

General Description

The TCL71XX is low power consumption very low 2 μ A ground current, high performance 150mA LDO . The family uses an advanced CMOS process and a PMOSFET pass device to achieve fast start-up, with high output voltage accuracy . The TCL71XX is stable with a 10.0 μ F ceramic output capacitor, and uses a precision voltage reference and feedback loop to achieve a worst-case accuracy of 1% over all load, line, process, and temperature variations. It is fully specified from T_J = -40°C to +125°C and is offered in a SOT89-3 , SOT23-3 package

Features

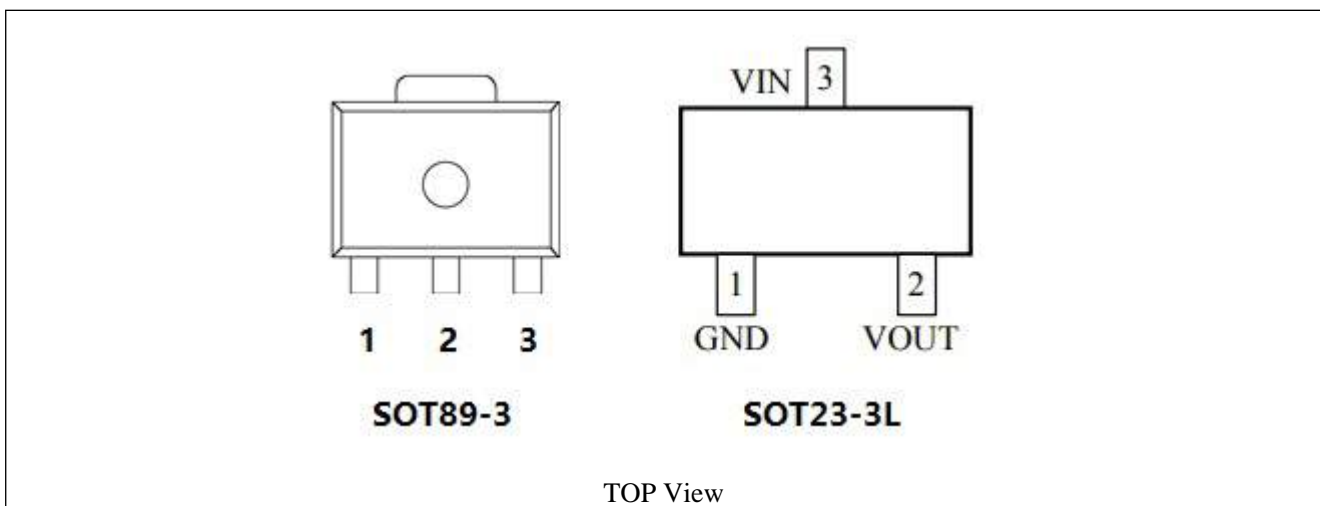
- Wide Input Voltage Range: 2V to 30V
- Up to 150mA Load Current
- Very Low I_Q: 2 μ A@Typ
- High PSRR: 75dB@100Hz; 51dB@1KHz
- Ultra Low Dropout: 650mV at 150mA Load @V_{OUT}=5V
- Short current protection:60mA
- Excellent Load/Line Transient Response
- Line Regulation: 0.05% typical
- Package: SOT89-3, SOT23-3

Ordering information

TCL71①② ③

| 数字项目 | 符号 | 描述 |
|------|-------|--------------------------|
| ① ② | 18-50 | 输出电压: 例 ①=3, ②=0 表示 3.0V |
| ③ | D | 封装类型: SOT89-3 |
| | C | SOT-23-3 |

