Features

- 1.5V to 5.5V Operating Range
- 1.5 μA Typical Supply Current
- ±1.25% Voltage Threshold Accuracy
- 10 nA Maximum Input Leakage Current Over Temperature
- 10 μs Propagation Delay
- Externally Adjustable Hysteresis (MIC841)
- Internal 20 mV Hysteresis (MIC842)
- Output Options:
  - Push-Pull, Active-High
  - Push-Pull, Active-Low
  - Open-Drain, Active-Low
- Open-Drain Output can be Pulled to 6V Regardless of VDD
- Immune to Brief Input Transients
- Teeny 5-Pin SC-70 Package
- 6-Pin 1.6 mm x 1.6 mm TDFN (MIC841)
- 4-Pin 1.2 mm x 1.6 mm TDFN (MIC842)

Applications

- Smartphones
- PDAs
- Precision Battery Monitoring
- Battery Chargers

General Description

The MIC841 and MIC842 are micro-power, precision-voltage comparators with an on-chip voltage reference.

Both devices are intended for voltage monitoring applications. External resistors are used to set the voltage monitor threshold. When the threshold is crossed, the outputs switch polarity.

The MIC842 incorporates a voltage reference and comparator with fixed internal hysteresis; two external resistors are used to set the switching threshold voltage. The MIC841 provides a similar function with user adjustable hysteresis; this part requires three external resistors to set the upper and lower thresholds (the difference between the threshold voltages being the hysteresis voltage).

Both the MIC841 and MIC842 are available with push-pull or open-drain output stage. The push-pull output stage is configured either active-high or active-low; the open-drain output stage is only configured active-low.

Supply current is extremely low (1.5 μA, typical), making it ideal for portable applications.

The MIC841/2 is supplied in the Teeny 5-pin SC-70, 6-pin 1.6 mm x 1.6 mm Thin DFN (MIC841), and 4-pin 1.2 mm x 1.6 mm Thin DFN (MIC842) packages.

Package Types

<table>
<thead>
<tr>
<th>MIC841</th>
<th>MIC841</th>
<th>MIC842</th>
<th>MIC842</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC-70-5 (C5)</td>
<td>6-Pin TDFN (MT)</td>
<td>SC-70-5 (C5)</td>
<td>4-Pin TDFN (MT)</td>
</tr>
<tr>
<td>LTH</td>
<td>GND</td>
<td>HTH</td>
<td>Yxx</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>OUT</td>
<td>VDD</td>
<td>OUT</td>
<td>VDD</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>NC</td>
<td>GND</td>
<td>INP</td>
<td>Yxx</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>OUT</td>
<td>VDD</td>
<td>OUT</td>
<td>VDD</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>NC</td>
<td>GND</td>
<td>INP</td>
<td>Yxx</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>OUT</td>
<td>VDD</td>
<td>OUT</td>
<td>VDD</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>NC</td>
<td>GND</td>
<td>INP</td>
<td>Yxx</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
Typical Application Circuits

**MIC841**
Threshold Detection with Adjustable Hysteresis

![MIC841 Circuit Diagram]

- $V_{IN}$
- $R1$
- $R2$
- $R3$
- $V_{DD}$
- $V_{OUT}$
- $LTH$
- $HTH$
- $GND$
- $VOUT > V_{HTH}$
- $V_{LTH} > V_{HTH}$
- $V_{REF} = 1.24V$
- $1.5V \leq V_{DD} \leq 5.5V$

**MIC842**
Threshold Detection with Internal Fixed Hysteresis

![MIC842 Circuit Diagram]

- $V_{IN}$
- $R1$
- $R2$
- $V_{DD}$
- $V_{OUT}$
- $V_{REF} = 1.24V$
- $1.5V \leq V_{DD} \leq 5.5V$
1.0 FUNCTIONAL BLOCK DIAGRAMS

Note: Block diagrams show SC-70 package pin numbers.

