



# BC856B, BC857B, BC858A

## General Purpose Transistors

### PNP Silicon

These transistors are designed for general purpose amplifier applications. They are housed in the SC-70/SOT-323 which is designed for low power surface mount applications.

#### Features

- 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 ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage BC856 BC857 BC858	$V_{CE0}$	-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	mA <sub>dc</sub>

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR-5 Board, (Note 1) $T_A = 25^\circ\text{C}$	$P_D$	150	mW
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	883	$^\circ\text{C}/\text{W}$
Junction and Storage Temperature	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

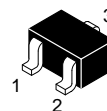
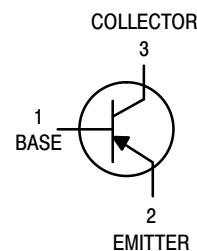
Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. FR-5 = 1.0 x 0.75 x 0.062 in.



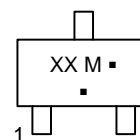
ON Semiconductor®

[www.onsemi.com](http://www.onsemi.com)



SC-70/SOT-323  
CASE 419  
STYLE 3

#### MARKING DIAGRAM



XX = 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 and shipping information in the package dimensions section on page 5 of this data sheet.

# BC856B, BC857B, BC858A

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>						
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = –10 mA)	BC856	V <sub>(BR)CEO</sub>	–65	–	–	V
	BC857		–45	–	–	
	BC858		–30	–	–	
Collector–Emitter Breakdown Voltage (I <sub>C</sub> = –10 μA, V <sub>EB</sub> = 0)	BC856	V <sub>(BR)CES</sub>	–80	–	–	V
	BC857		–50	–	–	
	BC858		–30	–	–	
Collector–Base Breakdown Voltage (I <sub>C</sub> = –10 μA)	BC856	V <sub>(BR)CBO</sub>	–80	–	–	V
	BC857		–50	–	–	
	BC858		–30	–	–	
Emitter–Base Breakdown Voltage (I <sub>E</sub> = –1.0 μA)	BC856	V <sub>(BR)EBO</sub>	–5.0	–	–	V
	BC857		–5.0	–	–	
	BC858		–5.0	–	–	
Collector Cutoff Current (V <sub>CB</sub> = –30 V) (V <sub>CB</sub> = –30 V, T <sub>A</sub> = 150°C)		I <sub>CBO</sub>	–	–	–15	nA
			–	–	–4.0	μA

## ON CHARACTERISTICS

DC Current Gain (I <sub>C</sub> = –10 μA, V <sub>CE</sub> = –5.0 V)	BC856A, BC858A	h <sub>FE</sub>	–	90	–	–
	BC856B, BC857B, BC858B		–	150	–	–
	BC857C		–	270	–	–
(I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V)	BC856A, BC858A		125	180	250	
	BC856B, BC857B, BC858B		220	290	475	
	BC857C		420	520	800	
Collector–Emitter Saturation Voltage (I <sub>C</sub> = –10 mA, I <sub>B</sub> = –0.5 mA) (I <sub>C</sub> = –100 mA, I <sub>B</sub> = –5.0 mA)		V <sub>CE(sat)</sub>	–	–	–0.3	V
			–	–	–0.65	
Base–Emitter Saturation Voltage (I <sub>C</sub> = –10 mA, I <sub>B</sub> = –0.5 mA) (I <sub>C</sub> = –100 mA, I <sub>B</sub> = –5.0 mA)		V <sub>BE(sat)</sub>	–	–0.7	–	V
			–	–0.9	–	
Base–Emitter On Voltage (I <sub>C</sub> = –2.0 mA, V <sub>CE</sub> = –5.0 V) (I <sub>C</sub> = –10 mA, V <sub>CE</sub> = –5.0 V)		V <sub>BE(on)</sub>	–0.6	–	–0.75	V
			–	–	–0.82	

## SMALL–SIGNAL CHARACTERISTICS

Current–Gain – Bandwidth Product (I <sub>C</sub> = –10 mA, V <sub>CE</sub> = –5.0 Vdc, f = 100 MHz)	f <sub>T</sub>	100	–	–	MHz
Output Capacitance (V <sub>CB</sub> = –10 V, f = 1.0 MHz)	C <sub>ob</sub>	–	–	4.5	pF
Noise Figure (I <sub>C</sub> = –0.2 mA, V <sub>CE</sub> = –5.0 Vdc, R <sub>S</sub> = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)	NF	–	–	10	dB

