

# BC546B, BC547A, B, C, BC548B, C

## Amplifier Transistors

### NPN Silicon

#### Features

- Pb-Free Packages are Available\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector - Emitter Voltage BC546 BC547 BC548	$V_{CEO}$	65 45 30	Vdc
Collector - Base Voltage BC546 BC547 BC548	$V_{CBO}$	80 50 30	Vdc
Emitter - Base Voltage	$V_{EBO}$	6.0	Vdc
Collector Current – Continuous	$I_C$	100	mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	625 5.0	mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5 12	W mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	-55 to +150	$^\circ\text{C}$

#### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

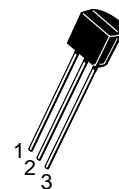
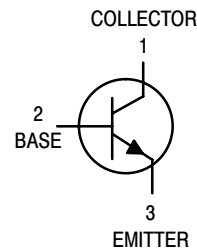
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur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

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



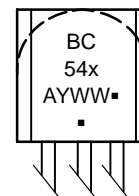
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<http://onsemi.com>



TO-92  
CASE 29  
STYLE 17

#### MARKING DIAGRAM



BC54x = Device Code  
x = 6, 7, or 8  
A = Assembly Location  
Y = Year  
WW = Work Week  
■ = 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.

# BC546B, BC547A, B, C, BC548B, C

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

Characteristic	Symbol	Min	Typ	Max	Unit	
<b>OFF CHARACTERISTICS</b>						
Collector – Emitter Breakdown Voltage ( $I_C = 1.0\text{ mA}$ , $I_B = 0$ )	BC546 BC547 BC548	$V_{(BR)CEO}$	65 45 30	– – –	– – –	V
Collector – Base Breakdown Voltage ( $I_C = 100\ \mu\text{A}$ )	BC546 BC547 BC548	$V_{(BR)CBO}$	80 50 30	– – –	– – –	V
Emitter – Base Breakdown Voltage ( $I_E = 10\ \mu\text{A}$ , $I_C = 0$ )	BC546 BC547 BC548	$V_{(BR)EBO}$	6.0 6.0 6.0	– – –	– – –	V
Collector Cutoff Current ( $V_{CE} = 70\text{ V}$ , $V_{BE} = 0$ ) ( $V_{CE} = 50\text{ V}$ , $V_{BE} = 0$ ) ( $V_{CE} = 35\text{ V}$ , $V_{BE} = 0$ ) ( $V_{CE} = 30\text{ V}$ , $T_A = 125^\circ\text{C}$ )	BC546 BC547 BC548 BC546/547/548	$I_{CES}$	– – – –	0.2 0.2 0.2 –	15 15 15 4.0	nA   $\mu\text{A}$
<b>ON CHARACTERISTICS</b>						
DC Current Gain ( $I_C = 10\ \mu\text{A}$ , $V_{CE} = 5.0\text{ V}$ )  ( $I_C = 2.0\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ )  ( $I_C = 100\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ )	BC547A BC546B/547B/548B BC548C  BC546 BC547 BC548 BC547A BC546B/547B/548B BC547C/BC548C  BC547A/548A BC546B/547B/548B BC548C	$h_{FE}$	– – –  110 110 110 110 200 420  – – –	90 150 270  – – – 180 290 520  120 180 300	– – –  450 800 800 220 450 800  – – –	–           – – –
Collector – Emitter Saturation Voltage ( $I_C = 10\text{ mA}$ , $I_B = 0.5\text{ mA}$ ) ( $I_C = 100\text{ mA}$ , $I_B = 5.0\text{ mA}$ ) ( $I_C = 10\text{ mA}$ , $I_B = \text{See Note 1}$ )		$V_{CE(sat)}$	– – –	0.09 0.2 0.3	0.25 0.6 0.6	V
Base – Emitter Saturation Voltage ( $I_C = 10\text{ mA}$ , $I_B = 0.5\text{ mA}$ )		$V_{BE(sat)}$	–	0.7	–	V
Base – Emitter On Voltage ( $I_C = 2.0\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ ) ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ )		$V_{BE(on)}$	0.55 –	– –	0.7 0.77	V
<b>SMALL-SIGNAL CHARACTERISTICS</b>						
Current – Gain – Bandwidth Product ( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ , $f = 100\text{ MHz}$ )	BC546 BC547 BC548	$f_T$	150 150 150	300 300 300	– – –	MHz
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )		$C_{obo}$	–	1.7	4.5	pF
Input Capacitance ( $V_{EB} = 0.5\text{ V}$ , $I_C = 0$ , $f = 1.0\text{ MHz}$ )		$C_{ibo}$	–	10	–	pF
Small – Signal Current Gain ( $I_C = 2.0\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ , $f = 1.0\text{ kHz}$ )	BC546 BC547/548 BC547A BC546B/547B/548B BC547C/548C	$h_{fe}$	125 125 125 240 450	– – 220 330 600	500 900 260 500 900	–
Noise Figure ( $I_C = 0.2\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ , $R_S = 2\text{ k}\Omega$ , $f = 1.0\text{ kHz}$ , $\Delta f = 200\text{ Hz}$ )	BC546 BC547 BC548	NF	– – –	2.0 2.0 2.0	10 10 10	dB

