Description

The PJ78SxxSQ series of fixed voltage monolithic integrated circuit voltage three-terminal positive regulators are suitable for applications that required supply up to 200mA.

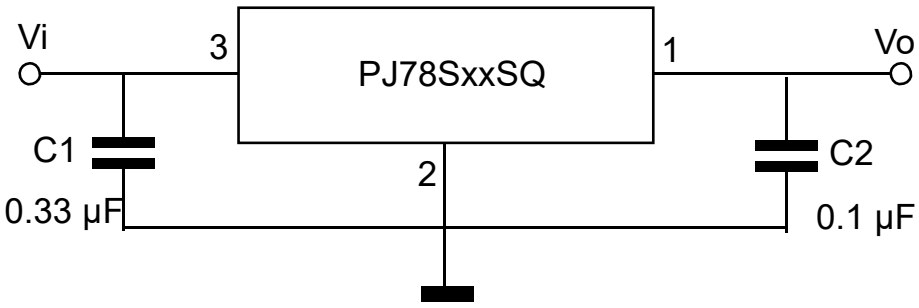
Features

- Input voltage:up to 30V
- Output voltage:3.3V,5V,6V,8V,9V,10V,12V,15V
- Output current up to 200 mA
- Thermal overload protection
- Short circuit current limiting

Applications

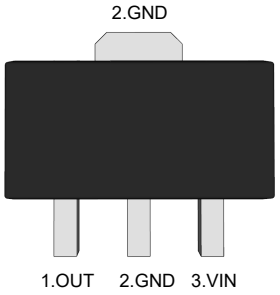
- TV Board
- Air Conditioner
- Charging Device

Typical Application Circuit



Pin Distribution

SOT-89



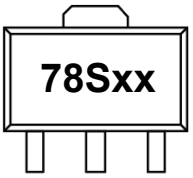
Ordering Information

PJ78 □□□□

Package Type
SQ:SOT-89

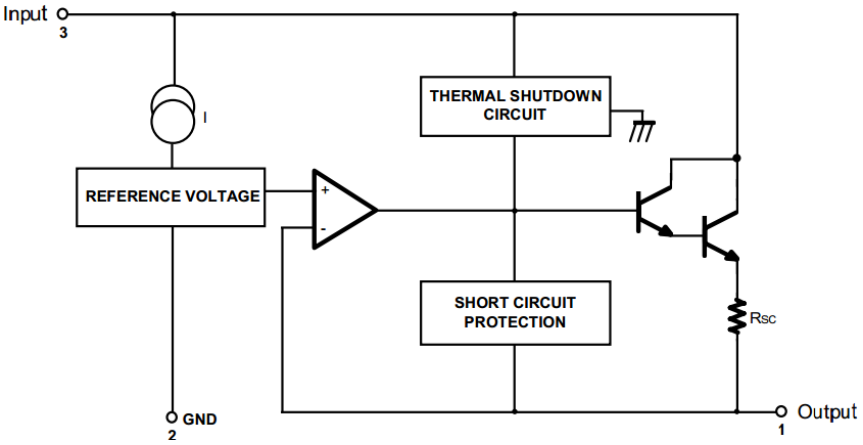
Output Voltage
33 : 3.3V 05 : 5V 06 : 6V
08 : 8V 09 : 9V 10 : 10V
12 : 12V 15 : 15V

Output current tap
S : 200mA

Orderable Device	Package	Reel (inch)	Package Qty (PCS)	Eco Plan Note	MSL Level	Marking Code
PJ78S33SQ	SOT-89	7/13	1000/3000	RoHS & Green	MSL1	
PJ78S05SQ						
PJ78S06SQ						
PJ78S08SQ						
PJ78S09SQ						
PJ78S10SQ						
PJ78S12SQ						
PJ78S15SQ						

78Sxx: Product Code
e.g. PJ78S33SQ: 78S33

Function Block Diagram



Absolute Maximum Ratings

Ratings at 25℃ ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Input Voltage	V_I	30	V
Output Current	I_O	200	mA
Maximum Power Dissipation	P_D	600	mW
Junction Temperature	T_J	125	°C
Operating Temperature Range	T_{OPR}	-40 to +120	°C
Storage Temperature Range	T_{STG}	-40 to +150	°C

