BC856BDW1T1, BC857BDW1T1 Series, BC858CDW1T1 Series

Preferred Devices

Dual General Purpose Transistors

PNP Duals

These transistors are designed for general purpose amplifier applications. They are housed in the SOT−363/SC−88 which is designed for low power surface mount applications.

Features

- Pb−Free Packages are Available

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector−Emitter Voltage BC856 BC857 BC858	V_{CEO}	 −65 −45 −30	V
Collector−Base Voltage BC856 BC857 BC858	V_{CBO}	 −80 −50 −30	V
Emitter−Base Voltage	V_{EBO}	−5.0	V
Collector Current −Continuous	I_C	−100	mAdc

THERMAL CHARACTERISTICS

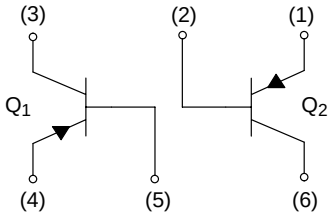
Characteristic	Symbol	Max	Unit
Total Device Dissipation Per Device FR−5 Board (Note 1) T_A = 25°C Derate Above 25°C	P_D	380 250 3.0	mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	328	°C/W
Junction and Storage Temperature Range	T_J, T_{stg}	−55 to +150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. FR−5 = 1.0 x 0.75 x 0.062 in

ON Semiconductor®

http://onsemi.com



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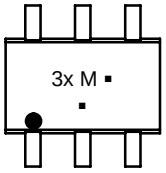
SOT−363/SC−88
CASE 419B
STYLE 1

MARKING DIAGRAM



3x = Specific Device Code
x = B, F, G, or L
(See Ordering Information)
M = Date Code
▪ = Pb−Free Package
(Note: Microdot may be in either location)

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

Preferred devices are recommended choices for future use and best overall value.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector−Emitter Breakdown Voltage		$V_{(BR)CEO}$				V
(I_C = −10 mA)	BC856 Series		−65	−	−	
	BC857 Series		−45	−	−	
	BC858 Series		−30	−	−	
Collector−Emitter Breakdown Voltage		$V_{(BR)CES}$				V
(I_C = −10 μA, V_{EB} = 0)	BC856 Series		−80	−	−	
	BC857B Only		−50	−	−	
	BC858 Series		−30	−	−	
Collector−Base Breakdown Voltage		$V_{(BR)CBO}$				V
(I_C = −10 μA)	BC856 Series		−80	−	−	
	BC857 Series		−50	−	−	
	BC858 Series		−30	−	−	
Emitter−Base Breakdown Voltage		$V_{(BR)EBO}$				V
(I_E = −1.0 μA)	BC856 Series		−5.0	−	−	
	BC857 Series		−5.0	−	−	
	BC858 Series		−5.0	−	−	
Collector Cutoff Current (V_{CB} = −30 V)		I_{CBO}	−	−	−15	nA
(V_{CB} = −30 V, T_A = 150°C)			−	−	−4.0	μA
ON CHARACTERISTICS						
DC Current Gain		h_{FE}				−
(I_C = −10 μA, V_{CE} = −5.0 V)	BC856B, BC857B		−	150	−	
	BC857C, BC858C		−	270	−	
(I_C = −2.0 mA, V_{CE} = −5.0 V)	BC856B, BC857B		220	290	475	
	BC857C, BC858C		420	520	800	
Collector−Emitter Saturation Voltage		$V_{CE(sat)}$				V
(I_C = −10 mA, I_B = −0.5 mA)			−	−	−0.3	
(I_C = −100 mA, I_B = −5.0 mA)			−	−	−0.65	
Base−Emitter Saturation Voltage		$V_{BE(sat)}$				V
(I_C = −10 mA, I_B = −0.5 mA)			−	−0.7	−	
(I_C = −100 mA, I_B = −5.0 mA)			−	−0.9	−	
Base−Emitter On Voltage		$V_{BE(on)}$				V
(I_C = −2.0 mA, V_{CE} = −5.0 V)			−0.6	−	−0.75	
(I_C = −10 mA, V_{CE} = −5.0 V)			−	−	−0.82	
SMALL−SIGNAL CHARACTERISTICS						
Current−Gain − Bandwidth Product		f_T	100	−	−	MHz
(I_C = −10 mA, V_{CE} = −5.0 Vdc, f = 100 MHz)						
Output Capacitance		C_{ob}	−	−	4.5	pF
(V_{CB} = −10 V, f = 1.0 MHz)						
Noise Figure		NF	−	−	10	dB
(I_C = −0.2 mA, V_{CE} = −5.0 Vdc, R_S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)						

