onsemi

Dual NPN Bias Resistor Transistors
R1 = 10 kΩ, R2 = 10 kΩ

MUN5211DW1, NSBC114EDXV6, NSBC114EDP6

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°C, common for Q_1 and Q_2, unless otherwise noted)

Rating	Symbol	Max	Unit
Collector-Base Voltage	V_{CBO}	50	Vdc
Collector-Emitter Voltage	V_{CEO}	50	Vdc
Collector Current – Continuous	I_C	100	mAdc
Input Forward Voltage	$V_{IN(fwd)}$	40	Vdc
Input Reverse Voltage	$V_{IN(rev)}$	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 CONNECTION

MARKING DIAGRAM

SOT−363
CASE 419B

SOT−563
CASE 463A

SOT−963
CASE 527AD
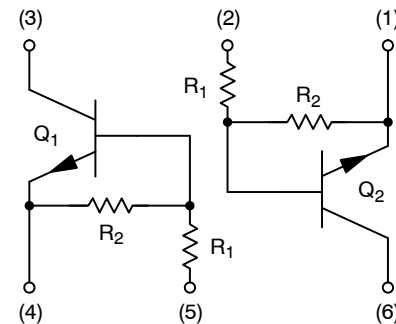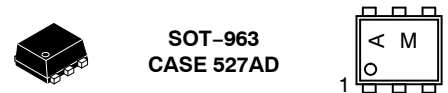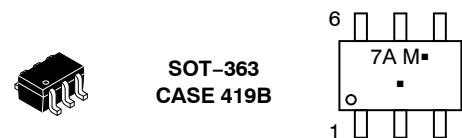
7A/A = Specific Device Code
M = Date Code*
■ = Pb-Free Package

(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 in the package dimensions section on page 2 of this data sheet.
NOTE: Some of the device on this data sheet have been **DISCONTINUED**. Please refer to the table on page 2

ORDERING INFORMATION

Device	Package	Shipping†
MUN5211DW1T1G, SMUN5211DW1T1G*	SOT−363	3,000 / Tape & Reel
NSVMUN5211DW1T2G*	SOT−363	3,000 / Tape & Reel
NSVMUN5211DW1T3G*	SOT−363	10,000 / Tape & Reel
NSBC114EDXV6T1G, NSVBC114EDXV6T1G*	SOT−563	4,000 / Tape & Reel
NSBC114EDP6T5G	SOT−963	8,000 / Tape & Reel

DISCONTINUED (Note 1)

Device	Package	Shipping†
NSBC114EDXV6T5G	SOT−563	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:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on www.onsemi.com.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
MUN5211DW1 (SOT−363) ONE JUNCTION HEATED			
Total Device Dissipation T_A = 25°C (Note 2) (Note 3) Derate above 25°C (Note 2) (Note 3)	P_D	187 256 1.5 2.0	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 2) (Note 3)	$R_{\theta JA}$	670 490	°C/W
MUN5211DW1 (SOT−363) BOTH JUNCTION HEATED (Note 4)			
Total Device Dissipation T_A = 25°C (Note 2) (Note 3) Derate above 25°C (Note 2) (Note 3)	P_D	250 385 2.0 3.0	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 2) (Note 3)	$R_{\theta JA}$	493 325	°C/W
Thermal Resistance, Junction to Lead (Note 2) (Note 3)	$R_{\theta JL}$	188 208	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C
NSBC114EDXV6 (SOT−563) ONE JUNCTION HEATED			
Total Device Dissipation T_A = 25°C (Note 2) Derate above 25°C (Note 2)	P_D	357 2.9	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	350	°C/W
NSBC114EDXV6 (SOT−563) BOTH JUNCTION HEATED (Note 4)			
Total Device Dissipation T_A = 25°C (Note 2) Derate above 25°C (Note 2)	P_D	500 4.0	mW mW/°C
Thermal Resistance, Junction to Ambient (Note 2)	$R_{\theta JA}$	250	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
NSBC114EDP6 (SOT−963) ONE JUNCTION HEATED			
Total Device Dissipation T_A = 25°C (Note 5) (Note 6) Derate above 25°C (Note 5) (Note 6)	P_D	231 269 1.9 2.2	MW mW/°C
Thermal Resistance, Junction to Ambient (Note 5) (Note 6)	$R_{\theta JA}$	540 464	°C/W
NSBC114EDP6 (SOT−963) BOTH JUNCTION HEATED (Note 4)			
Total Device Dissipation T_A = 25°C (Note 5) (Note 6) Derate above 25°C (Note 5) (Note 6)	P_D	339 408 2.7 3.3	MW mW/°C
Thermal Resistance, Junction to Ambient (Note 5) (Note 6)	$R_{\theta JA}$	369 306	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

