Digital Transistors (BRT) R1 = 22 k Ω , R2 = 47 k Ω

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 base–emitter resistor. The BRT eliminates these individual components by integrating them into a single device. The use of a BRT can reduce both system cost and board space.

Features

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

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

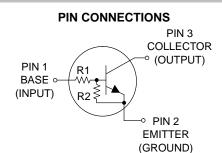
Rating	Symbol	Max	Unit
Collector-Base Voltage	V _{CBO}	50	Vdc
Collector–Emitter Voltage	V _{CEO}	50	Vdc
Collector Current – Continuous	۱ _C	100	mAdc
Input Forward Voltage	V _{IN(fwd)}	40	Vdc
Input Reverse Voltage	V _{IN(rev)}	8	Vdc

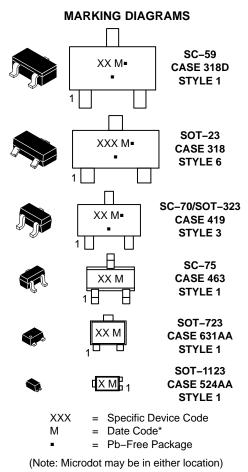
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.



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*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.

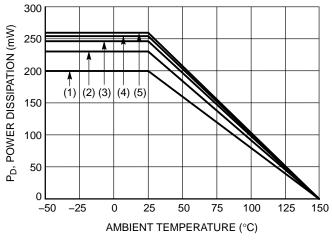
Table 1. ORDERING INFORMATION

Device	Part Marking	Package	Shipping [†]
MUN2234T1G	8L	SC–59 (Pb–Free)	3000 / Tape & Reel
MMUN2234LT1G, SMMUN2234LT1G*	A8L	SOT-23 (Pb-Free)	3000 / Tape & Reel
MUN5234T1G, NSVMUN5234T1G*	8L	SC-70/SOT-323 (Pb-Free)	3000 / Tape & Reel
DTC124XET1G	8L	SC–75 (Pb–Free)	3000 / Tape & Reel
DTC124XM3T5G	8L	SOT-723 (Pb-Free)	8000 / Tape & Reel
NSBC124XF3T5G	J (180°)**	SOT-1123 (Pb-Free)	8000 / Tape & Reel

+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.

* *(xx°) = Degree rotation in the clockwise direction.



SC-75 and SC-70/SOT323; Minimum Pad
 SC-59; Minimum Pad
 SOT-23; Minimum Pad
 SOT-1123; 100 mm², 1 oz. copper trace
 SOT-723; Minimum Pad

Figure 1. Derating Curve

Table 2. THERMAL CHARACTERISTICS

Characteristic		Symbol	Max	Unit
HERMAL CHARACTERISTICS (SC-59) (MUN2234)				
Total Device Dissipation $T_A = 25^{\circ}C$ Derate above 25^C	(Note 1) (Note 2) (Note 1)	P _D	230 338 1.8	mW mW/°C
Thermal Resistance,	(Note 2) (Note 1)	$R_{ hetaJA}$	2.7 540	°C/W
Junction to Ambient Thermal Resistance,	(Note 2) (Note 1)	R _{θJL}	370 264	°C/W
Junction to Lead Junction and Storage Temperature Range	(Note 2)	T _J , T _{stg}	287 -55 to +150	°C
HERMAL CHARACTERISTICS (SOT-23) (MMUN2234L)		i J, istg	-33 10 +130	0
Total Device Dissipation $T_A = 25^{\circ}C$ Derate above 25°C	(Note 1) (Note 2) (Note 1) (Note 2)	P _D	246 400 2.0 3.2	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 1) (Note 2)	R_{\thetaJA}	508 311	°C/W
Thermal Resistance, Junction to Lead	(Note 1) (Note 2)	R_{\thetaJL}	174 208	°C/W
Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +150	°C
HERMAL CHARACTERISTICS (SC-70/SOT-323) (MUN5234)				
Total Device Dissipation $T_A = 25^{\circ}C$ Derate above 25°C	(Note 1) (Note 2) (Note 1) (Note 2)	P _D	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 1) (Note 2)	$R_{\theta JL}$	280 332	°C/W
Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +150	°C
HERMAL CHARACTERISTICS (SC-75) (DTC124XE)				
Total Device Dissipation T _A = 25°C Derate above 25°C	(Note 1) (Note 2) (Note 1) (Note 2)	P _D	200 300 1.6 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 1) (Note 2)	R_{\thetaJA}	600 400	°C/W
Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +150	°C
THERMAL CHARACTERISTICS (SOT-723) (DTC124XM3)				
Total Device Dissipation $T_A = 25^{\circ}C$ Derate above $25^{\circ}C$	(Note 1) (Note 2) (Note 1)	P _D	260 600 2.0	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 2) (Note 1) (Note 2)	R_{\thetaJA}	4.8 480 205	°C/W
Junction and Storage Temperature Range	(- //	T _J , T _{stg}	-55 to +150	°C

