BC856ALT1G Series, SBC856ALT1G Series

General Purpose Transistors

PNP Silicon

Features

- AEC−Q101 Qualified and PPAP Capable
- S and NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

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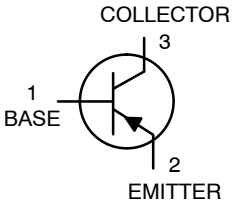
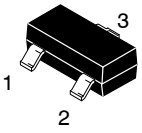




SOT−23 (TO−236AB)
CASE 318
STYLE 6

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Collector-Emitter Voltage BC856, SBC856 BC857, SBC857 BC858, NSVBC858, BC859	V_{CEO}	 −65 −45 −30	V
Collector-Base Voltage BC856, SBC856 BC857, SBC857 BC858, NSVBC858, BC859	V_{CBO}	 −80 −50 −30	V
Emitter−Base Voltage	V_{EBO}	−5.0	V
Collector Current − Continuous	I_C	−100	mAdc

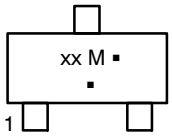
THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation FR−5 Board, (Note 1) T_A = 25°C Derate above 25°C	P_D	 225 1.8	 mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	556	°C/W
Total Device Dissipation Alumina Substrate, (Note 2) T_A = 25°C Derate above 25°C	P_D	 300 2.4	 mW mW/°C
Thermal Resistance, Junction−to−Ambient	$R_{\theta JA}$	417	°C/W
Junction and Storage Temperature	T_J, T_{stg}	−55 to +150	°C

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

1. FR−5 = 1.0 x 0.75 x 0.062 in.
2. Alumina = 0.4 x 0.3 x 0.024 in 99.5% alumina.

MARKING DIAGRAM



xx = Device Code
xx = (Refer to page 6)
M = Date Code*
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*Date Code orientation and/or overbar may vary depending upon manufacturing location.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 6 of this data sheet.

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

Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Collector – Emitter Breakdown Voltage (I_C = −10 mA)	BC856, SBC856 Series	$V_{(BR)CEO}$	−65	–	–	V
	BC857, SBC857 Series		−45	–	–	
	BC858, NSBVC858 BC859 Series		−30	–	–	
Collector – Emitter Breakdown Voltage (I_C = −10 μA, V_{EB} = 0)	BC856 S, SBC856eries	$V_{(BR)CES}$	−80	–	–	V
	BC857A, SBC857A, BC857B, SBC857B Only		−50	–	–	
	BC858, NSVB858, BC859 Series		−30	–	–	
Collector – Base Breakdown Voltage (I_C = −10 μA)	BC856, SBC856 Series	$V_{(BR)CBO}$	−80	–	–	V
	BC857, SBC857 Series		−50	–	–	
	BC858, NSVBC858, BC859 Series		−30	–	–	
Emitter – Base Breakdown Voltage (I_E = −1.0 μA)	BC856, SBC856 Series	$V_{(BR)EBO}$	−5.0	–	–	V
	BC857, SBC857 Series		−5.0	–	–	
	BC858, NSVBC858, BC859 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	BC856A, SBC856A, BC857A, SBC857A, BC858A	h_{FE}	–	90	–	–
(I_C = −10 μA, V_{CE} = −5.0 V)	BC856B, SBC856B, BC857B, SBC857B, BC858B, NSVBC858B		–	150	–	
	BC857C, SBC857C BC858C		–	270	–	
(I_C = −2.0 mA, V_{CE} = −5.0 V)	BC856A, SBC856A, BC857A, SBC857A, BC858A		125	180	250	
	BC856B, SBC856B, BC857B, SBC857B, BC858B, NSVBC858B, BC859B		220	290	475	
	BC857C, SBC857C, BC858C, BC859C		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 (I_C = −10 mA, V_{CE} = −5.0 Vdc, f = 100 MHz)		f_T	100	–	–	MHz
Output Capacitance (V_{CB} = −10 V, f = 1.0 MHz)		C_{ob}	–	–	4.5	pF
Noise Figure		NF				dB
(I_C = −0.2 mA, V_{CE} = −5.0 Vdc, R_S = 2.0 kΩ, f = 1.0 kHz, BW = 200 Hz)						
BC856, SBC856, BC857, SBC857, BC858, NSVBC858 Series			–	–	10	
BC859 Series			–	–	4.0	

