

MUN5314DW1, NSBC114YPDXV6, NSBC114YPDP6



Complementary Bias Resistor Transistors **R1 = 10 kΩ, R2 = 47 kΩ** NPN and PNP 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

($T_A = 25^\circ\text{C}$ both polarities Q_1 (PNP) & Q_2 (NPN), 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	$V_{IN(rev)}$	6	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.

ORDERING INFORMATION

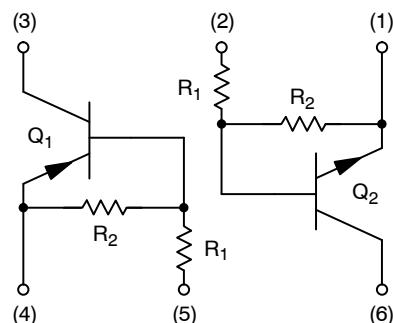
Device	Package	Shipping [†]
MUN5314DW1T1G, SMUN5314DW1T1G*	SOT-363	3,000 / Tape & Reel
NSVMUN5314DW1T3G*	SOT-363	10,000 / Tape & Reel
NSBC114YPDXV6T1G, NSVBC114YPDXV6T1G*	SOT-563	4,000 / Tape & Reel
NSBC114YPDXV6T5G	SOT-563	8,000 / Tape & Reel
NSBC114YPDP6T5G	SOT-963	8,000 / Tape & Reel

[†]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.

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PIN CONNECTIONS



MARKING DIAGRAMS



14/Q = 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.

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THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
MUN5314DW1 (SOT-363) ONE JUNCTION HEATED			
Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 1) (Note 2) Derate above 25°C (Note 1) (Note 2)	P_D	187 256 1.5 2.0	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 1) (Note 2)	$R_{\theta JA}$	670 490	$^\circ\text{C}/\text{W}$
NSBC114YPDXV6 (SOT-563) BOTH JUNCTION HEATED (Note 3)			
Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 1) (Note 2) Derate above 25°C (Note 1) (Note 2)	P_D	250 385 2.0 3.0	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 1) (Note 2)	$R_{\theta JA}$	493 325	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Lead (Note 1) (Note 2)	$R_{\theta JL}$	188 208	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
NSBC114YPDP6 (SOT-963) ONE JUNCTION HEATED			
Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 1) Derate above 25°C (Note 1)	P_D	357 2.9	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	350	$^\circ\text{C}/\text{W}$
NSBC114YPDP6 (SOT-963) BOTH JUNCTION HEATED (Note 3)			
Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 1) Derate above 25°C (Note 1)	P_D	500 4.0	mW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 1)	$R_{\theta JA}$	250	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
NSBC114YPDP6 (SOT-963) ONE JUNCTION HEATED			
Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 4) (Note 5) Derate above 25°C (Note 4) (Note 5)	P_D	231 269 1.9 2.2	MW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 4) (Note 5)	$R_{\theta JA}$	540 464	$^\circ\text{C}/\text{W}$
NSBC114YPDP6 (SOT-963) BOTH JUNCTION HEATED (Note 3)			
Total Device Dissipation $T_A = 25^\circ\text{C}$ (Note 4) (Note 5) Derate above 25°C (Note 4) (Note 5)	P_D	339 408 2.7 3.3	MW mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 4) (Note 5)	$R_{\theta JA}$	369 306	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$

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

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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
OFF CHARACTERISTICS					
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}	—	—	0.2	mAdc
Collector-Base Breakdown Voltage ($I_C = 10\text{ }\mu\text{A}$, $I_E = 0$)	$V_{(BR)CBO}$	50	—	—	Vdc
Collector-Emitter Breakdown Voltage (Note 6) ($I_C = 2.0\text{ mA}$, $I_B = 0$)	$V_{(BR)CEO}$	50	—	—	Vdc
ON CHARACTERISTICS					
DC Current Gain (Note 6) ($I_C = 5.0\text{ mA}$, $V_{CE} = 10\text{ V}$)	h_{FE}	80	140	—	
Collector-Emitter Saturation Voltage (Note 6) ($I_C = 10\text{ mA}$, $I_B = 0.3\text{ mA}$)	$V_{CE(sat)}$	—	—	0.25	V
Input Voltage (Off) ($V_{CE} = 5.0\text{ V}$, $I_C = 100\text{ }\mu\text{A}$) (NPN) ($V_{CE} = 5.0\text{ V}$, $I_C = 100\text{ }\mu\text{A}$) (PNP)	$V_{i(\text{off})}$	—	0.7 0.7	0.3 0.3	Vdc
Input Voltage (On) ($V_{CE} = 0.2\text{ V}$, $I_C = 1.0\text{ mA}$) (NPN) ($V_{CE} = 0.2\text{ V}$, $I_C = 1.0\text{ mA}$) (PNP)	$V_{i(\text{on})}$	1.4 1.4	0.8 0.9	—	Vdc
Output Voltage (On) ($V_{CC} = 5.0\text{ V}$, $V_B = 2.5\text{ V}$, $R_L = 1.0\text{ k}\Omega$)	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
Input Resistor	R_1	7.0	10	13	k Ω
Resistor Ratio	R_1/R_2	0.17	0.21	0.25	

