# EZ1588
## 2.0A Low Dropout Positive Voltage Regulators



## Description

The EZ1588 is a high performance positive voltage regulator designed for use in applications requiring low dropout performance at 2A. Additionally, the EZ1588 series provides excellent regulation over variations in line, load and temperature.

Outstanding features include low dropout performance at rated current, fast transient response, internal current limiting and thermal shutdown protection of the output device.

The EZ1588 series are three terminal regulators with fixed and adjustable voltage options available in popular packages.

## Features

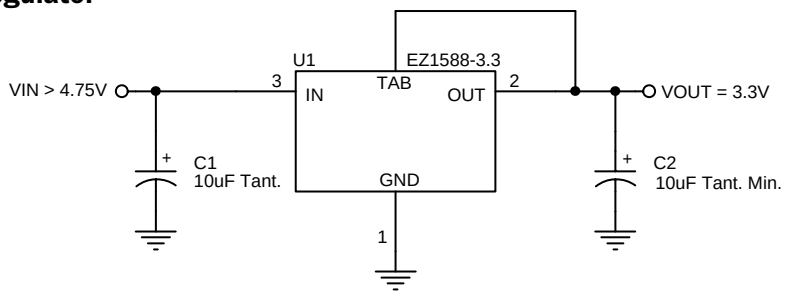
- Low dropout performance: 1.3V max.
- Full current rating over line and temperature
- Fast transient response
- ±2% total output regulation over line, load and temperature
- Adjust pin current max. 90µA over temperature
- Fixed/adjustable output voltage
- Line regulation typically 0.005%
- Load regulation typically 0.05%
- TO-220 or TO-263 packages

## Applications

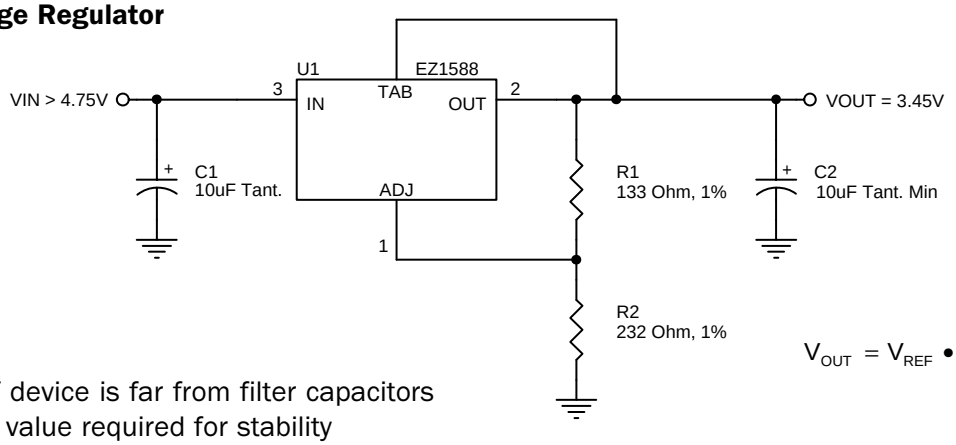
- Memory supplies
- Graphics core supplies
- 2.5V to 3.6V microprocessor supplies
- Low voltage logic supplies
- Battery-powered circuitry
- Post regulator for switching supply

## Typical Application Circuit

**Fixed Voltage Regulator**




**Adjustable Voltage Regulator**




$$V_{OUT} = V_{REF} \bullet \left(1 + \frac{R2}{R1}\right) + I_{ADJ} \bullet R2$$