**FIGURE 1-1:** MIC841H Block Diagram

**FIGURE 1-2:** MIC841L Block Diagram

**FIGURE 1-3:** MIC841N Block Diagram

**FIGURE 1-4:** MIC842H Block Diagram

**FIGURE 1-5:** MIC842L Block Diagram

**FIGURE 1-6:** MIC842N Block Diagram
2.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Supply Voltage (VDD) ................................................................................................................................... –0.3V to +7V
Input Voltage (VINP, VLTH, VHTH) .................................................................................................................. +7V
Output Current (IOUT) ............................................................................................................................................ ±20 mA
ESD Rating\(^{(1)}\) ..................................................................................................................................................... 1 kV

Operating Ratings ‡

Supply Voltage (VDD) ................................................................................................................................ +1.5V to +5.5V
Input Voltage (VINP, VLTH, VHTH) .................................................................................................................... 0V to +6V
VOUT ('H' and 'L' versions) ......................................................................................................................................... VDD
VOUT ('N' version) ........................................................................................................................................................+6V

† 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: Devices are ESD sensitive. Handling precautions are recommended. Human body model, 1.5 kΩ in series with 100 pF.
### TABLE 2-1: ELECTRICAL CHARACTERISTICS

**Electrical Characteristics:** $1.5V \leq V_{DD} \leq 5.5V$; $T_A = 25°C$, $-40°C \leq T_A \leq +85°C$, unless noted. (Note 1).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Current ($I_{DD}$)</td>
<td>—</td>
<td>1.5</td>
<td>3</td>
<td>µA</td>
<td>Output not asserted</td>
</tr>
<tr>
<td>Input Leakage Current ($I_{INP}$)</td>
<td>—</td>
<td>0.005</td>
<td>10</td>
<td>nA</td>
<td>—</td>
</tr>
<tr>
<td>Reference Voltage ($V_{REF}$)</td>
<td>1.225</td>
<td>1.240</td>
<td>1.256</td>
<td>V</td>
<td>$0°C \leq T_A \leq 85°C$</td>
</tr>
<tr>
<td></td>
<td>1.219</td>
<td>1.240</td>
<td>1.261</td>
<td></td>
<td>$-40°C \leq T_A \leq 85°C$</td>
</tr>
<tr>
<td>Hysteresis Voltage ($V_{HYST}$)</td>
<td>8</td>
<td>20</td>
<td>35</td>
<td>mV</td>
<td>MIC842 only</td>
</tr>
<tr>
<td>Propagation Delay ($t_D$)</td>
<td>—</td>
<td>12</td>
<td>50</td>
<td>µs</td>
<td>$V_{INP} = 1.352V$ to $1.128V$</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>8</td>
<td>50</td>
<td></td>
<td>$V_{INP} = 1.143V$ to $1.367V$</td>
</tr>
<tr>
<td>Output Voltage-Low ($V_{OUT}$)</td>
<td>—</td>
<td>0.05</td>
<td>0.3</td>
<td>V</td>
<td>$I_{SINK} = 1.6$ mA, $V_{DD} \geq 1.6V$</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>0.005</td>
<td>0.4</td>
<td></td>
<td>$I_{SINK} = 100$ µA, $V_{DD} \geq 1.2V$</td>
</tr>
<tr>
<td>Output Voltage-High ($V_{OUT}$)</td>
<td>—</td>
<td>0.99V$V_{DD}$</td>
<td>—</td>
<td></td>
<td>$I_{SOURCE} = 500$ µA, $V_{DD} \geq 1.6V$</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>0.99V$V_{DD}$</td>
<td>—</td>
<td></td>
<td>$I_{SOURCE} = 50$ µA, $V_{DD} \geq 1.2V$</td>
</tr>
</tbody>
</table>

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

2: $V_{HTH} = V_{REF} + V_{HYST}$.

3: $V_{DD}$ operating range is 1.5V to 5.5V. Output is guaranteed to be de-asserted down to $V_{DD} = 1.2V$. 