FR-4 @ 1.0 x 1.0 Inch Pad.
 FR-4 @ 100 mm², 1 oz. copper traces, still air.
 FR-4 @ 500 mm², 1 oz. copper traces, still air.

Table 2. THERMAL CHARACTERISTICS

Characteristic		Symbol	Max	Unit
THERMAL CHARACTERISTICS (SOT-1123) (NSBC123XF3)				
Total Device Dissipation $T_A = 25^{\circ}C$ Derate above 25°C	(Note 3) (Note 4) (Note 3) (Note 4)	P _D	254 297 2.0 2.4	mW mW/°C
Thermal Resistance, Junction to Ambient	(Note 3) (Note 4)	R_{\thetaJA}	493 421	°C/W
Thermal Resistance, Junction to Lead	(Note 3)	$R_{ extsf{ heta}JL}$	193	°C/W
Junction and Storage Temperature Range		T _J , T _{stg}	-55 to +150	°C

1. FR-4 @ Minimum Pad.

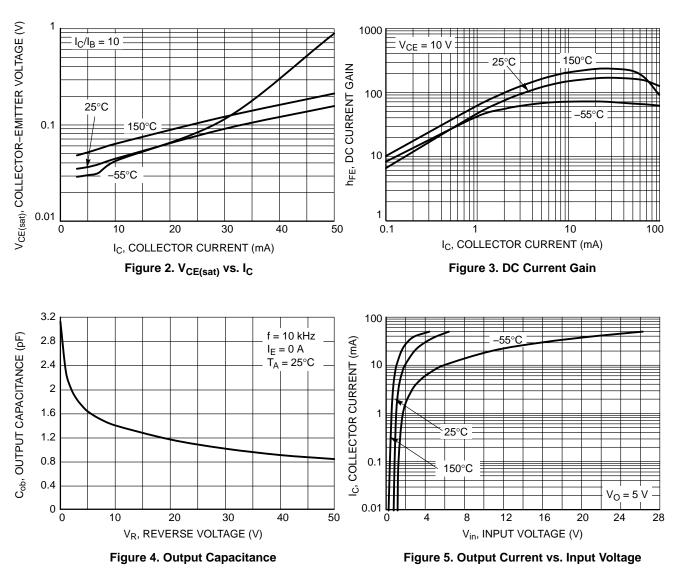
2. FR-4 @ 1.0 x 1.0 Inch Pad.

FR-4 @ 100 mm², 1 oz. copper traces, still air.
 FR-4 @ 500 mm², 1 oz. copper traces, still air.

