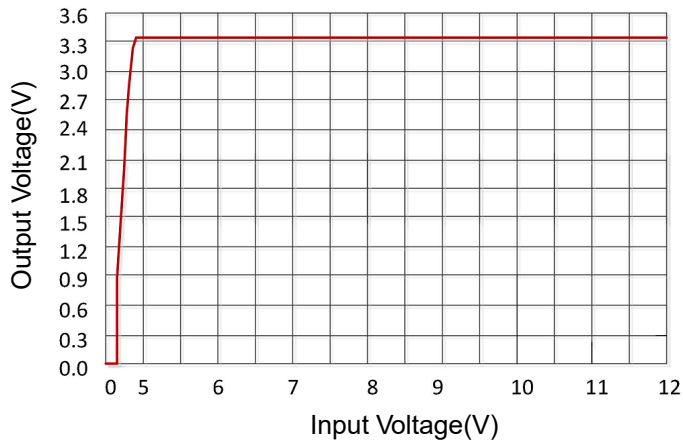
($V_{IN}=V_{OUT}+1$, $C_{IN}=1\mu F$, $C_{OUT}=10\mu F$, $T_A=25^\circ C$, unless otherwise noted.)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input Voltage	V_{IN}		--	--	15	V
Output Voltage Accuracy	ΔV_{OUT}	$V_{IN}=12V$, $I_{OUT}=10mA$	-2	--	+2	%
Quiescent Current	I_Q	$V_{IN}=12V$, $I_{OUT}=0A$	--	1	--	μA
Maximum Output Current	I_{OUT_Max}	$V_{IN}=V_{OUT}+1$	--	500	--	mA
Dropout Voltage ^{Note3}	V_{DROP}	$V_{IN}=V_{OUT}+0.1V$ $I_{OUT}=100mA$	--	120	--	mV
Line Regulation	ΔV_{LINE}	$V_{OUT}+0.5V \leq V_{IN} \leq 12V$, $I_{OUT}=1mA$	--	0.1	--	mV/mA
Load Regulation	ΔV_{LOAD}	$1mA \leq I_{OUT} \leq 500mA$, $V_{IN}=V_{OUT}+1V$	--	0.2	--	mV/V
EN Input Threshold Logic Low	V_{IL}		--	--	0.4	V
EN Input Threshold Logic High	V_{IH}		0.7	--	--	V
Short Circuit Current	I_{SHORT}	$V_{IN}=7V$	--	160	--	mA
Current Limit	I_{LIMIT}	$V_{IN}=7V$	--	900	--	mA
Power Supply Rejection Ratio	PSRR	$V_{IN}=5.3V$, $I_{OUT}=10mA$ $f=1KHz$, $V_{OUT}=3.3V$	--	80	--	dB
Thermal Shutdown Temperature	T_{SHDN}	Shutdown, Temp increasing	--	155	--	$^\circ C$
Thermal Reset Temperature		Reset, Temp increasing	--	125	--	$^\circ C$

Note3: The dropout voltage difference is the voltage difference between the input and output, where the output voltage is 2% lower than its nominal value.

