**NOTES:**

## 1.0 ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings †

Input Voltage ........................................................ 6.5V

Output Voltage .............................. (-0.3) to ($V_{IN}$ + 0.3)

Operating Temperature .................. -40°C < $T_J$< 125°C

Storage Temperature ......................... -65°C to +150°C

Maximum Voltage on Any Pin ........ $V_{IN}$ +0.3V to -0.3V

† **Notice:** Stresses above 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 above those indicated in the operation sections of the specifications is not implied. Exposure to Absolute Maximum Rating conditions for extended periods my affect device reliability.

## ELECTRICAL SPECIFICATIONS

**Electrical Specifications:** Unless otherwise noted, $V_{IN} = V_R$ + 1V, $I_L$ = 100 µA, $C_L$ = 3.3 µF, $\overline{SHDN} > V_{IH}$, $T_A$ = +25°C. **BOLDFACE** type specifications apply for junction temperature of -40°C to +125°C.

| Parameter | Sym | Min | Typ | Max | Units | Conditions |
|---|---|---|---|---|---|---|
| Input Operating Voltage | $V_{IN}$ | 2.7 | — | 6.0 | V | **Note 1** |
| Maximum Output Current | $IOUT_{MAX}$ | 50 | — | — | mA | TC2054 |
| | | 100 | — | — | | TC2055 |
| | | 150 | — | — | | TC2186 |
| Output Voltage | $V_{OUT}$ | $V_R$ - 2.0% | $V_R$ ± 0.4% | $V_R$ + 2.0% | V | **Note 2** |
| $V_{OUT}$ Temperature Coefficient | $TCV_{OUT}$ | — | 20 | — | ppm/°C | **Note 3** |
| | | — | 40 | — | | |
| Line Regulation | $\Delta V_{OUT}/\Delta V_{IN}$ | — | 0.05 | 0.5 | % | ($V_R$ + 1V) ≤ $V_{IN}$ ≤ 6V |
| Load Regulation | $\Delta V_{OUT}/V_{OUT}$ | -1.0 | 0.33 | +1.0 | % | TC2054;TC2055 $I_L$ = 0.1 mA to $IOUT_{MAX}$ |
| | | -2.0 | 0.43 | +2.0 | | TC2186 $I_L$ = 0.1 mA to $IOUT_{MAX}$ |
| | | | | | | **Note 6** |
| Dropout Voltage, **Note 7** | $V_{IN} – V_{OUT}$ | — | 2 | — | mV | $I_L$ = 100 µA |
| | | — | 45 | 70 | | $I_L$ = 50 mA |
| | | — | 90 | 140 | | TC2015; TC2185 $I_L$ = 100 mA |
| | | — | 140 | 210 | | TC2185 $I_L$ = 150 mA |
| | | | | | | **Note 7** |
| Supply Current | $I_{IN}$ | — | 55 | 80 | µA | $\overline{SHDN} = V_{IH}$, $I_L$=0 |
| Shutdown Supply Current | $I_{INSD}$ | — | 0.05 | 0.5 | µA | $\overline{SHDN}$ = 0V |
| Power Supply Rejection Ratio | PSRR | — | 50 | — | dB | $F_{RE}$ ≤ 100 kHz |
| Output Short Circuit Current | $IOUT_{SC}$ | 160 | 300 | — | mA | $V_{OUT}$ = 0V |

**Note 1:** The minimum $V_{IN}$ has to meet two conditions: $V_{IN}$ = 2.7V and $V_{IN} = V_R + V_{DROPOUT}$.

**2:** $V_R$ is the regulator output voltage setting. For example: $V_R$ = 1.8V, 2.7V, 2.8V, 2.85V, 3.0V, 3.3V.

**3:** $TCV_{OUT} = \frac{(V_{OUTMAX} - V_{OUTMIN}) \times 10^6}{V_{OUT} \times \Delta T}$

**4:**

**5:**

**6:** Regulation is measured at a constant junction temperature using low duty cycle pulse testing. Load regulation is tested over a load range from 1.0 mA to the maximum specified output current. Changes in output voltage due to heating effects are covered by the thermal regulation specification.

**7:** Dropout voltage is defined as the input to output differential at which the output voltage drops 2% below its nominal value at a 1V differential.

**8:** 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 for a current pulse equal to $I_{MAX}$ at $V_{IN}$ = 6V for T = 10 ms.

**9:** The maximum allowable power dissipation is a function of ambient temperature, the maximum allowable junction temperature and the thermal resistance from junction-to-air (i.e. $T_A$, $T_J$, $\theta_{JA}$).

**10:** Hysteresis voltage is referenced by $V_R$.

**11:** Time required for $V_{OUT}$ to reach 95% of $V_R$ (output voltage setting), after $V_{SHDN}$ is switched from 0 to $V_{IN}$.

## ELECTRICAL SPECIFICATIONS (CONTINUED)

**Electrical Specifications:** Unless otherwise noted, $V_{IN} = V_R + 1V$, $I_L = 100\ \mu A$, $C_L = 3.3\ \mu F$, $\overline{SHDN} > V_{IH}$, $T_A = +25°C$.
**BOLDFACE** type specifications apply for junction temperature of -40°C to +125°C.

