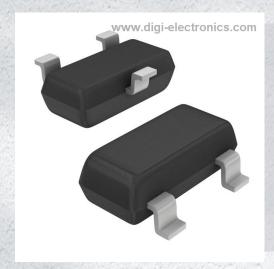


# **NSVMMUN2232LT3G Datasheet**



https://www.DiGi-Electronics.com

DiGi Electronics Part Number NSVMMUN2232LT3G-DG

Manufacturer onsemi

Manufacturer Product Number NSVMMUN2232LT3G

Description TRANS PREBIAS NPN 50V SOT23-3

**Detailed Description** Pre-Biased Bipolar Transistor (BJT) NPN - Pre-Biase d 50 V 100 mA 246 mW Surface Mount SOT-23-3 (TO

-236)



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.



# **Purchase and inquiry**

| Manufacturer Product Number:                 | Manufacturer:                          |
|--|--|
| NSVMMUN2232LT3G                              | onsemi                                 |
| Series:                                      | Product Status:                        |
| -  | Active                                 |
| Transistor Type:                             | Current - Collector (Ic) (Max):        |
| NPN - Pre-Biased                             | 100 mA                                 |
| Voltage - Collector Emitter Breakdown (Max): | Resistor - Base (R1):                  |
| 50 V   | 4.7 kOhms                              |
| Resistor - Emitter Base (R2):                | DC Current Gain (hFE) (Min) @ Ic, Vce: |
| 4.7 kOhms                                    | 15 @ 5mA, 10V                          |
| Vce Saturation (Max) @ lb, lc:               | Current - Collector Cutoff (Max):      |
| 250mV @ 1mA, 10mA                            | 500nA                                  |
| Power - Max:                                 | Mounting Type:                         |
| 246 mW                                       | Surface Mount                          |
| Package / Case:                              | Supplier Device Package:               |
| TO-236-3, SC-59, SOT-23-3                    | SOT-23-3 (TO-236)                      |
| Base Product Number:                         |  |
| NSVMMUN2232                                  |  |

# **Environmental & Export classification**

8541.21.0095

| RoHS Status:     | Moisture Sensitivity Level (MSL): |
|------------------|-----------------------------------|
| ROHS3 Compliant  | 1 (Unlimited)                     |
| REACH Status:    | ECCN:                             |
| REACH Unaffected | EAR99                             |
| HTSUS:           |                                   |



# **Digital Transistors (BRT)** $R1 = 4.7 \text{ k}\Omega$ , $R2 = 4.7 \text{ k}\Omega$

**NPN Transistors with Monolithic Bias Resistor Network** 

# **MUN2232, MMUN2232L, MUN5232, DTC143EE,** DTC143EM3, NSBC143EF3

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 baseemitter 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

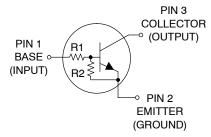
### **MAXIMUM RATINGS** $(T_A = 25^{\circ}C)$

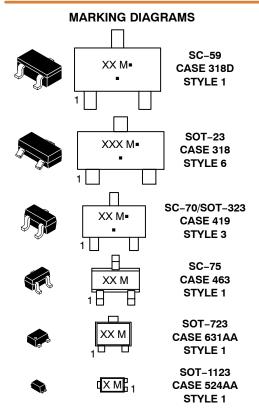
| Rating                         | Symbol               | Max | Unit |
|--------------------------------|----------------------|-----|------|
| Collector-Base Voltage         | $V_{CBO}$            | 50  | Vdc  |
| Collector-Emitter Voltage      | $V_{CEO}$            | 50  | Vdc  |
| Collector Current - Continuous | I <sub>C</sub>       | 100 | mAdc |
| Input Forward Voltage          | $V_{IN(fwd)}$        | 30  | 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.

1

### **PIN CONNECTIONS**





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

(Note: Microdot may be in either 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.

<sup>\*</sup>Date Code orientation may vary depending upon manufacturing location.

