

150mA 3-Terminal Positive Regulator

General Description

The RT9165 is a positive low dropout regulator designed for applications requiring low dropout performance at full rated current. The device is available in fixed output voltage of 5.0V or 8.0V. The RT9165 provides excellent regulation over line, load, and temperature variations.

The other features include low dropout performance at a maximum of 1.3V at 150mA, fast transient response, internal current limiting, and thermal shutdown protection of the output devices. The RT9165 is a three-terminal regulator compatible with industrial LM78L05/L08 and available in surface mount SOT-89 package.

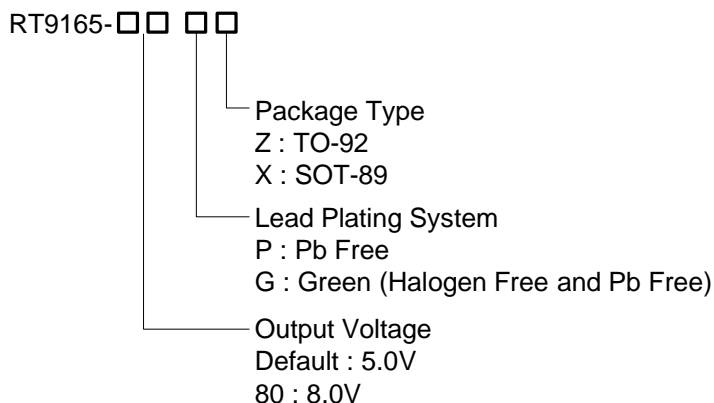
Features

- Low Dropout, Maximum 1.3V at 150mA
- Fast Transient Response
- ±3% Total Output Regulation
- 0.5% Line Regulation
- 0.5% Load Regulation
- SOT-89 and TO-92 Packages
- RoHS Compliant and 100% Lead (Pb)-Free

Applications

- 5V or 8V Output Linear Regulator
- Consumer Equipment Power Supply

Ordering Information



Note :

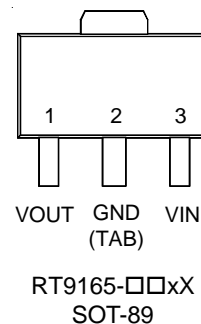
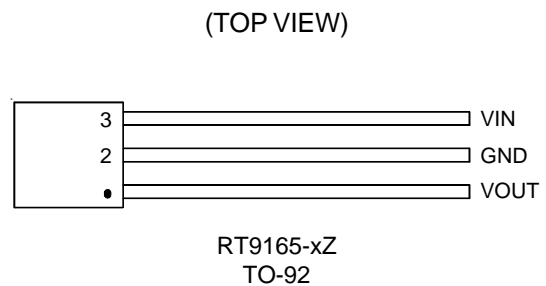
Richtek products are :

- ▶ RoHS compliant and compatible with the current requirements of IPC/JEDEC J-STD-020.
- ▶ Suitable for use in SnPb or Pb-free soldering processes.

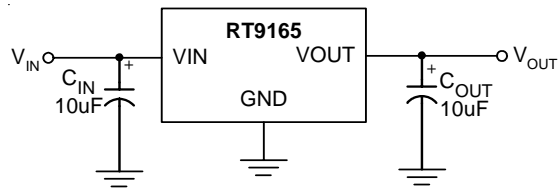
Marking Information

For marking information, contact our sales representative directly or through a Richtek distributor located in your area.

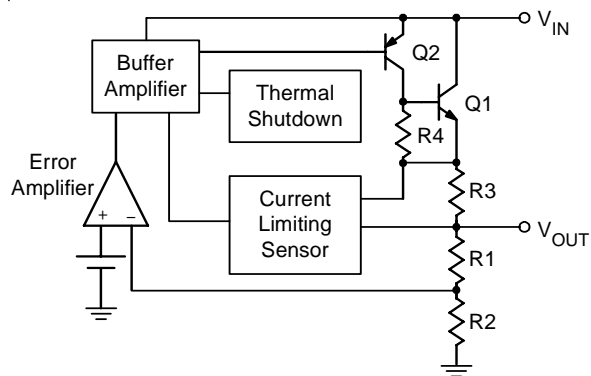
Pin Configurations



Typical Application Circuit



Function Block Diagram



Functional Pin Description

| Pin Name | Pin Function |
|----------|----------------|
| VOUT | Output Voltage |
| GND | Ground |
| VIN | Power Input |

Absolute Maximum Ratings

- Input Voltage ----- 16V
- Power Dissipation, $P_D @ T_A = 25^\circ\text{C}$
 - TO-92 ----- 0.625W
 - SOT-89 ----- 0.571W
- Package Thermal Resistance (Note 1)
 - TO-92, θ_{JA} ----- 160°C/W
 - SOT-89, θ_{JA} ----- 175°C/W
- Operating Junction Temperature Range ----- -40°C to 125°C
- Storage Temperature Range ----- -65°C to 150°C