1.  $I_B$  is value for which  $I_C = 11\text{ mA}$  at  $V_{CE} = 1.0\text{ V}$ .

# BC546B, BC547A, B, C, BC548B, C

## BC547/BC548

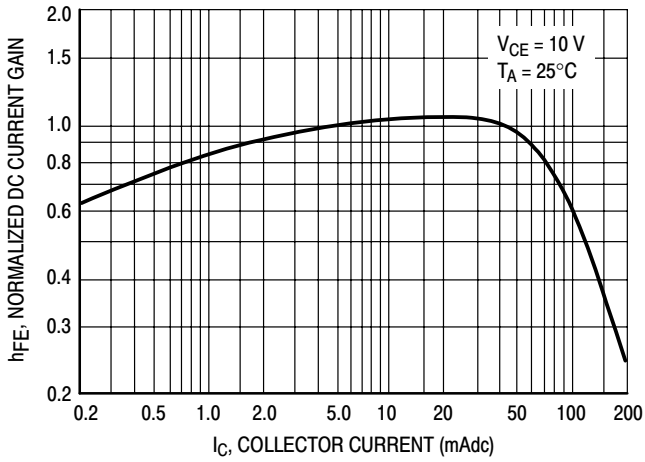


Figure 1. Normalized DC Current Gain

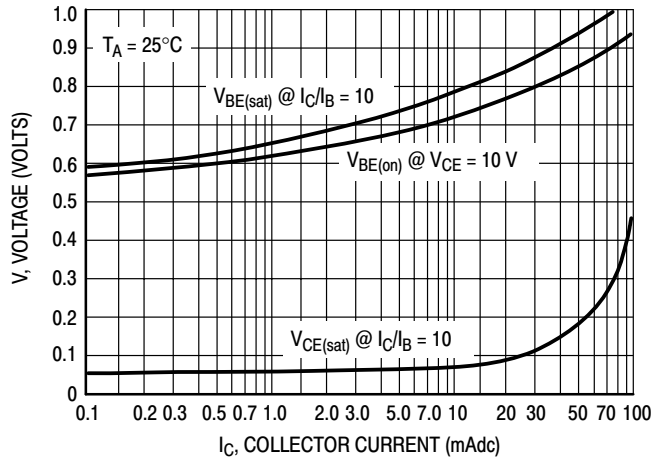


Figure 2. "Saturation" and "On" Voltages

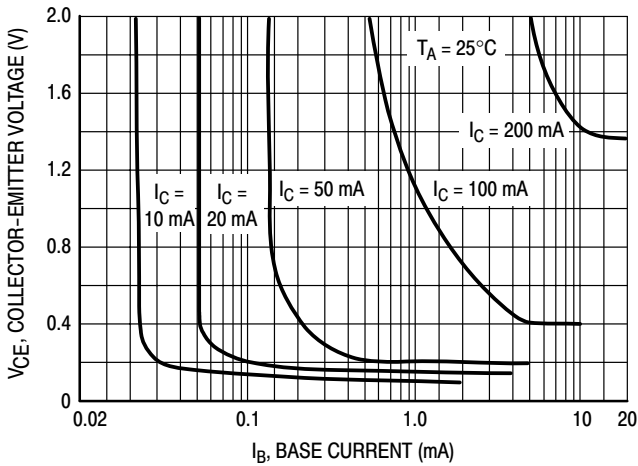


Figure 3. Collector Saturation Region

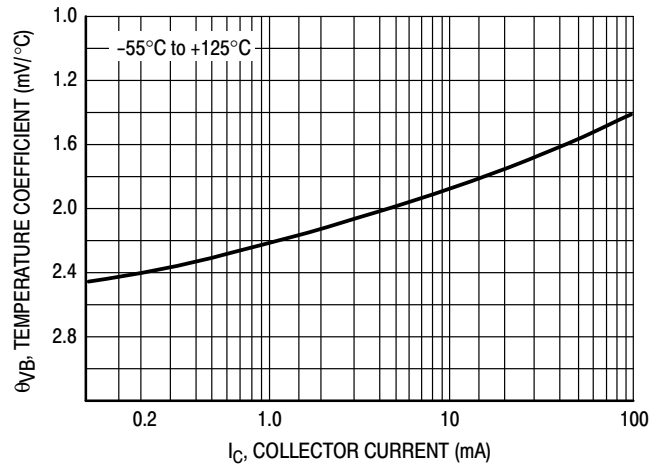


Figure 4. Base-Emitter Temperature Coefficient

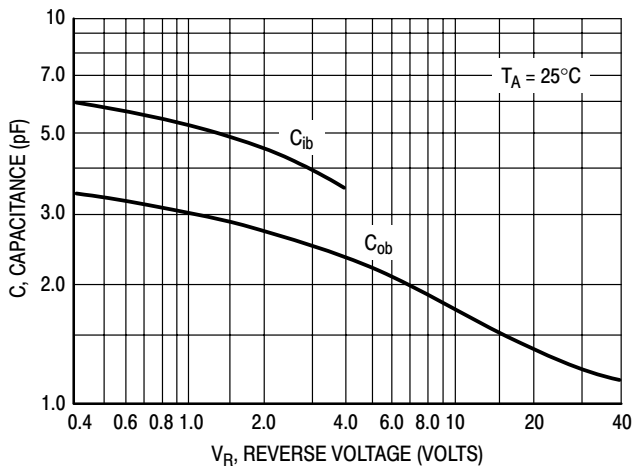


Figure 5. Capacitances

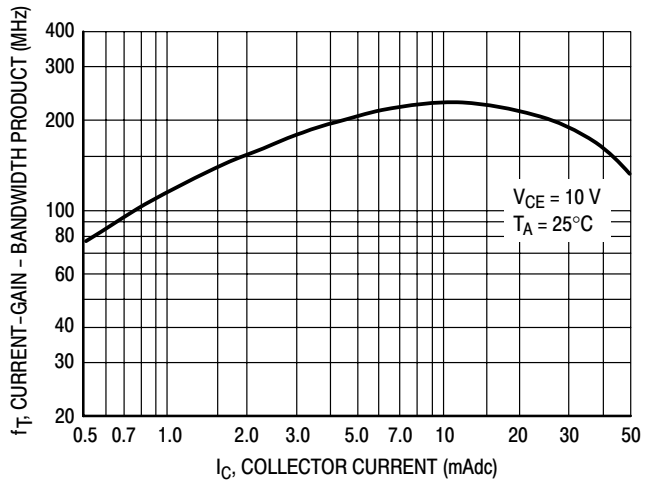


Figure 6. Current-Gain - Bandwidth Product

# BC546B, BC547A, B, C, BC548B, C

## BC546

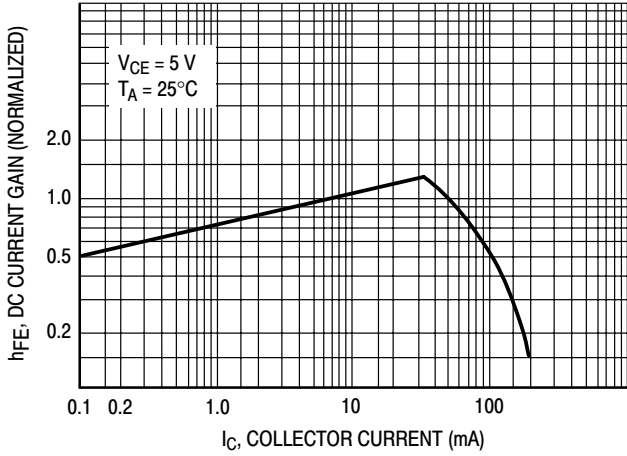


Figure 7. DC Current Gain

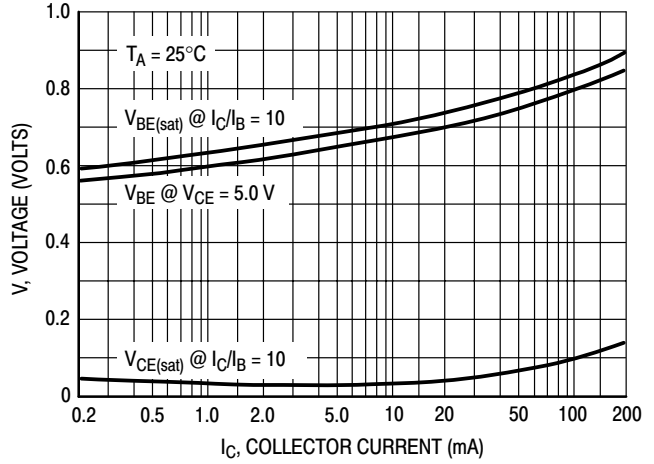


Figure 8. "On" Voltage

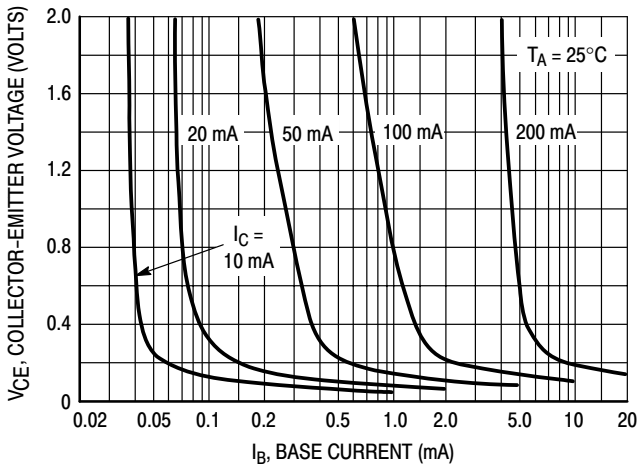


