



PJ73 Series Low Dropout Linear Regulator

Description

The PJ73 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, PJ73 series 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 μ A
- ◆ Output voltage tolerance: \pm 2%

Applications

- ◆ Battery-Powered Equipment
- ◆ Ultra Low Power Microcontrollers
- ◆ Notebook Computers

SOT-23

3.VIN



1.GND 2.VOUT

SOT-23-3

3.VIN



1.GND 2.VOUT

SOT-89

2.VIN



1.GND 2.VIN 3.VOUT

SOT-23-5

5.VOUT

4.NC



1.VIN 2.GND 3.NC



PJ73 Series

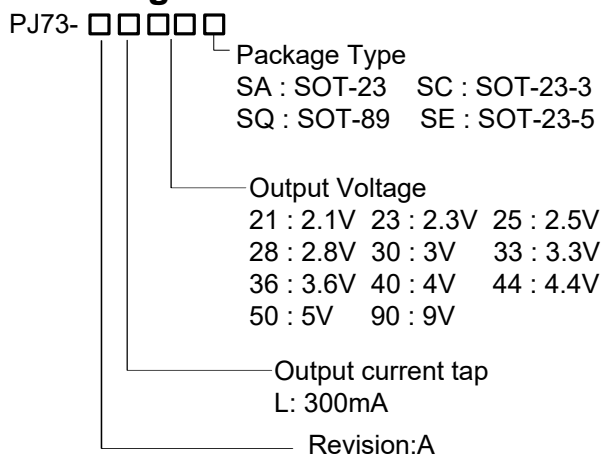
Low Dropout Linear Regulator

Marking Code ^{Note}

| Output Voltage | Package | Marking |
|----------------|----------|---------|
| 2.1V~9V | SOT-23 | 73XX |
| 2.1V~9V | SOT-23-3 | 73XXC |
| 2.1V~9V | SOT-23-5 | 73XXE |
| 2.1V~9V | SOT-89 | 73XX |

Note: XX: Output Voltage

Ordering Information





PJ73 Series Low Dropout Linear Regulator

Absolute Maximum Ratings ^{Note1}

Ratings at 25°C ambient temperature unless otherwise specified.

| | | | |
|---|----------|----------|------|
| Supply Voltage | | -0.3~+22 | V |
| Power Dissipation | SOT-23 | 300 | mW |
| | SOT-23-3 | 400 | mW |
| | SOT-23-5 | 400 | mW |
| | SOT-89 | 600 | mW |
| Thermal Resistance, Junction-to-Ambient | SOT-23 | 330 | °C/W |
| | SOT-23-3 | 380 | °C/W |
| | SOT-23-5 | 300 | °C/W |
| | SOT-89 | 180 | °C/W |
| Storage temperature range | | -50~125 | °C |
| Operating Ambient Temperature | | -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 indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions may affect device reliability.



Electrical Characteristics

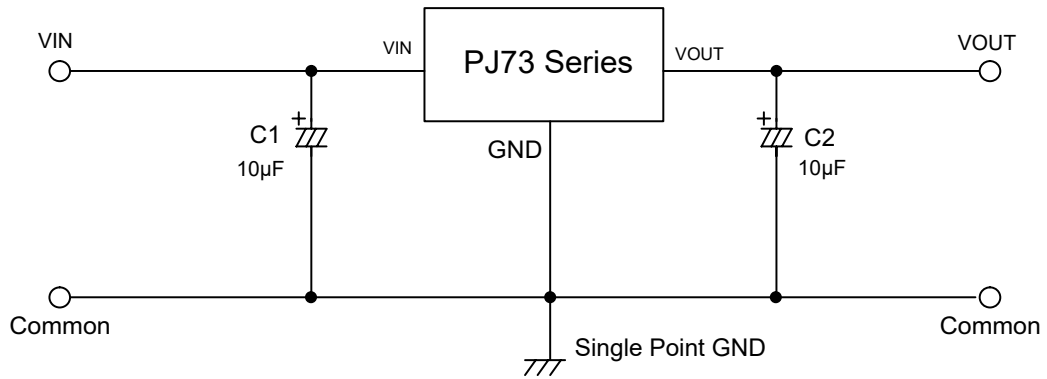
($V_{IN}=V_{OUT}+2$, $C_{IN}=C_{OUT}=10\mu F$, $T_A=25^\circ C$, unless otherwise noted.)