Electrical Characteristics

($V_{IN} = 7.0\text{V}$, $T_A = 25^\circ\text{C}$, unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---------------------------|-------------------|--|-------|-------|-------|---------------------|
| Output Voltage (Note 2) | RT9165 | $V_{IN} = V_{OUT} + 2\text{V}$ | 4.900 | 5.000 | 5.100 | V |
| | RT9165-80 | | 7.840 | 8.000 | 8.160 | |
| Line Regulation (Note 2) | ΔV_{LINE} | $V_{IN} = V_{OUT} + 2\text{V} \sim 16\text{V}$ | -- | 0.1 | 0.5 | % |
| Load Regulation (Note 2) | ΔV_{LOAD} | $I_L = 0 \sim 150\text{mA}$ | -- | 0.2 | 0.5 | % |
| Dropout Voltage (Note 3) | V_{DROP} | $\Delta V_{OUT} = 1\%$ | -- | 1.2 | 1.3 | V |
| Current Limit | I_{LIM} | | 300 | -- | -- | mA |
| Quiescent Current | I_Q | | -- | 4.5 | 8 | mA |
| Temperature Coefficient | T_C | | -- | 0.005 | -- | $\%/^\circ\text{C}$ |
| Temperature Stability | T_S | | -- | 0.5 | -- | % |
| RMS Output Noise (Note 4) | | | -- | 0.003 | -- | $\%/V_{OUT}$ |