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

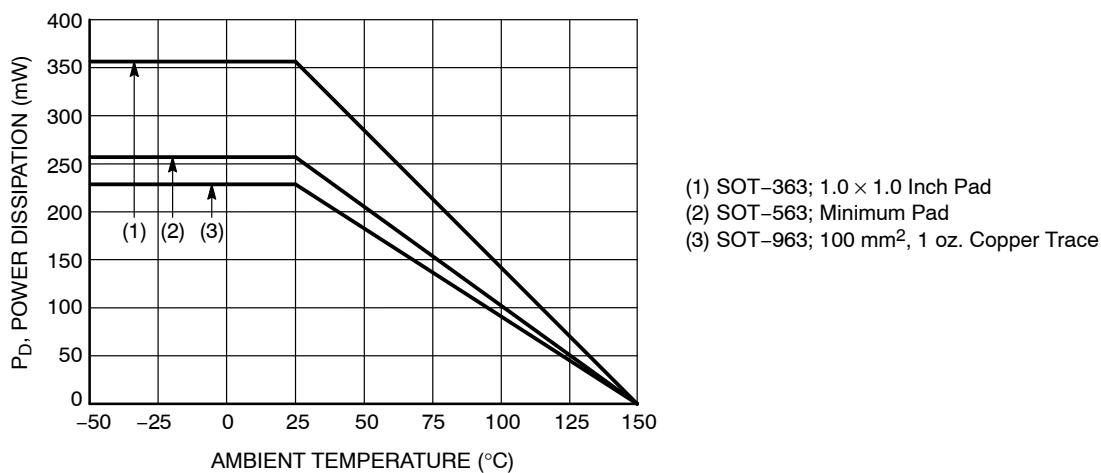


Figure 1. Derating Curve

MUN5314DW1, NSBC114YPDXV6, NSBC114YPDP6

TYPICAL CHARACTERISTICS – NPN TRANSISTOR MUN5314DW1, NSBC114YPDXV6

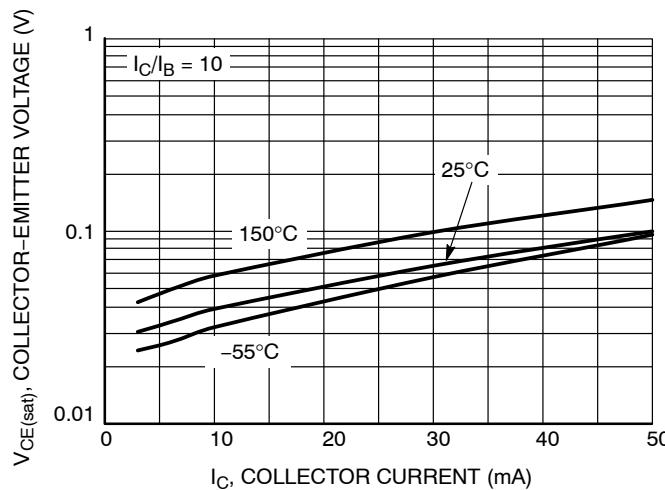


Figure 2. $V_{CE(sat)}$ vs. I_C

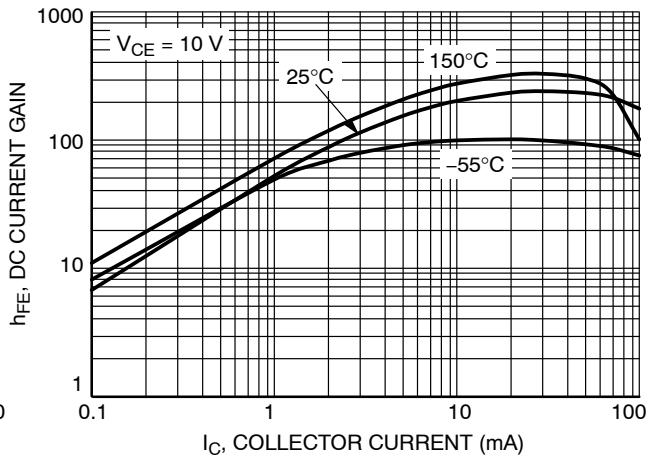


Figure 3. DC Current Gain

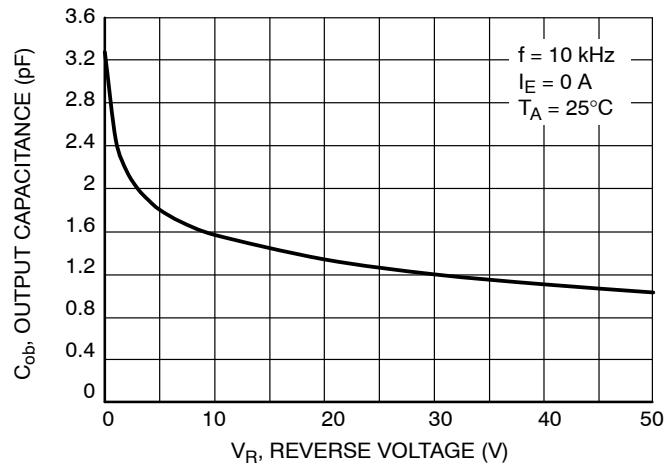