TYPICAL CHARACTERISTICS − BC856

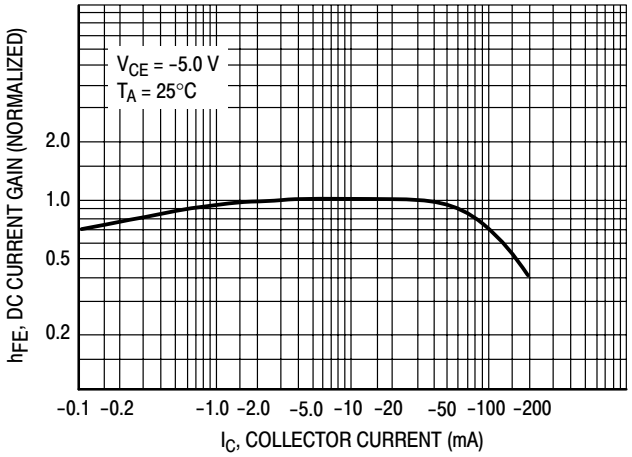


Figure 1. DC Current Gain

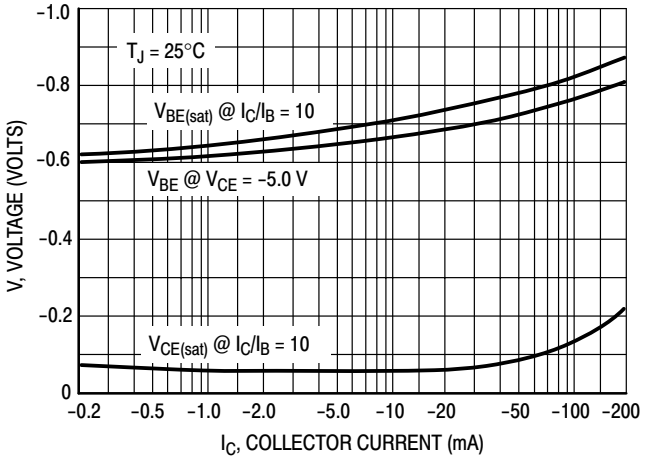


Figure 2. “On” Voltage

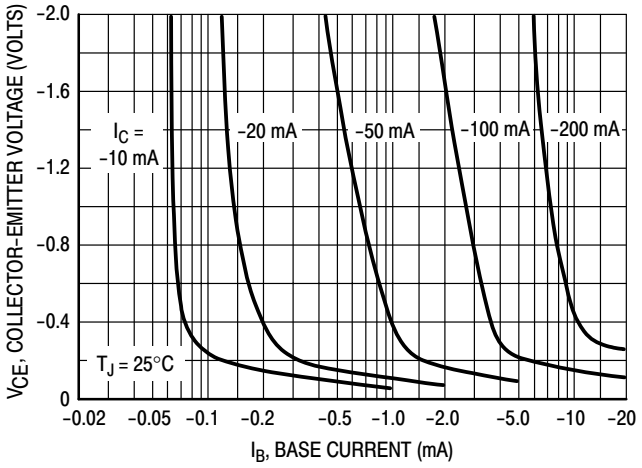


Figure 3. Collector Saturation Region

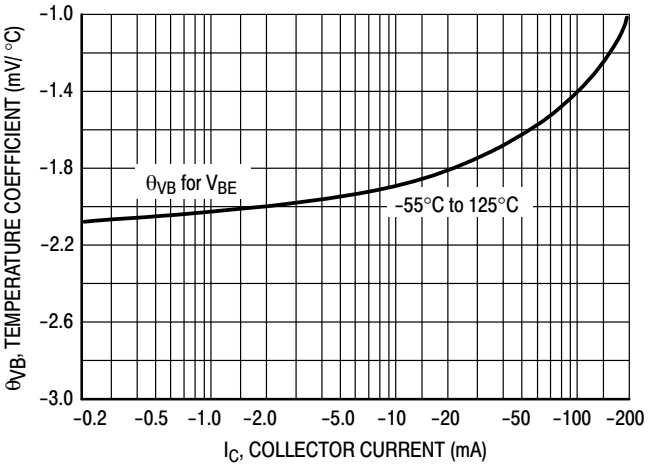


Figure 4. Base−Emitter Temperature Coefficient

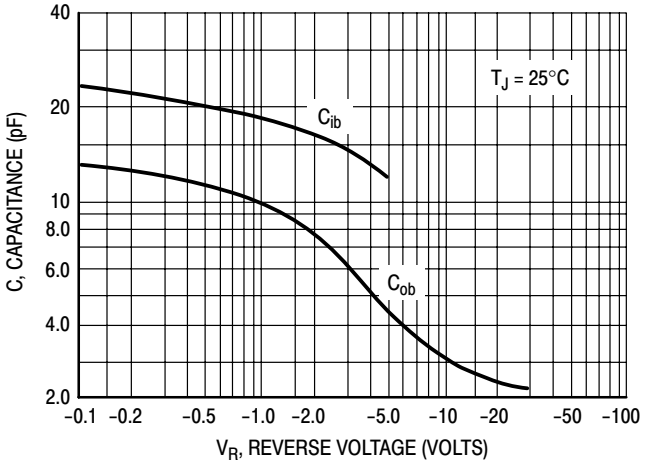


Figure 5. Capacitance

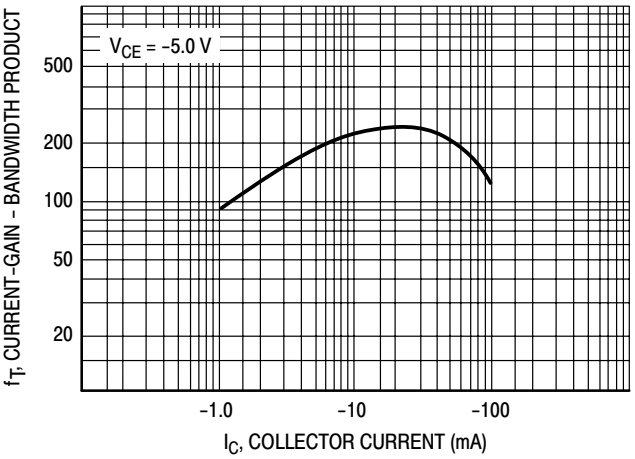


