



# PJ73ALXXSQ Series Low Dropout Regulators

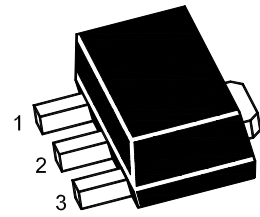
## Description

The PJ73ALXXSQ series is a set of three-terminal low power high voltage regulators implemented in CMOS technology. They allow input voltages as high as 20V. They are available with several fixed output voltages ranging from 2.1V to 9.0V. Because of the low power dissipation, PJ73ALXXSQ are widely used in a variety of equipment such as audio device, video device, communication device and so on.

## Features

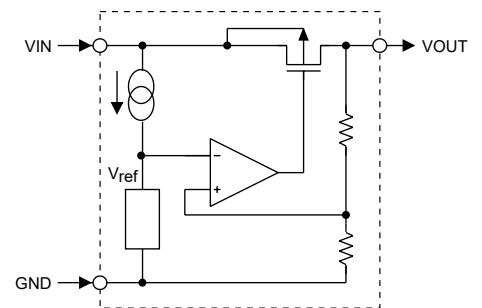
- ◆ Low power consumption
- ◆ Low voltage drop
- ◆ Low temperature coefficient
- ◆ High input voltage (up to 20V)
- ◆ Quiescent current : 1.5 $\mu$ A
- ◆ Output voltage tolerance:  $\pm$ 2%
- ◆ HAF(halogen and antimony free) is acquired

SOT-89



1.GND 2.VIN 3.VOUT

## Block Diagram



Selection Tablet PJ73ALXXSQ

Designator	Symbol	Description
XX	21	2.1V(output)
	23	2.3V
	25	2.5V
	28	2.8V
	30	3.0V
	33	3.3V
	36	3.6V
	40	4.0V
	44	4.4V
	50	5.0V
	90	9.0V



### Absolute Maximum Ratings <sup>Note1</sup>

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Limit	Unit
Supply voltage	-0.3 ~ +22	V
Storage temperature range	-50 ~ +125	°C
Operating temperature range	-40 ~ 85	°C

**Note:** 1. Stresses beyond those listed under absolute maximum ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Parameter	Symbol	Value	Unit
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	200	°C/W
Power Consumption	$P_D$	500	mW

### Electrical Characteristics

#### PJ73AL21SQ( $T_A=25^\circ\text{C}$ )

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	$V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10\text{mA}$	2.058	2.10	2.142	V
Output current	$I_{OUT}$	$V_{IN}=V_{OUT}+2.0V$	300	--	--	mA
Load regulation	$\Delta V_{OUT}$	$V_{IN}=V_{OUT}+2.0V$ $1\text{mA}\leq I_{OUT}\leq 300\text{mA}$	--	37	100	mV
Voltage drop <sup>Note2</sup>	$V_{DIF}$	$I_{OUT}=10\text{mA}$ , $\Delta V_{OUT}=2\%$	--	45	55	mV
Quiescent Current	$I_Q$	No Load	--	1.5	3.0	$\mu\text{A}$
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	$V_{OUT}+2.0V\leq V_{IN}\leq 20V$ , $I_{OUT}=1\text{mA}$	--	--	0.2	%/V
Input voltage	$V_{IN}$	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	$V_{IN}=V_{OUT}+2.0V$ , $I_{OUT}=10\text{mA}$ , $-40^\circ\text{C}\leq T_A\leq 85^\circ\text{C}$	--	100	--	ppm/°C
Short Current	$I_{Short}$	$V_{OUT}=0V$	--	400	--	mA



# PJ73ALXXSQ Series

## Low Dropout Regulators

### PJ73AL23SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	2.254	2.30	2.346	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =10mA, ΔV <sub>OUT</sub> =2%	--	40	55	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA

### PJ73AL25SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	2.45	2.50	2.55	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =10mA, ΔV <sub>OUT</sub> =2%	--	35	55	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA



# PJ73ALXXSQ Series Low Dropout Regulators

## PJ73AL28SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	2.744	2.80	2.856	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =10mA, ΔV <sub>OUT</sub> =2%	--	30	55	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA

