

# Complementary Bias Resistor Transistors

**R1 = 47 kΩ, R2 = 47 kΩ**

NPN and PNP Transistors with Monolithic Bias Resistor Network

**MUN5313DW1,  
NSBC144EPDXV6,  
NSBC144EPDP6**

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

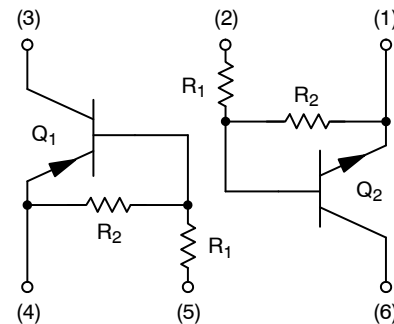
### MAXIMUM RATINGS

(T<sub>A</sub> = 25°C both polarities Q<sub>1</sub> (PNP) & Q<sub>2</sub> (NPN), unless otherwise noted)

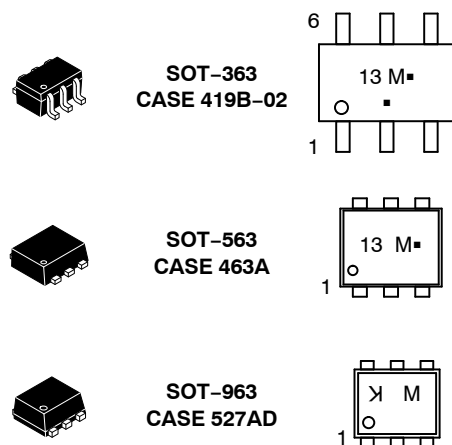
Rating	Symbol	Max	Unit
Collector-Base Voltage	V <sub>CBO</sub>	50	Vdc
Collector-Emitter Voltage	V <sub>CEO</sub>	50	Vdc
Collector Current – Continuous	I <sub>C</sub>	100	mAdc
Input Forward Voltage	V <sub>IN(fwd)</sub>	40	Vdc
Input Reverse Voltage	V <sub>IN(rev)</sub>	10	Vdc

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



13/K = 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.

# MUN5313DW1, NSBC144EPDXV6, NSBC144EPDP6

## ORDERING INFORMATION

Device	Package	Shipping†
MUN5313DW1T1G, SMUN5313DW1T1G*	SOT-363	3,000 / Tape & Reel
SMUN5313DW1T3G*	SOT-363	10,000 / Tape & Reel
NSBC144EPDXV6T1G NSVBC144EPDXV6T1G*	SOT-563	4,000 / Tape & Reel

## DISCONTINUED (Note 1)

NSBC144EPDXV6T5G	SOT-563	8,000 / Tape & Reel
NSBC144EPDP6T5G	SOT-963	8,000 / 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.

1. **DISCONTINUED:** These devices are not recommended for new design. Please contact your **onsemi** representative for information. The most current information on these devices may be available on [www.onsemi.com](http://www.onsemi.com).

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
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### MUN5313DW1 (SOT-363) ONE JUNCTION HEATED

Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 2) (Note 3) Derate above $25^\circ\text{C}$ (Note 2) (Note 3)	$P_D$	187 256 1.5 2.0	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 2) (Note 3)	$R_{\theta JA}$	670 490	$^\circ\text{C}/\text{W}$

### MUN5313DW1 (SOT-363) BOTH JUNCTION HEATED (Note 4)

Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 2) (Note 3) Derate above $25^\circ\text{C}$ (Note 2) (Note 3)	$P_D$	250 385 2.0 3.0	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 2) (Note 3)	$R_{\theta JA}$	493 325	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Lead (Note 2) (Note 3)	$R_{\theta JL}$	188 208	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

### NSBC144EPDXV6 (SOT-563) ONE JUNCTION HEATED

Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 2) Derate above $25^\circ\text{C}$ (Note 2)	$P_D$	357 2.9	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	350	$^\circ\text{C}/\text{W}$

### NSBC144EPDXV6 (SOT-563) BOTH JUNCTION HEATED (Note 4)

Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 2) Derate above $25^\circ\text{C}$ (Note 2)	$P_D$	500 4.0	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	250	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

# MUN5313DW1, NSBC144EPDXV6, NSBC144EPDP6

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
<b>NSBC144EPDP6 (SOT-963) ONE JUNCTION HEATED</b>			
Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 5)	$P_D$	231	MW
Derate above $25^\circ\text{C}$ (Note 6)		269	mW/ $^\circ\text{C}$
		1.9	
		2.2	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	540	$^\circ\text{C}/\text{W}$
(Note 6)		464	

## NSBC144EPDP6 (SOT-963) BOTH JUNCTION HEATED (Note 4)

Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 5)	$P_D$	339	MW
Derate above $25^\circ\text{C}$ (Note 6)		408	mW/ $^\circ\text{C}$
		2.7	
		3.3	
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	369	$^\circ\text{C}/\text{W}$
(Note 6)		306	
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

- FR-4 @ Minimum Pad.
- FR-4 @  $1.0 \times 1.0$  Inch Pad.
- Both junction heated values assume total power is sum of two equally powered channels.
- FR-4 @  $100 \text{ mm}^2$ , 1 oz. copper traces, still air.
- FR-4 @  $500 \text{ mm}^2$ , 1 oz. copper traces, still air.

## ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ both polarities $Q_1$ (PNP) & $Q_2$ (NPN), unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
Collector-Base Cutoff Current ( $V_{CB} = 50 \text{ V}, I_E = 0$ )	$I_{CBO}$	-	-	100	nAdc
Collector-Emitter Cutoff Current ( $V_{CE} = 50 \text{ V}, I_B = 0$ )	$I_{CEO}$	-	-	500	nAdc
Emitter-Base Cutoff Current ( $V_{EB} = 6.0 \text{ V}, I_C = 0$ )	$I_{EBO}$	-	-	0.1	mAdc
Collector-Base Breakdown Voltage ( $I_C = 10 \mu\text{A}, I_E = 0$ )	$V_{(BR)CBO}$	50	-	-	Vdc
Collector-Emitter Breakdown Voltage (Note 7) ( $I_C = 2.0 \text{ mA}, I_B = 0$ )	$V_{(BR)CEO}$	50	-	-	Vdc

## ON CHARACTERISTICS

DC Current Gain (Note 7) ( $I_C = 5.0 \text{ mA}, V_{CE} = 10 \text{ V}$ )	$h_{FE}$	80	140	-	
Collector-Emitter Saturation Voltage (Note 7) ( $I_C = 10 \text{ mA}, I_B = 0.3 \text{ mA}$ )	$V_{CE(sat)}$	-	-	0.25	V
Input Voltage (Off) ( $V_{CE} = 5.0 \text{ V}, I_C = 100 \mu\text{A}$ ) (NPN) ( $V_{CE} = 5.0 \text{ V}, I_C = 100 \mu\text{A}$ ) (PNP)	$V_{i(off)}$	-	1.2	-	Vdc
		-	1.2	-	
Input Voltage (On) ( $V_{CE} = 0.2 \text{ V}, I_C = 3.0 \text{ mA}$ ) (NPN) ( $V_{CE} = 0.2 \text{ V}, I_C = 3.0 \text{ mA}$ ) (PNP)	$V_{i(on)}$	-	1.9	-	Vdc
		-	2.0	-	
Output Voltage (On) ( $V_{CC} = 5.0 \text{ V}, V_B = 3.5 \text{ V}, R_L = 1.0 \text{ k}\Omega$ )	$V_{OL}$	-	-	0.2	Vdc
Output Voltage (Off) ( $V_{CC} = 5.0 \text{ V}, V_B = 0.5 \text{ V}, R_L = 1.0 \text{ k}\Omega$ )	$V_{OH}$	4.9	-	-	Vdc

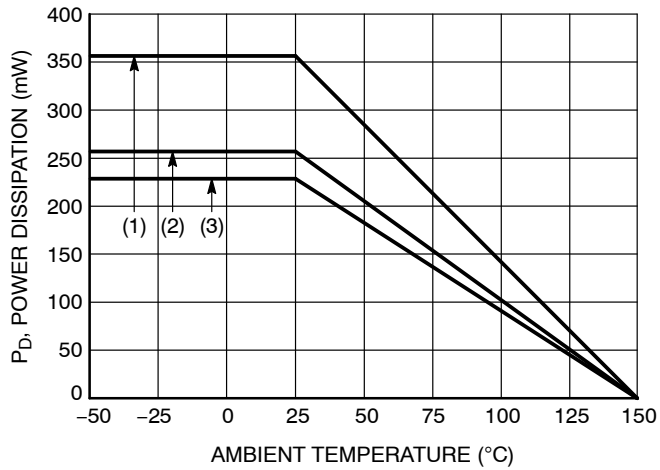
# MUN5313DW1, NSBC144EPDXV6, NSBC144EPDP6

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  both polarities  $Q_1$  (PNP) &  $Q_2$  (NPN), unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
Input Resistor	R1	32.9	47	61.1	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.

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



- (1) SOT-363; 1.0 x 1.0 Inch Pad
- (2) SOT-563; Minimum Pad
- (3) SOT-963; 100 mm<sup>2</sup>, 1 oz. Copper Trace

