

# Digital Transistors (BRT)

## R1 = 47 kΩ, R2 = 47 kΩ

### NPN Transistors with Monolithic Bias Resistor Network

## MUN2213, MMUN2213L, MUN5213, DTC144EE, DTC144EM3, NSBC144EF3

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

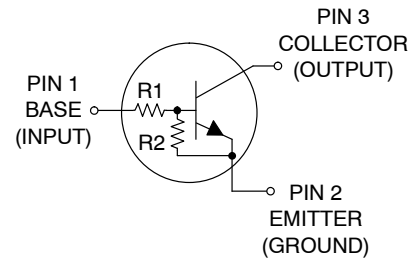
- Simplifies Circuit Design
- Reduces Board Space
- Reduces Component Count
- S and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

#### MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

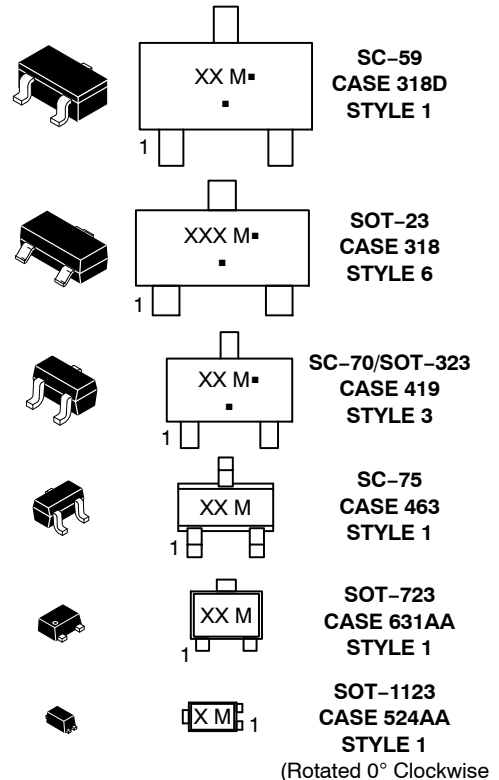
| Rating                         | Symbol               | Max | Unit |
|--------------------------------|----------------------|-----|------|
| Collector-Base Voltage         | V <sub>CBO</sub>     | 50  | Vdc  |
| Collector-Emitter Voltage      | V <sub>CEO</sub>     | 50  | Vdc  |
| Collector Current - Continuous | I <sub>C</sub>       | 100 | mAdc |
| Input Forward Voltage          | V <sub>IN(fwd)</sub> | 40  | Vdc  |
| Input Reverse Voltage          | V <sub>IN(rev)</sub> | 10  | Vdc  |

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.

#### PIN CONNECTIONS



#### MARKING DIAGRAMS



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

(Note: Microdot may be in either location)

\*Date Code orientation may vary depending upon manufacturing location.

#### ORDERING INFORMATION

See detailed ordering, marking, and shipping information on page 2 of this data sheet.

NOTE: Some of the devices on this data sheet have been **DISCONTINUED**. Please refer to the table on page 2.

# MUN2213, MMUN2213L, MUN5213, DTC144EE, DTC144EM3, NSBC144EF3

**Table 1. ORDERING INFORMATION**

| Device                          | Part Marking | Package                    | Shipping <sup>†</sup> |
|---------------------------------|--------------|----------------------------|-----------------------|
| MUN2213T1G, SMUN2213T1G*        | 8C           | SC-59<br>(Pb-Free)         | 3000 / Tape & Reel    |
| MMUN2213LT1G, SMMUN2213LT1G*    | A8C          | SOT-23<br>(Pb-Free)        | 3000 / Tape & Reel    |
| SMMUN2213LT3G                   | A8C          | SOT-23<br>(Pb-Free)        | 10000 / Tape & Reel   |
| MUN5213T1G, SMUN5213T1G*        | 8C           | SC-70/SOT-323<br>(Pb-Free) | 3000 / Tape & Reel    |
| DTC144EET1G, SDTC144EET1G*      | 8C           | SC-75<br>(Pb-Free)         | 3000 / Tape & Reel    |
| DTC144EM3T5G, NSV DTC144EM3T5G* | 8C           | SOT-723<br>(Pb-Free)       | 8000 / Tape & Reel    |

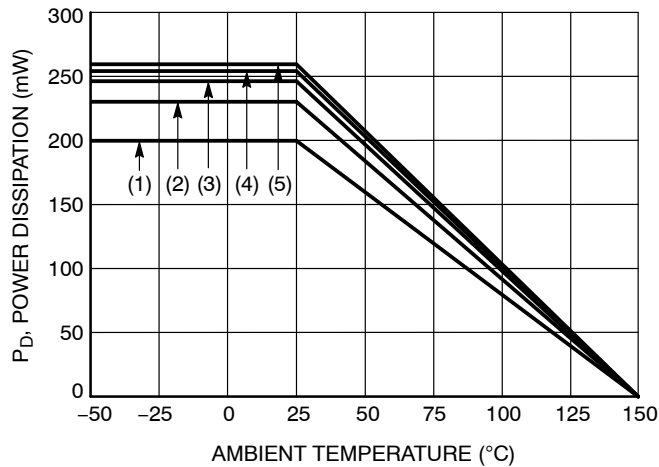
## DISCONTINUED (Note 1)

|               |   |                       |                    |
|---------------|---|-----------------------|--------------------|
| NSBC144EF3T5G | D | SOT-1123<br>(Pb-Free) | 8000 / Tape & Reel |
|---------------|---|-----------------------|--------------------|

<sup>†</sup>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.

