

MUN5133DW1, NSBA143ZDXV6, NSBA143ZDP6



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Dual PNP Bias Resistor Transistors **R₁ = 4.7 kΩ, R₂ = 47 kΩ**

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

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

MAXIMUM RATINGS

(T_A = 25°C, common for Q1 and Q2, 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)}	30	Vdc
Input Reverse Voltage	V _{IN(rev)}	5	Vdc

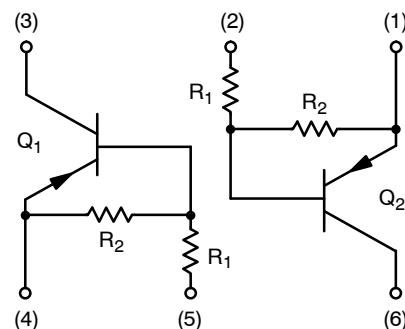
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

ORDERING INFORMATION

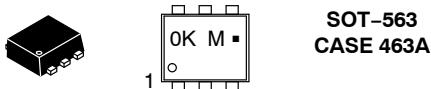
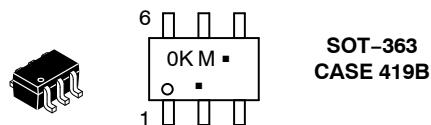
Device	Package	Shipping [†]
MUN5133DW1T1G	SOT-363	3,000 / Tape & Reel
NSBA143ZDXV6T1G	SOT-563	4,000 / Tape & Reel
NSBA143ZDP6T5G	SOT-963	8,000 / Tape & Reel

[†]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.

PIN CONNECTIONS



MARKING DIAGRAMS



OK/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.

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THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
MUN5133DW1 (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	$^\circ\text{C}/\text{W}$
MUN5133DW1 (SOT-363) 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 2)	$R_{\theta JL}$	188 208	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature Range	T_J, T_{stg}	-55 to +150	$^\circ\text{C}$
NSBA143ZDXV6 (SOT-563) 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	$^\circ\text{C}/\text{W}$
NSBA143ZDXV6 (SOT-563) 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	$^\circ\text{C}$
NSBA143ZDP6 (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	$^\circ\text{C}/\text{W}$
NSBA143ZDP6 (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 x 1.0 Inch Pad.
3. Both junction heated values assume total power is sum of two equally powered channels.
4. FR-4 @ 100 mm², 1 oz. copper traces, still air.
5. FR-4 @ 500 mm², 1 oz. copper traces, still air.

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, common for Q_1 and Q_2 , unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector–Base Cutoff Current ($V_{CB} = 50\text{ V}$, $I_E = 0$)	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}	–	–	0.18	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) ($I_C = 10\text{ mA}$, $I_B = 0.3\text{ mA}$)	$V_{CE(\text{sat})}$	–	–	0.25	Vdc
Input Voltage (off) ($V_{CE} = 5.0\text{ V}$, $I_C = 100\text{ }\mu\text{A}$)	$V_{i(\text{off})}$	–	0.67	–	Vdc
Input Voltage (on) ($V_{CE} = 0.2\text{ V}$, $I_C = 5.0\text{ mA}$)	$V_{i(\text{on})}$	–	0.91	–	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	3.3	4.7	6.1	$\text{k}\Omega$
Resistor Ratio	R_1/R_2	0.08	0.1	0.14	

