

## 120V<sub>IN</sub>, 50 mA, Ultra-Low I<sub>Q</sub>, High PSRR Linear Regulator

### Features

- Wide Input Voltage Range: 6V to 120V DC
- Ultra-Low Quiescent Current: 6  $\mu$ A
- 50 mA Ensured Output Current
- Adjustable Output from 1.27V to 5.5V
- Withstands up to +120V DC at the Input
- Stable with Ceramic Capacitors
- Ultra-High PSRR (80 dB at 10 kHz)
- Ultra-High Line Rejection (Load Dump)
- High Output Accuracy:  $\pm 3\%$  Initial
- Thermal-Shutdown and Current Limit Protection
- Thermally Efficient 8-Lead MSOP and 8-Lead ePad MSOP Packages

### Applications

- Industrial
- Remote Keyless Entry Power Supply
- Telecom
- Offline Power Supplies

### General Description

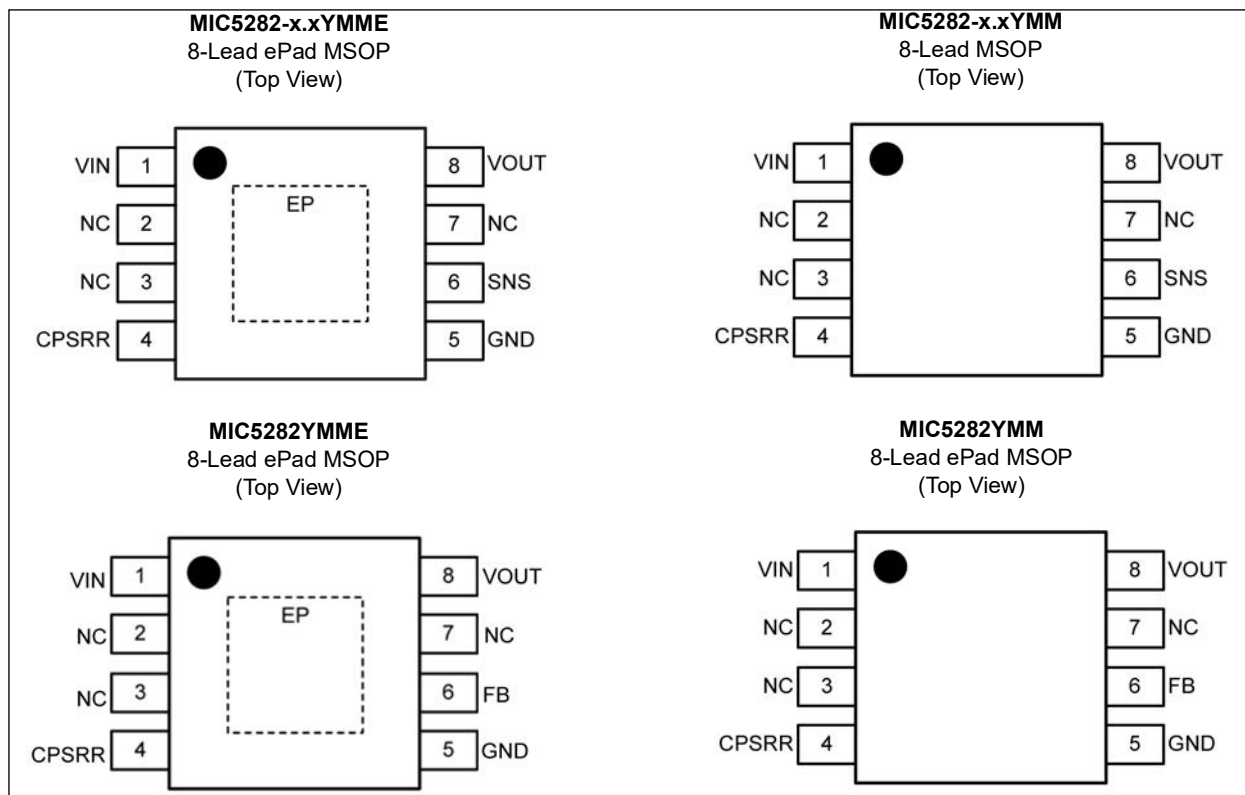
The MIC5282 high-performance linear regulator offers a very wide input operating voltage range, up to 120V DC, and supplies an output current of up to 50 mA.

Ideal for high input voltage applications such as industrial and telecom, the MIC5282 offers  $\pm 3\%$  initial accuracy, extremely high-power supply rejection ratio (80 dB at 10 kHz), and ultra-low quiescent current of 6  $\mu$ A. The MIC5282 is optimized for high-voltage line transients, making it ideal for harsh environment applications.

The MIC5282 is offered in both fixed output voltage (3.3V/5.0V) and adjustable output voltage (1.27V to 5.5V) options.

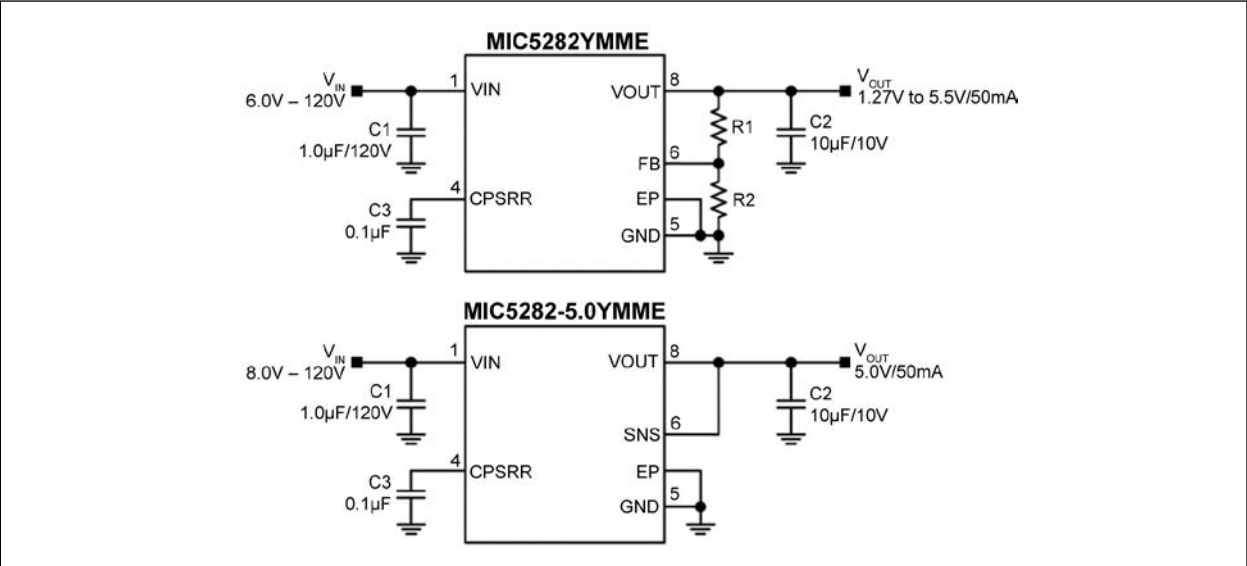
The MIC5282 operates over a  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  temperature range and is available in lead-free, RoHS-compliant, 8-lead ePad MSOP and 8-lead MSOP packages.

### Package Types

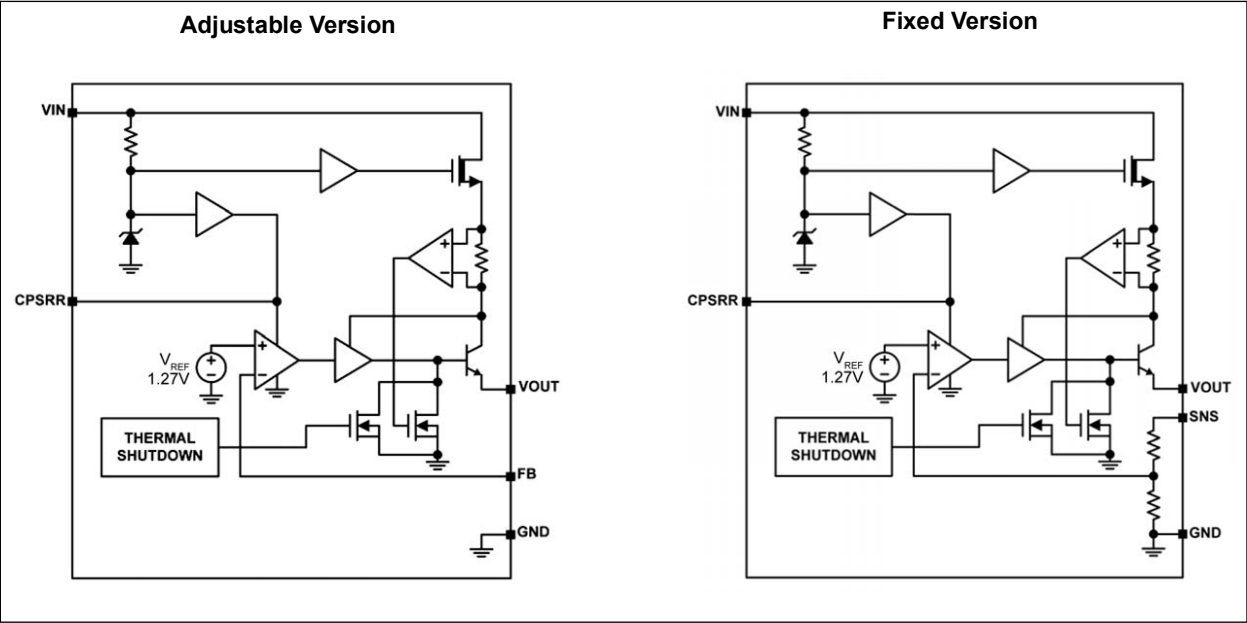


# MIC5282

## Typical Application Circuits



## Functional Block Diagrams



## 1.0 ELECTRICAL CHARACTERISTICS

### Absolute Maximum Ratings †

|                                                              |                |
|--------------------------------------------------------------|----------------|
| $V_{IN}$ to GND .....                                        | –0.3V to +125V |
| $V_{CPSRR}$ to GND .....                                     | –0.3V to +14V  |
| $V_{FB}$ , $V_{SNS}$ , $V_{OUT}$ to GND .....                | –0.3V to +6V   |
| ESD Rating (Human Body Model, <a href="#">Note 1</a> ) ..... | 2 kV           |
| ESD Rating (Machine Model) .....                             | 200V           |

### Operating Ratings ‡

|                                                            |                    |
|------------------------------------------------------------|--------------------|
| $V_{IN}$ .....                                             | +6V to +120V       |
| $V_{OUT}$ Adjust Range .....                               | +1.27V to +5.5V    |
| Power Dissipation ( $P_D$ , <a href="#">Note 2</a> ) ..... | Internally Limited |

† **Notice:** Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

‡ **Notice:** The device is not guaranteed to function outside its operating ratings.

**Note 1:** Device is ESD sensitive. Handling precautions are recommended.

**2:** The maximum allowable power dissipation at any  $T_A$  (ambient temperature) is  $P_{D(MAX)} = (T_{J(MAX)} - T_A)/\theta_{JA}$ . Exceeding the maximum allowable power dissipation results in excessive die temperature, and causes the regulator to enter thermal shutdown.