| Parameter | Symbol | Conditions | MIN. | TYP. | MAX. | Unit |
|---|--|---|------|------|------|------------|
| Input Voltage | V_{IN} | | -- | -- | 20 | V |
| Output Voltage Accuracy | ΔV_{OUT} | $I_{OUT}=10mA$ | -2 | -- | +2 | % |
| Output Current | I_{OUT} | | 300 | -- | -- | mA |
| Quiescent Current | I_Q | $I_{OUT}=0mA$ | -- | 1.5 | 3 | μA |
| Dropout Voltage ^{Note1} $I_{OUT}=10mA$ | V_{DROP} | $2.1V \leq V_{OUT} < 2.3V$ | -- | 45 | 55 | mV |
| | | $2.3V \leq V_{OUT} < 2.5V$ | -- | 40 | 55 | |
| | | $2.5V \leq V_{OUT} < 2.8V$ | -- | 35 | 55 | |
| | | $2.8V \leq V_{OUT} < 3.0V$ | -- | 30 | 55 | |
| Dropout Voltage ^{Note1} $I_{OUT}=100mA$ | V_{DROP} | $3.0V \leq V_{OUT} < 3.3V$ | -- | 210 | 300 | |
| | | $3.3V \leq V_{OUT} < 3.6V$ | -- | 195 | 300 | |
| | | $3.6V \leq V_{OUT} < 4.0V$ | -- | 180 | 300 | |
| | | $4.0V \leq V_{OUT} < 4.4V$ | -- | 170 | 300 | |
| | | $4.4V \leq V_{OUT} < 5.0V$ | -- | 160 | 300 | |
| | | $5.0V \leq V_{OUT} < 9.0V$ | -- | 150 | 300 | |
| | | $9.0V \leq V_{OUT}$ | -- | 130 | 300 | |
| Line Regulation | ΔV_{LINE} | $V_{IN}=V_{OUT}+2 \sim 20V$ $I_{OUT}=1mA$ | -- | -- | 0.2 | %/V |
| Load Regulation | ΔV_{LOAD} | $1mA < I_{OUT} < 300mA$ | -- | 37 | 100 | mV |
| Power Supply Rejection Rate | PSRR | $V_{IN}=V_{OUT}+3V, I_{OUT}=10mA$ $f=100Hz$ | -- | 54 | -- | dB |
| Short current | I_{SHORT} | $V_{OUT}=0V$ | -- | 400 | -- | mA |
| Temperature Coefficient | $\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T_A}$ | $V_{IN}=V_{OUT}+2V, I_{OUT}=10mA$ $-40^\circ C \leq T_A \leq 85^\circ C$ | -- | 100 | -- | $^\circ C$ |