Figure 4. Output Capacitance

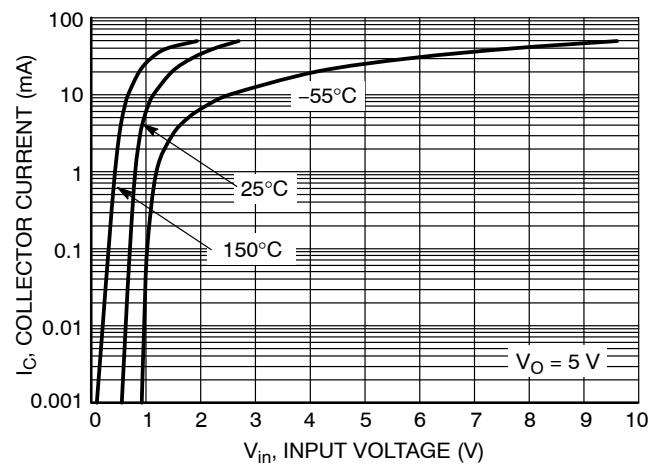


Figure 5. Output Current vs. Input Voltage

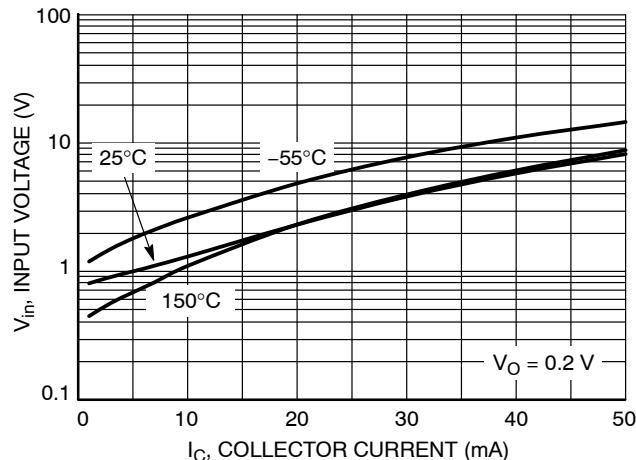


Figure 6. Input Voltage vs. Output Current

TYPICAL CHARACTERISTICS – PNP TRANSISTOR
MUN5314DW1, NSBC114YPDXV6

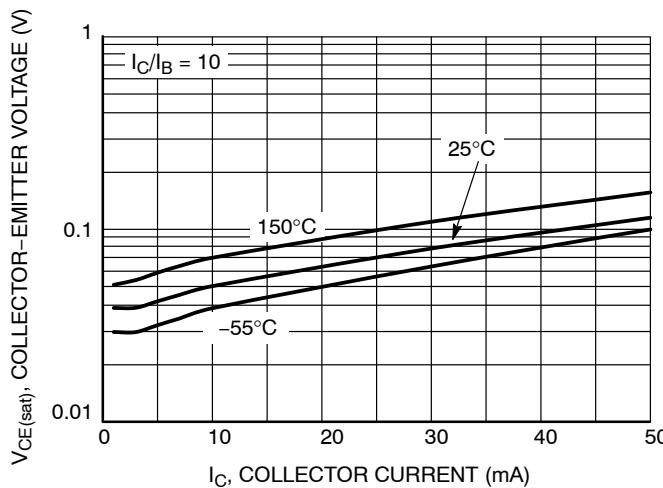


Figure 7. $V_{CE(sat)}$ vs. I_C

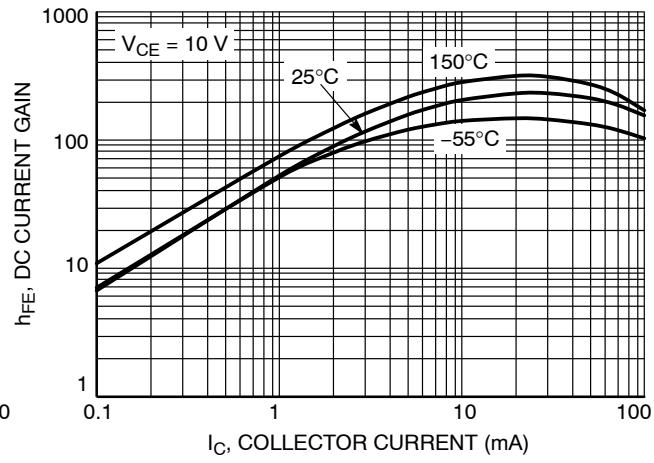