\*S and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

1. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on [www.onsemi.com](http://www.onsemi.com).



- (1) SC-75 and SC-70/SOT323; Minimum Pad
- (2) SC-59; Minimum Pad
- (3) SOT-23; Minimum Pad
- (4) SOT-1123; 100 mm<sup>2</sup>, 1 oz. copper trace
- (5) SOT-723; Minimum Pad

**Figure 1. Derating Curve**

**Table 2. THERMAL CHARACTERISTICS**

| Characteristic                                                | Symbol          | Max         | Unit                 |
|---------------------------------------------------------------|-----------------|-------------|----------------------|
| <b>THERMAL CHARACTERISTICS (SC-59) (MUN2213)</b>              |                 |             |                      |
| Total Device Dissipation<br>$T_A = 25^\circ\text{C}$ (Note 2) | $P_D$           | 230         | mW                   |
| Derate above $25^\circ\text{C}$ (Note 3)                      |                 | 338         |                      |
|                                                               |                 | 1.8         | mW/ $^\circ\text{C}$ |
|                                                               |                 | 2.7         |                      |
| Thermal Resistance,<br>Junction to Ambient (Note 2)           | $R_{\theta JA}$ | 540         | $^\circ\text{C/W}$   |
|                                                               |                 | 370         |                      |
| Thermal Resistance<br>Junction to Lead (Note 3)               | $R_{\theta JL}$ | 264         | $^\circ\text{C/W}$   |
|                                                               |                 | 287         |                      |
| Junction and Storage Temperature Range                        | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$     |

Table 2. THERMAL CHARACTERISTICS

| Characteristic                                                  | Symbol          | Max         | Unit                      |
|-----------------------------------------------------------------|-----------------|-------------|---------------------------|
| <b>THERMAL CHARACTERISTICS (SOT-23) (MMUN2213L)</b>             |                 |             |                           |
| Total Device Dissipation<br>$T_A = 25^\circ\text{C}$ (Note 2)   | $P_D$           | 246         | mW                        |
| (Note 3)                                                        |                 | 400         |                           |
| Derate above $25^\circ\text{C}$ (Note 2)                        |                 | 2.0         | mW/ $^\circ\text{C}$      |
| (Note 3)                                                        |                 | 3.2         |                           |
| Thermal Resistance,<br>Junction to Ambient (Note 1)<br>(Note 3) | $R_{\theta JA}$ | 508<br>311  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance,<br>Junction to Lead (Note 2)<br>(Note 3)    | $R_{\theta JL}$ | 174<br>208  | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range                          | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$          |

**THERMAL CHARACTERISTICS (SC-70/SOT-323) (MUN5213)**

|                                                                 |                 |             |                           |
|-----------------------------------------------------------------|-----------------|-------------|---------------------------|
| Total Device Dissipation<br>$T_A = 25^\circ\text{C}$ (Note 2)   | $P_D$           | 202         | mW                        |
| (Note 3)                                                        |                 | 310         |                           |
| Derate above $25^\circ\text{C}$ (Note 2)                        |                 | 1.6         | mW/ $^\circ\text{C}$      |
| (Note 3)                                                        |                 | 2.5         |                           |
| Thermal Resistance,<br>Junction to Ambient (Note 2)<br>(Note 3) | $R_{\theta JA}$ | 618<br>403  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance,<br>Junction to Lead (Note 2)<br>(Note 3)    | $R_{\theta JL}$ | 280<br>332  | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range                          | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$          |

**THERMAL CHARACTERISTICS (SC-75) (DTC144EE, SDTC144EE)**

|                                                                 |                 |             |                           |
|-----------------------------------------------------------------|-----------------|-------------|---------------------------|
| Total Device Dissipation<br>$T_A = 25^\circ\text{C}$ (Note 2)   | $P_D$           | 200         | mW                        |
| (Note 3)                                                        |                 | 300         |                           |
| Derate above $25^\circ\text{C}$ (Note 2)                        |                 | 1.6         | mW/ $^\circ\text{C}$      |
| (Note 3)                                                        |                 | 2.4         |                           |
| Thermal Resistance,<br>Junction to Ambient (Note 2)<br>(Note 3) | $R_{\theta JA}$ | 600<br>400  | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range                          | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$          |

**THERMAL CHARACTERISTICS (SOT-723) (DTC144EM3)**

|                                                                 |                 |             |                           |
|-----------------------------------------------------------------|-----------------|-------------|---------------------------|
| Total Device Dissipation<br>$T_A = 25^\circ\text{C}$ (Note 2)   | $P_D$           | 260         | mW                        |
| (Note 3)                                                        |                 | 600         |                           |
| Derate above $25^\circ\text{C}$ (Note 2)                        |                 | 2.0         | mW/ $^\circ\text{C}$      |
| (Note 3)                                                        |                 | 4.8         |                           |
| Thermal Resistance,<br>Junction to Ambient (Note 2)<br>(Note 3) | $R_{\theta JA}$ | 480<br>205  | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range                          | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$          |