Figure 6. Current−Gain − Bandwidth Product

TYPICAL CHARACTERISTICS − BC857/BC858

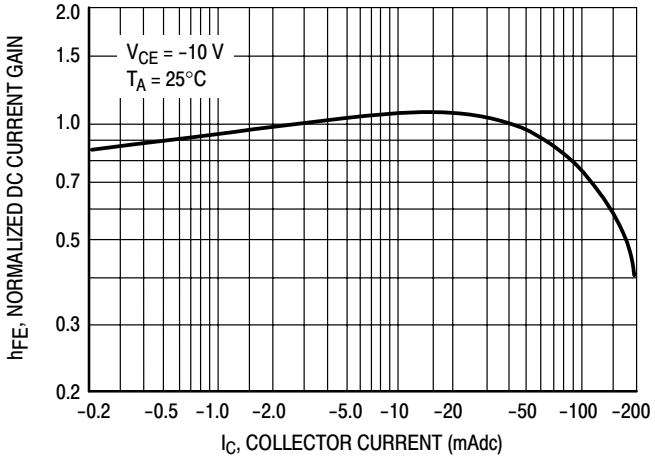


Figure 7. Normalized DC Current Gain

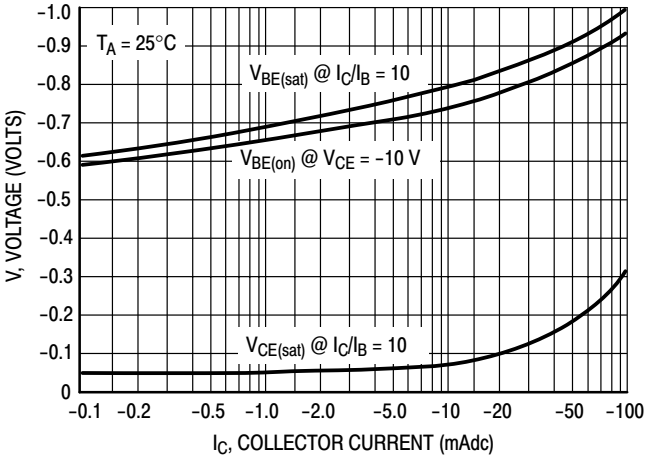


Figure 8. "Saturation" and "On" Voltages

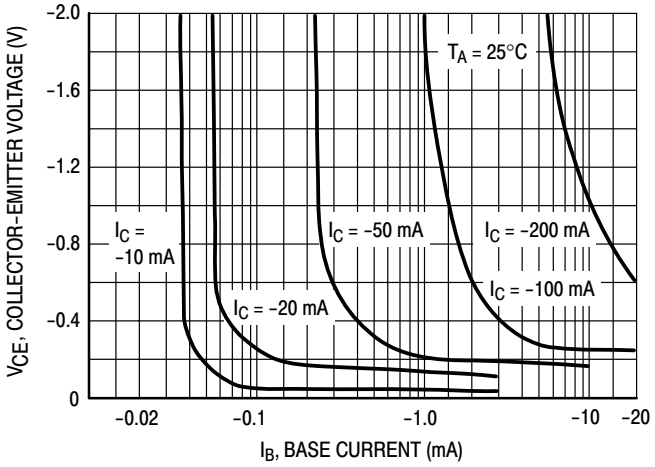


Figure 9. Collector Saturation Region

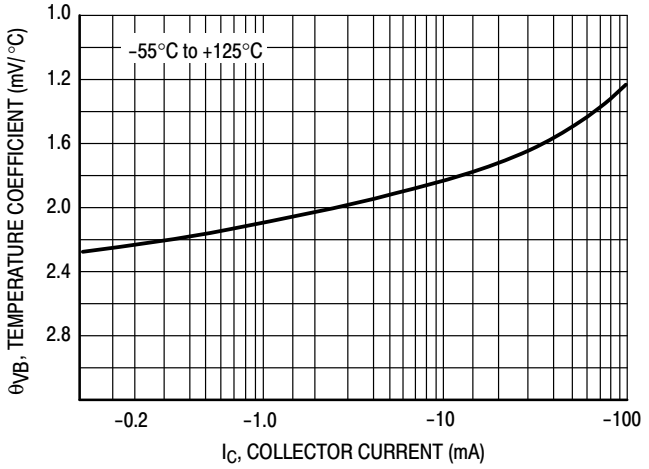


Figure 10. Base−Emitter Temperature Coefficient

