Description

The PJ71B series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 30V. They are available with several fixed output voltages ranging from 2.8V to 9.0V. Because of the low power dissipation, PJ71B series are widely used in a variety of equipment such as audio device, video device, communication device and so on.

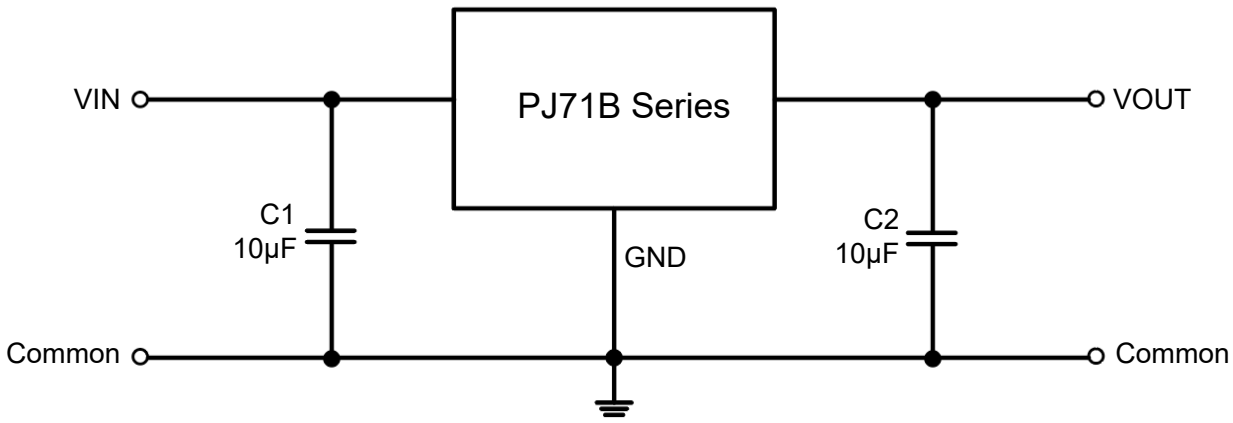
Features

- High Input Voltage Rating: Up to 30V
- Maximum Output Current: 100mA
- Standard Fixed Output Voltage Options: 2.8V,3V,3.3V,3.6V,4V,4.4V,5V and 9V
- Low Quiescent Current: 1.5uA
- PSRR=dB@1KHz
- Low Dropout : 100mV(Max.) @ 1mA
- Low Output Voltage Accuracy: ±2%
- Low Power Consumption
- Low Temperature Coefficient
- Available Packages: SOT-23, SOT-23-3 and SOT-89

Applications

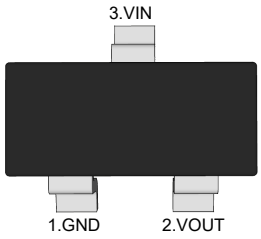
- Battery-Powered Equipment
- Communication Equipment
- Audio/Video Equipment

Typical Application Circuit



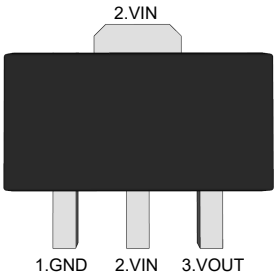
Pin Distribution

SOT-23



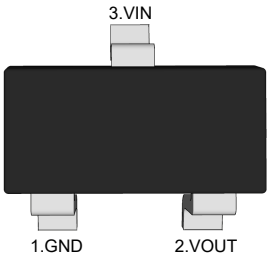
(Top View)

SOT-89



(Top View)

SOT-23-3



(Top View)

Functional Pin Description

Pin Name	Pin Function
GND	Ground
VOUT	Output Voltage
VIN	Power Input Voltage

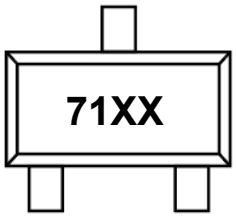
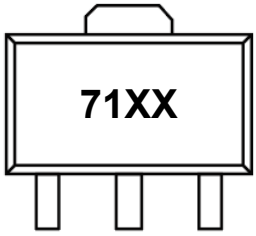
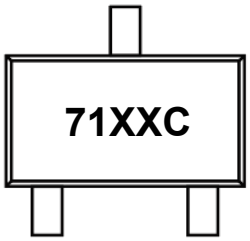
Ordering Information