## PJ73AL30SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	2.94	3.0	3.06	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =100mA, ΔV <sub>OUT</sub> =2%	--	210	300	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA



# PJ73ALXXSQ Series

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### PJ73AL33SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	3.234	3.30	3.366	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =100mA, ΔV <sub>OUT</sub> =2%	--	195	300	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA

### PJ73AL36SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	3.528	3.60	3.672	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =100mA, ΔV <sub>OUT</sub> =2%	--	180	300	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA



# PJ73ALXXSQ Series Low Dropout Regulators

## PJ73AL40SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	3.92	4.0	4.08	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =100mA, ΔV <sub>OUT</sub> =2%	--	170	300	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA

## PJ73AL44SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	4.312	4.4	4.488	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =100mA, ΔV <sub>OUT</sub> =2%	--	160	300	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA



# PJ73ALXXSQ Series Low Dropout Regulators

## PJ73AL50SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	4.90	5.0	5.10	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =100mA, ΔV <sub>OUT</sub> =2%	--	150	300	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA

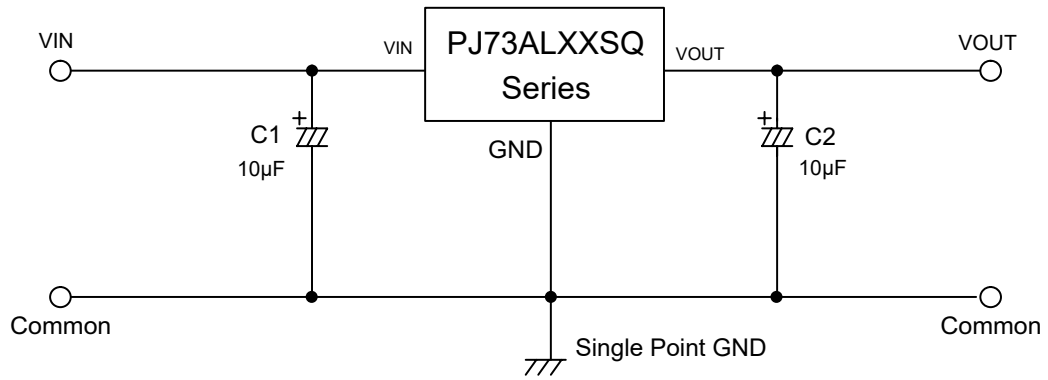
## PJ73AL90SQ(T<sub>A</sub>=25°C)

Parameter	Symbol	Test conditions	Min.	Typ.	Max	Unit
Output voltage	V <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA	8.82	9.0	9.18	V
Output current	I <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V	300	--	--	mA
Load regulation	ΔV <sub>OUT</sub>	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V 1mA≤I <sub>OUT</sub> ≤300mA	--	37	100	mV
Voltage drop <sup>Note2</sup>	V <sub>DIF</sub>	I <sub>OUT</sub> =100mA, ΔV <sub>OUT</sub> =2%	--	130	300	mV
Quiescent Current	I <sub>Q</sub>	No Load	--	1.5	3.0	μA
Line regulation	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta V_{IN}$	V <sub>OUT</sub> +2.0V≤V <sub>IN</sub> ≤20V, I <sub>OUT</sub> =1mA	--	--	0.2	%/V
Input voltage	V <sub>IN</sub>	--	--	--	20	V
Temperature coefficient	$\frac{\Delta V_{OUT}}{V_{OUT}} \times \Delta T_A$	V <sub>IN</sub> =V <sub>OUT</sub> +2.0V, I <sub>OUT</sub> =10mA, -40°C≤T <sub>A</sub> ≤85°C	--	100	--	ppm/°C
Short Current	I <sub>Short</sub>	V <sub>OUT</sub> =0V	--	400	--	mA

**Note:** 2.The difference of input voltage and output voltage when input voltage falls down gradually till output voltage equals to 98% of rating V<sub>OUT</sub>.