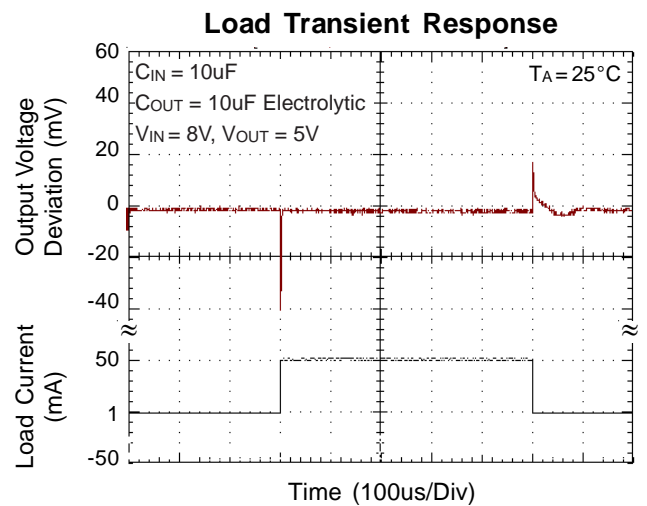
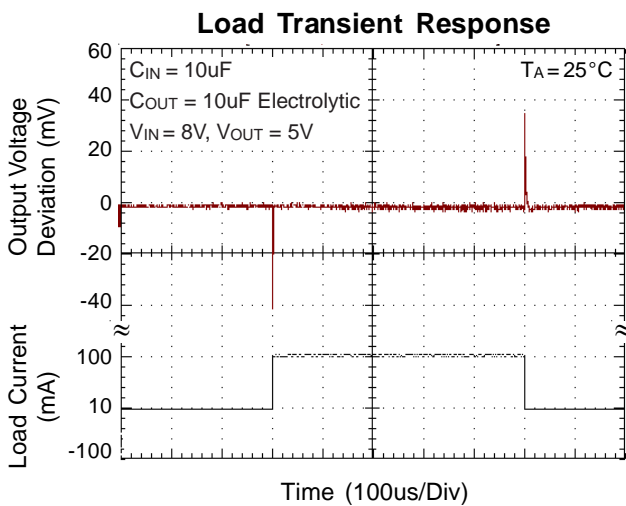
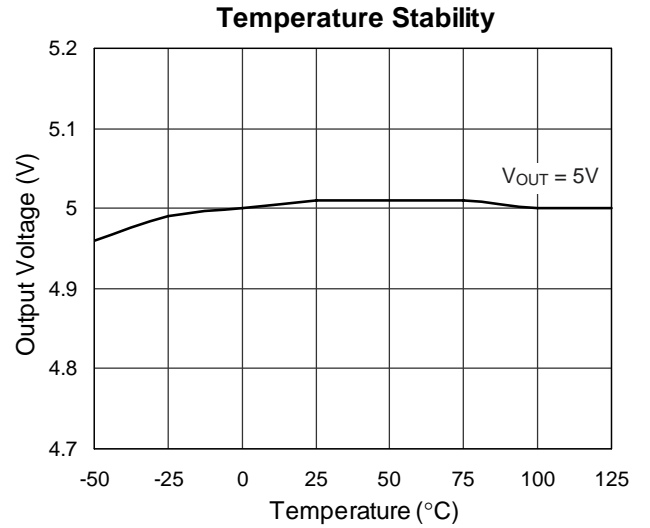
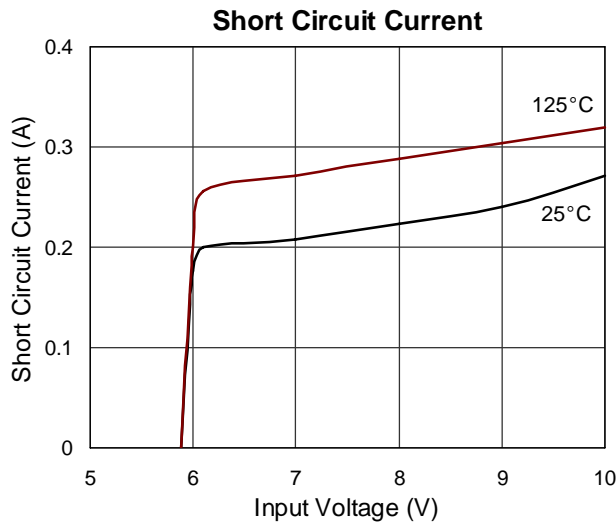
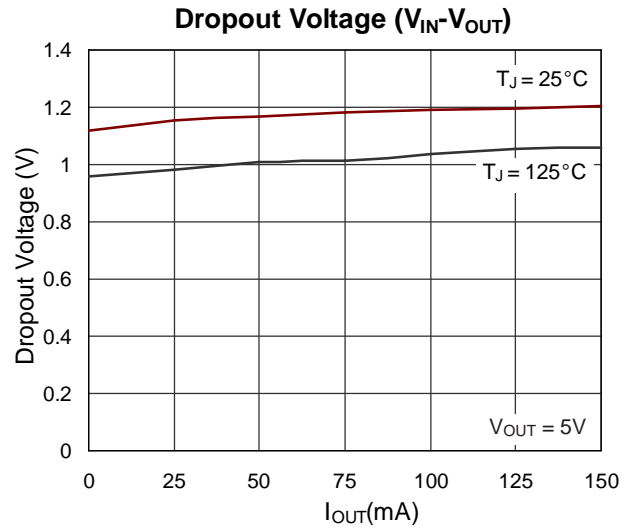
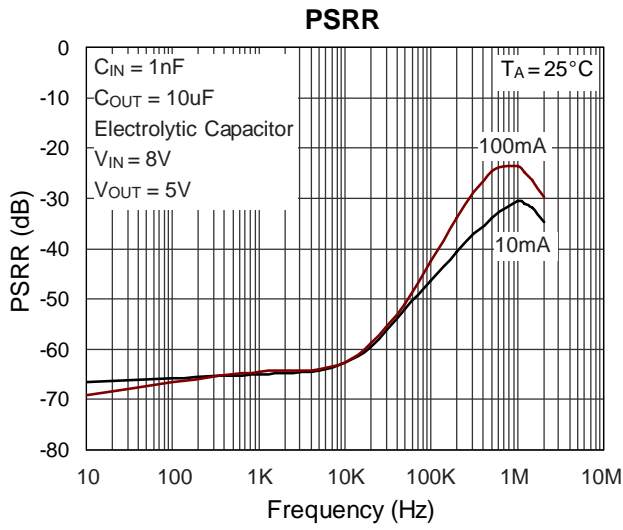
Note 1. θ_{JA} is measured in the natural convection at $T_A = 25^\circ\text{C}$ on a low effective thermal conductivity test board of JEDEC 51-3 thermal measurement standard.

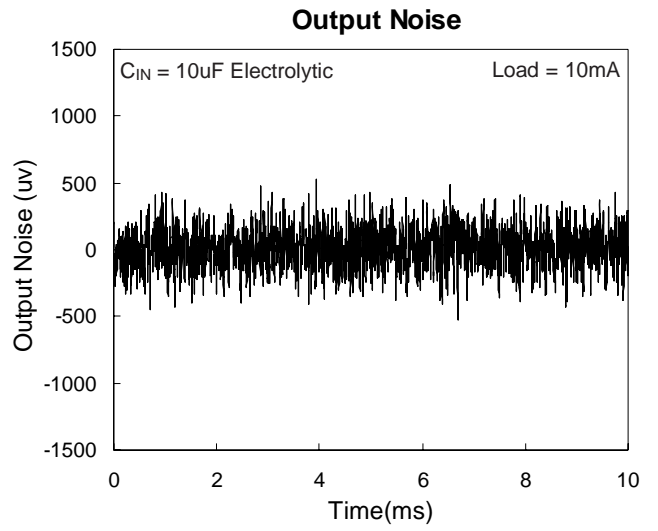
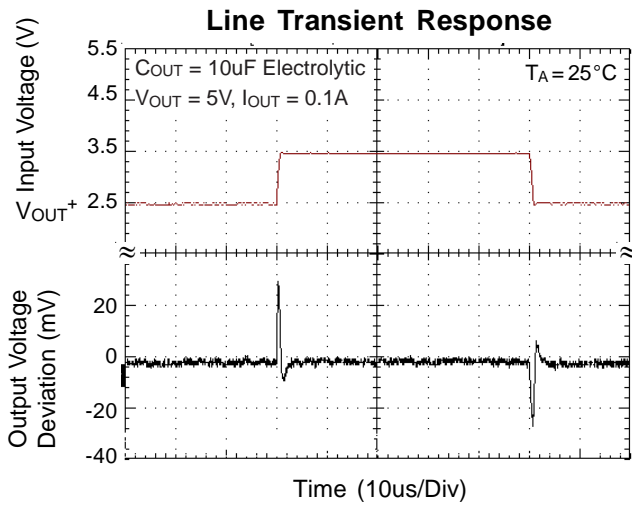
Note 2. Low duty cycle pulse testing with Kelvin connections required.