PJ71B□□□□

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

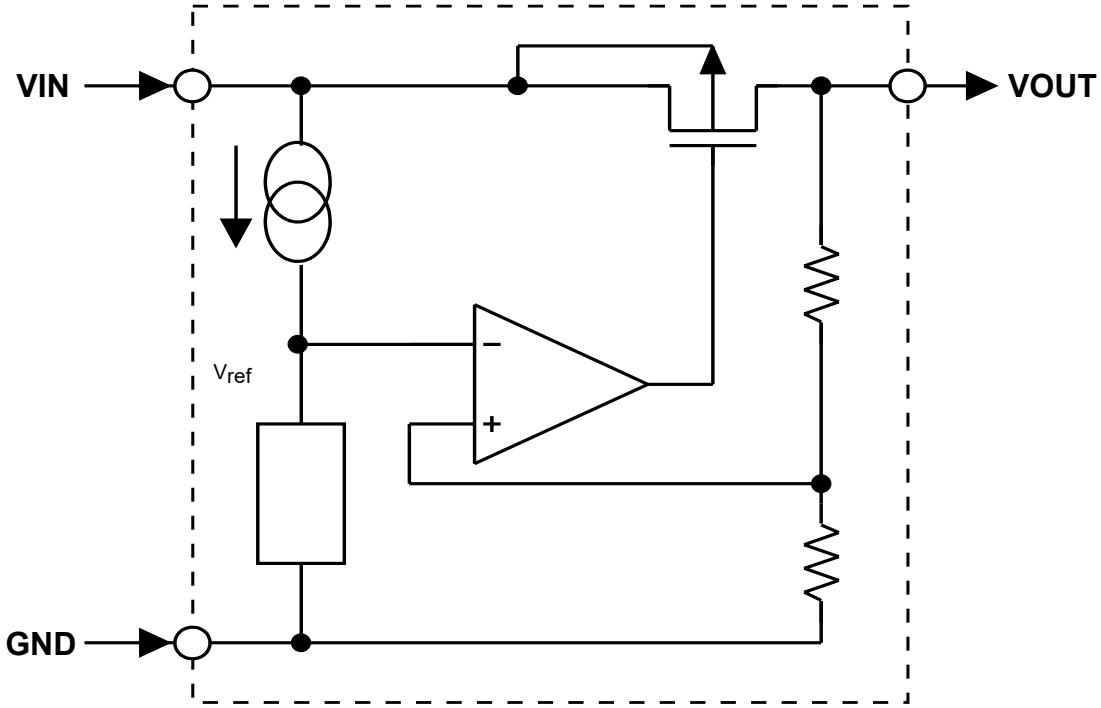
Output Voltage
28 : 2.8V 30 : 3.0V 33 : 3.3V
36 : 3.6V 40 : 4.0V 44 : 4.4V
50 : 5.0V 90 : 9.0V

Output current tap
K: 100mA

Orderable Device	Package	Reel (inch)	Package Qty (PCS)	Eco Plan [Note]	MSL Level	Marking Code
PJ71BK28SA	SOT-23	7	3000	RoHS & Green	MSL1	 XX:Output Voltage e.g. 30:3.0V
PJ71BK30SA						
PJ71BK33SA						
PJ71BK36SA						
PJ71BK40SA						
PJ71BK44SA						
PJ71BK50SA						
PJ71BK90SA						
PJ71BK28SQ	SOT-89	7/13	1000/3000	RoHS & Green	MSL1	 XX:Output Voltage e.g. 30:3.0V
PJ71BK30SQ						
PJ71BK33SQ						
PJ71BK36SQ						
PJ71BK40SQ						
PJ71BK44SQ						
PJ71BK50SQ						
PJ71BK90SQ						
PJ71BK28SC	SOT-23-3	7	3000	RoHS & Green	MSL3	 XX:Output Voltage e.g. 30:3.0V
PJ71BK30SC						
PJ71BK33SC						
PJ71BK36SC						
PJ71BK40SC						
PJ71BK44SC						
PJ71BK50SC						
PJ71BK90SC						

Note:
RoHS：PJ 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：PJ defines "Green" to mean Halogen-Free and Antimony-Free.

Function Block Diagram



Absolute Maximum Ratings

Ratings at 25℃ ambient temperature unless otherwise specified.

Parameter		Value	Unit
Supply Voltage		-0.3 ~ +30	V
Power Dissipation	SOT-23	200	mW
	SOT-23-3	400	mW
	SOT-89	600	mW
Thermal Resistance,Junction-to-Ambient	SOT-23	330	°C/W
	SOT-23-3	380	°C/W
	SOT-89	180	°C/W
Operating Ambient Temperature		-40 ~ +85	°C
Storage temperature range		-40 ~ +125	°C
ESD Voltage	HBM	2	KV

Note: 1. 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
Supply Voltage	24	V
Maximum Output Current	100	mA
Operating Ambient Temperature	-40 ~ +85	°C

Electrical Characteristics

(V_{IN}=V_{OUT}+2, C_{IN}=10μF, C_{OUT}=10μF, T_A=25℃ , unless otherwise noted.)

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input Voltage	V_{IN}		--	--	24	V
Output Voltage Accuracy	ΔV_{OUT}		-2	--	+2	%
Output Current	I_{OUT}	V_{IN}=V_{OUT}+2V	50	--	--	mA
Quiescent Current	I_Q	I_{OUT}=0mA	--	1.5	3.0	μA
Dropout Voltage Note1	V_{DROP}	2.8V≤V_{OUT}≤3.0V, ΔV_{OUT}=2%, I_{OUT}=1mA	--	30	100	mV
		3.0V<V_{OUT}≤9.0V, ΔV_{OUT}=2%, I_{OUT}=1mA	--	25	55	mV
Line Regulation	ΔV_{LINE}	V_{IN}=V_{OUT}+1V to 24V,I_{OUT}=1mA	--	--	0.2	%/V
Load Regulation	ΔV_{LOAD}	V_{IN}=V_{OUT}+2V,1mA≤I_{OUT}≤50mA	--	25	60	mV
Short Current	I_{SHORT}	V_{OUT}=0V	--	130	--	mA
Limit Current	I_{LIMIT}	V_{IN}=V_{OUT} + 2V	--	--	360	mA
Power Supply Rejection Ratio	PSRR	V_{OUT}=3.3V,I_{OUT}=50mA, f=1KHz	--	55	--	dB
Temperature Coefficient	$\frac{\Delta V_{OUT}}{\Delta T_A \times \Delta V_{OUT}}$	V_{IN}=V_{OUT}+2V,I_{OUT}=1mA, -40°C≤T_A≤85°C	--	100	--	ppm/°C

Note 1. The dropout voltage is defined as V_{IN} – V_{OUT}, when V_{OUT} is 98% of the normal value of V_{OUT}.