**THERMAL CHARACTERISTICS (SOT-1123) (NSBC144EF3)**

|                                                                 |                 |             |                           |
|-----------------------------------------------------------------|-----------------|-------------|---------------------------|
| Total Device Dissipation<br>$T_A = 25^\circ\text{C}$ (Note 4)   | $P_D$           | 254         | mW                        |
| (Note 5)                                                        |                 | 297         |                           |
| Derate above $25^\circ\text{C}$ (Note 4)                        |                 | 2.0         | mW/ $^\circ\text{C}$      |
| (Note 5)                                                        |                 | 2.4         |                           |
| Thermal Resistance,<br>Junction to Ambient (Note 4)<br>(Note 5) | $R_{\theta JA}$ | 493<br>421  | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance,<br>Junction to Lead (Note 4)                | $R_{\theta JL}$ | 193         | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range                          | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$          |

2. FR-4 @ Minimum Pad.
3. FR-4 @ 1.0 x 1.0 Inch Pad.
4. FR-4 @ 100 mm<sup>2</sup>, 1 oz. copper traces, still air.
5. FR-4 @ 500 mm<sup>2</sup>, 1 oz. copper traces, still air.

**Table 3. ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$ , unless otherwise noted)

| Characteristic                                                                                          | Symbol        | Min  | Typ | Max  | Unit             |
|---------------------------------------------------------------------------------------------------------|---------------|------|-----|------|------------------|
| <b>OFF CHARACTERISTICS</b>                                                                              |               |      |     |      |                  |
| Collector–Base Cutoff Current<br>( $V_{CB} = 50\text{ V}$ , $I_E = 0$ )                                 | $I_{CBO}$     | –    | –   | 100  | nAdc             |
| Collector–Emitter Cutoff Current<br>( $V_{CE} = 50\text{ V}$ , $I_B = 0$ )                              | $I_{CEO}$     | –    | –   | 500  | nAdc             |
| Emitter–Base Cutoff Current<br>( $V_{EB} = 6.0\text{ V}$ , $I_C = 0$ )                                  | $I_{EBO}$     | –    | –   | 0.1  | mAdc             |
| Collector–Base Breakdown Voltage<br>( $I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$ )                       | $V_{(BR)CBO}$ | 50   | –   | –    | Vdc              |
| Collector–Emitter Breakdown Voltage (Note 6)<br>( $I_C = 2.0\text{ mA}$ , $I_B = 0$ )                   | $V_{(BR)CEO}$ | 50   | –   | –    | Vdc              |
| <b>ON CHARACTERISTICS</b>                                                                               |               |      |     |      |                  |
| DC Current Gain (Note 6)<br>( $I_C = 5.0\text{ mA}$ , $V_{CE} = 10\text{ V}$ )                          | $h_{FE}$      | 80   | 140 | –    |                  |
| Collector–Emitter Saturation Voltage (Note 6)<br>( $I_C = 10\text{ mA}$ , $I_B = 0.3\text{ mA}$ )       | $V_{CE(sat)}$ | –    | –   | 0.25 | Vdc              |
| Input Voltage (off)<br>( $V_{CE} = 5.0\text{ V}$ , $I_C = 100\text{ }\mu\text{A}$ )                     | $V_{i(off)}$  | –    | 1.2 | 0.8  | Vdc              |
| Input Voltage (on)<br>( $V_{CE} = 0.3\text{ V}$ , $I_C = 2.0\text{ mA}$ )                               | $V_{i(on)}$   | 3.0  | 1.6 | –    | Vdc              |
| Output Voltage (on)<br>( $V_{CC} = 5.0\text{ V}$ , $V_B = 3.5\text{ V}$ , $R_L = 1.0\text{ k}\Omega$ )  | $V_{OL}$      | –    | –   | 0.2  | Vdc              |
| Output Voltage (off)<br>( $V_{CC} = 5.0\text{ V}$ , $V_B = 0.5\text{ V}$ , $R_L = 1.0\text{ k}\Omega$ ) | $V_{OH}$      | 4.9  | –   | –    | Vdc              |
| Input Resistor                                                                                          | $R_1$         | 32.9 | 47  | 61.1 | $\text{k}\Omega$ |
| Resistor Ratio                                                                                          | $R_1/R_2$     | 0.8  | 1.0 | 1.2  |                  |

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.