Figure 8. DC Current Gain

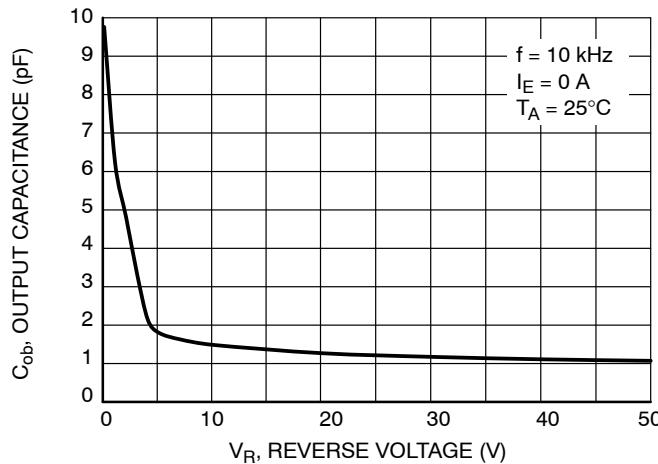


Figure 9. Output Capacitance

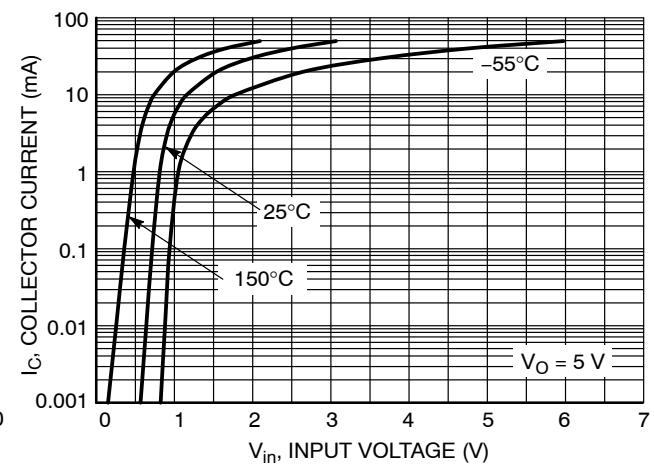


Figure 10. Output Current vs. Input Voltage

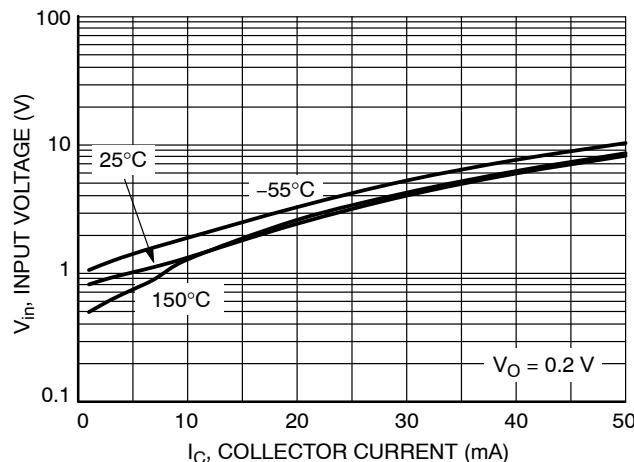


Figure 11. Input Voltage vs. Output Current

TYPICAL CHARACTERISTICS – NPN TRANSISTOR
NSBC114YPDP6

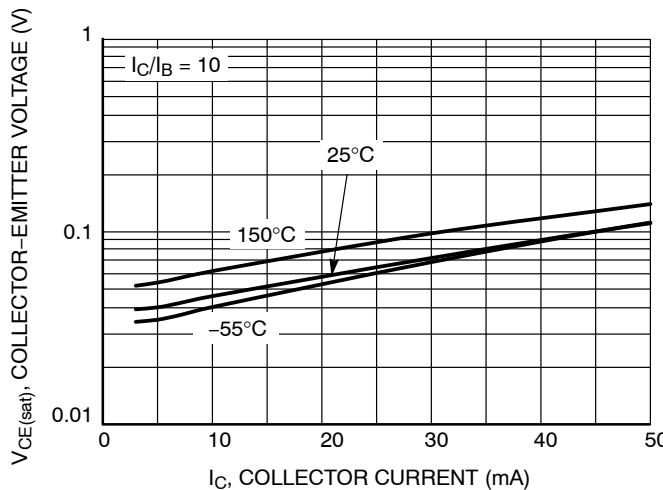


Figure 12. $V_{CE(sat)}$ vs. I_C

