

# General Purpose Transistor

## PNP Silicon

### BC857BTT1G

These transistors are designed for general purpose amplifier applications. They are housed in the SOT-416/SC-75 which is designed for low power surface mount applications.

#### Features

- NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- This is a Pb-Free Device

#### MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

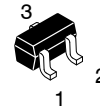
Symbol	Rating	Max	Unit
V <sub>CEO</sub>	Collector-Emitter Voltage	-45	V
V <sub>CBO</sub>	Collector-Base Voltage	-50	V
V <sub>EBO</sub>	Emitter-Base Voltage	-5.0	V
I <sub>C</sub>	Collector Current - Continuous	-100	mAdc
I <sub>C</sub>	Collector Current - Peak	-200	mAdc

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.

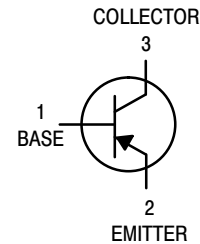
#### THERMAL CHARACTERISTICS

Symbol	Characteristic	Max	Unit
P <sub>D</sub>	Total Device Dissipation, FR-4 Board (Note 1) T <sub>A</sub> = 25°C Derated above 25°C	200	mW
		1.6	mW/°C
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient (Note 1)	600	°C/W
P <sub>D</sub>	Total Device Dissipation, FR-4 Board (Note 2) T <sub>A</sub> = 25°C Derated above 25°C	300	mW
		2.4	mW/°C
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient (Note 2)	400	°C/W
T <sub>J</sub> , T <sub>stg</sub>	Junction and Storage Temperature Range	-55 to +150	°C

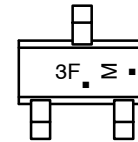
1. FR-4 @ min pad.
2. FR-4 @ 1.0 × 1.0 in pad.



SOT-416  
CASE 463  
STYLE 1



#### MARKING DIAGRAM



3F = 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 4 of this data sheet.

# BC857BTT1G

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

Symbol	Characteristic	Min	Typ	Max	Unit
<b>OFF CHARACTERISTICS</b>					
$V_{(BR)CEO}$	Collector – Emitter Breakdown Voltage ( $I_C = -10\text{ mA}$ )	-45	-	-	V
$V_{(BR)CES}$	Collector – Emitter Breakdown Voltage ( $I_C = -10\text{ }\mu\text{A}$ , $V_{EB} = 0$ )	-50	-	-	V
$V_{(BR)CBO}$	Collector – Base Breakdown Voltage ( $I_C = -10\text{ }\mu\text{A}$ )	-50	-	-	V
$V_{(BR)EBO}$	Emitter – Base Breakdown Voltage ( $I_E = -1.0\text{ }\mu\text{A}$ )	-5.0	-	-	V
$I_{CBO}$	Collector Cutoff Current ( $V_{CB} = -30\text{ V}$ ) ( $V_{CB} = -30\text{ V}$ , $T_A = 150^\circ\text{C}$ )	-	-	-15 -4.0	nA $\mu\text{A}$
<b>ON CHARACTERISTICS</b>					
$h_{FE}$	DC Current Gain ( $I_C = -10\text{ }\mu\text{A}$ , $V_{CE} = -5.0\text{ V}$ ) ( $I_C = -2.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ )	- 220	150 290	- 475	-
$V_{CE(sat)}$	Collector – Emitter Saturation Voltage ( $I_C = -10\text{ mA}$ , $I_B = -0.5\text{ mA}$ ) ( $I_C = -100\text{ mA}$ , $I_B = -5.0\text{ mA}$ )	- -	- -	-0.3 -0.65	V
$V_{BE(sat)}$	Base – Emitter Saturation Voltage ( $I_C = -10\text{ mA}$ , $I_B = -0.5\text{ mA}$ ) ( $I_C = -100\text{ mA}$ , $I_B = -5.0\text{ mA}$ )	- -	-0.7 -0.9	- -	V
$V_{BE(on)}$	Base – Emitter On Voltage ( $I_C = -2.0\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ ) ( $I_C = -10\text{ mA}$ , $V_{CE} = -5.0\text{ V}$ )	-0.6 -	- -	-0.75 -0.82	V
<b>SMALL – SIGNAL CHARACTERISTICS</b>					
$f_T$	Current – Gain – Bandwidth Product ( $I_C = -10\text{ mA}$ , $V_{CE} = -5.0\text{ Vdc}$ , $f = 100\text{ MHz}$ )	100	-	-	MHz
$C_{ob}$	Output Capacitance ( $V_{CB} = -10\text{ V}$ , $f = 1.0\text{ MHz}$ )	-	-	4.5	pF
NF	Noise Figure ( $I_C = -0.2\text{ mA}$ , $V_{CE} = -5.0\text{ Vdc}$ , $R_S = 2.0\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ , $BW = 200\text{ Hz}$ )	-	-	10	dB