PJ78S33SQ Electrical Characteristics

V_I=8.3V, I_O=80mA, 0℃≤ T_J≤125℃, C_I=0.33μF,C_O=0.1μF,unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=25°C	3.168	3.3	3.432	V
		I_O=1mA to 80mA, V_I=5.3V to 20V	3.135	--	3.465	V
		I_O=1mA to 140mA	3.135	--	3.465	V
Line Regulation	$\triangle V_O$	V_I=5.3V to 20V, T_J=25°C	--	7	150	mV
		V_I=6.3V to 20V, T_J=25°C	--	4	100	mV
Load Regulation	$\triangle V_O$	I_O=1mA to 200mA, T_J=25°C	--	10	60	mV
		I_O=1mA to 80mA, T_J=25°C	--	7	30	mV
Ripple Rejection	RR	V_I=6.3V to 16.3V, f=120Hz, T_J=25°C	40	49	--	dB
Dropout Voltage	V_D		--	1.7	--	V
Quiescent Current	I_Q	T_J=25°C	--	2.0	5.5	mA
Quiescent Current Change	$\triangle I_Q$	V_I=6.3V to 20V	--	--	1.5	mA
		I_O=1mA to 80mA	--	--	0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz,T_J=25°C	--	40	--	μV

PJ78S05SQ Electrical Characteristics

V_I=10V, I_O=80mA, 0℃≤ T_J≤125℃, C_I=0.33μF,C_O=0.1μF,unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=25°C	4.8	5.0	5.2	V
		I_O=1mA to 80mA, V_I=7V to 20V	4.75	--	5.25	V
		I_O=1mA to 140mA	4.75	--	5.25	V
Line Regulation	$\triangle V_O$	V_I=7V to 20V, T_J=25°C	--	15	150	mV
		V_I=8V to 20V, T_J=25°C	--	10	100	mV
Load Regulation	$\triangle V_O$	I_O=1mA to 200mA, T_J=25°C	--	10	60	mV
		I_O=1mA to 80mA, T_J=25°C	--	5	30	mV
Ripple Rejection	RR	V_I=8V to 18V, f=120Hz, T_J=25°C	40	49	--	dB
Dropout Voltage	V_D		--	1.7	--	V
Quiescent Current	I_Q	T_J=25°C	--	2.0	5.5	mA
Quiescent Current Change	$\triangle I_Q$	V_I=8V to 20V	--	--	1.5	mA
		I_O=1mA to 80mA	--	--	0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz,T_J=25°C	--	40	--	μV

PJ78S06SQ Electrical Characteristics

V_I=12V, I_O=80mA, 0℃≤ T_J≤125℃, C_I=0.33μF,C_O=0.1μF,unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=25°C	5.75	6.0	6.25	V
		I_O=1mA to 80mA, V_I=8.5V to 20V	5.7	--	6.3	V
		I_O=1mA to 140mA	5.7	--	6.3	V
Line Regulation	$\triangle V_O$	V_I=8.5V to 20V, T_J=25°C	--	12	150	mV
		V_I=9V to 20V, T_J=25°C	--	6	100	mV
Load Regulation	$\triangle V_O$	I_O=1mA to 200mA, T_J=25°C	--	18	60	mV
		I_O=1mA to 80mA, T_J=25°C	--	12	30	mV
Ripple Rejection	RR	V_I=9V to 20V, f=120Hz, T_J=25°C	38	46	--	dB
Dropout Voltage	V_D		--	1.7	--	V
Quiescent Current	I_Q	T_J=25°C	--	2.0	5.5	mA
Quiescent Current Change	$\triangle I_Q$	V_I=9V to 20V	--	--	1.5	mA
		I_O=1mA to 80mA	--	--	0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz,T_J=25°C	--	50	--	μV

PJ78S08SQ Electrical Characteristics

V_I=14V, I_O=80mA, 0℃≤ T_J≤125℃, C_I=0.33μF,C_O=0.1μF,unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=25°C	7.7	8.0	8.3	V
		I_O=1mA to 80mA, V_I=10.5V to 23V	7.6	--	8.4	V
		I_O=1mA to 140mA	7.6	--	8.4	V
Line Regulation	$\triangle V_O$	V_I=10.5V to 23V, T_J=25°C	--	16	175	mV
		V_I=11V to 23V, T_J=25°C	--	8	125	mV
Load Regulation	$\triangle V_O$	I_O=1mA to 200mA, T_J=25°C	--	24	80	mV
		I_O=1mA to 80mA, T_J=25°C	--	16	40	mV
Ripple Rejection	RR	V_I=12V to 23V, f=120Hz, T_J=25°C	36	45	--	dB
Dropout Voltage	V_D		--	1.7	--	V
Quiescent Current	I_Q	T_J=25°C	--	2.0	5.5	mA
Quiescent Current Change	$\triangle I_Q$	V_I=11V to 23V	--	--	1.5	mA
		I_O=1mA to 80mA	--	--	0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz,T_J=25°C	--	60	--	μV