Functional Description

Input Capacitor

A 10μF 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 10μF, 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.

Thermal Considerations

For continuous operation, do not exceed absolute maximum junction temperature. The maximum power dissipation depends on the thermal resistance of the IC package, PCB layout, rate of surrounding airflow, and difference between junction and ambient temperature. The maximum power dissipation can be calculated by the following formula :

$P_{D(MAX)} = (T_{J(MAX)} - T_A) / R_{\theta JA}$

Where $T_{J(MAX)}$ is the maximum operation junction temperature 125 ℃, T_A is the ambient temperature and the $R_{\theta JA}$ is the junction to ambient thermal resistance.

The power dissipation definition in device is:

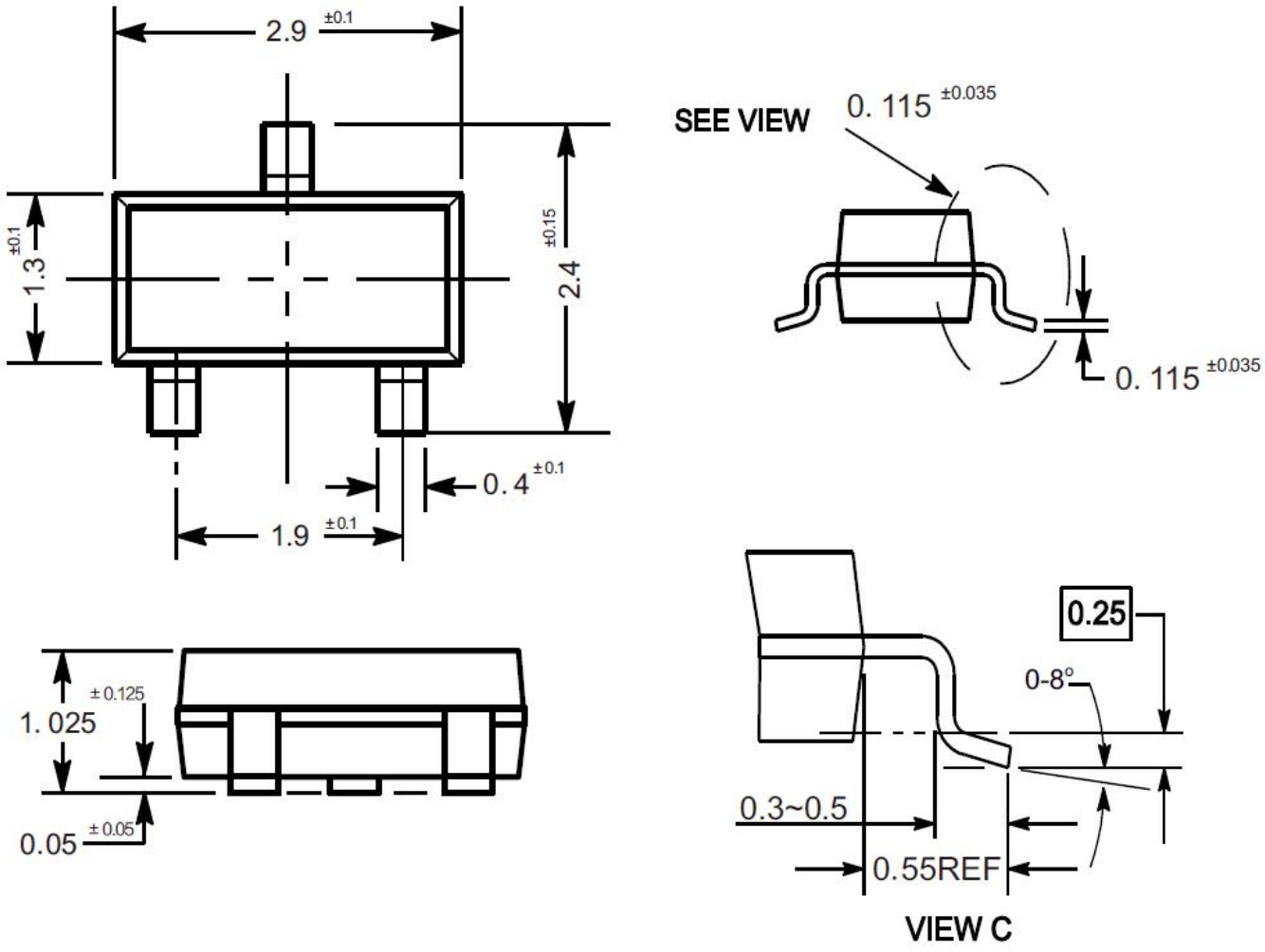
$P_D = (V_{IN} - V_{OUT}) \times I_{OUT} + V_{IN} \times I_Q$

Layout Consideration

By placing input and output capacitors on the same side of the PCB as the LDO, and placing them as close as is practical to the package can achieve the best performance. The ground connections for input and output capacitors must be back to the PJ71B Series ground pin using as wide and as short of a copper trace as is practical.Connections using long trace lengths, narrow trace widths, and connections through via must be avoided. These add parasitic inductances and resistance that results in worse performance especially during transient conditions.