Typical Characteristic Curves

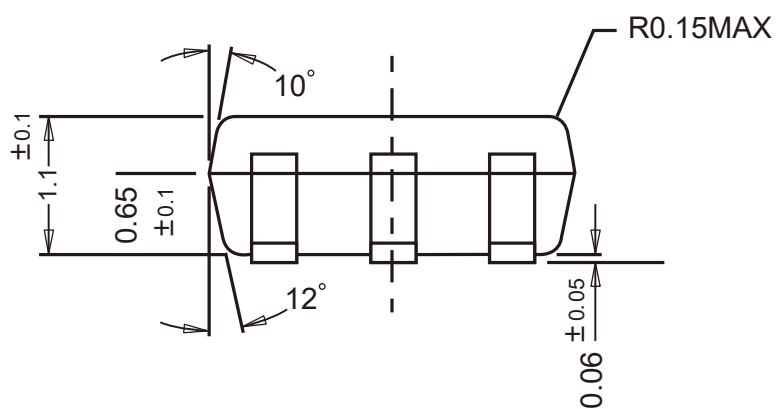
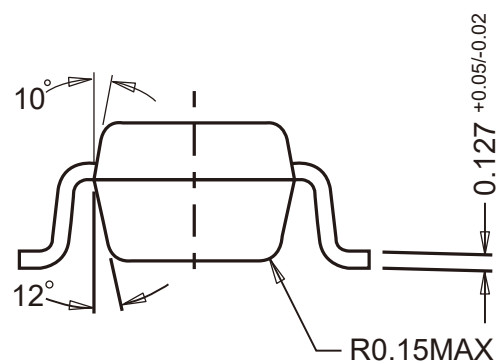
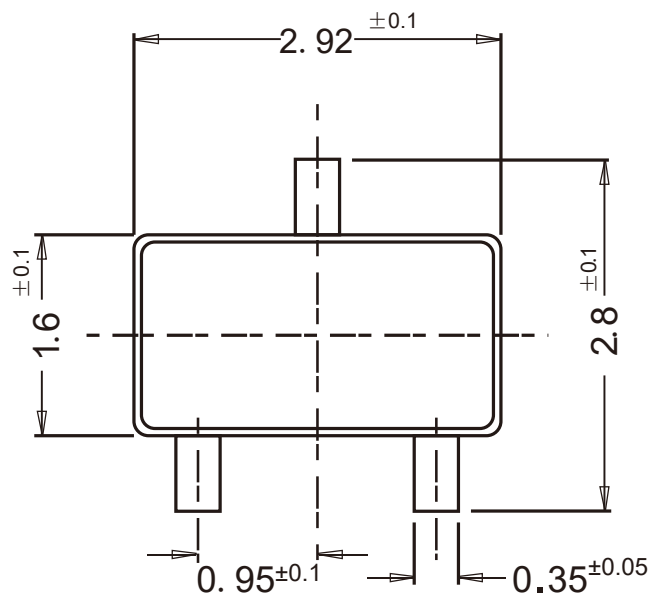
Test Condition: $T_A=25^{\circ}\text{C}$, $I_{\text{out}}=1\text{mA}$, $C_{\text{OUT}}=10\mu\text{F}$, $V_{\text{IN}}=V_{\text{OUT}}+1$, $V_{\text{OUT}}=3.3\text{V}$ unless otherwise noted