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

# BC857BTT1G

## TYPICAL CHARACTERISTICS

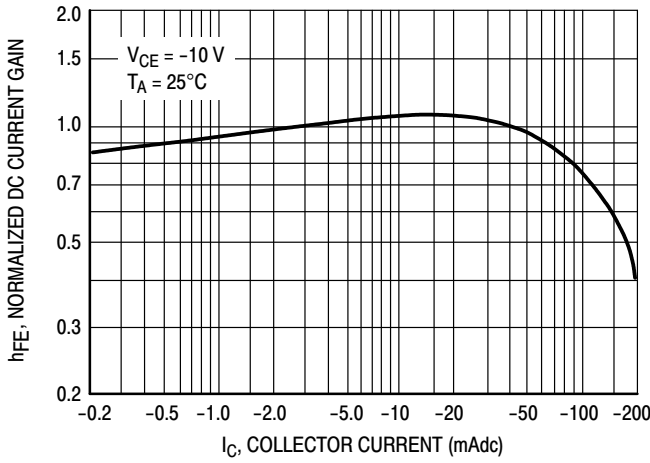


Figure 1. Normalized DC Current Gain

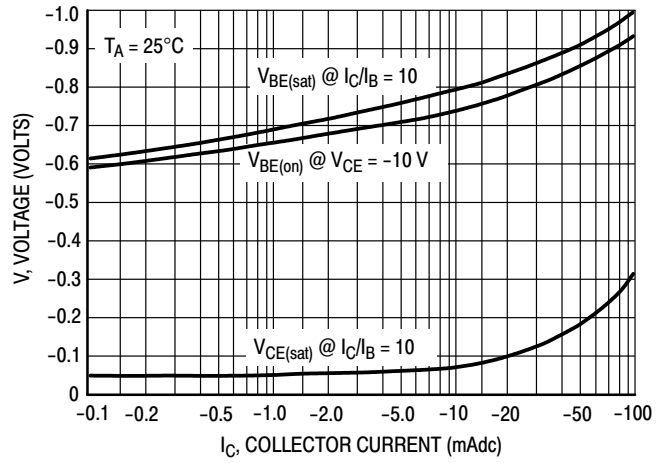


Figure 2. "Saturation" and "On" Voltages

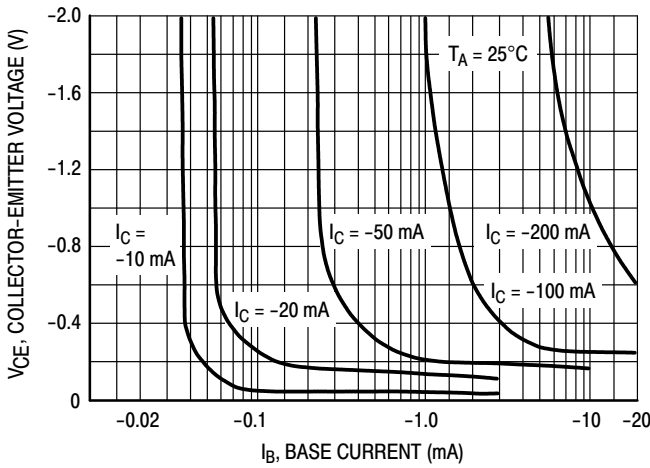


Figure 3. Collector Saturation Region

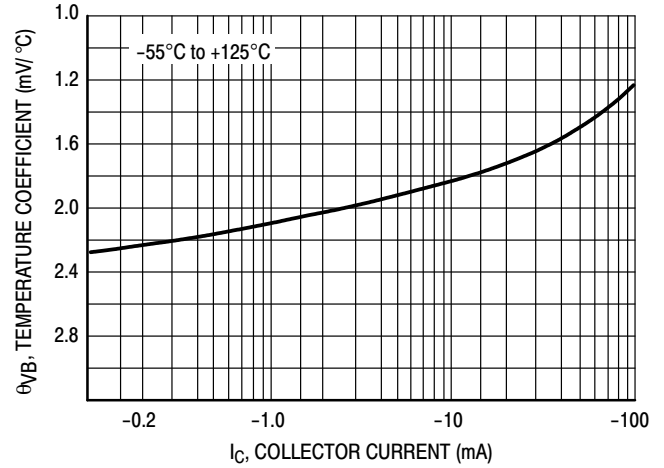


Figure 4. Base-Emitter Temperature Coefficient

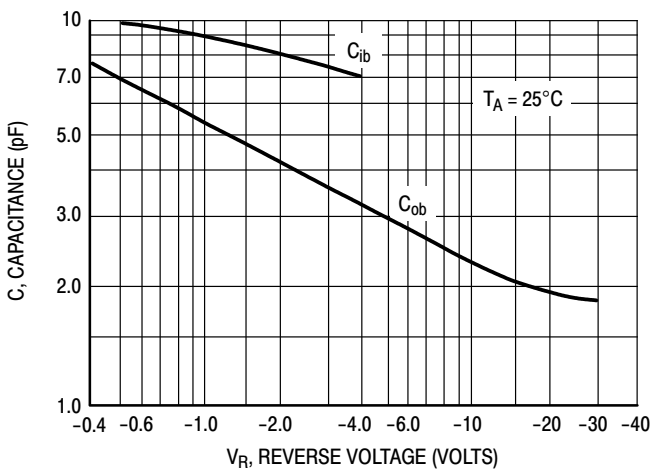


Figure 5. Capacitances

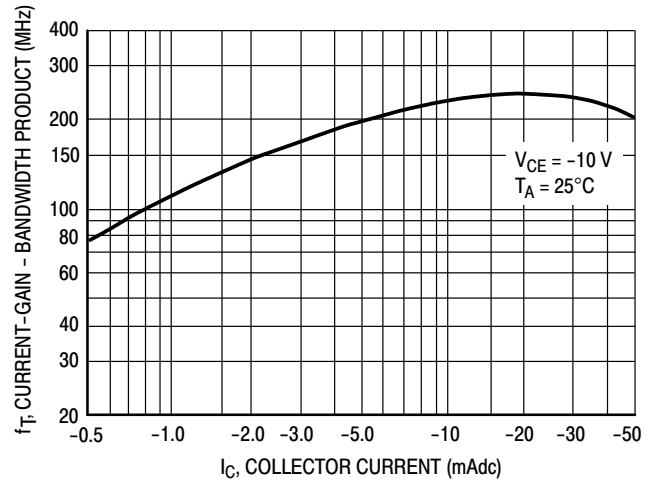


Figure 6. Current-Gain - Bandwidth Product

# BC857BTT1G

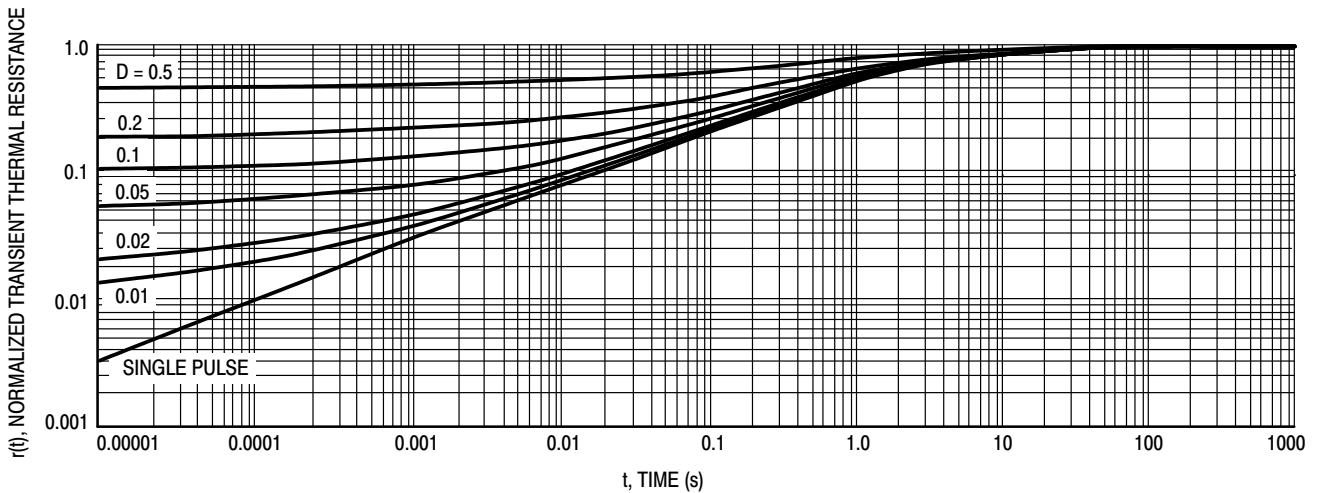


Figure 7. Thermal Response

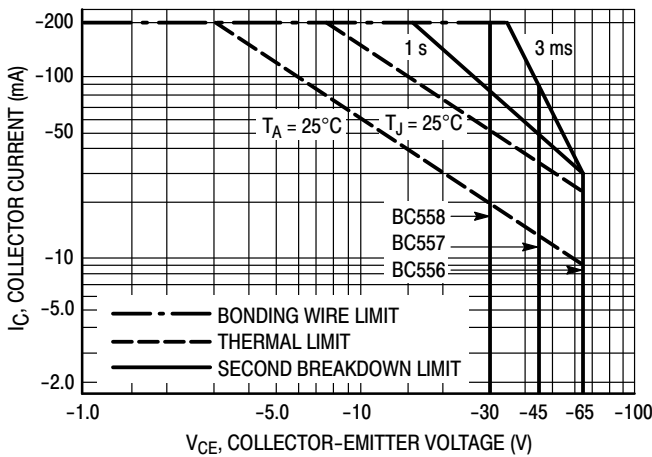


Figure 8. Active Region Safe Operating Area