**Table 1. ORDERING INFORMATION** 

| Device                         | Part Marking | Package                    | Shipping <sup>†</sup> |
|--------------------------------|--------------|----------------------------|-----------------------|
| MUN2232T1G, SMUN2232T1G*       | 8J           | SC-59<br>(Pb-Free)         | 3000 / Tape & Reel    |
| MMUN2232LT1G, NSVMMUN2232LT1G* | A8J          | SOT-23<br>(Pb-Free)        | 3000 / Tape & Reel    |
| NSVMMUN2232LT3G*               | A8J          | SOT-23<br>(Pb-Free)        | 10000 / Tape & Reel   |
| MUN5232T1G, SMUN5232T1G*       | 8J           | SC-70/SOT-323<br>(Pb-Free) | 3000 / Tape & Reel    |
| DTC143EET1G                    | 8J           | SC-75<br>(Pb-Free)         | 3000 / Tape & Reel    |
| DTC143EM3T5G                   | 8J           | SOT-723<br>(Pb-Free)       | 8000 / Tape & Reel    |

### **DISCONTINUED** (Note 1)

| NSBC143EF3T5G | Р | SOT-1123  | 8000 / Tape & Reel |
|---------------|---|-----------|--------------------|
|               |   | (Pb-Free) | ·                  |

<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.

<sup>1.</sup> **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 <a href="https://www.onsemi.com">www.onsemi.com</a>.

