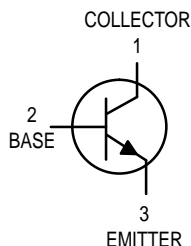
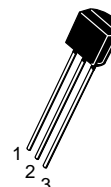


# Amplifier Transistors

## NPN Silicon



**BC546, B**  
**BC547, A, B, C**  
**BC548, A, B, C**



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

### MAXIMUM RATINGS

Rating	Symbol	BC 546	BC 547	BC 548	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/°C
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.5 12			Watt mW/°C
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–55 to +150			°C

### THERMAL CHARACTERISTICS

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

### 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, B BC547, A, B, C BC548, A, B, C****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 ( $I_C = 10\ \mu\text{A}$ , $V_{CE} = 5.0\ \text{V}$ )	$h_{FE}$	BC547A/548A	—	90	—
		BC546B/547B/548B	—	150	—
		BC548C	—	270	—
( $I_C = 2.0\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ )		BC546	110	—	450
		BC547	110	—	800
		BC548	110	—	800
		BC547A/548A	110	180	220
		BC546B/547B/548B	200	290	450
		BC547C/BC548C	420	520	800
( $I_C = 100\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ )		BC547A/548A	—	120	—
		BC546B/547B/548B	—	180	—
		BC548C	—	300	—
Collector–Emitter Saturation Voltage ( $I_C = 10\ \text{mA}$ , $I_B = 0.5\ \text{mA}$ )	$V_{CE(sat)}$	—	0.09	0.25	V
( $I_C = 100\ \text{mA}$ , $I_B = 5.0\ \text{mA}$ )		—	0.2	0.6	
( $I_C = 10\ \text{mA}$ , $I_B = \text{See Note 1}$ )		—	0.3	0.6	
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 ( $I_C = 2.0\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ )	$V_{BE(on)}$	0.55	—	0.7	V
( $I_C = 10\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ )		—	—	0.77	

**SMALL–SIGNAL CHARACTERISTICS**

Current–Gain — Bandwidth Product ( $I_C = 10\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ , $f = 100\ \text{MHz}$ )	BC546	$f_T$	150	300	—	MHz
	BC547		150	300	—	
	BC548		150	300	—	
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	$h_{fe}$	125	—	500	—
	BC547/548		125	—	900	
	BC547A/548A		125	220	260	
	BC546B/547B/548B		240	330	500	
	BC547C/548C		450	600	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	NF	—	2.0	10	dB
	BC547		—	2.0	10	
	BC548		—	2.0	10	

