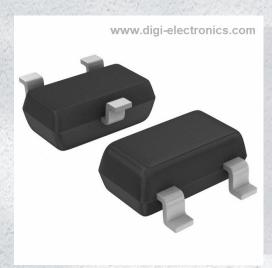


# **NSVMUN2212T1G Datasheet**



https://www.DiGi-Electronics.com

DiGi Electronics Part Number NSVMUN2212T1G-DG

Manufacturer onsemi

Manufacturer Product Number NSVMUN2212T1G

Description TRANS PREBIAS NPN 50V 0.1A SC59

**Detailed Description** Pre-Biased Bipolar Transistor (BJT) NPN - Pre-Biase

d 50 V 100 mA 230 mW Surface Mount SC-59



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:
NSVMUN2212T1G	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	22 kOhms
Resistor - Emitter Base (R2):	DC Current Gain (hFE) (Min) @ Ic, Vce:
22 kOhms	60 @ 5mA, 10V
Vce Saturation (Max) @ lb, lc:	Current - Collector Cutoff (Max):
250mV @ 300μA, 10mA	500nA
Power - Max:	Mounting Type:
230 mW	Surface Mount
Package / Case:	Supplier Device Package:
TO-236-3, SC-59, SOT-23-3	SC-59
Base Product Number:	
NSVMUN2212	

# **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)** $R1 = 22 k\Omega$ , $R2 = 22 k\Omega$

# **NPN 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 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 Compliant

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

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

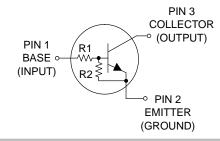
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

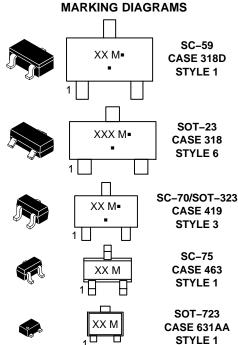


## ON Semiconductor®

#### www.onsemi.com

#### PIN CONNECTIONS





= Specific Device Code XXX = Date Code\* M

X ML 1

(Note: Microdot may be in either location)

= Pb-Free Package

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

#### ORDERING INFORMATION

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

SOT-1123

CASE 524AA STYLE 1

**Table 1. ORDERING INFORMATION** 

Device	Part Marking	Package	Shipping <sup>†</sup>
MUN2212T1G, NSVMUN2212T1G*	8B	SC-59 (P-Free)	3000 / Tape & Reel
MMUN2212LT1G, NSVMMUN2212LT1G*	A8B	SOT-23 (P-Free)	3000 / Tape & Reel
MUN5212T1G, SMUN5212T1G*	8B	SC-70/SOT-323 (P-Free)	3000 / Tape & Reel
DTC124EET1G, SDTC124EET1G*	8B	SC-75 (P-Free)	3000 / Tape & Reel
DTC124EM3T5G	8B	SOT-723 (P-Free)	8000 / Tape & Reel
NSBC124EF3T5G	L	SOT-1123 (P-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.