2. FR−4 @ Minimum Pad.
3. FR−4 @ 1.0 × 1.0 Inch Pad.
4. Both junction heated values assume total power is sum of two equally powered channels.
5. FR−4 @ 100 mm^2, 1 oz. copper traces, still air.
6. FR−4 @ 500 mm^2, 1 oz. copper traces, still air.

MUN5211DW1, NSBC114EDXV6, NSBC114EDP6

ELECTRICAL CHARACTERISTICS (T_A = 25 °C, common for Q_1 and Q_2, unless otherwise noted)

Characteristic	Symbol	Min	Typ	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 V, I_B = 0)	I_{CEO}	–	–	500	nAdc
Emitter-Base Cutoff Current (V_{EB} = 6.0 V, I_C = 0)	I_{EBO}	–	–	0.5	mAdc
Collector-Base Breakdown Voltage (I_C = 10 μA, I_E = 0)	$V_{(BR)CBO}$	50	–	–	Vdc
Collector-Emitter Breakdown Voltage (Note 7) (I_C = 2.0 mA, I_B = 0)	$V_{(BR)CEO}$	50	–	–	Vdc
ON CHARACTERISTICS					
DC Current Gain (Note 7) (I_C = 5.0 mA, V_{CE} = 10 V)	h_{FE}	35	60	–	
Collector-Emitter Saturation Voltage (Note 7) (I_C = 10 mA, I_B = 0.3 mA)	$V_{CE(sat)}$	–	–	0.25	V
Input Voltage (Off) (V_{CE} = 5.0 V, I_C = 100 μA)	$V_{i(off)}$	–	1.2	–	Vdc
Input Voltage (On) (V_{CE} = 0.2 V, I_C = 10 mA)	$V_{i(on)}$	–	2.0	–	Vdc
Output Voltage (On) (V_{CC} = 5.0 V, V_B = 2.5 V, R_L = 1.0 kΩ)	V_{OL}	–	–	0.2	Vdc
Output Voltage (Off) (V_{CC} = 5.0 V, V_B = 0.5 V, R_L = 1.0 kΩ)	V_{OH}	4.9	–	–	Vdc
Input Resistor	R1	7.0	10	13	kΩ
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 ≤ 2%.
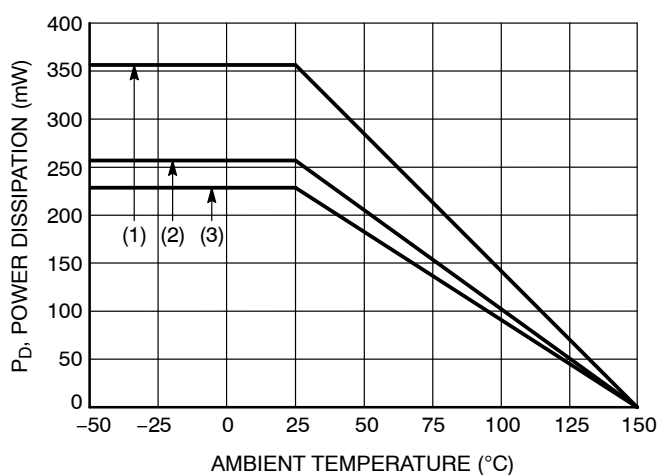
(1) SOT−363; 1.0 × 1.0 Inch Pad
(2) SOT−563; Minimum Pad
(3) SOT−963; 100 mm^2, 1 oz. Copper Trace