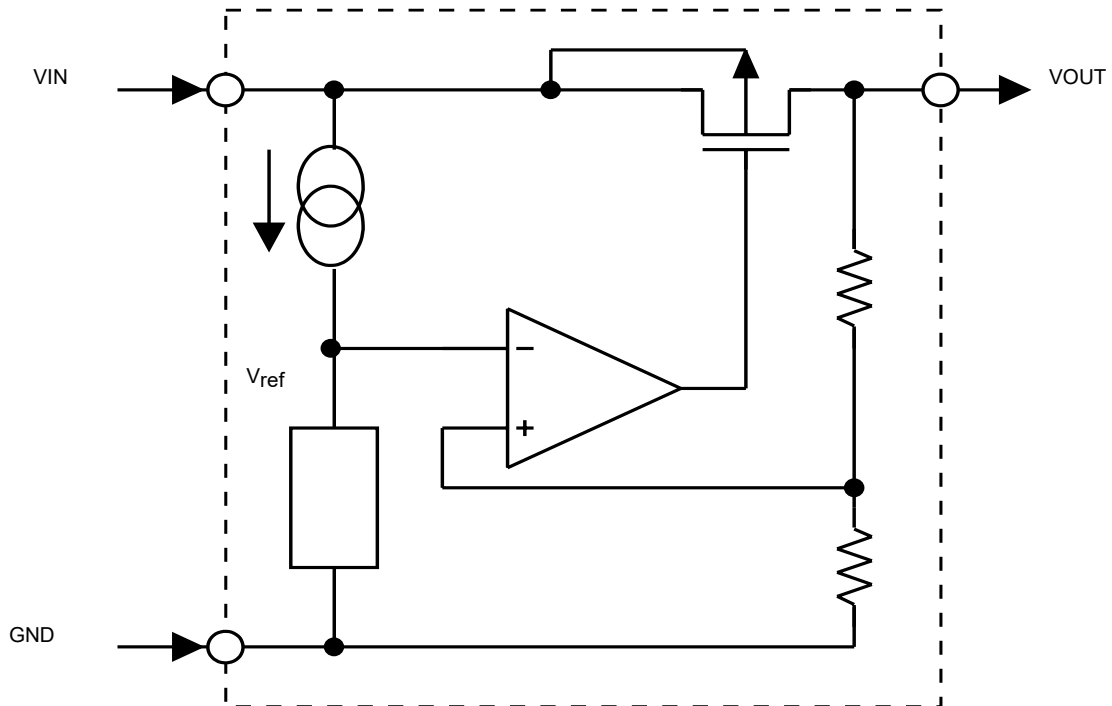
Note 1. The dropout voltage is defined as $V_{IN} - V_{OUT}$, when V_{OUT} is 98% of the normal value of V_{OUT} .



Basic Circuits



Block Diagram





Applications Information

Input Capacitor

A 1 μ F 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 1 μ F, 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 :

$$PD(MAX) = (TJ(MAX) - TA) / R\theta JA$$

Where TJ(MAX) is the maximum operation junction temperature 125°C, TA is the ambient temperature and the R θ JA is the junction to ambient thermal resistance.

The power dissipation definition in device is:

$$PD = (VIN - VOUT) \times IOUT + VIN \times IQ$$

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 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.

