

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

## Amplifier Transistors

### NPN Silicon

#### Features

- Pb-Free Package is Available\*

#### MAXIMUM RATINGS

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

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.

#### THERMAL CHARACTERISTICS

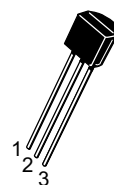
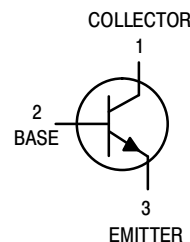
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	200	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	83.3	$^\circ\text{C}/\text{W}$

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



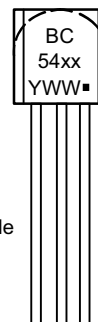
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TO-92  
CASE 29  
STYLE 17

#### MARKING DIAGRAM



BC54xx = Specific Device Code  
Y = Year  
WW = Work Week  
■ = Pb-Free Package

#### 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<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> = 1.0 mA, I <sub>B</sub> = 0)	BC546	V <sub>(BR)CEO</sub>	65	–	–	V
	BC547		45	–	–	
	BC548		30	–	–	
Collector – Base Breakdown Voltage (I <sub>C</sub> = 100 μA <sub>dc</sub> )	BC546	V <sub>(BR)CBO</sub>	80	–	–	V
	BC547		50	–	–	
	BC548		30	–	–	
Emitter – Base Breakdown Voltage (I <sub>E</sub> = 10 μA, I <sub>C</sub> = 0)	BC546	V <sub>(BR)EBO</sub>	6.0	–	–	V
	BC547		6.0	–	–	
	BC548		6.0	–	–	
Collector Cutoff Current (V <sub>CE</sub> = 70 V, V <sub>BE</sub> = 0) (V <sub>CE</sub> = 50 V, V <sub>BE</sub> = 0) (V <sub>CE</sub> = 35 V, V <sub>BE</sub> = 0) (V <sub>CE</sub> = 30 V, T <sub>A</sub> = 125°C)	BC546	I <sub>CES</sub>	–	0.2	15	nA
	BC547		–	0.2	15	
	BC548		–	0.2	15	
	BC546/547/548		–	–	4.0	μA
<b>ON CHARACTERISTICS</b>						
DC Current Gain (I <sub>C</sub> = 10 μA, V <sub>CE</sub> = 5.0 V)  (I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 V)  (I <sub>C</sub> = 100 mA, V <sub>CE</sub> = 5.0 V)	BC547A	h <sub>FE</sub>	–	90	–	–
	BC546B/547B/548B		–	150	–	
	BC548C		–	270	–	
	BC546		110	–	450	
	BC547		110	–	800	
	BC548		110	–	800	
	BC547A		110	180	220	
	BC546B/547B/548B		200	290	450	
	BC547C/BC548C		420	520	800	
	BC547A/548A		–	120	–	
	BC546B/547B/548B		–	180	–	
	BC548C		–	300	–	
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) (I <sub>C</sub> = 10 mA, I <sub>B</sub> = See Note 1)		V <sub>CE(sat)</sub>	–	0.09	0.25	V
			–	0.2	0.6	
			–	0.3	0.6	
Base – Emitter Saturation Voltage (I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.5 mA)		V <sub>BE(sat)</sub>	–	0.7	–	V
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>	0.55	–	0.7	V
			–	–	0.77	
<b>SMALL-SIGNAL CHARACTERISTICS</b>						
Current – Gain – Bandwidth Product (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 5.0 V, f = 100 MHz)	BC546	f <sub>T</sub>	150	300	–	MHz
	BC547		150	300	–	
	BC548		150	300	–	
Output Capacitance (V <sub>CB</sub> = 10 V, I <sub>C</sub> = 0, f = 1.0 MHz)		C <sub>obo</sub>	–	1.7	4.5	pF
Input Capacitance (V <sub>EB</sub> = 0.5 V, I <sub>C</sub> = 0, f = 1.0 MHz)		C <sub>ibo</sub>	–	10	–	pF
Small – Signal Current Gain (I <sub>C</sub> = 2.0 mA, V <sub>CE</sub> = 5.0 V, f = 1.0 kHz)	BC546	h <sub>fe</sub>	125	–	500	–
	BC547/548		125	–	900	
	BC547A		125	220	260	
	BC546B/547B/548B		240	330	500	
	BC547C/548C		450	600	900	
Noise Figure (I <sub>C</sub> = 0.2 mA, V <sub>CE</sub> = 5.0 V, R <sub>S</sub> = 2 kΩ, f = 1.0 kHz, Δf = 200 Hz)	BC546	NF	–	2.0	10	dB
	BC547		–	2.0	10	
	BC548		–	2.0	10	