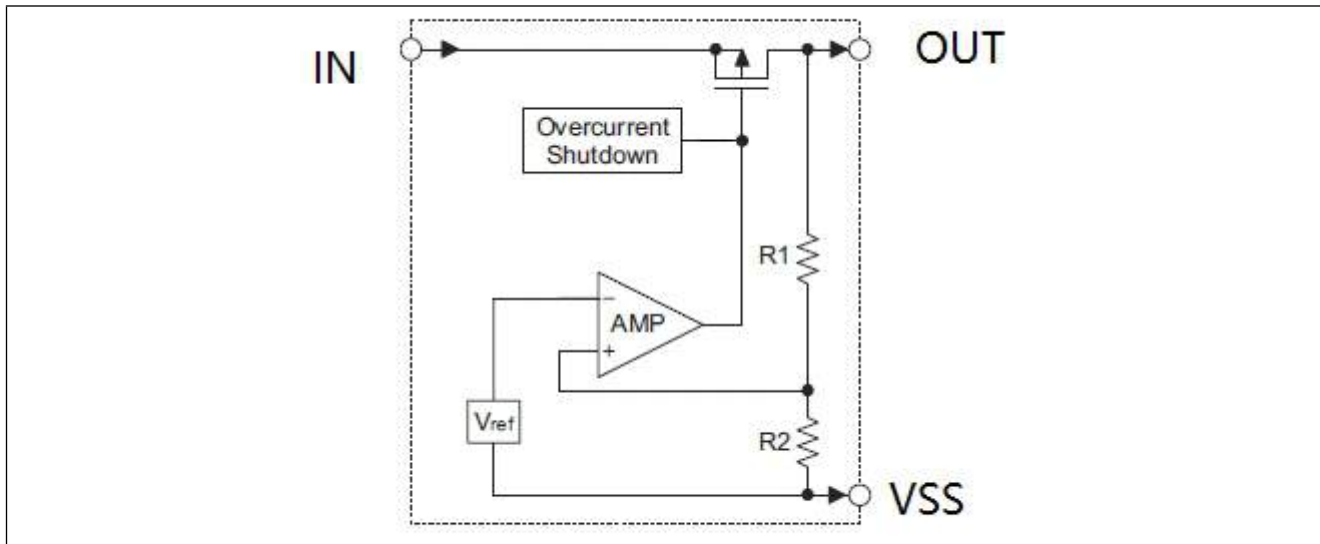
Pin Configuration



Pin Function

| Pin No. | | Pin Name | Pin Function |
|---------|---------|----------|---|
| SOT89-3 | SOT23-5 | | |
| 1 | 1 | GND | Ground. |
| 2 | 2 | IN | Supply input pin. Must be closely decoupled to GND with a 1 μ F or greater ceramic capacitor. |
| 3 | 3 | OUT | Output pin. Bypass a 1 μ F ceramic capacitor from this pin to ground. |
| | 4 | NC | No connection. |
| | 5 | NC | No connection. |

Block Diagram



Input Capacitor

A 1 μ F-10 μ F ceramic capacitor is recommended to connect between V_{IN} 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 V_{IN} and GND.

Output Capacitor

An output capacitor is required for the stability of the LDO. The recommended output capacitance is from 1 μ F to 10 μ F, Equivalent Series Resistance (ESR) is from 5m Ω to 100m Ω , 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 OUT and GND pins.

Low Quiescent Current

The TCL71XX, consuming only around 2 μ A for all input range and output loading, provides great power saving in portable and low power applications.

Short Current Limit Protection

When output current at the OUT pin is higher than current limit threshold or the OUT pin is short-circuit to GND, the short current limit protection will be triggered and clamp the output current to approximately 100mA to prevent over-current and to protect the regulator from damage due to overheating.

Absolute Maximum Ratings

| Parameter | Rating | | Unit |
|--------------------------------------|------------|-----|--------------|
| IN Voltage | -0.3 to 36 | | V |
| Maximum Power Dissipation | SOT89-3 | 700 | mw |
| | SOT23-3 | 500 | |
| Operating Junction Temperature | -40 to 125 | | $^{\circ}$ C |
| Storage Temperature | -65 to 150 | | $^{\circ}$ C |
| Lead Temperature (Soldering, 10 sec) | 300 | | $^{\circ}$ C |

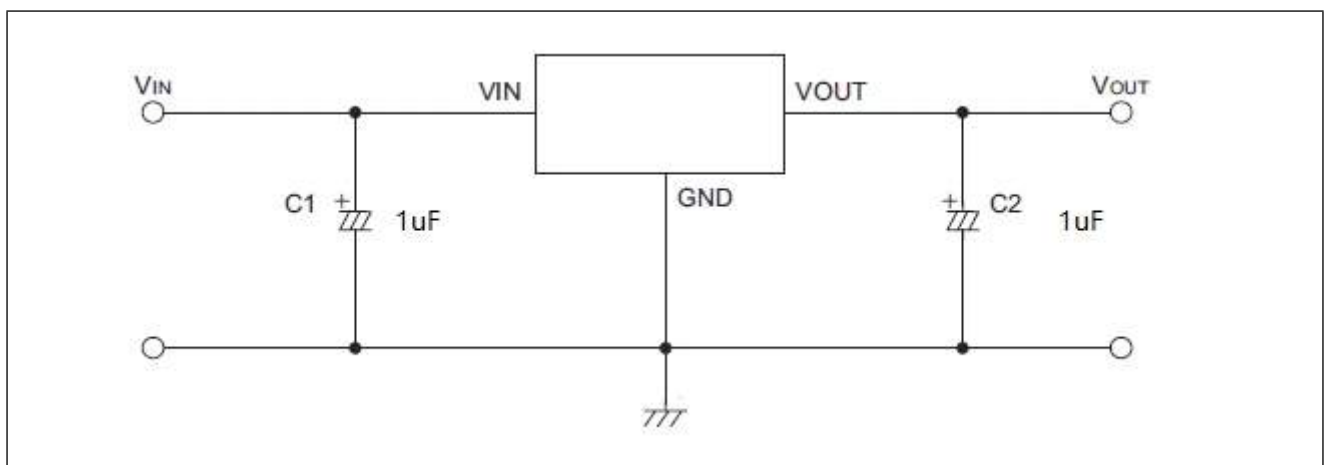
Electrical Characteristics

($V_{IN} = V_{EN} = 7V$, $T_A = 27^{\circ}C$ unless otherwise noted)