Package Outline

SOT-23-3

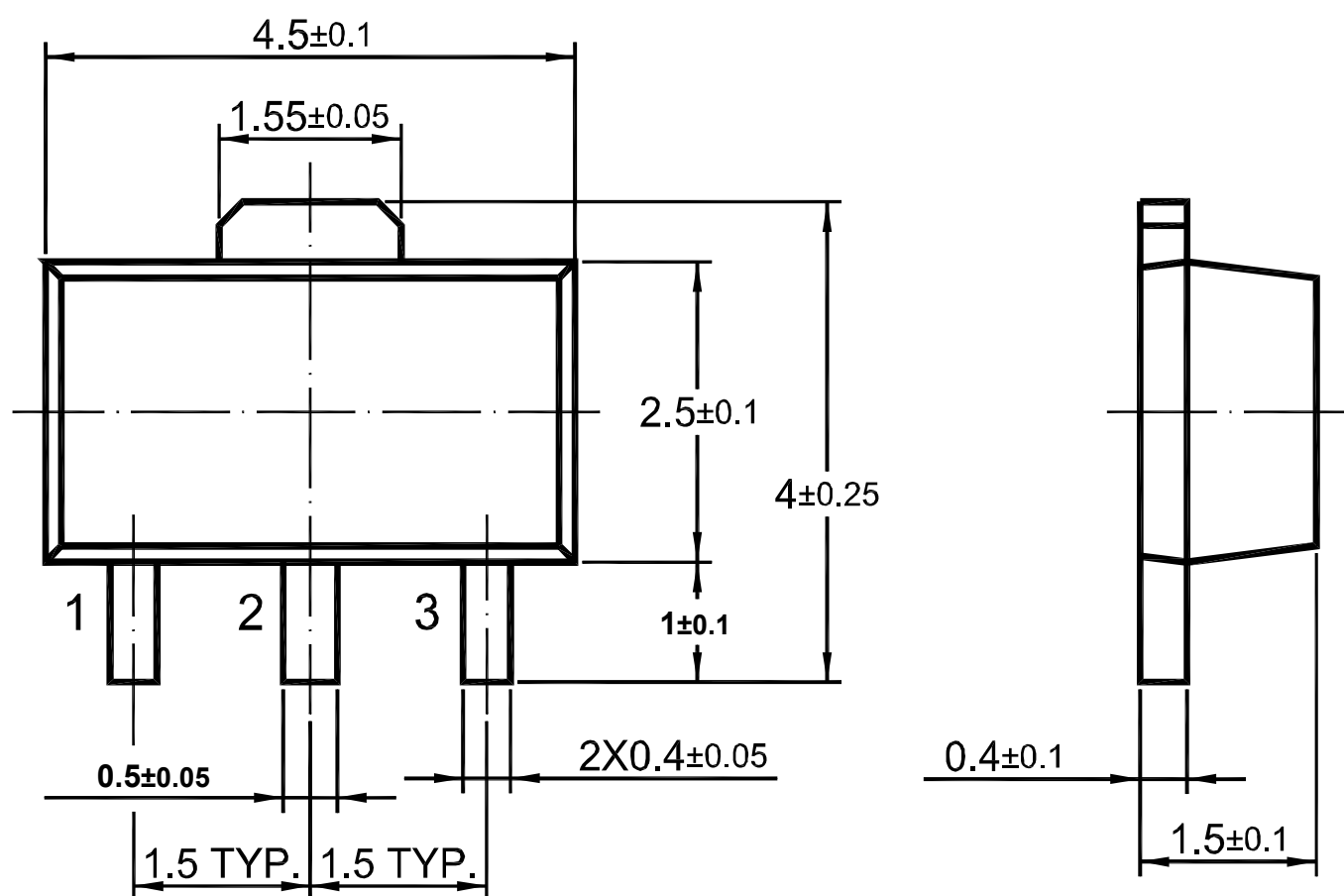
Dimensions in mm



Package Outline

SOT-89

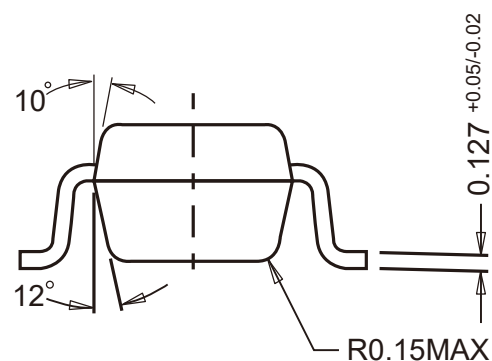
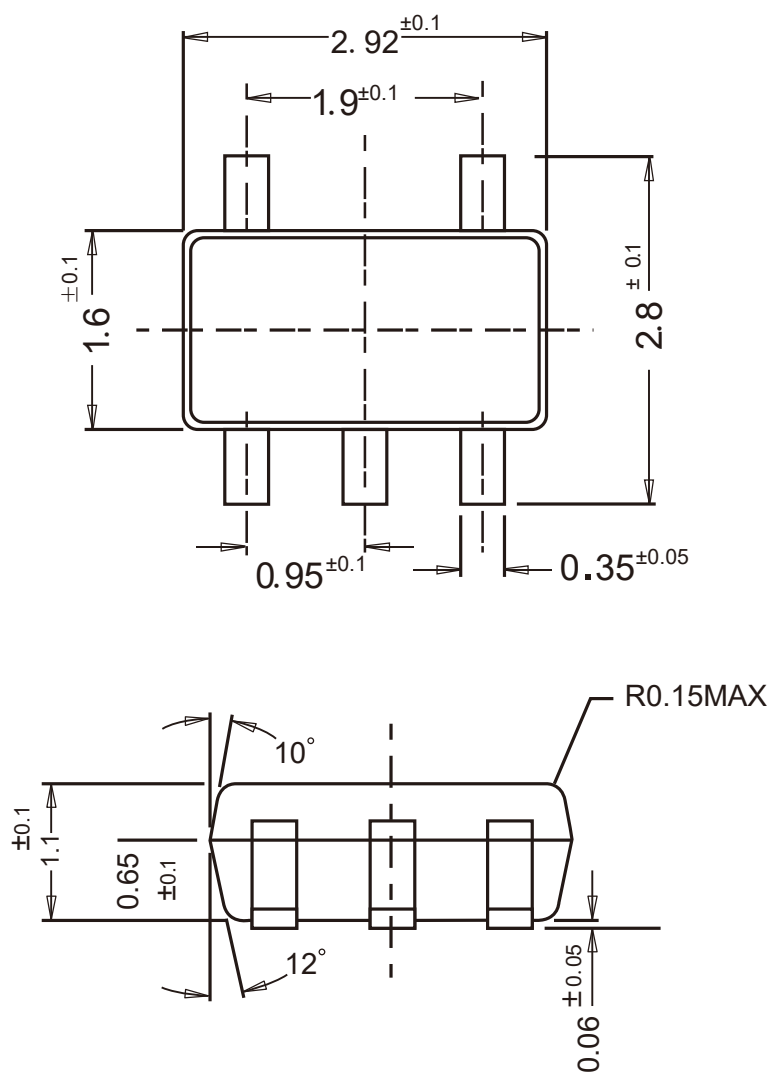
Dimensions in mm