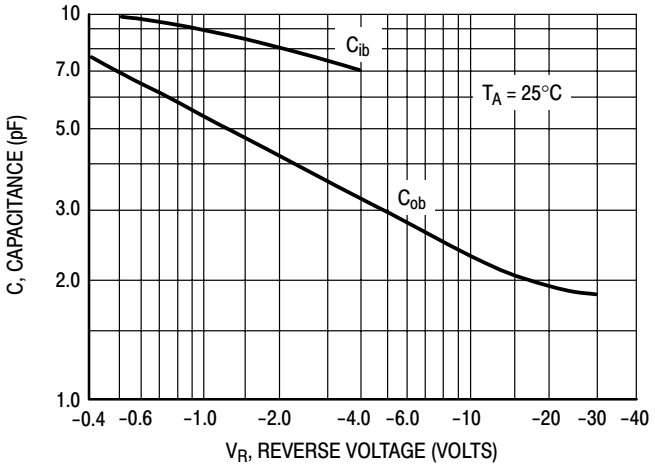


Figure 11. Capacitances

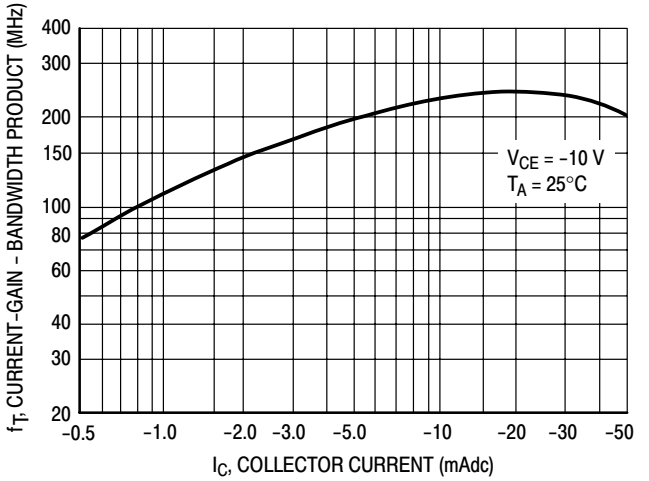


Figure 12. Current−Gain − Bandwidth Product

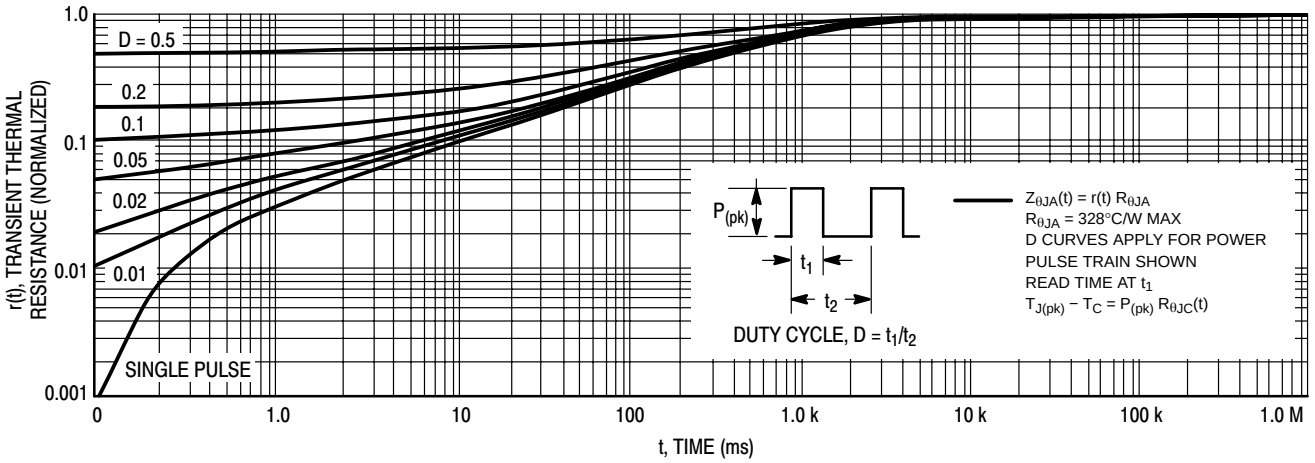


Figure 13. Thermal Response

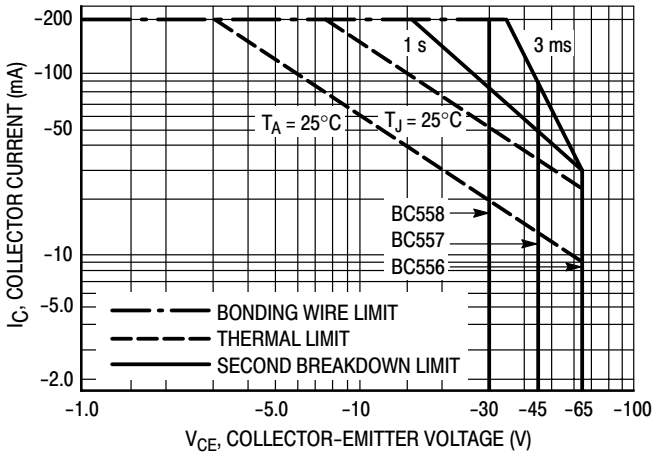


Figure 14. Active Region Safe Operating Area

The safe operating area curves indicate I_C-V_{CE} limits of the transistor that must be observed for reliable operation. Collector load lines for specific circuits must fall below the limits indicated by the applicable curve.

The data of Figure 14 is based upon $T_{J(pk)} = 150°C$; T_C or T_A is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided $T_{J(pk)} \leq 150°C$. $T_{J(pk)}$ may be calculated from the data in Figure 13. At high case or ambient temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by the secondary breakdown.

