

FEATURES

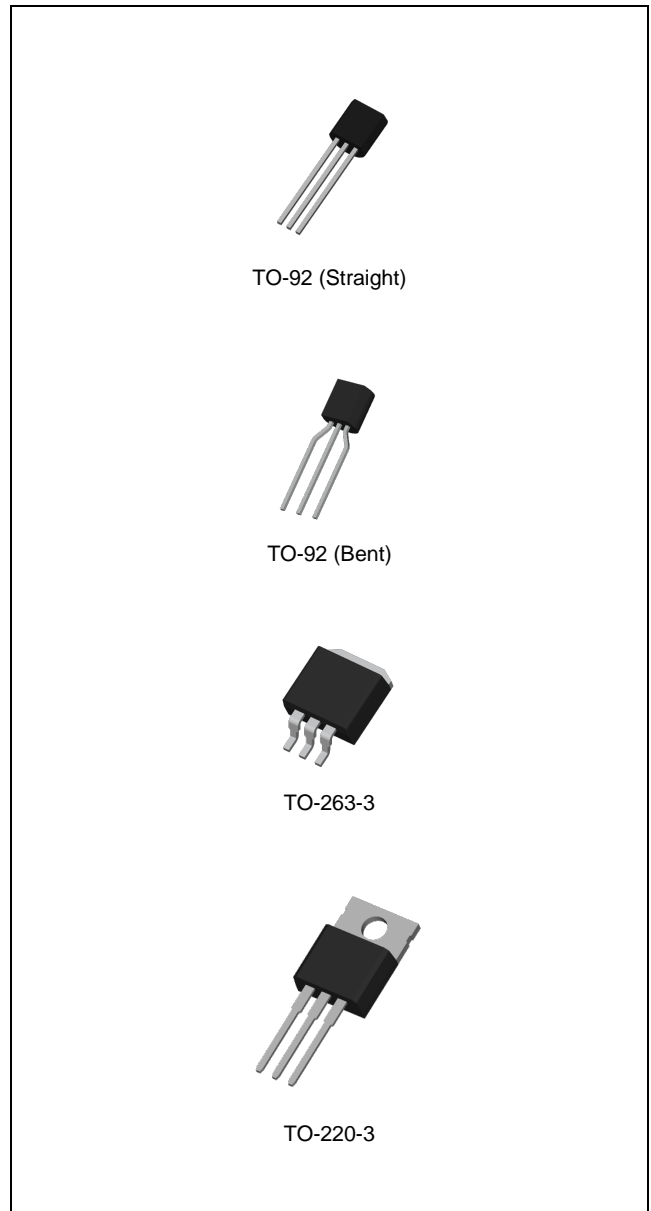
- 1.5V to 5.0V Output Voltage Versions
- Guaranteed 250mA Output Current
- Extremely Low Quiescent Current
- Very Low Dropout Voltage
- Reverse Battery Protection
- Extremely Tight Line and Load Regulation
- Very Low Temperature Coefficient
- Current and Thermal Limiting
- Available in TO-92, TO-263, and TO-220 Packages

APPLICATIONS

- High Efficiency Linear Regulator
- Low Dropout Battery-Powered Regulator

DESCRIPTION

The LP2954 is a fixed voltage micropower voltage regulator with very low quiescent current (90 μ A typical at 1mA load) and very low dropout voltage (typically 60mV at light loads and 470mV at 250mA load current). The quiescent current increases only slightly at dropout (120 μ A typical), which prolongs battery life. The LP2954 with a fixed output is available in the three-lead TO-220, TO-263, and TO-92 packages. Reverse battery protection is provided. The tight line and load regulation (0.04% typical), as well as very low output temperature coefficient make the LP2954 well suited for use as a low-power voltage reference. Output accuracy is guaranteed at both room temperature and over the entire operating temperature range.