**Notes:**

(1) C1 needed if device is far from filter capacitors

(2) C2 minimum value required for stability

## Absolute Maximum Ratings

| Parameter | Symbol | Maximum | Units |
|---|---|---|---|
| Input Supply Voltage | $V_{IN}$ | 7 | V |
| Power Dissipation | $P_D$ | Internally Limited | W |
| Thermal Resistance Junction to Case<br>TO-220<br>TO-263 | $\theta_{JC}$ | <br>3<br>3 | °C/W |
| Thermal Resistance Junction to Ambient<br>TO-220<br>TO-263 | $\theta_{JA}$ | <br>50<br>60 | °C/W |
| Operating Junction Temperature Range | $T_J$ | 0 to 125 | °C |
| Storage Temperature Range | $T_{STG}$ | -65 to 150 | °C |
| Lead Temperature (Soldering) 10 Sec. | $T_{LEAD}$ | 300 | °C |
| ESD Rating (Human Body Model) | $V_{ESD}$ | 2 | kV |

## Electrical Characteristics

Unless otherwise specified: Adj. $V_{IN}$ = 2.75 to 7.0V and Adj. $I_O$ = 10mA to 2.0A; Fixed $V_{IN}$ = 4.75 to 7.0V and Fixed $I_O$ = 0mA to 2.0A

| Parameter | Symbol | $V_{IN}$ | $I_O$ | $T_J$ (4) | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|---|---|
| Output Voltage (1) | $V_O$ | 5V | 0mA | 25°C | 0.99$V_O$ | $V_O$ | 1.01$V_O$ | V |
| Fixed Voltage Version | | | | O.T. | 0.98$V_O$ | $V_O$ | 1.02$V_O$ | |
| Reference Voltage (1) | $V_{REF}$ | 5V | 10mA | 25°C | 1.238 | 1.250 | 1.262 | V |
| Adj. Voltage Version | | | | O.T. | 1.225 | 1.250 | 1.275 | |
| Line Regulation (1) | $REG_{(LINE)}$ | | | 25°C | | 0.005 | 0.2 | % |
| Fixed Voltage Version | | | 0mA | O.T. | | 0.035 | 0.2 | |
| Adj. Voltage Version | | | 10mA | | | | | |
| Load Regulation (1) | $REG_{(LOAD)}$ | 5V | | 25°C | | 0.05 | 0.3 | % |
| | | | | O.T. | | 0.2 | 0.4 | |
| Dropout Voltage (2) | $V_D$ | | | 25°C | | 1 | | V |
| | | | | O.T. | | 1.1 | 1.3 | |
| Current Limit | $I_{CL}$ | | | O.T. | 2.0 | 2.5 | | A |
| Quiescent Current<br>Fixed Voltage Version | $I_Q$ | 5V | | O.T. | | 10 | 13 | mA |
| Termperature Coefficient | $T_C$ | | | O.T. | | 0.004 | 0.02 | %/°C |

## Electrical Characteristics (Cont.)

Unless otherwise specified: Adj. $V_{IN}$ = 2.75 to 7.0V and Adj. $I_O$ = 10mA to 2.0A; Fixed $V_{IN}$ = 4.75 to 7.0V and Fixed $I_O$ = 0mA to 2.0A

| Parameter | Symbol | $V_{IN}$ | $I_O$ | $T_J$(4) | Min | Typ | Max | Units |
|---|---|---|---|---|---|---|---|---|
| Adjust Pin Current | $I_{ADJ}$ | | | 25°C | | 55 | | µA |
| | | | | O.T. | | | 90 | |
| Adjust Pin Current Change | $\Delta I_{ADJ}$ | | | O.T. | | 0.2 | 5 | µA |
| Temperature Stability | $T_S$ | 5V | 0.5A | O.T. | | 0.5 | | % |
| Minimum Load Current Adj Voltage Version | $I_O$ | 5V | | O.T. | | 5 | 10 | mA |
| RMS Output Noise(3) | $V_N$ | | | 25°C | | 0.003 | | $\%V_O$ |
| Ripple Rejection Ratio (4) | $R_A$ | 5V | 2.0A | O.T. | 60 | 72 | | dB |

**Notes:**

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

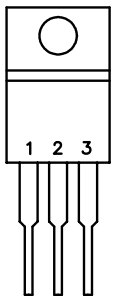
(2) $\Delta V_{OUT}$, $\Delta V_{REF}$ = 1%

(3) Bandwidth of 10 Hz to 10 kHz.