Package Outline

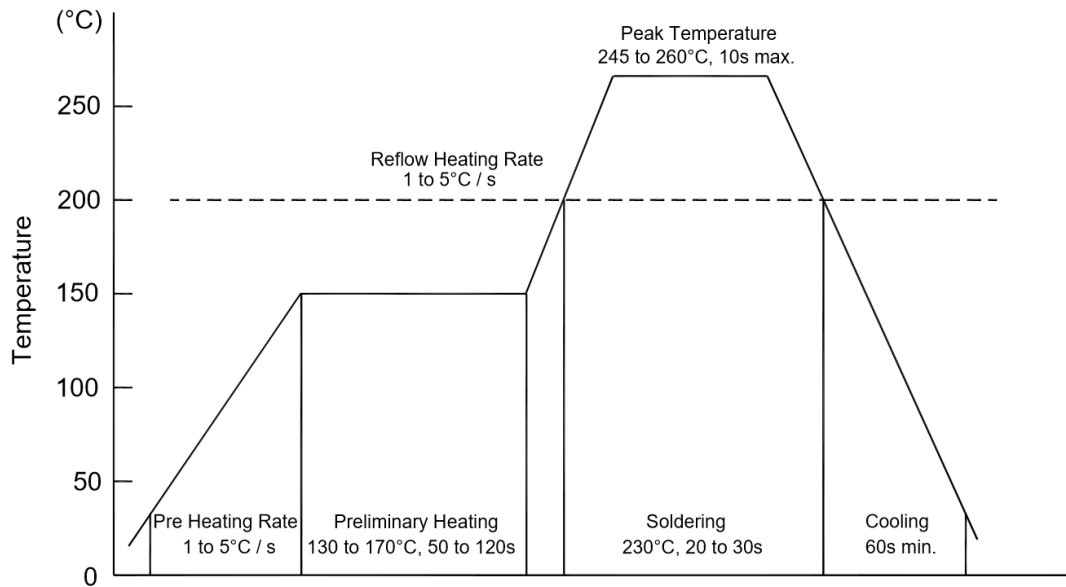
SOT-23-5

Dimensions in mm



Conditions of Soldering and Storage

◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245°C. If peak temperature is below 245°C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

◆ Conditions of hand soldering

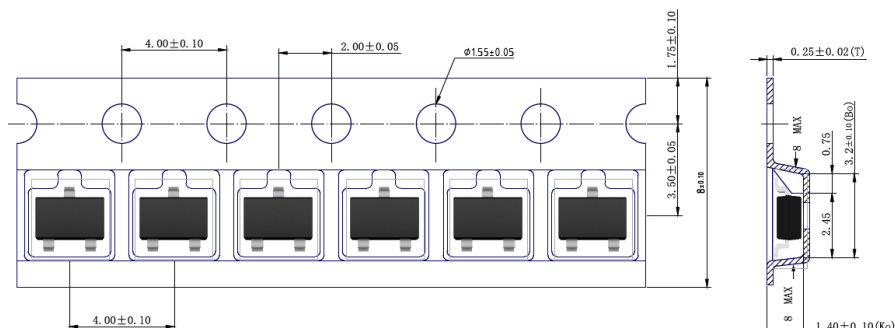
- Temperature: 300°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

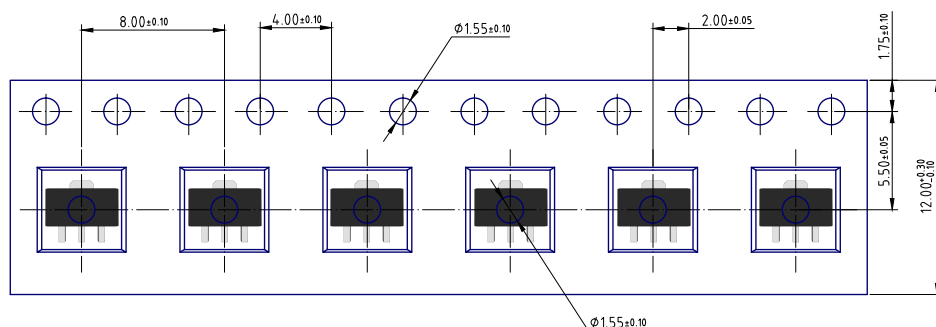
- **Temperature**
5 to 40°C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

◆ Embossed tape data

SOT-23-3



SOT-89



SOT-23-5