ORDERING INFORMATION

| Device | Package |
|--------------|------------------|
| LP2954-x.x | TO-92 (Straight) |
| LP2954TA-x.x | TO-92 (Bent) |
| LP2954R-x.x | TO-263-3L |
| LP2954T-x.x | TO-220-3L |

x.x: Output Voltage

ABSOLUTE MAXIMUM RATINGS ^(Note 1)

| CHARACTERISTIC | SYMBOL | MIN | MAX | UNIT |
|----------------------|-----------|------|---------|------|
| Input Supply Voltage | V_{IN} | -20 | 30 | V |
| Power Dissipation | P_D | | Limited | |
| ESD Rating, HBM | - | 2000 | - | V |
| Junction Temperature | T_J | -40 | 125 | °C |
| Storage Temperature | T_{STG} | -65 | 150 | °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 under *Recommended Operating Conditions* is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING RATINGS

| CHARACTERISTIC | SYMBOL | MIN | MAX | UNIT |
|------------------------------------|----------|-----|-----|------|
| Supply Voltage ^(Note 2) | V_{IN} | 2.3 | 30 | V |
| Junction Temperature | T_J | -40 | 125 | °C |

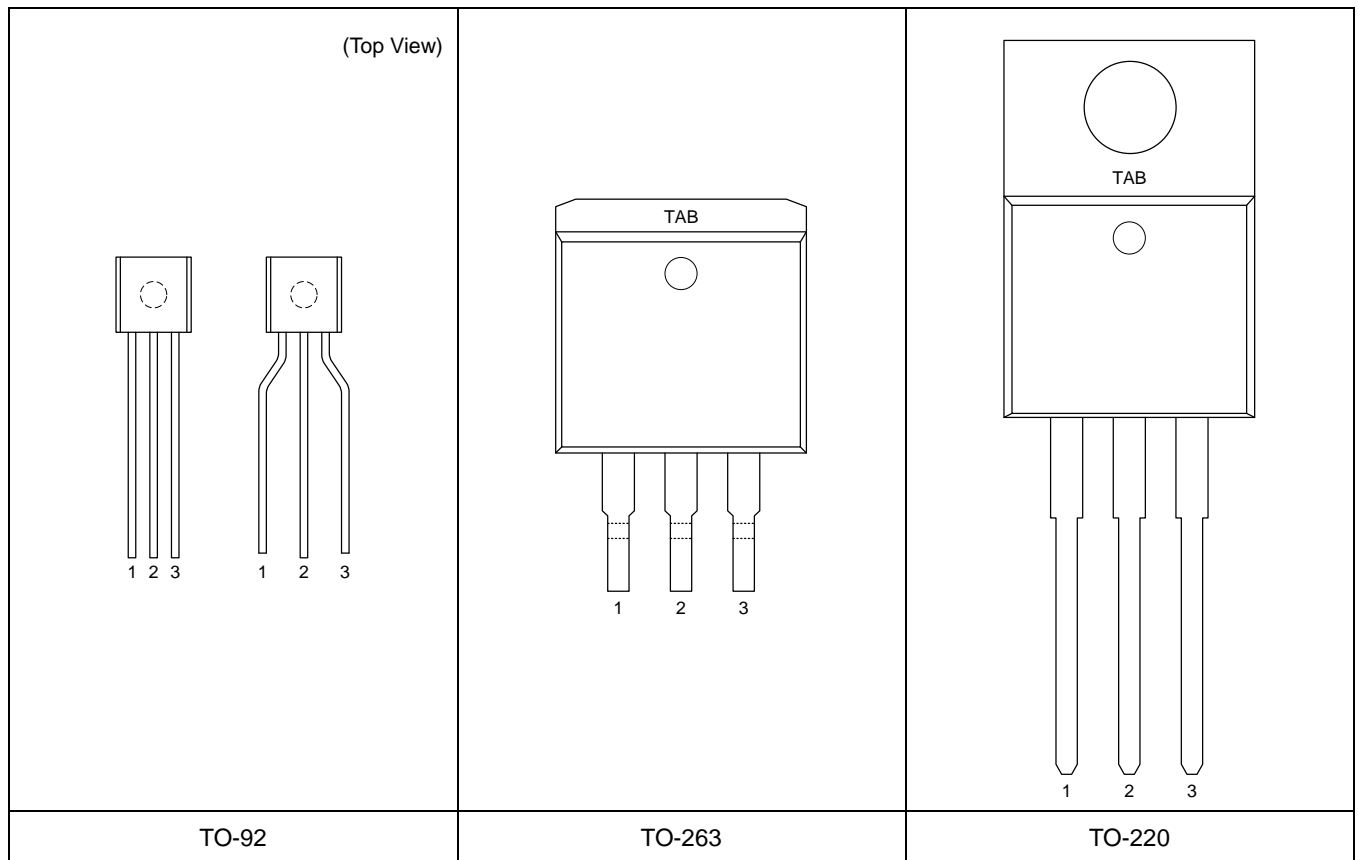
Note 2. Recommended minimum V_{IN} is the greater of 2.3V or V_O (max) + rated dropout voltage (max) for operating load current.