Figure 9. Collector Saturation Region

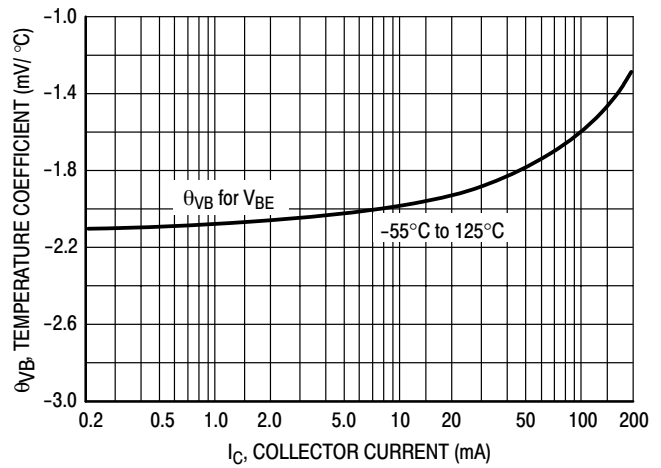


Figure 10. Base-Emitter Temperature Coefficient

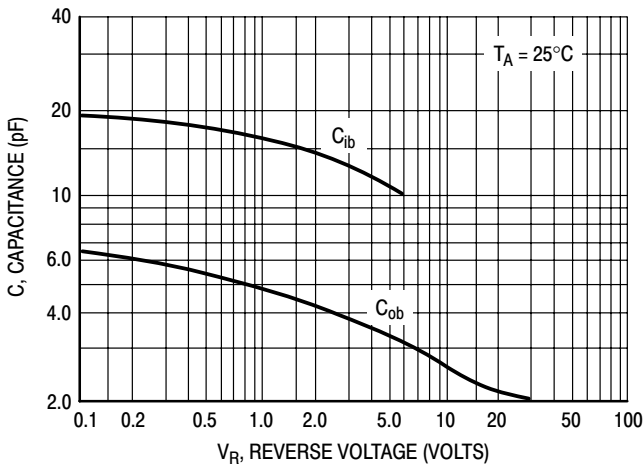


Figure 11. Capacitance

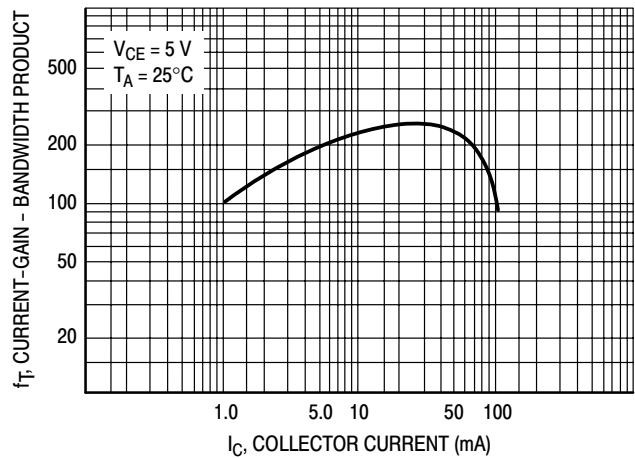


Figure 12. Current-Gain - Bandwidth Product

## BC546B, BC547A, B, C, BC548B, C

### DEVICE ORDERING INFORMATION

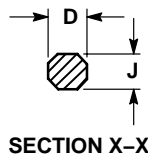
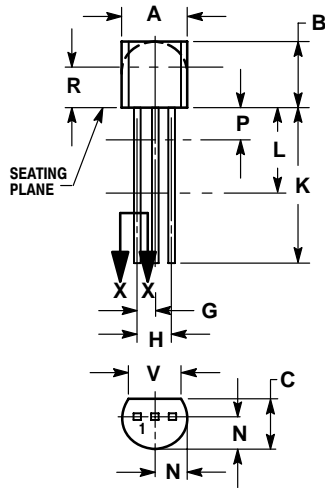
Device	Package	Shipping†
BC546B	TO-92	5000 Units / Bulk
BC546BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC546BRL1	TO-92	2000 / Tape & Reel
BC546BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC546BZL1	TO-92	2000 / Ammo Box
BC546BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC547ARL	TO-92	2000 / Tape & Reel
BC547ARLG	TO-92 (Pb-Free)	2000 / Tape & Reel
BC547ARL1	TO-92	2000 / Tape & Reel