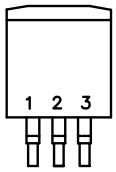
(4) 120 Hz input ripple, ($C_{ADJ}$ for ADJ = 25µF).

(5) Over Temp. (O.T.) = over specified operating junction temperature range.

## Pin Configuration




TO–220




TO–263

| PIN | FUNCTION |
|---|---|
| 1 | ADJ/GND |
| 2 | OUTPUT |
| 3 | INPUT |

TAB IS OUTPUT

## Ordering Information

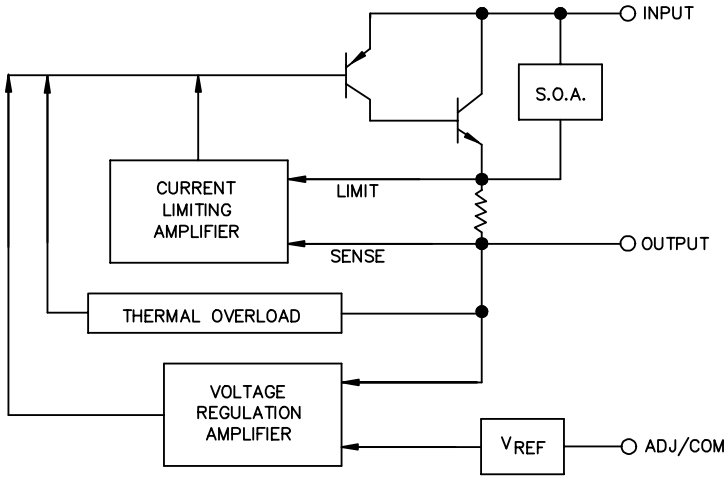
| Device[1] | Package |
|---|---|
| EZ1588CT-X.X | TO-220 |
| EZ1588CM-X.X.TR | TO-263[2] |

**Notes:**

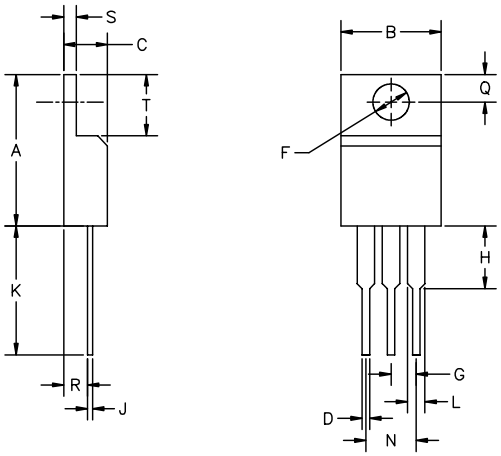
(1) Where X.X denotes voltage options. Available voltages are: 3.3V. Leave blank for adjustable version (1.3 to 5.7V). Contact factory for additional voltage options.

(2) Only available in tape and reel packaging. A reel contains 800 devices.