PJ78S09SQ Electrical Characteristics

V_I=15V, I_O=80mA, 0℃≤ T_J≤125℃, C_I=0.33μF,C_O=0.1μF,unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=25°C	8.64	9.0	9.36	V
		I_O=1mA to 80mA, V_I=11.5V to 23V	8.55	--	9.45	V
		I_O=1mA to 140mA	8.55	--	9.45	V
Line Regulation	$\triangle V_O$	V_I=11.5V to 23V, T_J=25°C	--	18	225	mV
		V_I=12V to 23V, T_J=25°C	--	9	150	mV
Load Regulation	$\triangle V_O$	I_O=1mA to 200mA, T_J=25°C	--	27	80	mV
		I_O=1mA to 80mA, T_J=25°C	--	18	40	mV
Ripple Rejection	RR	V_I=12V to 23V, f=120Hz, T_J=25°C	36	44	--	dB
Dropout Voltage	V_D		--	1.7	--	V
Quiescent Current	I_Q	T_J=25°C	--	2.0	5.5	mA
Quiescent Current Change	$\triangle I_Q$	V_I=12V to 23V	--	--	1.5	mA
		I_O=1mA to 80mA	--	--	0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz,T_J=25°C	--	70	--	μV

PJ78S10SQ Electrical Characteristics

V_I=16V, I_O=80mA, 0℃≤ T_J≤125℃, C_I=0.33μF,C_O=0.1μF,unless otherwise specified.

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=25°C	9.6	10	10.4	V
		I_O=1mA to 80mA, V_I=12.5V to 23V	9.5	--	10.5	V
		I_O=1mA to 140mA	9.5	--	10.5	V
Line Regulation	$\triangle V_O$	V_I=12.5V to 23V, T_J=25°C	--	20	230	mV
		V_I=13V to 23V, T_J=25°C	--	10	170	mV
Load Regulation	$\triangle V_O$	I_O=1mA to 200mA, T_J=25°C	--	30	90	mV
		I_O=1mA to 80mA, T_J=25°C	--	20	45	mV
Ripple Rejection	RR	V_I=14V to 23V, f=120Hz, T_J=25°C	36	45	--	dB
Dropout Voltage	V_D		--	1.7	--	V
Quiescent Current	I_Q	T_J=25°C	--	2.0	5.5	mA
Quiescent Current Change	$\triangle I_Q$	V_I=13V to 23V	--	--	1.5	mA
		I_O=1mA to 80mA	--	--	0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz,T_J=25°C	--	60	--	μV

PJ78S12SQ Electrical Characteristics

V_I=19V, I_O=80mA,0℃≤ T_J≤125℃, C_I=0.33μF,C_O=0.1μF,unless otherwise specified.

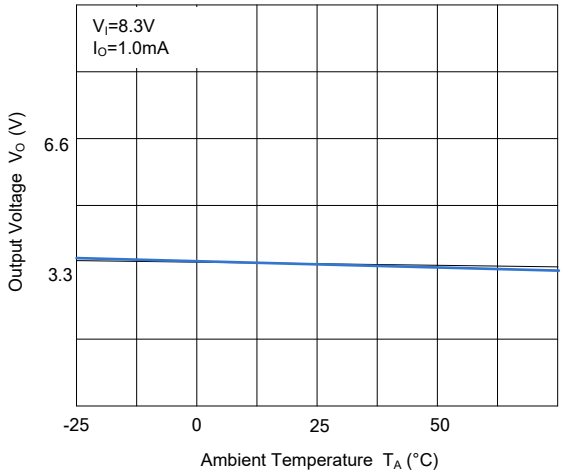
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=25°C	11.5	12	12.6	V
		I_O=1mA to 80mA, V_I=14.5V to 27V	11.4	--	12.6	V
		I_O=1mA to 140mA	11.4	--	12.6	V
Line Regulation	$\triangle V_O$	V_I=14.5V to 27V, T_J=25°C	--	24	250	mV
		V_I=16V to 27V, T_J=25°C	--	12	200	mV
Load Regulation	$\triangle V_O$	I_O=1mA to 200mA, T_J=25°C	--	36	240	mV
		I_O=1mA to 80mA, T_J=25°C	--	24	120	mV
Ripple Rejection	RR	V_I=15V to 25V, f=120Hz, T_J=25°C	36	42	--	dB
Dropout Voltage	V_D		--	1.7	--	V
Quiescent Current	I_Q	T_J=25°C	--	2.0	5.5	mA
Quiescent Current Change	$\triangle I_Q$	V_I=16V to 27V	--	--	1.5	mA
		I_O=1mA to 80mA	--	--	0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz,T_J=25°C	--	80	--	μV

