Digital Transistors (BRT)  
R1 = 10 kΩ, R2 = 47 kΩ

PNP Transistors with Monolithic Bias Resistor Network

This series of digital transistors is designed to replace a single device and its external resistor bias network. The Bias Resistor Transistor (BRT) contains a single transistor with a monolithic bias network consisting of two resistors; a series base resistor and a base-emitter resistor. The BRT eliminates these individual components by integrating them into a single device. The use of a BRT can reduce both system cost and board space.

Features

• Simplifies Circuit Design
• Reduces Board Space
• Reduces Component Count
• S and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC–Q101 Qualified and PPAP Capable
• These Devices are Pb–Free, Halogen Free/BFR Free and are RoHS Compliant

MAXIMUM RATINGS (T_A = 25°C)

<table>
<thead>
<tr>
<th>Rating</th>
<th>Symbol</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector–Base Voltage</td>
<td>V_CBO</td>
<td>50</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Emitter Voltage</td>
<td>V_CED</td>
<td>50</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector Current – Continuous</td>
<td>I_C</td>
<td>100</td>
<td>mAdc</td>
</tr>
<tr>
<td>Input Forward Voltage</td>
<td>V_IN(fwd)</td>
<td>40</td>
<td>Vdc</td>
</tr>
<tr>
<td>Input Reverse Voltage</td>
<td>V_IN(rev)</td>
<td>6</td>
<td>Vdc</td>
</tr>
</tbody>
</table>

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

MARKING DIAGRAMS

ORDERING INFORMATION

See detailed ordering, marking, and shipping information in the package dimensions section on page 2 of this data sheet.
### Table 1. ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Device</th>
<th>Part Marking</th>
<th>Package</th>
<th>Shipping</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUN2114T1G, SMUN2114T1G*</td>
<td>6D</td>
<td>SC−59</td>
<td>3,000 / Tape &amp; Reel</td>
</tr>
<tr>
<td>MMUN2114LT1G, SMMUN2114LT1G*</td>
<td>A6D</td>
<td>SOT−23</td>
<td>3,000 / Tape &amp; Reel</td>
</tr>
<tr>
<td>MMUN2114LT3G, NSVMUN2114LT3G*</td>
<td>A6D</td>
<td>SOT−23</td>
<td>10,000 / Tape &amp; Reel</td>
</tr>
<tr>
<td>MUN5114T1G, SMUN5114T1G*</td>
<td>6D</td>
<td>SC−70/SOT−323</td>
<td>3,000 / Tape &amp; Reel</td>
</tr>
<tr>
<td>SMUN5114T3G</td>
<td>6D</td>
<td>SC−70/SOT−323</td>
<td>10,000 / Tape &amp; Reel</td>
</tr>
<tr>
<td>DTA114YET1G, SDTA114YET1G*</td>
<td>6D</td>
<td>SC−75</td>
<td>3,000 / Tape &amp; Reel</td>
</tr>
<tr>
<td>DTA114YM3T5G, NSVDTA114YM3T5G*</td>
<td>6D</td>
<td>SOT−723</td>
<td>8,000 / Tape &amp; Reel</td>
</tr>
<tr>
<td>NSBA114YF3T5G</td>
<td>K</td>
<td>SOT−1123</td>
<td>8,000 / Tape &amp; Reel</td>
</tr>
</tbody>
</table>

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

### Figure 1. Derating Curve

![Derating Curve](image-url)