ORDERING INFORMATION

| VOUT | Package | Order No. | Description | Supplied As | Status |
|------|------------------|--------------|---------------------------------|------------------|------------|
| 5.0V | TO-92 (Straight) | LP2954-5.0 | Straight Lead | Bulk | Active |
| | TO-92 (Bent) | LP2954TA-5.0 | Bent Lead (0.2 In Line Spacing) | Tape & Ammo Pack | Contact Us |
| | TO-263-3L | LP2954R-5.0 | | Tape & Reel | Contact Us |
| | TO-220-3L | LP2954T-5.0 | | Tube | Contact Us |

* 1.5V to 5.0V output voltages are available upon request by customer

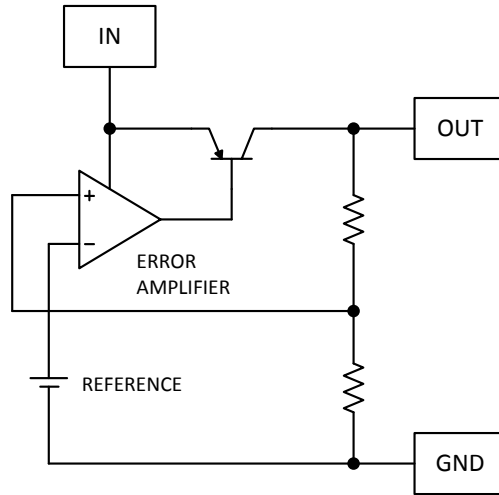
PIN CONFIGURATION



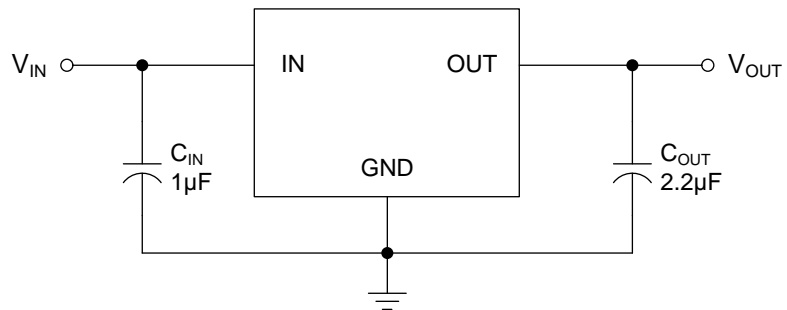
PIN DESCRIPTION

| Pin No. | | | Pin Name | Pin Function |
|---------|--------|--------|----------|--|
| TO-92 | TO-263 | TO-220 | | |
| 3 | 1 | 1 | IN | Input Voltage |
| 2 | 2 | 2 | GND | Ground |
| 1 | 3 | 3 | OUT | Output Voltage |
| - | TAB | TAB | TAB | Connect to GND. Attached to heatsink for thermal relief for TO-220 package or put a copper plane connected to this pin as a thermal relief for TO-263 package. |