## ELECTRICAL CHARACTERISTICS

$V_{IN} = 12V$ ,  $C_{IN} = 1.0 \mu F$ ,  $C_{PSRR} = 0.1 \mu F$ ,  $C_{OUT} = 10 \mu F$ ,  $V_{OUT} = 5.0V$  or  $3.3V$ ,  $I_{OUT} = 100 \mu A$ ,  $T_A = +25^\circ C$ , **bold** values valid for  $-40^\circ C \leq T_J \leq +125^\circ C$ ; unless noted. [Note 1](#)

| Parameter                          | Symbol    | Min.         | Typ.  | Max.         | Units   | Conditions                                      |
|------------------------------------|-----------|--------------|-------|--------------|---------|-------------------------------------------------|
| <b>Power Supply Input</b>          |           |              |       |              |         |                                                 |
| Input Voltage Range                | $V_{IN}$  | 6            | —     | 120          | V       | <a href="#">Note 2</a>                          |
| Quiescent Supply Current           | $I_Q$     | —            | 6     | <b>11</b>    | $\mu A$ | <a href="#">Note 3</a> , $I_{OUT} = 0A$         |
| <b>Output Voltage</b>              |           |              |       |              |         |                                                 |
| Output Voltage                     | $V_{OUT}$ | 1.27         | —     | 5.5          | V       | Adjustable                                      |
|                                    |           | 3.2          | 3.3   | 3.4          |         | 3.3V Fixed                                      |
|                                    |           | <b>3.13</b>  | 3.3   | <b>3.47</b>  |         |                                                 |
|                                    |           | 4.85         | 5.0   | 5.15         |         | 5.0V Fixed                                      |
|                                    |           | <b>4.75</b>  | 5.0   | <b>5.25</b>  |         |                                                 |
| Output Voltage Accuracy            |           | –3           | —     | 3            | %       | Variation from nominal $V_{OUT}$                |
|                                    |           | <b>–5</b>    | —     | <b>5</b>     |         |                                                 |
| Load Regulation                    |           | <b>–1.0</b>  | 0.5   | <b>1.0</b>   | %       | ePad, $I_{OUT} = 100 \mu A$ to 50 mA            |
|                                    |           | <b>–1.2</b>  | 0.6   | <b>1.2</b>   |         | non-ePad, $I_{OUT} = 100 \mu A$ to 50 mA        |
| Line Regulation                    |           | <b>–0.5</b>  | 0.04  | <b>0.5</b>   | %/V     | <a href="#">Note 4</a> , $V_{IN} = 10V$ to 120V |
| <b>Feedback Input (Adjustable)</b> |           |              |       |              |         |                                                 |
| Feedback Voltage                   | $V_{FB}$  | 1.232        | 1.270 | 1.308        | V       | —                                               |
|                                    |           | <b>1.206</b> | 1.270 | <b>1.333</b> |         |                                                 |
| Feedback Current                   | $I_{FB}$  | —            | 3.2   | —            | nA      | $V_{FB} = 1.27V$                                |
| <b>Current Limit</b>               |           |              |       |              |         |                                                 |
| Current Limit                      | $I_{LIM}$ | <b>60</b>    | 125   | <b>260</b>   | mA      | $V_{OUT} = 0V$                                  |

# MIC5282

## ELECTRICAL CHARACTERISTICS (CONTINUED)

$V_{IN} = 12V$ ,  $C_{IN} = 1.0 \mu F$ ,  $C_{PSRR} = 0.1 \mu F$ ,  $C_{OUT} = 10 \mu F$ ,  $V_{OUT} = 5.0V$  or  $3.3V$ ,  $I_{OUT} = 100 \mu A$ ,  $T_A = +25^\circ C$ , **bold** values valid for  $-40^\circ C \leq T_J \leq +125^\circ C$ ; unless noted. [Note 1](#)

| Parameter                                              | Symbol              | Min. | Typ. | Max. | Units | Conditions               |
|--------------------------------------------------------|---------------------|------|------|------|-------|--------------------------|
| Ripple Rejection                                       |                     |      |      |      |       |                          |
| Power Supply Rejection Ratio<br><a href="#">Note 5</a> | PSRR                | —    | 65   | —    | dB    | 100 Hz ≤ f ≤ 1 kHz       |
|                                                        |                     | —    | 75   | —    |       | 1 kHz ≤ f ≤ 5 kHz        |
|                                                        |                     | —    | 80   | —    |       | 5 kHz ≤ f ≤ 40 kHz       |
|                                                        |                     | —    | 90   | —    |       | 40 kHz ≤ f ≤ 1 MHz       |
| Power Dropout Voltage                                  |                     |      |      |      |       |                          |
| Dropout Voltage                                        | V <sub>DO</sub>     | —    | 2    | 3    | V     | I <sub>OUT</sub> = 50 mA |
| Thermal Protection                                     |                     |      |      |      |       |                          |
| Thermal Shutdown Temperature                           | T <sub>SHDN</sub>   | —    | 157  | —    | °C    | T <sub>J</sub> rising    |
| Thermal Shutdown Hysteresis                            | T <sub>SD_HYS</sub> | —    | 15   | —    | °C    | —                        |

**Note 1:** Specifications for packaged product only.

**2:** Ensure that  $V_{IN} \geq (V_{OUT} + 3V)$  and  $V_{IN} \geq 6V$ .

**3:** Quiescent current is specified for the adjustable option. The fixed options will add approximately  $1 \mu A$  due to internal feedback resistors.

**4:** Line regulation is a percentage of  $V_{OUT}$ .

**5:** See [Figure 2-18](#).

## TEMPERATURE SPECIFICATIONS

| Parameters                           | Sym.          | Min. | Typ. | Max. | Units        | Conditions         |
|--------------------------------------|---------------|------|------|------|--------------|--------------------|
| <b>Temperature Ranges</b>            |               |      |      |      |              |                    |
| Junction Temperature Range           | $T_J$         | -40  | —    | +125 | $^\circ C$   | —                  |
| Storage Temperature Range            | $T_S$         | -65  | —    | +150 | $^\circ C$   | —                  |
| Lead Temperature                     | $T_{LEAD}$    | —    | —    | +260 | $^\circ C$   | Soldering, 10 sec. |
| <b>Package Thermal Resistances</b>   |               |      |      |      |              |                    |
| Thermal Resistance, 8-Lead ePad MSOP | $\theta_{JA}$ | —    | 64   | —    | $^\circ C/W$ | —                  |
| Thermal Resistance, 8-Lead MSOP      | $\theta_{JA}$ | —    | 160  | —    | $^\circ C/W$ | —                  |

## 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.

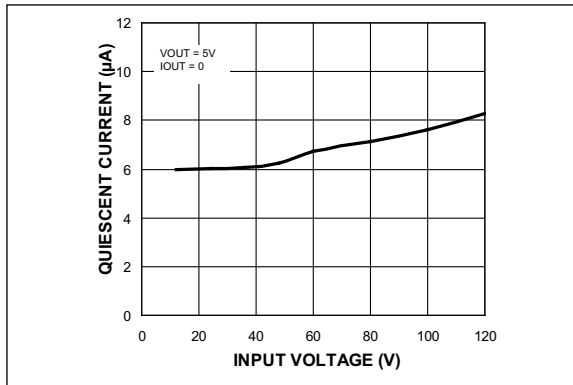


**FIGURE 2-1:** Quiescent Supply Current vs. Input Voltage.

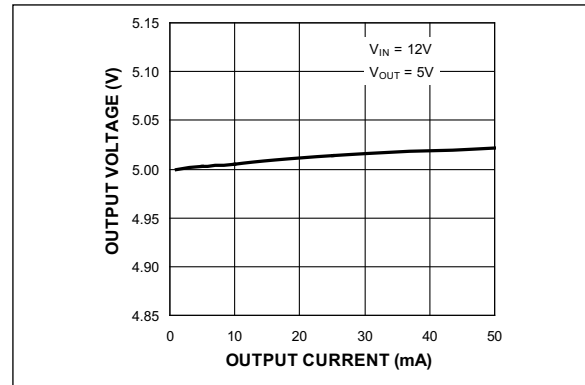


**FIGURE 2-4:** Output Voltage vs. Output Current.

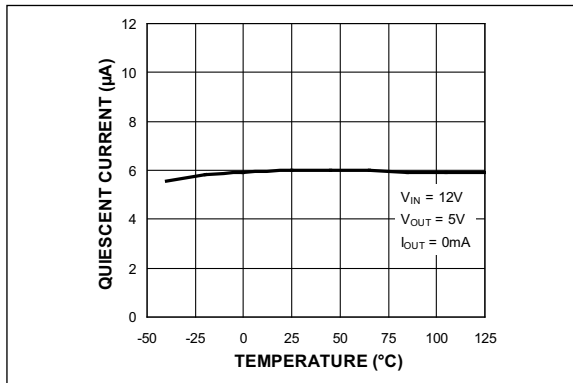


**FIGURE 2-2:** Quiescent Supply Current vs. Temperature.

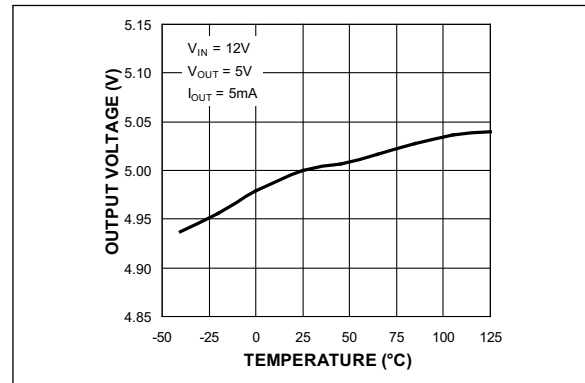


**FIGURE 2-5:** Output Voltage vs. Temperature.

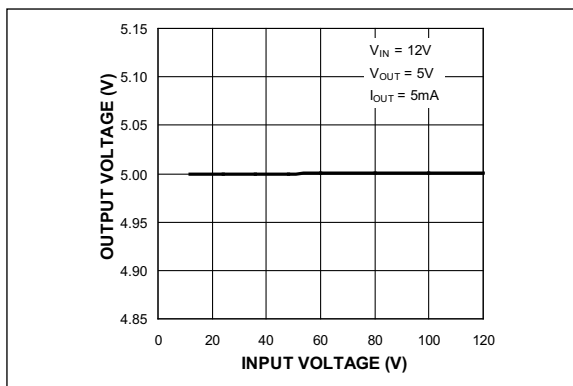


**FIGURE 2-3:** Output Voltage vs. Input Voltage.

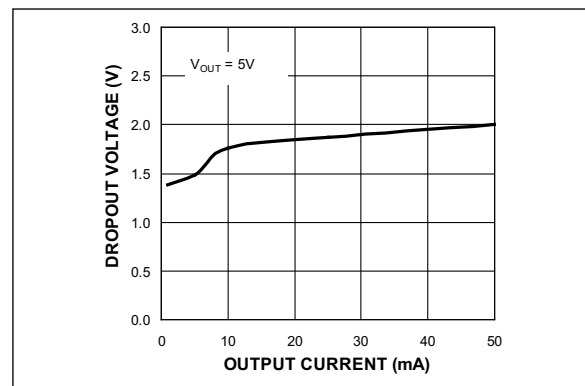


**FIGURE 2-6:** Dropout Voltage vs. Output Current.

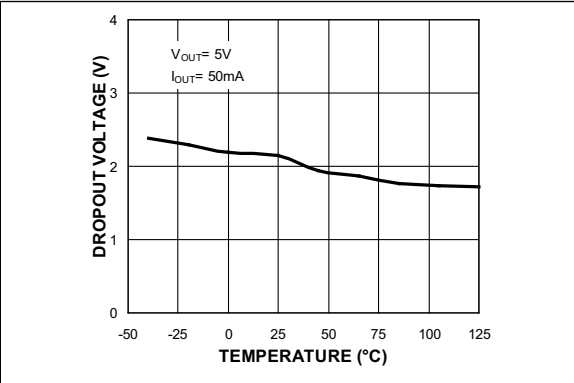


FIGURE 2-7: Dropout Voltage vs. Temperature.