Figure 1. Derating Curve

TYPICAL CHARACTERISTICS
MUN5211DW1, NSBC114EDXV6
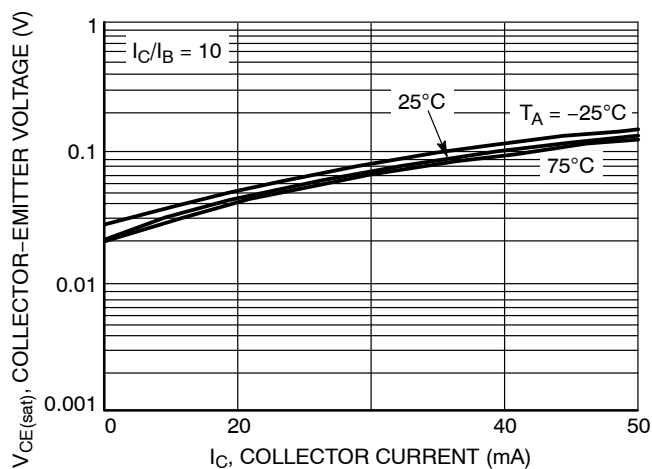
Figure 2. V$_{CE(sat)}$ vs. I$_C$
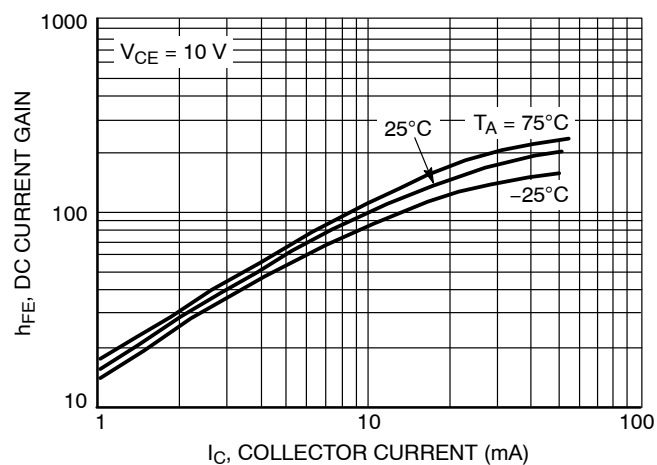
Figure 3. DC Current Gain
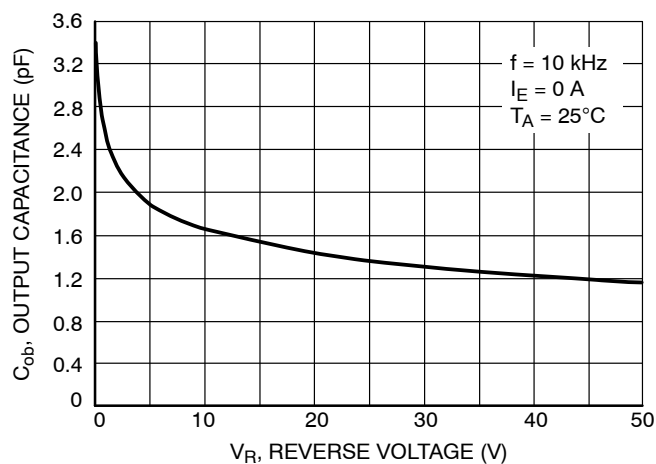
Figure 4. Output Capacitance