# BC856B, BC857B, BC858A

## BC857/BC858

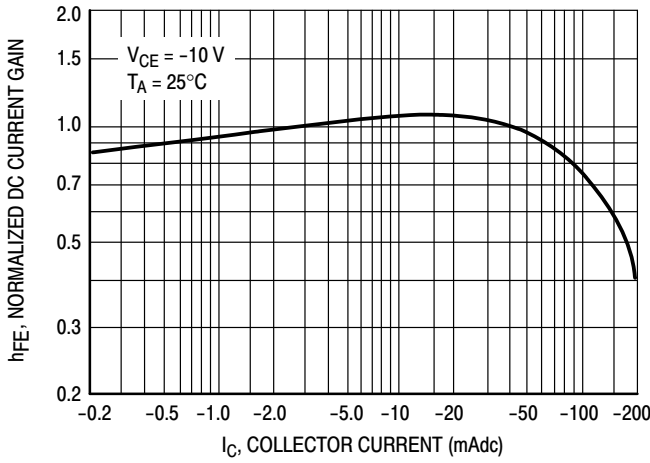


Figure 1. Normalized DC Current Gain

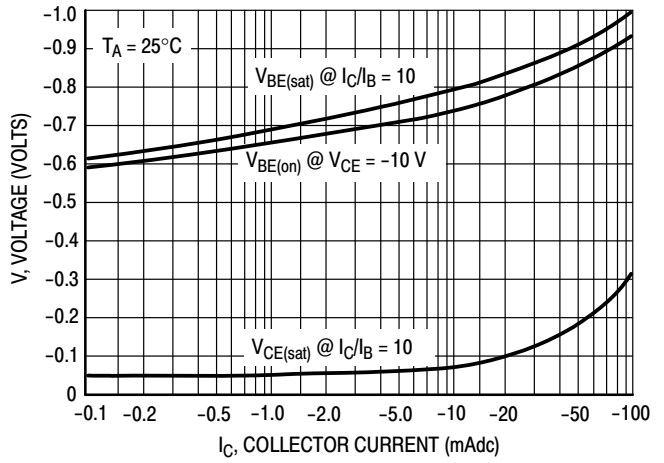


Figure 2. "Saturation" and "On" Voltages

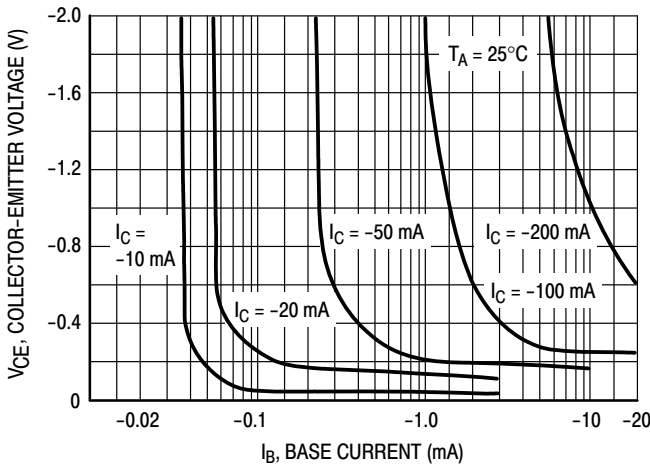


Figure 3. Collector Saturation Region

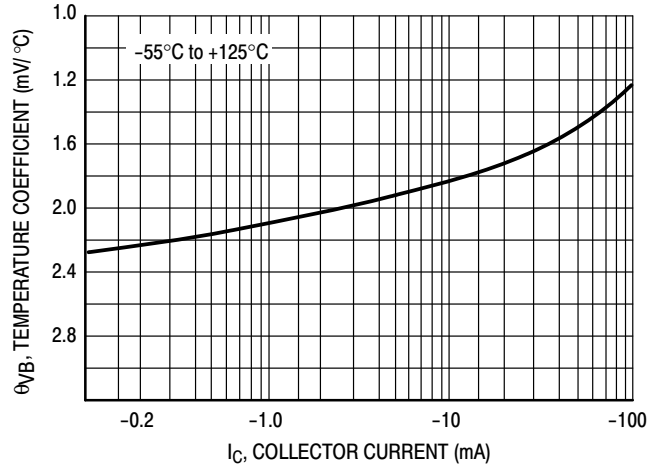


Figure 4. Base-Emitter Temperature Coefficient

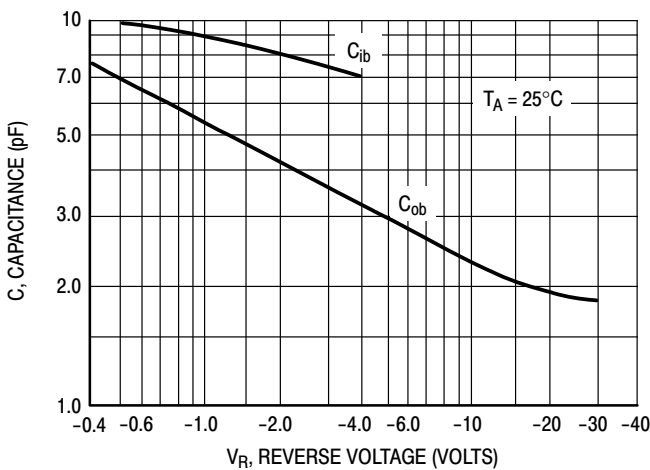


Figure 5. Capacitances

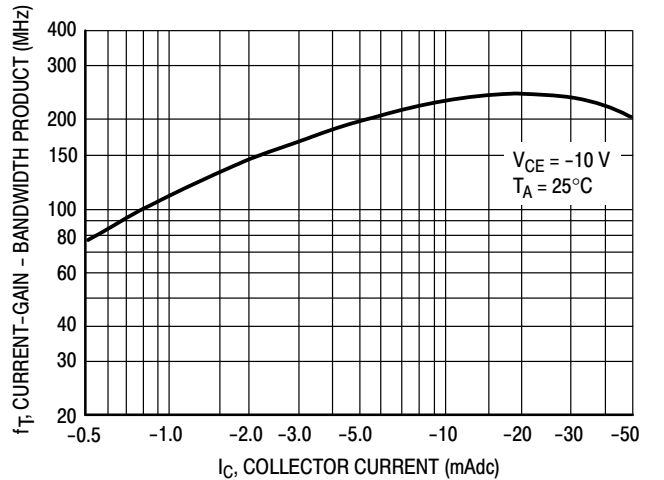


Figure 6. Current-Gain - Bandwidth Product

# BC856B, BC857B, BC858A

## BC856

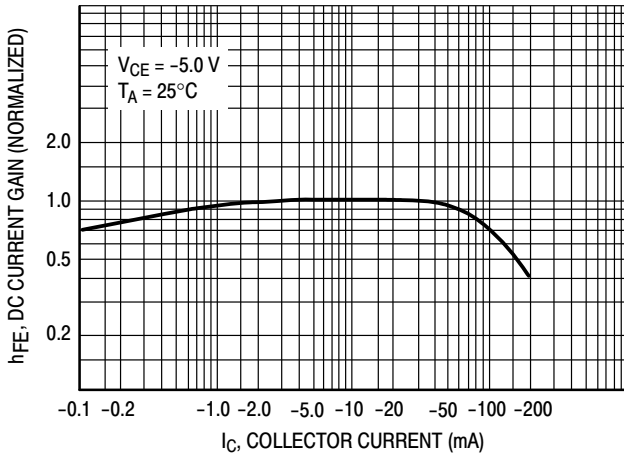


Figure 7. DC Current Gain

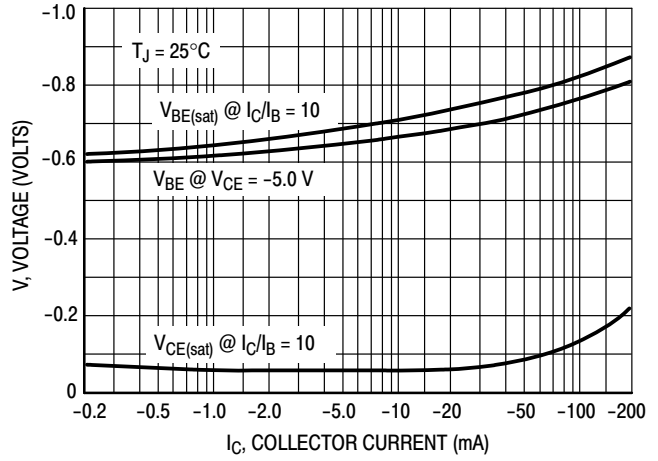


Figure 8. "On" Voltage

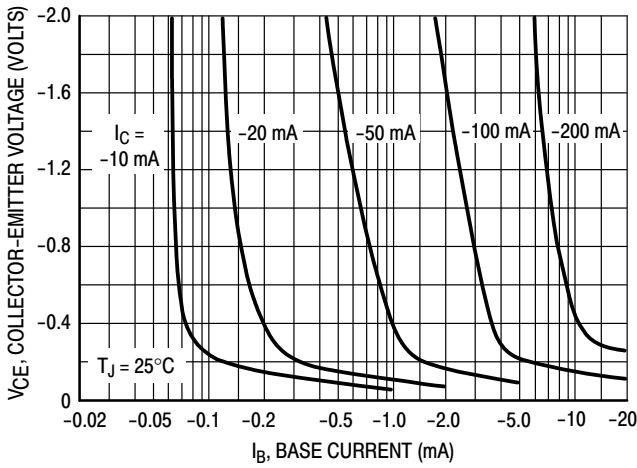