6. Pulsed Condition: Pulse Width = 300 msec, Duty Cycle  $\leq 2\%$ .

**TYPICAL CHARACTERISTICS**  
MUN2213, MMUN2213L, MUN5213, DTC144EE, SDTC144EE, DTC144EM3

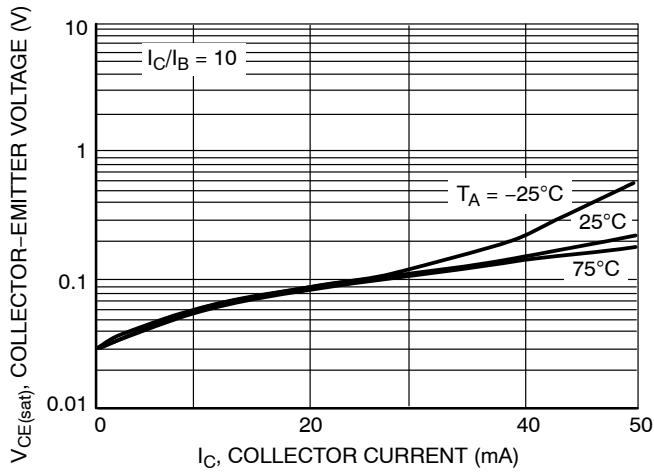


Figure 2.  $V_{CE(sat)}$  vs.  $I_C$

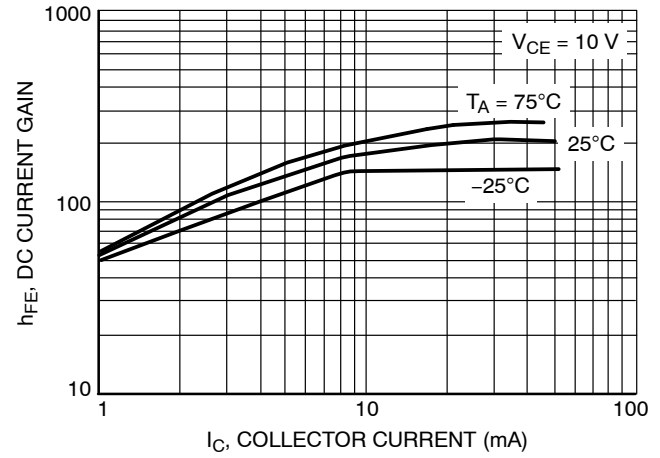


Figure 3. DC Current Gain

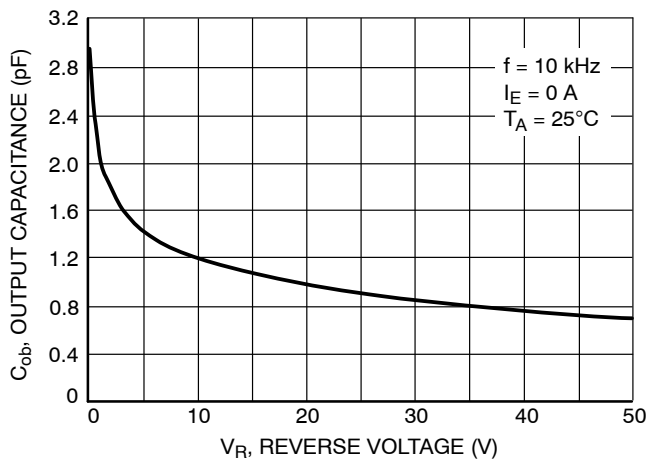


Figure 4. Output Capacitance

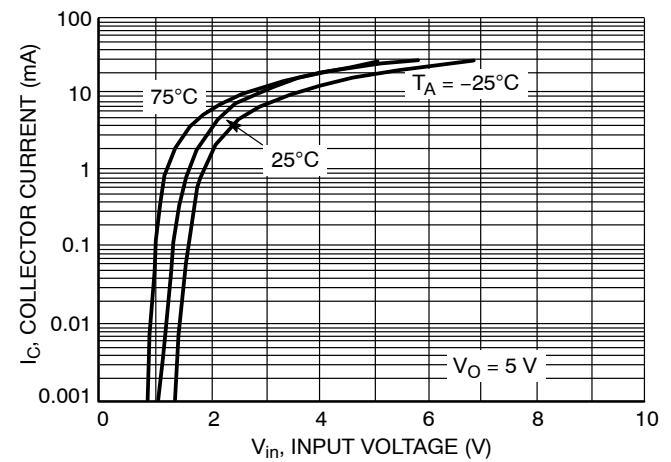


Figure 5. Output Current vs. Input Voltage

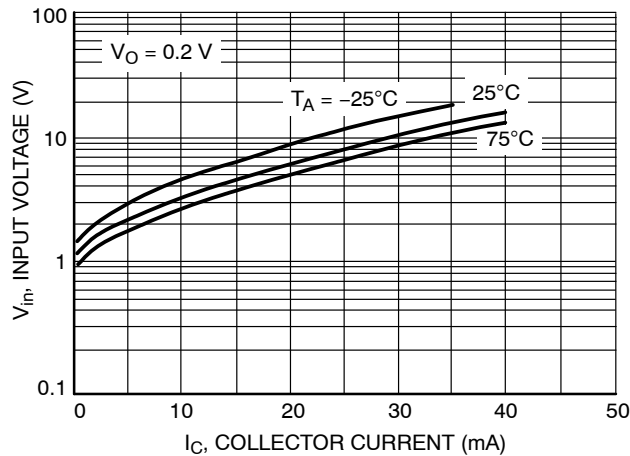