## Block Diagram



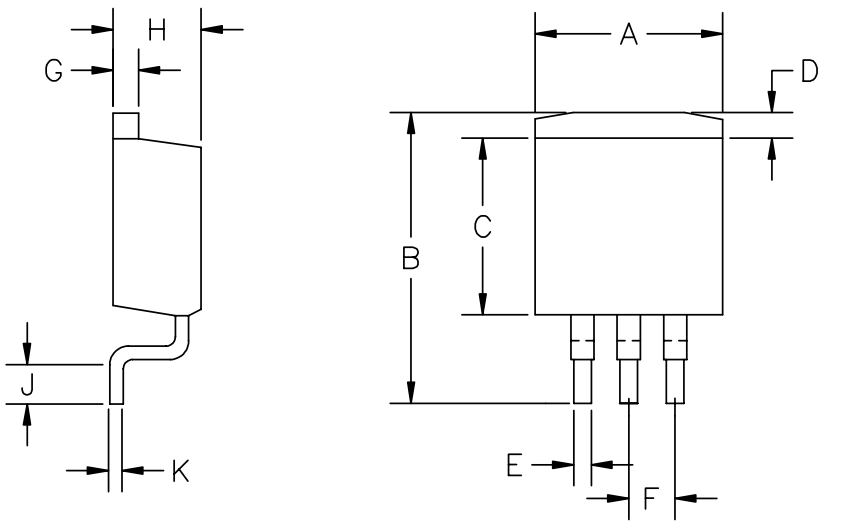

## Outline Drawing - TO-220




| DIMENSIONS | | | | | |
|---|---|---|---|---|---|
| DIM | INCHES | | MM | | NOTE |
| | MIN | MAX | MIN | MAX | |
| A | .560 | .650 | 14.23 | 16.51 | |
| B | .380 | .420 | 9.66 | 10.66 | |
| C | .140 | .190 | 3.56 | 4.82 | |
| D | .020 | .045 | 0.51 | 1.14 | |
| F | .139 | .161 | 3.54 | 4.08 | |
| G | .090 | .110 | 2.29 | 2.79 | |
| H | – | .250 | – | 6.35 | |
| J | .012 | .045 | .31 | 1.14 | |
| K | .500 | .580 | 12.70 | 14.73 | |
| L | .045 | .070 | 1.15 | 1.77 | |
| N | .190 | .210 | 4.83 | 5.33 | |
| Q | .100 | .135 | 2.54 | 3.42 | |
| R | .080 | .115 | 2.04 | 2.92 | |
| S | .020 | .055 | .51 | 1.39 | |
| T | .230 | .270 | 5.85 | 6.85 | |

JEDEC TO–220

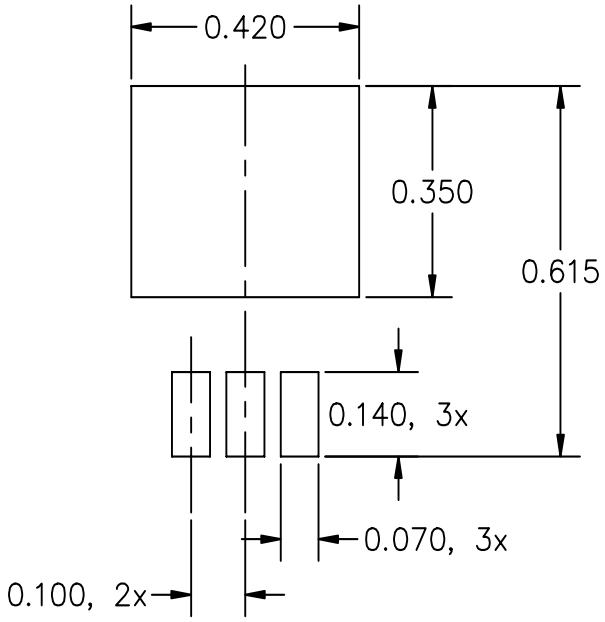
## Outline Drawing - TO-263




| DIMENSIONS | | | | | |
|---|---|---|---|---|---|
| DIM | INCHES | | MM | | NOTE |
| | MIN | MAX | MIN | MAX | |
| A | .380 | .405 | 9.65 | 10.29 | — |
| B | .575 | .625 | 14.60 | 15.88 | — |
| C | .325 | .340 | 8.25 | 8.64 | — |
| D | .055 | .066 | 1.40 | 1.68 | — |
| E | .020 | .039 | .50 | .99 | — |
| F | .100 BSC | | 2.54 BSC | | — |
| G | .045 | .055 | 1.14 | 1.40 | — |
| H | .160 | .190 | 4.06 | 4.83 | — |
| J | .090 | .110 | 2.28 | 2.80 | — |
| K | .018 | .029 | .457 | .736 | — |

JEDEC TO-263

## Land Pattern - TO-263




NOTE: ALL DIMENSIONS ARE IN INCHES

## Contact Information

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