Figure 9. Collector Saturation Region

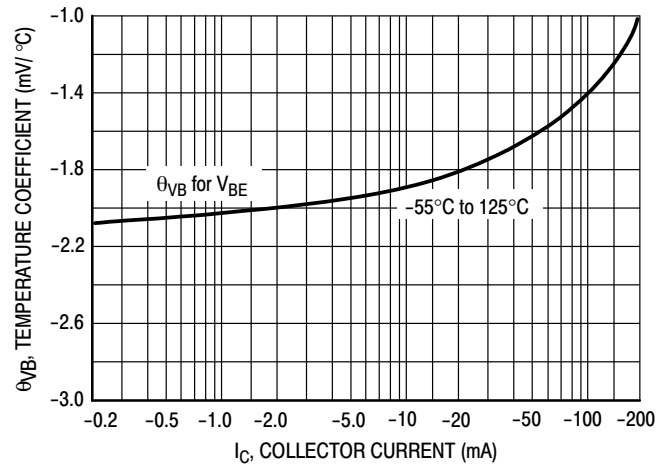


Figure 10. Base-Emitter Temperature Coefficient

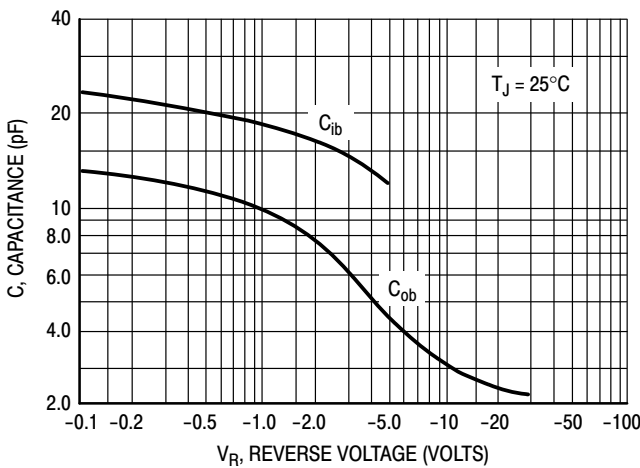


Figure 11. Capacitance

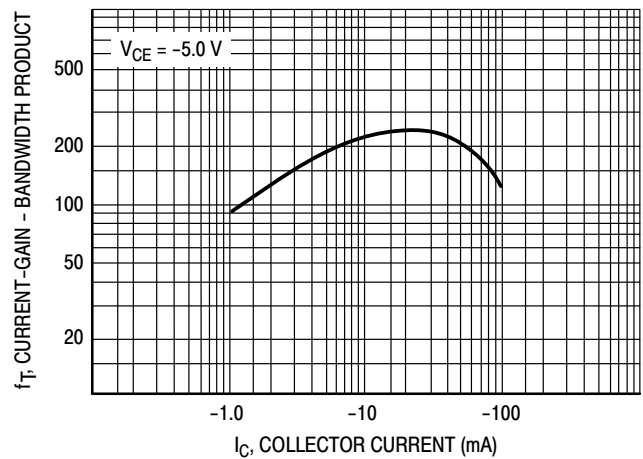


Figure 12. Current-Gain - Bandwidth Product

# BC856B, BC857B, BC858A

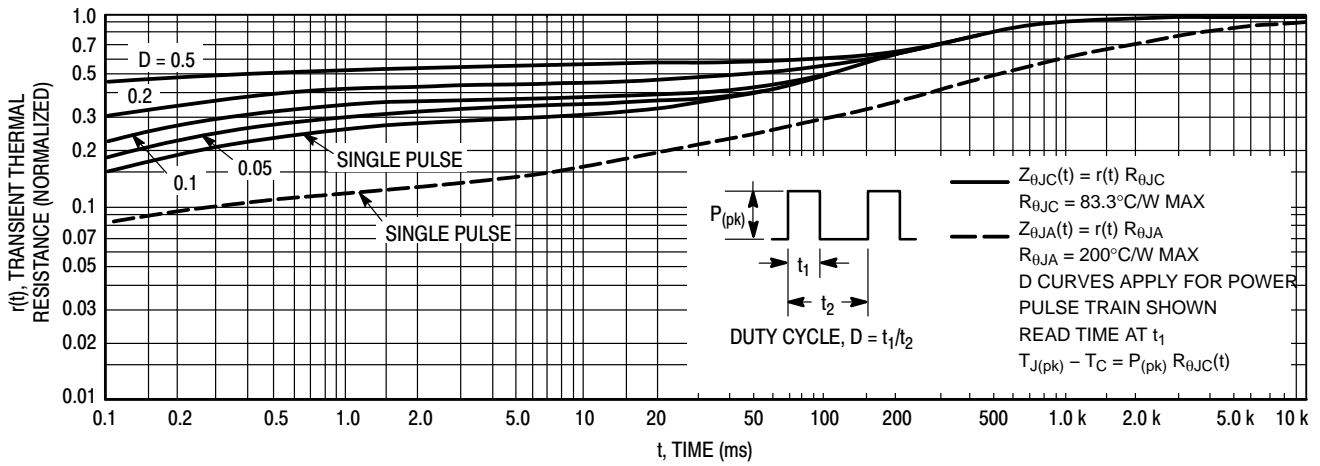


Figure 13. Thermal Response

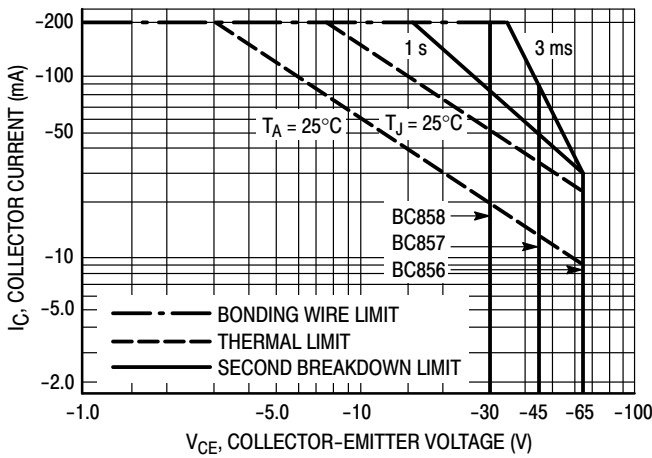


Figure 14. Active Region Safe Operating Area

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  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  or  $T_A$  is variable depending upon conditions. Pulse curves are valid for duty cycles to 10% provided  $T_{J(pk)} \leq 150^\circ\text{C}$ .  $T_{J(pk)}$  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	Marking	Package	Shipping†