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

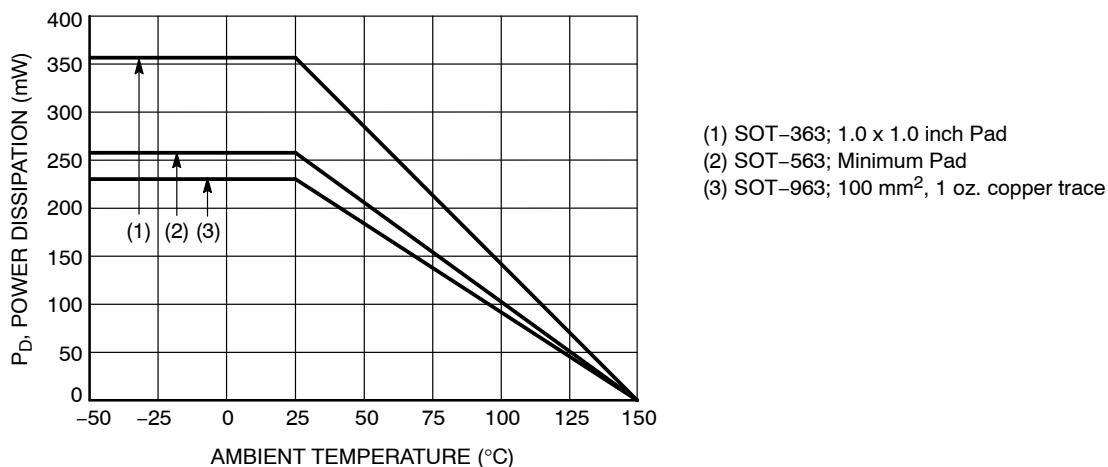


Figure 1. Derating Curve

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TYPICAL CHARACTERISTICS MUN5133DW1, NSBA143ZDXV6