| Parameter | Sym | Min | Typ | Max | Units | Conditions |
|---|---|---|---|---|---|---|
| Thermal Regulation | $\Delta V_{OUT}/\Delta P_D$ | — | 0.04 | — | V/W | **Note 8** |
| Thermal Shutdown Die Temperature | $T_{SD}$ | — | 160 | — | °C | |
| Output Noise | eN | — | 600 | — | nV / √Hz | $I_L = I_{OUTMAX}$, F = 10 kHz |
| Response Time (from Shutdown Mode) | $t_R$ | — | 60 | — | µs | $V_{IN} = 4V$<br>$C_{IN} = 1\ \mu F$, $C_{OUT} = 10\ \mu F$<br>$I_L = 0.1$ mA, **Note 11** |
| **$\overline{SHDN}$ Input** | | | | | | |
| $\overline{SHDN}$ Input High Threshold | $V_{IH}$ | 60 | — | — | $\%V_{IN}$ | $V_{IN} = 2.5V$ to $6.0V$ |
| $\overline{SHDN}$ Input Low Threshold | $V_{IL}$ | — | — | 15 | $\%V_{IN}$ | $V_{IN} = 2.5V$ to $6.0V$ |
| **$\overline{ERROR}$ OUTPUT** | | | | | | |
| Minimum $V_{IN}$ Operating Voltage | $V_{INMIN}$ | 1.0 | — | — | V | $I_{OL} = 0.1$ mA |
| Output Logic Low Voltage | $V_{OL}$ | — | — | 400 | mV | 1 mA Flows to $\overline{ERROR}$,<br>$I_{OL} = 1$ mA, $V_{IN} = 2V$ |
| $\overline{ERROR}$ Threshold Voltage | $V_{TH}$ | — | 0.95 x $V_R$ | — | V | See Figure 4-2 |
| $\overline{ERROR}$ Positive Hysteresis | $V_{HYS}$ | — | 50 | — | mV | **Note 10** |
| $V_{OUT}$ to $\overline{ERROR}$ Delay | $t_{DELAY}$ | — | 2 | — | ms | $V_{OUT}$ from $V_R = 3V$ to $2.8V$ |
| Resistance from $\overline{ERROR}$ to GND | $R_{\overline{ERROR}}$ | — | 126 | — | Ω | $V_{DD} = 2.5V$, $V_{OUT} = 2.5V$ |

**Note 1:** The minimum $V_{IN}$ has to meet two conditions: $V_{IN} = 2.7V$ and $V_{IN} = V_R + V_{DROPOUT}$.

**2:** $V_R$ is the regulator output voltage setting. For example: $V_R$ = 1.8V, 2.7V, 2.8V, 2.85V, 3.0V, 3.3V.

**3:** $TCV_{OUT} = \dfrac{(V_{OUTMAX} - V_{OUTMIN}) \times 10^6}{V_{OUT} \times \Delta T}$

**4:**

**5:**

**6:** Regulation is measured at a constant junction temperature using low duty cycle pulse testing. Load regulation is tested over a load range from 1.0 mA to the maximum specified output current. Changes in output voltage due to heating effects are covered by the thermal regulation specification.

**7:** Dropout voltage is defined as the input to output differential at which the output voltage drops 2% below its nominal value at a 1V differential.

**8:** 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 for a current pulse equal to $I_{MAX}$ at $V_{IN} = 6V$ for T = 10 ms.

**9:** The maximum allowable power dissipation is a function of ambient temperature, the maximum allowable junction temperature and the thermal resistance from junction-to-air (i.e. $T_A$, $T_J$, $\theta_{JA}$).

**10:** Hysteresis voltage is referenced by $V_R$.

**11:** Time required for $V_{OUT}$ to reach 95% of $V_R$ (output voltage setting), after $V_{SHDN}$ is switched from 0 to $V_{IN}$.

## TEMPERATURE CHARACTERISTICS

**Electrical Specifications:** Unless otherwise noted, $V_{DD}$ = +2.7V to +6.0V and $V_{SS}$ = GND.

| Parameters | Sym | Min | Typ | Max | Units | Conditions |
|---|---|---|---|---|---|---|
| **Temperature Ranges:** | | | | | | |
| Extended Temperature Range | $T_A$ | -40 | — | +125 | °C | |
| Operating Temperature Range | $T_A$ | -40 | — | +125 | °C | |
| Storage Temperature Range | $T_A$ | -65 | — | +150 | °C | |
| **Thermal Package Resistances:** | | | | | | |
| Thermal Resistance, 5L-SOT-23 | $\theta_{JA}$ | — | 255 | — | °C/W | |

## 2.0 TYPICAL PERFORMANCE CURVES

**Note:** The graphs and tables provided following this note are a statistical summary based on a limited number of samples and are provided for informational purposes only. The performance characteristics listed herein are not tested or guaranteed. In some graphs or tables, the data presented may be outside the specified operating range (e.g., outside specified power supply range) and therefore outside the warranted range.

**Note:** Unless otherwise indicated, $V_{IN} = V_R + 1V$, $I_L = 100\ \mu A$, $C_{OUT} = 3.3\ \mu F$, $\overline{SHDN} > V_{IH}$, $T_A = +25°C$.