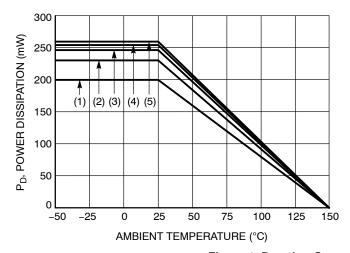


Figure 1. Derating Curve

- (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

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

# $MUN2232,\,MMUN2232L,\,MUN5232,\,DTC143EE,\,DTC143EM3,\,NSBC143EF3$

**Table 2. THERMAL CHARACTERISTICS** 

|   | Characteristic  | Symbol                            | Max   | Unit             |
|---|---|-----------------------------------|---|------------------|
| THERMAL CHARACTER   | ISTICS (SC-59) (MUN2232)  |                                   |   |                  |
| Total Device Dissipation  |   | $P_{D}$                           |   |                  |
| $T_A = 25^{\circ}C$   | (Note 2)  |                                   | 230   | mW               |
| Derate above 25°C   | (Note 3)<br>(Note 2)  |                                   | 338<br>1.8  | mW/°C            |
| Derate above 25 C   | (Note 3)  |                                   | 2.7   | IIIVV/ O         |
| Thermal Resistance,   | (Note 2)  | $R_{	hetaJA}$                     | 540   | °C/W             |
| Junction to Ambient   | (Note 3)  |                                   | 370   |                  |
| Thermal Resistance,   | (Note 2)  | $R_{	hetaJL}$                     | 264   | °C/W             |
| Junction to Lead  | (Note 3)  |                                   | 287   |                  |
| Junction and Storage Tem  | perature Range  | $T_{J}$ , $T_{stg}$               | -55 to +150   | °C               |
| THERMAL CHARACTER   | ISTICS (SOT-23) (MMUN2232L)   |                                   |   |                  |
| Total Device Dissipation  | (NIata O)   | $P_{D}$                           | 040   | \^/              |
| $T_A = 25^{\circ}C$   | (Note 2)<br>(Note 3)  |                                   | 246<br>400  | mW               |
| Derate above 25°C   | (Note 2)  |                                   | 2.0   | mW/°C            |
| Deraile above 25 O  | (Note 3)  |                                   | 3.2   | IIIVV/ O         |
| Thermal Resistance,   | (Note 1)  | $R_{	hetaJA}$                     | 508   | °C/W             |
| Junction to Ambient   | (Note 3)  |                                   | 311   |                  |
| Thermal Resistance,   | (Note 2)  | $R_{	hetaJL}$                     | 174   | °C/W             |
| Junction to Lead  | (Note 3)  |                                   | 208   |                  |
| Junction and Storage Tem  | iperature Range   | $T_{J}$ , $T_{stg}$               | -55 to +150   | °C               |
| THERMAL CHARACTER   | ISTICS (SC-70/SOT-323) (MUN5232)  |                                   |   |                  |
| Total Device Dissipation  | (Made 9)  | $P_{D}$                           | 200   | >4/              |
| $T_A = 25^{\circ}C$   | (Note 2)  |                                   | 202   | mW               |
| Derate above 25°C   | (Note 3)<br>(Note 2)  |                                   | 310<br>1.6  | mW/°C            |
| Derate above 25 O   | (Note 3)  |                                   | 2.5   | IIIVV/ O         |
| Thermal Resistance,   | (Note 2)  | $R_{	hetaJA}$                     | 618   | °C/W             |
| Junction to Ambient   | (Note 3)  |                                   | 403   |                  |
| Thermal Resistance,   | (Note 2)  | $R_{	hetaJL}$                     | 280   | °C/W             |
| Junction to Lead  | (Note 3)  |                                   | 332   |                  |
| Junction and Storage Tem  | perature Range  | T <sub>J</sub> , T <sub>stg</sub> | -55 to +150   | °C               |
| THERMAL CHARACTER   | ISTICS (SC-75) (DTC143EE)   |                                   |   |                  |
| Total Device Dissipation  | (Note 2)  | P <sub>D</sub>                    | 200   | m\^/             |
|   | (Note 2)  |                                   | 200<br>300  | mW               |
| $T_A = 25^{\circ}C$   |   |                                   |   |                  |
|   | (Note 3)  |                                   |   | m\W//°C          |
| Derate above 25°C   | (Note 3)<br>(Note 2)<br>(Note 3)  |                                   | 1.6<br>2.4  | mW/°C            |
| Derate above 25°C  Thermal Resistance,  | (Note 2)<br>(Note 3)<br>(Note 2)  | $R_{	heta JA}$                    | 1.6<br>2.4<br>600   | mW/°C            |
| Derate above 25°C   | (Note 2)<br>(Note 3)  | $R_{	heta JA}$                    | 1.6<br>2.4  | -                |
| Derate above 25°C  Thermal Resistance, Junction to Ambient  | (Note 2)<br>(Note 3)<br>(Note 2)<br>(Note 3)  | $R_{	heta JA}$ $T_J, T_{stg}$     | 1.6<br>2.4<br>600   | -                |
| Derate above 25°C  Thermal Resistance, Junction to Ambient  Junction and Storage Terr   | (Note 2)<br>(Note 3)<br>(Note 2)<br>(Note 3)  |                                   | 1.6<br>2.4<br>600<br>400  | °C/W             |
| Derate above 25°C  Thermal Resistance, Junction to Ambient  Junction and Storage Tem  THERMAL CHARACTER  Total Device Dissipation   | (Note 2) (Note 3)  (Note 2) (Note 3)  perature Range  ISTICS (SOT-723) (DTC143EM3)  |                                   | 1.6<br>2.4<br>600<br>400<br>-55 to +150                             | °C/W             |
| Derate above 25°C  Thermal Resistance, Junction to Ambient  Junction and Storage Terr   | (Note 2) (Note 3)  (Note 2) (Note 3)  Perature Range  ISTICS (SOT-723) (DTC143EM3)  (Note 2)  | T <sub>J</sub> , T <sub>stg</sub> | 1.6<br>2.4<br>600<br>400<br>-55 to +150                             | °C/W             |
| Derate above 25°C  Thermal Resistance, Junction to Ambient  Junction and Storage Tem  THERMAL CHARACTER  Total Device Dissipation  T <sub>A</sub> = 25°C                    | (Note 2) (Note 3)  (Note 3)  (Note 3)  (Note 3)  (Note 3)  (Note 3)  (Note 2) (Note 2) (Note 3)                                     | T <sub>J</sub> , T <sub>stg</sub> | 1.6<br>2.4<br>600<br>400<br>-55 to +150                             | °C/W             |
| Derate above 25°C  Thermal Resistance, Junction to Ambient  Junction and Storage Tem  THERMAL CHARACTER  Total Device Dissipation   | (Note 2) (Note 3)  (Note 2) (Note 3)  Perature Range  ISTICS (SOT-723) (DTC143EM3)  (Note 2)  | T <sub>J</sub> , T <sub>stg</sub> | 1.6<br>2.4<br>600<br>400<br>-55 to +150                             | °C/W             |
| Derate above 25°C  Thermal Resistance, Junction to Ambient  Junction and Storage Terr  THERMAL CHARACTER  Total Device Dissipation T <sub>A</sub> = 25°C  Derate above 25°C | (Note 2) (Note 3)  (Note 2) (Note 3)  (Note 3)  Inperature Range  ISTICS (SOT-723) (DTC143EM3)  (Note 2) (Note 3) (Note 2) (Note 3) | T <sub>J</sub> , T <sub>stg</sub> | 1.6<br>2.4<br>600<br>400<br>-55 to +150<br>260<br>600<br>2.0        | °C/W             |
| Derate above 25°C  Thermal Resistance, Junction to Ambient  Junction and Storage Tem  THERMAL CHARACTER  Total Device Dissipation  T <sub>A</sub> = 25°C                    | (Note 2) (Note 3)  (Note 3)  (Note 3)  (Note 3)  (Note 3)  (Note 2) (Note 2) (Note 3) (Note 2)                                      | T <sub>J</sub> , T <sub>stg</sub> | 1.6<br>2.4<br>600<br>400<br>-55 to +150<br>260<br>600<br>2.0<br>4.8 | °C/W °C mW mW/°C |