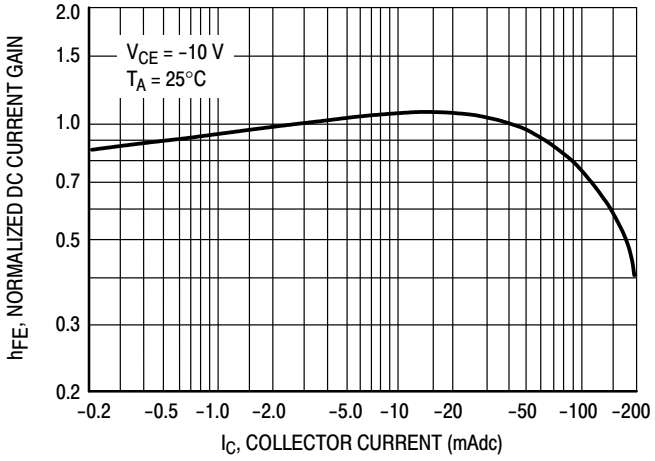


Figure 1. Normalized DC Current Gain

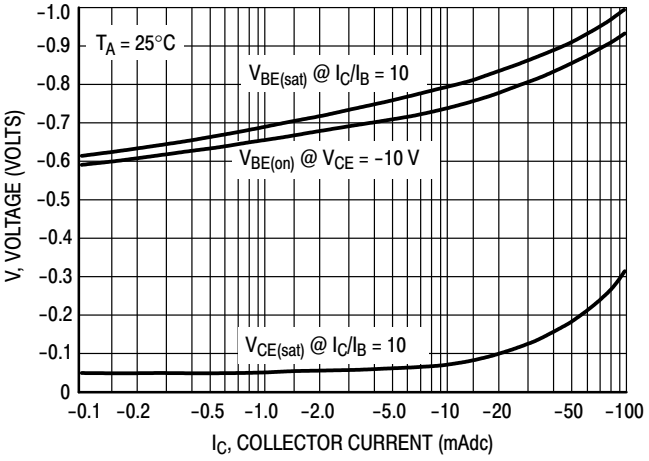


Figure 2. "Saturation" and "On" Voltages

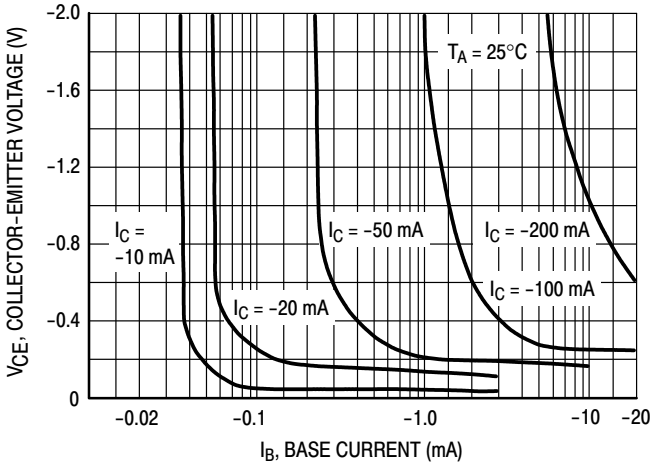


Figure 3. Collector Saturation Region

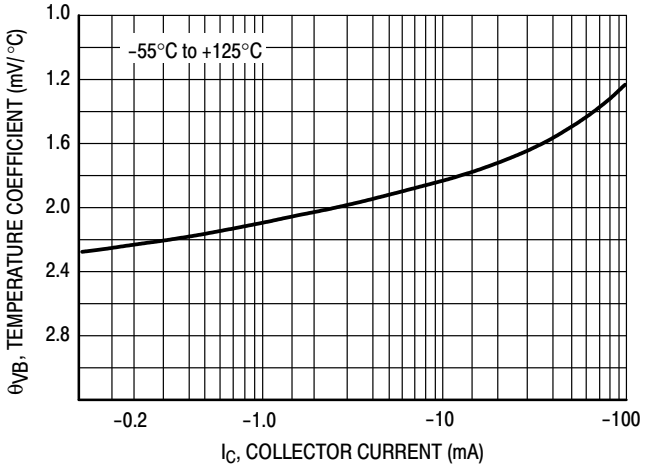