Figure 6. Input Voltage vs. Output Current

TYPICAL CHARACTERISTICS – NSBC144EF3

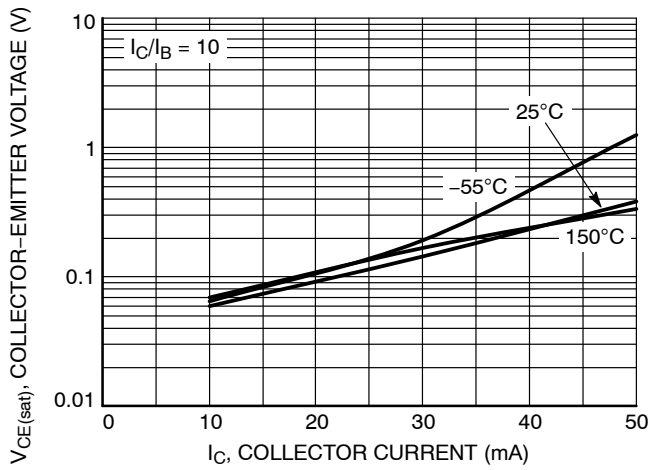


Figure 7.  $V_{CE(sat)}$  vs.  $I_C$

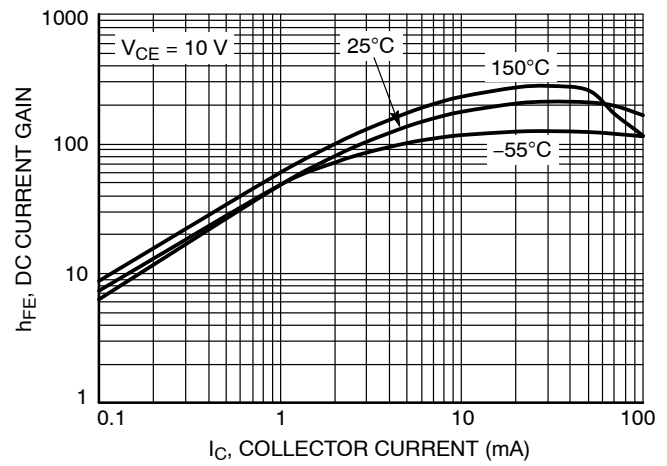


Figure 8. DC Current Gain

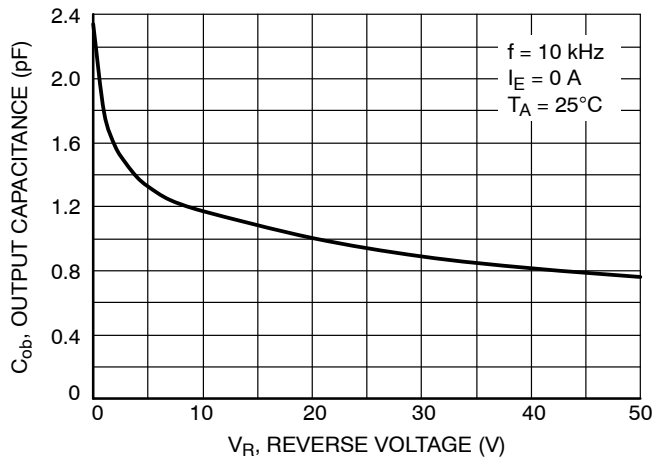


Figure 9. Output Capacitance

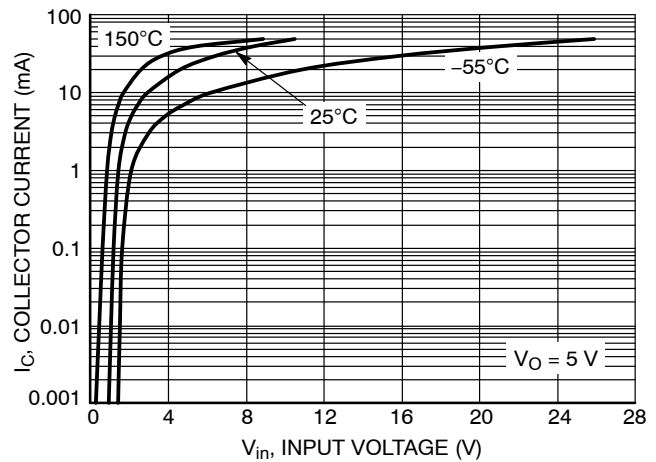


Figure 10. Output Current vs. Input Voltage

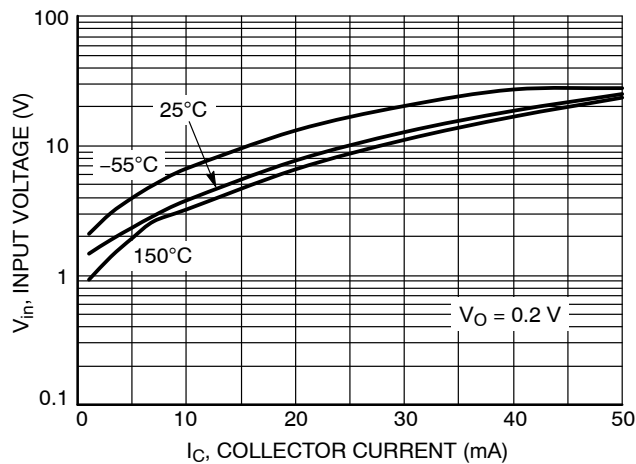


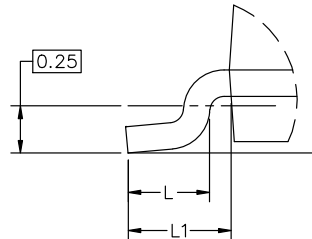
Figure 11. Input Voltage vs. Output Current