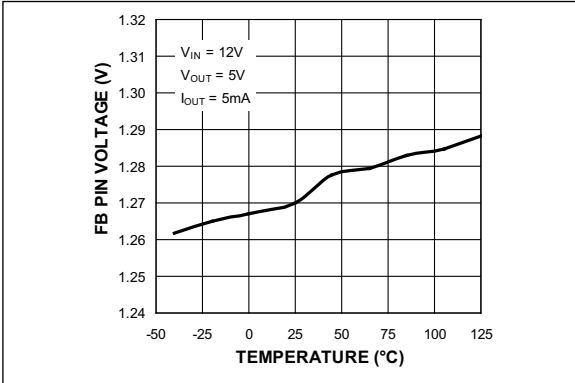


FIGURE 2-10: Feedback Pin Voltage vs. Temperature.

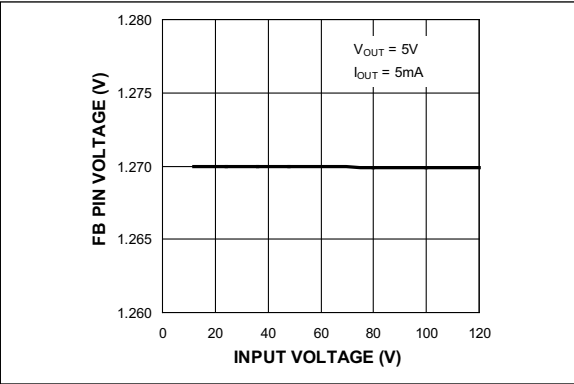


FIGURE 2-8: Feedback Pin Voltage vs. Input Voltage.

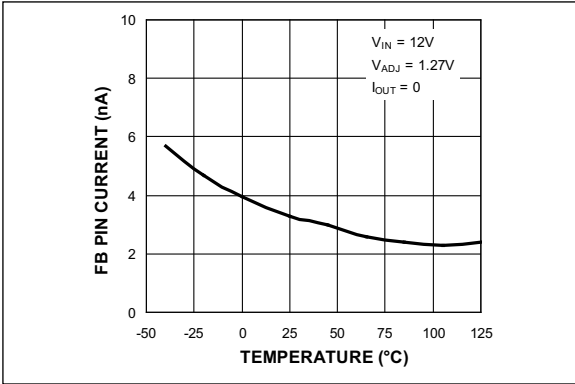


FIGURE 2-11: Feedback Pin Current vs. Temperature.

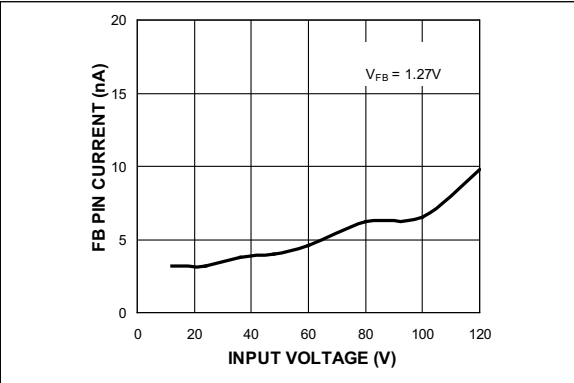


FIGURE 2-9: Feedback Pin Current vs. Input Voltage.

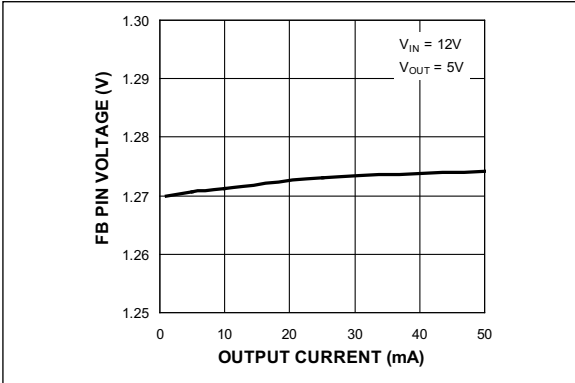


FIGURE 2-12: Feedback Pin Voltage vs. Output Current.

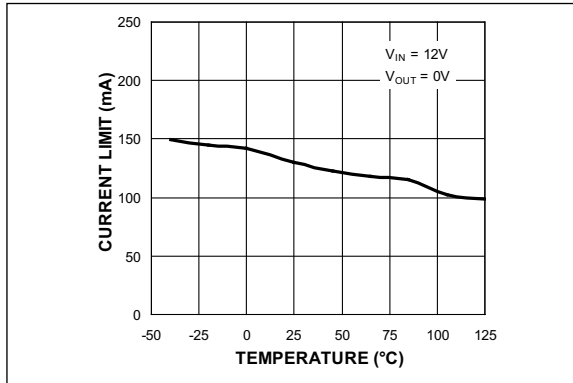


**FIGURE 2-13:** Current Limit vs. Temperature.

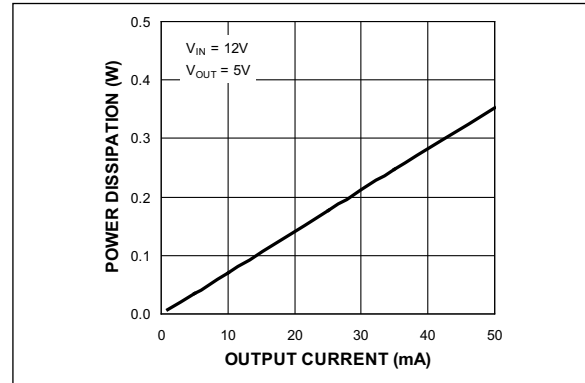


**FIGURE 2-16:** Power Dissipation vs. Output Current.

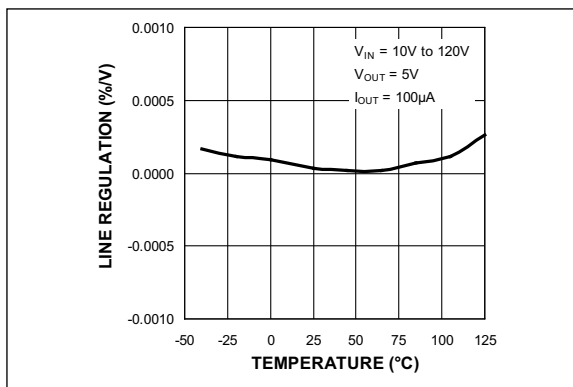


**FIGURE 2-14:** Line Regulation vs. Temperature.

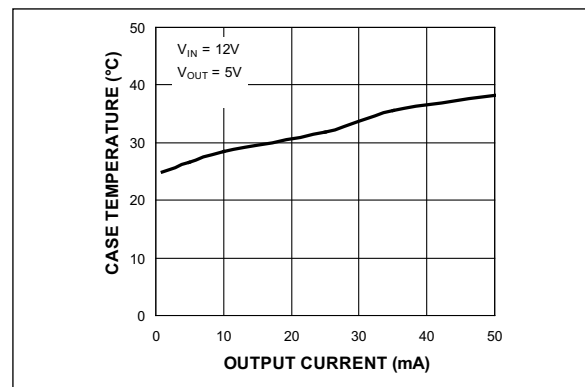


**FIGURE 2-17:** Case Temperature\* (MME) vs. Output Current.

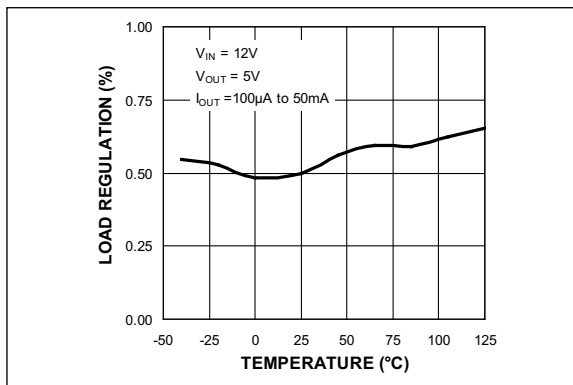


**FIGURE 2-15:** Load Regulation vs. Temperature.

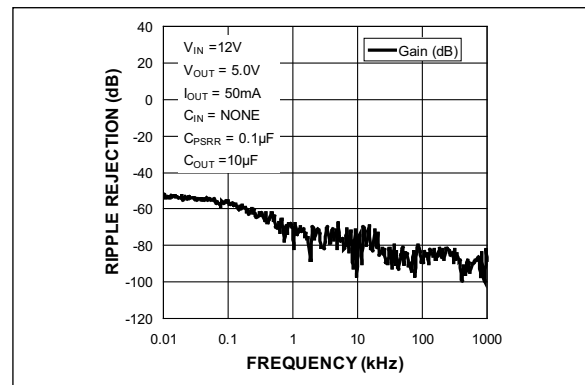


**FIGURE 2-18:** Power Supply Rejection Ratio vs. Frequency.

Case Temperature\*: The temperature measurement was taken at the hottest point on the MIC5282 case mounted on a 2.25 square inch PCB at an ambient temperature of 25°C; see the Thermal Measurement section. Actual results will depend upon the size of the PCB, ambient temperature, and proximity to other heat emitting components.