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

Characteristic	Symbol	Min	Тур	Max	Unit
OFF CHARACTERISTICS					
Collector-Base Cutoff Current ($V_{CB} = 50 V$, $I_E = 0$)	I _{CBO}	-	-	100	nAdc
Collector–Emitter Cutoff Current $(V_{CE} = 50 \text{ V}, I_B = 0)$	I _{CEO}	_	-	500	nAdc
Emitter–Base Cutoff Current ($V_{EB} = 6.0 \text{ V}, I_C = 0$)	I _{EBO}	_	_	0.13	mAdc
Collector–Base Breakdown Voltage ($I_C = 10 \ \mu A, I_E = 0$)	V _{(BR)CBO}	50	-	-	Vdc
Collector–Emitter Breakdown Voltage (Note 5) $(I_C = 2.0 \text{ mA}, I_B = 0)$	V _{(BR)CEO}	50	-	-	Vdc
ON CHARACTERISTICS					-
DC Current Gain (Note 5) ($I_C = 5.0 \text{ mA}, V_{CE} = 10 \text{ V}$)	h _{FE}	80	150	-	
Collector – Emitter Saturation Voltage (Note 5) $(I_C = 10 \text{ mA}, I_B = 1.0 \text{ mA})$	VCE(sat)	_	-	0.25	Vdc
Input Voltage (off) ($V_{CE} = 5.0 \text{ V}, I_C = 100 \ \mu\text{A}$)	V _{i(off)}	_	0.9	0.5	Vdc
Input Voltage (on) ($V_{CE} = 0.3 \text{ V}, I_C = 2.0 \text{ mA}$)	V _{i(on)}	2.0	1.2	_	Vdc
Output Voltage (on) (V _{CC} = 5.0 V, V _B = 2.5 V, R _L = 1.0 k Ω)	V _{OL}	_	-	0.2	Vdc
Output Voltage (off) $(V_{CC} = 5.0 \text{ V}, \text{ V}_{B} = 0.5 \text{ V}, \text{ R}_{L} = 1.0 \text{ k}\Omega)$	V _{OH}	4.9	-	_	Vdc
Input Resistor	R1	15.4	22	28.6	kΩ
Resistor Ratio	R ₁ /R ₂	0.38	0.47	0.56	

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 $\leq 2\%$.



TYPICAL CHARACTERISTICS MUN2234, MMUN2234L, MUN5234, DTC124XE, DTC124XM3

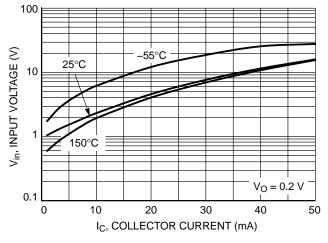


Figure 6. Input Voltage vs. Output Current

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TOP VIEW

SIDE VIEW

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DETAIL A

-3X b

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SCALE 4:1

A____ ' A1SOT-23 (TO-236) CASE 318 ISSUE AT

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DETAIL A

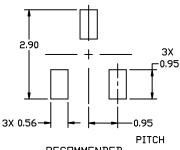
END VIEW

DATE 01 MAR 2023

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- 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M,1994.
- 2. CONTROLLING DIMENSION: MILLIMETERS
- 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF THE BASE MATERIAL.
- 4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	MILLIM	IETERS			INCHES	
DIM	MIN.	NDM.	MAX.	MIN.	NDM.	MAX.
Α	0.89	1.00	1.11	0.035	0.039	0.044
A1	0.01	0.06	0.10	0.000	0.002	0.004
b	0.37	0.44	0.50	0.015	0.017	0.020
с	0.08	0.14	0.20	0.003	0.006	0.008
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.080
L	0.30	0.43	0.55	0.012	0.017	0.022
L1	0.35	0.54	0.69	0.014	0.021	0.027
Η _E	2.10	2.40	2.64	0.083	0.094	0.104
Т	0*		10*	0*		10*



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*



XXX = Specific Device Code

M = Date Code

= Pb-Free Package

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

STYLES ON PAGE 2

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MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

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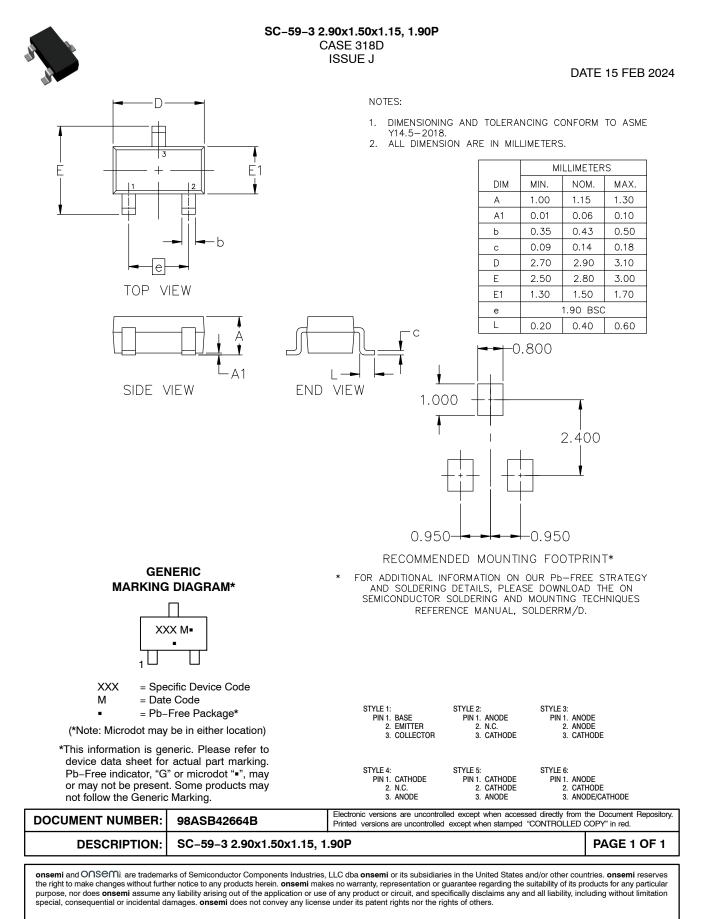
SOT-23 (TO-236) CASE 318 ISSUE AT

