

2A Fixed and Adjustable Low Dropout Positive Voltage Regulators

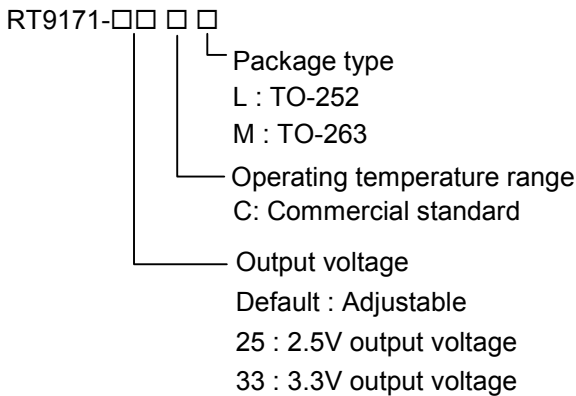
General Description

The RT9171 is a high performance positive voltage regulator designed for applications requiring low dropout at fully rated current. Additionally, the RT9171 provides excellent regulation over variations in line and load. Outstanding features include low dropout performance at rated current, fast transient response, internal current-limiting, and thermal-shutdown protection of the output device. The RT9171 three-terminal regulator offers fixed 2.5V and 3.3V output voltages, and adjustable voltage options available in TO-252 and TO-263 packages.

Applications

- Active SCSI Termination
- Low Voltage Microcontrollers
- Switching Power Supply Post-Regulator

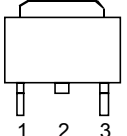
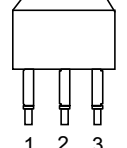
Ordering Information



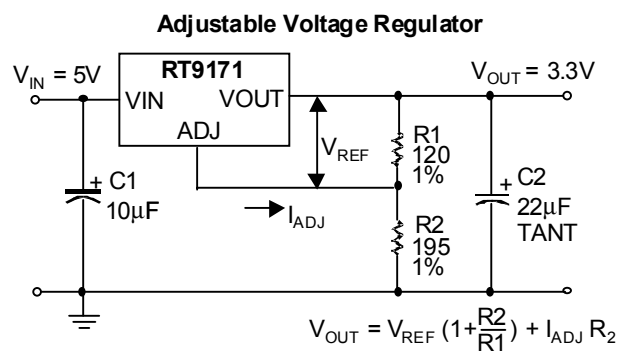
Features

- **Low Dropout, 1.6V Max.**
- **Full Current Rating Over Line and Temperature**
- **Fast Transient Response**
- **±1 % Output Voltage Accuracy**
- **Adjustable and Fixed Output Voltage**
- **TO- 252 and TO- 263 Packages**

Pin Configurations

| Part Number | Pin Configurations |
|---------------------------------|--|
| RT9171-□□CL (Plastic TO-252) |  <p>TOP VIEW</p> <ol style="list-style-type: none"> 1. ADJ/GND 2. VOUT (TAB) 3. VIN |
| RT9171-□□CM (Plastic TO-263) |  <p>TOP VIEW</p> <ol style="list-style-type: none"> 1. ADJ/GND 2. VOUT (TAB) 3. VIN |

Typical Application Circuit



- (1) C1 needed if device is far from filter capacitors.
- (2) C2 required for stability.

Pin Description

| Pin Name | Pin Function |
|-----------|-------------------------|
| ADJ / GND | Adjust Output or Ground |
| VOUT | Output Voltage |
| VIN | Power Input |

Absolute Maximum Ratings

| | |
|---|----------------|
| • Input Voltage | 9V |
| • Operating Junction Temperature Range | -40°C to 125°C |
| • Storage Temperature Range | -65°C to 150°C |
| • Lead Temperature (Soldering, 10 sec.) | 260°C |
| • Package Thermal Resistance | |
| TO-252, θ_{JC} | 15°C/W |
| TO-252, θ_{JA} | 56°C/W |
| TO-263, θ_{JC} | 8°C/W |
| TO-263, θ_{JA} | 19.4°C/W |