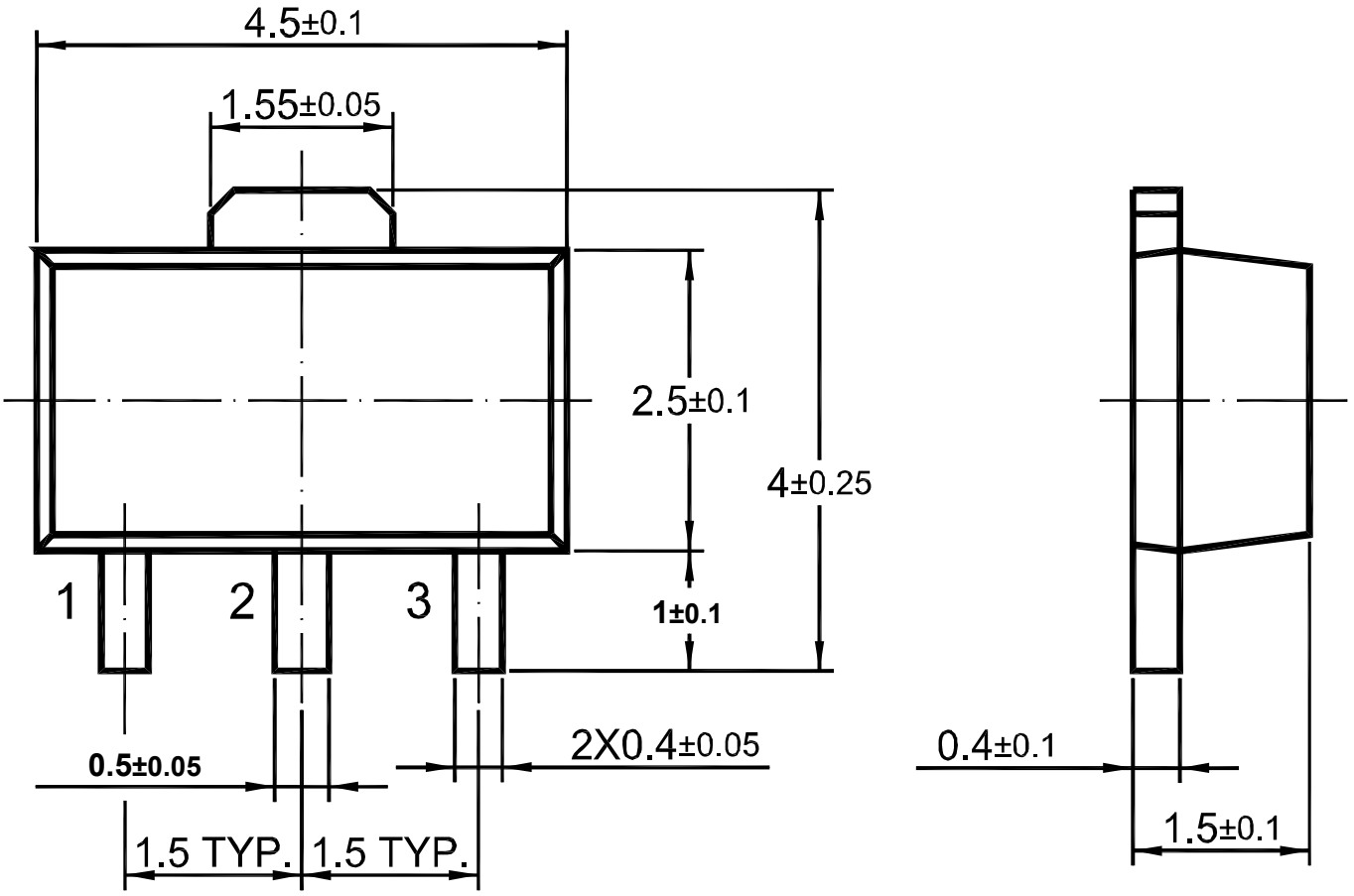
Package Outline

SOT-23
Dimensions in mm



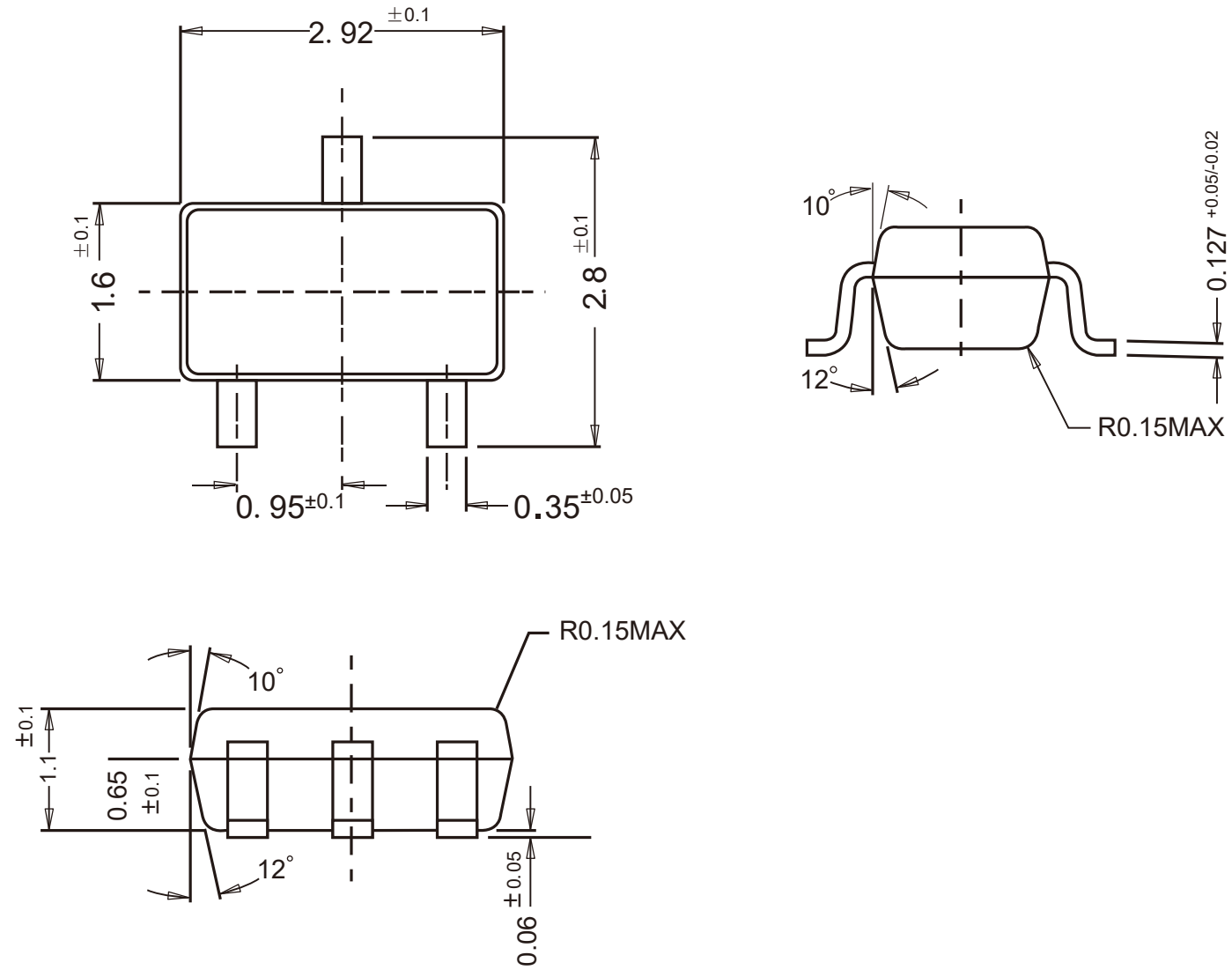
Package Outline

SOT-89
Dimensions in mm



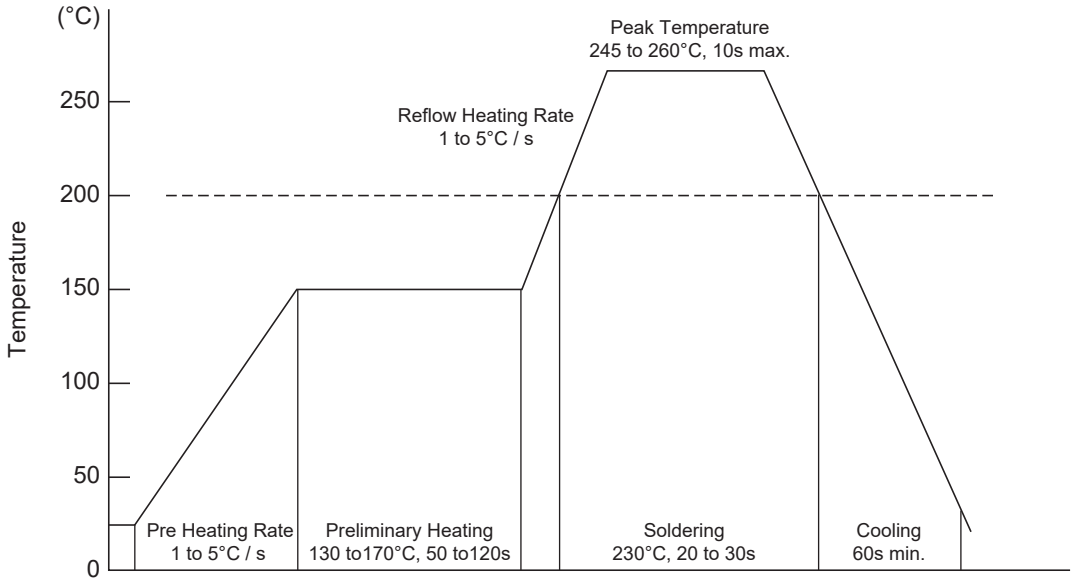