**Table 2. THERMAL CHARACTERISTICS** 

|  | Characteristic                               | Symbol                            | Max                      | Unit        |  |
|--|--|-----------------------------------|--------------------------|-------------|--|
| THERMAL CHARACTERISTICS (SOT-1123) (NSBC143EF3)                |  |                                   |                          |             |  |
| Total Device Dissipation $T_A = 25^{\circ}C$ Derate above 25°C | (Note 4)<br>(Note 5)<br>(Note 4)<br>(Note 5) | P <sub>D</sub>                    | 254<br>297<br>2.0<br>2.4 | mW<br>mW/°C |  |
| Thermal Resistance,<br>Junction to Ambient                     | (Note 4)<br>(Note 5)                         | $R_{	hetaJA}$                     | 493<br>421               | °C/W        |  |
| Thermal Resistance,<br>Junction to Lead                        | (Note 4)                                     | $R_{	heta JL}$                    | 193                      | °C/W        |  |
| Junction and Storage Tem                                       | perature Range                               | T <sub>J</sub> , T <sub>stg</sub> | -55 to +150              | °C          |  |

<sup>2.</sup> FR-4 @ Minimum Pad.

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

| Characteristic  | Symbol                         | Min | Тур | Max  | Unit |
|---|--------------------------------|-----|-----|------|------|
| OFF CHARACTERISTICS   | •                              |     | -   |      |      |
| Collector-Base Cutoff Current (V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0)                      | I <sub>CBO</sub>               | -   | _   | 100  | nAdc |
| Collector-Emitter Cutoff Current (V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0)                   | I <sub>CEO</sub>               | -   | _   | 500  | nAdc |
| Emitter-Base Cutoff Current (V <sub>EB</sub> = 6.0 V, I <sub>C</sub> = 0)                       | I <sub>EBO</sub>               | -   | -   | 1.5  | mAdc |
| Collector-Base Breakdown Voltage ( $I_C = 10 \mu A, I_E = 0$ )                                  | V <sub>(BR)</sub> CBO          | 50  | _   | -    | Vdc  |
| Collector-Emitter Breakdown Voltage (Note 6) (I <sub>C</sub> = 2.0 mA, I <sub>B</sub> = 0)      | V <sub>(BR)</sub> CEO          | 50  | -   | -    | Vdc  |
| ON CHARACTERISTICS  | •                              | •   | •   |      |      |
| DC Current Gain (Note 6)<br>(I <sub>C</sub> = 5.0 mA, V <sub>CE</sub> = 10 V)                   | h <sub>FE</sub>                | 15  | 30  | -    |      |
| Collector-Emitter Saturation Voltage (Note 6) (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 1.0 mA) | V <sub>CE(sat)</sub>           | -   | -   | 0.25 | Vdc  |
| Input Voltage (off) $(V_{CE} = 5.0 \text{ V}, I_C = 100 \mu\text{A})$                           | $V_{i(off)}$                   | -   | 1.2 | 0.5  | Vdc  |
| Input Voltage (on)<br>(V <sub>CE</sub> = 0.3 V, I <sub>C</sub> = 20 mA)                         | V <sub>i(on)</sub>             | 2.5 | 2.0 | -    | Vdc  |
| Output Voltage (on) $(V_{CC} = 5.0 \text{ V}, V_B = 2.5 \text{ V}, R_L = 1.0 \text{ k}\Omega)$  | V <sub>OL</sub>                | -   | -   | 0.2  | Vdc  |
| Output Voltage (off) ( $V_{CC}$ = 5.0 V, $V_{B}$ = 0.25 V, $R_{L}$ = 1.0 k $\Omega$ )           | V <sub>OH</sub>                | 4.9 | -   | -    | Vdc  |
| Input Resistor  | R1                             | 3.3 | 4.7 | 6.1  | kΩ   |
| Resistor Ratio  | R <sub>1</sub> /R <sub>2</sub> | 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 ≤ 2%.