Figure 4. Base−Emitter Temperature Coefficient

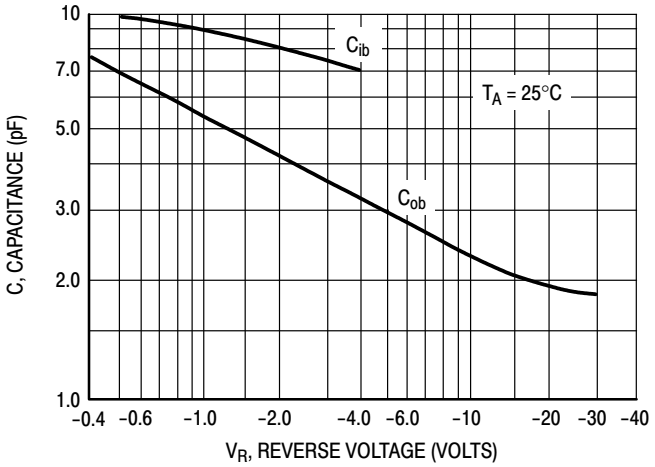


Figure 5. Capacitances

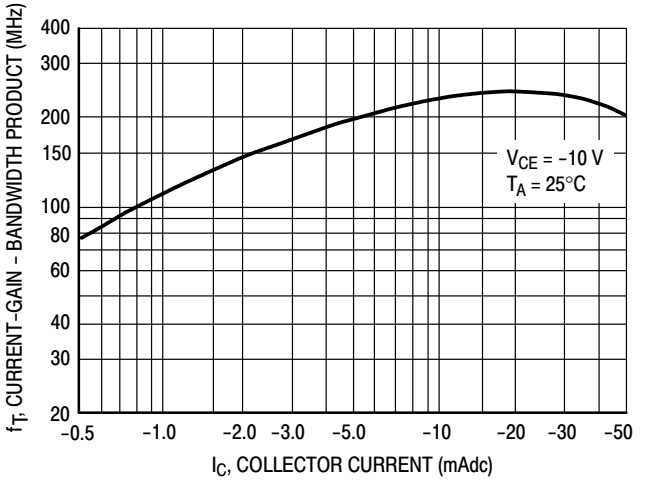


Figure 6. Current−Gain − Bandwidth Product

BC856/SBC856

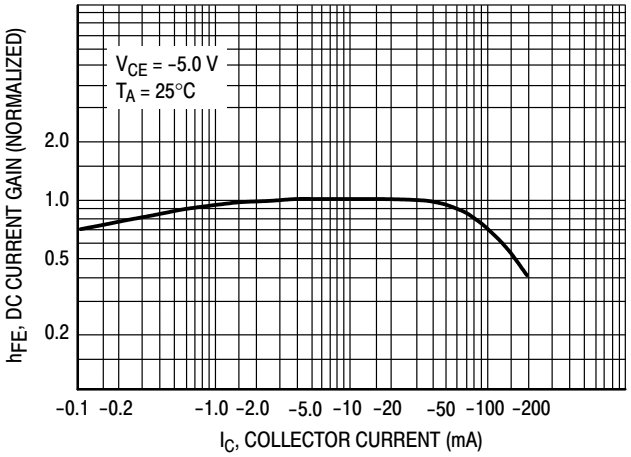


Figure 7. DC Current Gain