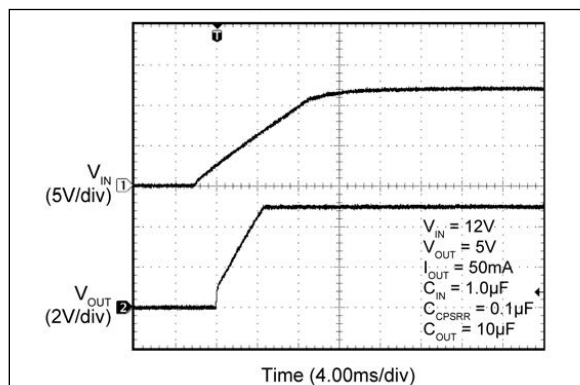


**FIGURE 2-19:** Soft Turn-On into Full Load.

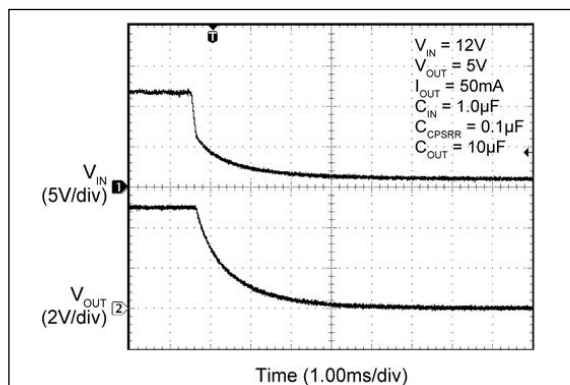


**FIGURE 2-22:** Hot Un-Plug.

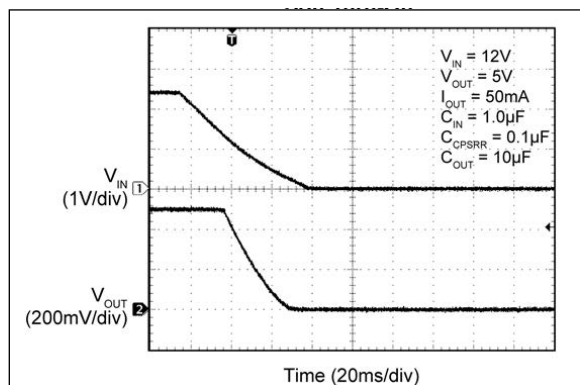


**FIGURE 2-20:** Soft Turn-Off.

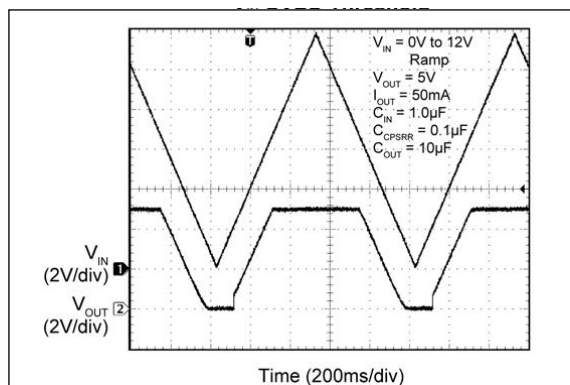


**FIGURE 2-23:**  $V_{IN}$  UVLO Threshold.

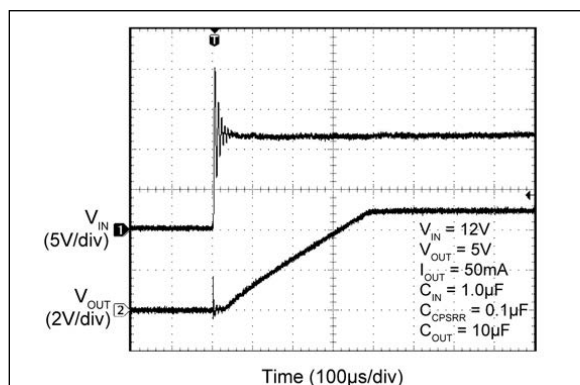


**FIGURE 2-21:** Hot Plug.

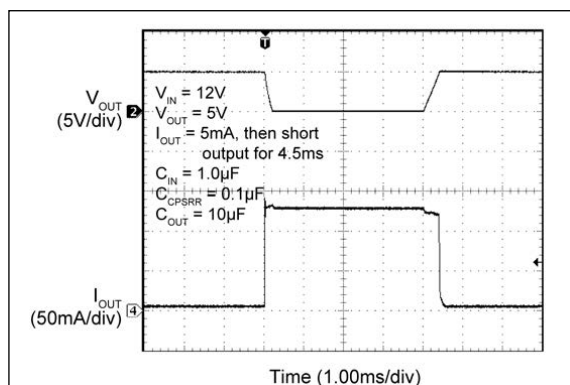


**FIGURE 2-24:** Current Limit.

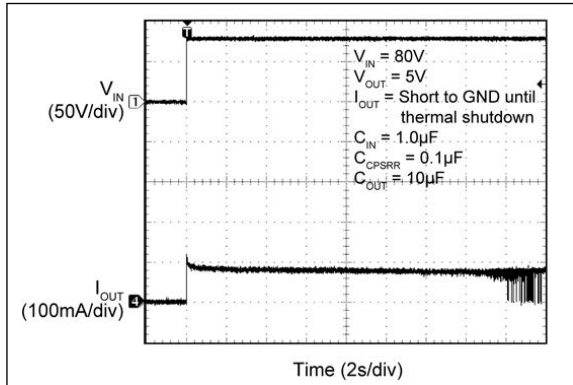


**FIGURE 2-25:** Thermal Shutdown Response.

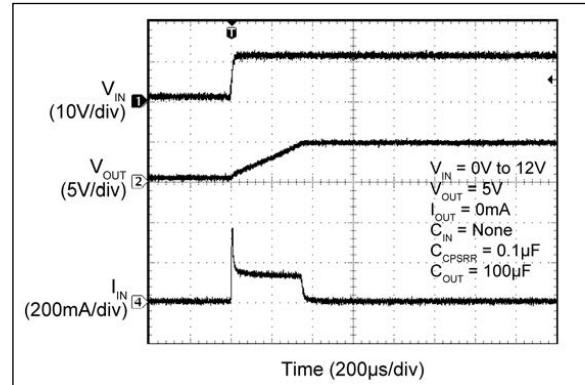


**FIGURE 2-28:** Inrush Current Response.

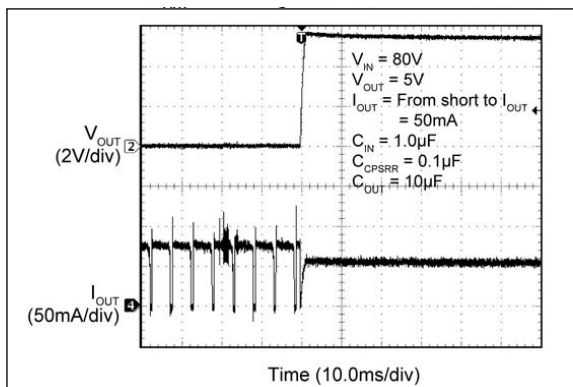


**FIGURE 2-26:**  $V_{OUT}$  Recovery from Thermal Shutdown.

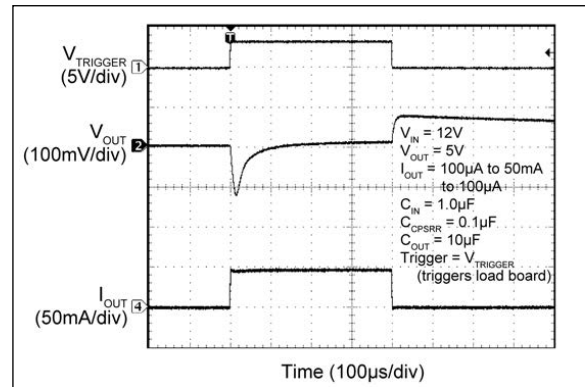


**FIGURE 2-29:** Load Transient Response.

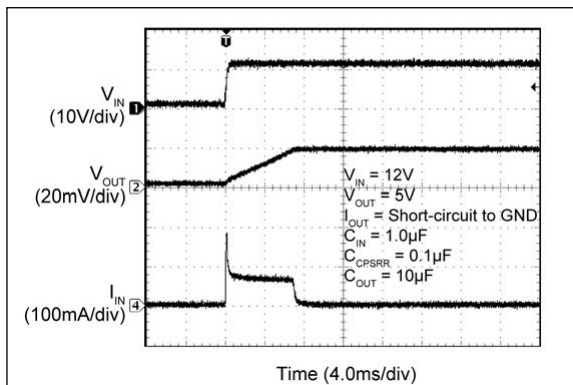


**FIGURE 2-27:** Turn-On into Short Circuit.

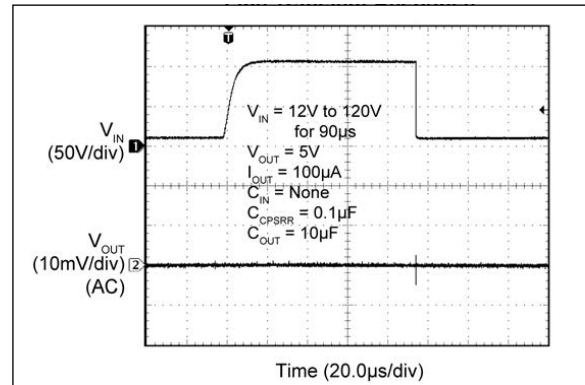


**FIGURE 2-30:** Line Transient Response.

# MIC5282

## 3.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in [Table 3-1](#).

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

| Pin Number<br>MIC5282YMME | Pin Number<br>MIC5282-x.xYMME | Pin Number<br>MIC5282YMM | Pin Number<br>MIC5282-x.xYMM | Pin Name | Description                                                                   |
|---------------------------|-------------------------------|--------------------------|------------------------------|----------|-------------------------------------------------------------------------------|
| 1                         | 1                             | 1                        | 1                            | VIN      | Supply Voltage Input. Connect 1 $\mu$ F capacitor from VIN to GND.            |
| 2, 3, 7                   | 2, 3, 7                       | 2, 3, 7                  | 2, 3, 7                      | NC       | Not internally connected. Connect NC to GND or leave unconnected.             |
| 4                         | 4                             | 4                        | 4                            | CPSRR    | Bypass Capacitor Connection. Connect 0.1 $\mu$ F capacitor from CPSRR to GND. |
| 5                         | 5                             | 5                        | 5                            | GND      | Ground.                                                                       |
| 6                         | —                             | 6                        | —                            | FB       | Feedback Connection. For external resistor divider to set $V_{OUT}$ .         |
| —                         | 6                             | —                        | 6                            | SNS      | Sense input. Connect SNS to VOUT.                                             |
| 8                         | 8                             | 8                        | 8                            | VOUT     | Regulator Output. Connect 10 $\mu$ F capacitor from VOUT to GND.              |
| EP                        | EP                            | —                        | —                            | ePad     | Exposed Pad (ePad) for Thermal Relief. Connect EP to GND.                     |

## 4.0 DETAILED DESCRIPTION

The MIC5282 voltage regulator accepts a 6V to 120V input and has an ultra-low 6  $\mu$ A typical quiescent current while offering an excellent line transient response and PSRR. These features make it ideal for harsh, noisy environments. All versions of the device offer 50 mA of output current. The MIC5282YMM and MIC5282YMME offer an adjustable output voltage from 1.27V to 5.5V. The MIC5282-3.3YMME and MIC5282-3.3YMM offer fixed 3.3V outputs and the MIC5282-5.0YMME and MIC5282-5.0YMM offer fixed 5.0V outputs. The YMME packaged devices feature a heat slug to more effectively remove heat from the die.

## 5.0 APPLICATIONS INFORMATION

### 5.1 Thermal Protection

MIC5282 has internal thermal shutdown to protect it from excessive heating of the die. When the junction temperature exceeds approximately +155°C, the output is disabled and the device begins to cool down. The device turns back on when the junction temperature cools by 15°C. This will result in a cycled output during continuous thermal overload conditions.

### 5.2 Current Limit

MIC5282 features output current-limit protection. The output sustains a continuous short circuit to GND without damage to the device, but thermal shutdown often results.

### 5.3 Input Capacitor

Connect a 1.0  $\mu$ F capacitor from VIN to GND. Microchip recommends the C5750X7R2E105M, 1.0  $\mu$ F, 250V capacitor made by TDK. When using a different capacitor, ensure that the voltage rating of the capacitor exceeds any potential transient.

### 5.4 CPSRR Capacitor

Connect a 0.1  $\mu$ F capacitor from CPSRR to GND to maintain high power supply rejection. The voltage rating of the capacitor must be at least 14V.

### 5.5 Output Capacitor

Connect a 10  $\mu$ F capacitor from VOUT to GND. Ensure that the voltage rating of the capacitor exceeds the designed output voltage of the MIC5282.