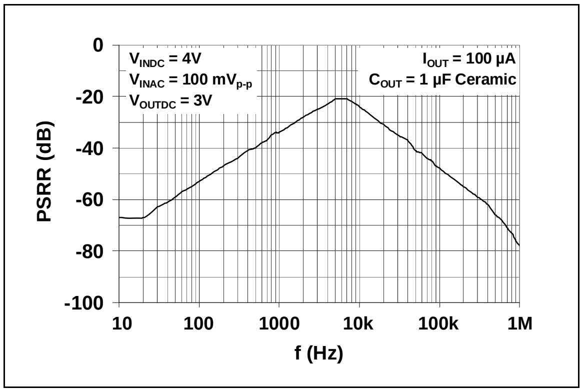



***FIGURE 2-1:*** *Power Supply Rejection Ratio.*

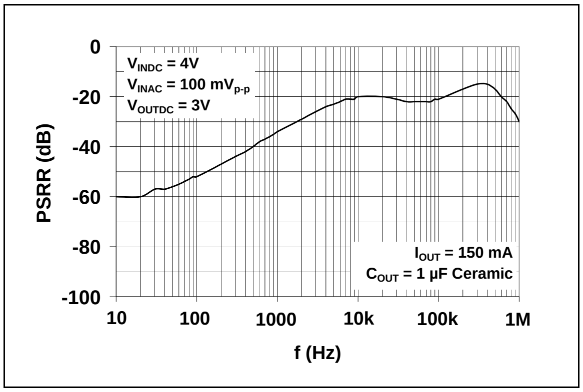



***FIGURE 2-2:*** *Power Supply Rejection Ratio.*

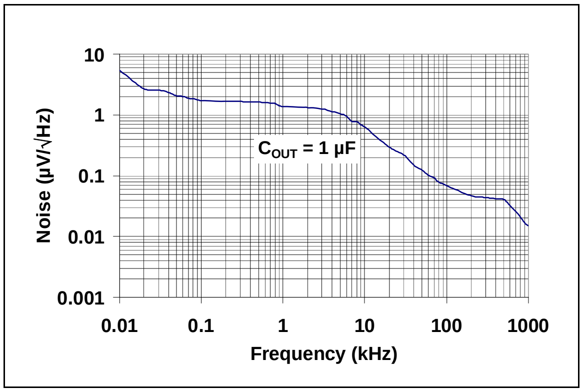



***FIGURE 2-3:*** *Output Noise vs. Frequency.*

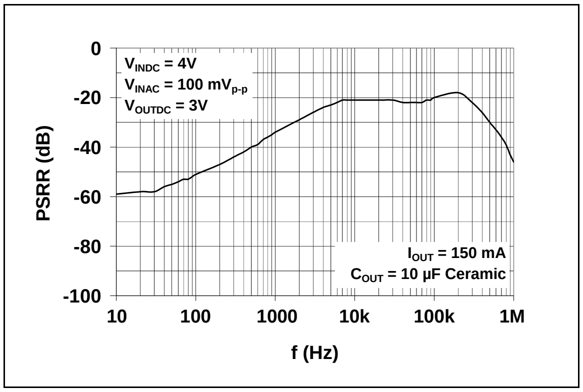



***FIGURE 2-4:*** *Power Supply Rejection Ratio.*

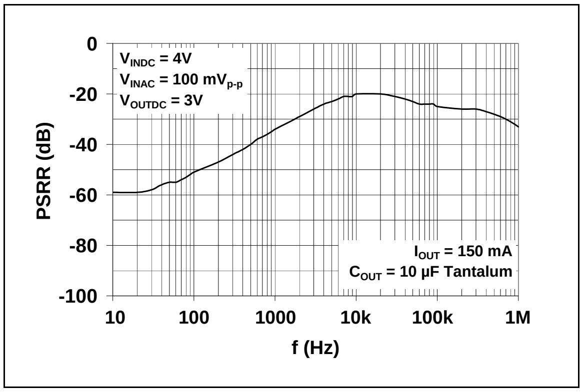



***FIGURE 2-5:*** *Power Supply Rejection Ratio.*

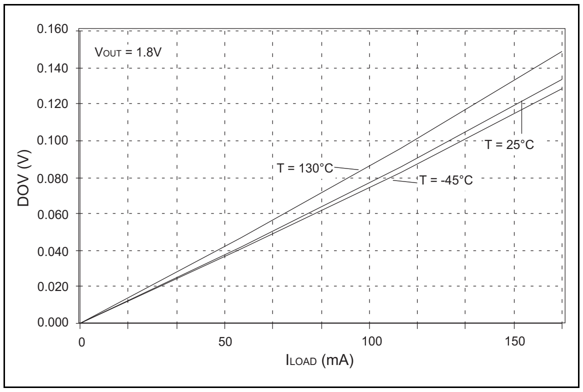



***FIGURE 2-6:*** *Dropout Voltage vs.* $I_{LOAD}$.

**Note:** Unless otherwise indicated, $V_{IN} = V_R + 1V$, $I_L = 100\ \mu A$, $C_{OUT} = 3.3\ \mu F$, $\overline{SHDN} > V_{IH}$, $T_A = +25°C$.