**Figure 1. Derating Curve**

TYPICAL CHARACTERISTICS – NPN TRANSISTOR  
MUN5313DW1, NSBC144EPDXV6

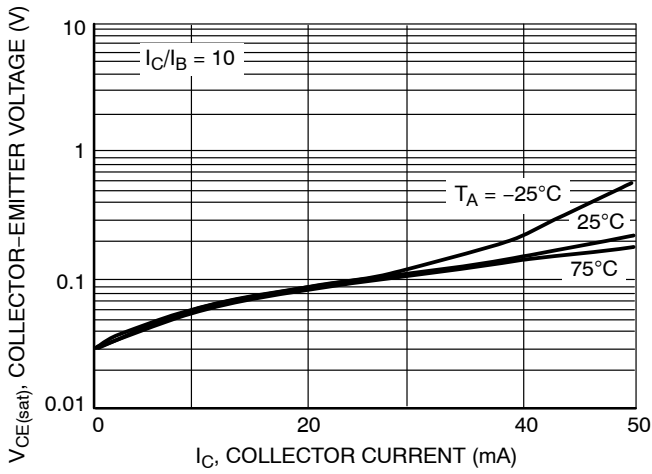


Figure 2.  $V_{CE(sat)}$  vs.  $I_C$

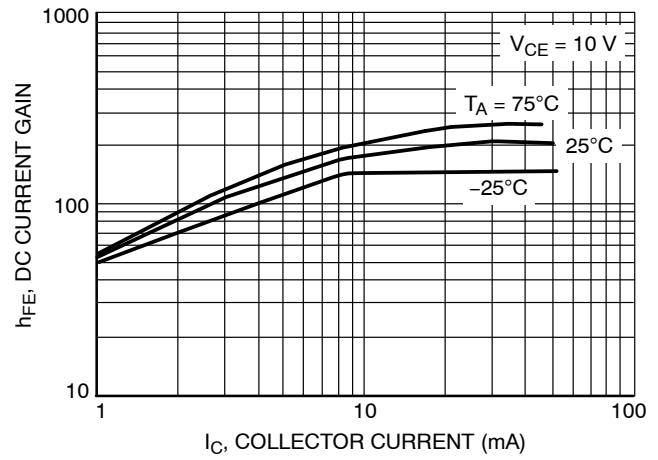


Figure 3. DC Current Gain

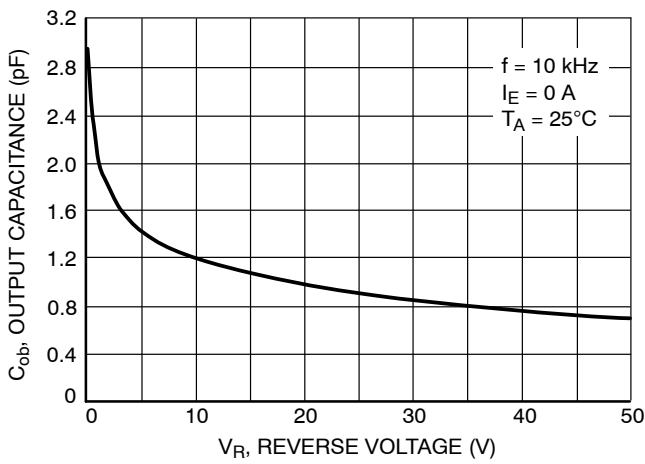


Figure 4. Output Capacitance

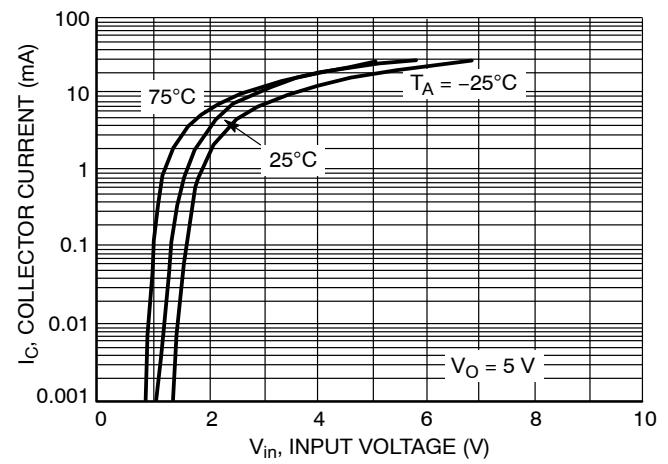


Figure 5. Output Current vs. Input Voltage

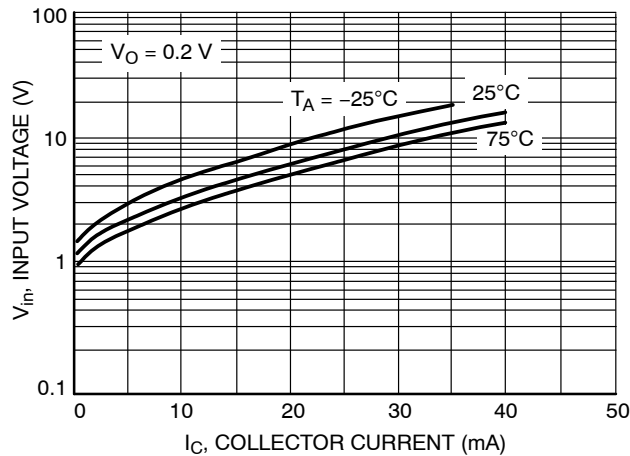


Figure 6. Input Voltage vs. Output Current

TYPICAL CHARACTERISTICS – PNP TRANSISTOR  
MUN5313DW1, NSBC144EPDXV6

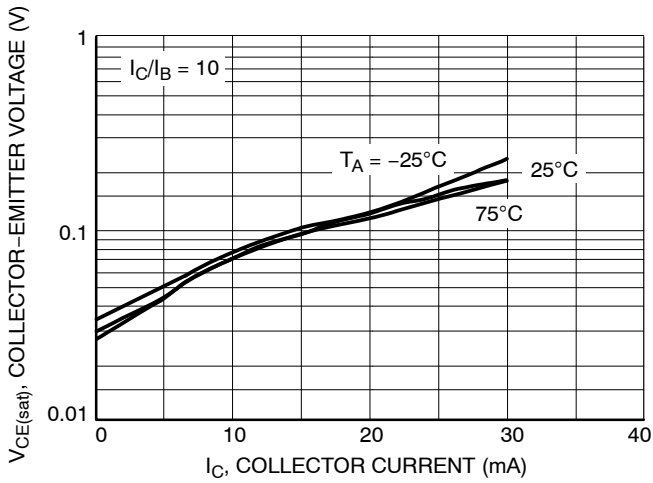


Figure 7.  $V_{CE(sat)}$  vs.  $I_C$

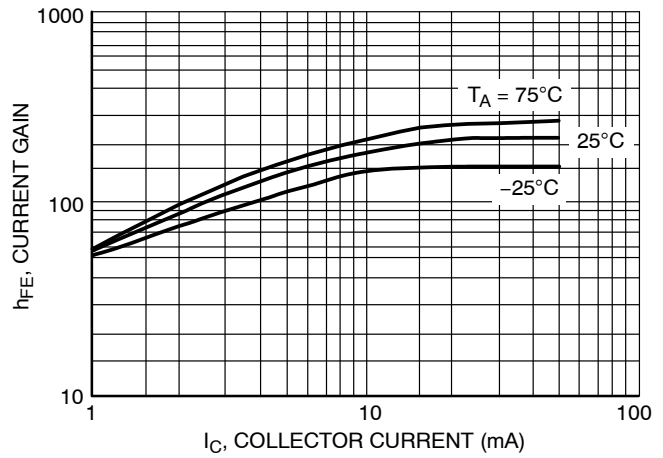


Figure 8. DC Current Gain

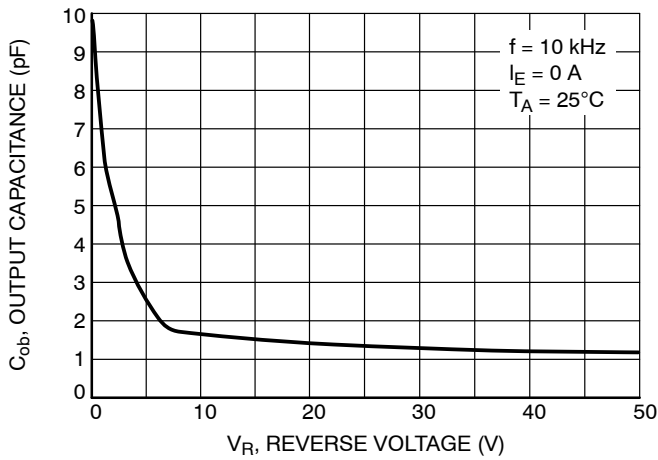


Figure 9. Output Capacitance

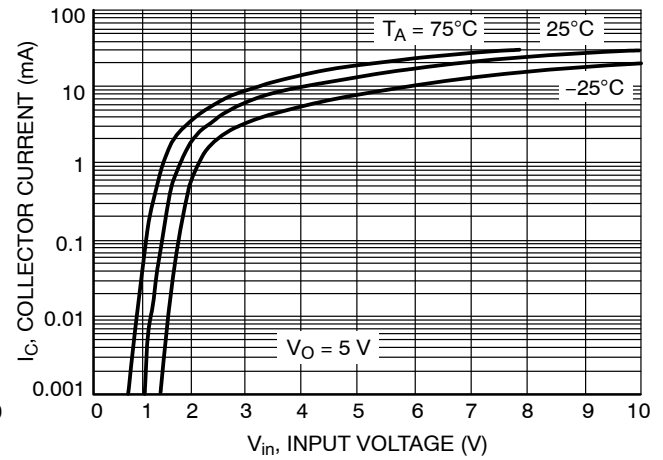


Figure 10. Output Current vs. Input Voltage

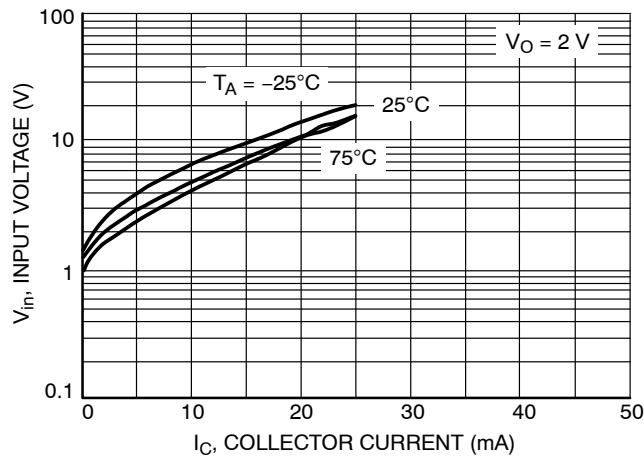