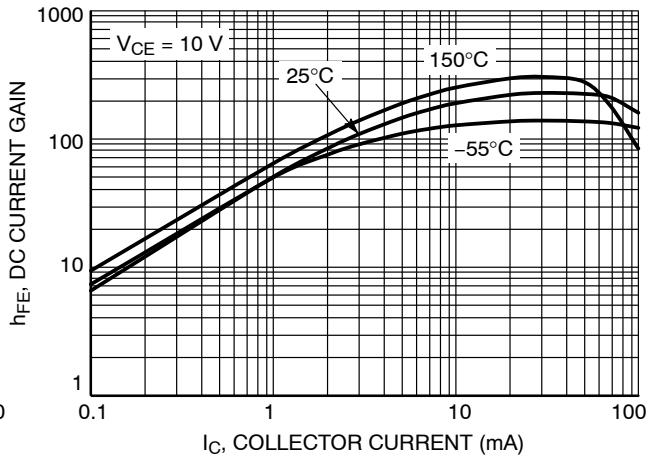


Figure 13. DC Current Gain

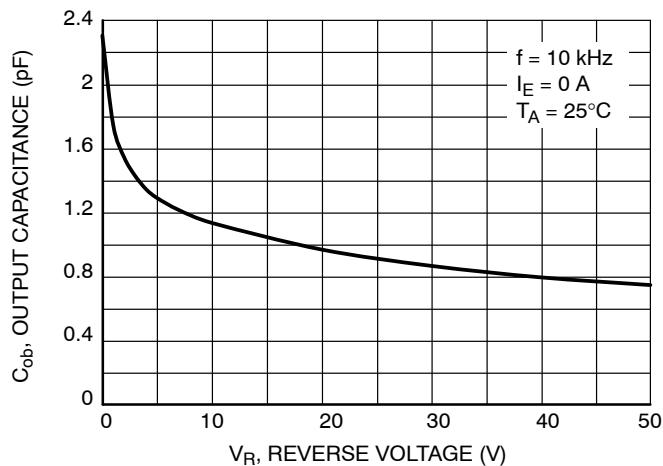


Figure 14. Output Capacitance

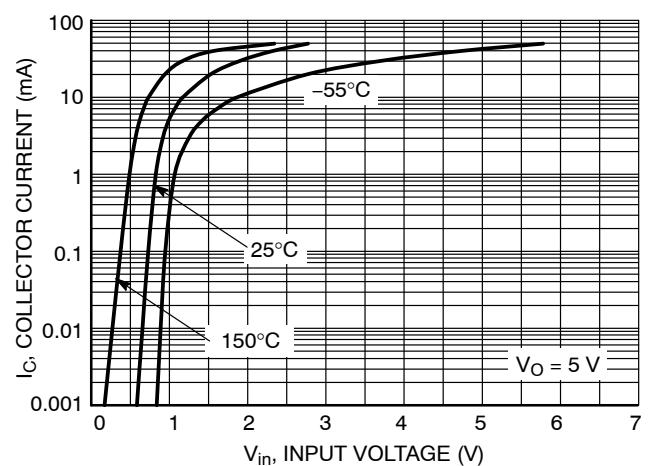


Figure 15. Output Current vs. Input Voltage

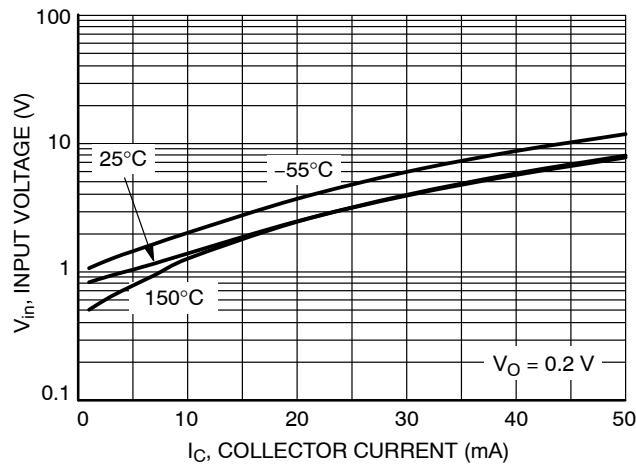


Figure 16. Input Voltage vs. Output Current

MUN5314DW1, NSBC114YPDXV6, NSBC114YPDP6

TYPICAL CHARACTERISTICS – PNP TRANSISTOR NSBC114YPDP6

