

October 3, 2000

TEL:805-498-2111 FAX:805-498-3804 WEB:http://www.semtech.com

## DESCRIPTION

The EZ1086 series of high performance positive voltage regulators are designed for use in applications requiring low dropout performance at full rated current. Additionally, the EZ1086 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.

A variety of options are available for maximum flexibility: the EZ1086C has both fixed and adjustable voltage options and is designed for use in commercial applications; the EZ1086BC is adjustable only for cost sensitive commercial applications; the EZ1086I is adjustable only for industrial applications. All devices are available in the popular TO-220 and TO-263 packages.

## APPLICATIONS

- Post regulators
- Battery chargers

## FEATURES

- Low dropout voltage: 1.3V max. for EZ1086C, 1.4V max. for EZ1086I, 1.45V max. for EZ1086BC
- Full current rating over line and temperature
- Fast transient response
- $\pm 2\%$  total output regulation over line, load and temperature ( $\pm 2.4\%$  for EZ1086BC)
- Adjust pin current max 90 $\mu$ A over temperature
- Fixed/adjustable output voltage (EZ1086C)
- Line regulation typically 0.015%
- Load regulation typically 0.05%
- Industrial temperature range (EZ1086I)
- TO-220 and TO-263 packages

## ORDERING INFORMATION

| DEVICE <sup>(1)(2)</sup>                       | PACKAGE               |
|--|-----------------------|
| EZ1086BCM.TR<br>EZ1086CM-X.X.TR<br>EZ1086IM.TR | TO-263 <sup>(3)</sup> |
| EZ1086BCT<br>EZ1086CT-X.X<br>EZ1086IT          | TO-220 <sup>(4)</sup> |

Notes:

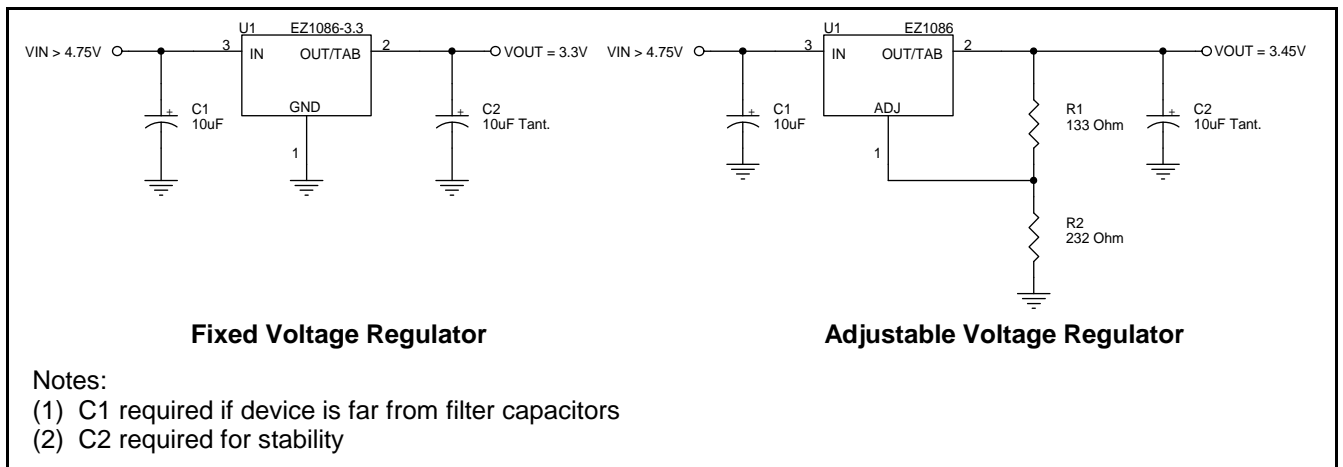
(1) Where X.X denotes voltage options (EZ1086C only). Available voltages are: 2.5V, 3.3V and 3.45V. Leave blank for adjustable version (1.3 to 5.7V). Contact factory for additional voltage options.

(2) Where C and I denote Commercial (0°C to 70°C) and Industrial (-40°C to 85°C) ambient temperature ranges.

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

(4) Only available in tube packaging. A tube contains 50 devices.