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

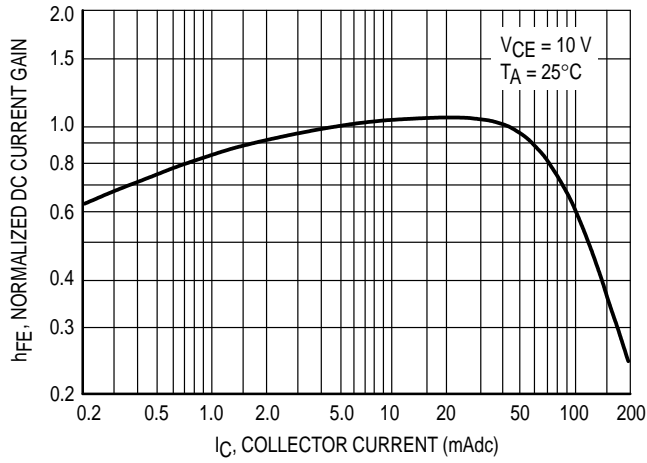


Figure 1. Normalized DC Current Gain

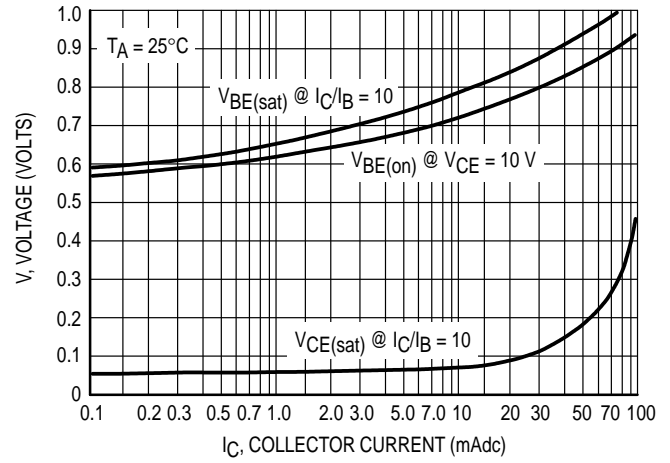


Figure 2. "Saturation" and "On" Voltages

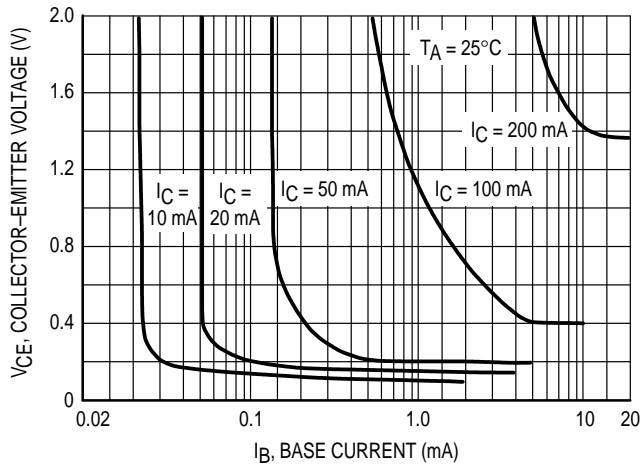


Figure 3. Collector Saturation Region

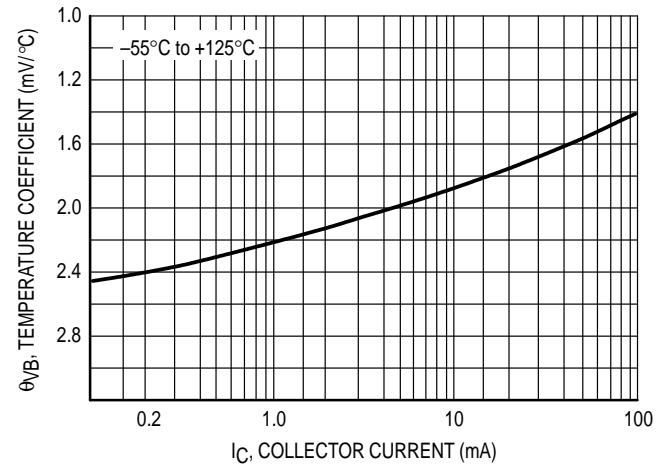


Figure 4. Base-Emitter Temperature Coefficient

### BC547/BC548

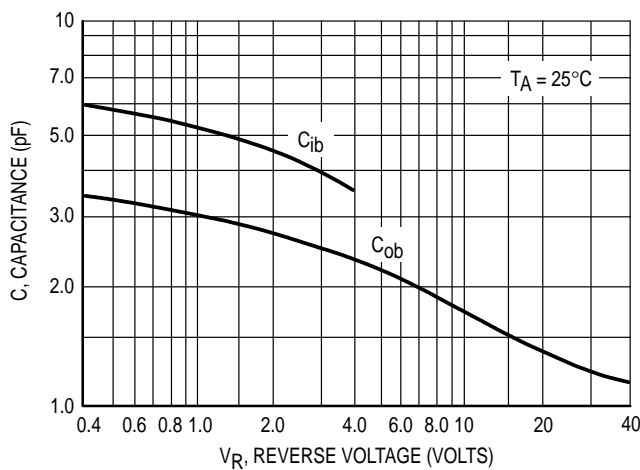


Figure 5. Capacitances

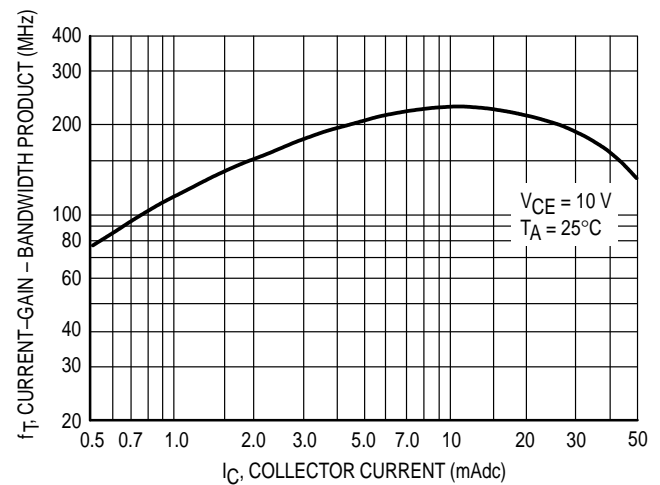


