

# Amplifier Transistors

## NPN Silicon

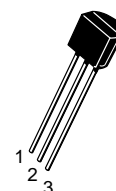
### MAXIMUM RATINGS

Rating	Symbol	BC546	BC547	BC548	Unit
Collector–Emitter Voltage	$V_{CEO}$	65	45	30	Vdc
Collector–Base Voltage	$V_{CBO}$	80	50	30	Vdc
Emitter–Base Voltage	$V_{EBO}$	6.0			Vdc
Collector Current — Continuous	$I_C$	100			mA dc
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			Watt mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–55 to +150			$^\circ\text{C}$

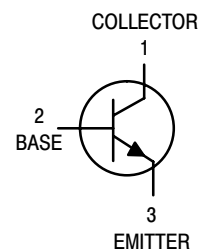
### THERMAL CHARACTERISTICS

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

**BC546**  
**BC546B**  
**BC547A**  
**BC547B**  
**BC547C**  
**BC548B**  
**BC548C**



CASE 29–04, STYLE 17  
TO–92 (TO–226AA)



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

Characteristic	Symbol	Min	Typ	Max	Unit
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#### OFF CHARACTERISTICS

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 ( $I_C = 100\text{ }\mu\text{A dc}$ )	BC546 BC547 BC548	$V_{(BR)CBO}$	80 50 30	— — —	— — —	V
Emitter–Base Breakdown Voltage ( $I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$ )	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   $\mu\text{A}$

# BC546 BC546B BC547A BC547B BC547C BC548B BC548C

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

Characteristic	Symbol	Min	Typ	Max	Unit
<b>ON CHARACTERISTICS</b>					
DC Current Gain ( $I_C = 10\ \mu\text{A}$ , $V_{CE} = 5.0\ \text{V}$ )  BC547A BC546B/547B/548B BC548C  ( $I_C = 2.0\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ ) BC546 BC547 BC548 BC547A BC546B/547B/548B BC547C/BC548C  ( $I_C = 100\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ ) 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