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

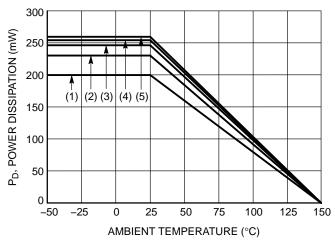


Figure 1. Derating Curve

- (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

#### Table 2 THERMAL CHARACTERISTICS

	Characteristic	Symbol	Max	Unit
THERMAL CHARACTERISTI	CS (SC-59) (MUN2212)			
Total Device Dissipation  T <sub>A</sub> = 25°C (Note 1) (Note 2)  Derate above 25°C (Note 2)	(Note 1)	P <sub>D</sub>	230 338 1.8 2.7	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 1) (Note 2)	$R_{ hetaJA}$	540 370	°C/W
Thermal Resistance, Junction to Lead (Note 2)	(Note 1)	$R_{ hetaJL}$	264 287	°C/W
Junction and Storage Temper	ature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C
THERMAL CHARACTERISTI	CS (SOT-23) (MMUN2212L)			
Total Device Dissipation $T_A = 25^{\circ}C \qquad \text{(Note 1)}$ $\text{(Note 2)}$ Derate above 25°C $\text{(Note 2)}$	(Note 1)	P <sub>D</sub>	246 400 2.0 3.2	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 1) (Note 2)	$R_{ hetaJA}$	508 311	°C/W
Thermal Resistance, Junction to Lead (Note 2)	(Note 1)	$R_{ heta JL}$	174 208	°C/W
Junction and Storage Temper	ature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C
THERMAL CHARACTERISTI	CS (SC-70/SOT-323) (MUN5212)	•		
Total Device Dissipation $T_A = 25^{\circ}C \qquad \text{(Note 1)}$ $\text{(Note 2)}$ Derate above 25°C $\text{(Note 2)}$	(Note 1)	P <sub>D</sub>	202 310 1.6 2.5	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 1) (Note 2)	$R_{ hetaJA}$	618 403	°C/W
Thermal Resistance, Junction to Lead (Note 2)	(Note 1)	$R_{ hetaJL}$	280 332	°C/W
Junction and Storage Temper	ature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C
THERMAL CHARACTERISTI	CS (SC-75) (DTC124EE)	•		
Total Device Dissipation $T_A = 25^{\circ}C \qquad \text{(Note 1)}$ $\text{(Note 2)}$ Derate above 25 $^{\circ}$ C $\text{(Note 2)}$	(Note 1)	P <sub>D</sub>	200 300 1.6 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 1) (Note 2)	$R_{ heta JA}$	600 400	°C/W
Junction and Storage Temper	ature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C
THERMAL CHARACTERISTI	CS (SOT-723) (DTC124EM3)		-	
Total Device Dissipation $T_A = 25^{\circ}C \qquad \text{(Note 1)}$ $\text{(Note 2)}$ Derate above $25^{\circ}C$ $\text{(Note 2)}$	(Note 1)	P <sub>D</sub>	260 600 2.0 4.8	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 1) (Note 2)	$R_{ hetaJA}$	480 205	°C/W
Junction and Storage Temper	ature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C

- 1. FR-4 @ Minimum Pad.

- FR-4 © Millindin Pad.
   FR-4 © 1.0 x 1.0 Inch Pad.
   FR-4 © 100 mm<sup>2</sup>, 1 oz. copper traces, still air.
   FR-4 © 500 mm<sup>2</sup>, 1 oz. copper traces, still air.

## **Table 2. THERMAL CHARACTERISTICS**

Characteristic	Symbol	Max	Unit
THERMAL CHARACTERISTICS (SOT-1123) (NSBC124EF3)		-	
Total Device Dissipation  T <sub>A</sub> = 25°C (Note 3) (Note 4)  Derate above 25°C (Note 3) (Note 4)	P <sub>D</sub>	254 297 2.0 2.4	mW mW/°C
Thermal Resistance, (Note 3) Junction to Ambient (Note 4)	$R_{ heta JA}$	493 421	°C/W
Thermal Resistance, Junction to Lead (Note 3)	R <sub>θ</sub> JL	193	°C/W
Junction and Storage Temperature Range	T <sub>J</sub> , T <sub>stg</sub>	-55 to +150	°C

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

## **Table 3. ELECTRICAL CHARACTERISTICS** (T<sub>A</sub> = 25°C, unless otherwise noted)

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS		•			
Collector–Base Cutoff Current $(V_{CB} = 50 \text{ V}, I_E = 0)$	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>	_	_	0.2	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 5) (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 5) (I <sub>C</sub> = 5.0 mA, V <sub>CE</sub> = 10 V)	h <sub>FE</sub>	60	100	-	
Collector–Emitter Saturation Voltage (Note 5) (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.3 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 <sub>i(off)</sub>	_	1.2	0.8	Vdc
Input Voltage (on) (V <sub>CE</sub> = 0.3 V, I <sub>C</sub> = 5.0 mA)	V <sub>i(on)</sub>	2.5	1.6	-	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 <sub>CC</sub> = 5.0 V, V <sub>B</sub> = 0.5 V, R <sub>L</sub> = 1.0 k $\Omega$ )	V <sub>OH</sub>	4.9	-	-	Vdc
Input Resistor	R1	15.4	22	28.6	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.

