Description

The PJ72 series is manufactured using CMOS technology with a maximum input voltage of 30V. This series is a high-voltage linear regulator with multiple fixed output voltages.

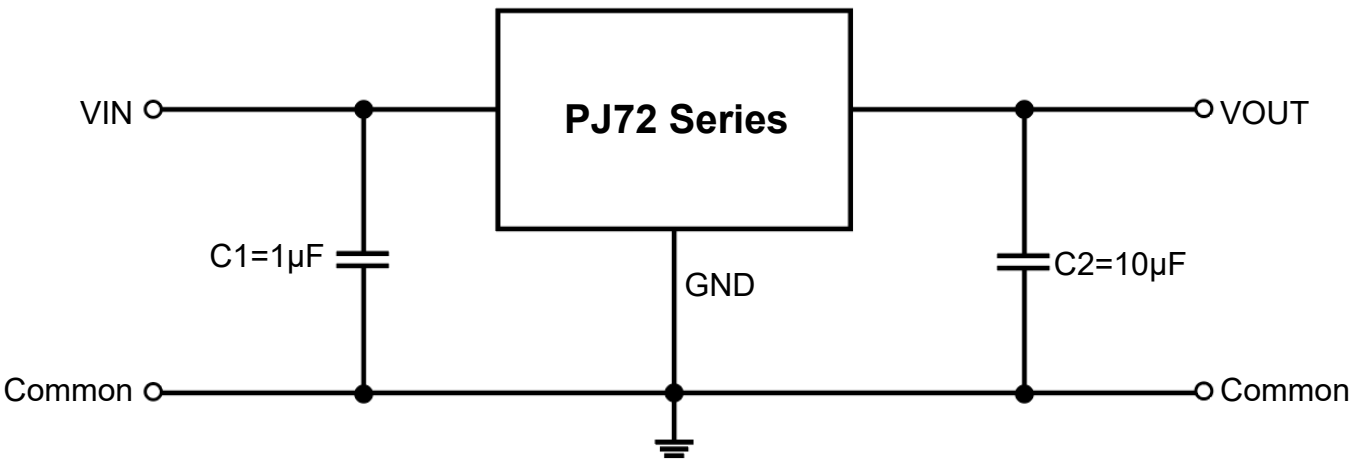
Features

- Wide Input Voltage Range: 3V~ 30V
- Maximum Output Current: 200mA
- Low Dropout: 500mV @ 100mA
- Fixed Output Voltages: 1.8V,2.5V,3.0V,3.3V,4.0V,4.2V,4.4V,5.0V
- Output Voltage Accuracy: ±2%
- Current Limiting Protection
- Short Circuit Protection
- Thermal Shutdown Protection
- Available Packages: SOT-23, SOT-23-3, SOT-89, SOT-23-5 DFN1x1-4Land DFN2x2C-6L

Applications

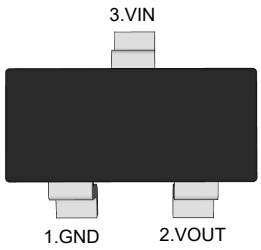
- Battery-Powered Equipment
- Smoke Detectors and Sensors
- Microcontroller Applications
- Household Appliances

Typical Application Circuit



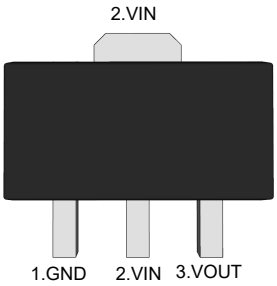
Pin Distribution

SOT-23



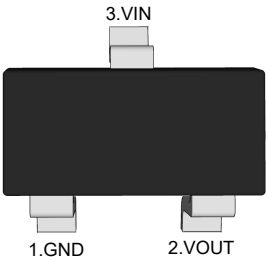
(Top View)

SOT-89



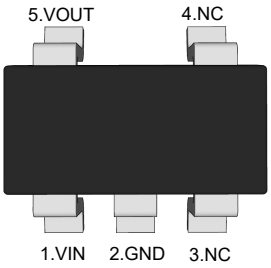
(Top View)

SOT-23-3



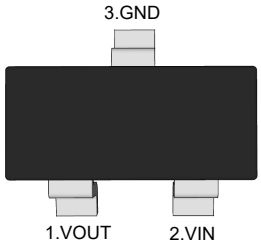
(Top View)

SOT-23-5



(Top View)

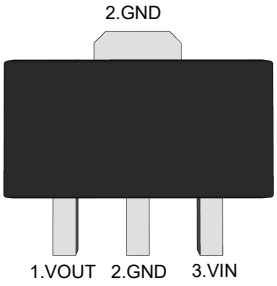
SOT-23



(Top View)

PJ72-A Series

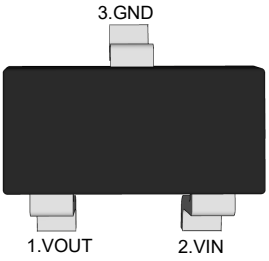
SOT-89



(Top View)

PJ72-A Series

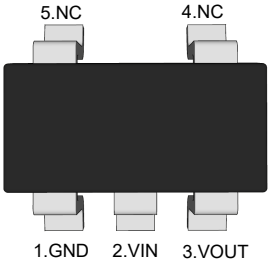
SOT-23-3



(Top View)

PJ72-A Series

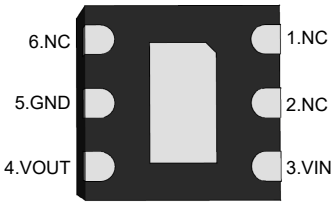
SOT-23-5



(Top View)

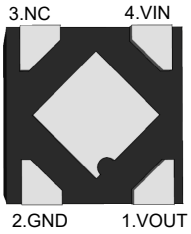
PJ72-A Series

DFN2x2C-6L



Bottom View

DFN1x1-4L



(Bottom View)

Functional Pin Description

Pin Name	Pin Function
NC	NO Connected
GND	Ground
VOUT	Output Voltage
VIN	Power Input Voltage

Ordering Information

PJ72 □□□□□□

Pin arrangement version number
□(Blank): Normal pin arrangement version
-A: A version pin arrangement

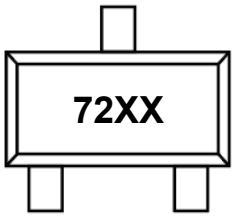
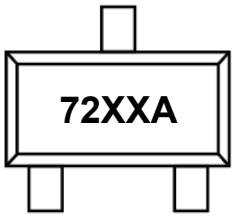
Package Type
SA:SOT-23 SC:SOT-23-3 SQ:SOT-89
SE:SOT-23-5 DFC : DFN2x2C-6L DE:DFN1x1-4L

Output Voltage
18 : 1.8V 25 : 2.5V 30 : 3.0V 33 : 3.3V
40 : 4.0V 42 : 4.2V 44 : 4.4V 50 : 5.0V

Output current tap
L : 200mA

A:Revision NO.

Series NO.

Orderable Device	Package	Reel (inch)	Package Qty (PCS)	Eco Plan Note	MSL Level	Marking Code
PJ72AL18SA	SOT-23	7	3000	RoHS & Green	MSL1	 XX:Output Voltage e.g. 30:3.0V
PJ72AL25SA						
PJ72AL30SA						
PJ72AL33SA						
PJ72AL40SA						
PJ72AL42SA						
PJ72AL44SA						
PJ72AL50SA						
PJ72AL18SA-A						 XX:Output Voltage e.g. 30:3.0V
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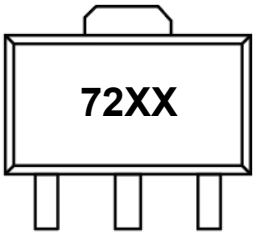
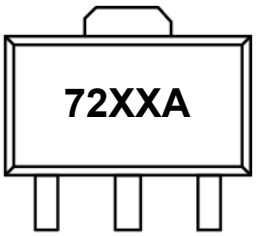
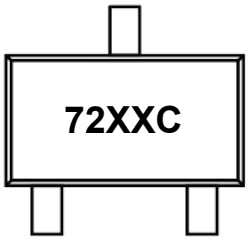
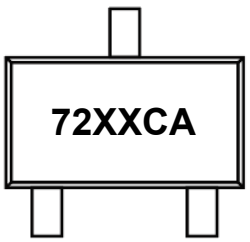
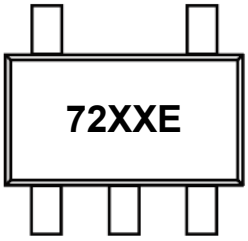
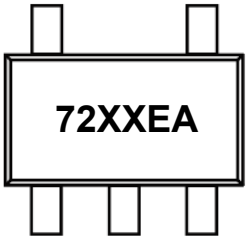
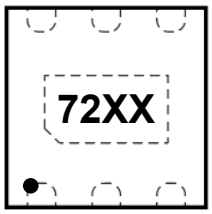
PJ72AL30SA-A						
PJ72AL33SA-A						
PJ72AL40SA-A						
PJ72AL42SA-A						
PJ72AL44SA-A						
PJ72AL50SA-A						

Ordering Information Continue

Orderable Device	Package	Reel (inch)	Package Qty (PCS)	Eco Plan Note	MSL Level	Marking Code
PJ72AL18SQ	SOT-89	7/13	1000/3000	RoHS & Green	MSL1	 XX:Output Voltage e.g. 30:3.0V
PJ72AL25SQ						
PJ72AL30SQ						
PJ72AL33SQ						
PJ72AL40SQ						
PJ72AL42SQ						
PJ72AL44SQ						
PJ72AL50SQ						
PJ72AL18SQ-A						 XX:Output Voltage e.g. 30:3.0V
PJ72AL25SQ-A						
PJ72AL30SQ-A						
PJ72AL33SQ-A						
PJ72AL40SQ-A						
PJ72AL42SQ-A						
PJ72AL44SQ-A						
PJ72AL50SQ-A						
PJ72AL18SC	SOT-23-3	7	3000	RoHS & Green	MSL3	 XX:Output Voltage e.g. 30:3.0V
PJ72AL25SC						
PJ72AL30SC						
PJ72AL33SC						
PJ72AL40SC						
PJ72AL42SC						
PJ72AL44SC						
PJ72AL50SC						
PJ72AL18SC-A						 XX:Output Voltage e.g. 30:3.0V
PJ72AL25SC-A						
PJ72AL30SC-A						
PJ72AL33SC-A						
PJ72AL40SC-A						
PJ72AL42SC-A						
PJ72AL44SC-A						
PJ72AL50SC-A						