## 5.6 Output Voltage Setting

For the adjustable version MIC5282,  $V_{OUT}$  is programmed from 1.27V to 5.5V using:

### EQUATION 5-1:

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

Where:

$V_{REF} = 1.27V$

R1 & R2 are shown in the [Typical Application Circuits](#)

## 5.7 Thermal Measurements

It is always wise to measure an IC's case temperature to make sure that it is within operating limits, but it is easy to get erroneous results. The standard thermal couple that comes with many voltage meters uses a large wire gauge that behaves like a heat sink, resulting in artificially low case temperature measurements. Use a thermocouple of 36-gauge wire or smaller, such as the Omega (5SC-TT-K-36-36), to minimize the heat-sinking effect. Also, apply thermal compound to maximize heat transfer between the IC and the thermocouple.

An infrared thermometer is a recommended alternative. The IR thermometer from Optris has a 1 mm spot size, ideal for monitoring small surface mount packages. Also, the optional stand makes it easy to keep the beam on the IC for long periods of time.

# MIC5282

## 6.0 EVALUATION BOARD SCHEMATIC

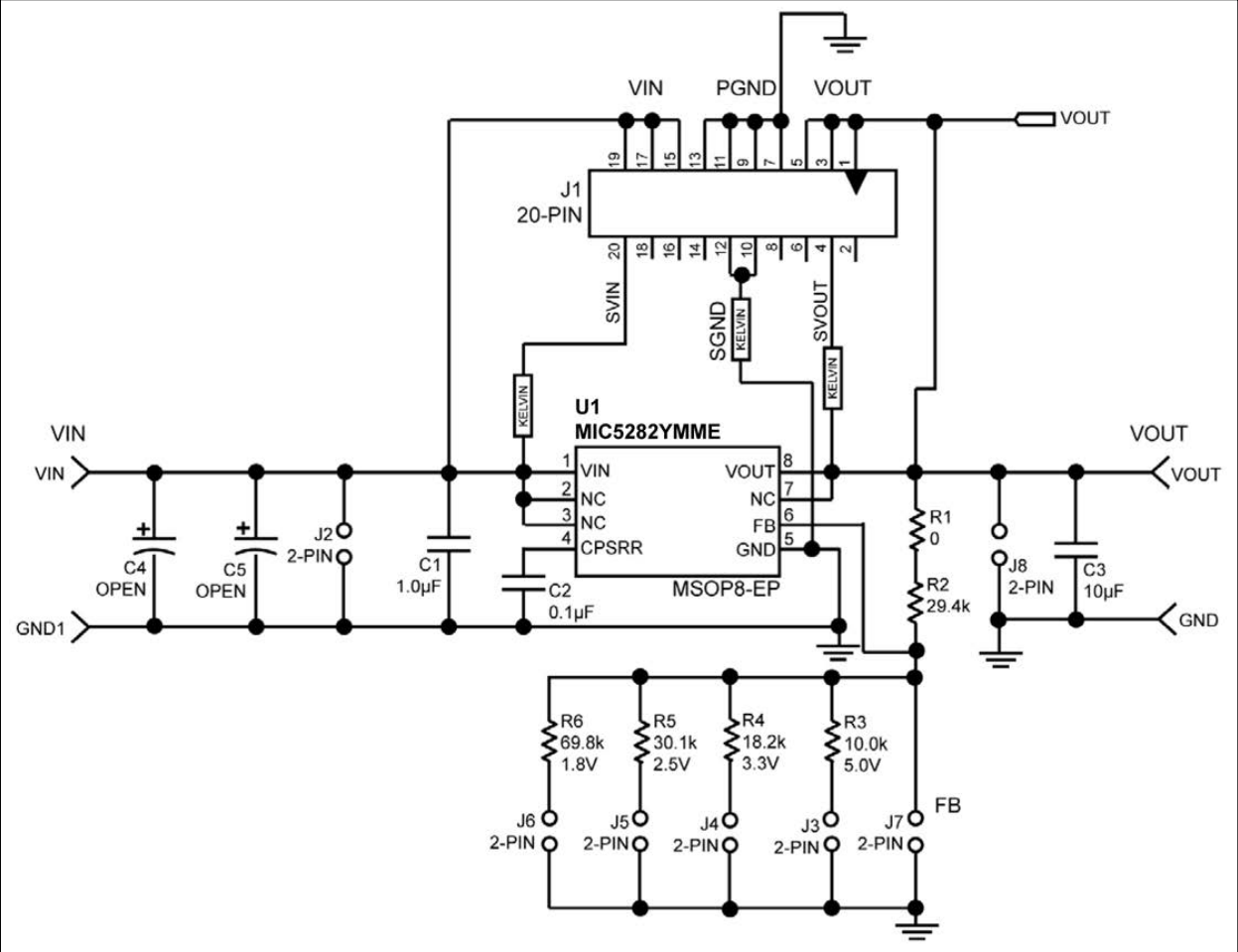


TABLE 6-1: BILL OF MATERIALS

| Item | Part Number    | Manufacturer              | Description                                                                                    | Qty. |
|------|----------------|---------------------------|------------------------------------------------------------------------------------------------|------|
| C1   | C5750X7R2E105M | TDK                       | 1.0 µF, 250V, 20%, X7R capacitor (2220)                                                        | 1    |
| C2   | 08053C104KAT2A | AVX                       | 0.1 µF 25V 20%, X7R capacitor (0805)                                                           | 1    |
| C3   | 0805ZD106KAT2A | AVX                       | 10 µF, 10V, 20%, X5R, capacitor (0805)                                                         | 1    |
| C4   | OPEN           | Panasonic                 | 100 µF, 160V, 20% capacitor (ALU, 0.492" diameter can 0.197" lead spacing - Part # ECA-2CM101) | 0    |
| C5   | OPEN           | Any                       | Capacitor                                                                                      | 0    |
| R1   | CRCW06030000F  | Vishay Dale               | 0Ω, 1% resistor, 0603                                                                          | 1    |
| R2   | CRCW06032942F  | Vishay Dale               | 29.4 kΩ, 1% resistor, 0603                                                                     | 1    |
| R3   | CRCW06031002F  | Vishay Dale               | 10.0 kΩ, 1% resistor, 0603                                                                     | 1    |
| R4   | CRCW06031822F  | Vishay Dale               | 18.2 kΩ, 1%, resistor, 0603                                                                    | 1    |
| R5   | CRCW06033012F  | Vishay Dale               | 30.1 kΩ, 1% resistor chip, 0603                                                                | 1    |
| R6   | CRCW06036982F  | Vishay Dale               | 69.8 kΩ, 1%, resistor, 0603                                                                    | 1    |
| U1   | MIC5282YMME    | Microchip Technology Inc. | 120VIN, 50 mA, Ultra-Low IQ, High-PSRR Linear Regulator                                        | 1    |