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

# TYPICAL CHARACTERISTICS MUN2212, MMUN2212L, NSVMMUN2212LT1G, MUN5212, DTC124EE, DTC124EM3

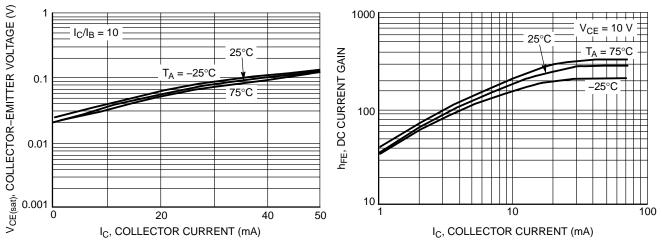


Figure 2. V<sub>CE(sat)</sub> vs. I<sub>C</sub>

Figure 3. DC Current Gain

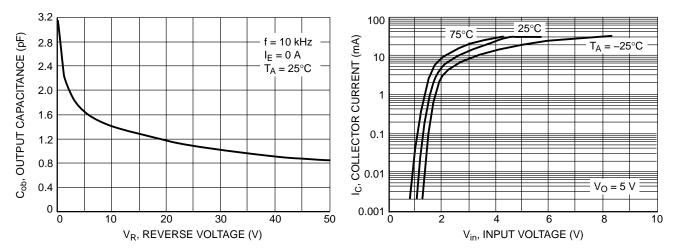


Figure 4. Output Capacitance

Figure 5. Output Current vs. Input Voltage

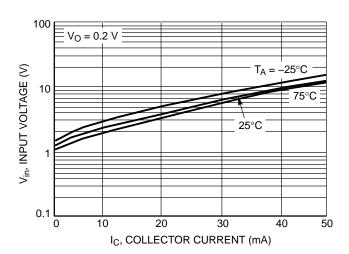


Figure 6. Input Voltage vs. Output Current

## **TYPICAL CHARACTERISTICS - NSBC124EF3**

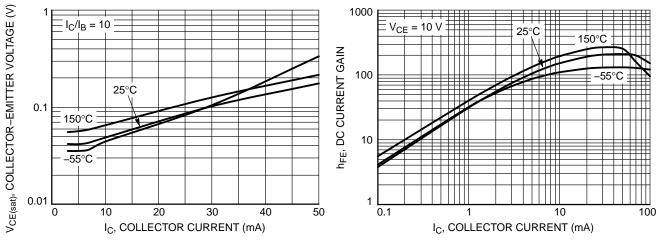


Figure 7. V<sub>CE(sat)</sub> vs. I<sub>C</sub>

Figure 8. DC Current Gain

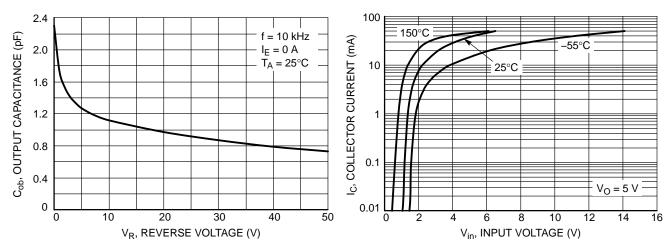


Figure 9. Output Capacitance

Figure 10. Output Current vs. Input Voltage

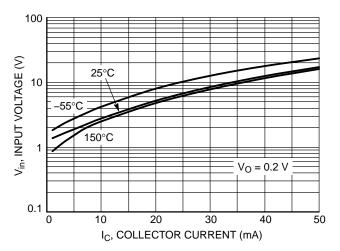


Figure 11. Input Voltage vs. Output Current

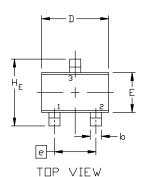


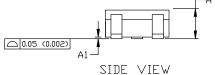
PACKAGE DIMENSIONS

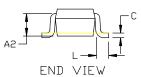


**DATE 11 OCT 2022** 









#### NOTES:

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

	MILLIMETERS				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



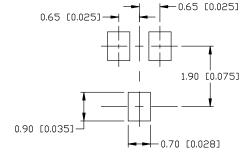


XX = Specific Device Code

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.