<sup>3.</sup> FR-4 @ 1.0 x 1.0 Inch Pad.

<sup>4.</sup> FR-4 @ 100 mm², 1 oz. copper traces, still air.
5. FR-4 @ 500 mm², 1 oz. copper traces, still air.

# TYPICAL CHARACTERISTICS MUN2232, MMUN2232L, MUN5232, DTC143EE, DTC143EM3

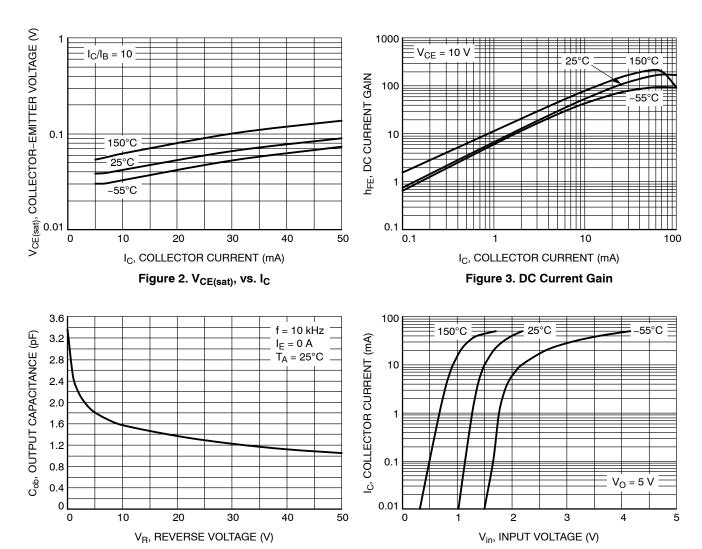


Figure 4. Output Capacitance

Figure 5. Output Current vs. Input Voltage

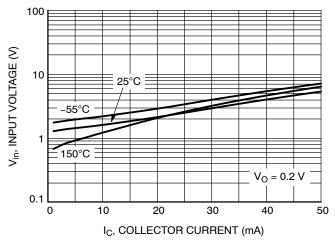


Figure 6. Input Voltage vs. Output Current

### **TYPICAL CHARACTERISTICS - NSBC143EF3**

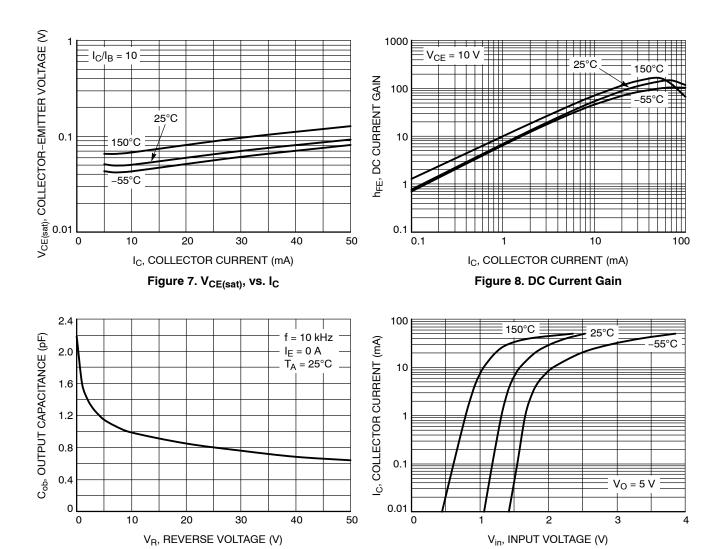


Figure 9. Output Capacitance

Figure 10. Output Current vs. Input Voltage

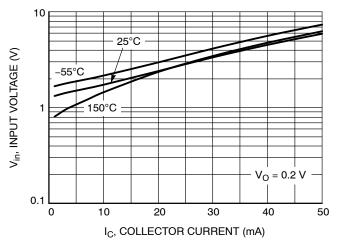


Figure 11. Input Voltage vs. Output Current

### **PACKAGE DIMENSIONS**



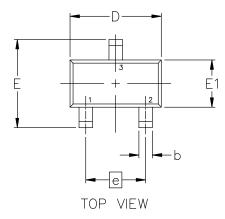
SC-59-3 2.90x1.50x1.15, 1.90P CASE 318D ISSUE J