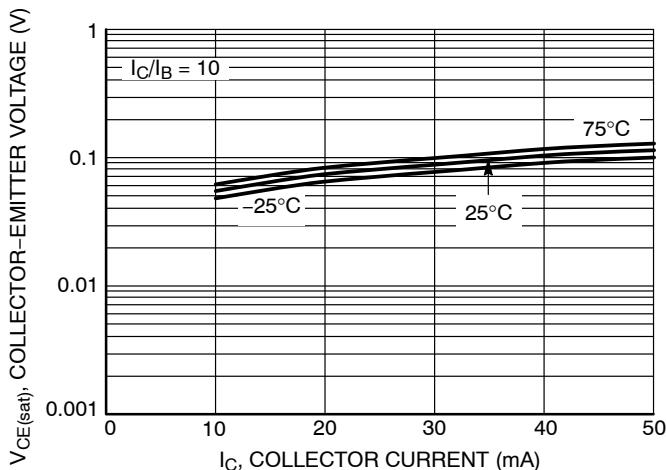


Figure 2. $V_{CE(sat)}$ vs. I_C

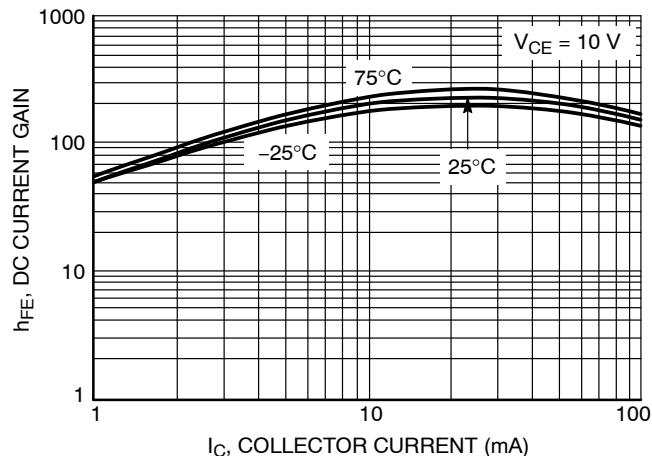


Figure 3. DC Current Gain

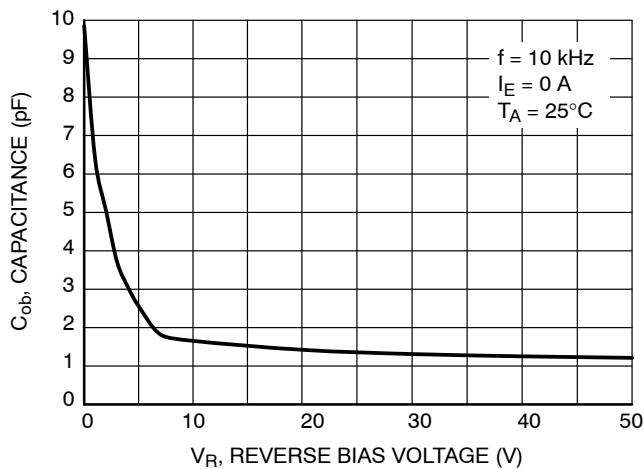


Figure 4. Output Capacitance

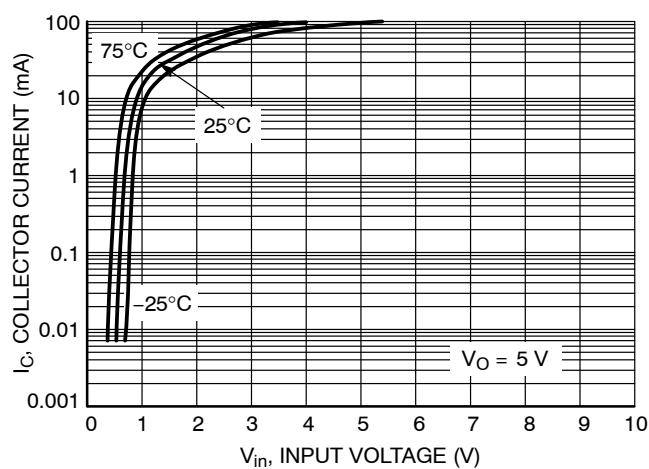


Figure 5. Output Current vs. Input Voltage

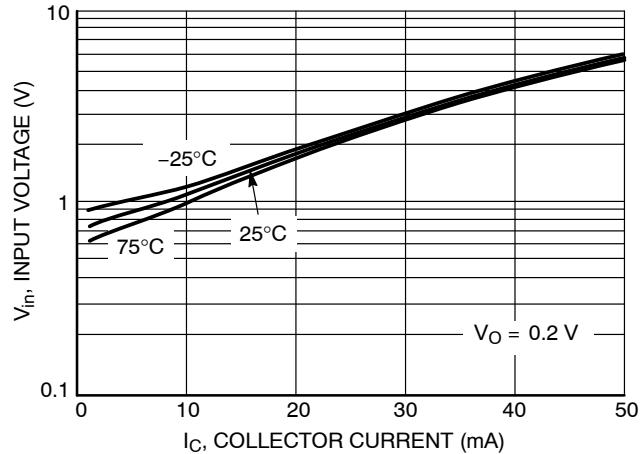
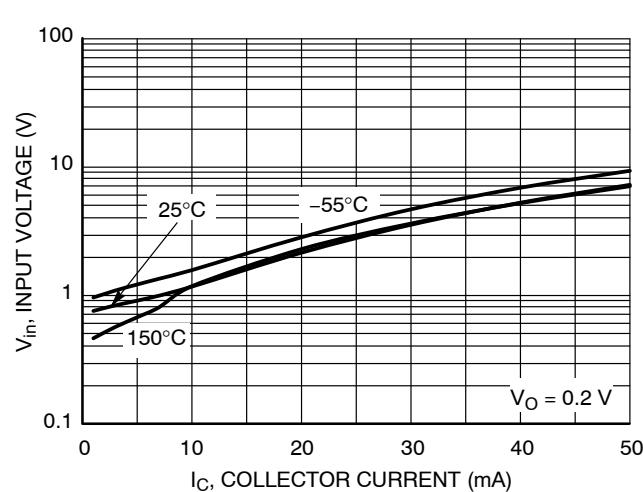
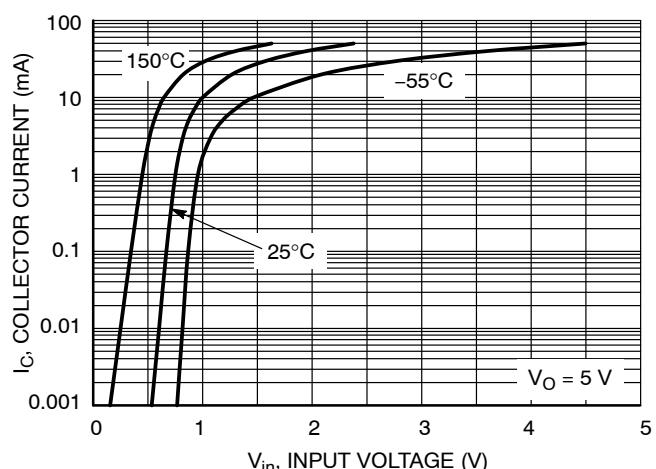
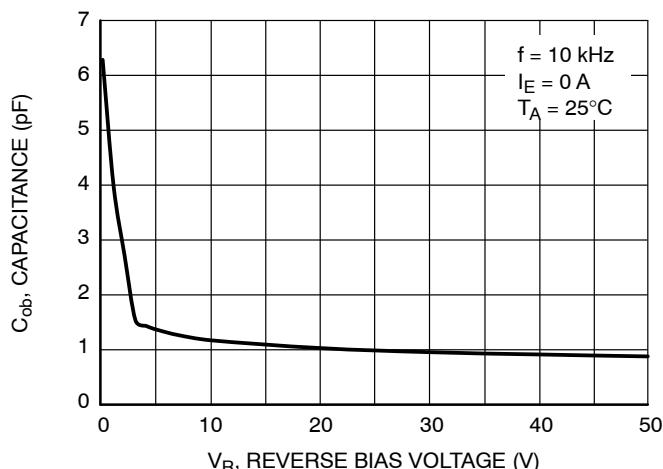
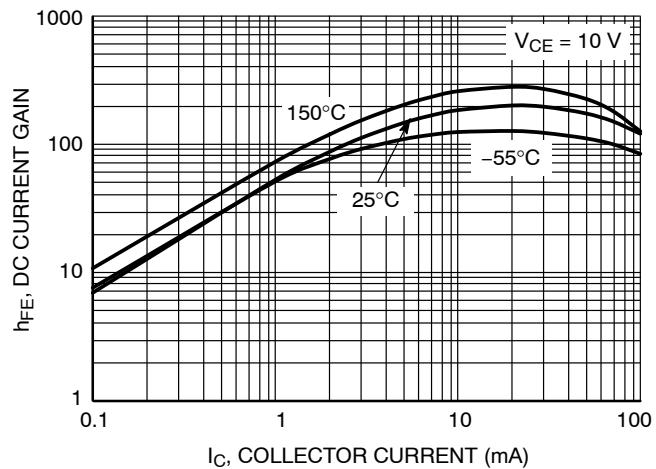
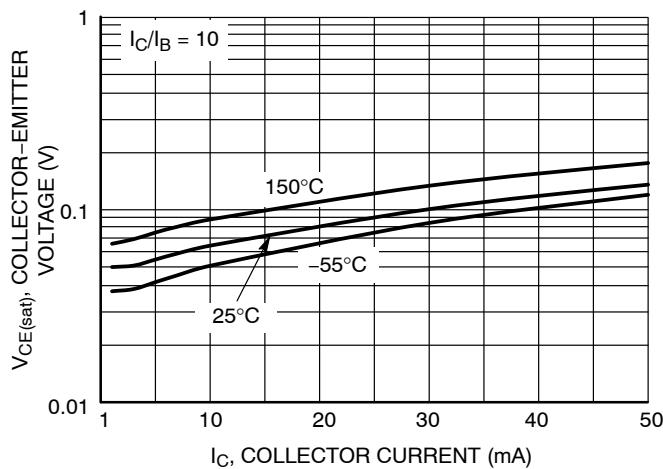