(1) SC−75 and SC−70/SOT−323; Minimum Pad  
(2) SC−59; Minimum Pad  
(3) SOT−23; Minimum Pad  
(4) SOT−1123; 100 mm², 1 oz. copper trace  
(5) SOT−723; Minimum Pad
### Table 2. THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Max</th>
<th>Unit</th>
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</thead>
<tbody>
<tr>
<td><strong>THERMAL CHARACTERISTICS (SC−59) (MUN2114)</strong></td>
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<tr>
<td>Total Device Dissipation</td>
<td>PD</td>
<td>230</td>
<td>mW</td>
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<tr>
<td>TA = 25°C</td>
<td></td>
<td>338</td>
<td>mW</td>
</tr>
<tr>
<td>(Note 1)</td>
<td></td>
<td>(Note 2)</td>
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<tr>
<td>Derate above 25°C</td>
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<td>1.8</td>
<td>mW/°C</td>
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<tr>
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<td>2.7</td>
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<td>RJJA</td>
<td>540</td>
<td>°C/W</td>
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<tr>
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<td></td>
<td>370</td>
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<td>287</td>
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<td>(Note 2)</td>
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<td>Junction and Storage Temperature Range</td>
<td>TJ, Tstg</td>
<td>−55 to +150</td>
<td>°C</td>
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<tr>
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<td>mW</td>
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<td>TA = 25°C</td>
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<td>400</td>
<td>mW</td>
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<td>Thermal Resistance, Junction to Ambient</td>
<td>RJJA</td>
<td>508</td>
<td>°C/W</td>
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<td>311</td>
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<td>Thermal Resistance, Junction to Lead</td>
<td>RJJL</td>
<td>174</td>
<td>°C/W</td>
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<td>(Note 2)</td>
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<td>Junction and Storage Temperature Range</td>
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<td>°C</td>
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<td>mW</td>
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<td>310</td>
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<td>Derate above 25°C</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Thermal Resistance, Junction to Ambient</td>
<td>RJJA</td>
<td>618</td>
<td>°C/W</td>
</tr>
<tr>
<td>(Note 1)</td>
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<td>403</td>
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<tr>
<td>(Note 2)</td>
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<td>Thermal Resistance, Junction to Lead</td>
<td>RJJL</td>
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<td>°C/W</td>
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<td>332</td>
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<td></td>
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<tr>
<td>Junction and Storage Temperature Range</td>
<td>TJ, Tstg</td>
<td>−55 to +150</td>
<td>°C</td>
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<td>PD</td>
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<td>mW</td>
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<td>300</td>
<td>mW</td>
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<tr>
<td>(Note 1)</td>
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<td>1.6</td>
<td>mW/°C</td>
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<td>(Note 2)</td>
<td></td>
<td>2.4</td>
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<td>Derate above 25°C</td>
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<td></td>
<td></td>
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<tr>
<td>Thermal Resistance, Junction to Ambient</td>
<td>RJJA</td>
<td>600</td>
<td>°C/W</td>
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<td>400</td>
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</tr>
<tr>
<td>(Note 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junction and Storage Temperature Range</td>
<td>TJ, Tstg</td>
<td>−55 to +150</td>
<td>°C</td>
</tr>
<tr>
<td><strong>THERMAL CHARACTERISTICS (SOT−723) (DTA114YM3)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>mW</td>
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<tr>
<td>TA = 25°C</td>
<td></td>
<td>600</td>
<td>mW</td>
</tr>
<tr>
<td>(Note 1)</td>
<td></td>
<td>2.0</td>
<td>mW/°C</td>
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<tr>
<td>(Note 2)</td>
<td></td>
<td>4.8</td>
<td></td>
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<tr>
<td>Derate above 25°C</td>
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<td></td>
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<td>Thermal Resistance, Junction to Ambient</td>
<td>RJJA</td>
<td>480</td>
<td>°C/W</td>
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<td>205</td>
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<td>(Note 2)</td>
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<td></td>
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<tr>
<td>Junction and Storage Temperature Range</td>
<td>TJ, Tstg</td>
<td>−55 to +150</td>
<td>°C</td>
</tr>
</tbody>
</table>

1. FR−4 @ Minimum Pad.
2. FR−4 @ 1.0 x 1.0 Inch Pad.
3. FR−4 @ 100 mm², 1 oz. copper traces, still air.
4. FR−4 @ 500 mm², 1 oz. copper traces, still air.
Table 2. THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Device Dissipation</td>
<td>PD</td>
<td>254 mW</td>
<td></td>
</tr>
<tr>
<td>Derate above 25°C</td>
<td></td>
<td>297 mW/°C</td>
<td></td>
</tr>
<tr>
<td>Thermal Resistance, Junction to Ambient</td>
<td>RθJA</td>
<td>493°C/W</td>
<td></td>
</tr>
<tr>
<td>Thermal Resistance, Junction to Lead</td>
<td>RθJL</td>
<td>193°C/W</td>
<td></td>
</tr>
</tbody>
</table>

1. FR−4 @ Minimum Pad.
2. FR−4 @ 1.0 x 1.0 Inch Pad.
3. FR−4 @ 100 mm², 1 oz. copper traces, still air.
4. FR−4 @ 500 mm², 1 oz. copper traces, still air.