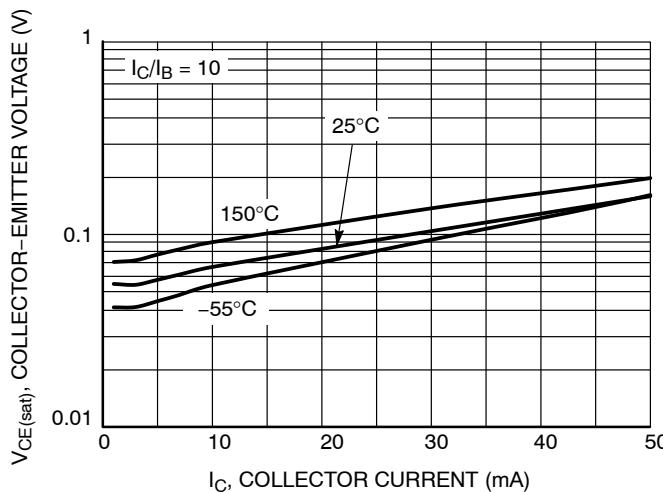


Figure 17. $V_{CE(sat)}$ vs. I_C

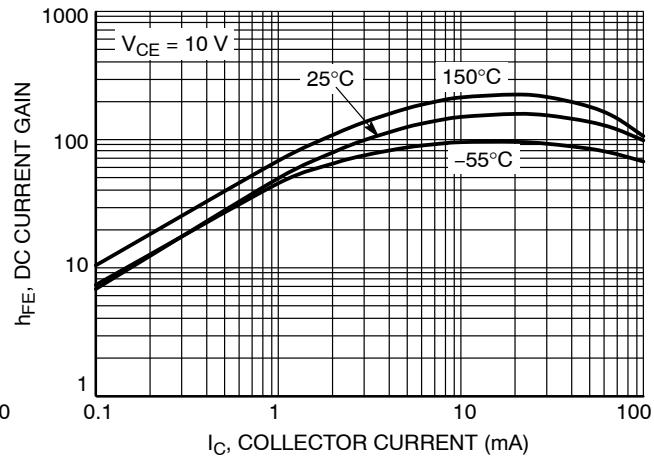


Figure 18. DC Current Gain

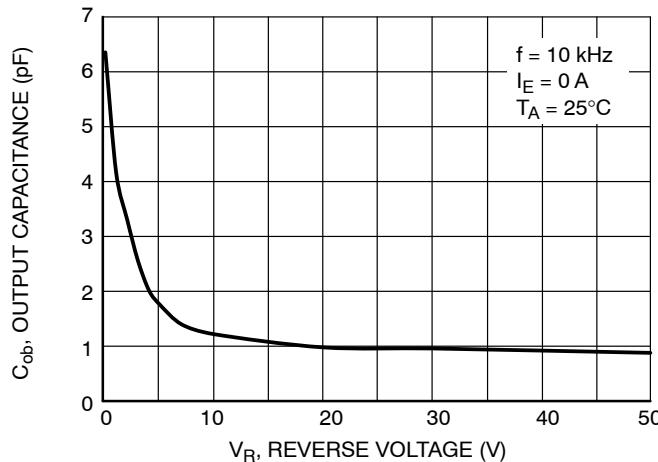


Figure 19. Output Capacitance

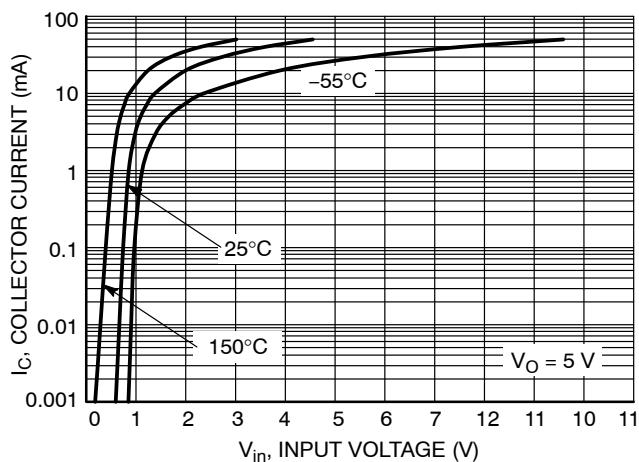


Figure 20. Output Current vs. Input Voltage

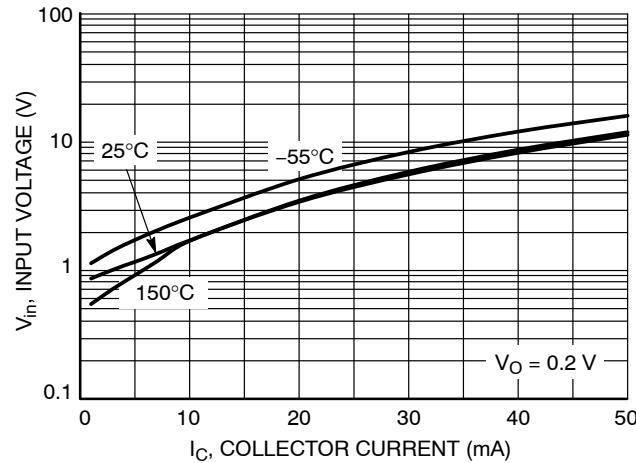
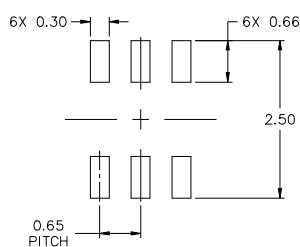