Figure 11. Input Voltage vs. Output Current

TYPICAL CHARACTERISTICS – NPN TRANSISTOR  
NSBC144EPDP6

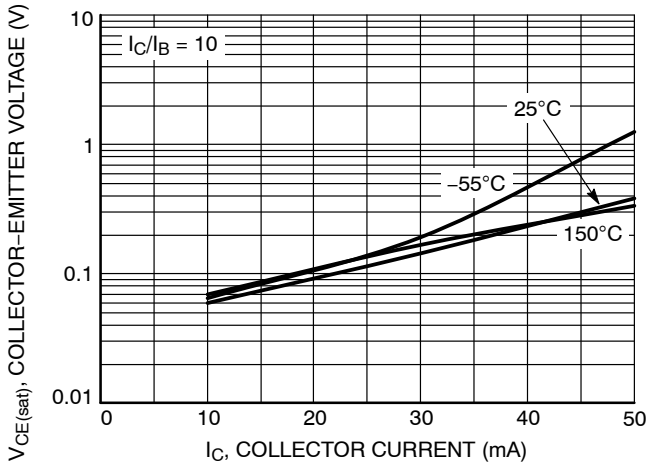


Figure 12.  $V_{CE(sat)}$  vs.  $I_C$

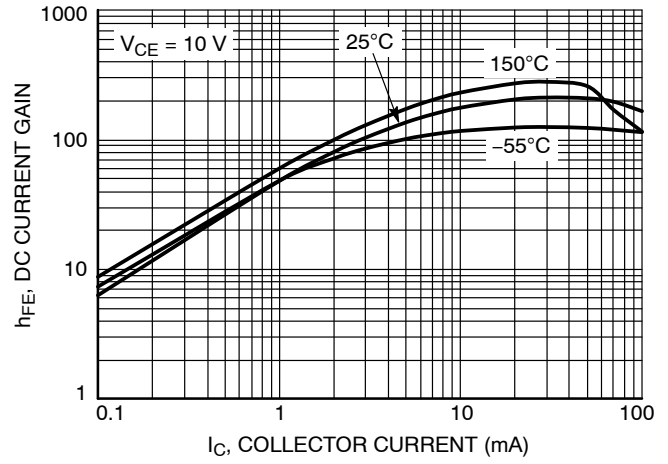


Figure 13. DC Current Gain

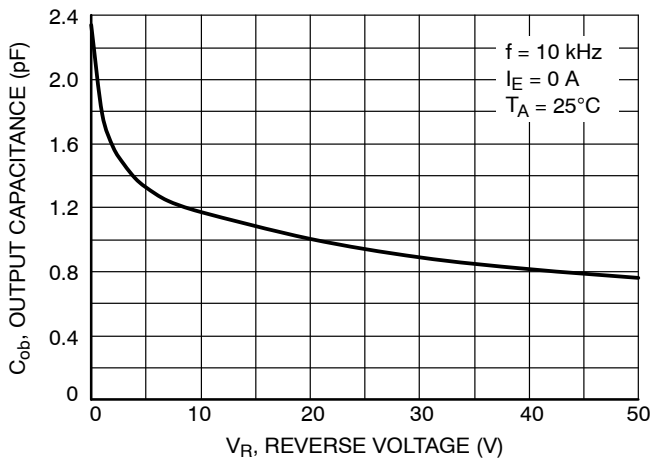


Figure 14. Output Capacitance

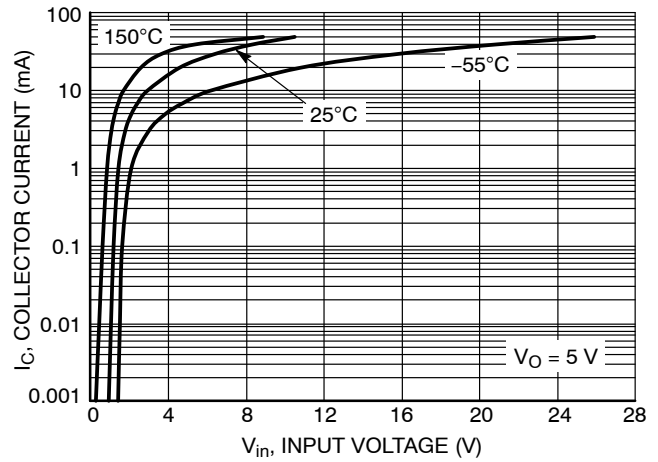


Figure 15. Output Current vs. Input Voltage

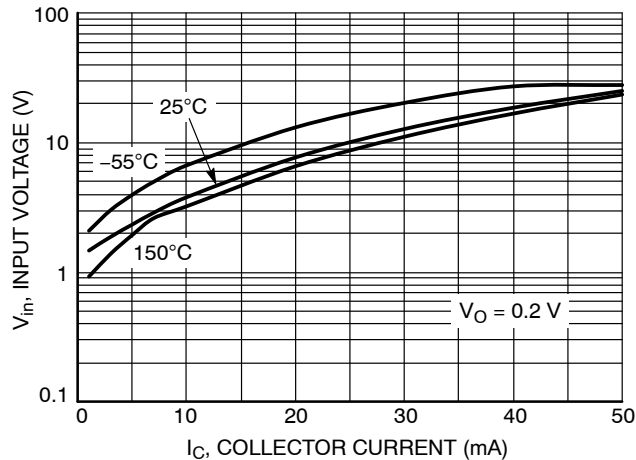


Figure 16. Input Voltage vs. Output Current

TYPICAL CHARACTERISTICS – PNP TRANSISTOR  
NSBC144EPDP6

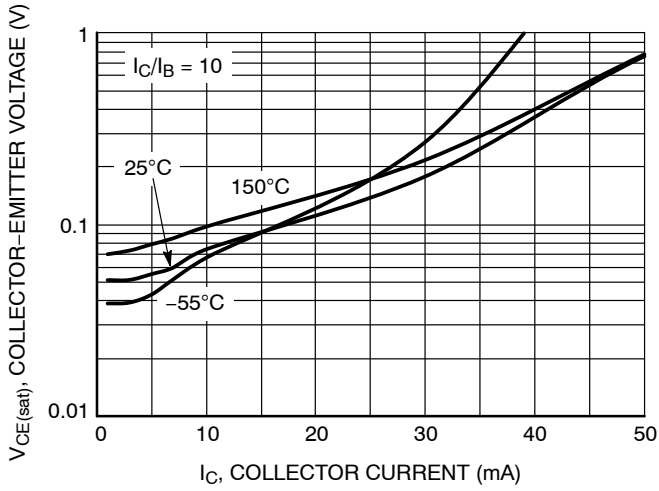


Figure 17.  $V_{CE(sat)}$  vs.  $I_C$

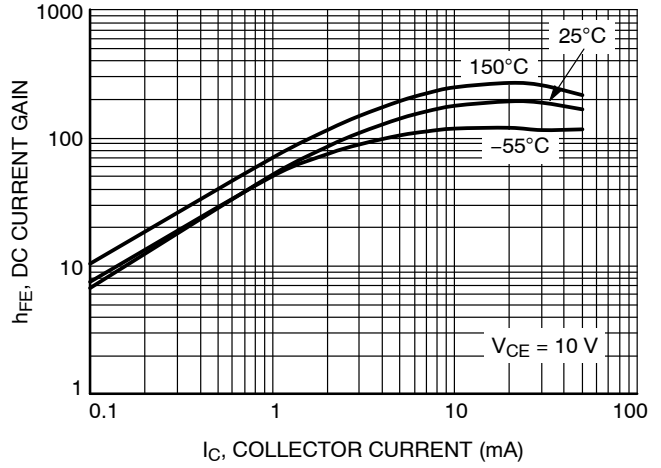


Figure 18. DC Current Gain

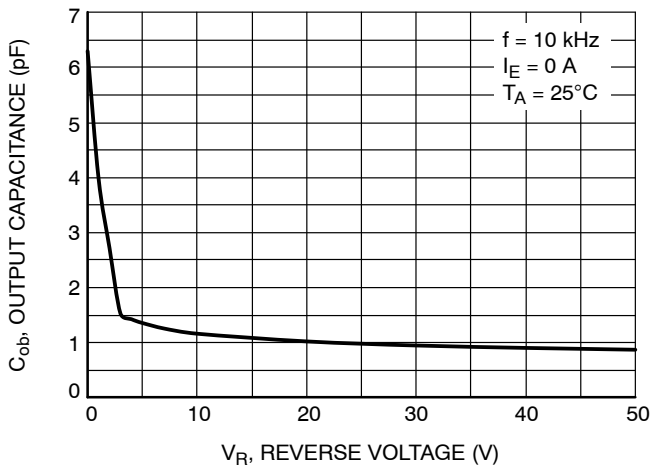


Figure 19. Output Capacitance

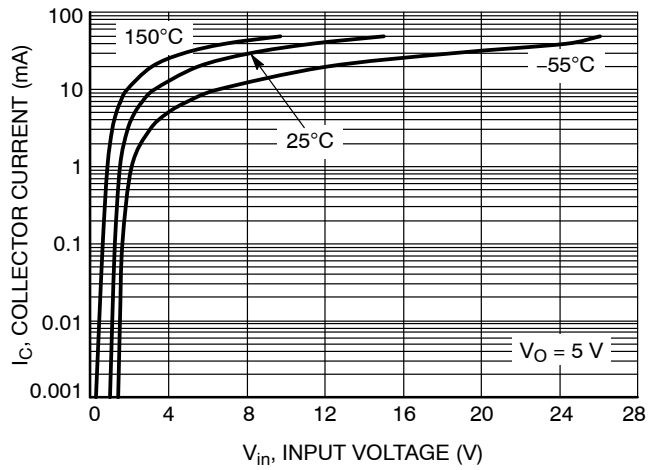


Figure 20. Output Current vs. Input Voltage

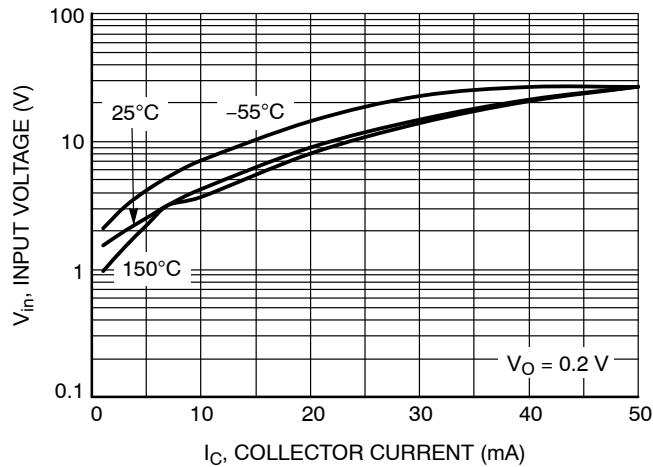