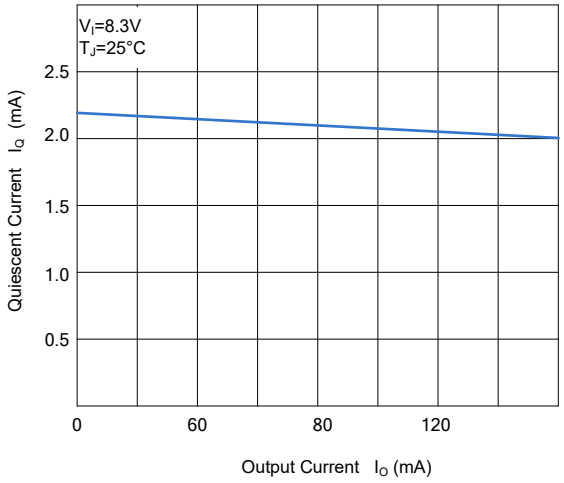
PJ78S15SQ Electrical Characteristics

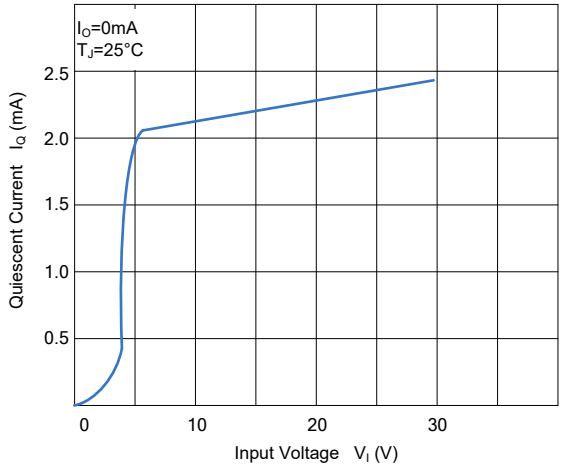
V_I=21V, I_O=80mA,0℃≤ T_J≤125℃, C_I=0.33μF,C_O=0.1μF,unless otherwise specified.

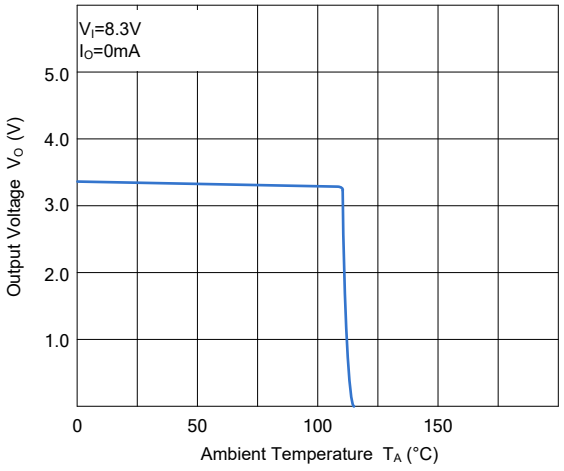
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage	V_O	T_J=25°C	14.4	15	15.6	V
		I_O=1mA to 80mA, V_I=17.5V to 30V	14.25	--	15.75	V
		I_O=1mA to 140mA	14.25	--	15.75	V
Line Regulation	$\triangle V_O$	V_I=17.5V to 30V, T_J=25°C	--	30	300	mV
		V_I=20V to 30V, T_J=25°C	--	15	250	mV
Load Regulation	$\triangle V_O$	I_O=1mA to 200mA, T_J=25°C	--	45	150	mV
		I_O=1mA to 80mA, T_J=25°C	--	30	75	mV
Ripple Rejection	RR	V_I=18.5V to 28.5V, f=120Hz, T_J=25°C	33	39	--	dB
Dropout Voltage	V_D		--	1.7	--	V
Quiescent Current	I_Q	T_J=25°C	--	2.2	6.0	mA
Quiescent Current Change	$\triangle I_Q$	V_I=20V to 30V	--	--	1.5	mA
		I_O=1mA to 80mA	--	--	0.1	mA
Output Noise Voltage	V_N	10Hz≤f≤100kHz,T_J=25°C	--	90	--	μV