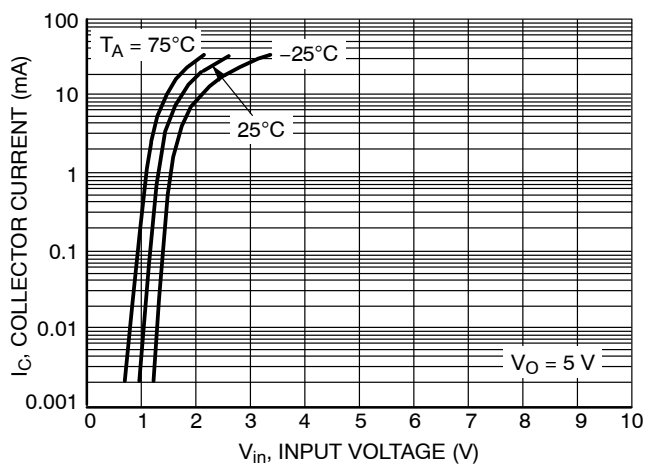
Figure 5. Output Current vs. Input Voltage
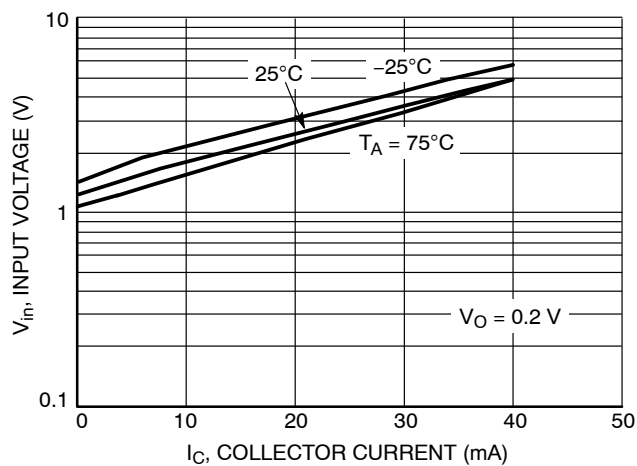
Figure 6. Input Voltage vs. Output Current
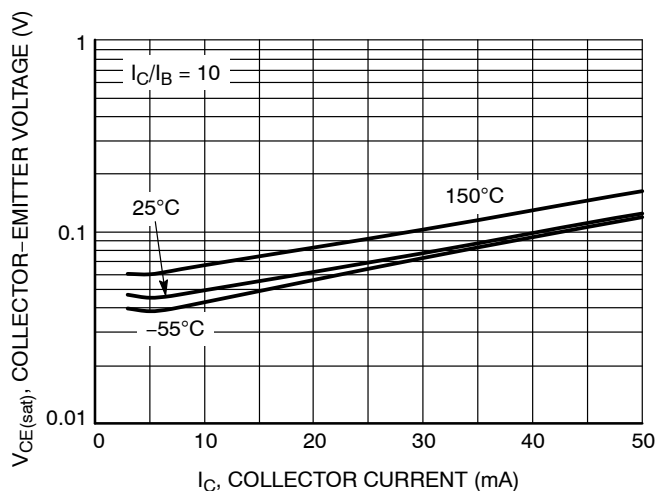
TYPICAL CHARACTERISTICS
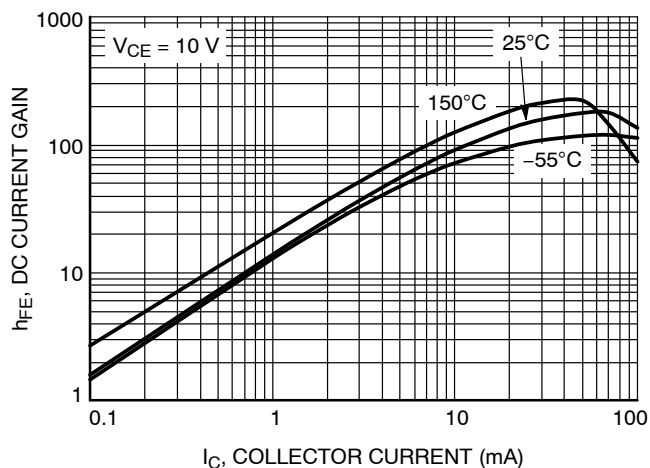**NSBC114EDP6**