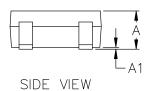
**DATE 15 FEB 2024** 

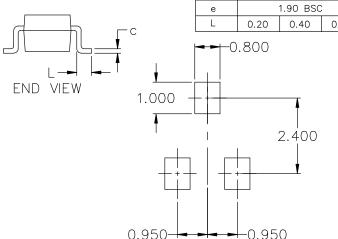
### NOTES:

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









### 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.



**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.

 STYLE 1:
 STYLE 2:
 STYLE 3:

 PIN 1. BASE
 PIN 1. ANODE
 PIN 1. ANODE

 2. EMITTER
 2. N.C.
 2. ANODE

 3. COLLECTOR
 3. CATHODE
 3. CATHODE

 STYLE 4:
 STYLE 5:
 STYLE 6:

 PIN 1. CATHODE
 PIN 1. CATHODE
 PIN 1. ANODE

 2. N.C.
 2. CATHODE
 2. CATHODE

 3. ANODE
 3. ANODE
 3. ANODE/CATHODE



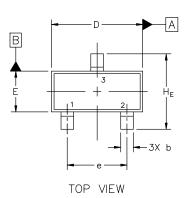
PACKAGE DIMENSIONS

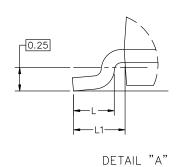


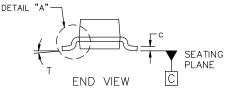
### SOT-23 (TO-236) 2.90x1.30x1.00 1.90P **CASE 318 ISSUE AU**

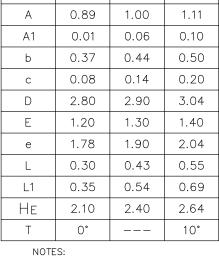
**DATE 14 AUG 2024** 

MAX









**MILLIMETERS** 

MIN

DIM

NOM

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

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

SIDE VIEW

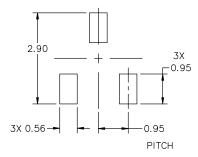


XXX = Specific Device Code

= Date Code

= Pb-Free Package

<sup>\*</sup>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.



Scale 3:1

### 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**

| DOCUMENT NUMBER: | 98ASB42226B              | Electronic versions are uncontrolled except when accessed directly from the Document Repo<br>Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. |             |  |  |
|------------------|--------------------------|--|-------------|--|--|
| DESCRIPTION:     | SOT-23 (TO-236) 2.90x1.3 | 0x1.00 1.90P   | PAGE 1 OF 2 |  |  |

### 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 | ı                |                  |
|---|---|---|--|------------------|------------------|
| STYLE 9:  | STYLE 10:   | STYLE 11: PIN 1. ANODE 2. CATHODE 3. CATHODE-ANODE    | STYLE 12:  | STYLE 13:        | STYLE 14:        |
| PIN 1. ANODE  | PIN 1. DRAIN  |   | PIN 1. CATHODE   | PIN 1. SOURCE    | PIN 1. CATHODE   |
| 2. ANODE  | 2. SOURCE   |   | 2. CATHODE   | 2. DRAIN         | 2. GATE          |
| 3. CATHODE  | 3. GATE   |   | 3. ANODE   | 3. GATE          | 3. ANODE         |
| STYLE 15:   | STYLE 16:   | STYLE 17:   | STYLE 18:  | STYLE 19:        | STYLE 20:        |
| PIN 1. GATE   | PIN 1. ANODE  | PIN 1. NO CONNECTION                                  | PIN 1. NO CONNECTION                                       | PIN 1. CATHODE   | PIN 1. CATHODE   |
| 2. CATHODE  | 2. CATHODE  | 2. ANODE  | 2. CATHODE   | 2. ANODE         | 2. ANODE         |
| 3. ANODE  | 3. CATHODE  | 3. CATHODE  | 3. ANODE   | 3. CATHODE-ANODE | 3. GATE          |
| STYLE 21:   | STYLE 22:   | STYLE 23:   | STYLE 24:  | STYLE 25:        | STYLE 26:        |
| PIN 1. GATE   | PIN 1. RETURN   | PIN 1. ANODE  | PIN 1. GATE  | PIN 1. ANODE     | PIN 1. CATHODE   |
| 2. SOURCE   | 2. OUTPUT   | 2. ANODE  | 2. DRAIN   | 2. CATHODE       | 2. ANODE         |
| 3. DRAIN  | 3. INPUT  | 3. CATHODE  | 3. SOURCE  | 3. GATE          | 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) 2.90x1.3 | SOT-23 (TO-236) 2.90x1.30x1.00 1.90P  |  |  |  |