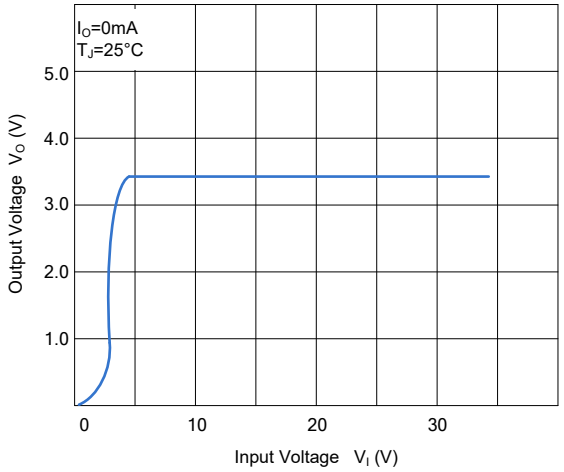
Typical Characteristic Curves(PJ78S33SQ)

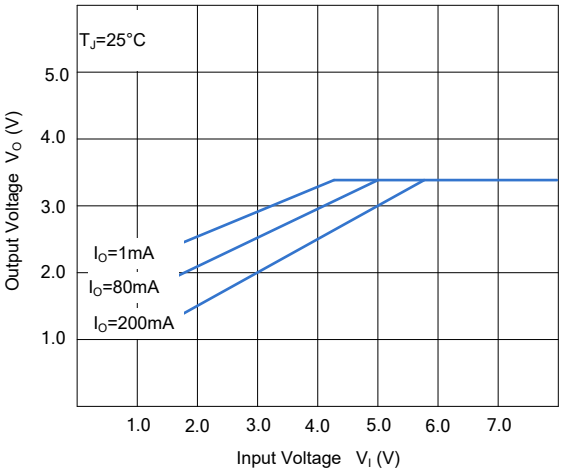








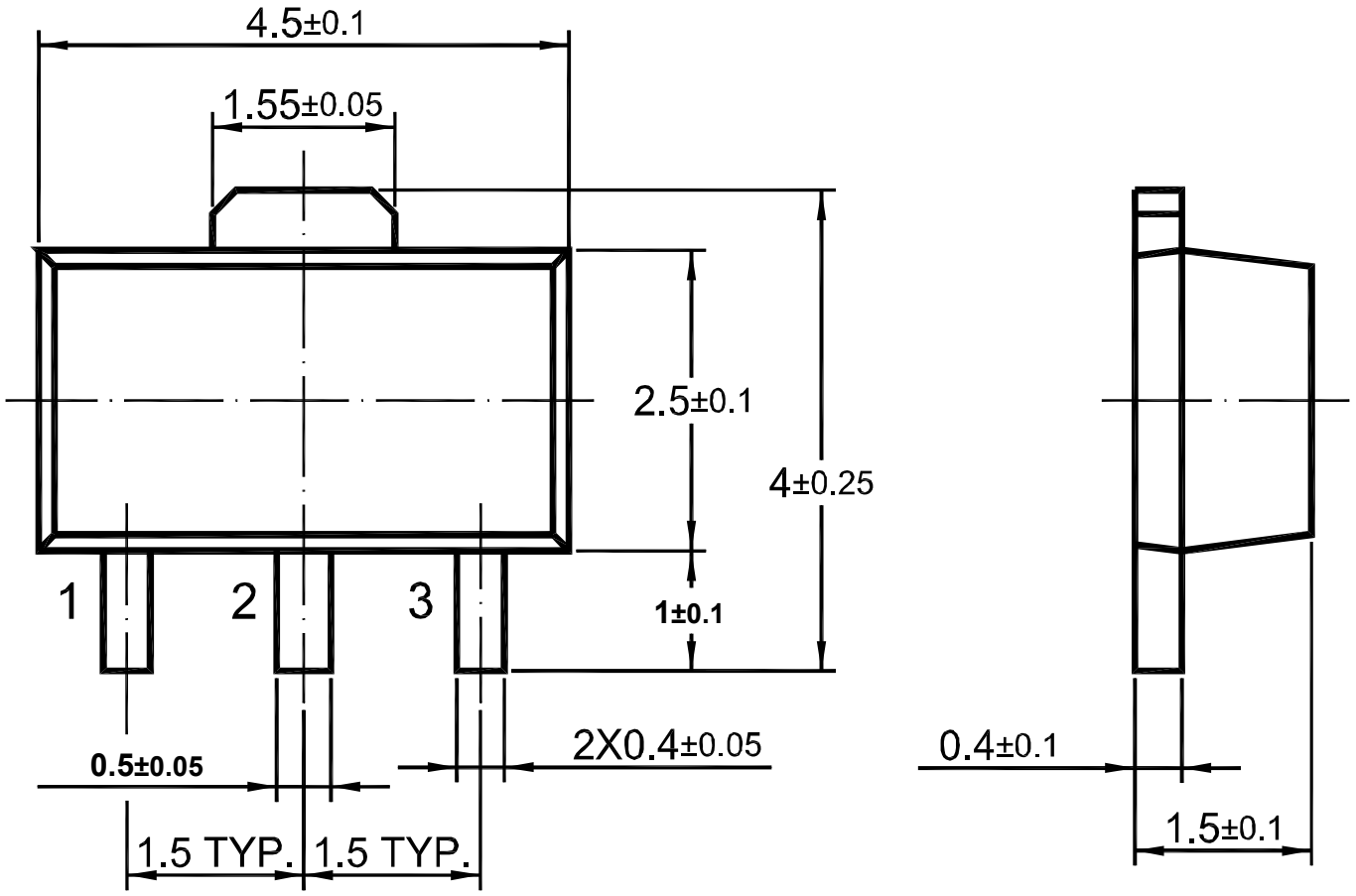




Package Outline

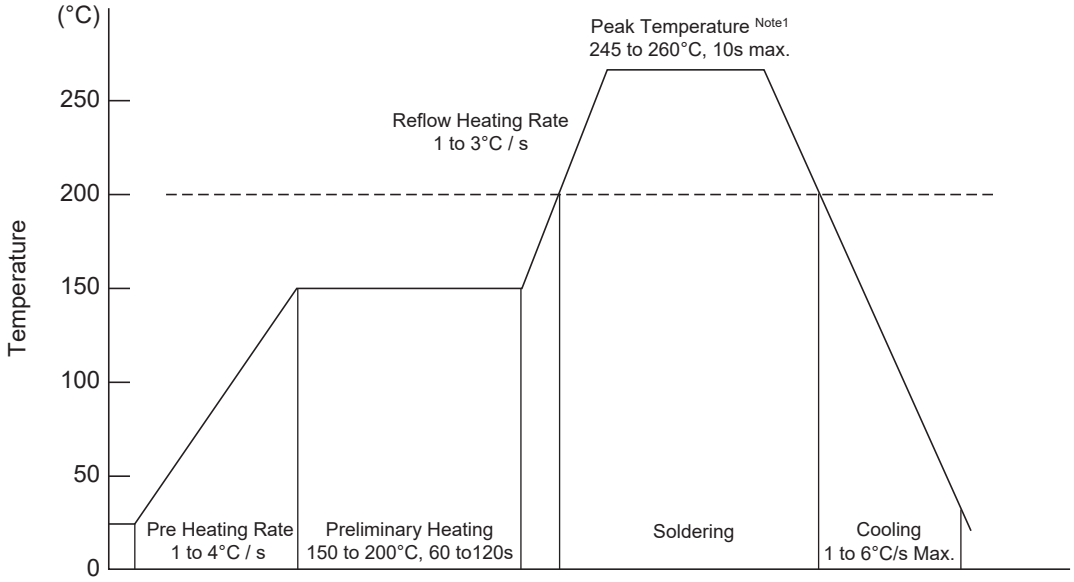
SOT-89

Dimensions in mm



Conditions of Soldering and Storage

◆ **Recommended condition of Reflow Soldering(Pb-Free Solder)**



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)

Note1:

Maximum thermal excursion allowed during the reflow assembly is as follow:

- Temperature: 255°C~260°C
- Duration at peak soak : 30 seconds
- Number of reflow: 3

- **Conditions of hand soldering Note2**

- Temperature: 320±10°C
- Time: 3s max.
- Times: one time

Note2: Not recommended for mass production, an engineering project, or re-work, it is allowed. It should be used with caution