Package Outline

SOT-23-3
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

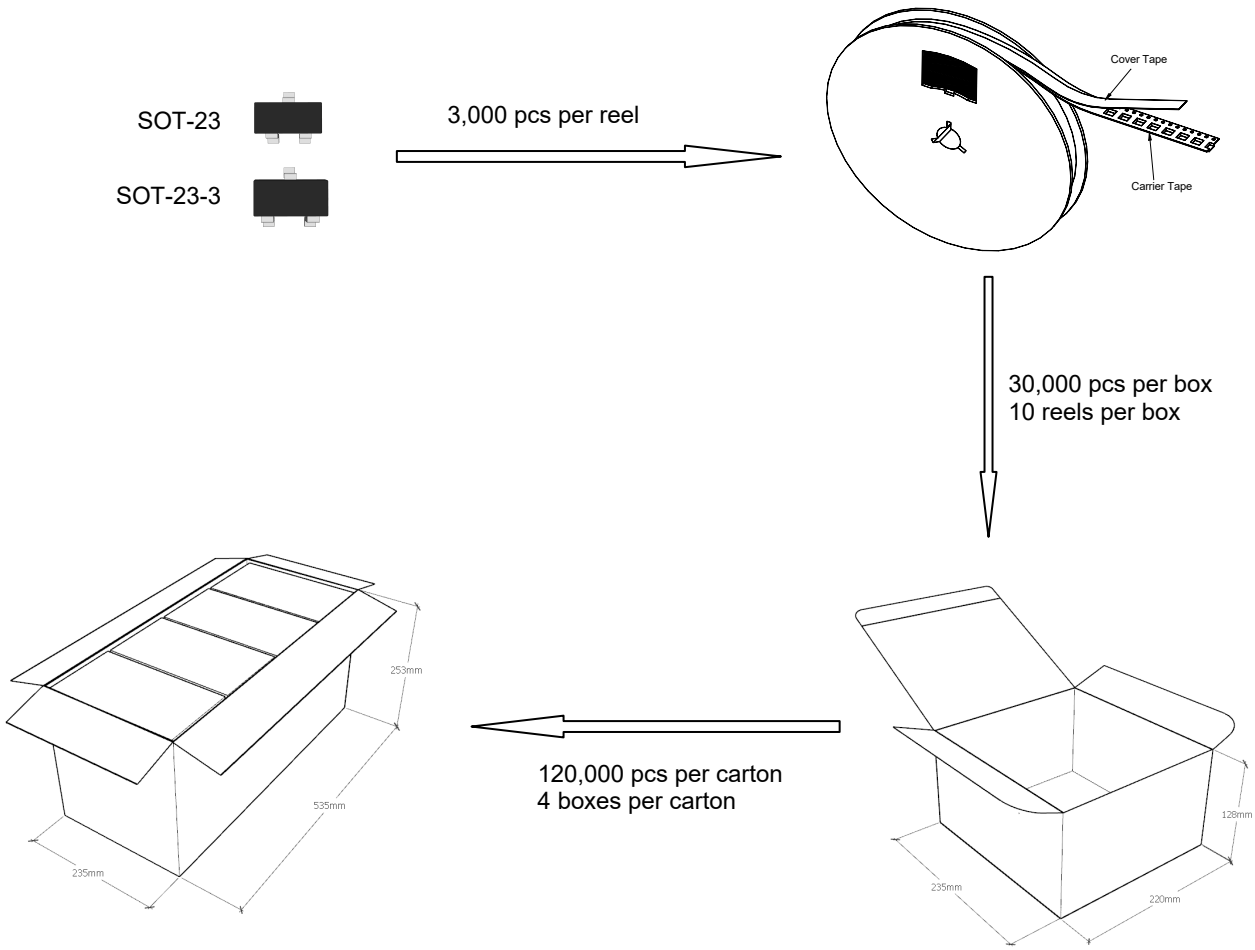
- Temperature: 300°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

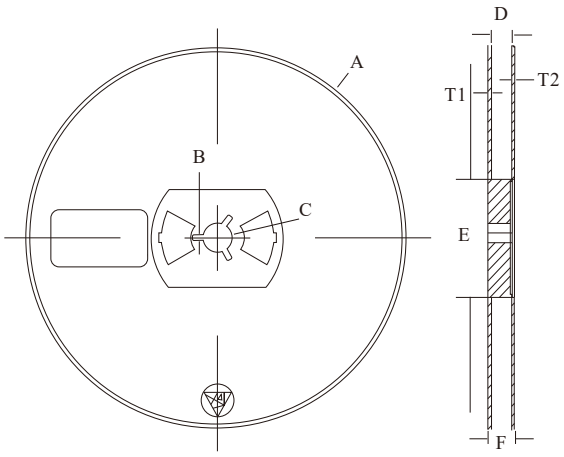
- **Temperature**
  5 to 40°C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Package Specifications (SOT-23/SOT-23-3)