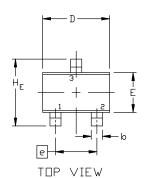
PACKAGE DIMENSIONS

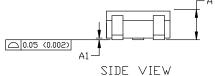


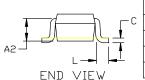
SC-70 (SOT-323) **CASE 419** ISSUE R

**DATE 11 OCT 2022** 

## SCALE 4:1







### NOTES:

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

|     | M)       | LLIMETE  | RS   |       | INCHES   |       |
|-----|----------|----------|------|-------|----------|-------|
| DIM | MIN.     | N□M.     | MAX. | MIN.  | N□M.     | MAX.  |
| Α   | 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 BS | C     |
| b   | 0.30     | 0.35     | 0.40 | 0.012 | 0.014    | 0.016 |
| С   | 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 |
| е   | 1.20     | 1.30     | 1.40 | 0.047 | 0.051    | 0.055 |
| e1  | 0.65 BSC |          |      |       | 0.026 BS | C     |
| L   | 0.20     | 0.38     | 0.56 | 0.008 | 0.015    | 0.022 |
| HE  | 2.00     | 2.10     | 2.40 | 0.079 | 0.083    | 0.095 |



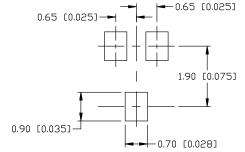


XX = Specific Device Code

М = 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 ID Semiconductor Soldering and Mounting Techniques Reference Manual, SDLDERRM/D.

SOLDERING FOOTPRINT

| STYLE 1:<br>CANCELLED       | STYLE 2:<br>PIN 1. ANODE<br>2. N.C.<br>3. CATHODE | STYLE 3:<br>PIN 1. BASE<br>2. EMITTER<br>3. COLLECTOR | STYLE 4:<br>PIN 1. CATHODE<br>2. CATHODE<br>3. ANODE | STYLE 5:<br>PIN 1. ANODE<br>2. ANODE<br>3. CATHODE |                           |
|-----------------------------|---|---|--|--|---------------------------|
| STYLE 6:                    | STYLE 7:  | STYLE 8:  | STYLE 9:   | STYLE 10:  | STYLE 11:                 |
| PIN 1. EMITTER              | PIN 1. BASE                                       | PIN 1. GATE   | PIN 1. ANODE   | PIN 1. CATHODE                                     | PIN 1. CATHODE            |
| 2. BASE                     | 2. EMITTER  | 2. SOURCE   | 2. CATHODE   | 2. ANODE   | <ol><li>CATHODE</li></ol> |
| <ol><li>COLLECTOR</li></ol> | <ol><li>COLLECTOR</li></ol>                       | 3. DRAIN  | <ol><li>CATHODE-ANODE</li></ol>                      | <ol><li>ANODE-CATHODE</li></ol>                    | <ol><li>CATHODE</li></ol> |

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

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**PACKAGE DIMENSIONS** 

### SC75-3 1.60x0.80x0.80, 1.00P

**CASE 463 ISSUE H** 

**DATE 01 FEB 2024** 

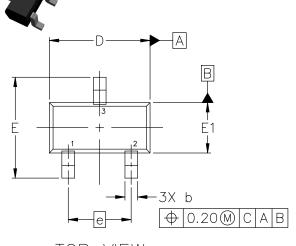
### NOTES:

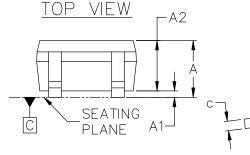
- DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
- ALL DIMENSION ARE IN MILLIMETERS.