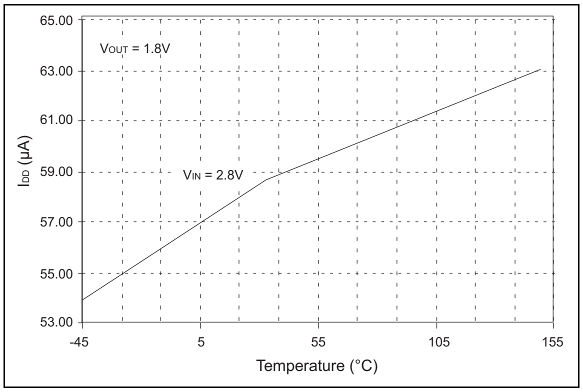



***FIGURE 2-7:*** *$I_{DD}$ vs. Temperature.*

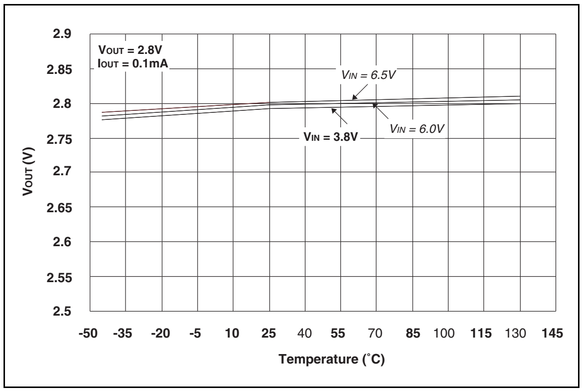



***FIGURE 2-8:*** *Output Voltage vs. Temperature.*

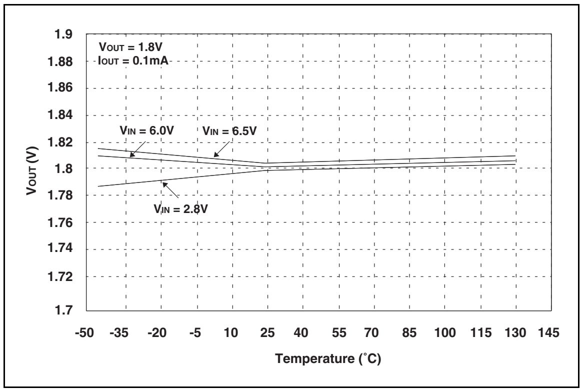



***FIGURE 2-9:*** *Output Voltage vs. Temperature.*

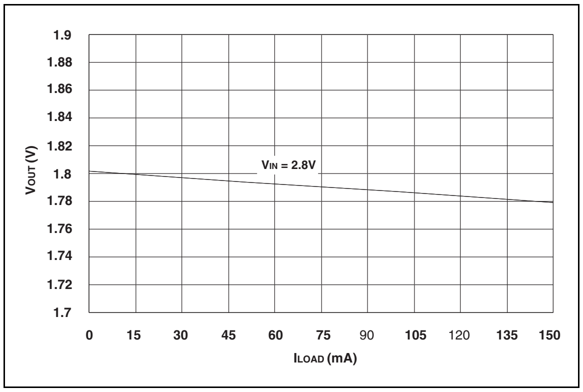



***FIGURE 2-10:*** *Output Voltage vs. Output Current.*

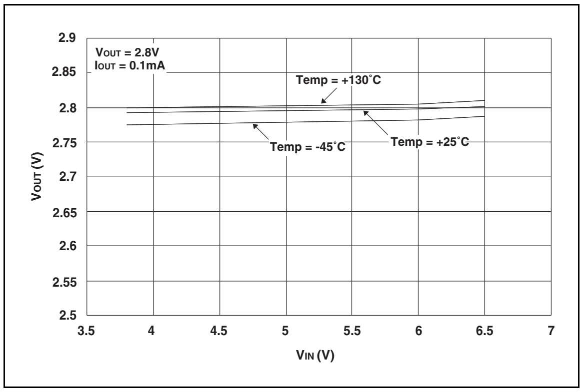



***FIGURE 2-11:*** *Output Voltage vs. Supply Voltage.*

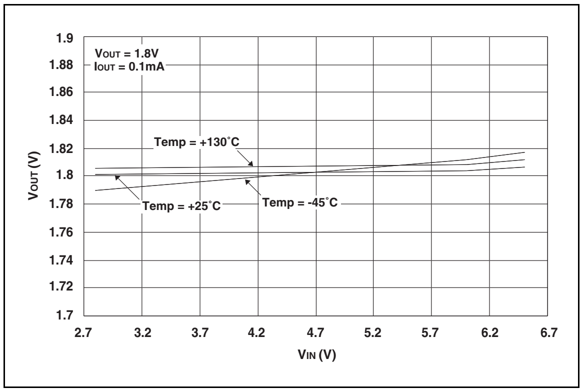



***FIGURE 2-12:*** *Dropout Voltage vs. Supply Voltage.*

**Note:** Unless otherwise indicated, $V_{IN} = V_R + 1V$, $I_L = 100\ \mu A$, $C_{OUT} = 3.3\ \mu F$, $\overline{SHDN} > V_{IH}$, $T_A = +25°C$.