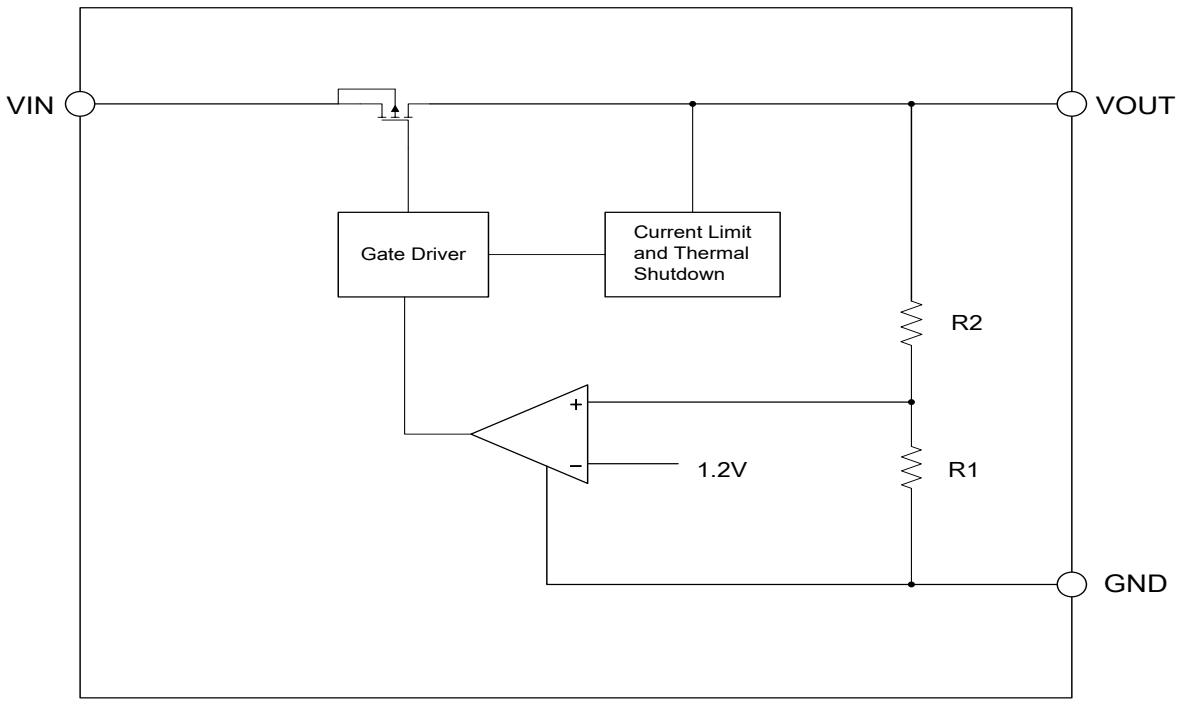
Ordering Information Continue

Orderable Device	Package	Reel (inch)	Package Qty (PCS)	Eco Plan Note	MSL Level	Marking Code
PJ72AL18SE	SOT-23-5	7	3000	RoHS & Green	MSL3	 XX:Output Voltage e.g. 30:3.0V
PJ72AL25SE						
PJ72AL30SE						
PJ72AL33SE						
PJ72AL40SE						
PJ72AL42SE						
PJ72AL44SE						
PJ72AL50SE						
PJ72AL18SE-A						 XX:Output Voltage e.g. 30:3.0V
PJ72AL25SE-A						
PJ72AL30SE-A						
PJ72AL33SE-A						
PJ72AL40SE-A						
PJ72AL42SE-A						
PJ72AL44SE-A						
PJ72AL50SE-A						
PJ72AL18DFC	DFN2x2C-6L	7	3000	RoHS & Green	MSL1	 XX:Output Voltage e.g. 30:3.0V
PJ72AL25DFC						
PJ72AL30DFC						
PJ72AL33DFC						
PJ72AL40DFC						
PJ72AL42DFC						
PJ72AL44DFC						
PJ72AL50DFC						

Orderable Device	Package	Reel (inch)	Package Qty (PCS)	Eco Plan [Note]	MSL Level	Marking Code
PJ72AL18DE	DFN1x1-4L	7	10000	RoHS & Green	MSL1	 XX:Output Voltage e.g. 18:1.8V
PJ72AL25DE						
PJ72AL30DE						
PJ72AL33DE						
PJ72AL40DE						
PJ72AL42DE						
PJ72AL44DE						
PJ72AL50DE						

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 Note1

Ratings at 25℃ ambient temperature unless otherwise specified.

Parameter		Value	Unit
VIN to GND Voltage		-0.3~36	V
VOUT to GND Voltage		-0.3~7	V
VIN to GND Voltage		-0.3~31	V
Output Current		Internally limited	--
Power Dissipation	SOT-23	300	mW
	SOT-23-3	400	mW
	SOT-23-5	400	mW
	SOT-89	740	mW
	DFN1x1-4L	400	mW
	DFN2x2C-6L	1370	mW
Thermal Resistance,Junction-to-Ambient	SOT-23	333	°C/W
	SOT-23-3	250	°C/W
	SOT-23-5	250	°C/W
	SOT-89	135	°C/W
	DFN1x1-4L	250	°C/W
	DFN2x2C-6L	73	°C/W
Operating Junction Temperature		-40 ~ +125	°C
Storage Temperature Range		-40 ~ +150	°C
Human Body Model ESD Level (HBM)		4	KV
Charge Device Model ESD Level (CDM)		200	V

Note1: 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	3~30	V
Maximum Output Current	200	mA
Operating Ambient Temperature	-40 ~ +125	°C

Electrical Characteristics

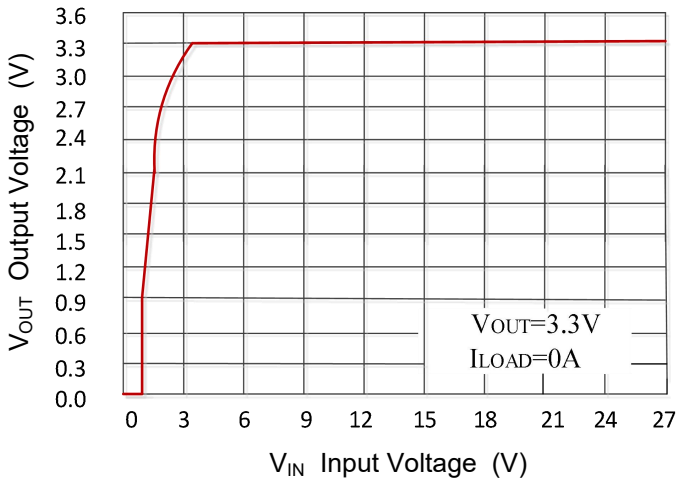
(V_{IN}=V_{OUT}+1V, C_{IN}=1μF, C_{OUT}=10μF, T_A=25℃ , unless otherwise noted.)

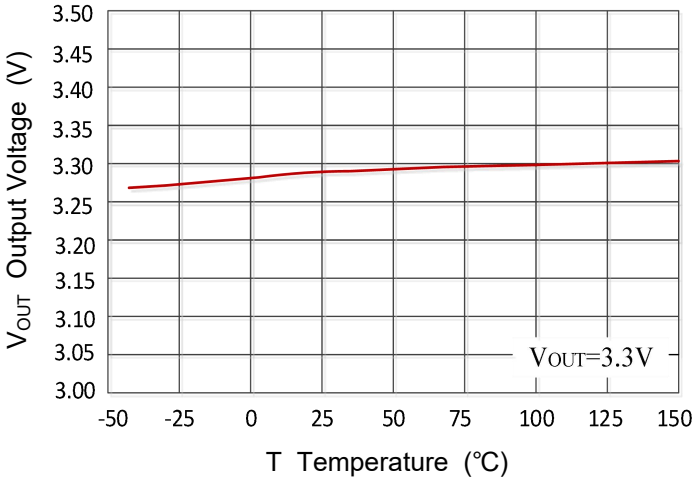
Parameter	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Input Voltage	V_{IN}			3	--	30	V
Output Voltage Accuracy	ΔV_{OUT}	V_{IN}=12V, I_{OUT}=10mA		-2	--	+2	%
Max. Output Current	I_{OUT_MAX}			--	200	--	mA
Quiescent Current	I_Q	V_{IN}=12V, I_{OUT}=0mA		--	--	3	μA
Dropout Voltage Note2	V_{DROP}	1.8V≤V_{OUT}≤3V	I_{OUT}=100mA	--	500	750	mV
			I_{OUT}=150mA	--	700	1100	
		3.3V≤V_{OUT}≤3.6V	I_{OUT}=100mA	--	500	700	
			I_{OUT}=150mA	--	800	990	
		4V≤V_{OUT}≤5V	I_{OUT}=100mA	--	500	700	
			I_{OUT}=150mA	--	700	990	
Line Regulation	ΔV_{LINE}	V_{IN}=V_{OUT}+2 to24V, I_{OUT}=1mA		--	0.1	--	mV/V
Load Regulation	ΔV_{LOAD}	1mA<I_{OUT}<150mA, V_{IN}=7V		--	0.1	--	mV/mA
Limit Current	I_{LIMIT}	V_{IN}=V_{OUT} + 2V		--	350	--	mA
Short Current	I_{SHORT}	The Output Short-Circuit Current to The Ground		--	120	--	mA
Power Supply Rejection Ratio	PSRR	V_{IN}=12V,I_{OUT}=1mA, f=1KHz		--	60	--	dB
Thermal Shutdown Temperature	T_{SHDN}	Shutdown, Temp increasing		--	154	--	°C
Thermal Reset Temperature	T_{SHDN}	Reset, Temp increasing		--	125	--	°C

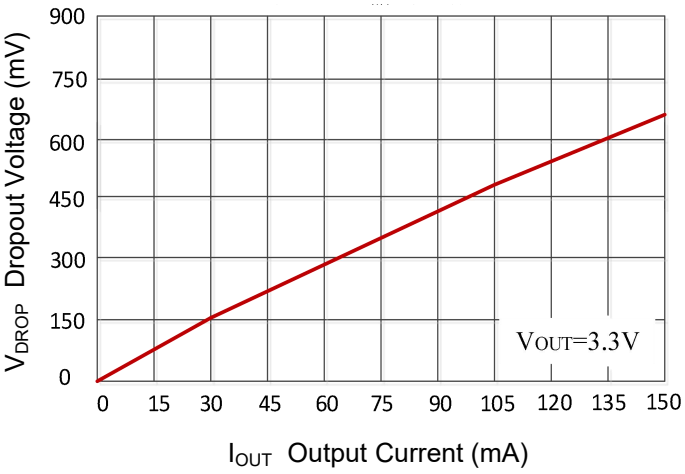
Note2: The dropout voltage is defined as V_{IN} − V_{OUT}, when V_{OUT} is 98% of the normal value of V_{OUT}.