## SMALL–SIGNAL CHARACTERISTICS

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

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

BC547/BC548

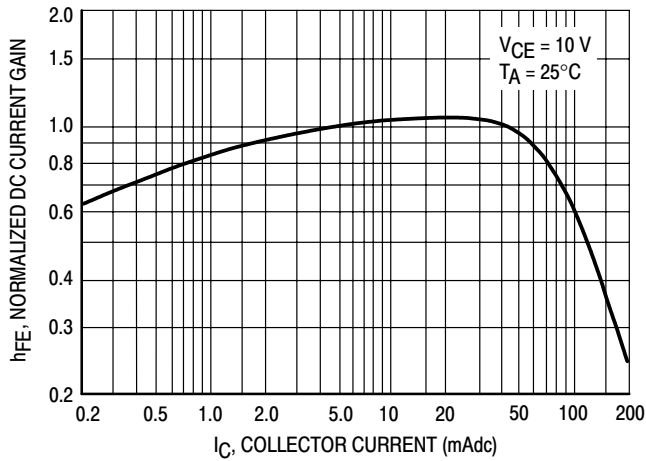


Figure 1. Normalized DC Current Gain

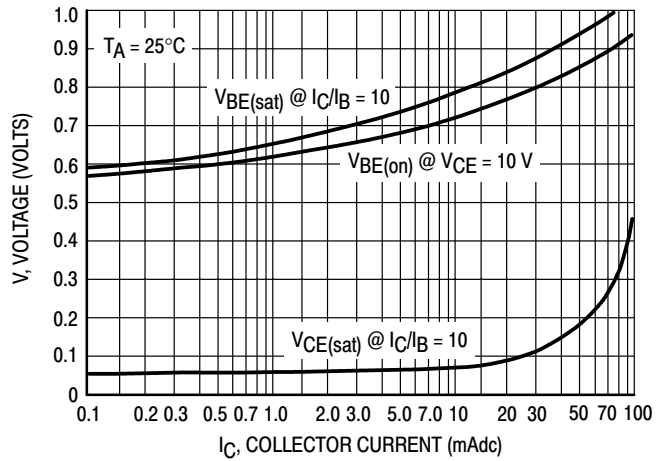


Figure 2. "Saturation" and "On" Voltages

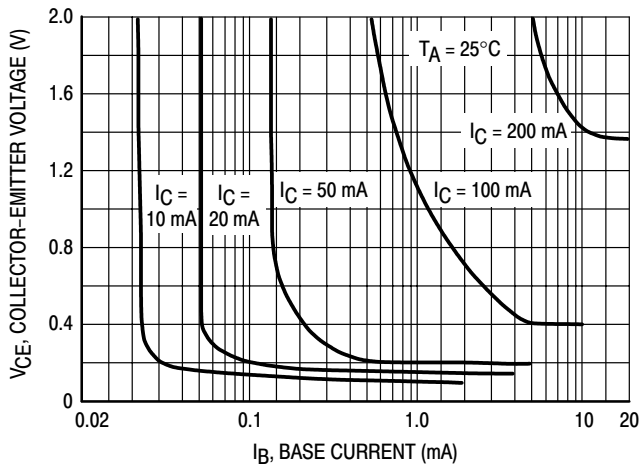


Figure 3. Collector Saturation Region

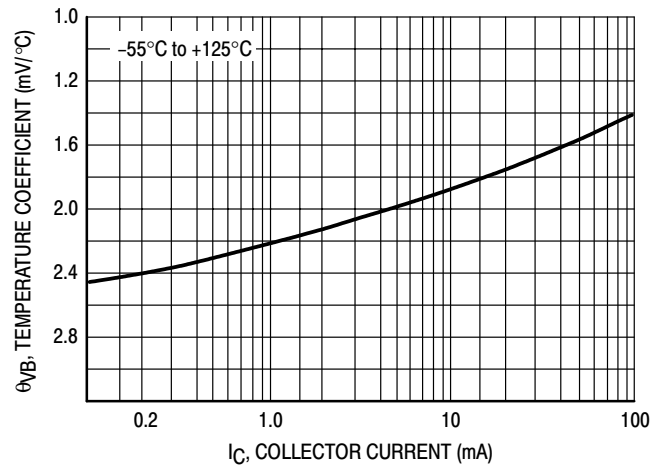