Table 3. ELECTRICAL CHARACTERISTICS (TA = 25°C, unless otherwise noted)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Symbol</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collector–Base Cutoff Current (V CB = 50 V, IE = 0)</td>
<td>ICBO</td>
<td>–</td>
<td>–</td>
<td>100</td>
<td>nADC</td>
</tr>
<tr>
<td>Collector–Emitter Cutoff Current (V CE = 50 V, IB = 0)</td>
<td>ICEO</td>
<td>–</td>
<td>–</td>
<td>500</td>
<td>nADC</td>
</tr>
<tr>
<td>Emitter–Base Cutoff Current (VEB = 6.0 V, IC = 0)</td>
<td>IEBO</td>
<td>–</td>
<td>–</td>
<td>0.2</td>
<td>mADC</td>
</tr>
<tr>
<td>Collector–Base Breakdown Voltage (IC = 10 μA, IE = 0)</td>
<td>V(BR)CBO</td>
<td>50</td>
<td>–</td>
<td>–</td>
<td>Vdc</td>
</tr>
<tr>
<td>Collector–Emitter Breakdown Voltage (Note 5) (IC = 2.0 mA, IB = 0)</td>
<td>V(BR)CEO</td>
<td>50</td>
<td>–</td>
<td>–</td>
<td>Vdc</td>
</tr>
</tbody>
</table>

ON CHARACTERISTICS

DC Current Gain (Note 5) (IC = 5.0 mA, VCE = 10 V) | hFE | 80 | 140 | – |
| Collector – Emitter Saturation Voltage (Note 5) (IC = 10 mA, IB = 0.3 mA) | VCE(sat) | – | – | 0.25 | Vdc |
| Input Voltage (off) (VCE = 5.0 V, IC = 100 μA) | V(i(off) | – | 0.7 | 0.5 | Vdc |
| Input Voltage (on) (VCE = 0.2 V, IC = 1.0 mA) | V(i(on) | 1.4 | 0.9 | – | Vdc |
| Output Voltage (on) (VCC = 5.0 V, VB = 2.5 V, RL = 1.0 kΩ) | VOL | – | – | 0.2 | Vdc |
| Output Voltage (off) (VCC = 5.0 V, VB = 0.5 V, RL = 1.0 kΩ) | VOH | 4.9 | – | – | Vdc |
| Input Resistor | R1 | 7.0 | 10 | 13 | kΩ |
| Resistor Ratio | R1/R2 | 0.17 | 0.21 | 0.25 | |

5. Pulsed Condition: Pulse Width = 300 msec, Duty Cycle ≤ 2%.

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
**TYPICAL CHARACTERISTICS**

MUN2114, MMUN2114L, MUN5114, DTA114YE, DTA114YM3, NSBA114YF3

---

**Figure 2.** $V_{CE(sat)}$ vs. $I_C$

**Figure 3.** DC Current Gain

**Figure 4.** Output Capacitance

**Figure 5.** Output Current vs. Input Voltage

**Figure 6.** Input Voltage vs. Output Current

---

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5
MUN2114, MMUN2114L, MUN5114, DTA114YE, DTA114YM3, NSBA114YF3

TYPICAL CHARACTERISTICS
NSBA114YF3

Figure 7. $V_{CE(sat)}$ vs. $I_C$

Figure 8. DC Current Gain

Figure 9. Output Capacitance

Figure 10. Output Current vs. Input Voltage

Figure 11. Input Voltage vs. Output Current
MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

SOT–23 (TO–236)
CASE 318
ISSUE AT

DATE 01 MAR 2023

NOTES:
1. DIMENSIONING AND TOLERANCING PER
2. CONTROLLING DIMENSION MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH.
   MINIMUM LEAD THICKNESS IS THE MINIMUM
   THICKNESS OF THE BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH,
   PROTRUSIONS, OR GATE BURRS.