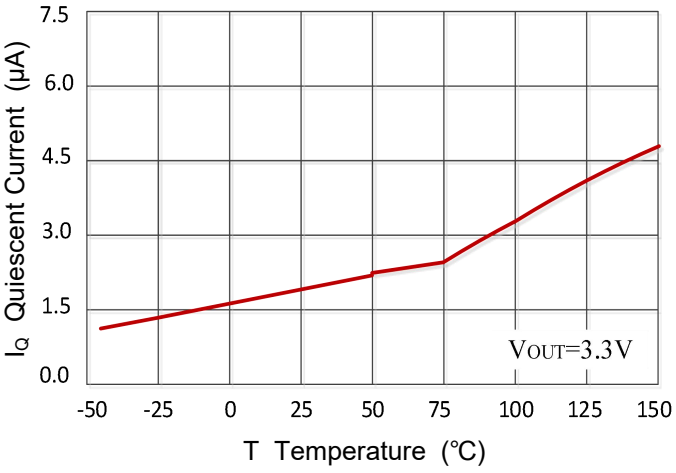
Typical Electrical Curves

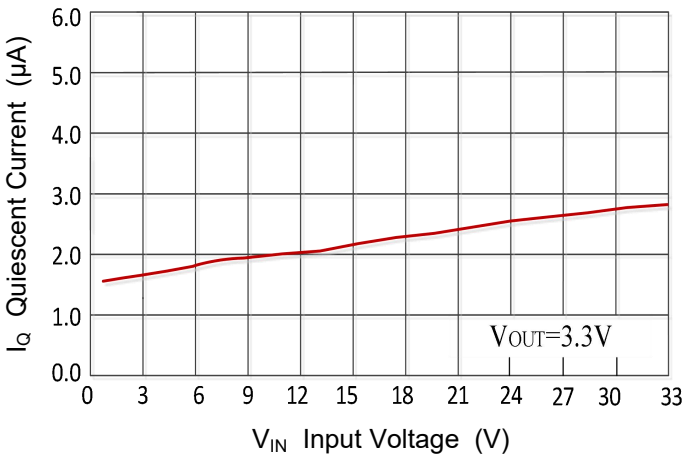
(V_{IN}=V_{OUT}+1V, C_{IN}=1μF, C_{OUT}=10μF, T_A=25℃ , unless otherwise noted.)

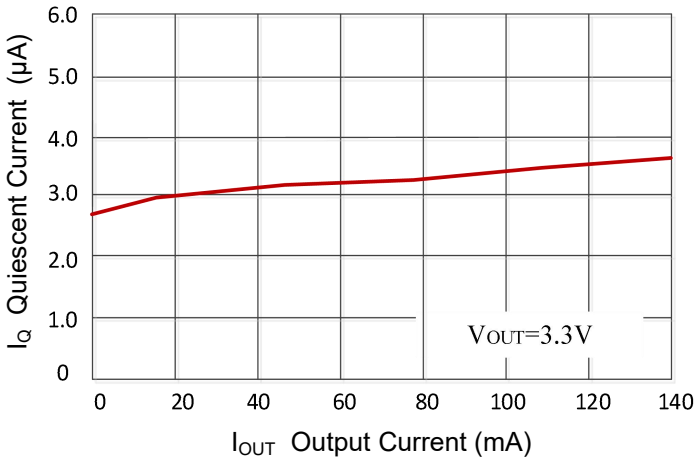




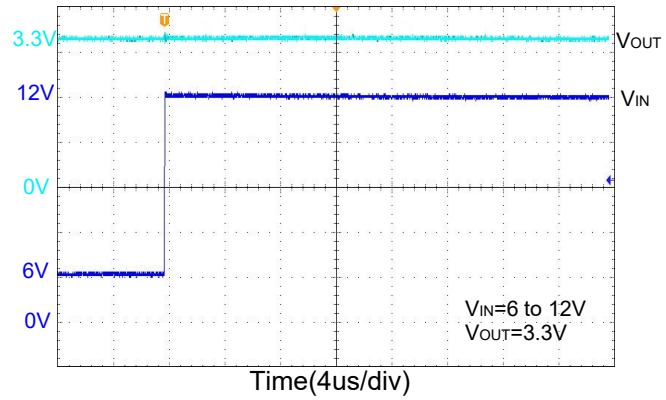






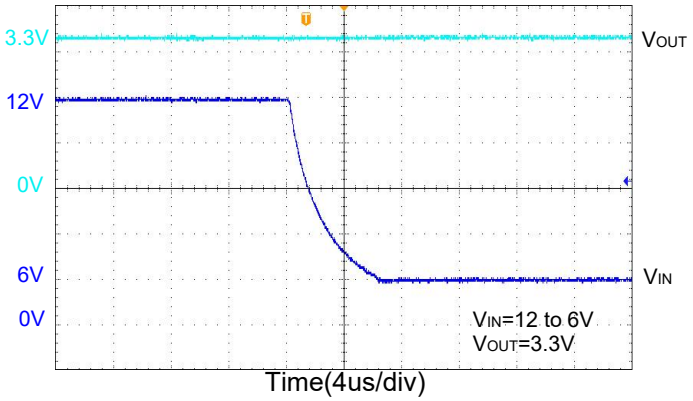


Input jump



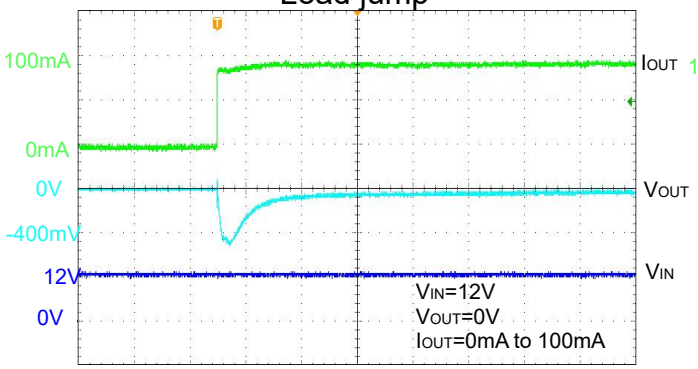
Time(4us/div)

Input jump



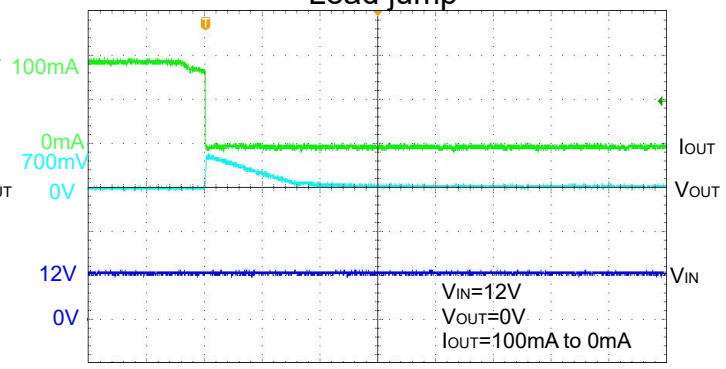
Time(4us/div)

Load jump



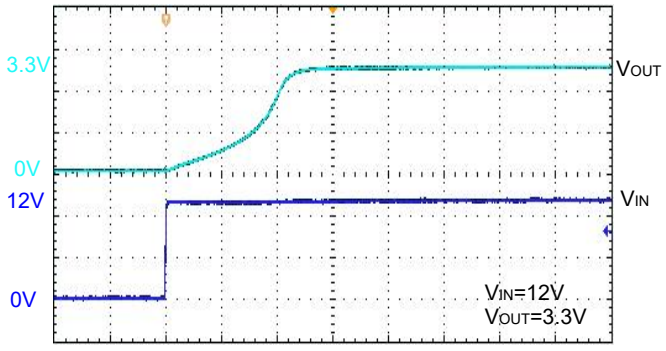
Time(200us /div)

Load jump



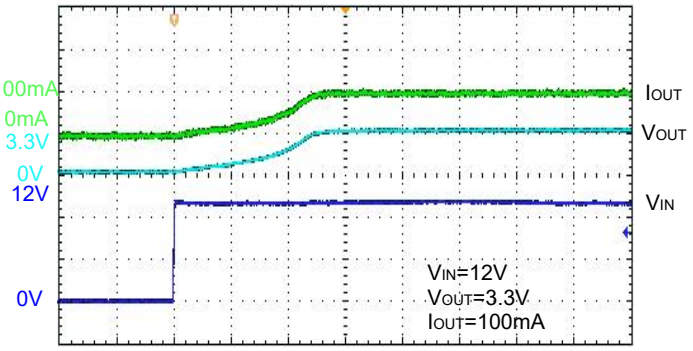
Time(200us/div)