Figure 6. Current-Gain - Bandwidth Product

## BC547/BC548

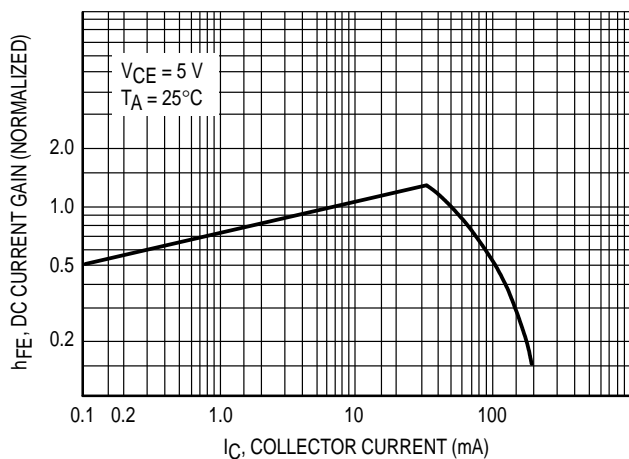


Figure 7. DC Current Gain

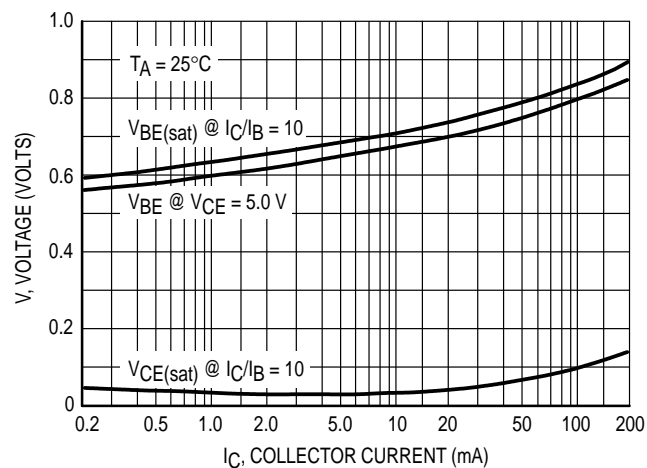


Figure 8. "On" Voltage

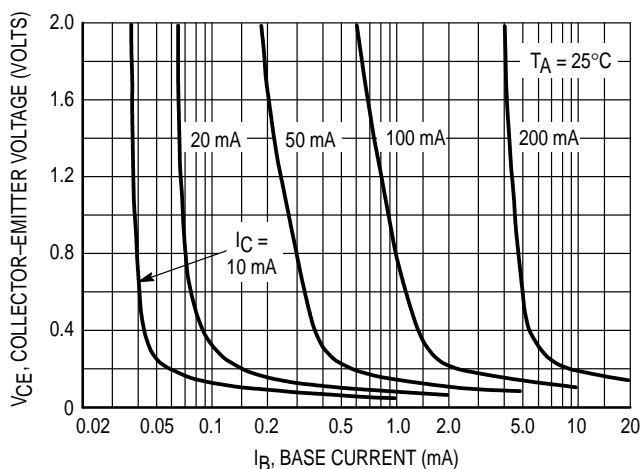


Figure 9. Collector Saturation Region

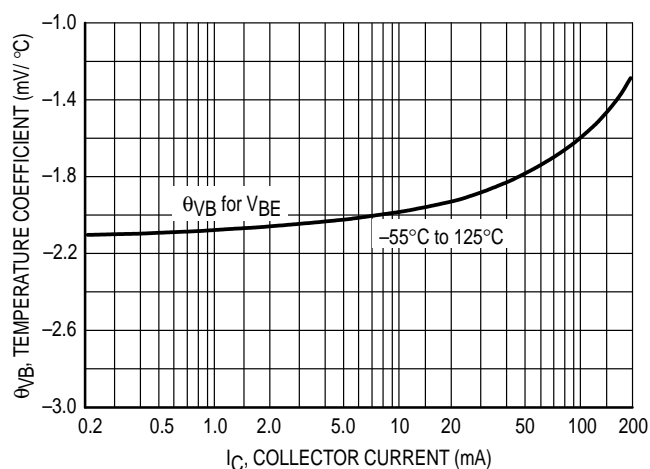


Figure 10. Base-Emitter Temperature Coefficient

## BC546

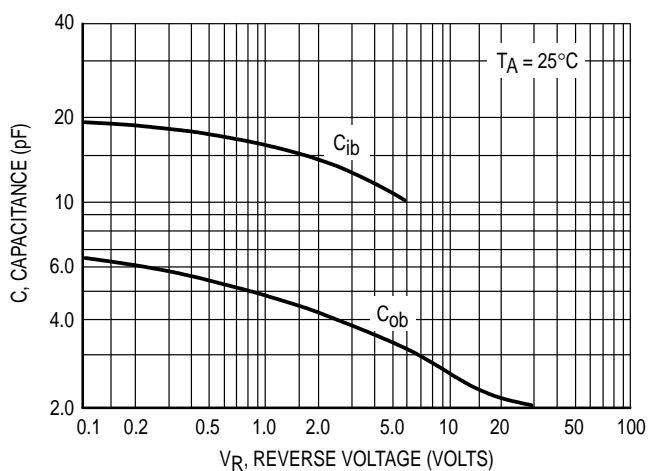


Figure 11. Capacitance

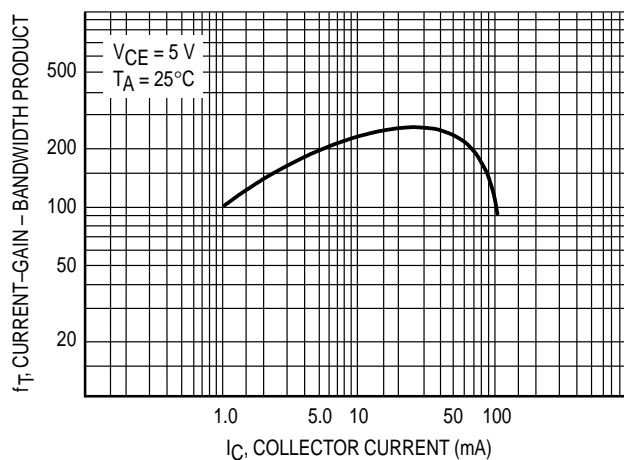
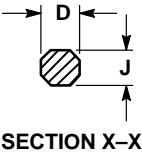
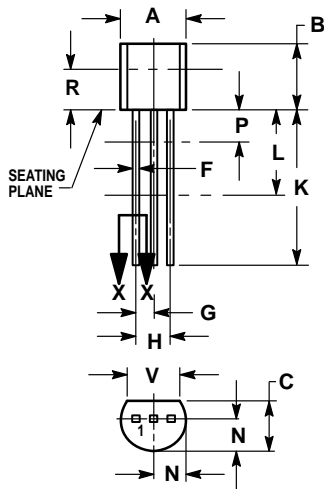


Figure 12. Current-Gain - Bandwidth Product

PACKAGE DIMENSIONS




CASE 029-04  
(TO-226AA)  
ISSUE AD

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: INCH.
  3. CONTOUR OF PACKAGE BEYOND DIMENSION R IS UNCONTROLLED.
  4. DIMENSION F APPLIES BETWEEN P AND L. DIMENSION D AND J APPLY BETWEEN L AND K MINIMUM. 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	0.022	0.41	0.55
F	0.016	0.019	0.41	0.48
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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**BC546/D**