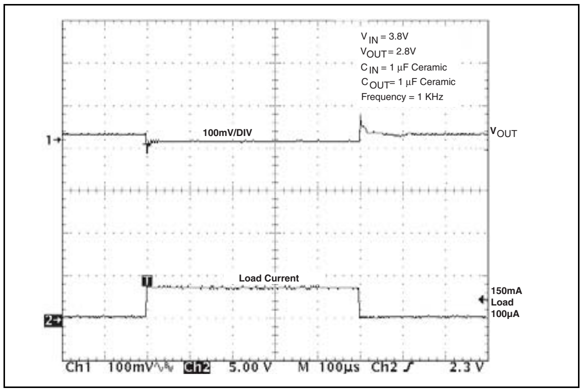



*FIGURE 2-13: Load Transient Response.*

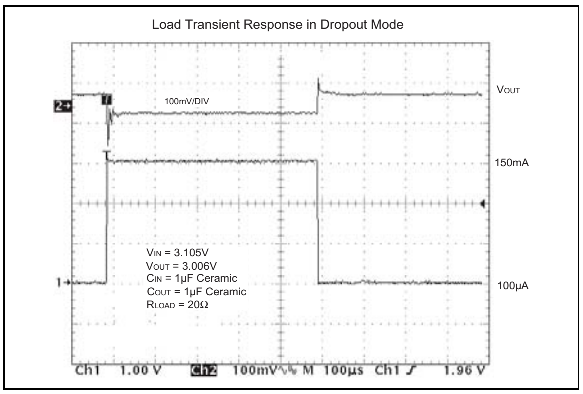



*FIGURE 2-14: Load Transient Response in Dropout Mode.*

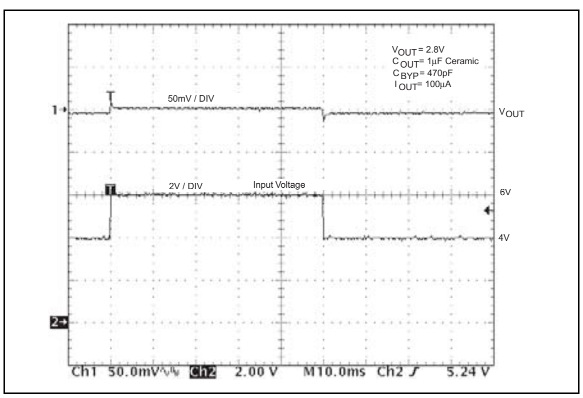



*FIGURE 2-15: Line Transient Response.*

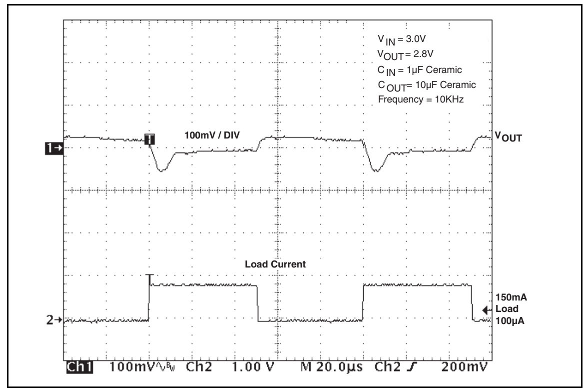



*FIGURE 2-16: Load Transient Response.*

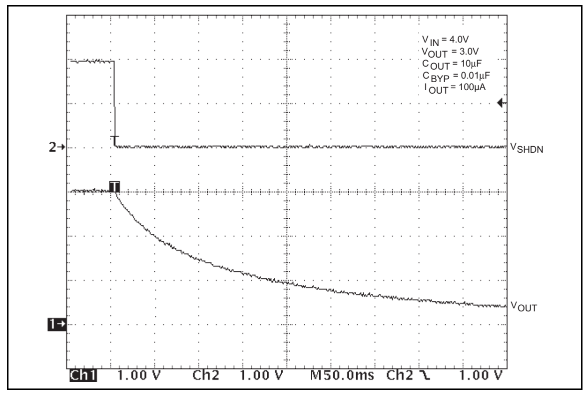



*FIGURE 2-17: Shutdown Delay.*

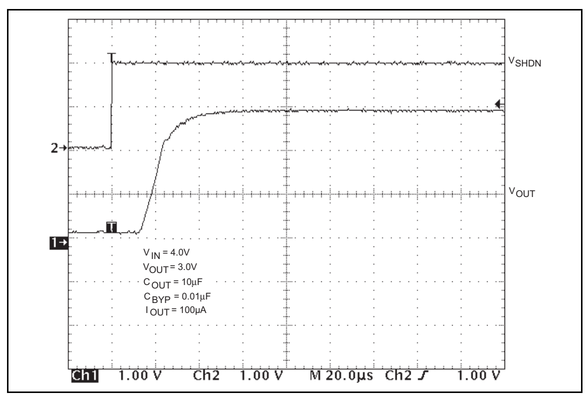



*FIGURE 2-18: Shutdown Wake-up Time.*

**Note:** Unless otherwise indicated, $V_{IN} = V_R + 1V$, $I_L = 100\ \mu A$, $C_{OUT} = 3.3\ \mu F$, $\overline{SHDN} > V_{IH}$, $T_A = +25°C$.

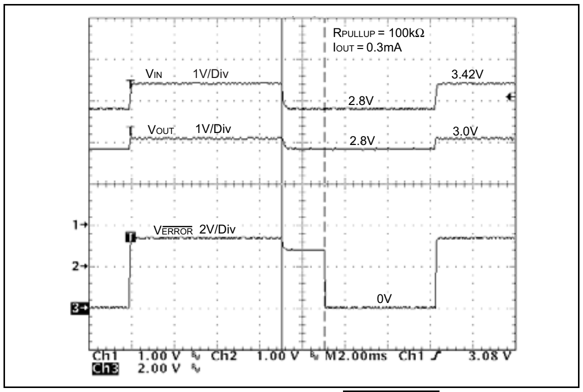



***FIGURE 2-19:*** *$V_{OUT}$ to $\overline{ERROR}$ Delay.*

## 3.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 3-1.

**TABLE 3-1: PIN FUNCTION TABLE**

| Pin Number | Symbol | Description |
|---|---|---|
| 1 | $V_{IN}$ | Unregulated supply input. |
| 2 | GND | Ground terminal. |
| 3 | $\overline{\text{SHDN}}$ | Shutdown control input. The regulator is fully enabled when a logic high is applied to this input. The regulator enters shutdown when a logic low is applied to this input. During shutdown, output voltage falls to zero, ERROR is open circuited and supply current is reduced to 0.5 µA (maximum). |
| 4 | $\overline{\text{ERROR}}$ | Out-of-Regulation Flag. (Open-drain output). This output goes low when $V_{OUT}$ is out-of-tolerance by approximately -5%. |
| 5 | $V_{OUT}$ | Regulated voltage output. |

### 3.1 Unregulated Supply Input ($V_{IN}$)

Connect the unregulated input supply to the $V_{IN}$ pin. If there is a large distance between the input supply and the LDO regulator, some input capacitance is necessary for proper operation. A 1 µF capacitor, connected from $V_{IN}$ to ground, is recommended for most applications.

### 3.2 Ground Terminal (GND)

Connect the unregulated input supply ground return to GND. Also connect one side of the 1 µF typical input decoupling capacitor close to this pin and one side of the output capacitor $C_{OUT}$ to this pin.

### 3.3 Shutdown Control Input ($\overline{\text{SHDN}}$)

The regulator is fully enabled when a logic-high is applied to $\overline{\text{SHDN}}$. The regulator enters shutdown when a logic-low is applied to this input. During shutdown, the output voltage falls to zero and the supply current is reduced to 0.5 µA (maximum).