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: 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:	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>

DOCUMENT NUMBER:	98ASB42819B	Electronic versions are uncontrolled except when accessed directly from the Document Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.		
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** 

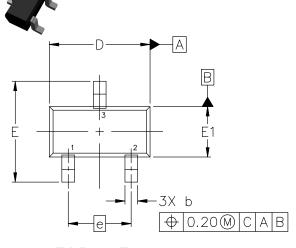
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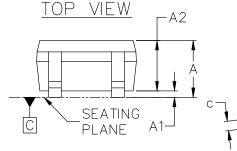
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- ALL DIMENSION ARE IN MILLIMETERS.

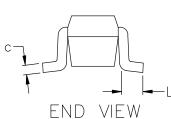
DIM	MILLIMETERS				
DIM	MIN.	NOM.	MAX.		
А	0.70	0.80	0.90		
A1	0.00	0.05	0.10		
A2	(	0.80 REF			
Ь	0.15	0.20	0.30		
С	0.10	0.15	0.25		
D	1.55	1.60	1.65		
Е	1.50	1.60	1.70		
E1	0.70	0.80	0.90		
е	1.00 BSC				
L	0.10	0.15	0.20		

-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	
<ol><li>EMITTER</li></ol>	

3 COLLECTOR

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

1.803

0.508

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

1.000

RECOMMENDED MOUNTING FOOTPRINT\*

STYLE 4:	
PIN 1. CATHODE	
<ol><li>CATHODE</li></ol>	
3. ANODE	

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

**DOCUMENT NUMBER:** 

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98ASB15184C **DESCRIPTION:** SC75-3 1.60x0.80x0.80, 1.00P

PAGE 1 OF 1

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PACKAGE DIMENSIONS

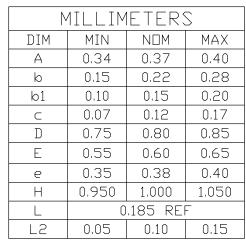


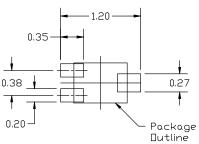
#### SOT-1123 0.80x0.60x0.37, 0.35P CASE 524AA ISSUE D

**DATE 18 JAN 2024** 



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



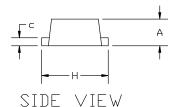


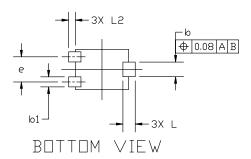
## RECOMMENDED MOUNTING FOOTPRINT

\*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

TOP VIEW





## **GENERIC MARKING DIAGRAM\***



= Specific Device Code

= Date Code

<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.

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

DOCUMENT NUMBER:	98AON23134D	Electronic versions are uncontrolled except when accessed directly from the Document Reposito Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.		
DESCRIPTION:	SOT-1123 0.80x0.60x0.37, 0.35P		PAGE 1 OF 1	

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PACKAGE DIMENSIONS

MILLIMETERS

 $N\square M$ .

0.50

0.21

0.31

0.12

1.20

0.80

0.40 BSC

1.20

0.29 REF



#### 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

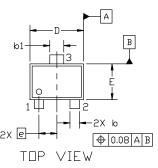
1.25

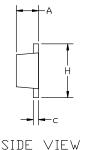
0.85

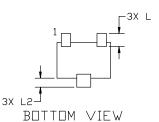
1.25

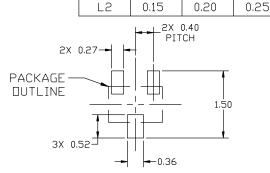
#### NOTES:

- 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

MIN.

0.45

0.15

0.25

0.07

1.15

0.75

1.15

## 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. BASE	PIN 1. ANODE	PIN 1. ANODE	PIN 1. CATHODE	PIN 1. GATE
<ol><li>EMITTER</li></ol>	2. N/C	2. ANODE	2. CATHODE	<ol><li>SOURCE</li></ol>
<ol><li>COLLECTOR</li></ol>	<ol><li>CATHODE</li></ol>	<ol><li>CATHODE</li></ol>	<ol><li>ANODE</li></ol>	<ol><li>DRAIN</li></ol>

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

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