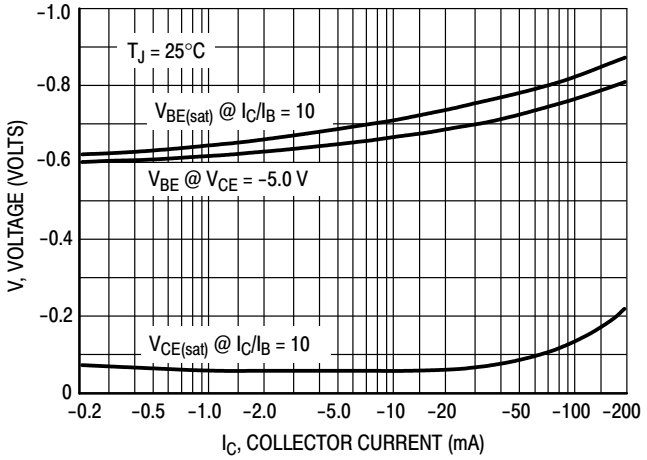


Figure 8. “On” Voltage

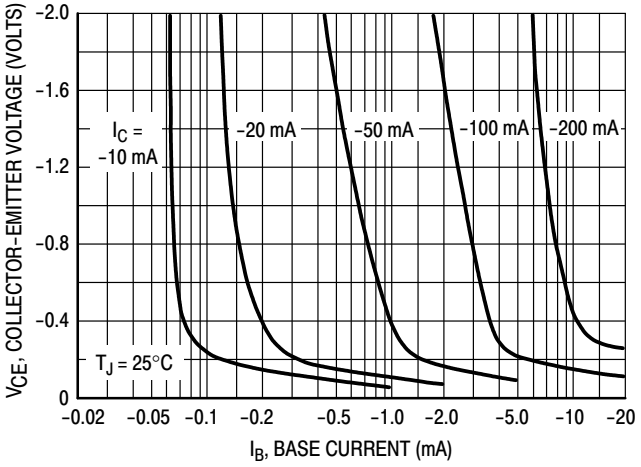


Figure 9. Collector Saturation Region

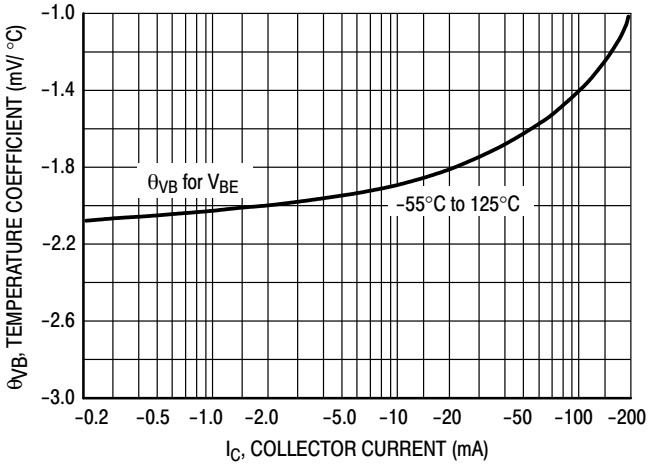


Figure 10. Base−Emitter Temperature Coefficient

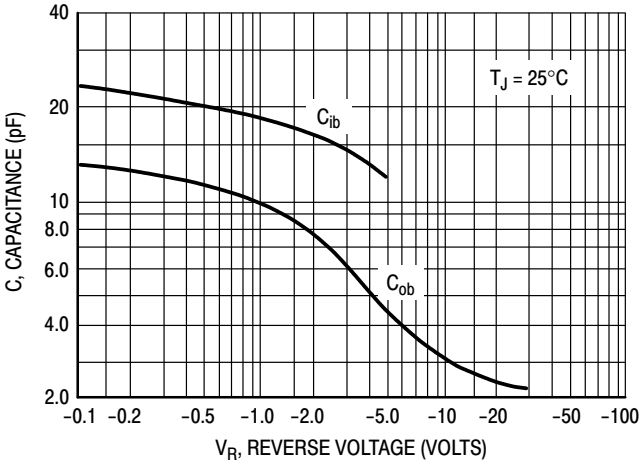


Figure 11. Capacitance