DATE 01 MAR 2023

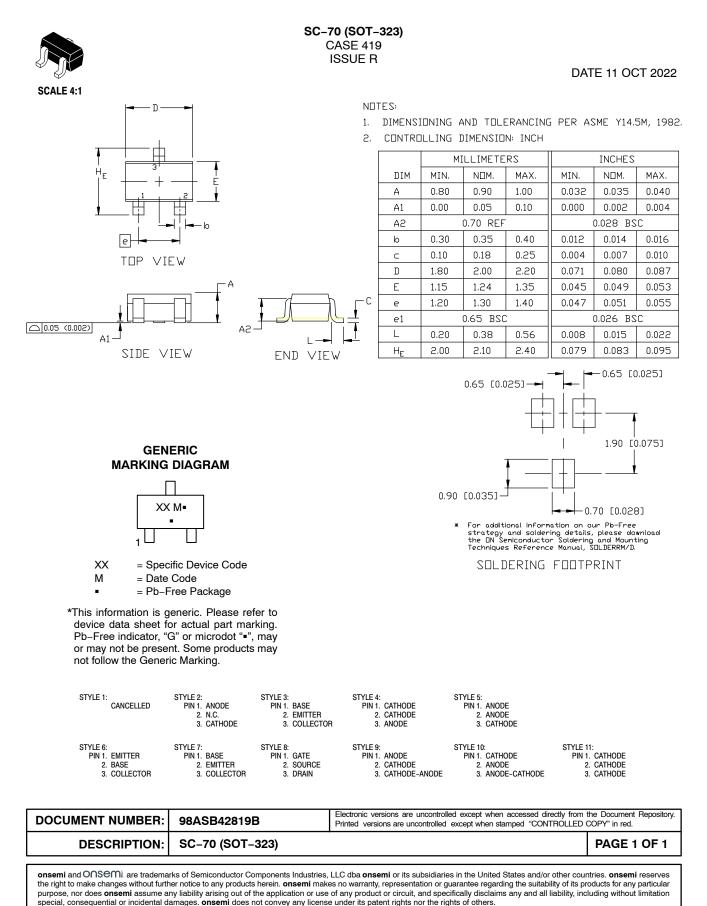
STYLE 1 THRU 5: CANCELLED	STYLE 6: PIN 1. BASE 2. EMITTER 3. COLLECTOR	STYLE 7: PIN 1. EMITTER 2. BASE 3. COLLECTOR	STYLE 8: PIN 1. ANODE 2. NO CONNECTION 3. CATHODE		
STYLE 9:	STYLE 10:	STYLE 11:	STYLE 12:	STYLE 13:	STYLE 14:
PIN 1. ANODE	PIN 1. DRAIN	PIN 1. ANODE	PIN 1. CATHODE	PIN 1. SOURCE	PIN 1. CATHODE
2. ANODE	2. SOURCE	2. CATHODE	2. CATHODE	2. DRAIN	2. GATE
3. CATHODE	3. GATE	3. CATHODE-ANODE	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: PIN 1. CATHODE 2. CATHODE 3. CATHODE	STYLE 28: PIN 1. ANODE 2. ANODE 3. ANODE				