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--------------------------------|------------|---|-----|------|-----|---------|
| Input Voltage Operation Range | V_{IN} | | 3 | | 30 | V |
| Dropout Voltage | V_{drop} | $V_{OUT} = 5V, I_{OUT} = 150mA$ | | 650 | 780 | mV |
| | | $V_{OUT} = 5V, I_{OUT} = 100mA$ | | 400 | 530 | |
| DC Supply Quiescent Current | I_Q | | | 2 | | μ A |
| Regulated Output Voltage | V_{OUT} | $I_{OUT} = 1mA, -40^{\circ}C \leq T_A \leq 85^{\circ}C$ | -1 | | 1 | % |
| Output Voltage Line Regulation | | $V_{IN} = V_{OUT} + 1V$ to 30V, $I_{OUT} = 10mA$ | | 0.05 | | % |
| Output Voltage Load Regulation | | I_{OUT} from 0mA to 150mA | | 0.2 | | % |
| Maximum Output Current | | $V_{IN} = V_{OUT} + 1V$ | 150 | | | mA |
| Short Current Protection | | OUT short to GND | | 60 | | mA |

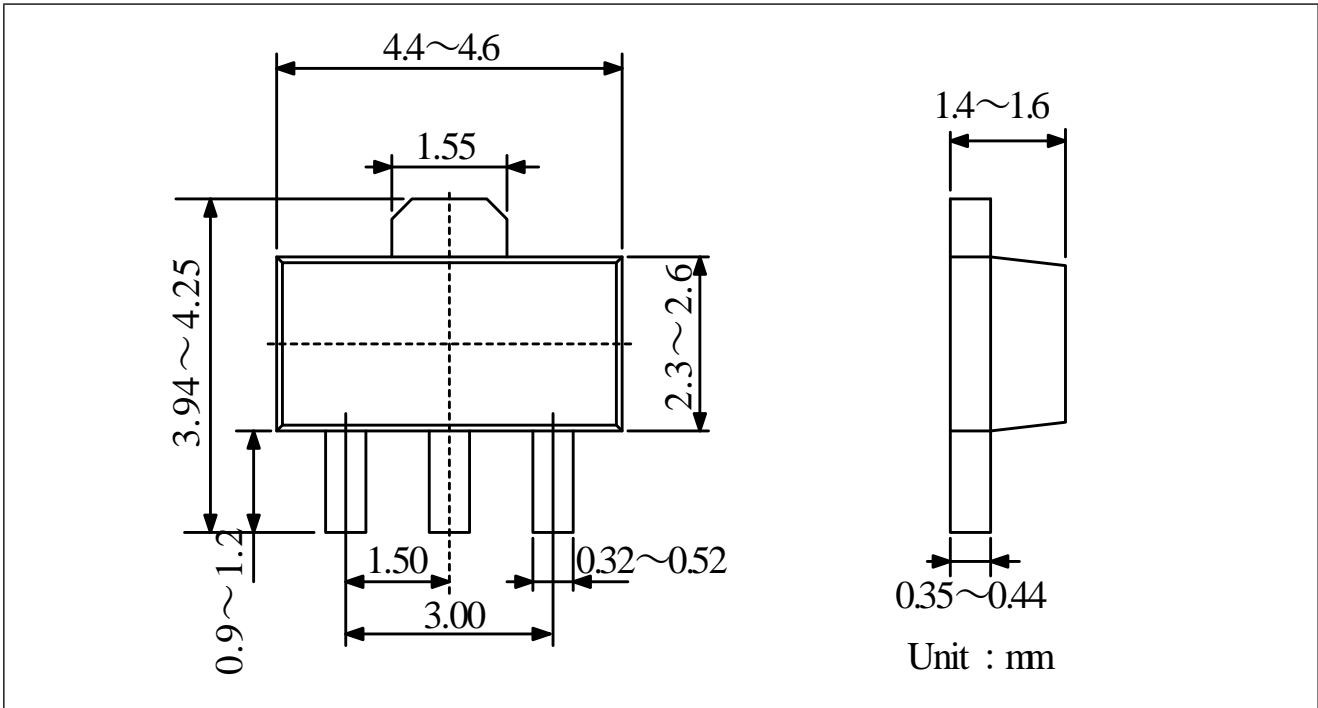
Note: Production test at +25 $^{\circ}C$. Specifications over the temperature range are guaranteed by design and characterization.

Application Circuits



Package Dimension

SOT89-3



SOT23-3L