## TYPICAL APPLICATIONS



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**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              | $\theta_{JC}$ | 3<br>3                 | °C/W  |
| Thermal Resistance Junction to Ambient<br>TO-220<br>TO-263           | $\theta_{JA}$ | 50<br>60               | °C/W  |
| Operating Ambient Temperature Range<br>EZ1086BC, EZ1086C<br>EZ1086I  | $T_A$         | 0 to 70<br>-40 to 85   | °C    |
| Operating Junction Temperature Range<br>EZ1086BC, EZ1086C<br>EZ1086I | $T_J$         | 0 to 125<br>-40 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)  | ESD           | 2                      | kV    |

**ELECTRICAL CHARACTERISTICS**

Unless otherwise specified: Adj  $V_{IN} = 2.75V$  to  $7.0V$  and Adj  $I_O = 10mA$  to  $1.5A$ ; Fixed  $V_{IN} = 4.75$  to  $7.0V$  and Fixed  $I_O = 0$  mA to  $1.5A$ .  
 Values in **bold** apply over full operating ambient temperature range.

| Parameter   | Symbol         | $V_{IN}$ | $I_O$ | Min   | Typ                  | Max   | Units |
|---|----------------|----------|-------|---|----------------------|---|-------|
| Output Voltage <sup>(1)</sup><br>EZ1086C-X.X  | $V_O$          | 5V       | 0mA   | 0.99IV <sub>O</sub> I<br><b>0.98IV<sub>O</sub>I</b> | $V_O$                | 1.01IV <sub>O</sub> I<br><b>1.02IV<sub>O</sub>I</b> | V     |
| Reference Voltage <sup>(1)</sup><br>EZ1086C, EZ1086I  | $V_{REF}$      | 5V       | 10mA  | 1.238<br><b>1.225</b>                               | 1.250                | 1.262<br><b>1.275</b>                               | V     |
| Reference Voltage <sup>(1)</sup><br>EZ1086BC  | $V_{REF}$      | 5V       | 10mA  | 1.233<br><b>1.220</b>                               | 1.250                | 1.267<br><b>1.280</b>                               | V     |
| Line Regulation <sup>(1)</sup>  | $REG_{(LINE)}$ |          | 10mA  |   | 0.045                | <b>0.2</b>  | %     |
| Load Regulation <sup>(1)</sup>  | $REG_{(LOAD)}$ | 5V       |       |   | 0.15                 | <b>0.4</b>  | %     |
| Dropout Voltage<br>EZ1086C, EZ1086C-X.X <sup>(2)</sup><br>EZ1086BC <sup>(2)</sup><br>EZ1086I <sup>(2)</sup> | $V_D$          |          | 1.5A  |   | 1.20<br>1.20<br>1.20 | <b>1.30</b><br><b>1.45</b><br><b>1.40</b>           | V     |
| Current Limit   | $I_{CL}$       |          |       | <b>1.5</b>  | 2.0                  |   | A     |
| Quiescent Current Fixed Voltage<br>Version  | $I_Q$          | 5V       |       |   | 10                   | <b>14</b>   | mA    |
| Temperature Coefficient   | $T_C$          |          |       |   | <b>0.005</b>         |   | %/°C  |

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### ELECTRICAL CHARACTERISTICS (Cont.)