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 8 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 7. 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	Package	Shipping <sup>†</sup>
BC857BTT1G	SOT-416 (PB-Free)	3,000 / Tape & Reel
NSVBC857BTT1G*		

<sup>†</sup>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](#).

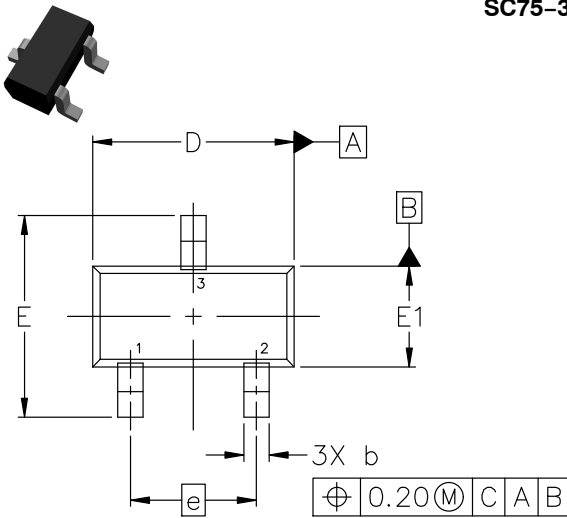
\*NSV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable.

**SC75-3 1.60x0.80x0.80, 1.00P**  
CASE 463  
ISSUE H

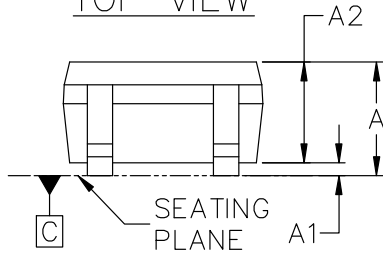
DATE 01 FEB 2024

NOTES:

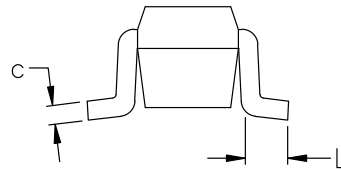
1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5-2018.
2. ALL DIMENSION ARE IN MILLIMETERS.



TOP VIEW



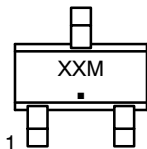
SIDE VIEW



END VIEW

DIM	MILLIMETERS		
	MIN.	NOM.	MAX.
A	0.70	0.80	0.90
A1	0.00	0.05	0.10
A2	0.80 REF.		
b	0.15	0.20	0.30