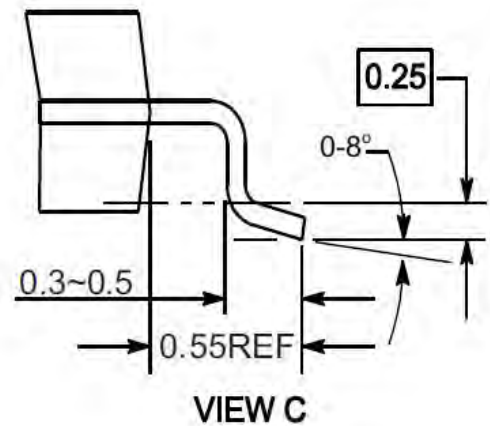
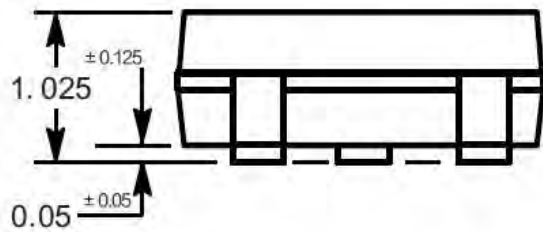
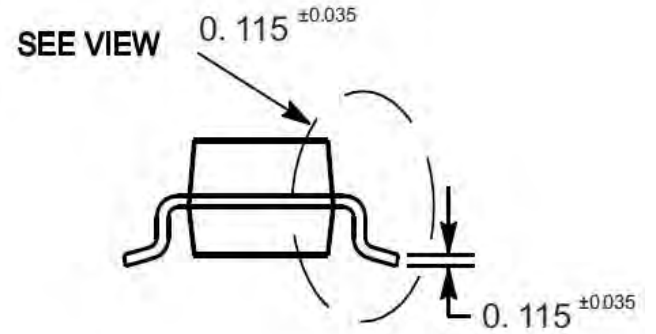
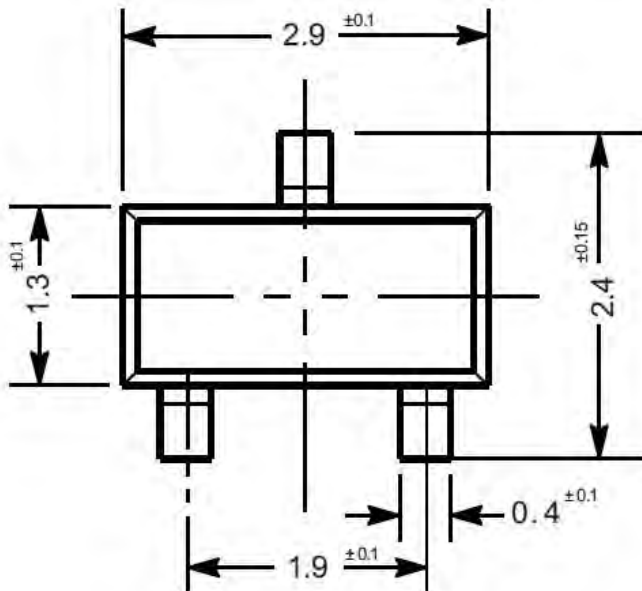


PJ73 Series Low Dropout Linear Regulator

Package Outline

SOT-23

Dimensions in mm



Ordering Information

| Device | Package | Shipping |
|-------------|---------|-------------------------------|
| PJ73 Series | SOT-23 | 3,000/ Tape & Reel (7 inches) |



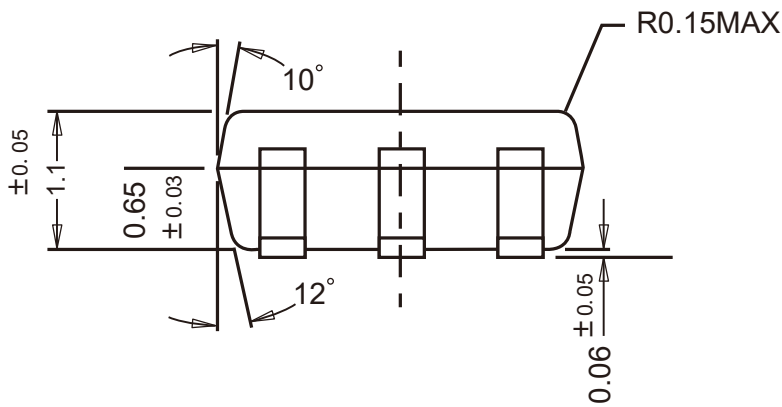
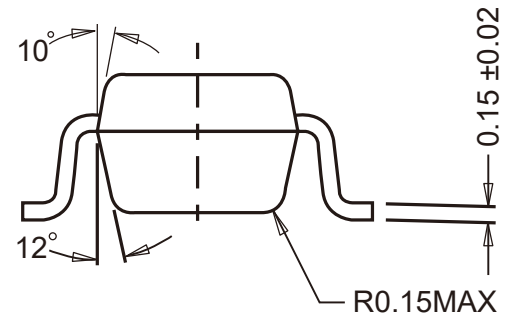
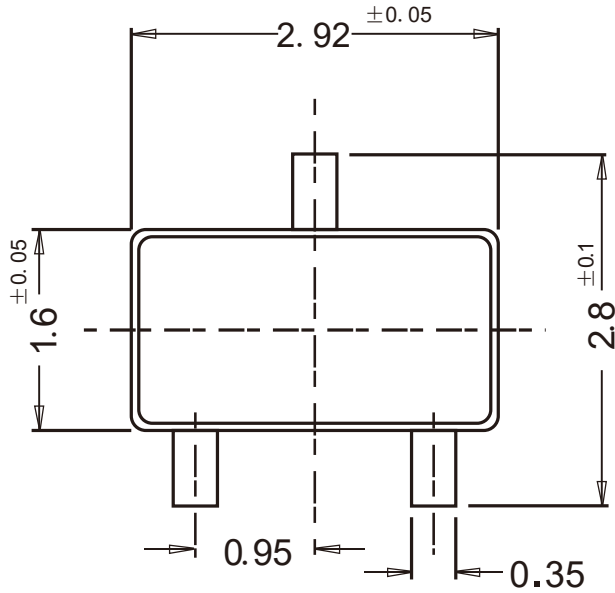
PJ73 Series