BC547ARL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC547AZL1	TO-92	2000 / Ammo Box
BC547AZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC547B	TO-92	5000 Units / Bulk
BC547BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC547BRL1	TO-92	2000 / Tape & Reel
BC547BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC547BZL1	TO-92	2000 / Ammo Box
BC547BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC547C	TO-92	5000 Units / Bulk
BC547CG	TO-92 (Pb-Free)	5000 Units / Bulk
BC547CZL1	TO-92	2000 / Ammo Box
BC547CZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC548B	TO-92	5000 Units / Bulk
BC548BG	TO-92 (Pb-Free)	5000 Units / Bulk
BC548BRL1	TO-92	2000 / Tape & Reel
BC548BRL1G	TO-92 (Pb-Free)	2000 / Tape & Reel
BC548BZL1	TO-92	2000 / Ammo Box
BC548BZL1G	TO-92 (Pb-Free)	2000 / Ammo Box
BC548C	TO-92	5000 Units / Bulk
BC548CG	TO-92 (Pb-Free)	5000 Units / Bulk
BC548CZL1	TO-92	2000 / Ammo Box
BC548CZL1G	TO-92 (Pb-Free)	2000 / Ammo Box

†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.

# BC546B, BC547A, B, C, BC548B, C

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-11  
ISSUE AL



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
4. LEAD DIMENSION IS UNCONTROLLED IN P AND BEYOND DIMENSION K MINIMUM.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.175	0.205	4.45	5.20
B	0.170	0.210	4.32	5.33
C	0.125	0.165	3.18	4.19
D	0.016	0.021	0.407	0.533
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.015	0.020	0.39	0.50
K	0.500	---	12.70	---
L	0.250	---	6.35	---
N	0.080	0.105	2.04	2.66
P	---	0.100	---	2.54
R	0.115	---	2.93	---
V	0.135	---	3.43	---

### STYLE 17:

1. COLLECTOR
2. BASE
3. EMITTER

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