c	0.10	0.15	0.25
D	1.55	1.60	1.65
E	1.50	1.60	1.70
E1	0.70	0.80	0.90
e	1.00 BSC		
L	0.10	0.15	0.20

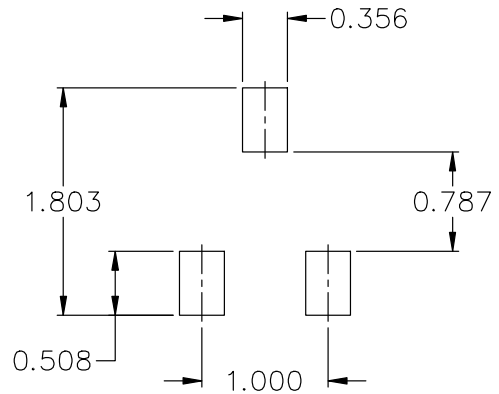
**GENERIC MARKING DIAGRAM\***



- XX = Specific Device Code
- M = Date 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 1:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR
- STYLE 2:  
PIN 1. ANODE  
2. N/C  
3. CATHODE
- STYLE 3:  
PIN 1. ANODE  
2. ANODE  
3. CATHODE
- STYLE 4:  
PIN 1. CATHODE  
2. CATHODE  
3. ANODE
- STYLE 5:  
PIN 1. GATE  
2. SOURCE  
3. DRAIN



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.

<b>DOCUMENT NUMBER:</b>	<b>98ASB15184C</b>	Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped "CONTROLLED COPY" in red.
<b>DESCRIPTION:</b>	<b>SC75-3 1.60x0.80x0.80, 1.00P</b>	<b>PAGE 1 OF 1</b>

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