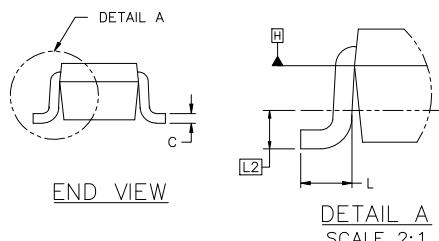
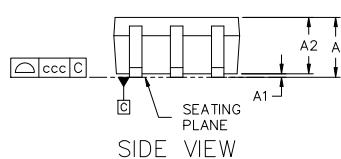
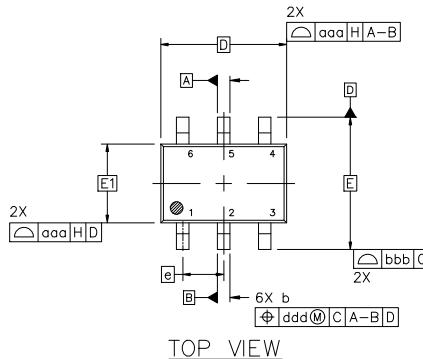


Figure 21. Input Voltage vs. Output Current



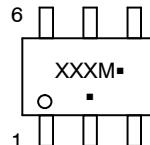
SC-88 2.00x1.25x0.90, 0.65P
CASE 419B-02
ISSUE Z

DATE 18 APR 2024



* 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***



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.