No-load start



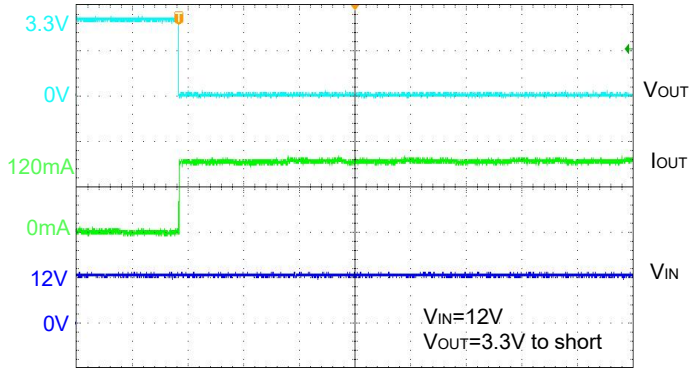
Time(40us/div)

Start with load



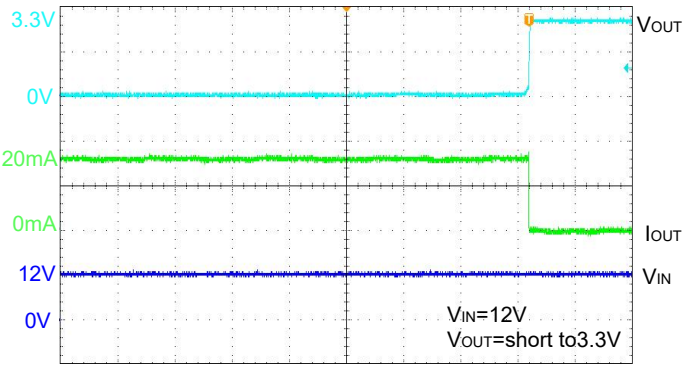
Time(40us/div)

Short-circuit Protection



Time(2ms/div)

Short-circuit Protection



Time(2ms/div)

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 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.

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 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.

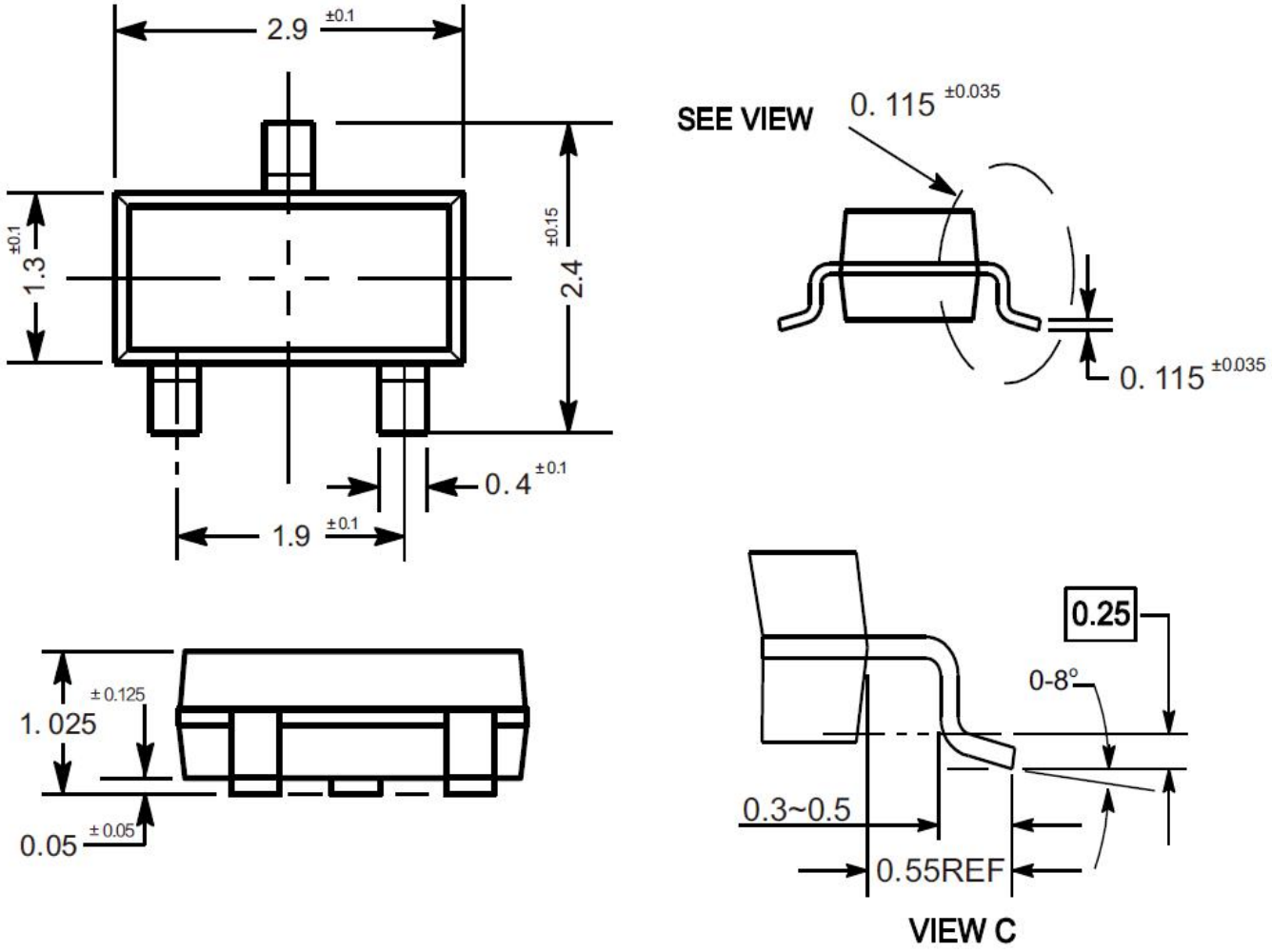
The power dissipation definition in device is:

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

Package Outline

SOT-23

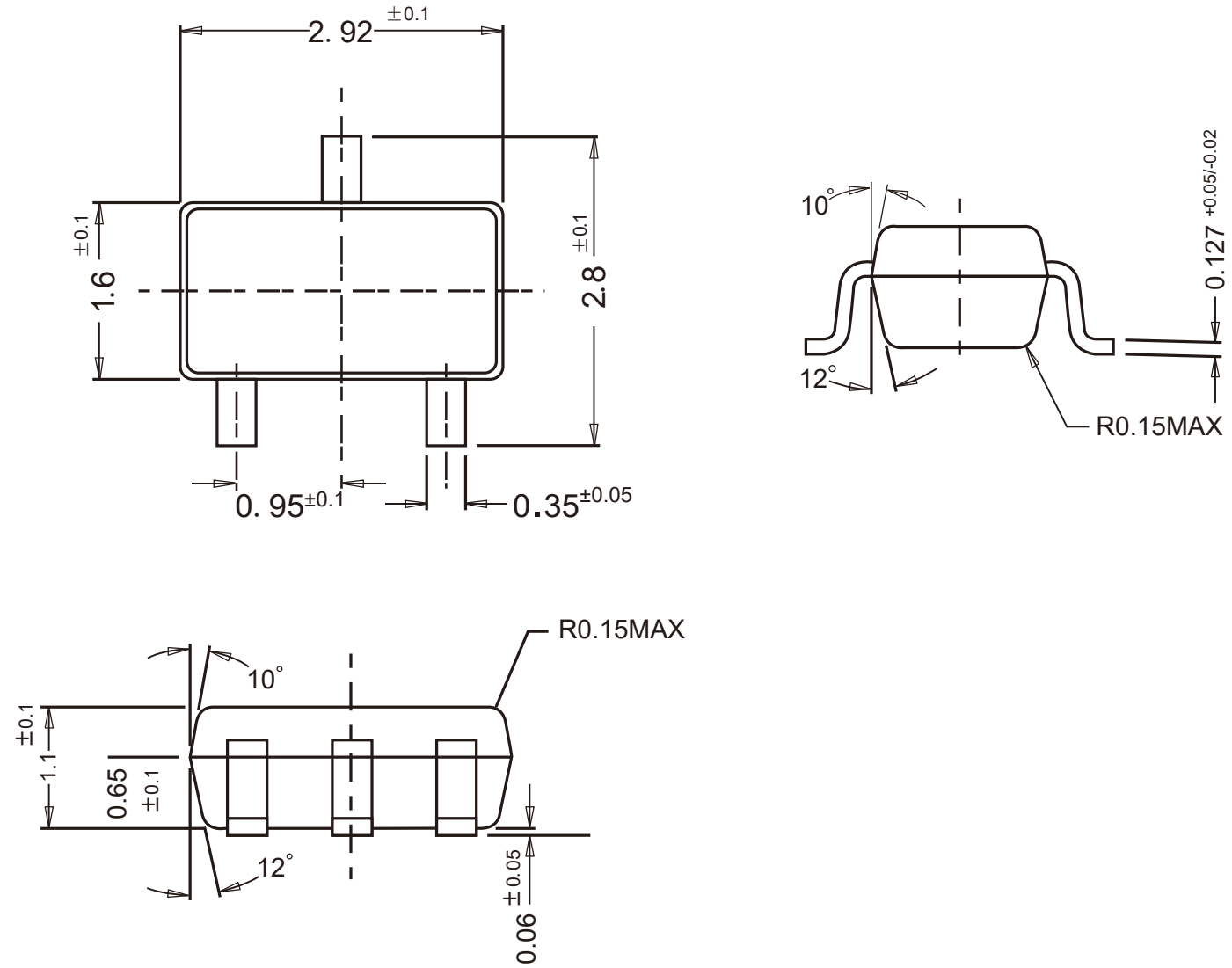
Dimensions in mm



Package Outline

SOT-23-3

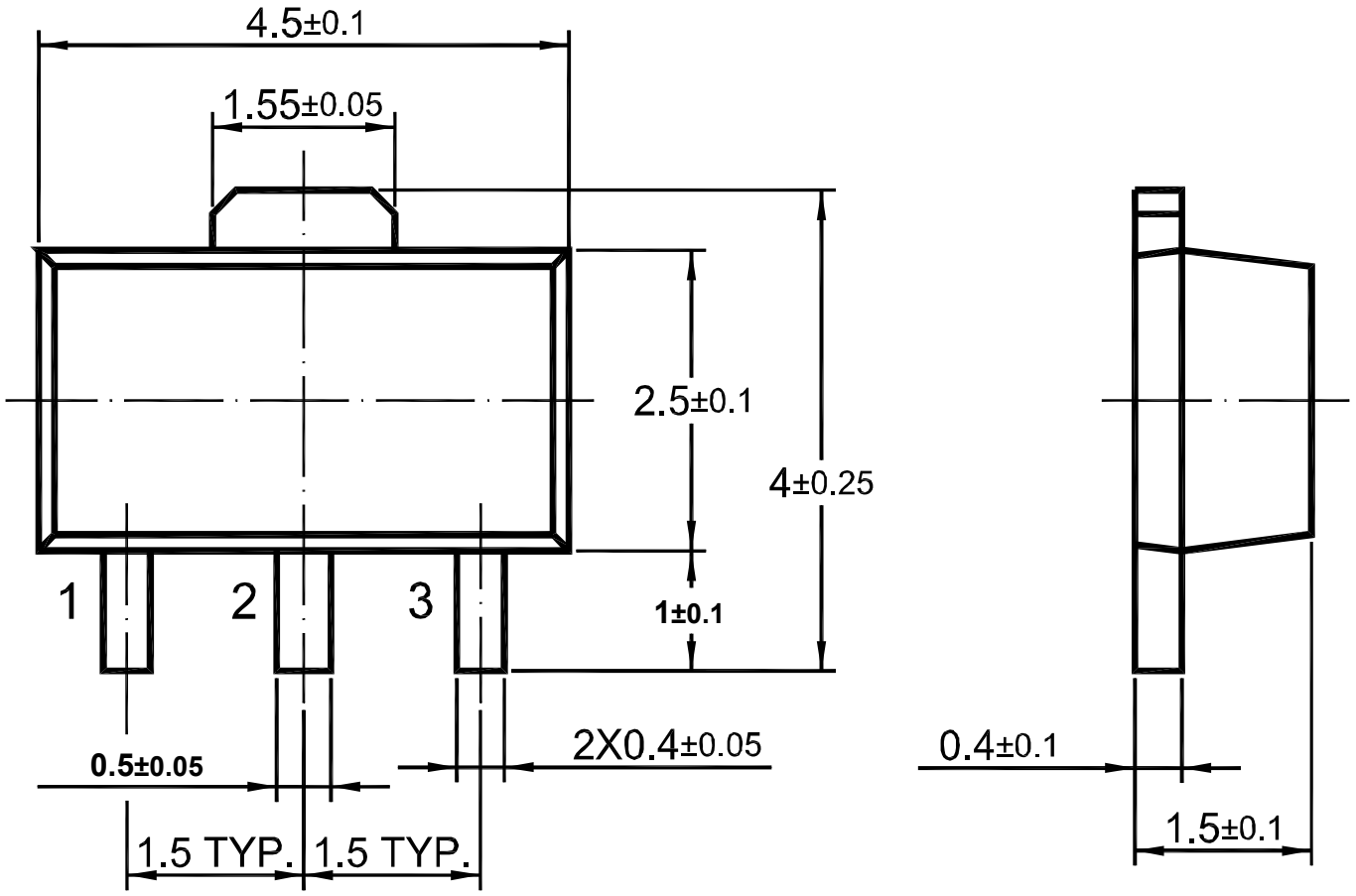
Dimensions in mm



Package Outline

SOT-89

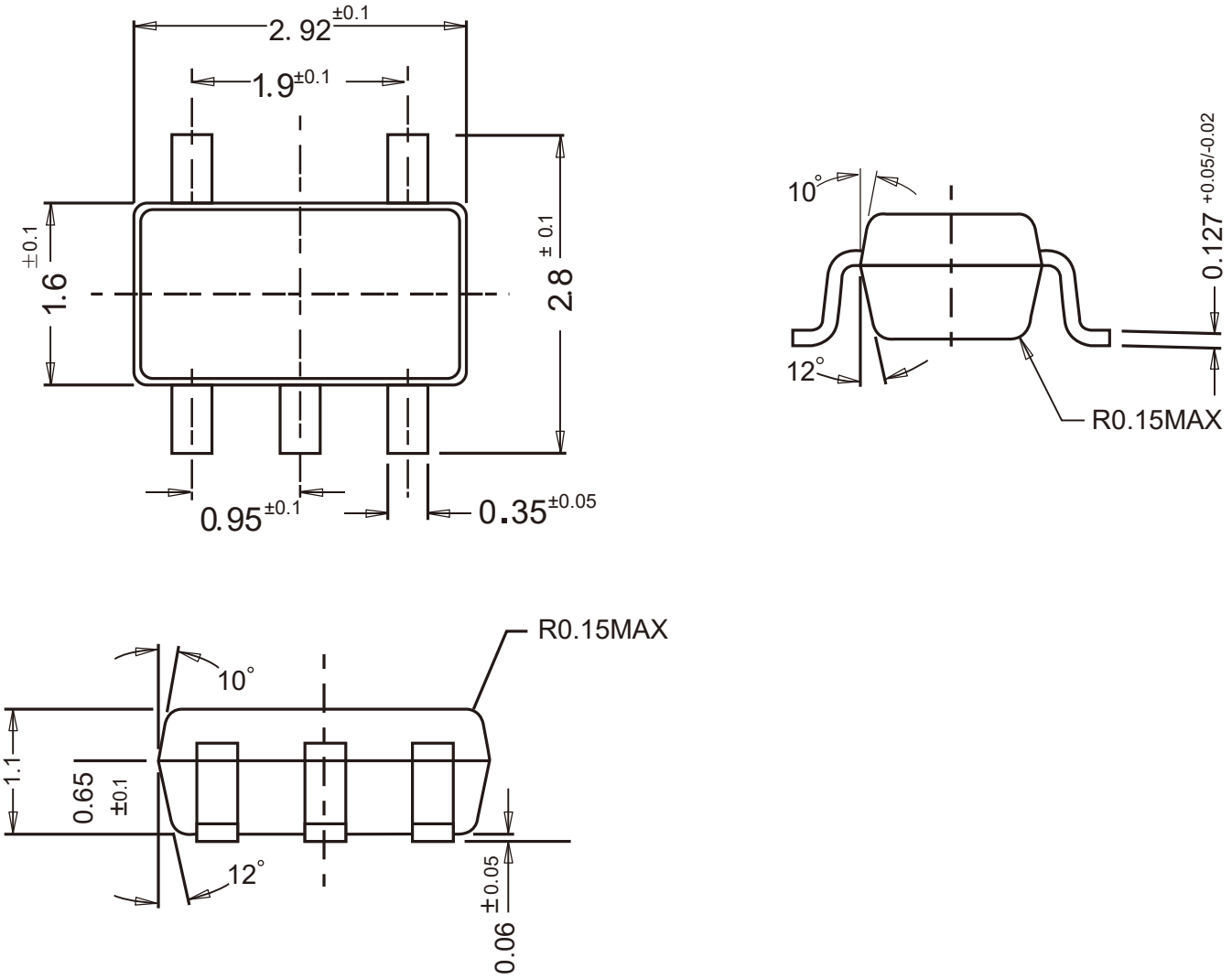
Dimensions in mm



Package Outline

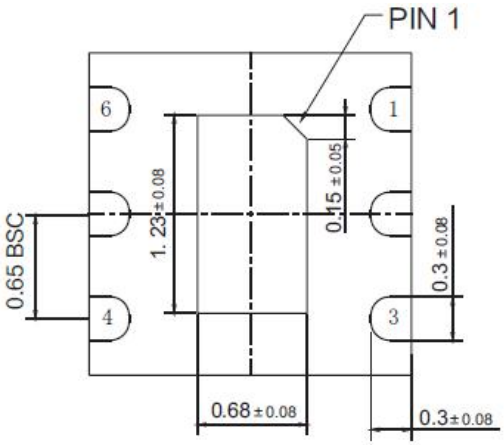
SOT-23-5

Dimensions in mm

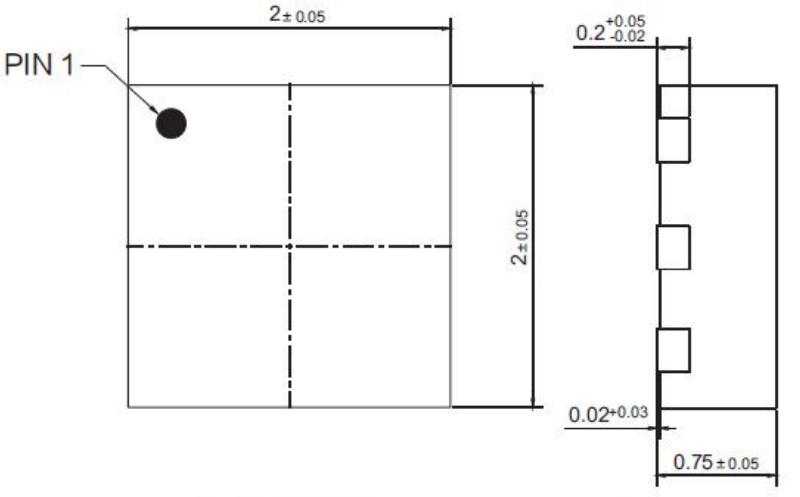


Package Outline

DFN2x2C-6L
Dimensions in mm