1. I<sub>B</sub> is value for which I<sub>C</sub> = 11 mA at V<sub>CE</sub> = 1.0 V.

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

## BC547/BC548

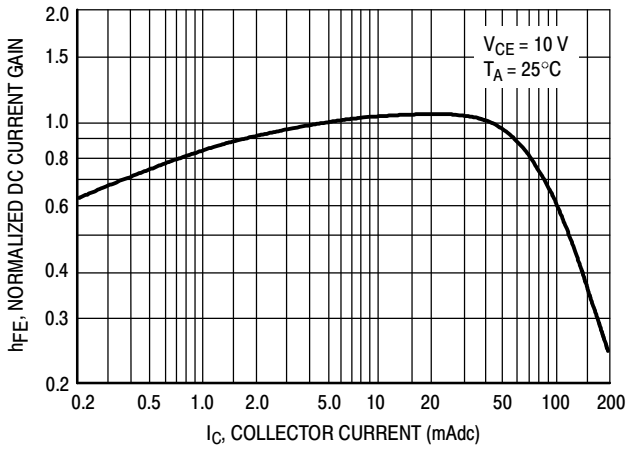


Figure 1. Normalized DC Current Gain

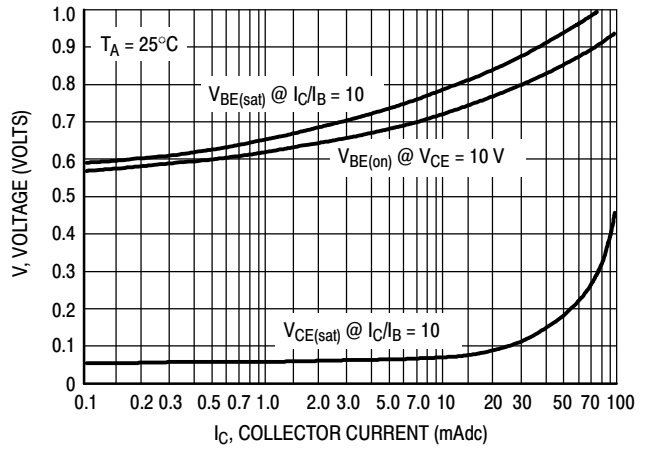


Figure 2. "Saturation" and "On" Voltages

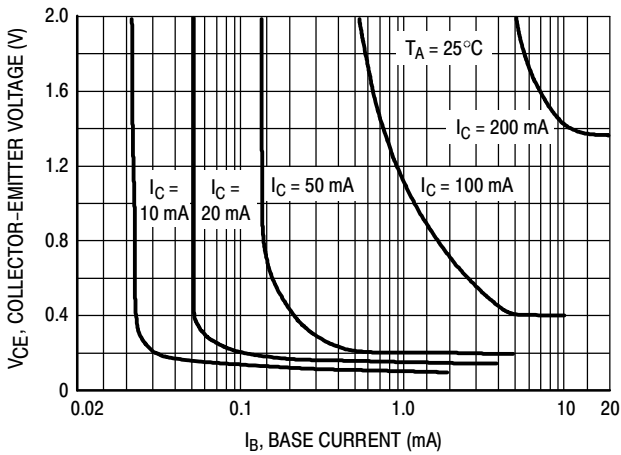


Figure 3. Collector Saturation Region

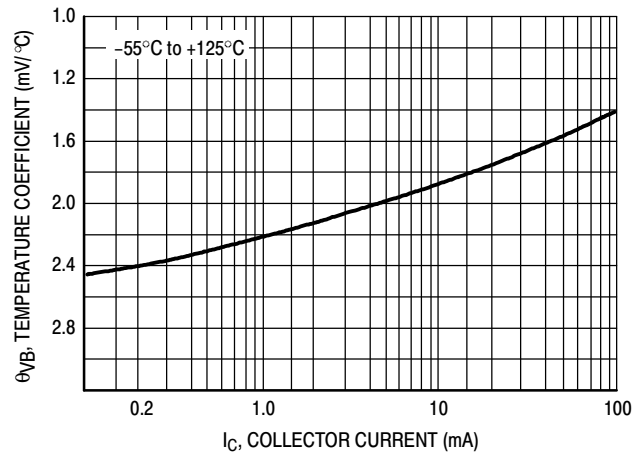


Figure 4. Base-Emitter Temperature Coefficient

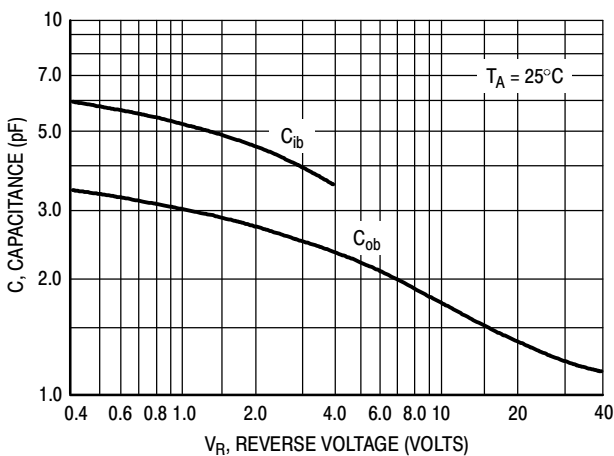


Figure 5. Capacitances

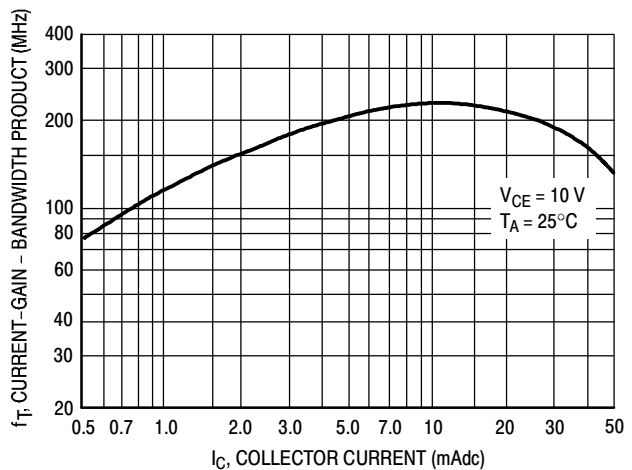


Figure 6. Current-Gain - Bandwidth Product