Low Dropout Linear Regulator

Package Outline

SOT-23-3

Dimensions in mm



Ordering Information

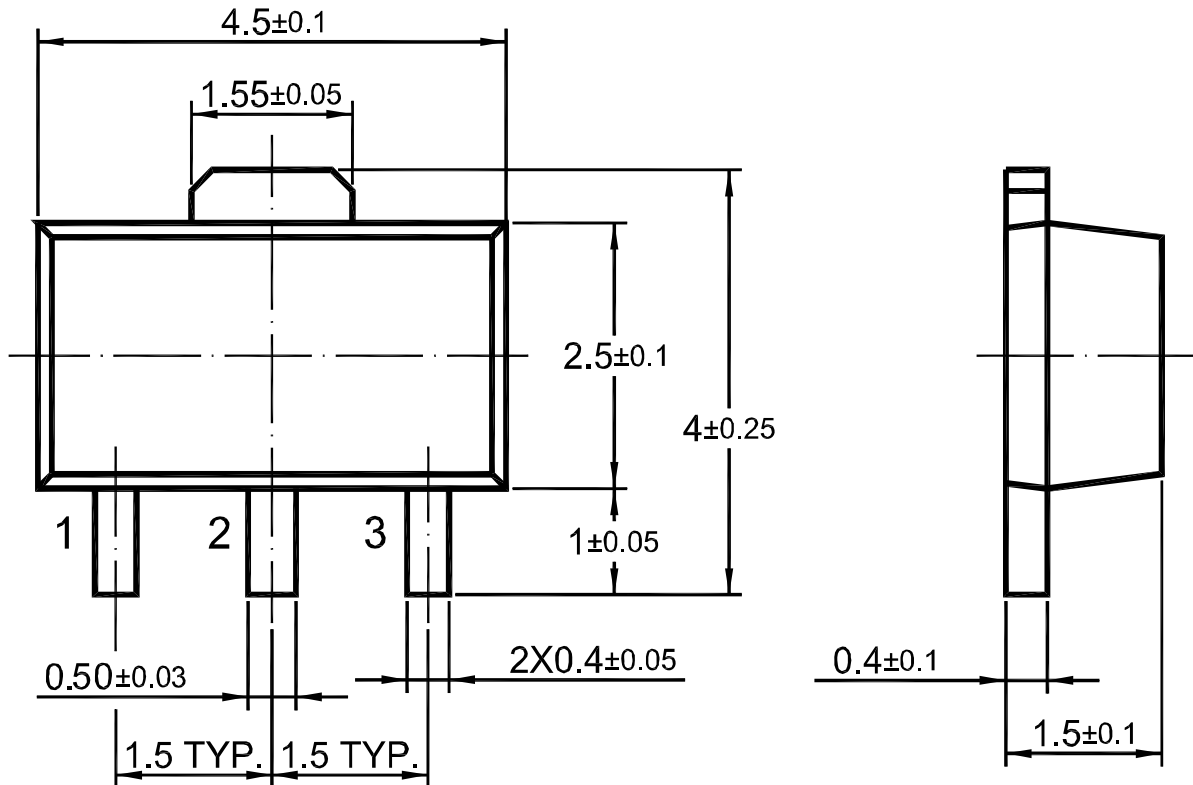
| Device | Package | Shipping |
|-------------|----------|-------------------------------|
| PJ73 Series | SOT-23-3 | 3,000/ Tape & Reel (7 inches) |