### 3.4 Out-of-Regulation Flag ($\overline{\text{ERROR}}$)

The open-drain $\overline{\text{ERROR}}$ flag provides indication that the regulator output voltage is not in regulation. The $\overline{\text{ERROR}}$ pin will be low when the output is typically below 5% of its specified value.

### 3.5 Regulated Voltage Output ($V_{OUT}$)

Connect the output load to $V_{OUT}$ of the LDO. Also connect one side of the LDO output decoupling capacitor as close as possible to the $V_{OUT}$ pin.

**NOTES:**

## 4.0 DETAILED DESCRIPTION

The TC2054, TC2055 and TC2186 are precision fixed output voltage regulators. (If an adjustable version is desired, refer to the TC1070/TC1071/TC1187 data sheet (DS21353). Unlike bipolar regulators, the TC2054, TC2055 and TC2186 supply current does not increase with load current. In addition, $V_{OUT}$ remains stable and within regulation over the entire 0 mA to maximum output current operating load range.

Figure 4-1 shows a typical application circuit. The regulator is enabled any time the shutdown input (SHDN) is at or above $V_{IH}$, and shutdown (disabled) when SHDN is at or below $V_{IL}$. SHDN may be controlled by a CMOS logic gate, or I/O port of a microcontroller. If the SHDN input is not required, it should be connected directly to the input supply. While in shutdown, supply current decreases to 0.05 µA (typical), $V_{OUT}$ falls to zero volts, and ERROR is open-circuited.

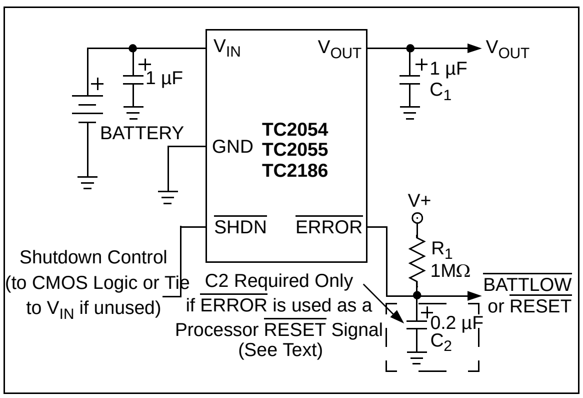



*FIGURE 4-1: Typical Application Circuit.*

### 4.1 ERROR Open-Drain Output

ERROR is driven low whenever $V_{OUT}$ falls out of regulation by more than -5% (typical). This condition may be caused by low input voltage, output current limiting or thermal limiting. The ERROR threshold is 5% below rated $V_{OUT}$ regardless of the programmed output voltage value (e.g. ERROR = $V_{OL}$ at 4.75V (typical) for a 5.0V regulator and 2.85V (typical) for a 3.0V regulator). ERROR output operation is shown in Figure 4-2.

Note that ERROR is active when $V_{OUT}$ falls to $V_{TH}$, and inactive when $V_{OUT}$ rises above $V_{TH}$ by $V_{HYS}$.

As shown in Figure 4-1, ERROR can be used as a battery low flag or as a processor RESET signal (with the addition of timing capacitor $C_2$). $R_1$ x $C_2$ should be chosen to maintain ERROR below $V_{IH}$ of the processor RESET input for at least 200 ms to allow time for the system to stabilize. Pull-up resistor $R_1$ can be tied to $V_{OUT}$, $V_{IN}$ or any other voltage less than ($V_{IN}$ + 0.3V). The ERROR pin sink current is self-limiting to approximately 18 mA.

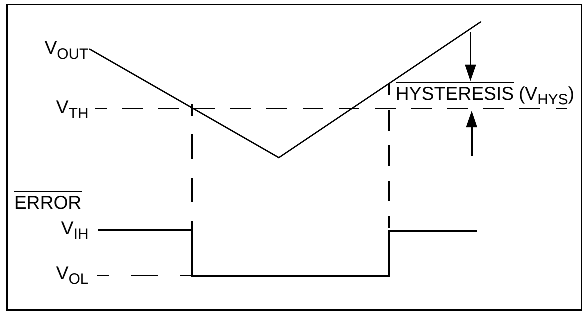



*FIGURE 4-2: Error Output Operation.*

### 4.2 Output Capacitor

A 1 µF (minimum) capacitor from $V_{OUT}$ to ground is required. The output capacitor should have an effective series resistance of 0.01Ω. to 5Ω for $V_{OUT}$ = 2.5V, and 0.05Ω. to 5Ω for $V_{OUT}$ < 2.5V. Ceramic, tantalum and aluminum electrolytic capacitors can be used. (Since many aluminum electrolytic capacitors freeze at approximately -30°C, solid tantalums are recommended for applications operating below -25°C). When operating from sources other than batteries, supply-noise rejection and transient response can be improved by increasing the value of the input and output capacitors and employing passive filtering techniques.

### 4.3 Input Capacitor

A 1 µF capacitor should be connected from $V_{IN}$ to GND if there is more than 10 inches of wire between the regulator and this AC filter capacitor, or if a battery is used as the power source. Aluminum electrolytic or tantalum capacitors can be used (since many aluminum electrolytic capacitors freeze at approximately -30°C, solid tantalum are recommended for applications operating below -25°C). When operating from sources other than batteries, supply-noise rejection and transient response can be improved by increasing the value of the input and output capacitors and employing passive filtering techniques.

**NOTES:**

# 5.0 THERMAL CONSIDERATIONS

## 5.1 Thermal Shutdown

Integrated thermal protection circuitry shuts the regulator off when the die temperature exceeds approximately 160°C. The regulator remains off until the die temperature cools to approximatley 150°C.