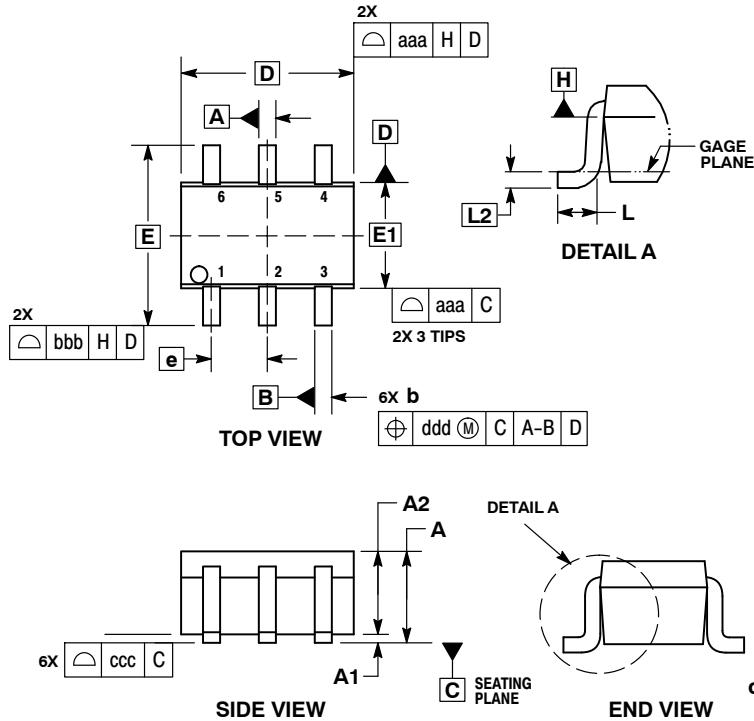
Figure 6. Input Voltage vs. Output Current