BOTTOM VIEW

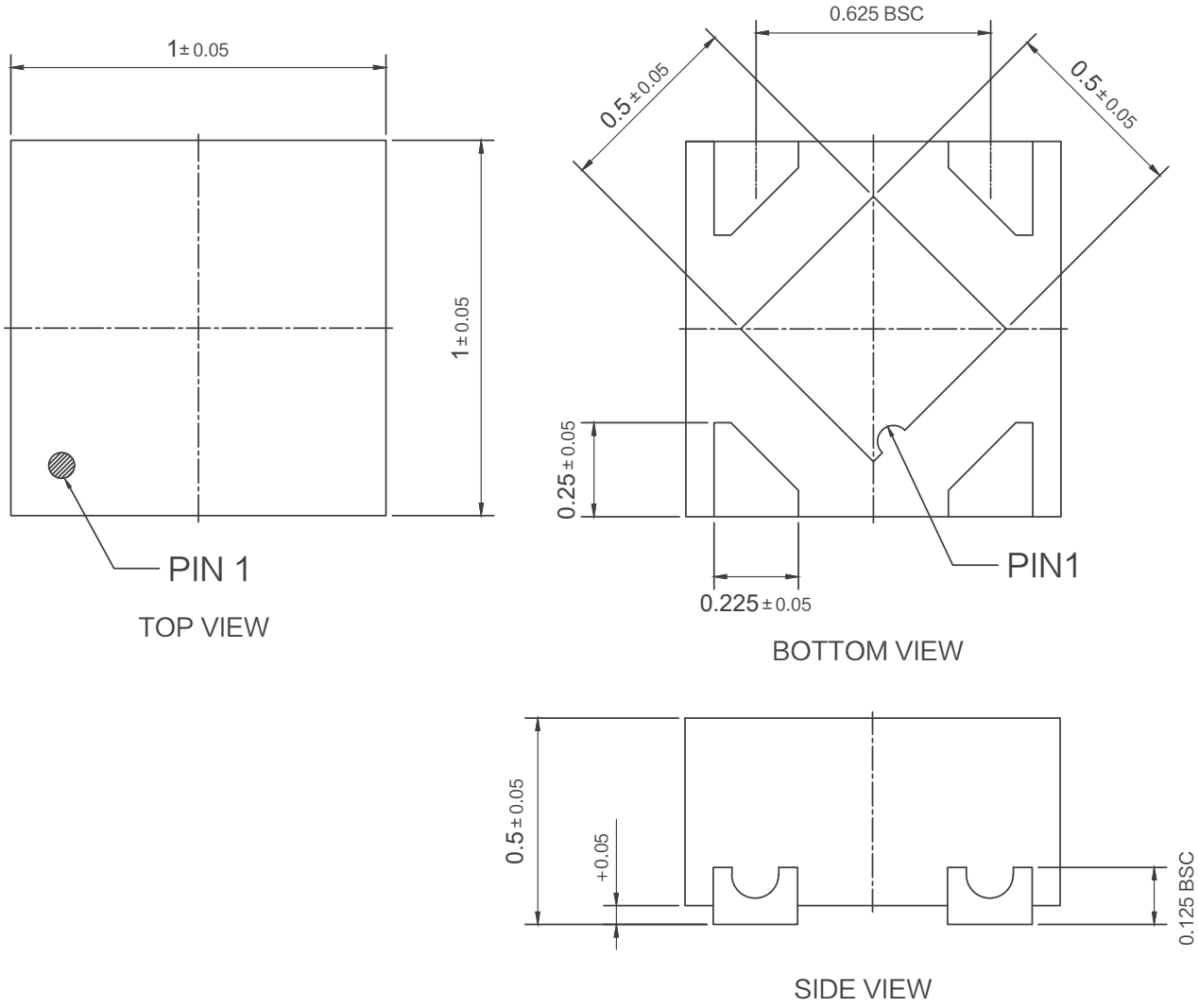


TOP VIEW SIDE VIEW

Package Outline

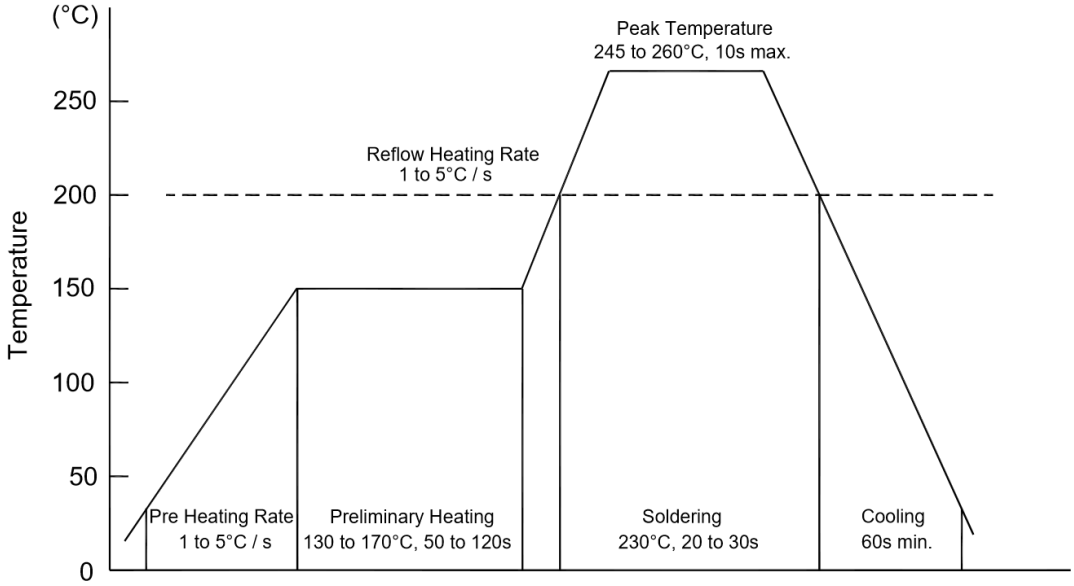
DFN1x1-4L

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

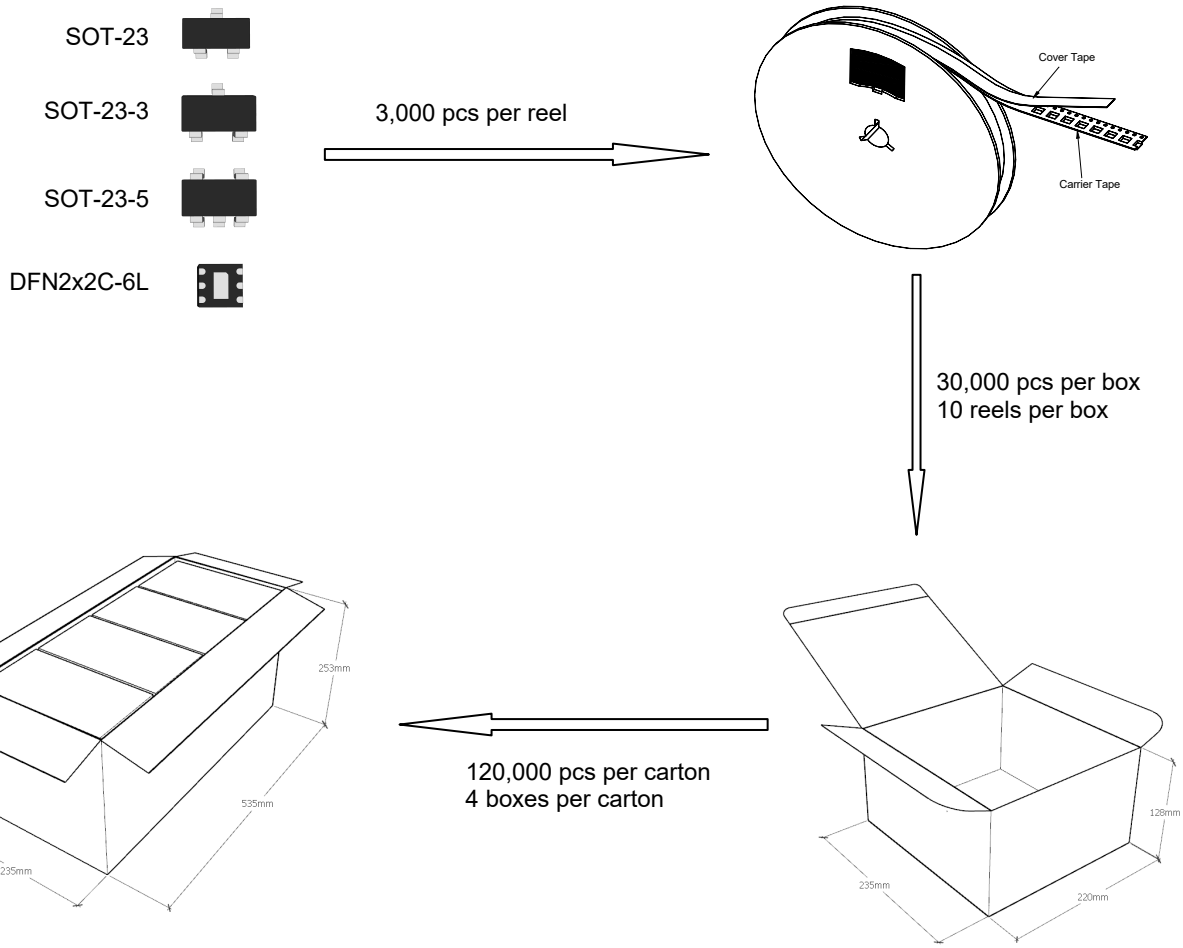
- Temperature: 300°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

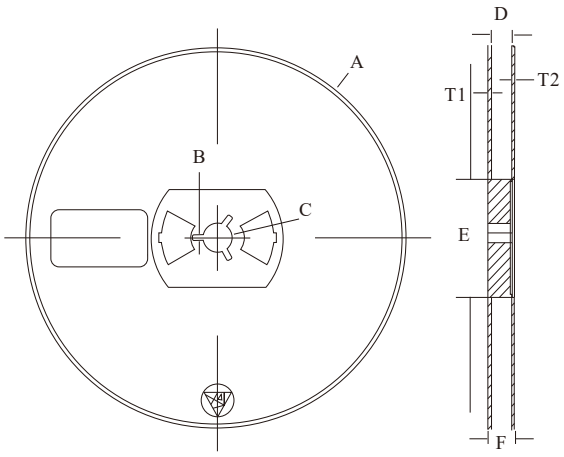
- **Temperature**
  5 to 40°C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Package Specifications (SOT-23/SOT-23-3/SOT-23-5/DFN2x2C-6L)