Figure 4. Base-Emitter Temperature Coefficient

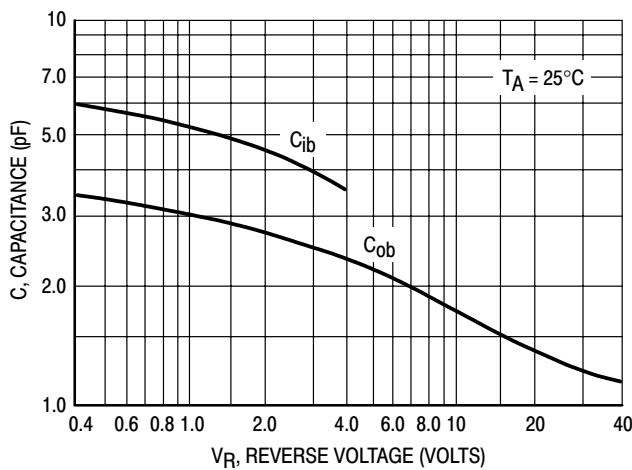


Figure 5. Capacitances

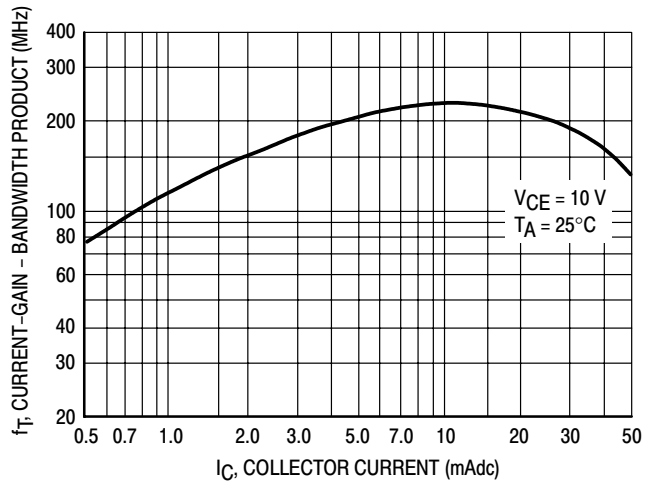


Figure 6. Current-Gain - Bandwidth Product

BC546

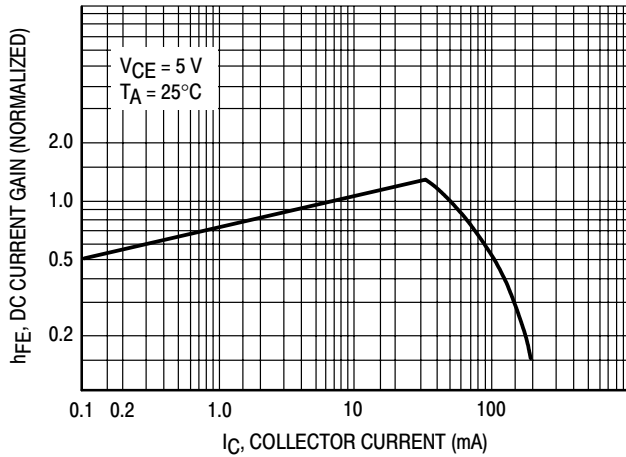


Figure 7. DC Current Gain

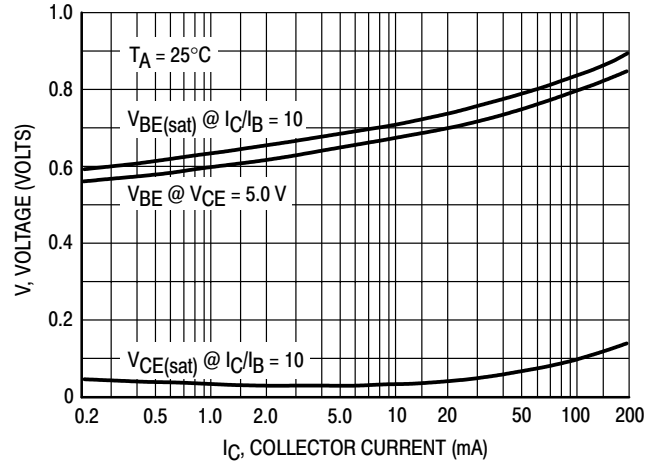


Figure 8. "On" Voltage

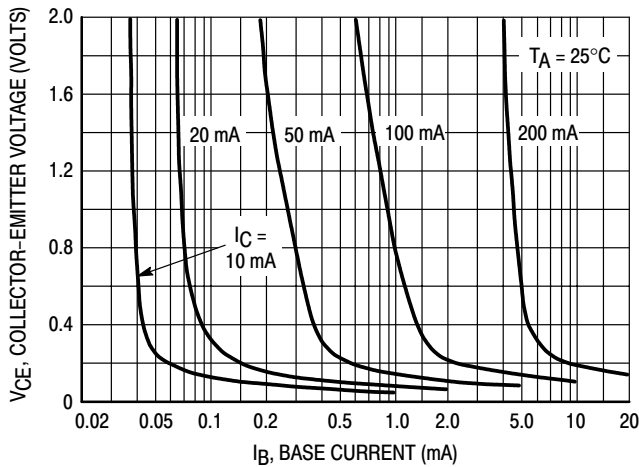


Figure 9. Collector Saturation Region

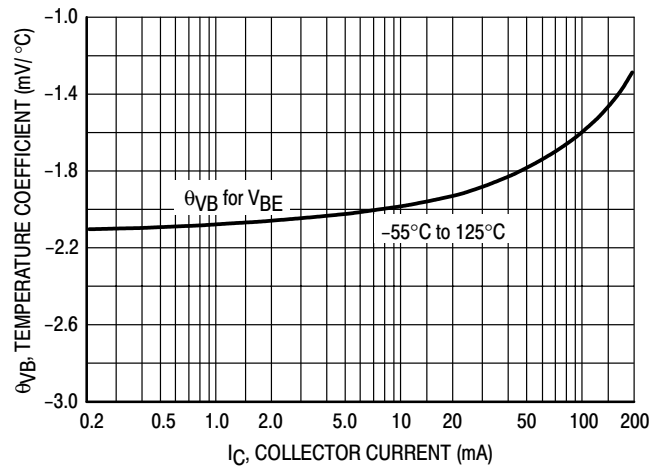