## Basic Circuits



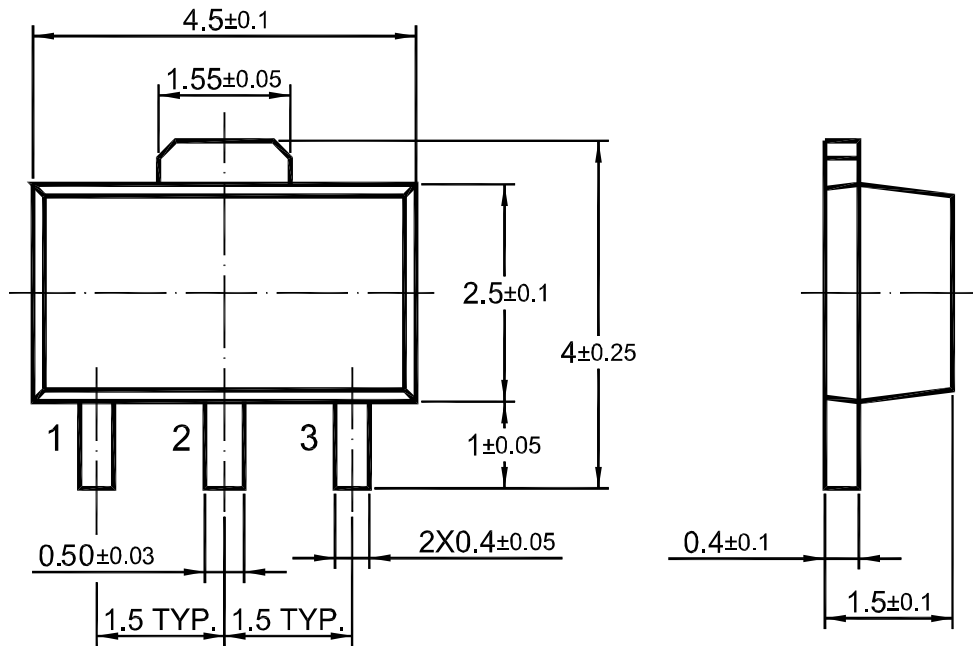




### Package Outline

SOT-89

Dimensions in mm



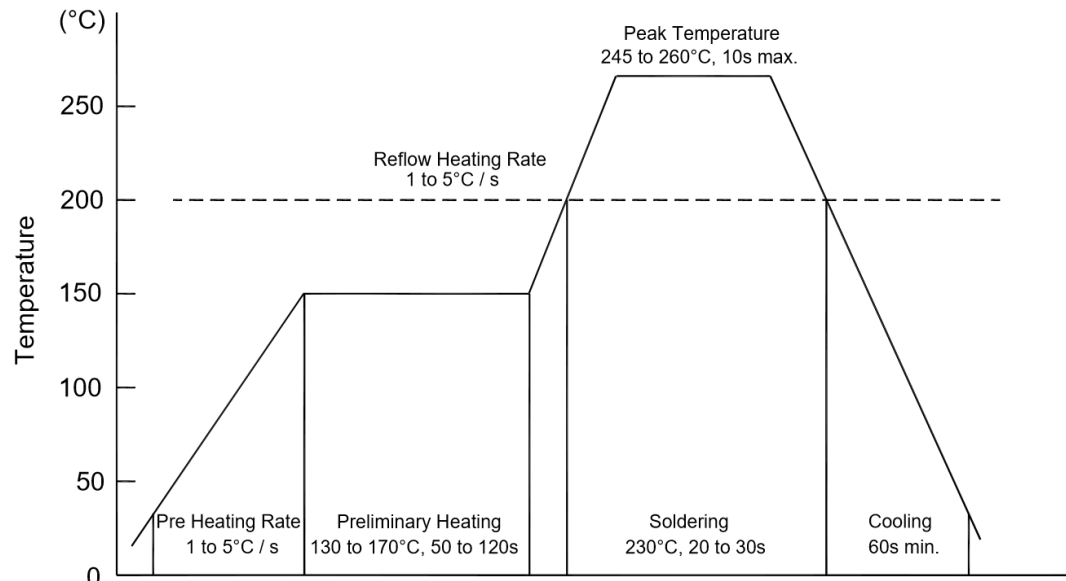
### Ordering Information

Device	Package	Shipping
PJ73ALXXSQ	SOT-89	1000PCS/Reel&Tape



## Conditions of Soldering

### ◆ 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: 370 °C
- Time: 3s max.
- Times: one time