- The method of packaging



◆ Embossed tape and reel data

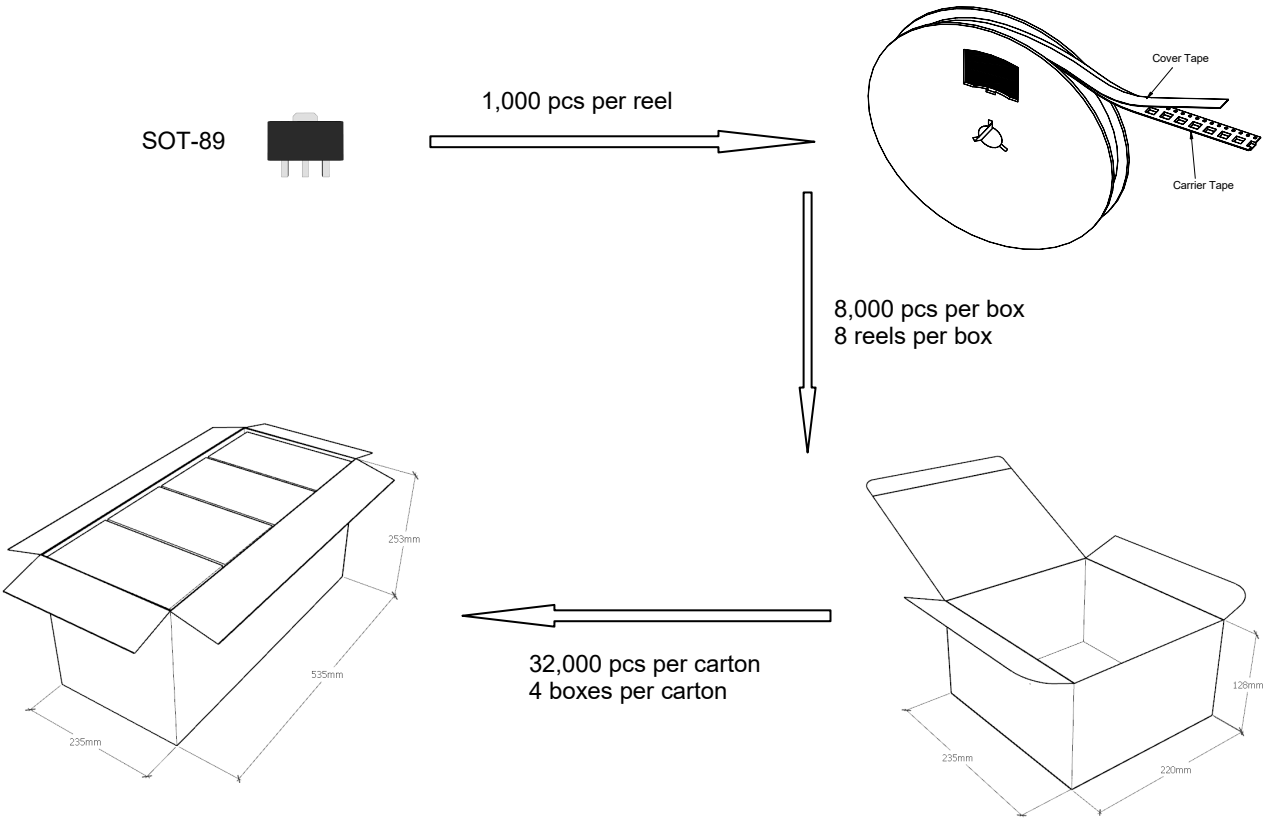


Reel (7")

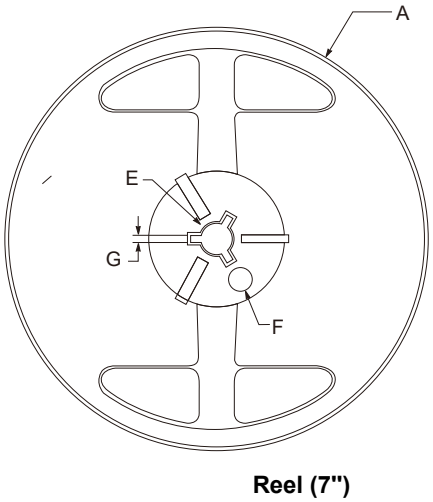
Symbol	Value (unit: mm)
A	Ø 177.8±1
B	2.7±0.2
C	Ø 13.5±0.2
E	Ø 54.5±0.2
F	12.3±0.3
D	9.6+2/-0.3
T1	1.0±0.2
T2	1.2±0.2

Package Specifications (SOT-89)

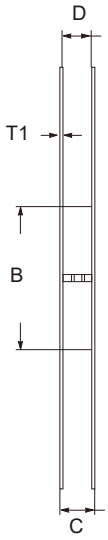
- The method of packaging (1,000PCS/Reel&7inches)



- **Embossed tape and reel data**



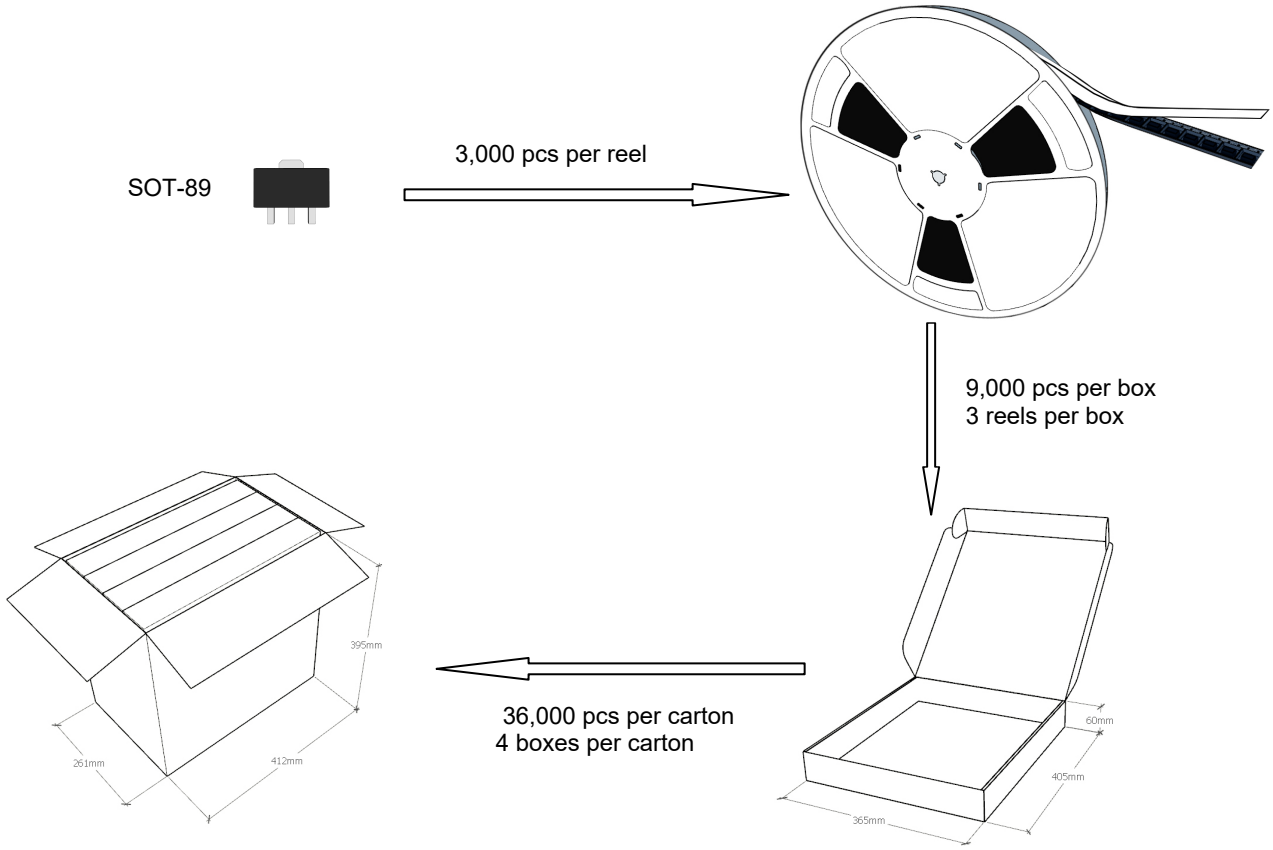
Reel (7")