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## BC546

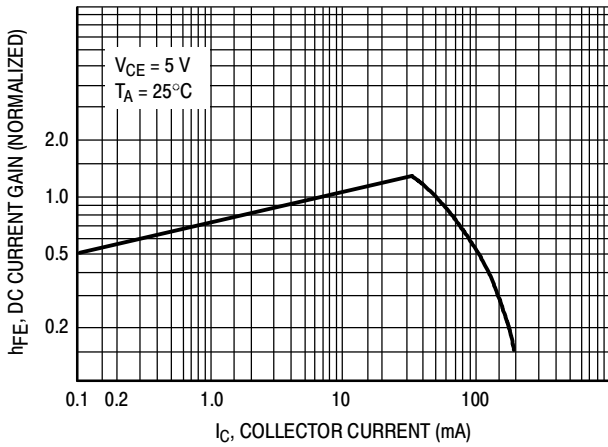


Figure 7. DC Current Gain

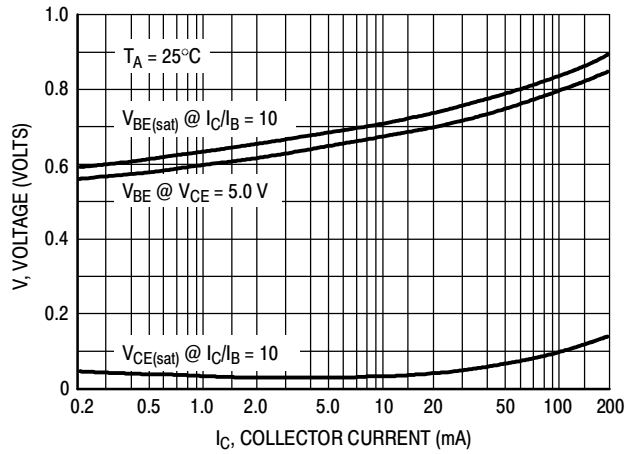


Figure 8. "On" Voltage

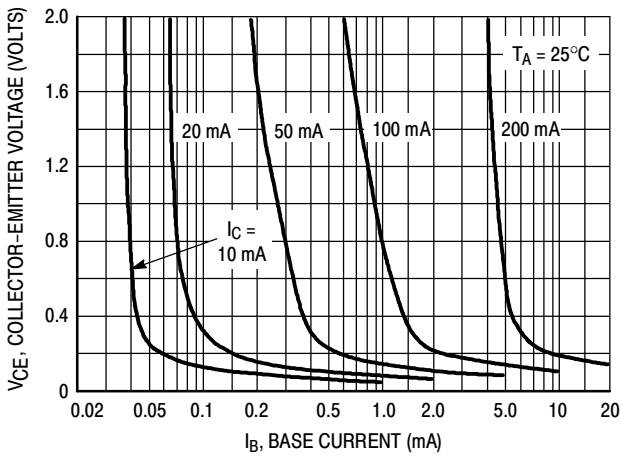


Figure 9. Collector Saturation Region

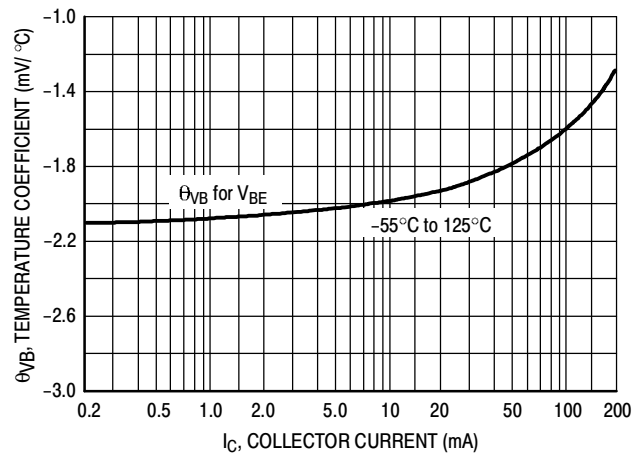


Figure 10. Base-Emitter Temperature Coefficient

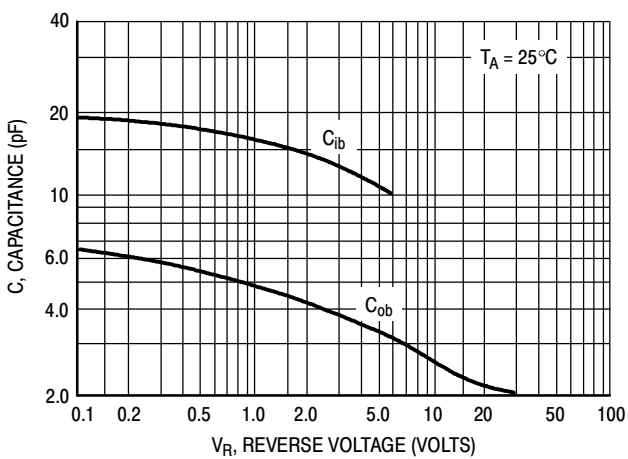


Figure 11. Capacitance

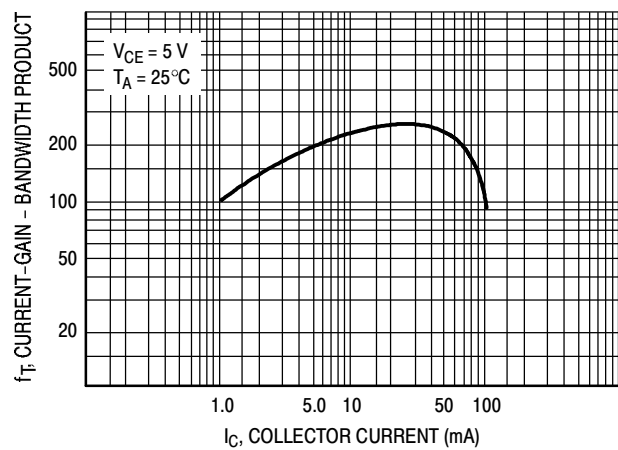


Figure 12. Current-Gain - Bandwidth Product

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

### DEVICE ORDERING INFORMATION

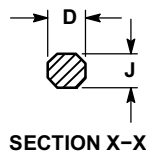