### ◆ Storage conditions

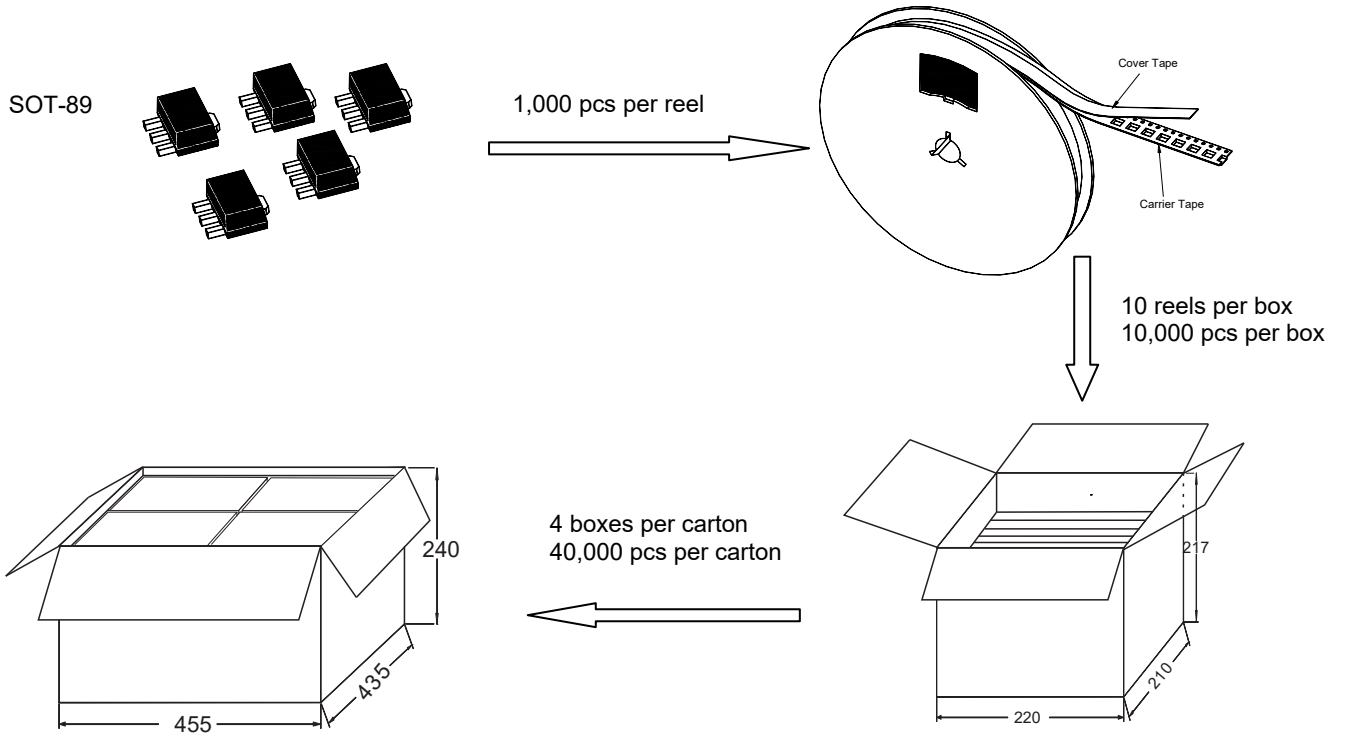
- **Temperature**  
5 to 40 °C
- **Humidity**  
30 to 80% RH
- **Recommended period**  
One year after manufacturing



# PJ73ALXXSQ Series Low Dropout Regulators

## Package Specification

The method of packaging and dimension are shown as below figure.



## Tape and reel data (Units: mm)