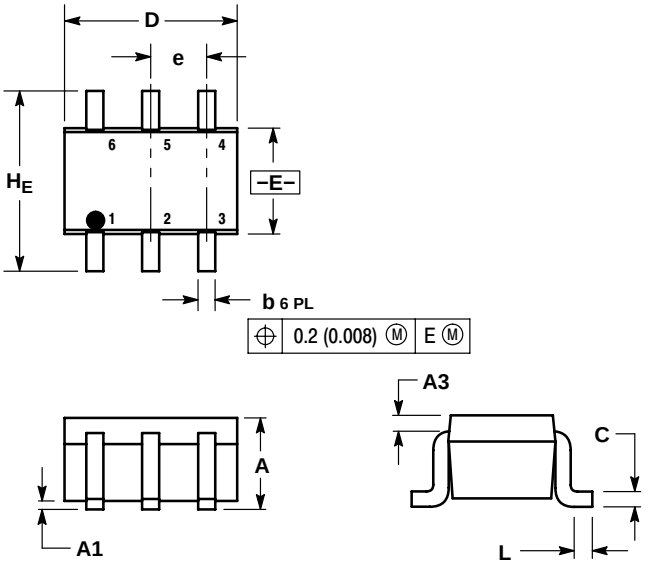
ORDERING INFORMATION

Device	Device Marking	Package	Shipping†
BC856BDW1T1	3B	SOT−363	3,000 / Tape & Reel
BC856BDW1T1G	3B	SOT−363 (Pb−Free)	
BC856BDW1T3	3B	SOT−363	10,000 / Tape & Reel
BC856BDW1T3G	3B	SOT−363 (Pb−Free)	
BC857BDW1T1	3F	SOT−363	3,000 / Tape & Reel
BC857BDW1T1G	3F	SOT−363 (Pb−Free)	
BC857CDW1T1	3G	SOT−363	3,000 / Tape & Reel
BC857CDW1T1G	3G	SOT−363 (Pb−Free)	
BC858CDW1T1	3L	SOT−363	3,000 / Tape & Reel
BC858CDW1T1G	3L	SOT−363 (Pb−Free)	

†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.

PACKAGE DIMENSIONS

SC−88 (SOT−363)
CASE 419B−02
ISSUE V

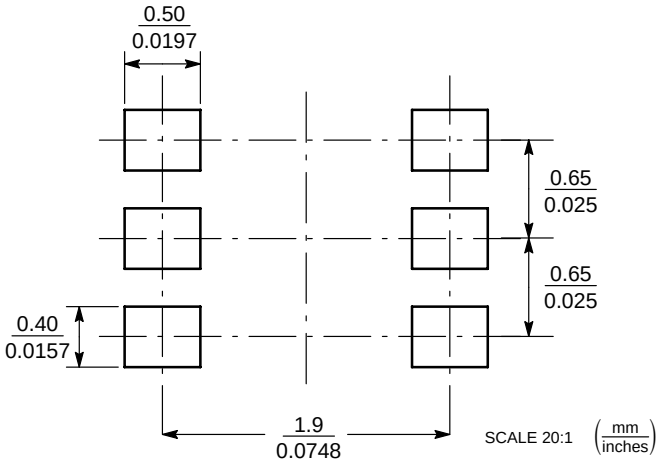


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. 419B−01 OBSOLETE, NEW STANDARD 419B−02.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.95	1.10	0.031	0.037	0.043
A1	0.00	0.05	0.10	0.000	0.002	0.004
A3	0.20 REF			0.008 REF		
b	0.10	0.21	0.30	0.004	0.008	0.012
C	0.10	0.14	0.25	0.004	0.005	0.010
D	1.80	2.00	2.20	0.070	0.078	0.086
E	1.15	1.25	1.35	0.045	0.049	0.053
e	0.65 BSC			0.026 BSC		
L	0.10	0.20	0.30	0.004	0.008	0.012
H_E	2.00	2.10	2.20	0.078	0.082	0.086

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

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.

PUBLICATION ORDERING INFORMATION

LITERATURE FULFILLMENT:
Literature Distribution Center for ON Semiconductor
P.O. Box 61312, Phoenix, Arizona 85082−1312 USA
Phone: 480−829−7710 or 800−344−3860 Toll Free USA/Canada
Fax: 480−829−7709 or 800−344−3867 Toll Free USA/Canada
Email: orderlit@onsemi.com

N. American Technical Support: 800−282−9855 Toll Free USA/Canada

Japan: ON Semiconductor, Japan Customer Focus Center
2−9−1 Kamimeguro, Meguro−ku, Tokyo, Japan 153−0051
Phone: 81−3−5773−3850

ON Semiconductor Website: http://onsemi.com

Order Literature: http://www.onsemi.com/litorder

For additional information, please contact your local Sales Representative.

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