SCALE 4:1

**SOT-23 (TO-236) 2.90x1.30x1.00 1.90P**  
CASE 318  
ISSUE AU

DATE 14 AUG 2024



| MILLIMETERS |      |      |      |
|-------------|------|------|------|
| DIM         | MIN  | NOM  | MAX  |
| A           | 0.89 | 1.00 | 1.11 |
| A1          | 0.01 | 0.06 | 0.10 |
| b           | 0.37 | 0.44 | 0.50 |
| c           | 0.08 | 0.14 | 0.20 |
| D           | 2.80 | 2.90 | 3.04 |
| E           | 1.20 | 1.30 | 1.40 |
| e           | 1.78 | 1.90 | 2.04 |
| L           | 0.30 | 0.43 | 0.55 |
| L1          | 0.35 | 0.54 | 0.69 |
| HE          | 2.10 | 2.40 | 2.64 |
| T           | 0°   | ---  | 10°  |

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSIONS: 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.

**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.


**RECOMMENDED MOUNTING FOOTPRINT**

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

**STYLES ON PAGE 2**

|                         |                                             |                                                                                                                                                                                  |
|-------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| <b>DESCRIPTION:</b>     | <b>SOT-23 (TO-236) 2.90x1.30x1.00 1.90P</b> | <b>PAGE 1 OF 2</b>                                                                                                                                                               |

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**SOT-23 (TO-236) 2.90x1.30x1.00 1.90P**  
**CASE 318**  
**ISSUE AU**

DATE 14 AUG 2024

|                                                         |                                                       |                                                             |                                                             |                                                             |                                                             |
|---------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
| STYLE 1 THRU 5:<br>CANCELLED                            | STYLE 6:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR | STYLE 7:<br>PIN 1. EMITTER<br>2. BASE<br>3. COLLECTOR       | STYLE 8:<br>PIN 1. ANODE<br>2. NO CONNECTION<br>3. CATHODE  |                                                             |                                                             |
| STYLE 9:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE      | STYLE 10:<br>PIN 1. DRAIN<br>2. SOURCE<br>3. GATE     | STYLE 11:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE-ANODE | STYLE 12:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE       | STYLE 13:<br>PIN 1. SOURCE<br>2. DRAIN<br>3. GATE           | STYLE 14:<br>PIN 1. CATHODE<br>2. GATE<br>3. ANODE          |
| STYLE 15:<br>PIN 1. GATE<br>2. CATHODE<br>3. ANODE      | STYLE 16:<br>PIN 1. ANODE<br>2. CATHODE<br>3. CATHODE | STYLE 17:<br>PIN 1. NO CONNECTION<br>2. ANODE<br>3. CATHODE | STYLE 18:<br>PIN 1. NO CONNECTION<br>2. CATHODE<br>3. ANODE | STYLE 19:<br>PIN 1. CATHODE<br>2. ANODE<br>3. CATHODE-ANODE | STYLE 20:<br>PIN 1. CATHODE<br>2. ANODE<br>3. GATE          |
| STYLE 21:<br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN       | STYLE 22:<br>PIN 1. RETURN<br>2. OUTPUT<br>3. INPUT   | STYLE 23:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE         | STYLE 24:<br>PIN 1. GATE<br>2. DRAIN<br>3. SOURCE           | STYLE 25:<br>PIN 1. ANODE<br>2. CATHODE<br>3. GATE          | STYLE 26:<br>PIN 1. CATHODE<br>2. ANODE<br>3. NO CONNECTION |
| STYLE 27:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. CATHODE | STYLE 28:<br>PIN 1. ANODE<br>2. ANODE<br>3. ANODE     |                                                             |                                                             |                                                             |                                                             |

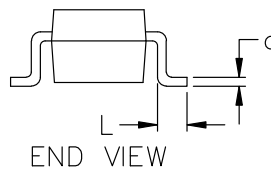
|                  |                                      |                                                                                                                                                                                     |
|------------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | SOT-23 (TO-236) 2.90x1.30x1.00 1.90P | PAGE 2 OF 2                                                                                                                                                                         |

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**SC-59-3 2.90x1.50x1.15, 1.90P**  
**CASE 318D**  
**ISSUE J**

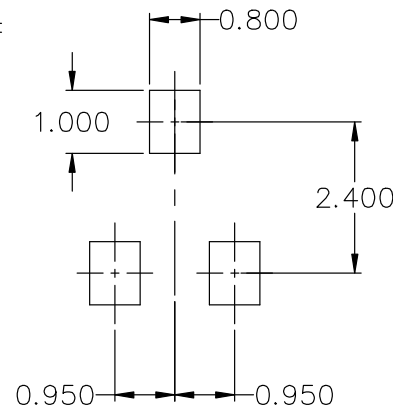
DATE 15 FEB 2024



NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | 1.00        | 1.15 | 1.30 |
| A1  | 0.01        | 0.06 | 0.10 |
| b   | 0.35        | 0.43 | 0.50 |
| c   | 0.09        | 0.14 | 0.18 |
| D   | 2.70        | 2.90 | 3.10 |
| E   | 2.50        | 2.80 | 3.00 |
| E1  | 1.30        | 1.50 | 1.70 |
| e   | 1.90 BSC    |      |      |
| L   | 0.20        | 0.40 | 0.60 |



**GENERIC MARKING DIAGRAM\***



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

(\*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.

\* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

STYLE 1:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

STYLE 2:  
PIN 1. ANODE  
2. N.C.  
3. CATHODE

STYLE 3:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE

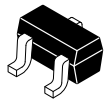
STYLE 4:  
PIN 1. CATHODE  
2. N.C.  
3. ANODE

STYLE 5:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE

STYLE 6:  
PIN 1. ANODE  
2. CATHODE  
3. ANODE/CATHODE

|                         |                                      |                                                                                                                                                                                  |
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| <b>DESCRIPTION:</b>     | <b>SC-59-3 2.90x1.50x1.15, 1.90P</b> | <b>PAGE 1 OF 1</b>                                                                                                                                                               |

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SCALE 4:1

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

DATE 11 OCT 2022



NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH

| DIM            | MILLIMETERS |      |      | INCHES    |       |       |
|----------------|-------------|------|------|-----------|-------|-------|
|                | MIN.        | NOM. | MAX. | MIN.      | NOM.  | MAX.  |
| A              | 0.80        | 0.90 | 1.00 | 0.032     | 0.035 | 0.040 |
| A1             | 0.00        | 0.05 | 0.10 | 0.000     | 0.002 | 0.004 |
| A2             | 0.70 REF    |      |      | 0.028 BSC |       |       |
| b              | 0.30        | 0.35 | 0.40 | 0.012     | 0.014 | 0.016 |
| c              | 0.10        | 0.18 | 0.25 | 0.004     | 0.007 | 0.010 |
| D              | 1.80        | 2.00 | 2.20 | 0.071     | 0.080 | 0.087 |
| E              | 1.15        | 1.24 | 1.35 | 0.045     | 0.049 | 0.053 |
| e              | 1.20        | 1.30 | 1.40 | 0.047     | 0.051 | 0.055 |
| e1             | 0.65 BSC    |      |      | 0.026 BSC |       |       |
| L              | 0.20        | 0.38 | 0.56 | 0.008     | 0.015 | 0.022 |
| H <sub>E</sub> | 2.00        | 2.10 | 2.40 | 0.079     | 0.083 | 0.095 |

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.



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

SOLDERING FOOTPRINT

STYLE 1:  
CANCELLED

STYLE 2:  
PIN 1. ANODE  
2. N.C.  
3. CATHODE

STYLE 3:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

STYLE 4:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE

STYLE 5:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE

STYLE 6:  
PIN 1. EMITTER  
2. BASE  
3. COLLECTOR

STYLE 7:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

STYLE 8:  
PIN 1. GATE  
2. SOURCE  
3. DRAIN

STYLE 9:  
PIN 1. ANODE  
2. CATHODE  
3. CATHODE-ANODE

STYLE 10:  
PIN 1. CATHODE  
2. ANODE  
3. ANODE-CATHODE

STYLE 11:  
PIN 1. CATHODE  
2. CATHODE  
3. CATHODE

|                  |                 |                                                                                                                                                                                  |
|------------------|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | SC-70 (SOT-323) | PAGE 1 OF 1                                                                                                                                                                      |

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SC75-3 1.60x0.80x0.80, 1.00P  
CASE 463  
ISSUE H

DATE 01 FEB 2024



TOP VIEW



SIDE VIEW



END VIEW

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.

STYLE 1:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

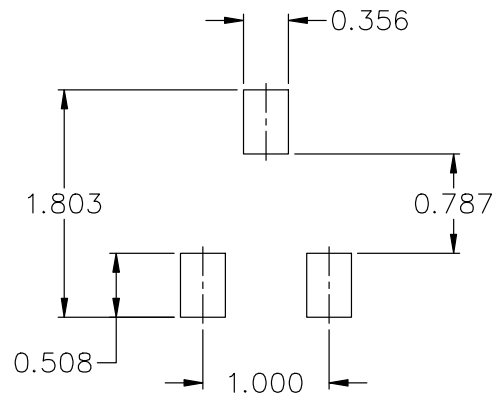
STYLE 2:  
PIN 1. ANODE  
2. N/C  
3. CATHODE

STYLE 3:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE

STYLE 4:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE

STYLE 5:  
PIN 1. GATE  
2. SOURCE  
3. DRAIN

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | 0.70        | 0.80 | 0.90 |
| A1  | 0.00        | 0.05 | 0.10 |
| A2  | 0.80 REF.   |      |      |
| b   | 0.15        | 0.20 | 0.30 |
| c   | 0.10        | 0.15 | 0.25 |
| D   | 1.55        | 1.60 | 1.65 |
| E   | 1.50        | 1.60 | 1.70 |
| E1  | 0.70        | 0.80 | 0.90 |
| e   | 1.00 BSC    |      |      |
| L   | 0.10        | 0.15 | 0.20 |



RECOMMENDED MOUNTING FOOTPRINT\*

\* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

|                  |                              |                                                                                                                                                                                  |
|------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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| DESCRIPTION:     | SC75-3 1.60x0.80x0.80, 1.00P | PAGE 1 OF 1                                                                                                                                                                      |