## 7.0 PCB EVALUATION BOARD LAYOUT

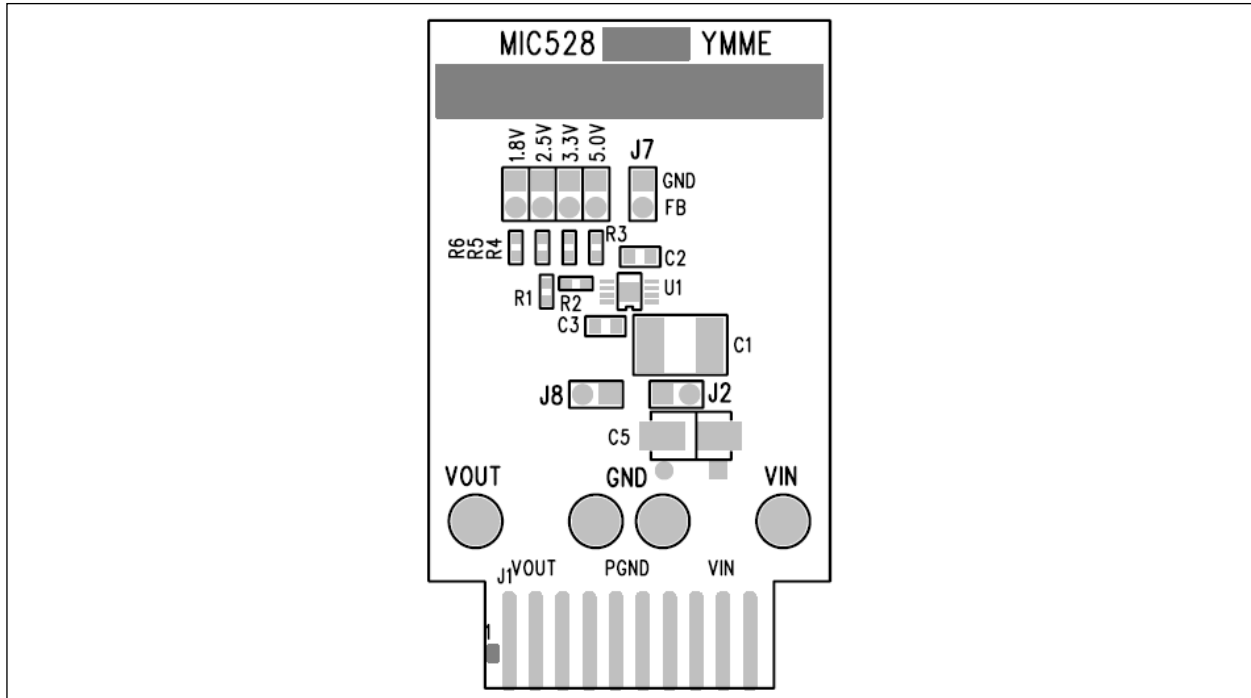


**FIGURE 7-1:** Top Layer Silk Screen.

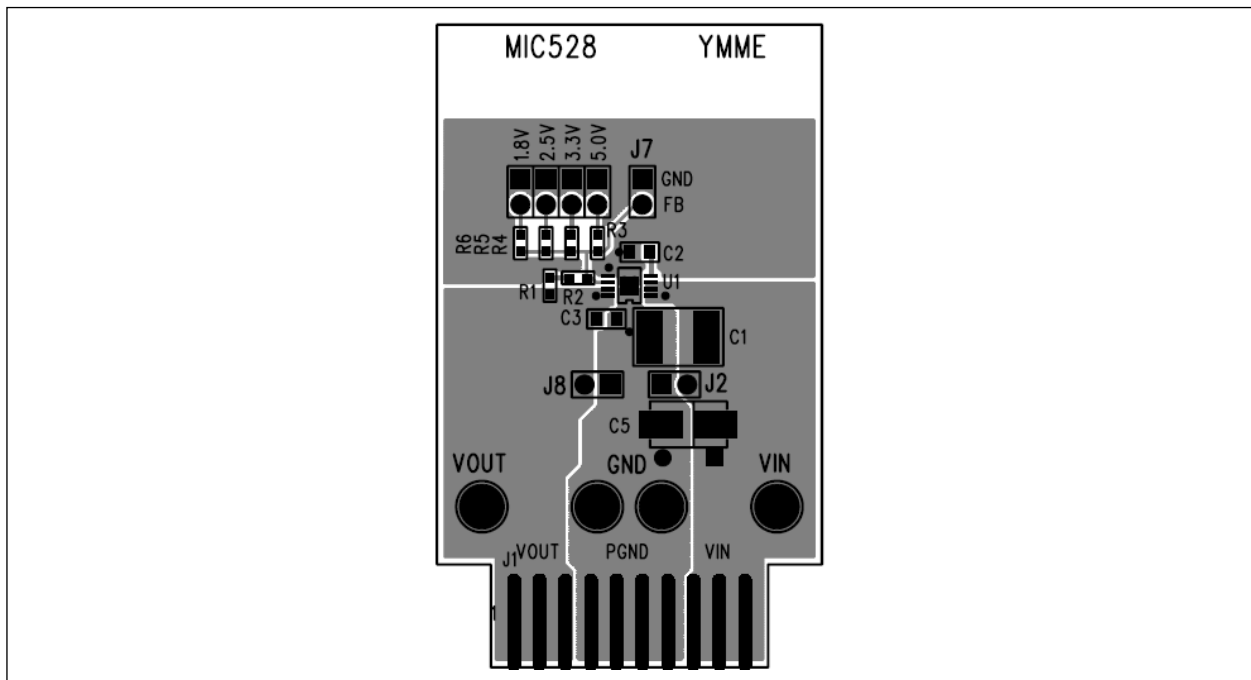


**FIGURE 7-2:** Top Layer Traces.

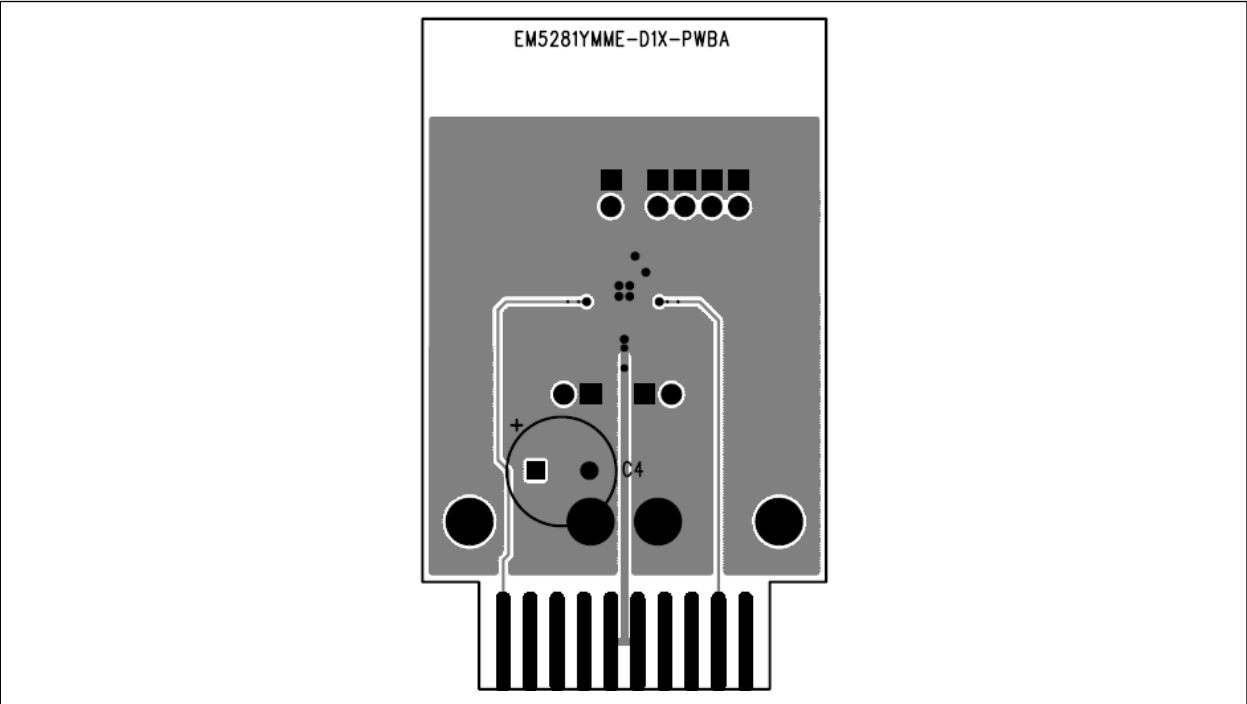


FIGURE 7-3: Bottom Layer Traces.

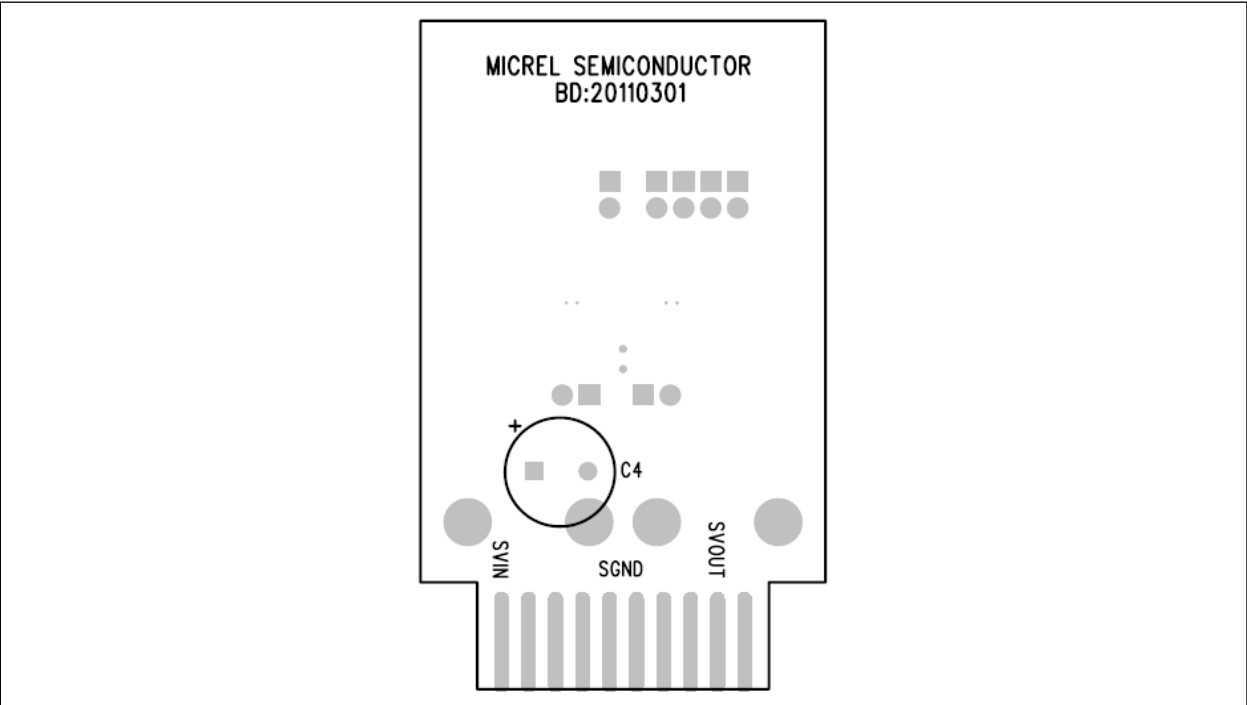


FIGURE 7-4: Bottom Layer Silk Screen.

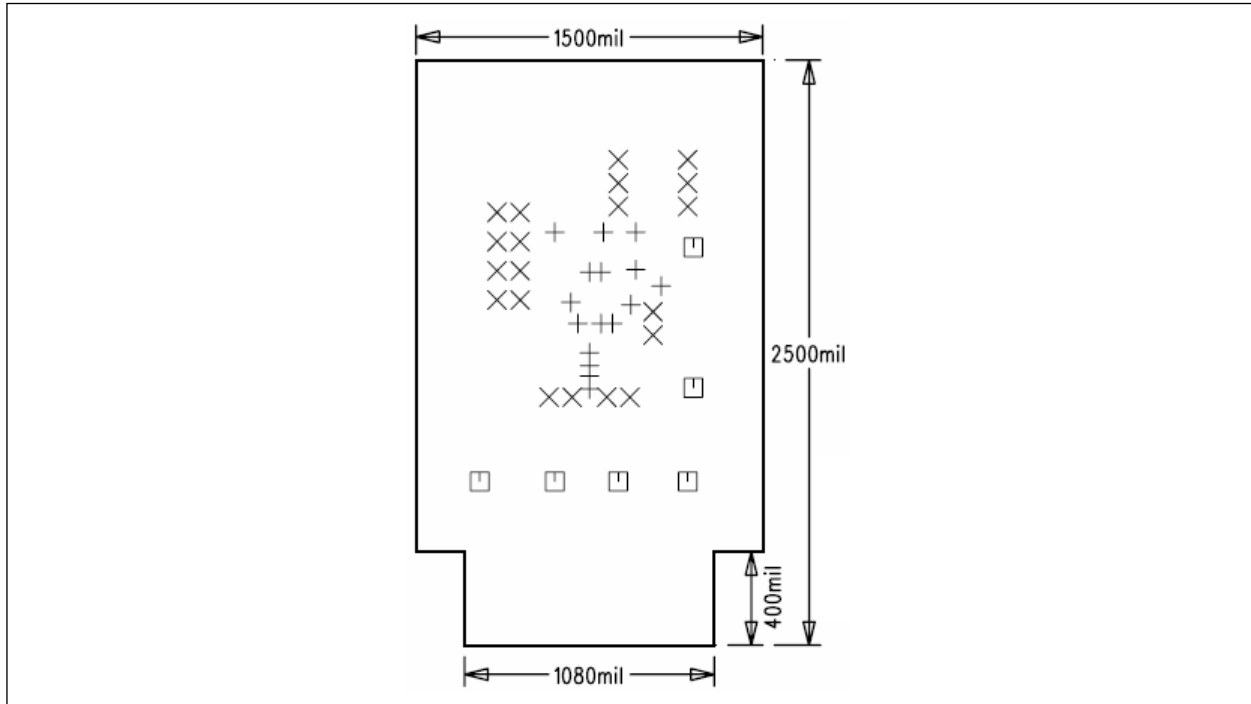
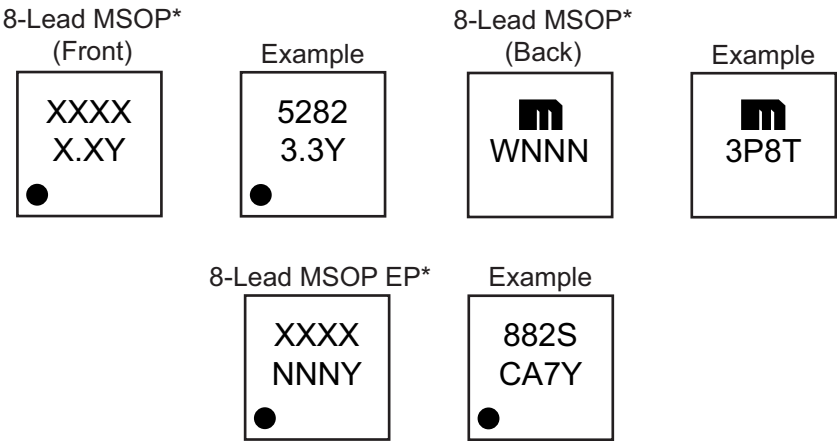


**FIGURE 7-5:** EV Board Dimensions.

8.0 PACKAGING INFORMATION

8.1 Package Marking Information



Legend:

XX...X

Y

YY

WW

NNN



\*

•, ▲, ▼

Product code or customer-specific information

Year code (last digit of calendar year)

Year code (last 2 digits of calendar year)

Week code (week of January 1 is week '01')

Alphanumeric traceability code

Pb-free JEDEC® designator for Matte Tin (Sn)

This package is Pb-free. The Pb-free JEDEC designator () can be found on the outer packaging for this package.