Figure 21. Input Voltage vs. Output Current



# MECHANICAL CASE OUTLINE PACKAGE DIMENSIONS

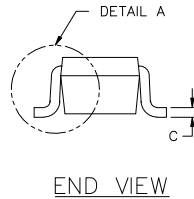
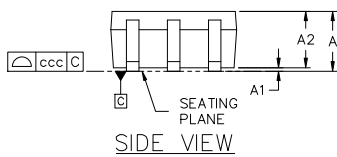
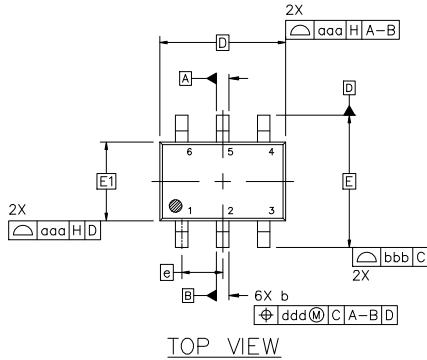


**SC-88 2.00x1.25x0.90, 0.65P**  
CASE 419B-02  
ISSUE Z

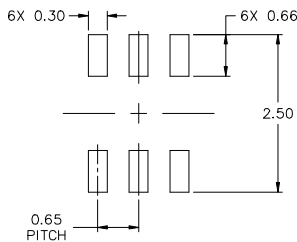
DATE 18 APR 2024

NOTES:

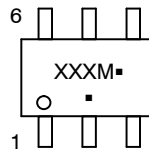
1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS. MOLD FLASH, PROTRUSIONS, OR GATE BURRS SHALL NOT EXCEED 0.20 PER END.
4. DIMENSIONS D AND E1 AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY AND DATUM H.
5. DATUMS A AND B ARE DETERMINED AT DATUM H.
6. DIMENSIONS b AND c APPLY TO THE FLAT SECTION OF THE LEAD BETWEEN 0.08 AND 0.15 FROM THE TIP.
7. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 TOTAL IN EXCESS OF DIMENSION b AT MAXIMUM MATERIAL CONDITION. THE DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OF THE FOOT.



DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	---	---	1.10
A1	0.00	---	0.10
A2	0.70	0.90	1.00
b	0.15	0.20	0.25
c	0.08	0.15	0.22
D	2.00 BSC		
E	2.10 BSC		
E1	1.25 BSC		
e	0.65 BSC		
L	0.26	0.36	0.46
L2	0.15 BSC		
aaa	0.15		
bbb	0.30		
ccc	0.10		
ddd	0.10		



**GENERIC MARKING DIAGRAM\***



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

(Note: Microdot may be in either location)  
 \*Date Code orientation and/or position may vary depending upon manufacturing 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 ONSEMI SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

**STYLES ON PAGE 2**

<b>DOCUMENT NUMBER:</b>	<b>98ASB42985B</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>SC-88 2.00x1.25x0.90, 0.65P</b>	<b>PAGE 1 OF 2</b>

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**SC-88 2.00x1.25x0.90, 0.65P**  
**CASE 419B-02**  
**ISSUE Z**