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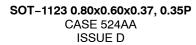
SC75-3 1.60x0.80x0.80, 1.00P **CASE 463 ISSUE H** DATE 01 FEB 2024 NOTES: Α D DIMENSIONING AND TOLERANCING CONFORM 1. В TO ASME Y14.5-2018. ALL DIMENSION ARE IN MILLIMETERS. 2. F MILLIMETERS F DIM MIN. MAX. NOM. 0.70 0.800.90 А 3X b Α1 0.00 0.05 0.10 \oplus 0.20 \oplus C A B е A2 0.80 REF. 0.15 0.20 b 0.30 TOP VIEW С 0.10 0.15 0.25 A2 D 1.55 1.60 1.65 E 1.50 1.60 1.70 E1 0.70 0.80 0.90 С 1.00 BSC е SEATING Ċ A1 L 0.20 PLANE 0.10 0.15 -0.356 END VIEW SIDE VIEW GENERIC **MARKING DIAGRAM*** 1.803 0.787XXM XX = Specific Device Code Μ = Date Code 0.508 = Pb-Free Package 1.000 *This information is generic. Please refer to device data sheet for actual part marking. RECOMMENDED MOUNTING FOOTPRINT* Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY not follow the Generic Marking. AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES STYLE 3: PIN 1. ANODE 2. ANODE STYLE 1: PIN 1. BASE 2. EMITTER STYLE 2: PIN 1. ANODE 2. N/C REFERENCE MANUAL, SOLDERRM/D. 3. COLLECTOR 3. CATHODE 3. CATHODE STYLE 4: STYLE 5: PIN 1. CATHODE 2. CATHODE PIN 1. GATE 2. SOURCE 3. ANODE 3. DRAIN Electronic versions are uncontrolled except when accessed directly from the Document Repository. DOCUMENT NUMBER: 98ASB15184C Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red. **DESCRIPTION:** SC75-3 1.60x0.80x0.80, 1.00P PAGE 1 OF 1 onsemi and ONSEMI are trademarks of Semiconductor Components Industries, LLC dba onsemi or its subsidiaries in the United States and/or other countries. onsemi reserves the right to make changes without further notice to any products herein. onsemi makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does onsemi assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. onsemi does not convey any license under its patent rights nor the rights of others.

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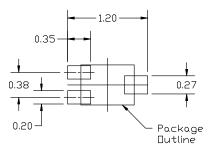
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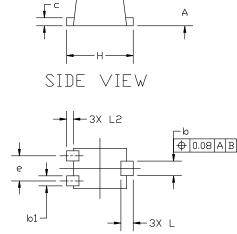
- 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
- 2. CONTROLLING DIMENSION: MILLIMETERS.
- 3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS DF BASE MATERIAL.
- 4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

MILLIMETERS					
DIM	MIN	NDM	MAX		
A	0.34	0.37	0.40		
b	0,15	0.22	0.28		
b1	0.10	0,15	0.20		
С	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		
Н	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 th e DN Semiconductor Soldering and Mounting Techniques Reference manual, SDLDERRM/D.



TOP 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.

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
2. EMITTER	2. N/C	2. ANODE	2. CATHODE	2. SOURCE
3. COLLECTOR	3. CATHODE	3. CATHODE	3. ANODE	3. DRAIN

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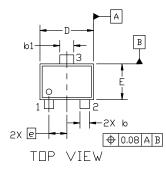
SOT-723 1.20x0.80x0.50, 0.40P CASE 631AA ISSUE E

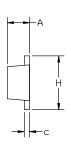
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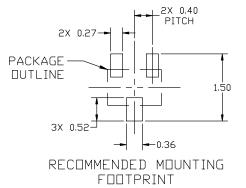
- DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018. CONTROLLING DIMENSION: MILLIMETERS. 1.
- 2.
- MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH, MINIMUM З. LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
- 4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS.



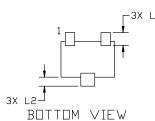


SIDE VIEW

	MILLIMETERS						
DIM	MIN.	NDM.	MAX.				
А	0.45	0.50	0.55				
b	0.15	0.21	0.27 0.37 0.17 1.25 0.85				
b1	0.25	0.31					
С	0.07	0.12					
D	1.15	1.20					
E	0.75	0.80					
e							
Н	1.15	1.20	1.25				
L	0.29 REF						
L2	L2 0.15		0.25				



*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 Μ = 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: 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. CATH 2. CATH 3. ANOE	ODE 2. SOURCE								
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DESCRIPT	FION: SOT-	723 1.20x0.80x	0.50, 0.40F			PAGE 1	OF 1					
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