# TEMPERATURE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sym.</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature Ranges</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Junction Temperature</td>
<td>$T_J$</td>
<td>—</td>
<td>—</td>
<td>+150</td>
<td>°C</td>
<td>Note 1</td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>$T_S$</td>
<td>−65</td>
<td>—</td>
<td>+150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Ambient Temperature Range</td>
<td>$T_A$</td>
<td>−40</td>
<td>—</td>
<td>+85</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>Lead Temperature</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>+260</td>
<td>°C</td>
<td>Soldering, 10s</td>
</tr>
<tr>
<td><strong>Package Thermal Resistances</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC-70-5</td>
<td>$\theta_{JA}$</td>
<td>—</td>
<td>256.5</td>
<td>—</td>
<td>°C/W</td>
<td></td>
</tr>
<tr>
<td>6-Pin 1.6 mm x 1.6 mm TDFN</td>
<td>$\theta_{JA}$</td>
<td>—</td>
<td>92</td>
<td>—</td>
<td>°C/W</td>
<td></td>
</tr>
<tr>
<td>4-Pin 1.2 mm x 1.6 mm TDFN</td>
<td>$\theta_{JA}$</td>
<td>—</td>
<td>173</td>
<td>—</td>
<td>°C/W</td>
<td></td>
</tr>
</tbody>
</table>

**Note 1:** 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., $T_A$, $T_J$, $\theta_{JA}$). Exceeding the maximum allowable power dissipation will cause the device operating junction temperature to exceed the maximum +150°C rating. Sustained junction temperatures above +150°C can impact the device reliability.
### 3.0 PIN DESCRIPTIONS

The descriptions of the pins are listed in Table 3-1 and Table 3-2.

#### TABLE 3-1: MIC841 PIN FUNCTION TABLE

<table>
<thead>
<tr>
<th>Pin Number SC-70</th>
<th>Pin Number TDFN</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>HTH</td>
<td>High Threshold Input. HTH and LTH monitor external voltages.</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>GND</td>
<td>Ground.</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>LTH</td>
<td>Low Threshold Input. LTH and HTH monitor external voltages.</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>OUT (&quot;H&quot; Version) Active-Low Push-Pull Output. OUT asserts low when V&lt;sub&gt;LTH&lt;/sub&gt; &lt; V&lt;sub&gt;REF&lt;/sub&gt;. OUT remains low until V&lt;sub&gt;HTH&lt;/sub&gt; &gt; V&lt;sub&gt;REF&lt;/sub&gt;.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUT (&quot;L&quot; Version) Active-High Push-Pull Output. OUT asserts high when V&lt;sub&gt;LTH&lt;/sub&gt; &lt; V&lt;sub&gt;REF&lt;/sub&gt;. OUT remains high until V&lt;sub&gt;HTH&lt;/sub&gt; &gt; V&lt;sub&gt;REF&lt;/sub&gt;.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUT (&quot;N&quot; Version) Active-Low, Open-Drain Output. OUT asserts low when V&lt;sub&gt;LTH&lt;/sub&gt; &lt; V&lt;sub&gt;REF&lt;/sub&gt;. OUT remains low until V&lt;sub&gt;HTH&lt;/sub&gt; &gt; V&lt;sub&gt;REF&lt;/sub&gt;.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>VDD</td>
<td>Power Supply Input.</td>
</tr>
<tr>
<td>—</td>
<td>5</td>
<td>NC</td>
<td>No Connect. Not internally connected.</td>
</tr>
</tbody>
</table>

#### TABLE 3-2: MIC842 PIN FUNCTION TABLE

<table>
<thead>
<tr>
<th>Pin Number SC-70</th>
<th>Pin Number TDFN</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>INP</td>
<td>Threshold Input. INP monitors an external voltage.</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>GND</td>
<td>Ground.</td>
</tr>
<tr>
<td>3</td>
<td>—</td>
<td>NC</td>
<td>No Connect. Not internally connected.</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>OUT (&quot;H&quot; Version) Active-Low, Push-Pull Output. OUT asserts low when V&lt;sub&gt;INP&lt;/sub&gt; &lt; V&lt;sub&gt;REF&lt;/sub&gt;. OUT remains low until V&lt;sub&gt;INP&lt;/sub&gt; &gt; (V&lt;sub&gt;REF&lt;/sub&gt; + V&lt;sub&gt;HYST&lt;/sub&gt;).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUT (&quot;L&quot; Version) Active-High, Push-Pull Output. OUT asserts high when V&lt;sub&gt;INP&lt;/sub&gt; &lt; V&lt;sub&gt;REF&lt;/sub&gt;. OUT remains high until V&lt;sub&gt;INP&lt;/sub&gt; &gt; (V&lt;sub&gt;REF&lt;/sub&gt; + V&lt;sub&gt;HYST&lt;/sub&gt;).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>OUT (&quot;N&quot; Version) Active-Low, Open-Drain Output. OUT asserts low when V&lt;sub&gt;INP&lt;/sub&gt; &lt; V&lt;sub&gt;REF&lt;/sub&gt;. OUT remains low until V&lt;sub&gt;INP&lt;/sub&gt; &gt; (V&lt;sub&gt;REF&lt;/sub&gt; + V&lt;sub&gt;HYST&lt;/sub&gt;).</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>VDD</td>
<td>Power Supply Input.</td>
</tr>
</tbody>
</table>
4.0 APPLICATION INFORMATION