DATE 18 APR 2024

<b>STYLE 1:</b> PIN 1. EMITTER 2 2. BASE 2 3. COLLECTOR 1 4. EMITTER 1 5. BASE 1 6. COLLECTOR 2	<b>STYLE 2:</b> CANCELLED	<b>STYLE 3:</b> CANCELLED	<b>STYLE 4:</b> PIN 1. CATHODE 2. CATHODE 3. COLLECTOR 4. EMITTER 5. BASE 6. ANODE	<b>STYLE 5:</b> PIN 1. ANODE 2. ANODE 3. COLLECTOR 4. EMITTER 5. BASE 6. CATHODE	<b>STYLE 6:</b> PIN 1. ANODE 2 2. N/C 3. CATHODE 1 4. ANODE 1 5. N/C 6. CATHODE 2
<b>STYLE 7:</b> PIN 1. SOURCE 2 2. DRAIN 2 3. GATE 1 4. SOURCE 1 5. DRAIN 1 6. GATE 2	<b>STYLE 8:</b> CANCELLED	<b>STYLE 9:</b> PIN 1. EMITTER 2 2. EMITTER 1 3. COLLECTOR 1 4. BASE 1 5. BASE 2 6. COLLECTOR 2	<b>STYLE 10:</b> PIN 1. SOURCE 2 2. SOURCE 1 3. GATE 1 4. DRAIN 1 5. DRAIN 2 6. GATE 2	<b>STYLE 11:</b> PIN 1. CATHODE 2 2. CATHODE 2 3. ANODE 1 4. CATHODE 1 5. CATHODE 1 6. ANODE 2	<b>STYLE 12:</b> PIN 1. ANODE 2 2. ANODE 2 3. CATHODE 1 4. ANODE 1 5. ANODE 1 6. CATHODE 2
<b>STYLE 13:</b> PIN 1. ANODE 2. N/C 3. COLLECTOR 4. EMITTER 5. BASE 6. CATHODE	<b>STYLE 14:</b> PIN 1. VREF 2. GND 3. GND 4. IOUT 5. VEN 6. VCC	<b>STYLE 15:</b> PIN 1. ANODE 1 2. ANODE 2 3. ANODE 3 4. CATHODE 3 5. CATHODE 2 6. CATHODE 1	<b>STYLE 16:</b> PIN 1. BASE 1 2. EMITTER 2 3. COLLECTOR 2 4. BASE 2 5. EMITTER 1 6. COLLECTOR 1	<b>STYLE 17:</b> PIN 1. BASE 1 2. EMITTER 1 3. COLLECTOR 2 4. BASE 2 5. EMITTER 2 6. COLLECTOR 1	<b>STYLE 18:</b> PIN 1. VIN1 2. VCC 3. VOUT2 4. VIN2 5. GND 6. VOUT1
<b>STYLE 19:</b> PIN 1. IOUT 2. GND 3. GND 4. V CC 5. V EN 6. V REF	<b>STYLE 20:</b> PIN 1. COLLECTOR 2. COLLECTOR 3. BASE 4. EMITTER 5. COLLECTOR 6. COLLECTOR	<b>STYLE 21:</b> PIN 1. ANODE 1 2. N/C 3. ANODE 2 4. CATHODE 2 5. N/C 6. CATHODE 1	<b>STYLE 22:</b> PIN 1. D1 (i) 2. GND 3. D2 (j) 4. D2 (c) 5. VBUS 6. D1 (c)	<b>STYLE 23:</b> PIN 1. Vn 2. CH1 3. Vp 4. N/C 5. CH2 6. N/C	<b>STYLE 24:</b> PIN 1. CATHODE 2. ANODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE
<b>STYLE 25:</b> PIN 1. BASE 1 2. CATHODE 3. COLLECTOR 2 4. BASE 2 5. EMITTER 6. COLLECTOR 1	<b>STYLE 26:</b> PIN 1. SOURCE 1 2. GATE 1 3. DRAIN 2 4. SOURCE 2 5. GATE 2 6. DRAIN 1	<b>STYLE 27:</b> PIN 1. BASE 2 2. BASE 1 3. COLLECTOR 1 4. EMITTER 1 5. EMITTER 2 6. COLLECTOR 2	<b>STYLE 28:</b> PIN 1. DRAIN 2. DRAIN 3. GATE 4. SOURCE 5. DRAIN 6. DRAIN	<b>STYLE 29:</b> PIN 1. ANODE 2. ANODE 3. COLLECTOR 4. EMITTER 5. BASE/ANODE 6. CATHODE	<b>STYLE 30:</b> PIN 1. SOURCE 1 2. DRAIN 2 3. DRAIN 2 4. SOURCE 2 5. GATE 1 6. DRAIN 1

Note: Please refer to datasheet for style callout. If style type is not called out in the datasheet refer to the device datasheet pinout or pin assignment.

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<b>DESCRIPTION:</b>	<b>SC-88 2.00x1.25x0.90, 0.65P</b>	<b>PAGE 2 OF 2</b>

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

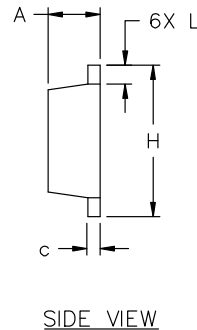
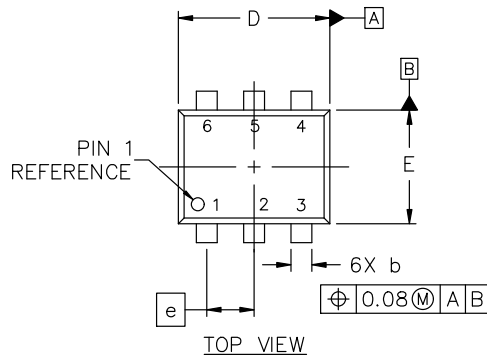


**SOT-563-6 1.60x1.20x0.55, 0.50P**  
**CASE 463A**  
**ISSUE J**

DATE 15 FEB 2024

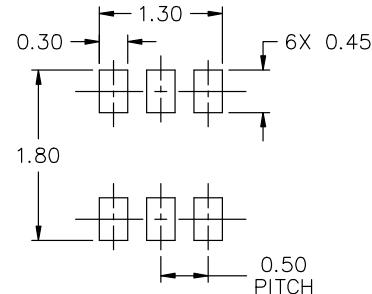
**NOTES:**

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.