BC856BWT1G	3B	SC-70/SOT-323 (Pb-Free)	3,000 / Tape & Reel
SBC856BWT1G*			
BC857BWT1G	3F	SC-70/SOT-323 (Pb-Free)	3,000 / Tape & Reel
SBC857BWT1G*			
BC857CWT1G	3G	SC-70/SOT-323 (Pb-Free)	3,000 / Tape & Reel
NSVBC857CWT1G*			
BC858AWT1G	3J	SC-70/SOT-323 (Pb-Free)	3,000 / Tape & Reel
BC858BWT1G	3K	SC-70/SOT-323 (Pb-Free)	3,000 / Tape & Reel

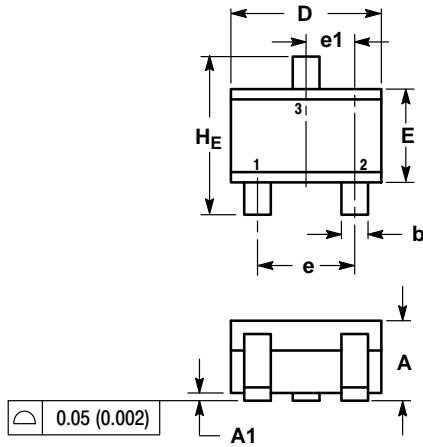
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

\*S and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

# BC856B, BC857B, BC858A

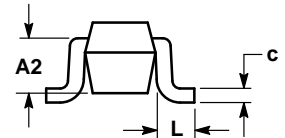
## PACKAGE DIMENSIONS

### SC-70 (SOT-323) CASE 419-04 ISSUE N



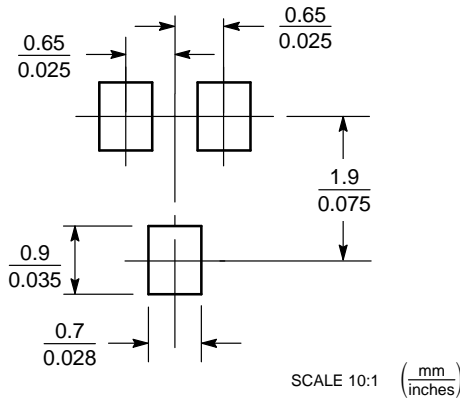
- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