4.1 Output

The MIC841N and MIC842N outputs are an open-drain MOSFET, so most applications will require a pull-up resistor. The value of the resistor should not be too large or leakage effects may dominate. 470 kΩ is the maximum recommended value. Note that the output of the "N" version may be pulled up as high as 6V regardless of the IC’s supply voltage. The “H” and “L” versions of the MIC841 and MIC842 have a push-pull output stage with a diode clamped to VDD. Thus, the maximum output voltage of the “H” and “L” versions is VDD (see Table 2-1).

When working with large resistors on the input to the devices, a small amount of leakage current can cause voltage offsets that degrade system accuracy. The maximum recommended total resistance from VIN to ground is 3 MΩ. The accuracy of the resistors can be chosen based upon the accuracy required by the system. The inputs may be subjected to voltages as high as 6V steady-state without adverse effects of any kind regardless of the IC’s supply voltage. This applies even if the supply voltage is zero. This permits the situation in which the IC’s supply is turned off, but voltage is still present on the inputs (see Table 2-1).

4.2 Programming the MIC841 Thresholds

The low-voltage threshold is calculated using Equation 4-1.

**EQUATION 4-1:**

\[
V_{IN(LO)} = V_{REF} \times \left( \frac{R_1 + R_2 + R_3}{R_2 + R_3} \right)
\]

Where:

\[V_{REF} = 1.240V\]

The high-voltage threshold is calculated using Equation 4-2.

**EQUATION 4-2:**

\[
V_{IN(HI)} = V_{REF} \times \left( \frac{R_1 + R_2 + R_3}{R_3} \right)
\]

Where:

\[V_{REF} = 1.240V\]

In order to provide the additional criteria needed to solve for the resistor values, the resistors can be selected such that they have a given total value, that is, \(R_1 + R_2 + R_3 = R_{TOTAL}\). A value such as 1 MΩ for \(R_{TOTAL}\) is a reasonable value because it draws minimum current but has no significant effect on accuracy.

**EQUATION 4-3:**

\[
V_{IN(HI)} = 3.6V = 1.24V \left( \frac{1MΩ}{R_3} \right)
\]

Solve:

\[R_3 = 344 kΩ\]

Once R3 is determined, the equation for \(V_{IN(LO)}\) can be used to determine R2. A single lithium-ion cell, for example, should not be discharged below 2.5V. Many applications limit the drain to 3.1V.

Using 3.1V for the \(V_{IN(LO)}\) threshold allows the calculation of the two remaining resistor values.

**EQUATION 4-4:**

\[
V_{IN(LO)} = 3.1V = 1.24V \left( \frac{1MΩ}{R_2 + 344kΩ} \right)
\]

Solve:

\[R_2 = 56 kΩ\]
\[R_1 = 1 MΩ - R_2 - R_3\]
\[R_1 = 600 kΩ\]

The accuracy of the resistors can be chosen based upon the accuracy required by the system.

**FIGURE 4-1:** MIC841 Example Circuit

Once the desired trip points are determined, set the \(V_{IN(HI)}\) threshold first.

For example, use a total of 1 MΩ = R1 + R2 + R3. For a typical single-cell lithium ion battery, 3.6V is a good "high threshold" because at 3.6V the battery is moderately charged. Solving for R3:

\[
V_{IN(HI)} = 3.6V = 1.24V \left( \frac{1MΩ}{R_3} \right)
\]

Solve:

\[R_3 = 344 kΩ\]
4.3 Programming the MIC842 Thresholds

The voltage threshold is calculated using Equation 4-5.