Note 3. The dropout voltage is defined as $V_{IN} - V_{OUT}$, which is measured when V_{OUT} is $V_{OUT(NORMAL)} - 100\text{mV}$.

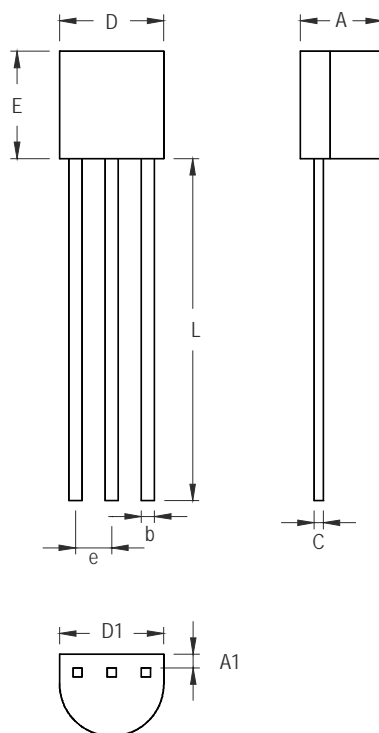
Note 4. Bandwidth of 10Hz to 10kHz.

Typical Operating Characteristics



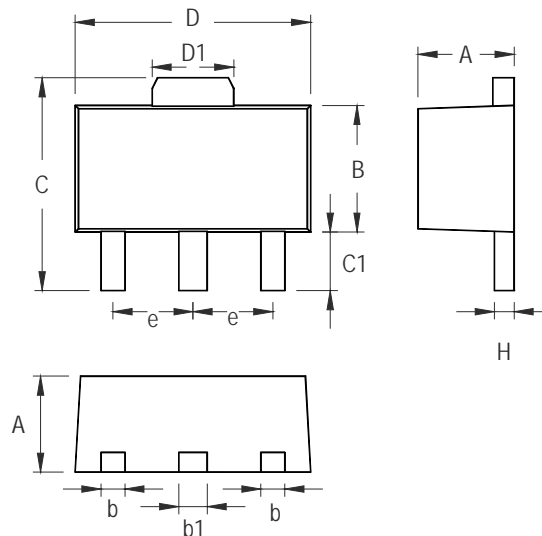


Outline Dimension



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 3.175 | 4.191 | 0.125 | 0.165 |
| A1 | 1.143 | 1.372 | 0.045 | 0.054 |
| b | 0.406 | 0.533 | 0.016 | 0.021 |
| C | 0.406 | 0.533 | 0.016 | 0.021 |
| D | 4.445 | 5.207 | 0.175 | 0.205 |
| D1 | 3.429 | 5.029 | 0.135 | 0.198 |
| E | 4.318 | 5.334 | 0.170 | 0.210 |
| e | 1.143 | 1.397 | 0.045 | 0.055 |
| L | 12.700 | | 0.500 | |

3-Lead TO-92 Plastic Package



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.397 | 1.600 | 0.055 | 0.063 |
| b | 0.356 | 0.483 | 0.014 | 0.019 |
| B | 2.388 | 2.591 | 0.094 | 0.102 |
| b1 | 0.406 | 0.533 | 0.016 | 0.021 |
| C | 3.937 | 4.242 | 0.155 | 0.167 |
| C1 | 0.787 | 1.194 | 0.031 | 0.047 |
| D | 4.394 | 4.597 | 0.173 | 0.181 |
| D1 | 1.397 | 1.753 | 0.055 | 0.069 |
| e | 1.448 | 1.549 | 0.057 | 0.061 |
| H | 0.356 | 0.432 | 0.014 | 0.017 |

3-Lead SOT-89 Surface Mount Package

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