- **Storage conditions**

- **Temperature**

5 to 30°C

- **Humidity**

≤ 60% RH

- **Floor Life**

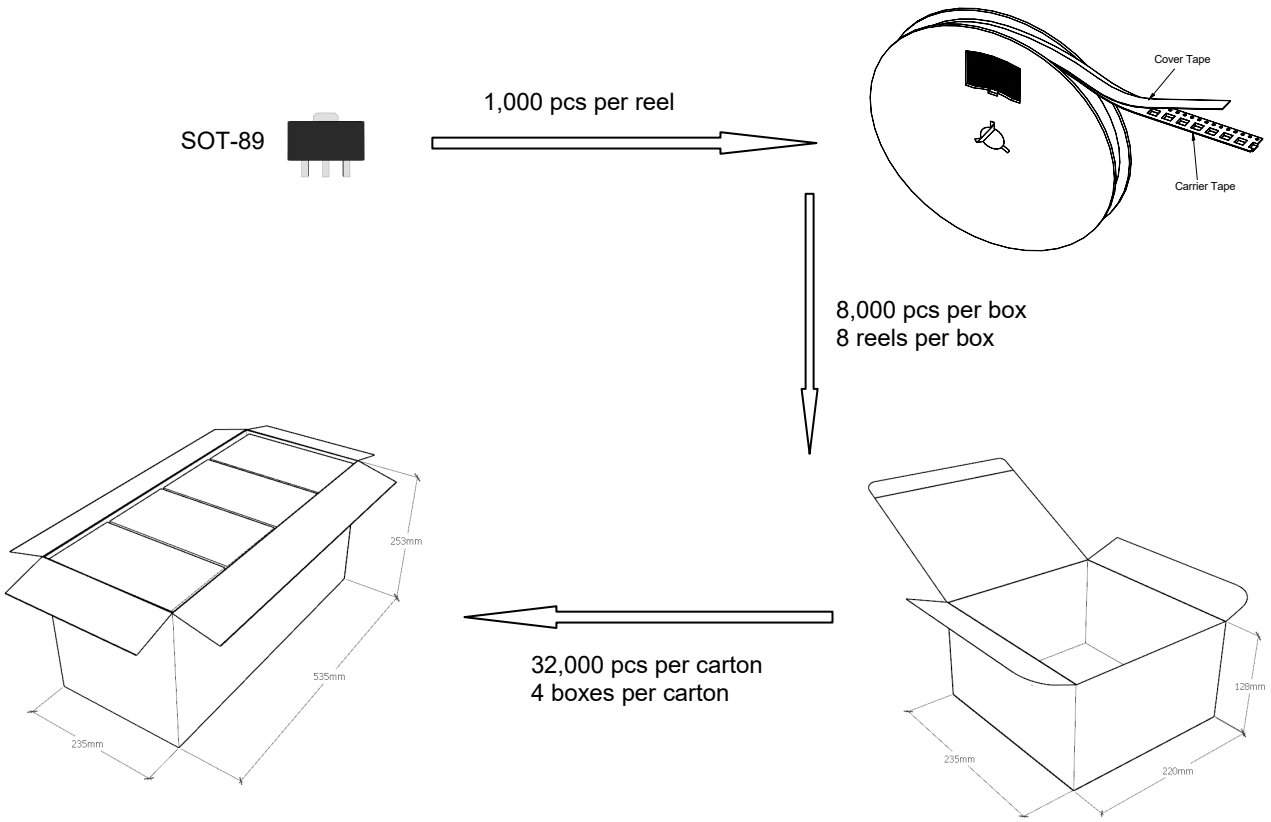
168 Hours

- **Recommended period**

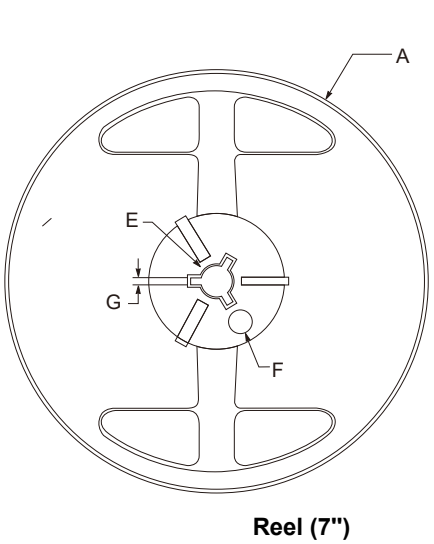
Five year after manufacturing(Depends on storage conditions)

Package Specifications

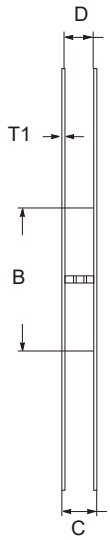
- The method of packaging (1,000PCS/Reel&7inches)