Package Outline

SOT-89

Dimensions in mm



Ordering Information

| Device | Package | Shipping |
|-------------|---------|-------------------------------|
| PJ73 Series | SOT-89 | 1,000/ Tape & Reel (7 inches) |

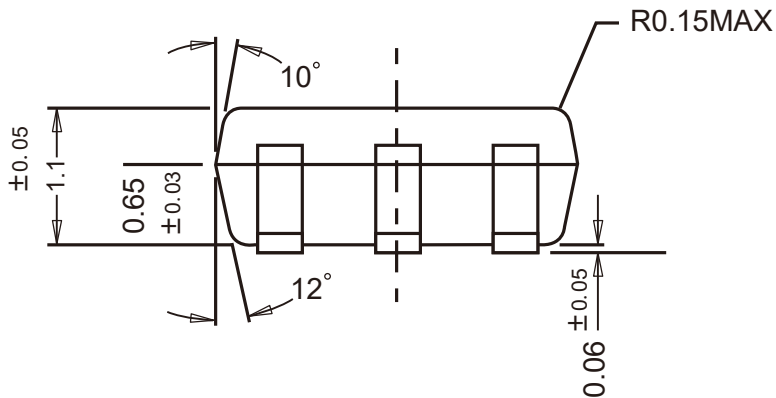
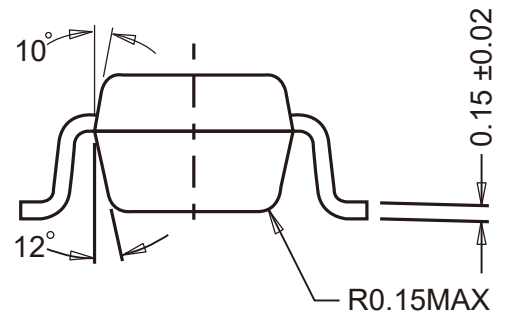
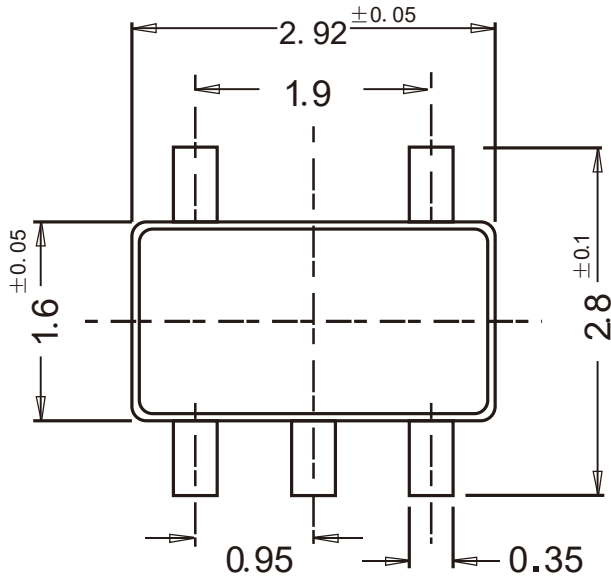


PJ73 Series Low Dropout Linear Regulator

Package Outline

SOT-23-5

Dimensions in mm



Ordering Information

| Device | Package | Shipping |
|-------------|----------|-------------------------------|
| PJ73 Series | SOT-23-5 | 3,000/ Tape & Reel (7 inches) |

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