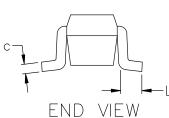
| DIM   | MILLIMETERS |      |      |  |
|-------|-------------|------|------|--|
| DIIVI | MIN.        | NOM. | MAX. |  |
| А     | 0.70        | 0.80 | 0.90 |  |
| A1    | 0.00        | 0.05 | 0.10 |  |
| A2    | 0.80 REF.   |      |      |  |
| b     | 0.15        | 0.20 | 0.30 |  |
| С     | 0.10        | 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 |  |
| е     | 1.00 BSC    |      |      |  |
| L     | 0.10        | 0.15 | 0.20 |  |

-0.356

0.787







SIDE VIEW

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



XX = Specific Device Code

Μ = 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

RECOMMENDED MOUNTING FOOTPRINT\* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY

1.803

0.508

AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

1.000

STYLE 4: PIN 1. CATHODE

2. CATHODE 3. ANODE

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

**DOCUMENT NUMBER:** 

98ASB15184C

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**DESCRIPTION:** 

SC75-3 1.60x0.80x0.80, 1.00P

PAGE 1 OF 1



### **MECHANICAL CASE OUTLINE** PACKAGE DIMENSIONS



ТПР

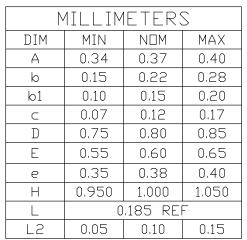


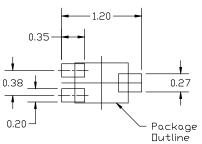
### SOT-1123 0.80x0.60x0.37, 0.35P CASE 524AA ISSUE D

**DATE 18 JAN 2024** 

### NOTES:

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



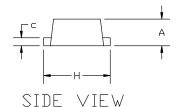


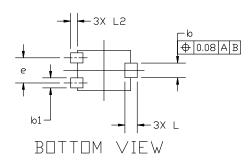
### RECOMMENDED MOUNTING FOOTPRINT

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

# В

VIEW





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



= Specific Device Code

= 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.

| STYLE 1:                    | ST |
|-----------------------------|----|
| PIN 1. BASE                 | Ρ  |
| 2. EMITTER                  |    |
| <ol><li>COLLECTOR</li></ol> |    |

TYLE 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

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| DESCRIPTION:     | SOT-1123 0.80x0.60x0.37, 0.35P |   | PAGE 1 OF 1 |





MILLIMETERS

 $N\square M$ .

0.50

0.21

0.31

0.12

1.20

0.80

0.40 BSC

1.20

0.29 REF

0.20



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

**DATE 24 JAN 2024** 

MAX.

0.55

0.27

0.37

0.17

1.25

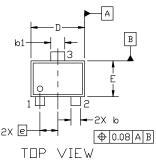
0.85

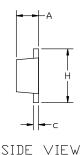
1.25

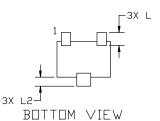
0.25

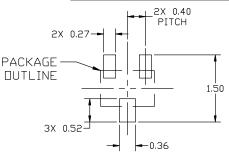
### NOTES:

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









DIM

Α

b

b1

 $\subset$ D

Ε

е Н

L L2 MIN.

0.45

0.15

0.25

0.07

1.15

0.75

1.15

0.15

### RECOMMENDED MOUNTING FOOTPRINT

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

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



XX = Specific Device Code = 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.

STYLE 1: STYLE 2: STYLE 3: STYLE 4: STYLE 5: PIN 1. GATE 2. SOURCE PIN 1. BASE PIN 1. ANODE PIN 1. ANODE PIN 1. CATHODE 2 FMITTER 2 CATHODE 2 N/C 2. ANODE 3. COLLECTOR 3. CATHODE 3. CATHODE 3. DRAIN

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| DESCRIPTION:     | SOT-723 1.20x0.80x0.50, 0.40P |   | PAGE 1 OF 1 |  |

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