<table>
<thead>
<tr>
<th>DIM</th>
<th>MILLIMETERS</th>
<th>INCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MIN.</td>
<td>NOM.</td>
</tr>
<tr>
<td>A</td>
<td>0.89</td>
<td>1.00</td>
</tr>
<tr>
<td>A1</td>
<td>0.01</td>
<td>0.06</td>
</tr>
<tr>
<td>b</td>
<td>0.37</td>
<td>0.44</td>
</tr>
<tr>
<td>c</td>
<td>0.08</td>
<td>0.14</td>
</tr>
<tr>
<td>D</td>
<td>2.80</td>
<td>2.90</td>
</tr>
<tr>
<td>E</td>
<td>1.20</td>
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<tr>
<td>L</td>
<td>0.30</td>
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<tr>
<td>L1</td>
<td>0.35</td>
<td>0.54</td>
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<tr>
<td>H2</td>
<td>2.10</td>
<td>2.40</td>
</tr>
<tr>
<td>T</td>
<td>0°</td>
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</tr>
</tbody>
</table>

**GENERIC MARKING DIAGRAM**

XXX = Specific Device Code
M = Date Code
* = Pb–Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb–Free indicator, "G" or microdot ",", may or may not be present. Some products may not follow the Generic Marking.

**STYLES ON PAGE 2**

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## MECHANICAL CASE OUTLINE

**PACKAGE DIMENSIONS**

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<thead>
<tr>
<th>Style</th>
<th>Pin 1</th>
<th>Pin 2</th>
<th>Pin 3</th>
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<tbody>
<tr>
<td>1</td>
<td>ANODE</td>
<td>ANODE</td>
<td>CATHODE</td>
</tr>
<tr>
<td>2</td>
<td>CATHODE</td>
<td>CATHODE</td>
<td>CATHODE</td>
</tr>
<tr>
<td>3</td>
<td>ANODE</td>
<td>ANODE</td>
<td>ANODE</td>
</tr>
<tr>
<td>4</td>
<td>GATE</td>
<td>GATE</td>
<td>GATE</td>
</tr>
</tbody>
</table>

**STYLES 1 THRU 5:**
- CANCELLED

**STYLES 6 THRU 8:**
- PIN 1: EMITTER
- PIN 2: BASE
- PIN 3: NO CONNECTION

**STYLES 9 THRU 11:**
- PIN 1: ANODE
- PIN 2: CATHODE
- PIN 3: collector

**STYLES 12 THRU 20:**
- PIN 1: GATE
- PIN 2: SOURCE
- PIN 3: DRAIN

**STYLES 21 THRU 28:**
- PIN 1: CATHODE
- PIN 2: ANODE
- PIN 3: CATHODE
NOTES:
2. CONTROLLING DIMENSION: MILLIMETER.

<table>
<thead>
<tr>
<th>MILLIMETERS</th>
<th>INCHES</th>
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</thead>
<tbody>
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<td>A</td>
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<td>b</td>
<td>0.35</td>
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<tr>
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<td>H_E</td>
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</table>

RECOMMENDED SOLDERING FOOTPRINT*

*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**Note: Microdot may be in either location**

(*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot ".", may or may not be present. Some products may not follow the Generic Marking.)

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MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS

SC-70 (SOT-323)
CASE 419
ISSUE R

DATE 11 OCT 2022

NOTES:
2. CONTROLLING DIMENSION INCH

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<th>STYLE</th>
<th>PIN 1</th>
<th>PIN 2</th>
<th>PIN 3</th>
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<td>N.C.</td>
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<td>EMITTER</td>
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**GENERIC MARKING DIAGRAM**

XX = Specific Device Code
M = Date Code
* = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "*", may or may not be present. Some products may not follow the Generic Marking.

**SOLDERING FOOTPRINT**
**SC-75/SOT-416**

**CASE 463**

**ISSUE G**

**DATE 07 AUG 2015**

NOTES:
2. CONTROLLING DIMENSION: MILLIMETER.

**DIM MIN NOM MAX**

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<td>D</td>
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**RECOMMENDED SOLDERING FOOTPRINT**

*For additional information on our Pb-Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.*

**GENERIC MARKING DIAGRAM**

XX = Specific Device Code  
M = Date Code  
\* = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, “G” or microdot “\*”, may or may not be present. Some products may not follow the Generic Marking.*
NOTES:
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

SOLDERING FOOTPRINT*

*For additional information on our Pb–Free strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.
MECHANICAL CASE OUTLINE

SOT–723
CASE 631AA
ISSUE D

DATE 10 AUG 2009

NOTES:
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.

DIMENSIONS: MILLIMETERS

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RECOMMENDED SOLDERING FOOTPRINT*

XX = Specific Device Code
M = Date Code

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*Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

Scale 4:1

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