- The method of packaging



◆ **reel data**

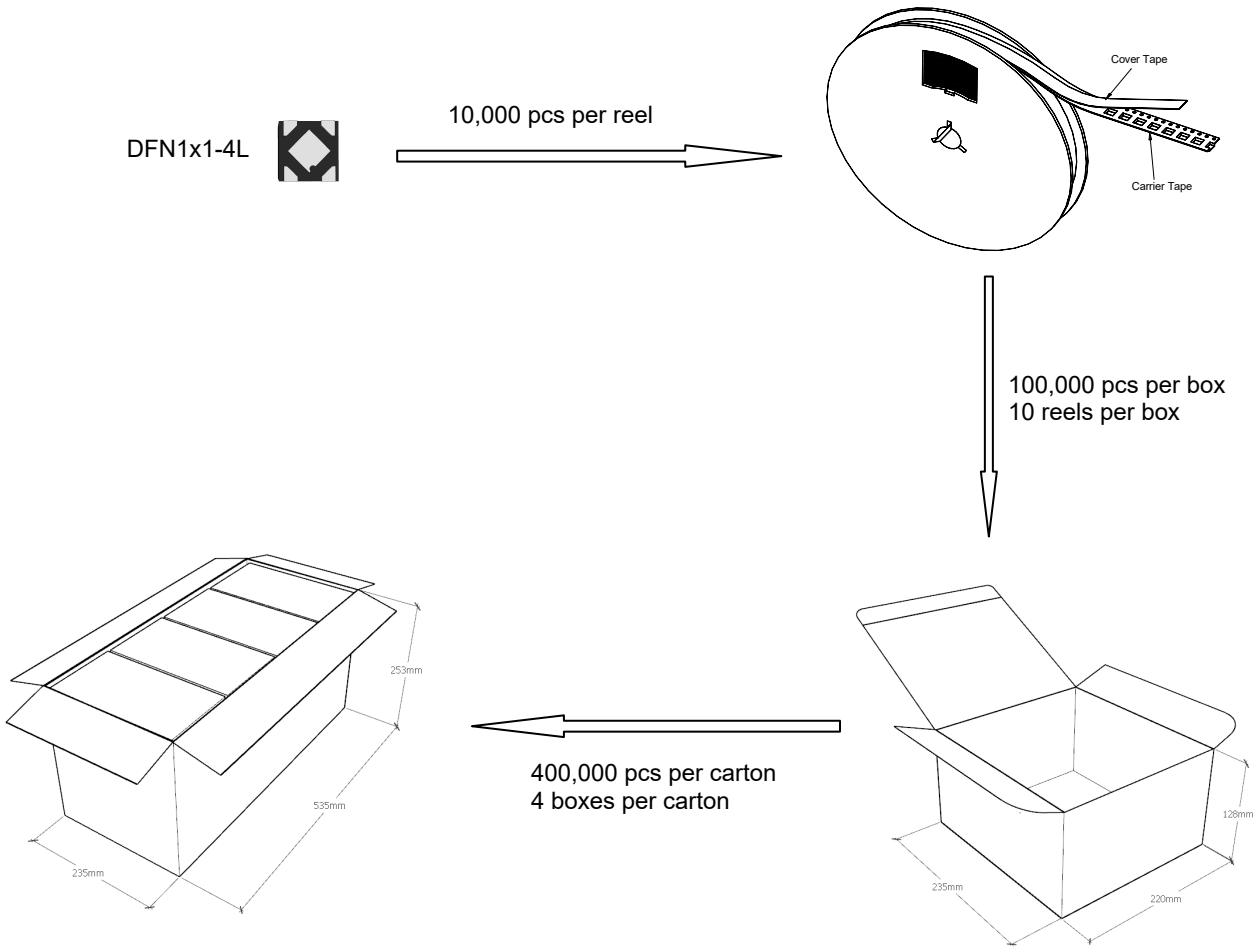


Reel (7")

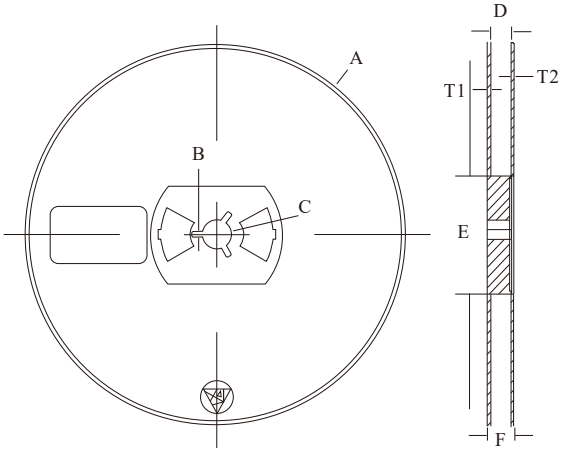
Symbol	Value (unit: mm)
A	Ø 177.8±1
B	2.7±0.2
C	Ø 13.5±0.2
E	Ø 54.5±0.2
F	12.3±0.3
D	9.6+2/-0.3
T1	1.0±0.2
T2	1.2±0.2

Package Specifications (DFN1x1-4L)

- The method of packaging



◆ **reel data**

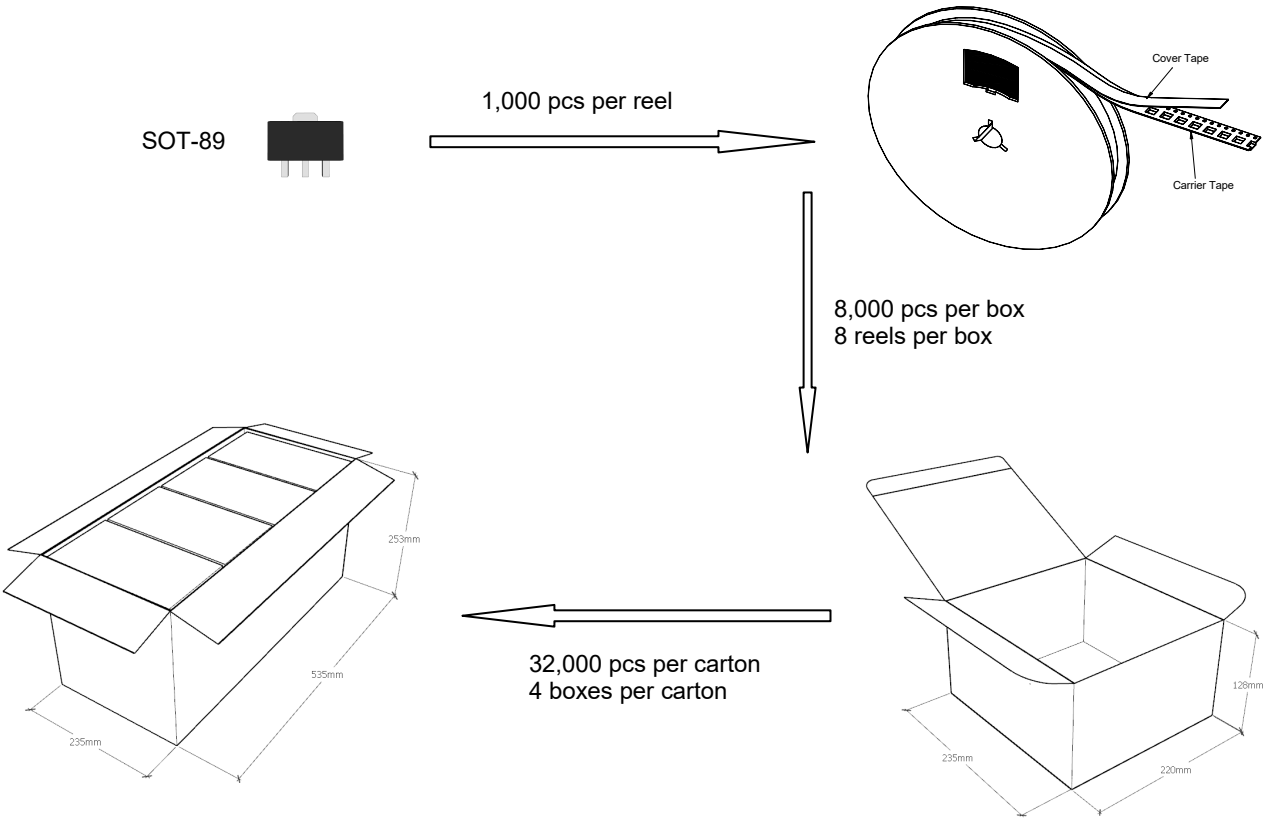


Reel (7")

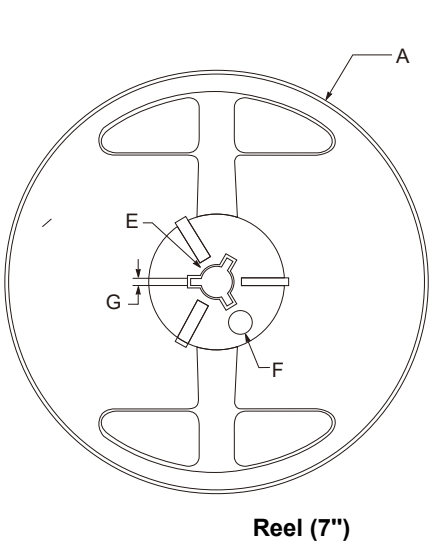
Symbol	Value (unit: mm)
A	Ø 177.8±1
B	2.7±0.2
C	Ø 13.5±0.2
E	Ø 54.5±0.2
F	12.3±0.3
D	9.6+2/-0.3
T1	1.0±0.2
T2	1.2±0.2

Package Specifications (SOT-89)

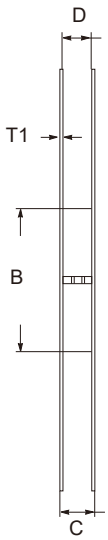
- The method of packaging (1,000PCS/Reel&7inches)