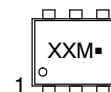
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.50	0.55	0.60
b	0.17	0.22	0.27
c	0.08	0.13	0.18
D	1.50	1.60	1.70
E	1.10	1.20	1.30
e	0.50 BSC		
H	1.50	1.60	1.70
L	0.10	0.20	0.30

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



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

**GENERIC MARKING DIAGRAM\***



- XX = Specific Device Code
- M = Month Code
- = Pb-Free Package

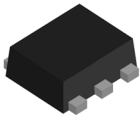
\*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "•", may or may not be present. Some products may not follow the Generic Marking.

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<b>DESCRIPTION:</b>	<b>SOT-563-6 1.60x1.20x0.55, 0.50P</b>	<b>PAGE 1 OF 1</b>

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# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

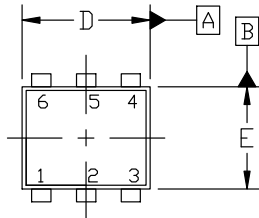


**SOT-963 1.00x1.00x0.37, 0.35P**  
**CASE 527AD**  
**ISSUE F**

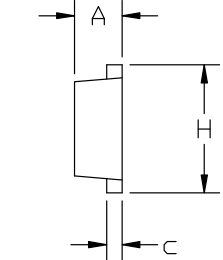
DATE 20 FEB 2024

**NOTES:**

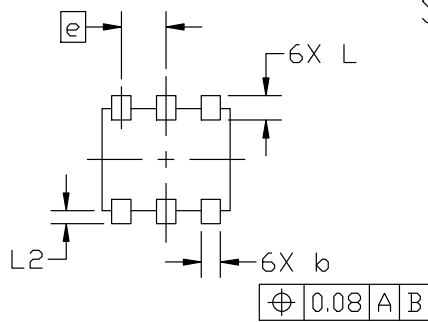
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.



TOP VIEW

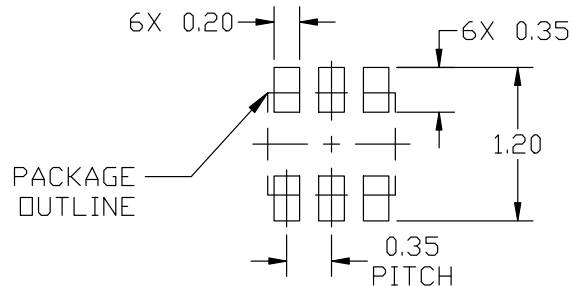


SIDE VIEW



BOTTOM VIEW

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.34	0.37	0.40
b	0.10	0.15	0.20
c	0.07	0.12	0.17
D	0.95	1.00	1.05
E	0.75	0.80	0.85
e	0.35 BSC		
H	0.95	1.00	1.05
L	0.19 REF		
L2	0.05	0.10	0.15

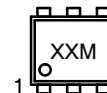


RECOMMENDED MOUNTING FOOTPRINT

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

- |  |   |  |
|--|---|--|
| <p><b>STYLE 1:</b><br/>         PIN 1. EMITTER 1<br/>         2. BASE 1<br/>         3. COLLECTOR 2<br/>         4. EMITTER 2<br/>         5. BASE 2<br/>         6. COLLECTOR 1</p> | <p><b>STYLE 2:</b><br/>         PIN 1. EMITTER 1<br/>         2. EMITTER2<br/>         3. BASE 2<br/>         4. COLLECTOR 2<br/>         5. BASE 1<br/>         6. COLLECTOR 1</p> | <p><b>STYLE 3:</b><br/>         PIN 1. CATHODE 1<br/>         2. CATHODE 1<br/>         3. ANODE/ANODE 2<br/>         4. CATHODE 2<br/>         5. CATHODE 2<br/>         6. ANODE/ANODE 1</p> |
| <p><b>STYLE 4:</b><br/>         PIN 1. COLLECTOR<br/>         2. COLLECTOR<br/>         3. BASE<br/>         4. EMITTER<br/>         5. COLLECTOR<br/>         6. COLLECTOR</p>      | <p><b>STYLE 5:</b><br/>         PIN 1. CATHODE<br/>         2. CATHODE<br/>         3. ANODE<br/>         4. ANODE<br/>         5. CATHODE<br/>         6. CATHODE</p>              | <p><b>STYLE 6:</b><br/>         PIN 1. CATHODE<br/>         2. ANODE<br/>         3. CATHODE<br/>         4. CATHODE<br/>         5. CATHODE<br/>         6. CATHODE</p>                       |
| <p><b>STYLE 7:</b><br/>         PIN 1. CATHODE<br/>         2. ANODE<br/>         3. CATHODE<br/>         4. CATHODE<br/>         5. ANODE<br/>         6. CATHODE</p>               | <p><b>STYLE 8:</b><br/>         PIN 1. DRAIN<br/>         2. DRAIN<br/>         3. GATE<br/>         4. SOURCE<br/>         5. DRAIN<br/>         6. DRAIN</p>                      | <p><b>STYLE 9:</b><br/>         PIN 1. SOURCE 1<br/>         2. GATE 1<br/>         3. DRAIN 2<br/>         4. SOURCE 2<br/>         5. GATE 2<br/>         6. DRAIN 1</p>                     |
| <p><b>STYLE 10:</b><br/>         PIN 1. CATHODE 1<br/>         2. N/C<br/>         3. CATHODE 2<br/>         4. ANODE 2<br/>         5. N/C<br/>         6. ANODE 1</p>              |   |  |

**GENERIC MARKING DIAGRAM\***



XX = Specific Device Code  
 M = Month 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.

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<b>DESCRIPTION:</b>	<b>SOT-963 1.00x1.00x0.37, 0.35P</b>	<b>PAGE 1 OF 1</b>

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