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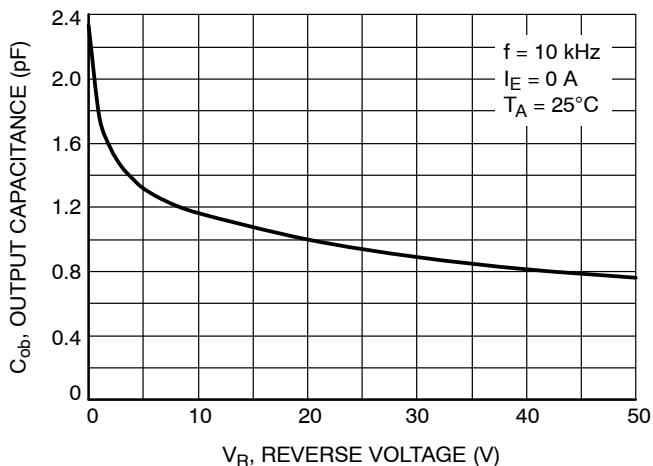

Figure 8. DC Current Gain
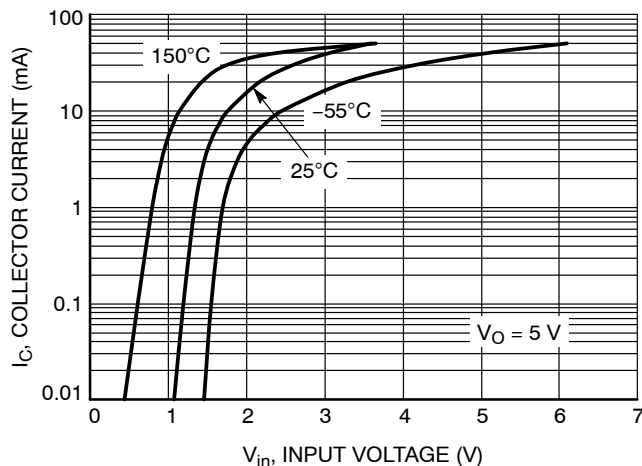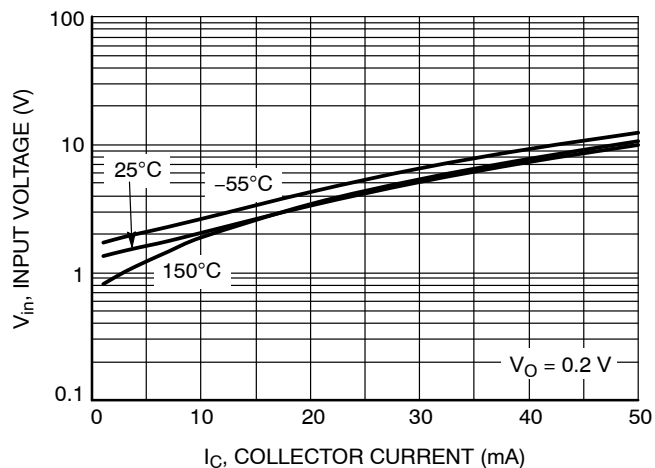

Figure 9. Output Capacitance

Figure 10. Output Current vs. Input Voltage

Figure 11. Input Voltage vs. Output Current

REVISION HISTORY

Revision	Description of Changes	Date
7	NSBC114EDXV6T5G OPN Marked as Discontinued + Rebranded the Data Sheet to onsemi format	5/27/2025

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.

TOP VIEW

SIDE VIEW

DETAIL A

END VIEW

DETAIL A
SCALE 2:1

RECOMMENDED MOUNTING FOOTPRINT*

6X 0.30
6X 0.66
2.50
0.65 PITCH

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

GENERIC MARKING DIAGRAM*

XXXM▪
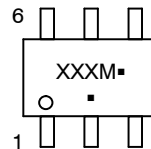
XXX = Specific Device Code
M = Date Code*
▪ = Pb−Free Package

(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.