◆ **reel data**



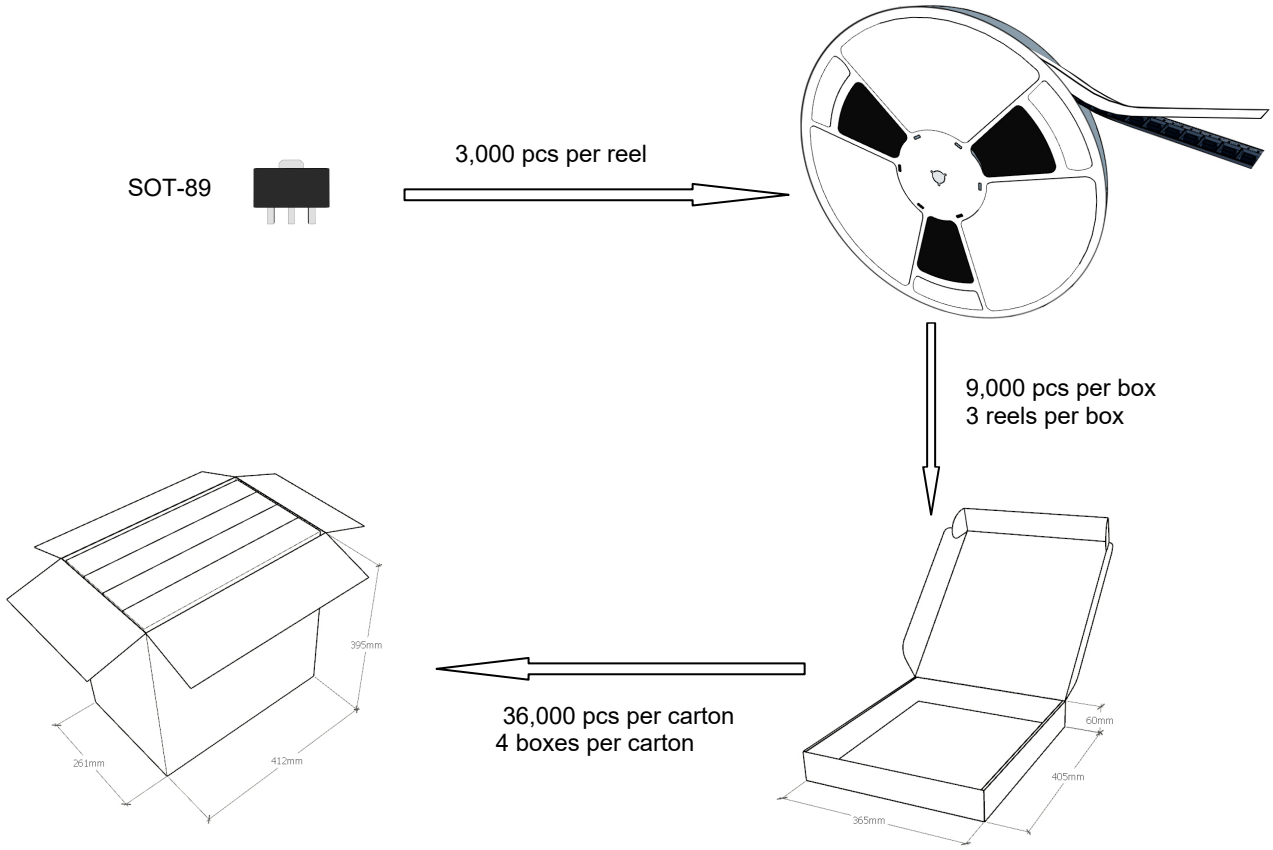
Reel (7")



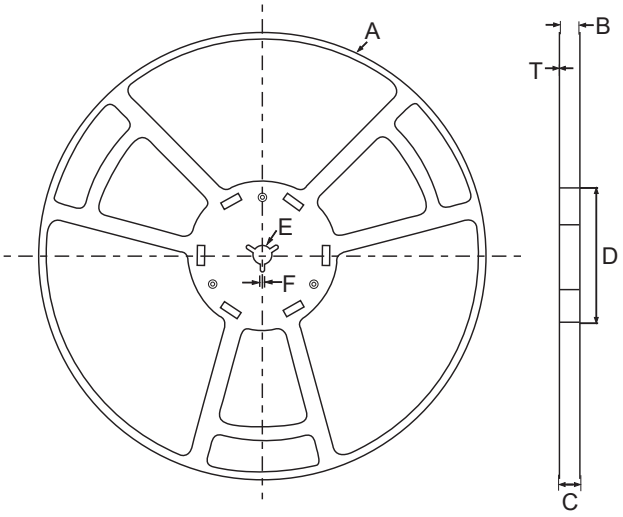
symbol	Value(unit:mm)
A	Φ179±1
B	60.5±0.2
C	15.3±0.3
D	12.5~13.7
E	Φ13.5±0.2
F	Φ10.0±0.2
G	2.7±0.2
T1	1.0±0.2

Package Specifications (SOT-89)

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



◆ **reel data**

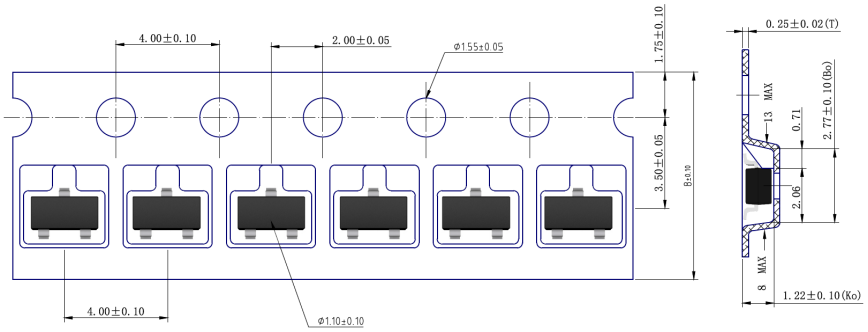


Reel (13")

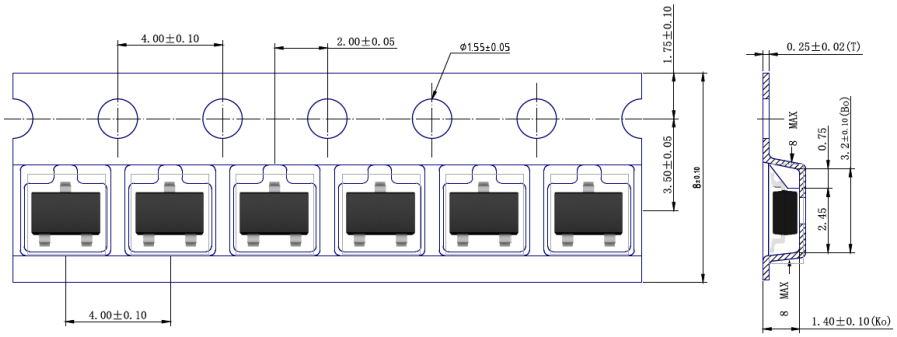
symbol	Value(unit:mm)
A	ϕ330±1
B	12.7±0.5
C	16.5±0.3
D	ϕ99.5±0.5
E	ϕ13.6±0.3
F	2.8±0.3
T	1.9±0.2

◆ Embossed tape data

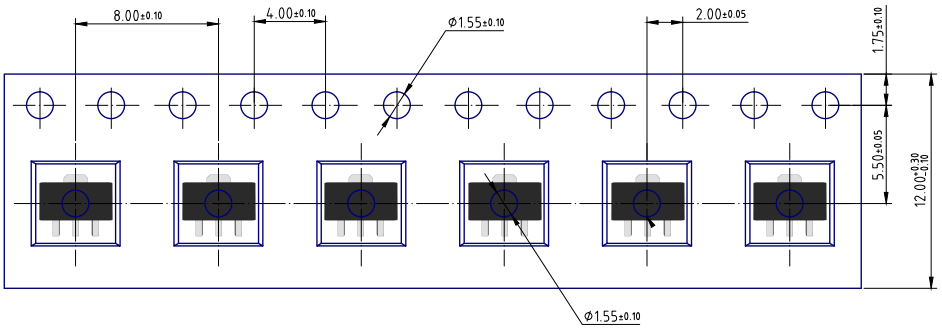
SOT-23



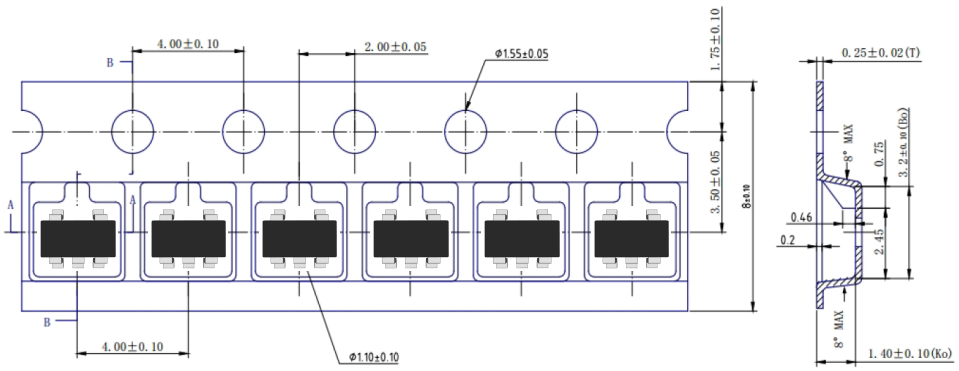
SOT-23-3



SOT-89

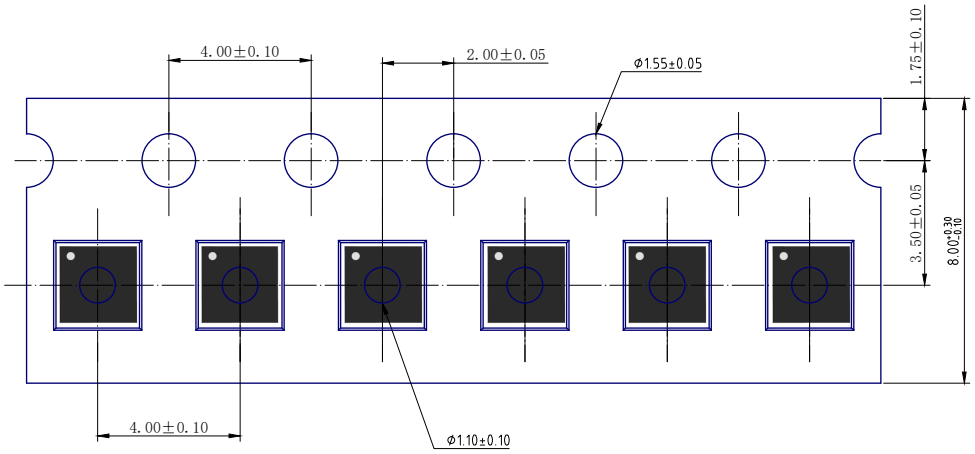


SOT-23-5



◆ **Embossed tape data**

DFN2x2C-6L



DFN1x1-4L