**EQUATION 4-5:**

\[ V_{IN(LO)} = V_{REF} \cdot \frac{R_1 + R_2}{R_2} \]

Where:
- \( V_{REF} = 1.240 \text{V} \)

4.4 Input Transients

The MIC841/2 is inherently immune to very short negative-going "glitches." Very brief transients may exceed the \( V_{IN(LO)} \) threshold without tripping the output.

As shown in Figure 4-4, the narrower the transient, the deeper the threshold overdrive that will be ignored by the MIC841/2. The graph represents the typical allowable transient duration for a given amount of threshold overdrive that will not generate an output.
5.0 PACKAGING INFORMATION

5.1 Package Marking Information

### 5-Pin SC-70* Example

<table>
<thead>
<tr>
<th>Device</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIC841H</td>
<td>B13</td>
</tr>
<tr>
<td>MIC841L</td>
<td>B14</td>
</tr>
<tr>
<td>MIC841N</td>
<td>B15</td>
</tr>
<tr>
<td>MIC842H</td>
<td>B16</td>
</tr>
<tr>
<td>MIC842L</td>
<td>B17</td>
</tr>
<tr>
<td>MIC842N</td>
<td>B18</td>
</tr>
</tbody>
</table>

Example: XXX NNN B14 408

### 4-Pin TDFN* 6-Pin TDFN*

<table>
<thead>
<tr>
<th>Device</th>
<th>Marking</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIC841H</td>
<td>BH</td>
</tr>
<tr>
<td>MIC841L</td>
<td>BL</td>
</tr>
<tr>
<td>MIC841N</td>
<td>BN</td>
</tr>
<tr>
<td>MIC842H</td>
<td>HB</td>
</tr>
<tr>
<td>MIC842L</td>
<td>HL</td>
</tr>
<tr>
<td>MIC842N</td>
<td>HN</td>
</tr>
</tbody>
</table>

Example: ▲ XX ▲ BL

---

**Legend:**
- **XX...X** Product code or customer-specific information
- **Y** Year code (last digit of calendar year)
- **YY** Year code (last 2 digits of calendar year)
- **WW** Week code (week of January 1 is week ’01’)
- **NNN** Alphanumeric traceability code
- **③** Pb-free JEDEC® designator for Matte Tin (Sn)
- *This package is Pb-free. The Pb-free JEDEC designator (③) 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.
5 Lead SC70 Package Outline and Recommended Land Pattern

<table>
<thead>
<tr>
<th>DRAWING #</th>
<th>SC70-5LD-PL-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIT</td>
<td>MM</td>
</tr>
</tbody>
</table>

**TITLE**
5 LEAD SC70 PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

**TOP VIEW**

**SIDE VIEW**

**END VIEW**

**RECOMMENDED LAND PATTERN**

**NOTE:**
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. DIMENSIONS ARE INCLUSIVE OF PLATING.
3. DIMENSIONS ARE EXCLUSIVE OF MOLD FLASH & METAL BURR.

---

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at [http://www.microchip.com/packaging](http://www.microchip.com/packaging).
**6-Lead 1.6 mm x 1.6 mm Package Outline and Recommended Land Pattern**

**TITLE**

6 LEAD TDFN 1.6x1.6mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

<table>
<thead>
<tr>
<th>DRAWING #</th>
<th>TDFN1616-6LD-PL-1</th>
<th>UNIT MM</th>
</tr>
</thead>
</table>

**TOP VIEW**

**NOTE:** 1, 2, 3

**SIDE VIEW**

**NOTE:** 1, 2, 3

**BOTTOM VIEW**

**NOTE:** 1, 2, 3

**RECOMMENDED LAND PATTERN**

**NOTE:** 4

1. MAX PACKAGE WARPAGE IS 0.05 MM
2. MAX ALLOWABLE BURR IS 0.076MM IN ALL DIRECTIONS
3. PIN #1 IS ON TOP WILL BE LASER MARKED
4. GREEN SHADED AREA REPRESENT SOLDER STENCIL OPENING (OPTIONAL) FOR IMPROVED THERMAL PERFORMANCE. SIZE: 0.55x0.30MM