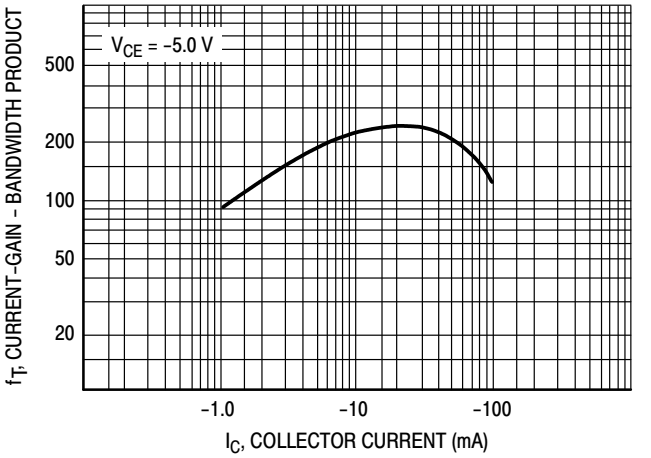


Figure 12. Current−Gain − Bandwidth Product

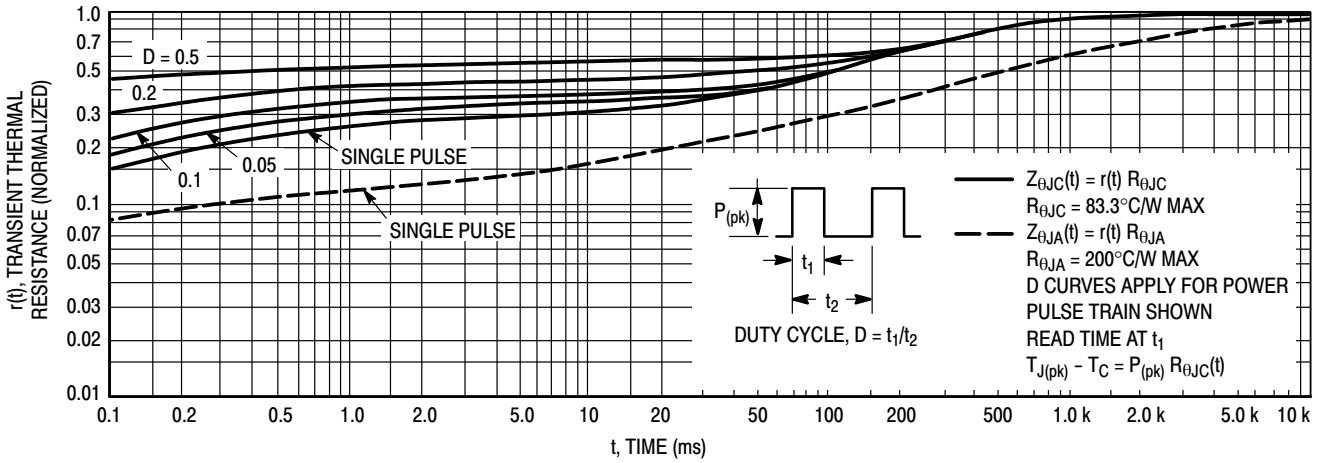


Figure 13. Thermal Response

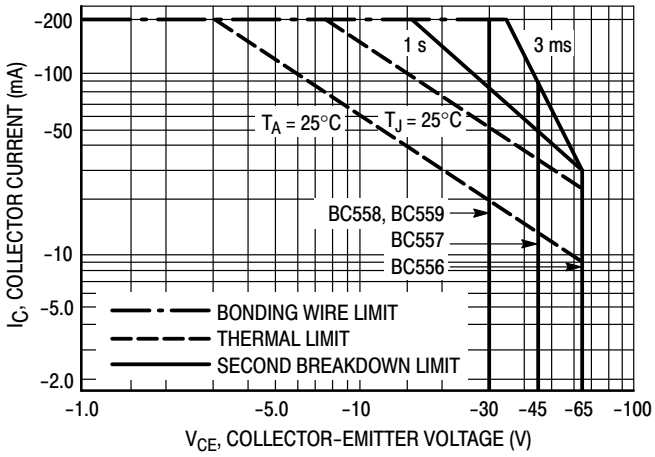


Figure 14. Active Region Safe Operating Area

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.