BLOCK DIAGRAM



TYPICAL APPLICATION



ELECTRICAL CHARACTERISTICS

Limits in standard typeface are for $T_J = 25^\circ\text{C}$, and limits **boldface** type apply over the full operating temperature range. Limits are specified by production testing or correlation techniques using standard Statistical Quality Control (SQC) methods. Unless otherwise noted: $V_{IN} = V_{OUT} + 1\text{ V}$, $I_L = 1\text{ mA}$, $C_L = 2.2\text{ }\mu\text{F}$

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|--|-----------------------------|---|--|----------------|--|-----------------------|
| Output Voltage | V_{OUT} | $I_L = 1\text{ mA}$ | $\times 0.99$ $\times 0.98$ | $V_{OUT(NOM)}$ | $\times 1.01$ $\times 1.02$ | V |
| | | $1\text{ mA} \leq I_L \leq 250\text{ mA}$ | $\times 0.976$ | $V_{OUT(NOM)}$ | $\times 1.024$ | V |
| Output Voltage Temperature Coefficient | $\Delta V_{OUT}/\Delta T$ | (Note 3) | - | 20 | 150 | ppm/ $^\circ\text{C}$ |
| Line Regulation | LNR | $V_{IN} = V_{OUT(NOM)} + 1\text{ V}$ to 30 V | - | 0.03 | 0.20 0.40 | % |
| Load Regulation (Note 4) | LDR | $I_L = 1\text{ mA}$ to 250 mA, $I_L = 0.1\text{ mA}$ to 1 mA | - | 0.04 | 0.20 0.30 | % |
| Dropout Voltage | V_{DROP} | $I_L = 1\text{ mA}$ | - | 60 | 100 150 | mV |
| | | $I_L = 50\text{ mA}$ | - | 240 | 300 420 | mV |
| | | $I_L = 100\text{ mA}$ | - | 310 | 400 520 | mV |
| | | $I_L = 250\text{ mA}$ | - | 470 | 600 800 | mV |
| Ground Pin Current | I_{GND} | $I_L = 1\text{ mA}$ | - | 90 | 150 180 | μA |
| | | $I_L = 50\text{ mA}$ | - | 1.1 | 2 2.5 | mA |
| | | $I_L = 100\text{ mA}$ | - | 4.5 | 6 8 | mA |
| | | $I_L = 250\text{ mA}$ | - | 21 | 28 33 | mA |
| | | $V_{IN} = V_{OUT(NOM)} - 0.5\text{ V}$ | - | 120 | 170 210 | μA |
| Current Limit | I_{CL} | $V_{OUT} = 0\text{ V}$ | - | 380 | 500 530 | mA |
| Thermal Regulation | $\Delta V_{OUT}/\Delta P_D$ | (Note 5) | - | 0.05 | 0.2 | %/W |
| Output Noise Voltage (10 Hz to 100 kHz) | e_n | $I_L = 100\text{ mA}$, $C_L = 2.2\text{ }\mu\text{F}$ | - | 400 | - | μV_{RMS} |
| | | $I_L = 100\text{ mA}$, $C_L = 33\text{ }\mu\text{F}$ | - | 260 | - | |

Note 3. Output voltage temperature coefficient is defined as the worst case voltage change divided by the total temperature range.

Note 4. Low duty cycle pulse testing with Kelvin connections required.

Note 5. Thermal regulation is defined as the change in output voltage at a time T after a change in power dissipation is applied, excluding load or line regulation effects. Specifications are 200mA load pulse at $V_{IN} = 20\text{ V}$ (3W pulse) for $T=10\text{ ms}$.

TYPICAL OPERATING CHARACTERISTICS

T.B.D.

APPLICATION INFORMATION

T.B.D.

REVISION NOTICE

The description in this datasheet is subject to change without any notice to describe its electrical characteristics properly.

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