## 5.2 Power Dissipation

The amount of power the regulator dissipates is primarily a function of input and output voltage, and output current.

Equation 5-1 is used to calculate worst case power dissipation:

**EQUATION 5-1:**

$$P_D \approx (V_{INMAX} - V_{OUTMIN}) I_{LOADMAX}$$

Where:

| | | |
|---|---|---|
| $P_D$ | = | Worst-case actual power dissipation |
| $V_{INMAX}$ | = | Maximum voltage on $V_{IN}$ |
| $V_{OUTMIN}$ | = | Minimum regulator output voltage |
| $I_{LOADMAX}$ | = | Maximum output (load) current |

The maximum allowable power dissipation (Equation 5-2) is a function of the maximum ambient temperature ($T_{AMAX}$), the maximum allowable die temperature (125 °C) and the thermal resistance from junction-to-air ($\theta_{JA}$). The 5-Pin SOT-23A package has a $\theta_{JA}$ of approximately 220°C/Watt when mounted on a typical two layer FR4 dielectric copper clad PC board.

**EQUATION 5-2:**

$$P_{DMAX} = \frac{T_{JMAX} - T_{AMAX}}{\theta_{JA}}$$

Where all terms are previously defined.

Equation 5-1 can be used in conjunction with Equation 5-2 to ensure regulator thermal operation is within limits. For example:

Given:

| | | |
|---|---|---|
| $V_{INMAX}$ | = | 3.0V +10% |
| $V_{OUTMIN}$ | = | 2.7V – 2.5% |
| $I_{LOADMAX}$ | = | 40 mA |
| $T_{AMAX}$ | = | +55°C |

Find:

1. Actual power dissipation
2. Maximum allowable dissipation

Actual power dissipation:

$$\begin{aligned} P_D &= (V_{INMAX} - V_{OUTMIN}) I_{LOADMAX} \\ &= [(3.0 \times 1.1) - (2.7 \times 0.975)] 40 \times 10^{-3} \\ &= 26.7 mW \end{aligned}$$

Maximum allowable power dissipation:

$$\begin{aligned} P_{DMAX} &= \frac{T_{JMAX} - T_{AMAX}}{\theta_{JA}} \\ &= \frac{125 - 55}{220} \\ &= 318 mW \end{aligned}$$

In this example, the TC2054 dissipates a maximum of only 26.7 mW; far below the allowable limit of 318 mW. In a similar manner, Equation 5-1 and Equation 5-2 can be used to calculate maximum current and/or input voltage limits.

## 5.3 Layout Considerations

The primary path of heat conduction out of the package is via the package leads. Therefore, layouts having a ground plane, wide traces at the pads, and wide power supply bus lines combine to lower $\theta_{JA}$ and, therefore, increase the maximum allowable power dissipation limit.

**NOTES:**

# 6.0 PACKAGING INFORMATION

## 6.1 Package Marking Information

5-Lead SOT-23

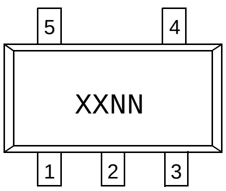
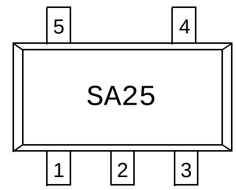



**TABLE 6-1: PART NUMBER CODE AND TEMPERATURE RANGE**

| (V) | TC2054 | TC2055 | TC2186 |
|---|---|---|---|
| 1.8 | SA | TA | VA |
| 2.5 | SB | TB | VB |
| 2.6 | SH | TH | VH |
| 2.7 | SC | TC | VC |
| 2.8 | SD | TD | VD |
| 2.85 | SE | TE | VE |
| 3.0 | SF | TF | VF |
| 3.3 | SG | TG | VG |
| 5.0 | SK | TJ | VJ |

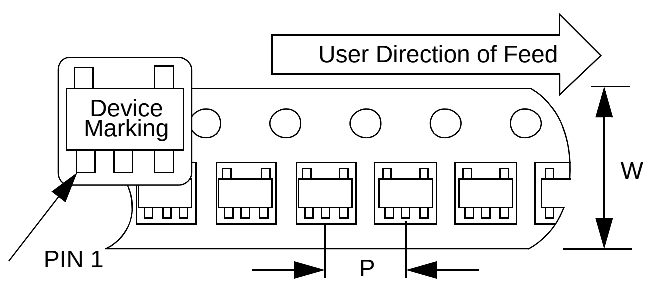
Example:




**Legend:** XX...X Customer-specific information
NN Alphanumeric traceability code

## 6.2 Taping Information

**Component Taping Orientation for 5-Pin SOT-23A (EIAJ SC-74A) Devices**

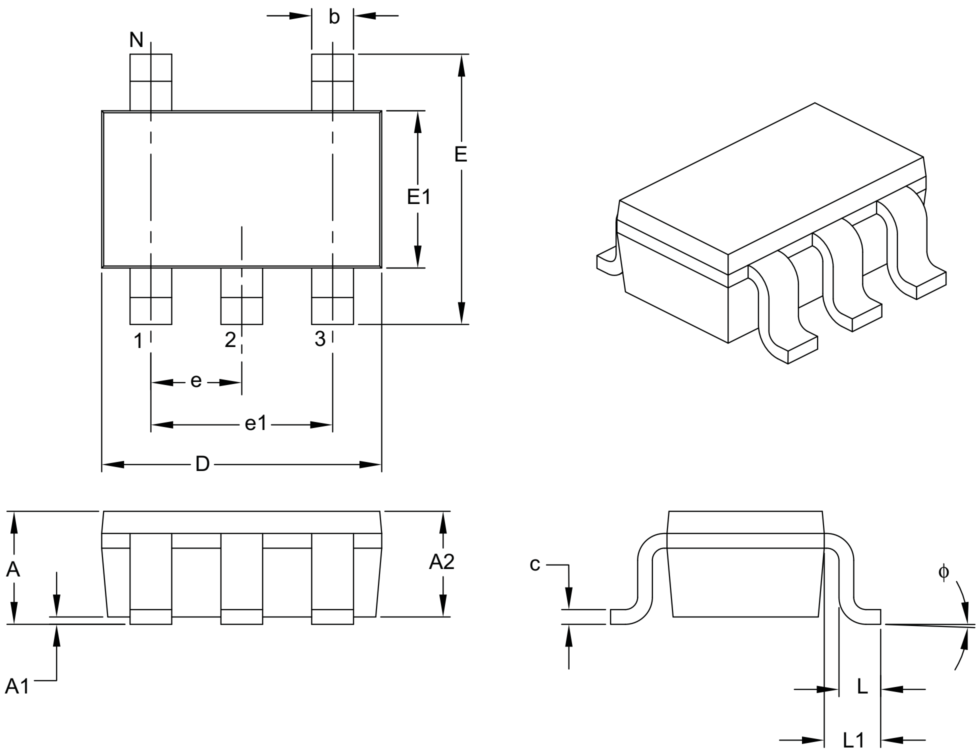



Standard Reel Component Orientation
for 713 Suffix Device
(Mark Right Side Up)

| Carrier Tape, Number of Components Per Reel and Reel Size: | | | | |
|---|---|---|---|---|
| **Package** | **Carrier Width (W)** | **Pitch (P)** | **Part Per Full Reel** | **Reel Size** |
| 5-Pin SOT-23A | 8 mm | 4 mm | 3000 | 7 in. |

## 5-Lead Plastic Small Outline Transistor (CT) [SOT-23]

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging




| Units | | MILLIMETERS | | |
|---|---|---|---|---|
| Dimension Limits | | MIN | NOM | MAX |
| Number of Pins | N | 5 | | |
| Lead Pitch | e | 0.95 BSC | | |
| Outside Lead Pitch | e1 | 1.90 BSC | | |
| Overall Height | A | 0.90 | – | 1.45 |
| Molded Package Thickness | A2 | 0.89 | – | 1.30 |
| Standoff | A1 | 0.00 | – | 0.15 |
| Overall Width | E | 2.20 | – | 3.20 |
| Molded Package Width | E1 | 1.30 | – | 1.80 |
| Overall Length | D | 2.70 | – | 3.10 |
| Foot Length | L | 0.10 | – | 0.60 |
| Footprint | L1 | 0.35 | – | 0.80 |
| Foot Angle | ϕ | 0° | – | 30° |
| Lead Thickness | c | 0.08 | – | 0.26 |
| Lead Width | b | 0.20 | – | 0.51 |

**Notes:**

1. Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.127 mm per side.
2. Dimensioning and tolerancing per ASME Y14.5M.

   BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-091B

# APPENDIX A: REVISION HISTORY

## Revision D (September 2009)

The following is the list of modifications:

1. Added the 2.6V, and 5.0V option in Table 6-1 in **Section 6.0 "Packaging Information"**.
2. Updated the package outline drawing.
3. Added 2.6V option to **Product Identification System** section.

## Revision C (May 2006)

The following is the list of modifications:

1. Added overtemperature to bullet for overcurrent protection in Features and General Description verbiage.
2. Added "Thermal Shutdown Die Temperature" to the Electrical Specifications table. Changed condition for "Minimum $V_{IN}$ Operating Voltage".
3. Added Temperature Characteristics Table.
4. Added **Section 5.1 "Thermal Shutdown"**.
5. Updated the package outline drawing.

## Revision B (May 2002)

- Data Sheet converted to Microchip standards.

## Revision A (May 2001)

- Original Release of this Document under Telcom.

**NOTES:**

## PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, refer to the factory or the listed sales office.

| PART NO. | -XX | X | XXXX |
|---|---|---|---|
| Device | Output Voltage | Temperature Range | Package |

Device:
- TC2054: 50 mA LDO with Shutdown and ERROR Output
- TC2055: 100 mA LDO with Shutdown and ERROR Output
- TC2186: 150 mA LDO with Shutdown and ERROR Output

Output Voltage:
- XX = 1.8V
- XX = 2.5V
- XX = 2.6V
- XX = 2.7V
- XX = 2.8V
- XX = 2.85V
- XX = 3.0V
- XX = 3.3V
- XX = 5.0V

Temperature Range: V = -40°C to +125°C

Package: CTTR = Plastic Small Outline Transistor (SOT-23), 5-lead, Tape and Reel

**Examples:**

a) TC2054-1.8VCTTR: 5LD SOT-23-A, 1.8V, Tape and Reel.
b) TC2054-2.85VCTTR: 5LD SOT-23-A, 2.85V, Tape and Reel.
c) TC2054-3.3VCTTR: 5LD SOT-23-A, 3.3V, Tape and Reel.

a) TC2055-1.8VCTTR: 5LD SOT-23-A, 1.8V, Tape and Reel.
b) TC2055-2.85VCTTR: 5LD SOT-23-A, 2.85V, Tape and Reel.
c) TC2055-3.0VCTTR: 5LD SOT-23-A, 3.0V, Tape and Reel.

a) TC2186-1.8VCTTR: 5LD SOT-23-A, 1.8V, Tape and Reel.
b) TC2186-2.8VCTTR: 5LD SOT-23-A, 2.8V, Tape and Reel.

**NOTES:**

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