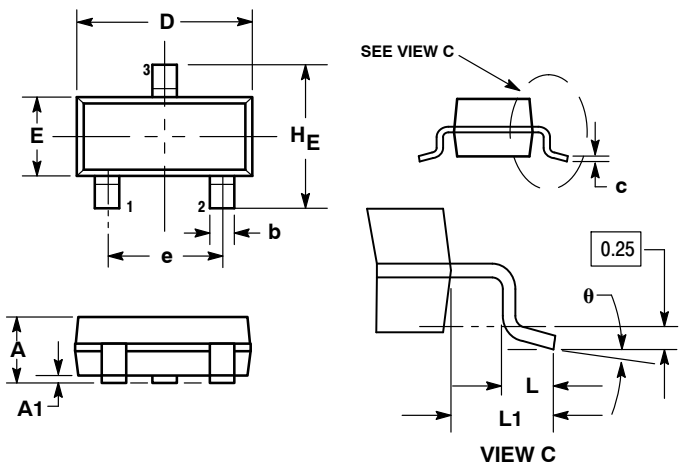
ORDERING INFORMATION

Device	Marking	Package	Shipping†
BC856ALT1G	3A	SOT−23 (Pb−Free)	3,000 / Tape & Reel
SBC856ALT1G			
BC856ALT3G			10,000 / Tape & Reel
BC856BLT1G	3B	SOT−23 (Pb−Free)	3,000 / Tape & Reel
SBC856BLT1G			
BC856BLT3G			10,000 / Tape & Reel
SBC856BLT3G			
BC857ALT1G	3E	SOT−23 (Pb−Free)	3,000 / Tape & Reel
SBC857ALT1G			
BC857BLT1G	3F	SOT−23 (Pb−Free)	3,000 / Tape & Reel
SBC857BLT1G			
BC857BLT3G			10,000 / Tape & Reel
BC857CLT1G	3G	SOT−23 (Pb−Free)	3,000 / Tape & Reel
SBC857CLT1G			
BC857CLT3G			10,000 / Tape & Reel
BC858ALT1G	3J	SOT−23 (Pb−Free)	3,000 / Tape & Reel
BC858BLT1G	3K	SOT−23 (Pb−Free)	
NSVBC858BLT1G			
BC858BLT3G	3L	SOT−23 (Pb−Free)	10,000 / Tape & Reel
BC858CLT1G		SOT−23 (Pb−Free)	3,000 / Tape & Reel
BC858CLT3G		SOT−23 (Pb−Free)	10,000 / Tape & Reel
BC859BLT1G	4B	SOT−23 (Pb−Free)	3,000 / Tape & Reel
BC859BLT3G		SOT−23 (Pb−Free)	10,000 / Tape & Reel
BC859CLT1G	4C	SOT−23 (Pb−Free)	3,000 / Tape & Reel
BC859CLT3G		SOT−23 (Pb−Free)	10,000 / 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.

PACKAGE DIMENSIONS

SOT−23 (TO−236)
CASE 318−08
ISSUE AP

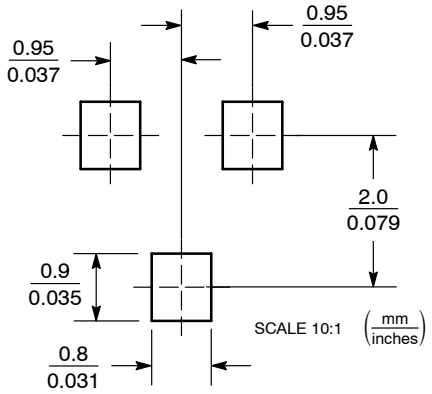


NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. MAXIMUM LEAD THICKNESS INCLUDES LEAD FINISH THICKNESS. MINIMUM LEAD THICKNESS IS THE MINIMUM THICKNESS OF BASE MATERIAL.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH, PROTRUSIONS, OR GATE BURRS.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	0.89	1.00	1.11	0.035	0.040	0.044
A1	0.01	0.06	0.10	0.001	0.002	0.004
b	0.37	0.44	0.50	0.015	0.018	0.020
c	0.09	0.13	0.18	0.003	0.005	0.007
D	2.80	2.90	3.04	0.110	0.114	0.120
E	1.20	1.30	1.40	0.047	0.051	0.055
e	1.78	1.90	2.04	0.070	0.075	0.081
L	0.10	0.20	0.30	0.004	0.008	0.012
L1	0.35	0.54	0.69	0.014	0.021	0.029
H_E	2.10	2.40	2.64	0.083	0.094	0.104
θ	0°	−−−	10°	0°	−−−	10°

STYLE 6:
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.

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

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