STYLES ON PAGE 2

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.
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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		

SC-88 2.00x1.25x0.90, 0.65P

CASE 419B-02

ISSUE Z

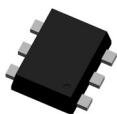
DATE 18 APR 2024

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. Iout 2. Gnd 3. Gnd 4. Vcc 5. Ven 6. Vref	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.

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

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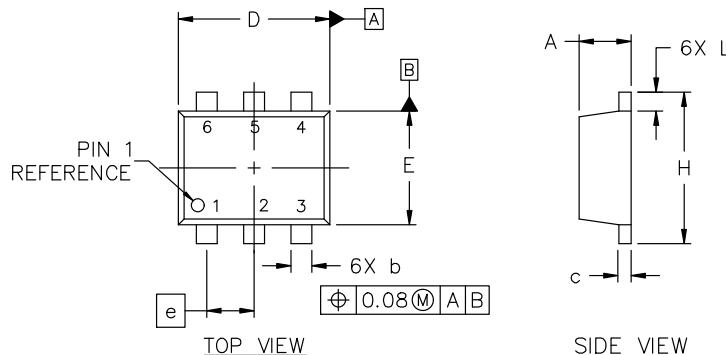


SOT-563-6 1.60x1.20x0.55, 0.50P
CASE 463A
ISSUE J

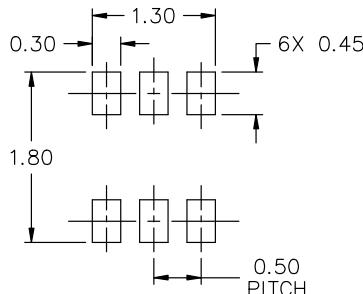
DATE 15 FEB 2024

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



RECOMMENDED MOUNTING FOOTPRINT*

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

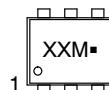
* FOR ADDITIONAL INFORMATION ON OUR Pb-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE ON SEMICONDUCTOR SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERRM/D.

STYLE 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

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.

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

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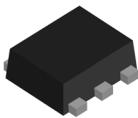
DOCUMENT NUMBER:	98AON11126D	
DESCRIPTION:	SOT-563-6 1.60x1.20x0.55, 0.50P	PAGE 1 OF 1

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MECHANICAL CASE OUTLINE

PACKAGE DIMENSIONS

onsemi™

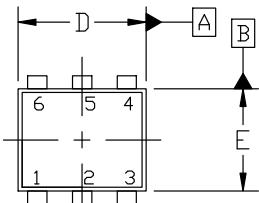


SOT-963 1.00x1.00x0.37, 0.35P
CASE 527AD
ISSUE F

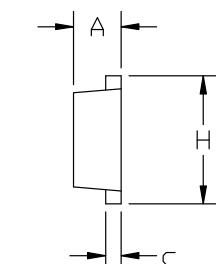
DATE 20 FEB 2024

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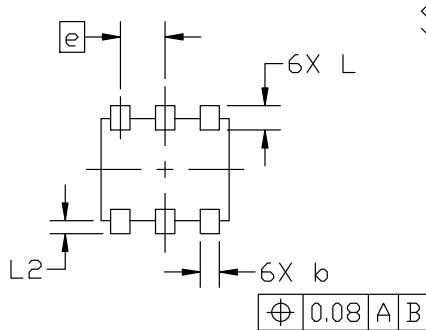
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.



TOP VIEW



SIDE VIEW



BOTTOM VIEW

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

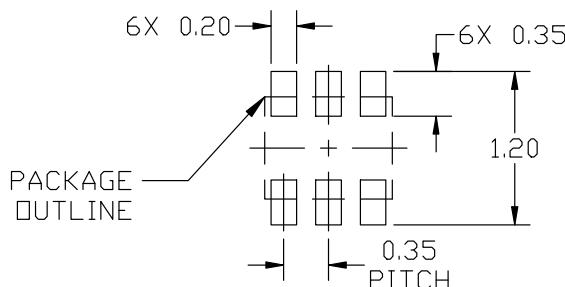
STYLE 9:

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

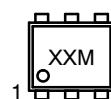
DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.34	0.37	0.40
b	0.10	0.15	0.20
c	0.07	0.12	0.17
D	0.95	1.00	1.05
E	0.75	0.80	0.85
e	0.35 BSC		
H	0.95	1.00	1.05
L	0.19 REF		
L2	0.05	0.10	0.15



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.

GENERIC MARKING DIAGRAM*



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*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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