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**SOT-1123 0.80x0.60x0.37, 0.35P**  
**CASE 524AA**  
**ISSUE D**

DATE 18 JAN 2024



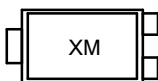
TOP VIEW



SIDE VIEW



BOTTOM VIEW

**GENERIC**  
**MARKING DIAGRAM\***

X = Specific Device Code  
M = Date Code

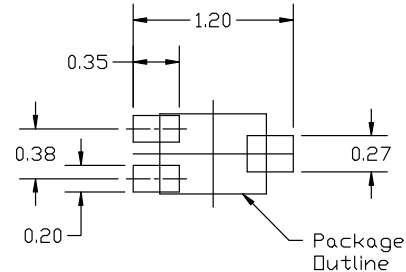
\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

## NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
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.

## MILLIMETERS

| DIM | MIN       | NOM   | MAX   |
|-----|-----------|-------|-------|
| A   | 0.34      | 0.37  | 0.40  |
| b   | 0.15      | 0.22  | 0.28  |
| b1  | 0.10      | 0.15  | 0.20  |
| c   | 0.07      | 0.12  | 0.17  |
| D   | 0.75      | 0.80  | 0.85  |
| E   | 0.55      | 0.60  | 0.65  |
| e   | 0.35      | 0.38  | 0.40  |
| H   | 0.950     | 1.000 | 1.050 |
| L   | 0.185 REF |       |       |
| L2  | 0.05      | 0.10  | 0.15  |


**RECOMMENDED**  
**MOUNTING FOOTPRINT**

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference manual, SOLDERM/D.

STYLE 1:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

STYLE 2:  
PIN 1. ANODE  
2. N/C  
3. CATHODE

STYLE 3:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE

STYLE 4:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE

STYLE 5:  
PIN 1. GATE  
2. SOURCE  
3. DRAIN

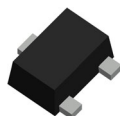
**DOCUMENT NUMBER:** 98AON23134D

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**DESCRIPTION:** SOT-1123 0.80x0.60x0.37, 0.35P

**PAGE 1 OF 1**

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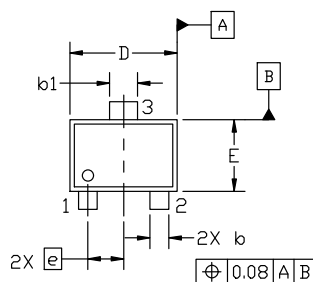


**SOT-723 1.20x0.80x0.50, 0.40P**  
**CASE 631AA**  
**ISSUE E**

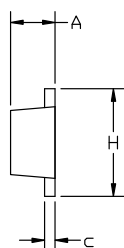
DATE 24 JAN 2024

NOTES:

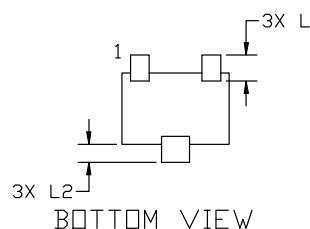
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.



TOP VIEW

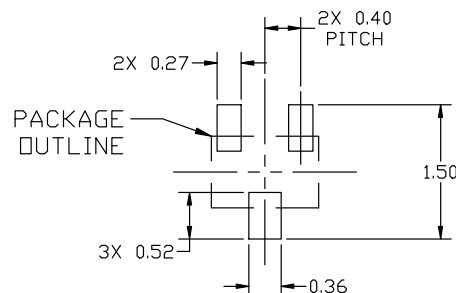


SIDE VIEW



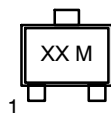
BOTTOM VIEW

| DIM | MILLIMETERS |      |      |
|-----|-------------|------|------|
|     | MIN.        | NOM. | MAX. |
| A   | 0.45        | 0.50 | 0.55 |
| b   | 0.15        | 0.21 | 0.27 |
| b1  | 0.25        | 0.31 | 0.37 |
| c   | 0.07        | 0.12 | 0.17 |
| D   | 1.15        | 1.20 | 1.25 |
| E   | 0.75        | 0.80 | 0.85 |
| e   | 0.40 BSC    |      |      |
| H   | 1.15        | 1.20 | 1.25 |
| L   | 0.29 REF    |      |      |
| L2  | 0.15        | 0.20 | 0.25 |



RECOMMENDED MOUNTING  
FOOTPRINT

**GENERIC  
MARKING DIAGRAM\***



XX = Specific Device Code  
M = Date Code

\*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.

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

|                                                       |                                                  |                                                    |                                                      |                                                  |
|-------------------------------------------------------|--------------------------------------------------|----------------------------------------------------|------------------------------------------------------|--------------------------------------------------|
| STYLE 1:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR | STYLE 2:<br>PIN 1. ANODE<br>2. N/C<br>3. CATHODE | STYLE 3:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE | STYLE 4:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE | STYLE 5:<br>PIN 1. GATE<br>2. SOURCE<br>3. DRAIN |
|-------------------------------------------------------|--------------------------------------------------|----------------------------------------------------|------------------------------------------------------|--------------------------------------------------|

|                         |                                      |                                                                                                                                                                                  |
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