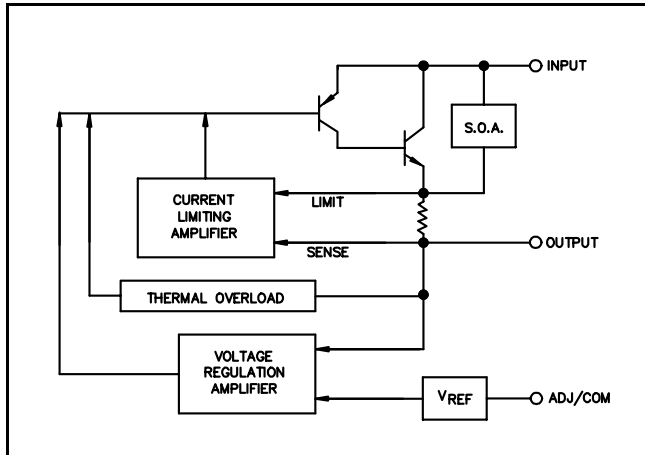
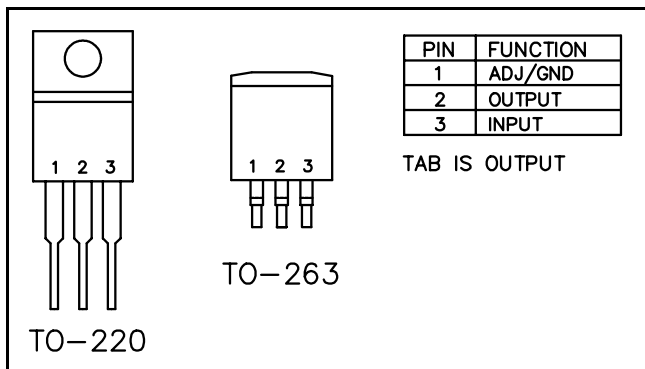
Unless otherwise specified: Adj  $V_{IN}$  = 2.75V to 7.0V and Adj  $I_O$  = 10mA to 1.5A; Fixed  $V_{IN}$  = 4.75 to 7.0V and Fixed  $I_O$  = 0 mA to 1.5A. Values in **bold** apply over full operating ambient temperature range.

| Parameter                                  | Symbol           | $V_{IN}$ | $I_O$ | Min       | Typ        | Max       | Units   |
|--|------------------|----------|-------|-----------|------------|-----------|---------|
| Adjust Pin Current                         | $I_{ADJ}$        |          |       |           | 55         | <b>90</b> | $\mu A$ |
| Adjust Pin Current Change                  | $\Delta I_{ADJ}$ |          |       |           | 0.2        | <b>5</b>  | $\mu A$ |
| Temperature Stability                      | $T_S$            | 5V       | 0.5A  |           | <b>0.5</b> |           | %       |
| Minimum Load Current Adj. Voltage Versions | $I_O$            | 5V       |       |           | 5          | <b>10</b> | mA      |
| RMS Output Noise <sup>(3)</sup>            | $V_N$            |          |       |           | 0.003      |           | % $V_O$ |
| Ripple Rejection Ratio <sup>(4)</sup>      | $R_A$            | 5V       | 1.5A  | <b>60</b> | 72         |           | dB      |