◆ **reel data**



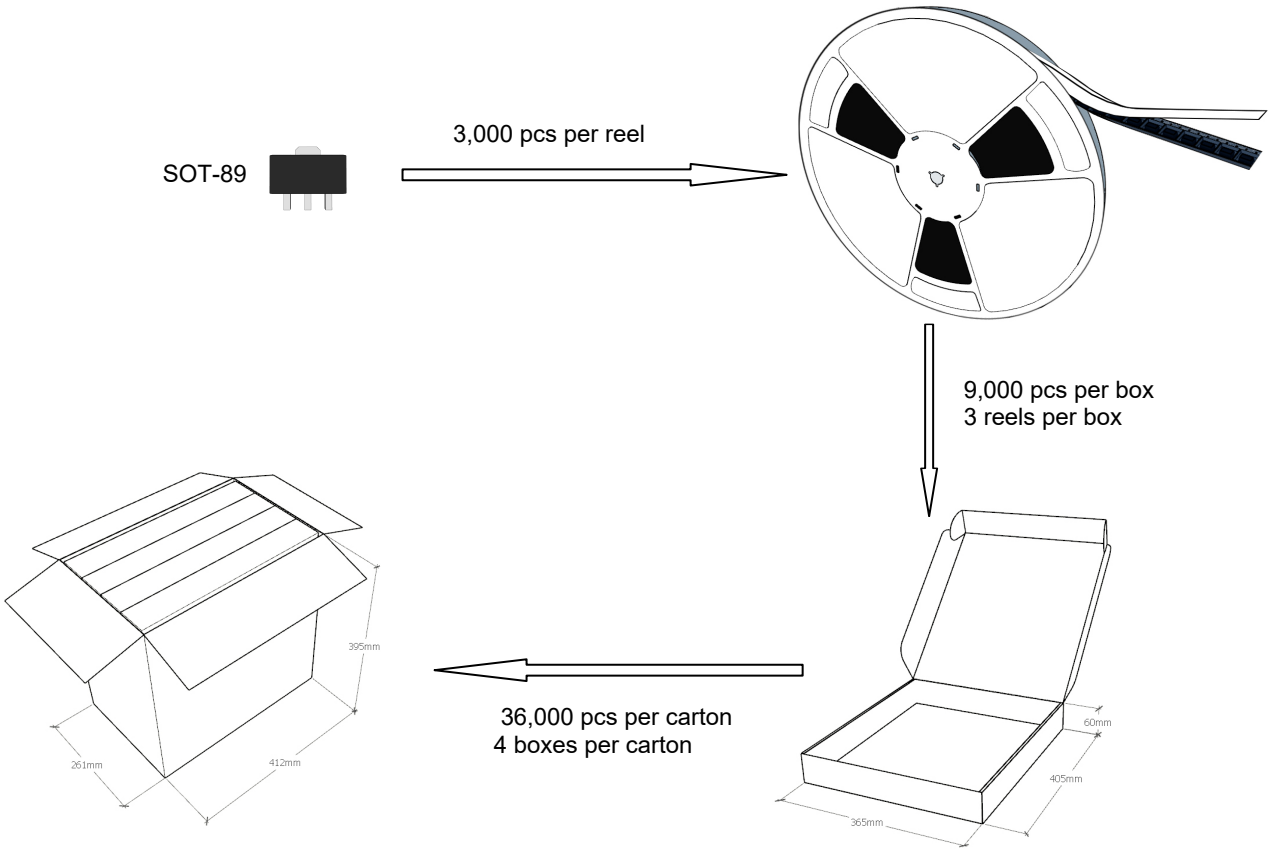
Reel (7")



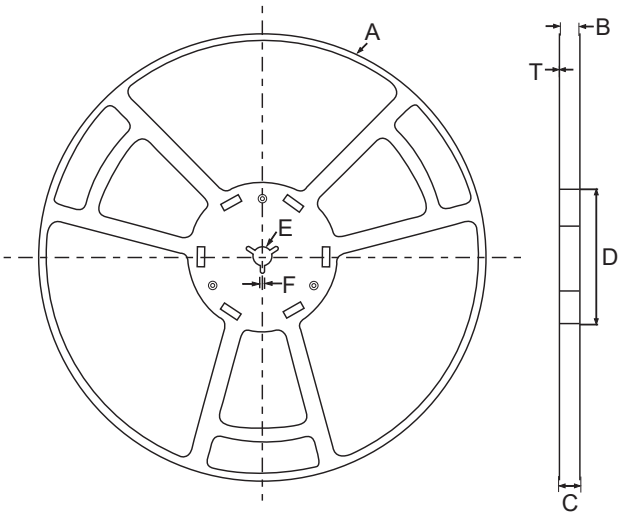
symbol	Value(unit:mm)
A	Φ179±1
B	60.5±0.2
C	15.3±0.3
D	12.5~13.7
E	Φ13.5±0.2
F	Φ10.0±0.2
G	2.7±0.2
T1	1.0±0.2

Package Specifications

- 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**