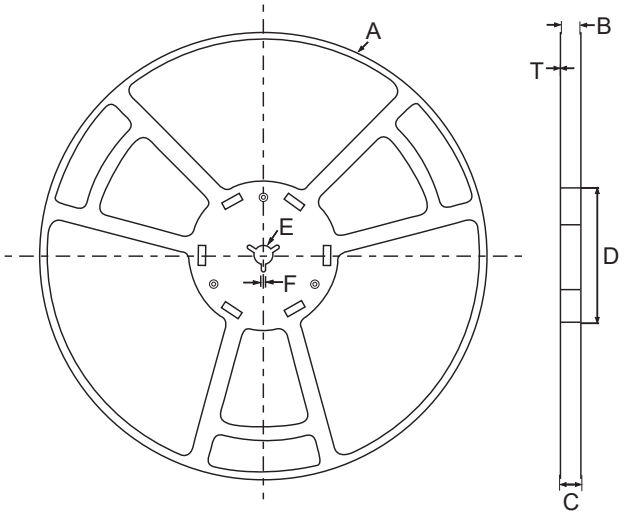
symbol	Value(unit:mm)
A	Φ179±1
B	60.5±0.2
C	15.3±0.3
D	12.5~13.7
E	Φ13.5±0.2
F	Φ10.0±0.2
G	2.7±0.2
T1	1.0±0.2

Package Specifications (SOT-89)

- The method of packaging (3,000PCS/Reel&13inches)



◆ Embossed reel data

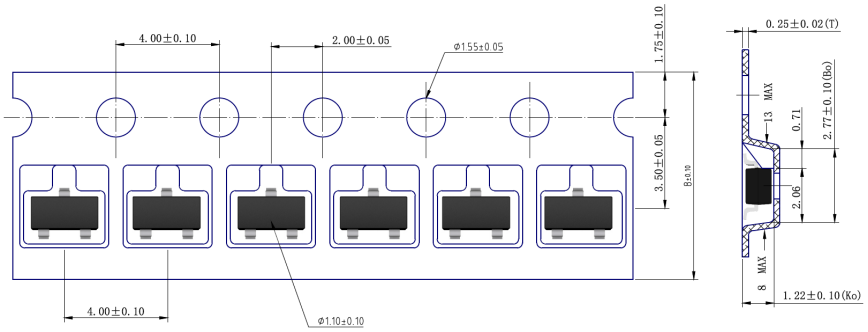


Reel (13")

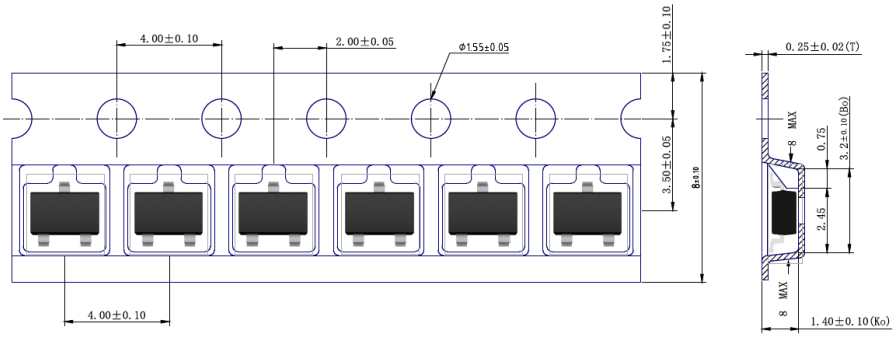
symbol	Value(unit:mm)
A	ϕ330±1
B	12.7±0.5
C	16.5±0.3
D	ϕ99.5±0.5
E	ϕ13.6±0.3
F	2.8±0.3
T	1.9±0.2

◆ Embossed tape data

SOT-23



SOT-23-3



SOT-89