#### NOTES:

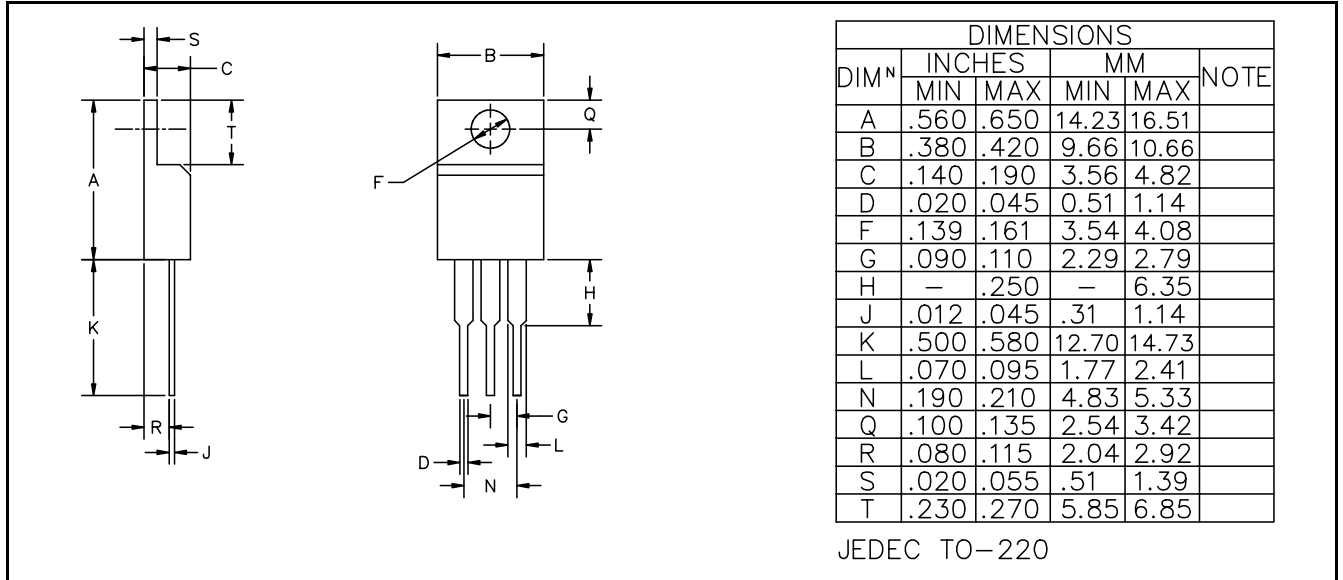
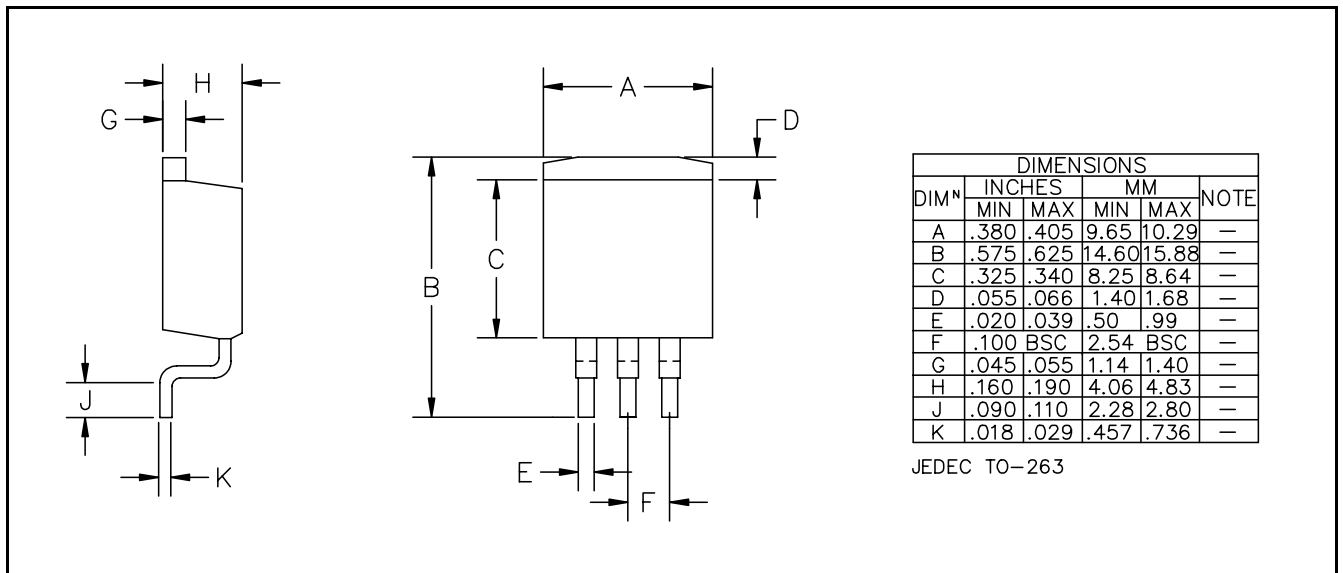
- (1) Low duty cycle pulse testing with Kelvin connections required.
- (2)  $\Delta V_{OUT}, \Delta V_{REF} = 1\%$
- (3) Bandwidth of 10 Hz to 10 kHz.
- (4) 120 Hz input ripple ( $C_{ADJ}$  for ADJ = 25 $\mu F$ ).
- (5) Over Temp. (O.T.) = over specified operating junction temperature range.

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**BLOCK DIAGRAM**

**PIN CONFIGURATIONS**

**PIN DESCRIPTIONS**

| Pin | Pin Name | Pin Function  |
|-----|----------|---|
| 1   | ADJUST / | This pin is the negative side of the reference voltage for adjustable devices. Transient response can be improved by adding a small bypass capacitor from the adjust pin to ground. |
|     | GROUND   | This pin is the bottom end of the internal resistor feedback chain for fixed output voltage parts, and should be connected to ground.   |
| 2   | OUTPUT   | This is the power output of the device, and is electrically connected to the TAB.   |
| 3   | INPUT    | This is the input supply pin for both the control circuitry and the pass device.  |

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**DEVICE OUTLINE - TO-220**

**DEVICE OUTLINE - TO-263**


ECN00-1352