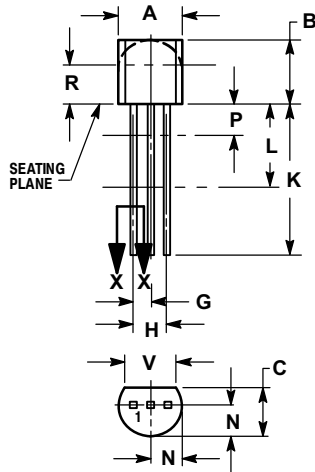
Device	Package	Shipping†
BC546B	TO-92 (TO-226)	5000 Units / Bulk
BC546BRL1		2000 Tape & Reel
BC546BZL1		2000 Tape & Ammo Box
BC547ARL		2000 Tape & Reel
BC547ARL1		2000 Tape & Reel
BC547AZL1		2000 Tape & Ammo Box
BC547B		5000 Units / Bulk
BC547BRL1		2000 Tape & Reel
BC547BZL1		2000 Tape & Ammo Box
BC547C		5000 Units / Bulk
BC547CZL1		2000 Tape & Ammo Box
BC548B		5000 Units / Bulk
BC548BRL1		2000 Tape & Reel
BC548BZL1		2000 Tape & Ammo Box
BC548BZL1G		
BC548C	TO-92 (TO-226)	5000 Units / Bulk
BC548CZL1		2000 Tape & 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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