DIM	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.80	0.90	1.00	0.032	0.035	0.040
A1	0.00	0.05	0.10	0.000	0.002	0.004
A2	0.70 REF			0.028 REF		
b	0.30	0.35	0.40	0.012	0.014	0.016
c	0.10	0.18	0.25	0.004	0.007	0.010
D	1.80	2.10	2.20	0.071	0.083	0.087
E	1.15	1.24	1.35	0.045	0.049	0.053
e	1.20	1.30	1.40	0.047	0.051	0.055
e1	0.65 BSC			0.026 BSC		
L	0.20	0.38	0.56	0.008	0.015	0.022
HE	2.00	2.10	2.40	0.079	0.083	0.095



- STYLE 3:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

### 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.

ON Semiconductor and are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

### PUBLICATION ORDERING INFORMATION

**LITERATURE FULFILLMENT:**  
Literature Distribution Center for ON Semiconductor  
P.O. Box 5163, Denver, Colorado 80217 USA  
Phone: 303-675-2175 or 800-344-3860 Toll Free USA/Canada  
Fax: 303-675-2176 or 800-344-3867 Toll Free USA/Canada  
Email: orderlit@onsemi.com

**N. American Technical Support:** 800-282-9855 Toll Free  
USA/Canada  
**Europe, Middle East and Africa Technical Support:**  
Phone: 421 33 790 2910  
**Japan Customer Focus Center**  
Phone: 81-3-5817-1050

**ON Semiconductor Website:** [www.onsemi.com](http://www.onsemi.com)  
**Order Literature:** <http://www.onsemi.com/orderlit>  
For additional information, please contact your local Sales Representative

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View BC858AWT1G on WIN SOURCE](#)

 [ON Semiconductor](#) Information

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management