Figure 10. Base-Emitter Temperature Coefficient

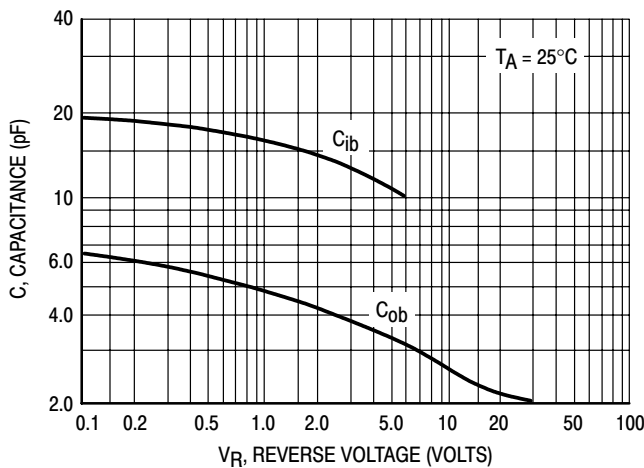


Figure 11. Capacitance

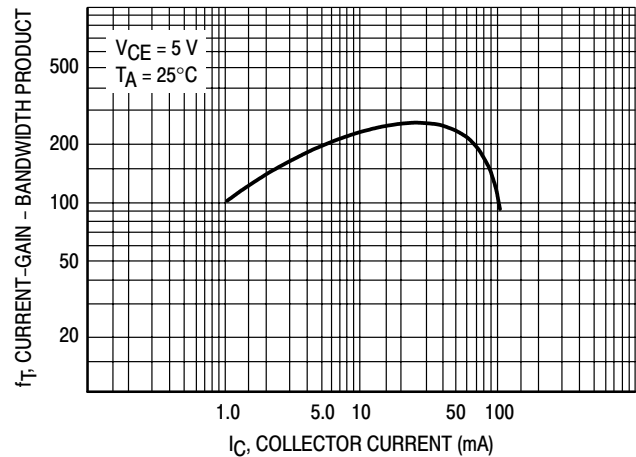
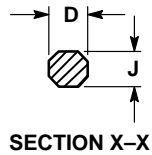
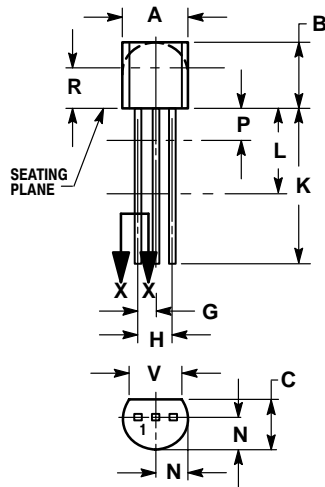


Figure 12. Current-Gain - Bandwidth Product

# BC546 BC546B BC547A BC547B BC547C BC548B BC548C

## 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	---

## **Notes**

## **Notes**

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