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		

STYLES ON PAGE 2

DOCUMENT NUMBER:	98ASB42985B		
DESCRIPTION:	SC−88 2.00x1.25x0.90, 0.65P		PAGE 1 OF 2

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

STYLE 2:
CANCELLED

STYLE 3:
CANCELLED

STYLE 4:
PIN 1. CATHODE
2. CATHODE
3. COLLECTOR
4. EMITTER
5. BASE
6. ANODE

STYLE 5:
PIN 1. ANODE
2. ANODE
3. COLLECTOR
4. EMITTER
5. BASE
6. CATHODE

STYLE 6:
PIN 1. ANODE 2
2. N/C
3. CATHODE 1
4. ANODE 1
5. N/C
6. CATHODE 2

STYLE 7:
PIN 1. SOURCE 2
2. DRAIN 2
3. GATE 1
4. SOURCE 1
5. DRAIN 1
6. GATE 2

STYLE 8:
CANCELLED

STYLE 9:
PIN 1. EMITTER 2
2. EMITTER 1
3. COLLECTOR 1
4. BASE 1
5. BASE 2
6. COLLECTOR 2

STYLE 10:
PIN 1. SOURCE 2
2. SOURCE 1
3. GATE 1
4. DRAIN 1
5. DRAIN 2
6. GATE 2

STYLE 11:
PIN 1. CATHODE 2
2. CATHODE 2
3. ANODE 1
4. CATHODE 1
5. CATHODE 1
6. ANODE 2

STYLE 12:
PIN 1. ANODE 2
2. ANODE 2
3. CATHODE 1
4. ANODE 1
5. ANODE 1
6. CATHODE 2

STYLE 13:
PIN 1. ANODE
2. N/C
3. COLLECTOR
4. EMITTER
5. BASE
6. CATHODE

STYLE 14:
PIN 1. VREF
2. GND
3. GND
4. IOUT
5. VEN
6. VCC

STYLE 15:
PIN 1. ANODE 1
2. ANODE 2
3. ANODE 3
4. CATHODE 3
5. CATHODE 2
6. CATHODE 1

STYLE 16:
PIN 1. BASE 1
2. EMITTER 2
3. COLLECTOR 2
4. BASE 2
5. EMITTER 1
6. COLLECTOR 1

STYLE 17:
PIN 1. BASE 1
2. EMITTER 1
3. COLLECTOR 2
4. BASE 2
5. EMITTER 2
6. COLLECTOR 1

STYLE 18:
PIN 1. VIN1
2. VCC
3. VOUT2
4. VIN2
5. GND
6. VOUT1

STYLE 19:
PIN 1. I OUT
2. GND
3. GND
4. V CC
5. V EN
6. V REF

STYLE 20:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

STYLE 21:
PIN 1. ANODE 1
2. N/C
3. ANODE 2
4. CATHODE 2
5. N/C
6. CATHODE 1

STYLE 22:
PIN 1. D1 (i)
2. GND
3. D2 (i)
4. D2 (c)
5. VBUS
6. D1 (c)

STYLE 23:
PIN 1. Vn
2. CH1
3. Vp
4. N/C
5. CH2
6. N/C

STYLE 24:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 25:
PIN 1. BASE 1
2. CATHODE
3. COLLECTOR 2
4. BASE 2
5. EMITTER
6. COLLECTOR 1

STYLE 26:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 27:
PIN 1. BASE 2
2. BASE 1
3. COLLECTOR 1
4. EMITTER 1
5. EMITTER 2
6. COLLECTOR 2

STYLE 28:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 29:
PIN 1. ANODE
2. ANODE
3. COLLECTOR
4. EMITTER
5. BASE/ANODE
6. CATHODE

STYLE 30:
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.

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

**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.

TOP VIEW

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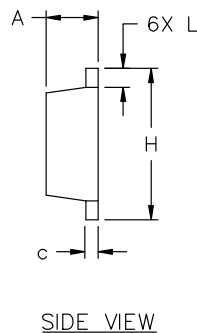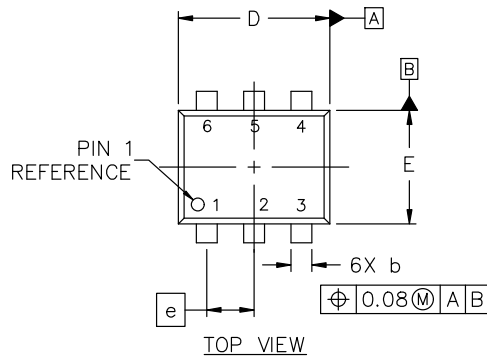
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.50	0.55	0.60
b	0.17	0.22	0.27
c	0.08	0.13	0.18
D	1.50	1.60	1.70
E	1.10	1.20	1.30
e	0.50 BSC		
H	1.50	1.60	1.70
L	0.10	0.20	0.30
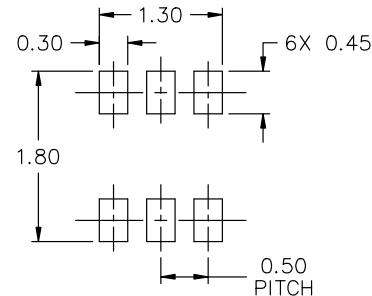
RECOMMENDED MOUNTING FOOTPRINT*