Pin one index is identified by a dot, delta up, or delta down (triangle mark).

Note:

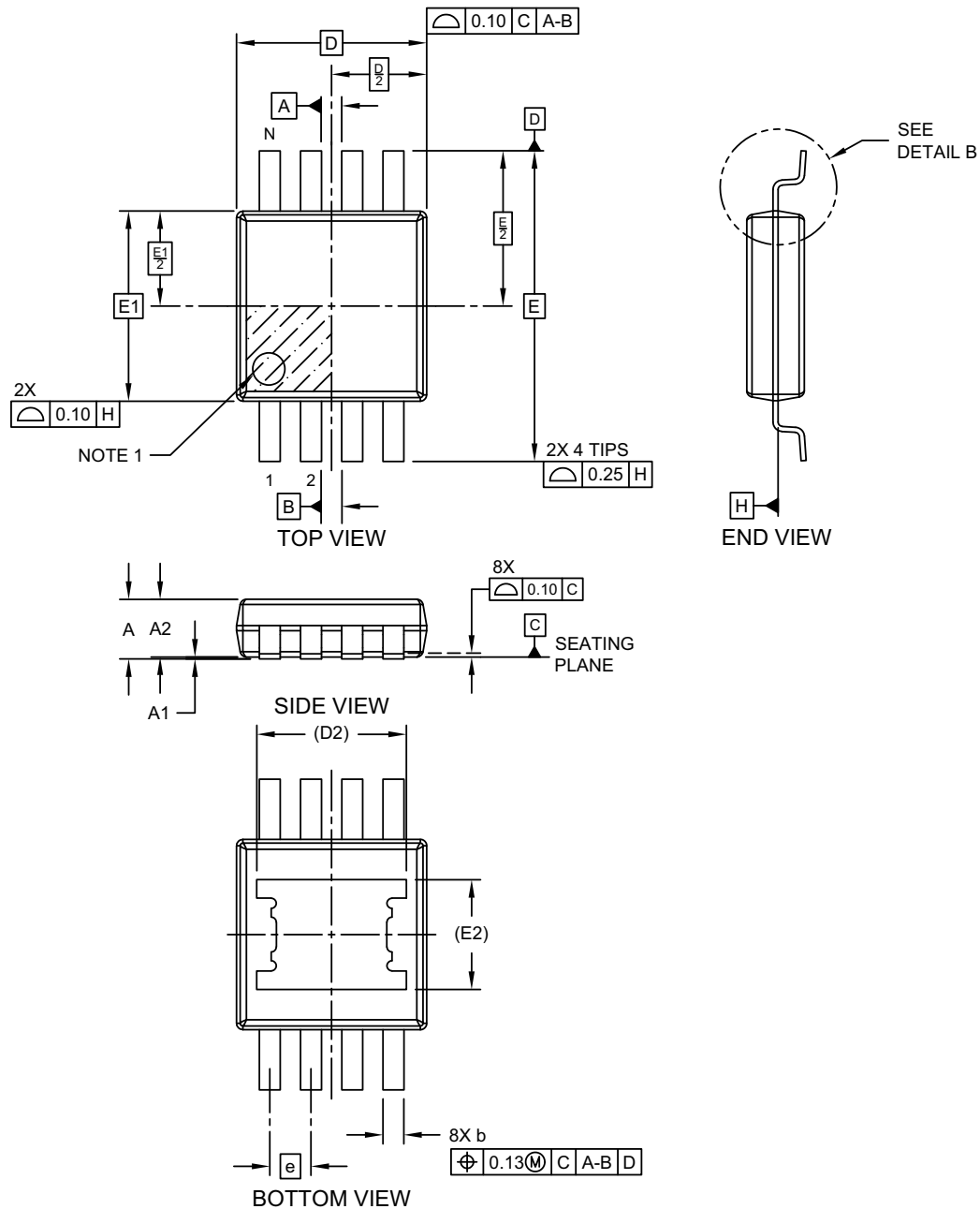
In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

Underbar (  ) and/or Overbar (  ) symbol may not be to scale.

**Note:** If the full seven-character YYWWNNN code cannot fit on the package, the following truncated codes are used based on the available marking space:  
6 Characters = YWWNNN; 5 Characters = WWNNN; 4 Characters = WNNN; 3 Characters = NNN;  
2 Characters = NN; 1 Character = N

## 8-Lead Micro Small Outline Package (DPA) - 3x3 mm Body [MSOP] With 2.36x1.73 mm Exposed Pad; Micel Legacy Package eP-MSOP-08L

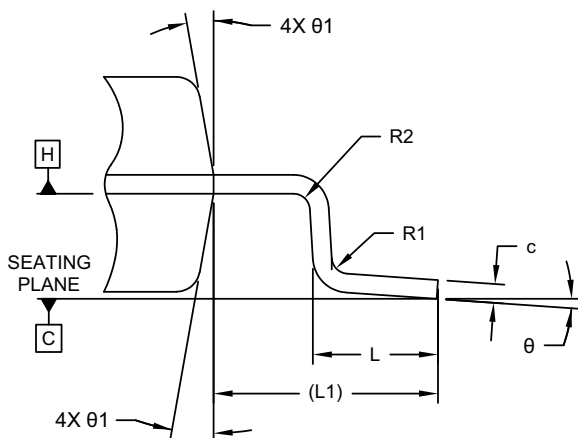
**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at <http://www.microchip.com/packaging>



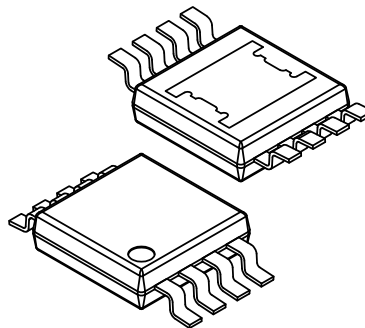
Microchip Technology Drawing C04-1085 Rev A Sheet 1 of 2

## 8-Lead Micro Small Outline Package (DPA) - 3x3 mm Body [MSOP] With 2.36x1.73 mm Exposed Pad; Micel Legacy Package eP-MSOP-08L

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



**DETAIL B**  
ROTATED FOR CLARITY



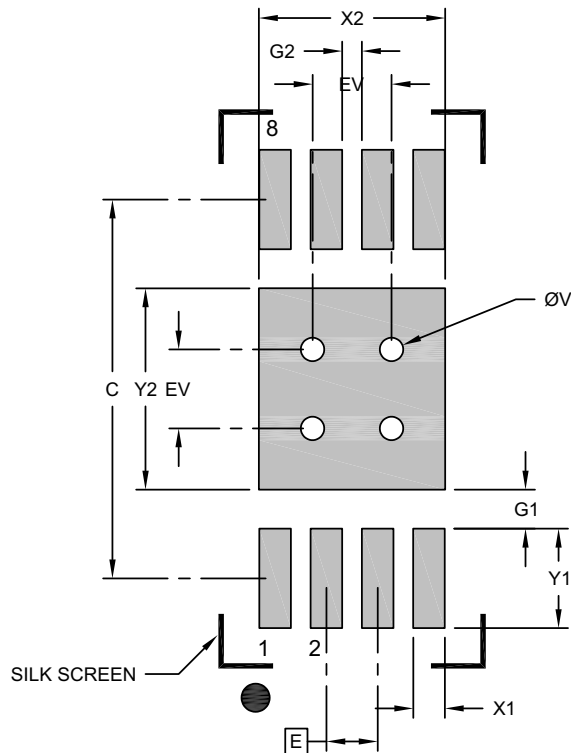
| Units                    |    | MILLIMETERS |      |      |
|--------------------------|----|-------------|------|------|
| Dimension Limits         |    | MIN         | NOM  | MAX  |
| Number of Terminals      | N  | 8           |      |      |
| Pitch                    | e  | 0.65 BSC    |      |      |
| Overall Height           | A  | 0.84        | 0.94 | 1.04 |
| Standoff                 | A1 | 0.03        | 0.08 | 0.13 |
| Molded Package Thickness | A2 | 0.81        | 0.86 | 0.91 |
| Overall Length           | D  | 3.00 BSC    |      |      |
| Overall Width            | E  | 4.90 BSC    |      |      |
| Molded Package Width     | E1 | 3.00 BSC    |      |      |
| Exposed Pad Length       | D2 | 2.36 REF    |      |      |
| Exposed Pad Width        | E2 | 1.73 REF    |      |      |
| Terminal Width           | b  | 0.30        | 0.33 | 0.43 |
| Terminal Thickness       | c  | 0.10        | 0.15 | 0.20 |
| Terminal Length          | L  | 0.43        | 0.53 | 0.63 |
| Footprint                | L1 | 0.95 REF    |      |      |
| Lead Bend Radius         | R1 | 0.07        | —    | —    |
| Lead Bend Radius         | R2 | 0.07        | —    | —    |
| Foot Angle               | θ  | 0°          | —    | 8°   |
| Mold Draft Angle         | θ1 | 5°          | —    | 15°  |

**Notes:**

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensioning and tolerancing per ASME Y14.5M  
BSC: Basic Dimension. Theoretically exact value shown without tolerances.  
REF: Reference Dimension, usually without tolerance, for information purposes only.

## 8-Lead Micro Small Outline Package (DPA) - 3x3 mm Body [MSOP] With 2.36x1.73 mm Exposed Pad; Micel Legacy Package eP-MSOP-08L

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



RECOMMENDED LAND PATTERN

| Units                           |    | MILLIMETERS |      |      |
|---------------------------------|----|-------------|------|------|
| Dimension Limits                |    | MIN         | NOM  | MAX  |
| Contact Pitch                   | E  |             | 0.65 |      |
| Center Pad Width                | X2 |             |      | 2.36 |
| Center Pad Length               | Y2 |             |      | 2.55 |
| Contact Pad Spacing             | C  |             | 4.80 |      |
| Contact Pad Width (X8)          | X1 |             |      | 0.40 |
| Contact Pad Length (X8)         | Y1 |             |      | 1.26 |
| Contact Pad to Center Pad (X8)  | G1 | 0.50        |      |      |
| Contact Pad to Contact Pad (X6) | G2 | 0.25        |      |      |
| Thermal Via Diameter            | V  |             | 0.30 |      |
| Thermal Via Pitch               | EV |             | 1.00 |      |