Electrical Characteristics

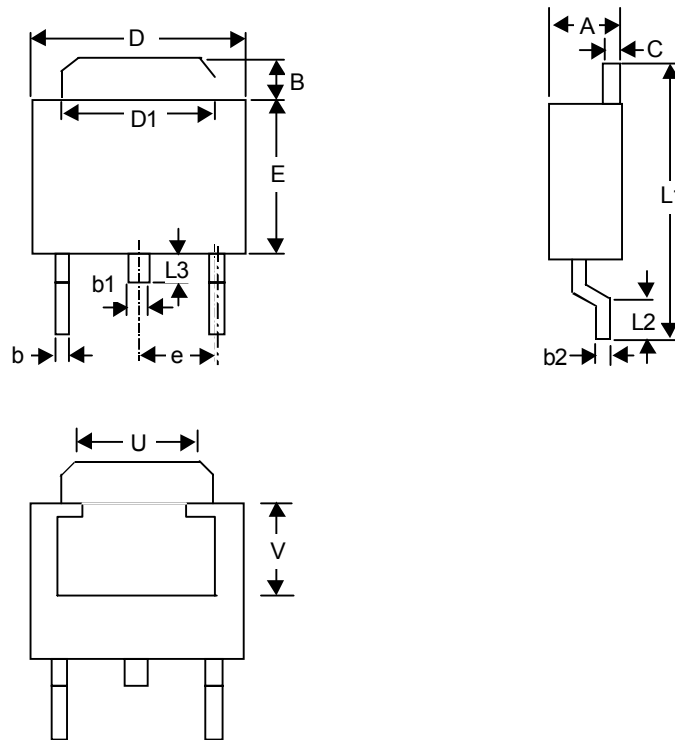
($T_A = 25^\circ\text{C}$, unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Units | |
|----------------------------------|-------------------|---|--|-------|-------|---------------|---|
| Reference Voltage ⁽¹⁾ | RT9171 | V_{REF} | $I_{OUT} = 10\text{mA}$, $(V_{IN} - V_{OUT}) = 2\text{V}$ $T_A = 25^\circ\text{C}$ | 1.238 | 1.250 | 1.262 | V |
| | | | $10\text{mA} < I_{OUT} < 2\text{A}$, $1.6\text{V} < V_{IN} - V_{OUT} < 9\text{V}$ | 1.225 | 1.250 | 1.270 | |
| Output Voltage | RT9171-25 | V_{OUT} | $V_{IN} = V_{OUT} + 2\text{V}$, $I_{OUT} = 10\text{mA}$ | 2.475 | 2.5 | 2.525 | V |
| | RT9171-33 | | | 3.267 | 3.3 | 3.333 | |
| Line Regulation ⁽¹⁾ | ΔV_{LINE} | $I_{OUT} = 10\text{mA}$ $1.6\text{V} \leq V_{IN} - V_{OUT} \text{ to } V_{IN} = 9\text{V}$ | -- | 0.1 | 0.3 | % | |
| Load Regulation ⁽¹⁾ | ΔV_{LOAD} | $(V_{IN} - V_{OUT}) = 2\text{V}$, $0\text{mA} \leq I_{OUT} \leq 2\text{A}$ | -- | 0.2 | 0.4 | % | |
| Dropout Voltage ⁽²⁾ | V_{DROP} | $I_{OUT} = 100\text{mA}$ | -- | 1.1 | 1.2 | V | |
| | | $I_{OUT} = 2\text{A}$ | -- | 1.4 | 1.6 | | |
| Current Limit | I_{LIMIT} | $V_{IN} = 5\text{V}$ | 2.2 | 3 | -- | A | |
| Minimum Load Current | RT9171 | $(V_{IN} - V_{OUT}) = 2\text{V}$ | -- | 5 | 10 | mA | |
| Ripple Rejection | PSRR | $f_{RIPPLE} = 120\text{Hz}$, $(V_{IN} - V_{OUT}) = 2\text{V}$, $V_{RIPPLE} = 1V_{P-P}$ | -- | 72 | -- | dB | |
| Adjust Pin Current | I_{ADJ} | | -- | 65 | 120 | μA | |
| Adjust Pin Current Change | ΔI_{ADJ} | $10\text{mA} \leq I_{OUT} \leq 1\text{A}$, $V_{IN} = 5\text{V}$ | -- | 0.2 | 5 | μA | |

Notes: (1) Low duty cycle pulse testing with Kelvin connections.