TYPICAL CHARACTERISTICS
NSBA143ZDP6

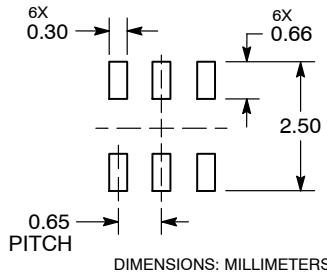


PACKAGE DIMENSIONS

SC-88/SC70-6/SOT-363
CASE 419B-02
ISSUE Y



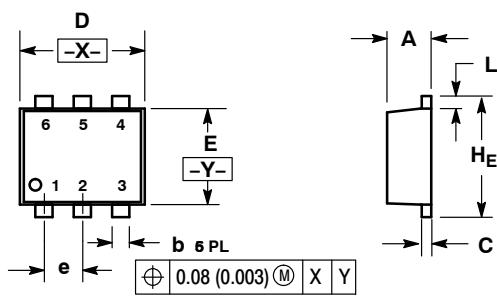
DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	---	---	1.10	---	---	0.043
A1	0.00	---	0.10	0.000	---	0.004
A2	0.70	0.90	1.00	0.027	0.035	0.039
b	0.15	0.20	0.25	0.006	0.008	0.010
C	0.08	0.15	0.22	0.003	0.006	0.009
D	1.80	2.00	2.20	0.070	0.078	0.086
E	2.00	2.10	2.20	0.078	0.082	0.086
E1	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.26	0.36	0.46	0.010	0.014	0.018
L2	0.15 BSC			0.006 BSC		
aaa	0.15			0.006		
bbb	0.30			0.012		
ccc	0.10			0.004		
ddd	0.10			0.004		

RECOMMENDED
SOLDERING 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.

PACKAGE DIMENSIONS

SOT-563, 6 LEAD
CASE 463A
ISSUE G

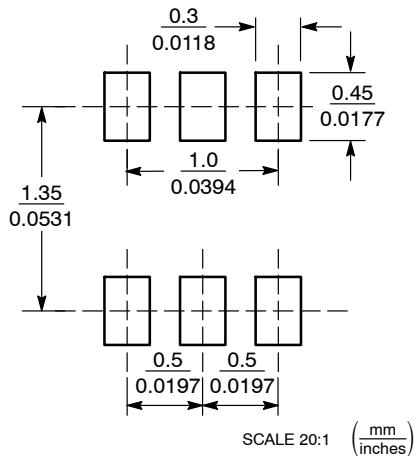


NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETERS
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.50	0.55	0.60	0.020	0.021	0.023
b	0.17	0.22	0.27	0.007	0.009	0.011
C	0.08	0.12	0.18	0.003	0.005	0.007
D	1.50	1.60	1.70	0.059	0.062	0.066
E	1.10	1.20	1.30	0.043	0.047	0.051
e	0.5 BSC			0.02 BSC		
L	0.10	0.20	0.30	0.004	0.008	0.012
H _E	1.50	1.60	1.70	0.059	0.062	0.066

SOLDERING FOOTPRINT*

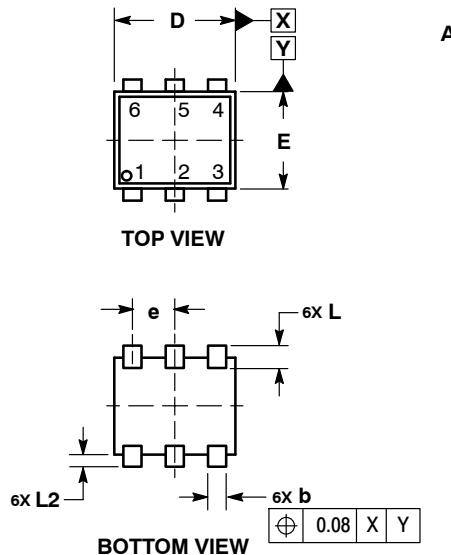


*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

MUN5133DW1, NSBA143ZDXV6, NSBA143ZDP6

PACKAGE DIMENSIONS

SOT-963 CASE 527AD ISSUE E

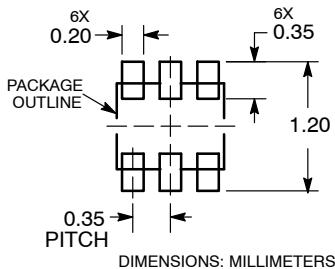


NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
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.

MILLIMETERS			
DIM	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 _E	0.95	1.00	1.05
L	0.19 REF		
L ₂	0.05	0.10	0.15

RECOMMENDED MOUNTING FOOTPRINT



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