**Notes:**

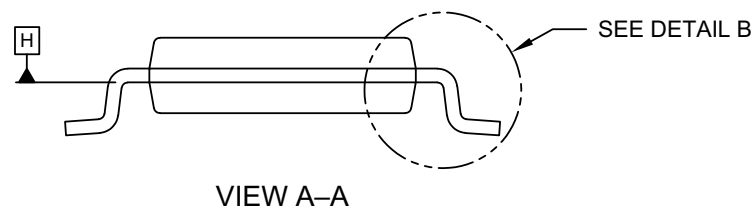
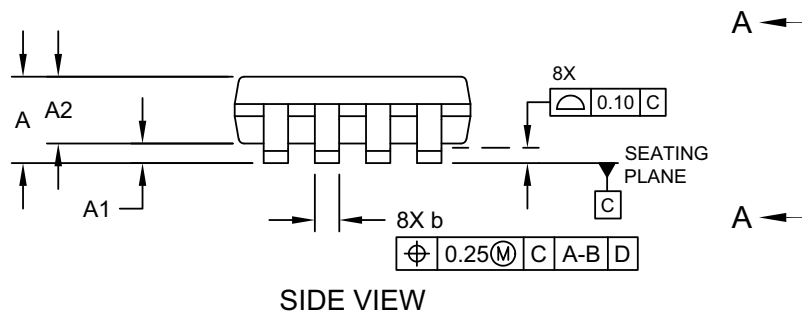
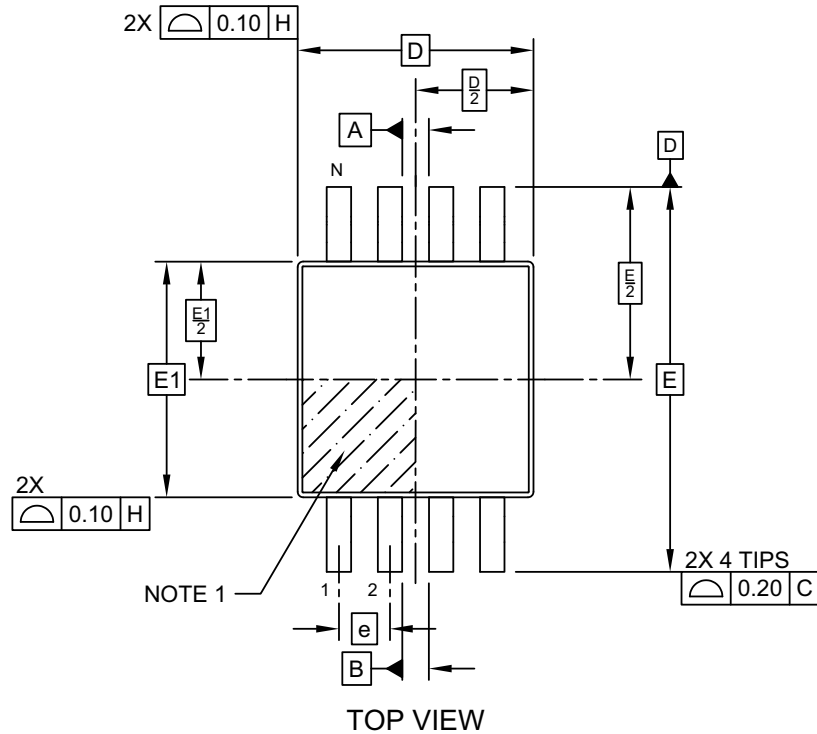
- Dimensioning and tolerancing per ASME Y14.5M  
BSC: Basic Dimension. Theoretically exact value shown without tolerances.
- For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

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**8-Lead Plastic Micro Small Outline Package (DMA) - 3x3 mm Body [MSOP]  
Micrel Legacy Package MSOP-08L**

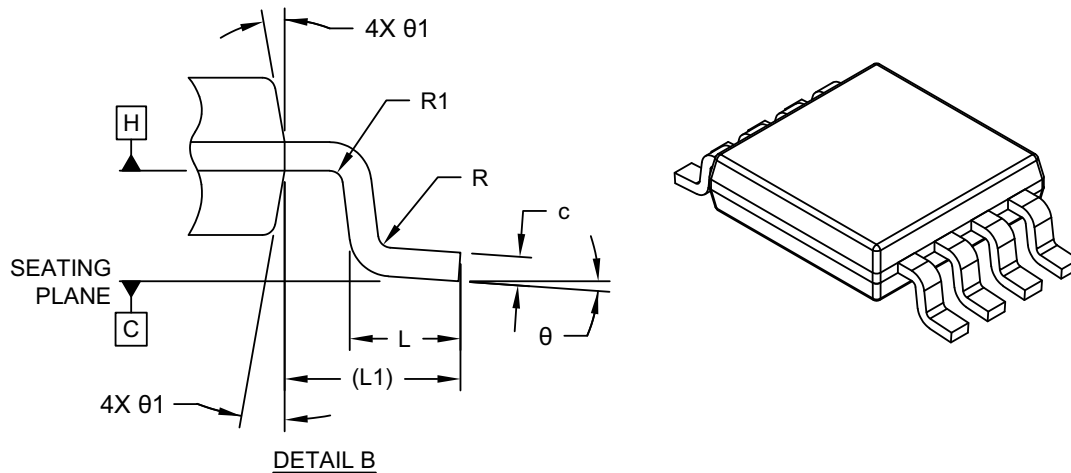
|              |                                                                                                                                                                                          |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Note:</b> | For the most current package drawings, please see the Microchip Packaging Specification located at <a href="http://www.microchip.com/packageing">http://www.microchip.com/packageing</a> |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Microchip Technology Drawing C04-1082 Rev A Sheet 1 of 2

## 8-Lead Plastic Micro Small Outline Package (DMA) - 3x3 mm Body [MSOP] Micrel Legacy Package MSOP-08L

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



| Dimension Limits         | Units | MILLIMETERS |      |      |
|--------------------------|-------|-------------|------|------|
|                          |       | MIN         | NOM  | MAX  |
| Number of Terminals      | N     | 8           |      |      |
| Pitch                    | e     | 0.65 BSC    |      |      |
| Overall Height           | A     | 0.94        | 1.02 | 1.10 |
| Standoff                 | A1    | 0.00        | —    | 0.15 |
| Molded Package Thickness | A2    | 0.75        | 0.85 | 0.95 |
| Overall Length           | D     | 3.00 BSC    |      |      |
| Overall Width            | E     | 4.90 BSC    |      |      |
| Molded Package Width     | E1    | 3.00 BSC    |      |      |
| Terminal Width           | b     | 0.25        | 0.30 | 0.40 |
| Terminal Thickness       | c     | 0.13        | 0.15 | 0.23 |
| Terminal Length          | L     | 0.45        | 0.55 | 0.70 |
| Footprint                | L1    | 0.95 REF    |      |      |
| Lead Bend Radius         | R     | 0.07        | —    | —    |
| Lead Bend Radius         | R1    | 0.07        | —    | —    |
| Foot Angle               | θ     | 0°          | —    | 8°   |
| Mold Draft Angle         | θ1    | 5°          | —    | 15°  |

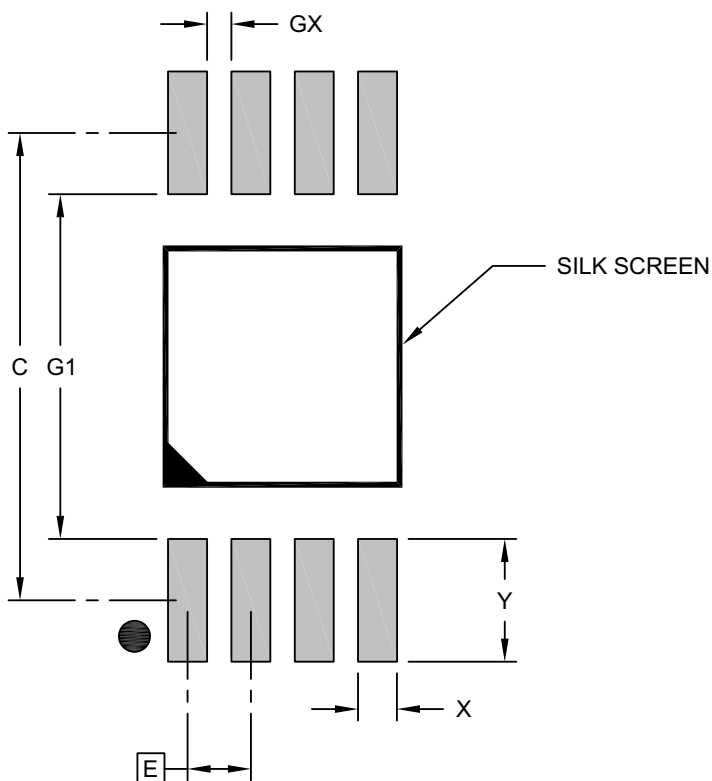
### Notes:

- Pin 1 visual index feature may vary, but must be located within the hatched area.
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
- Dimensioning and tolerancing per ASME Y14.5M  
BSC: Basic Dimension. Theoretically exact value shown without tolerances.  
REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-1082 Rev A Sheet 2 of 2

## 8-Lead Plastic Micro Small Outline Package (DMA) - 3x3 mm Body [MSOP] Micrel Legacy Package MSOP-08L

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



### RECOMMENDED LAND PATTERN

| Dimension Limits                | Units | MILLIMETERS |      |      |
|---------------------------------|-------|-------------|------|------|
|                                 |       | MIN         | NOM  | MAX  |
| Contact Pitch                   | E     | 0.65 BSC    |      |      |
| Contact Pad Spacing             | C     |             | 4.80 |      |
| Contact Pad Width (X8)          | X     |             |      | 0.40 |
| Contact Pad Length (X8)         | Y     |             |      | 1.26 |
| Contact Pad to Contact Pad (X4) | G1    | 3.54        |      |      |
| Contact Pad to Contact Pad (X6) | GX    | 0.25        |      |      |

#### Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

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

Microchip Technology Drawing C04-3082 Rev A

## APPENDIX A: REVISION HISTORY

### Revision A (March 2026)

- Converted Micrel document MIC5282 to Microchip data sheet DS20007027A.
- Minor text changes throughout.

NOTES:

## PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

| <u>Part Number</u>        | <u>[-X.X]</u>  | <u>X</u>                                                                          | <u>XX</u>        | <u>-XX</u> |
|---------------------------|----------------|-----------------------------------------------------------------------------------|------------------|------------|
| Device                    | Output Voltage | Temp. Range                                                                       | Package          | Media Type |
| <b>Device:</b>            | MIC5282:       | 120V <sub>IN</sub> , 50 mA, Ultra-Low I <sub>Q</sub> , High PSRR Linear Regulator |                  |            |
| <b>Output Voltage:</b>    | <blank>        | =                                                                                 | Adjustable       |            |
|                           | 3.3            | =                                                                                 | 3.3V             |            |
|                           | 5.0            | =                                                                                 | 5.0V             |            |
| <b>Temperature Range:</b> | Y              | =                                                                                 | -40°C to +125°C  |            |
| <b>Package:</b>           | MME            | =                                                                                 | 8-Lead ePad MSOP |            |
|                           | MM             | =                                                                                 | 8-Lead MSOP      |            |
| <b>Media Type:</b>        | <blank>        | =                                                                                 | 100/Tube         |            |
|                           | TR             | =                                                                                 | 2,500/Reel       |            |

**Examples:**

a) MIC5282YMME:  
MIC25282, Adjustable Output Voltage, -40°C to +125°C Temp. Range, 8-Lead ePad MSOP, 100/Tube

b) MIC5282-3.3YMM-TR:  
MIC5282, 3.3V Output Voltage, -40°C to +125°C Temp. Range, 8-Lead MSOP, 2,500/Reel

c) MIC5282-5.0YMME-TR:  
MIC5282, 5.0V Output Voltage, -40°C to +125°C Temp. Range, 8-Lead ePad MSOP, 2,500/Reel

d) MIC5282YMM:  
MIC5282, Adjustable Output Voltage, -40°C to +125°C Temp. Range, 8-Lead MSOP, 100/Tube

**Note:** Tape and Reel identifier only appears in the catalog part number description. This identifier is used for ordering purposes and is not printed on the device package. Check with your Microchip Sales Office for package availability with the Tape and Reel option.

# MIC5282

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NOTES:

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ISBN: 979-8-3371-3047-7

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