---

**Note:** For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging.
4-Lead 1.2 mm x 1.6 mm Package Outline and Recommended Land Pattern

**TITLE**
4 LEAD TDFN 1.2x1.6mm PACKAGE OUTLINE & RECOMMENDED LAND PATTERN

<table>
<thead>
<tr>
<th>DRAWING #</th>
<th>TDFN1216-4LD-PL-1</th>
<th>UNIT</th>
<th>MM</th>
</tr>
</thead>
</table>

**TOP VIEW**
NOTE: 1, 2, 3

**BOTTOM VIEW**
NOTE: 1, 2, 3

**SIDE VIEW**
NOTE: 1, 2, 3

**RECOMMENDED LAND PATTERN**
NOTE: 4, 5

**NOTE:**
1. MAX PACKAGE MOLDING IS 0.05mm.
2. MAX ALLOWABLE BURR IS 0.076mm IN ALL DIRECTIONS.
3. PIN #1 IS ON TOP WILL BE LASER MARKED.
4. GREEN SHADED AREA INDICATES SOLDER STENCIL OPENING (OPTIONAL) FOR IMPROVED THERMAL PERFORMANCE. RECOMMENDED SIZE is 0.60mm x 0.30mm.
5. RED CIRCLE REPRESENTS THERMAL VIA & SHOULD BE CONNECTED TO GND FOR MAX PERFORMANCE. RECOMMENDED DIAMETER is 0.30mm - 0.35mm.

Note: For the most current package drawings, please see the Microchip Packaging Specification located at [http://www.microchip.com/packaging](http://www.microchip.com/packaging).
APPENDIX A: REVISION HISTORY

Revision A (April 2017)

- Converted Micrel data sheet MIC841/2 to Microchip data sheet DS20005758A.
- Minor grammatical corrections throughout.
PRODUCT IDENTIFICATION SYSTEM

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

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>Device</th>
<th>Output Stage</th>
<th>Temp.</th>
<th>Package</th>
<th>Media Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIC841: Comparator with 1.25% Reference and Adjustable Hysteresis</td>
<td>H = Push-Pull, Active-Low</td>
<td>Y = –40°C to +85°C</td>
<td>C5 = SC-70-5</td>
<td>T5 = 500/Reel</td>
</tr>
<tr>
<td></td>
<td>MIC842: Comparator with 1.25% Reference and Internal Fixed Hysteresis</td>
<td>L = Push-Pull, Active-High</td>
<td></td>
<td>MT = 1.6 mm x 1.6 mm TDFN (MIC841 Only)</td>
<td>TR = 5,000/Reel</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N = Open-Drain, Active-Low</td>
<td></td>
<td>MT = 1.2 mm x 1.6 mm TDFN (MIC842 Only)</td>
<td></td>
</tr>
</tbody>
</table>

Examples:

a) MIC841HYC5-T5: Comparator with 1.25% Reference and Adjustable Hysteresis, Push-Pull, Active-Low, –40°C to +85°C Temperature Range, SC-70-5 Package, 500/Reel
b) MIC841LYMT-TR: Comparator with 1.25% Reference and Adjustable Hysteresis, Push-Pull, Active-High, –40°C to +85°C Temperature Range, 1.6 mm x 1.6 mm TDFN Package, 5,000/Reel
c) MIC841NYC5-T5: Comparator with 1.25% Reference and Adjustable Hysteresis, Open-Drain, Active-Low, –40°C to +85°C Temperature Range, SC-70-5 Package, 500/Reel
d) MIC842HYMT-T5: Comparator with 1.25% Reference and Internal Fixed Hysteresis, Push-Pull, Active-Low, –40°C to +85°C Temperature Range, 1.2 mm x 1.6 mm TDFN Package, 500/Reel
e) MIC842LYC5-TR: Comparator with 1.25% Reference and Internal Fixed Hysteresis, Push-Pull, Active-High, –40°C to +85°C Temperature Range, SC-70-5 Package, 5,000/Reel
f) MIC842NYMT-TR: Comparator with 1.25% Reference and Internal Fixed Hysteresis, Open-Drain, Active-Low, –40°C to +85°C Temperature Range, 1.2 mm x 1.6 mm TDFN Package, 5,000/Reel
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