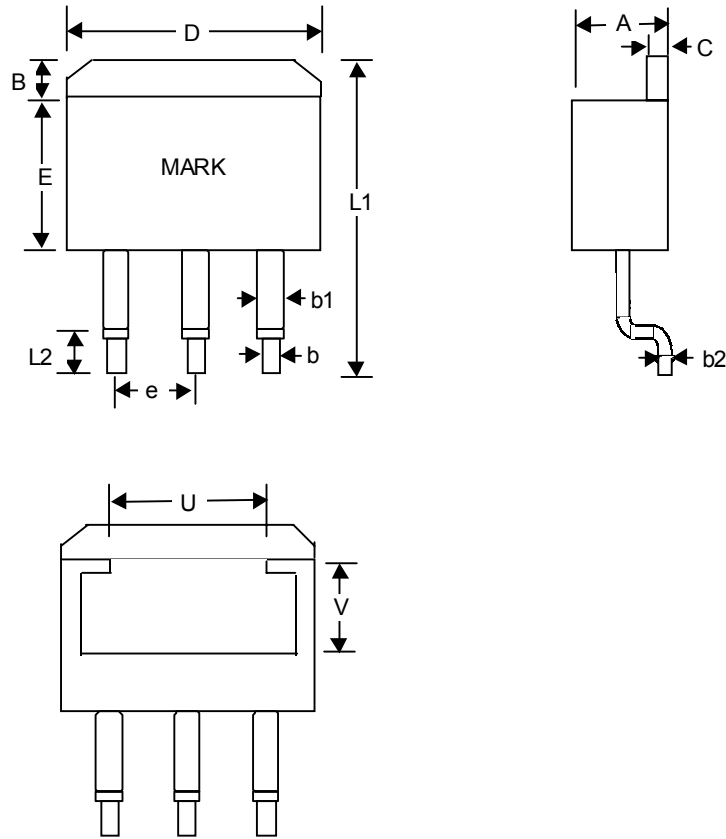
(2) ΔV_{OUT} and $\Delta V_{REF} = 1\%$.

Package Information



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 2.184 | 2.388 | 0.086 | 0.094 |
| B | 0.889 | 2.032 | 0.035 | 0.080 |
| b | 0.508 | 0.889 | 0.020 | 0.035 |
| b1 | 1.016 Ref. | | 0.040 Ref. | |
| b2 | 0.457 | 0.584 | 0.018 | 0.023 |
| C | 0.457 | 0.584 | 0.018 | 0.023 |
| D | 6.350 | 6.731 | 0.250 | 0.265 |
| D1 | 5.207 | 5.461 | 0.205 | 0.215 |
| E | 5.334 | 6.223 | 0.210 | 0.245 |
| e | 2.108 | 2.438 | 0.083 | 0.096 |
| L1 | 9.398 | 10.414 | 0.370 | 0.410 |
| L2 | 0.508 | -- | 0.020 | -- |
| L3 | 0.635 | 1.016 | 0.025 | 0.040 |
| U | 3.810 Ref. | | 0.150 Ref. | |
| V | 3.048 Ref. | | 0.120 Ref. | |

3-Lead TO-252 Plastic Surface Mount Package



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 4.064 | 4.826 | 0.160 | 0.190 |
| B | 1.143 | 1.676 | 0.045 | 0.066 |
| b | 0.660 | 0.914 | 0.026 | 0.036 |
| b1 | 1.143 | 1.397 | 0.045 | 0.055 |
| b2 | 0.305 | 0.584 | 0.012 | 0.023 |
| C | 1.143 | 1.397 | 0.045 | 0.055 |
| D | 9.652 | 10.668 | 0.380 | 0.420 |
| E | 8.128 | 9.652 | 0.320 | 0.380 |
| e | 2.286 | 2.794 | 0.090 | 0.110 |
| L1 | 14.605 | 15.875 | 0.575 | 0.625 |
| L2 | 2.286 | 2.794 | 0.090 | 0.110 |
| U | 6.223 Ref. | | 0.245 Ref. | |
| V | 7.620 Ref. | | 0.300 Ref. | |

3-Lead TO- 263 Surface Mount

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