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

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

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

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

STYLE 4:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

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

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. ANODE
6. CATHODE

STYLE 8:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 9:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 10:
PIN 1. CATHODE 1
2. N/C
3. CATHODE 2
4. ANODE 2
5. N/C
6. ANODE 1

STYLE 11:
PIN 1. EMITTER 2
2. BASE 2
3. COLLECTOR 1
4. EMITTER 1
5. BASE 1
6. COLLECTOR 2

GENERIC
MARKING DIAGRAM*

XXM▪
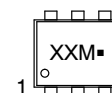
XX = Specific Device Code
M = Month Code
▪ = Pb−Free Package

*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.

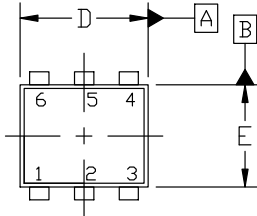| DOCUMENT NUMBER:	98AON11126D	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.	
DESCRIPTION:	SOT−563−6 1.60x1.20x0.55, 0.50P		PAGE 1 OF 1

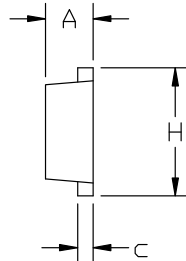**SOT−963 1.00x1.00x0.37, 0.35P**
CASE 527AD
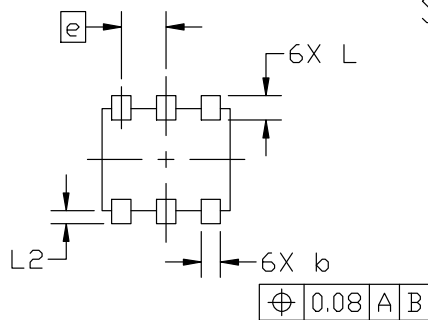ISSUE F

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.
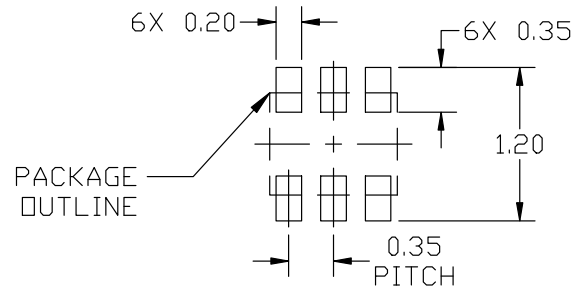4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

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

TOP VIEW

SIDE VIEW

BOTTOM VIEW

⌖ 0.08 A B

RECOMMENDED MOUNTING FOOTPRINT

6X 0.20
6X 0.35
1.20
0.35 PITCH
PACKAGE OUTLINE

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

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

STYLE 2:
PIN 1. EMITTER 1
2. EMITTER2
3. BASE 2
4. COLLECTOR 2
5. BASE 1
6. COLLECTOR 1

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

STYLE 4:
PIN 1. COLLECTOR
2. COLLECTOR
3. BASE
4. EMITTER
5. COLLECTOR
6. COLLECTOR

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

STYLE 6:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. CATHODE
6. CATHODE

STYLE 7:
PIN 1. CATHODE
2. ANODE
3. CATHODE
4. CATHODE
5. ANODE
6. CATHODE

STYLE 8:
PIN 1. DRAIN
2. DRAIN
3. GATE
4. SOURCE
5. DRAIN
6. DRAIN

STYLE 9:
PIN 1. SOURCE 1
2. GATE 1
3. DRAIN 2
4. SOURCE 2
5. GATE 2
6. DRAIN 1

STYLE 10:
PIN 1. CATHODE 1
2. N/C
3. CATHODE 2
4. ANODE 2
5. N/C
6. ANODE 1

GENERIC MARKING DIAGRAM*

XXM
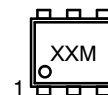
XX = Specific Device Code
M = Month Code

*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.

DOCUMENT NUMBER:	98AON26456D	
DESCRIPTION:	SOT−963 1.00x1.00x0.37, 0.35P	PAGE 1 OF 1

ADDITIONAL INFORMATION

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