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# Amplifier Transistors

## NPN Silicon

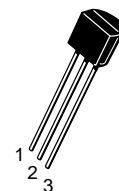
### MAXIMUM RATINGS

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			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			$^\circ\text{C}$

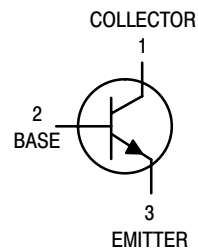
### THERMAL CHARACTERISTICS

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	$^\circ\text{C}/\text{W}$

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

## SMALL–SIGNAL CHARACTERISTICS

Current–Gain — Bandwidth Product ( $I_C = 10\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ , $f = 100\ \text{MHz}$ )	$f_T$	150	300	—	MHz
	BC546	150	300	—	
	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 ( $I_C = 2.0\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ , $f = 1.0\ \text{kHz}$ )	$h_{fe}$	125	—	500	—
	BC546	125	—	900	—
	BC547/548	125	—	900	—
	BC547A	125	220	260	—
	BC546B/547B/548B	240	330	500	—
	BC547C/548C	450	600	900	—
Noise Figure ( $I_C = 0.2\ \text{mA}$ , $V_{CE} = 5.0\ \text{V}$ , $R_S = 2\ \text{k}\Omega$ , $f = 1.0\ \text{kHz}$ , $\Delta f = 200\ \text{Hz}$ )	NF	—	2.0	10	dB
	BC546	—	2.0	10	
	BC547	—	2.0	10	
	BC548	—	2.0	10	

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

BC547/BC548

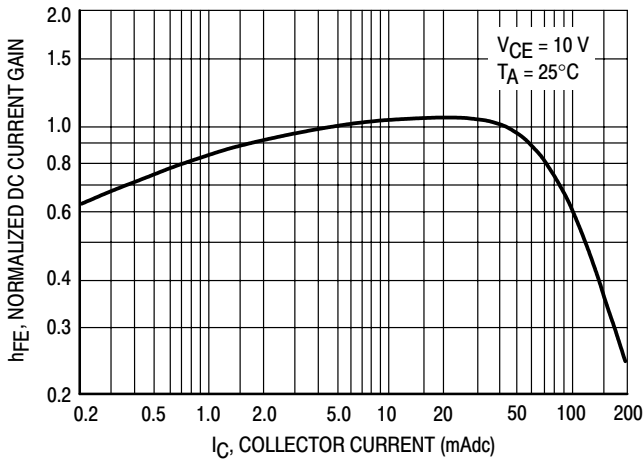


Figure 1. Normalized DC Current Gain

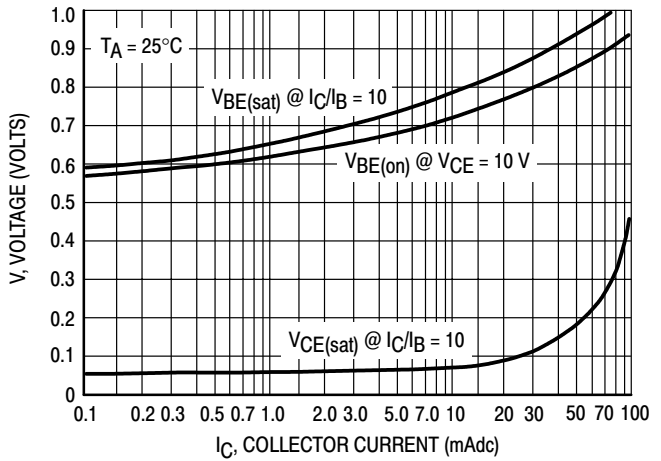


Figure 2. "Saturation" and "On" Voltages

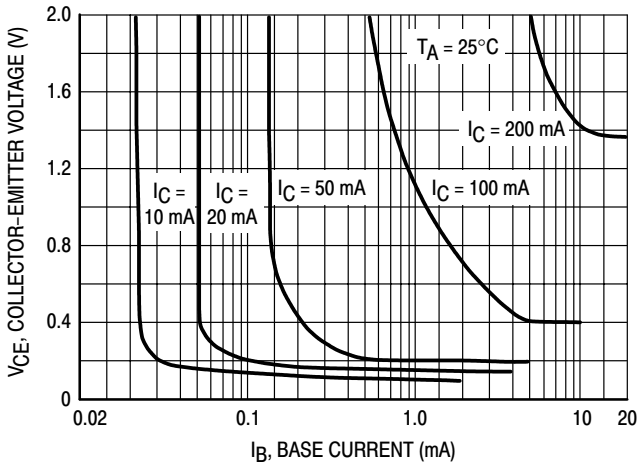


Figure 3. Collector Saturation Region

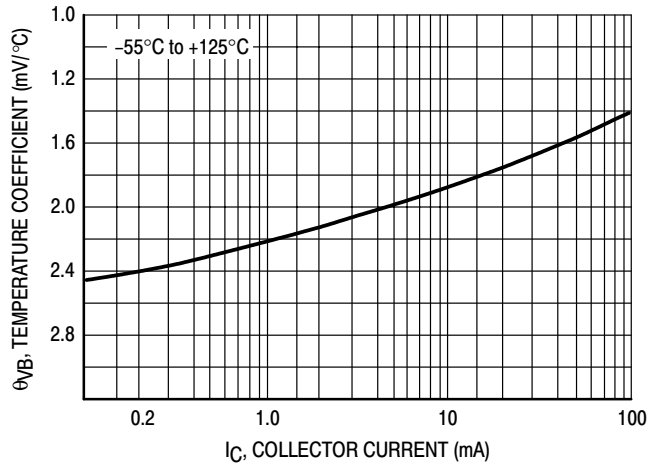


Figure 4. Base-Emitter Temperature Coefficient

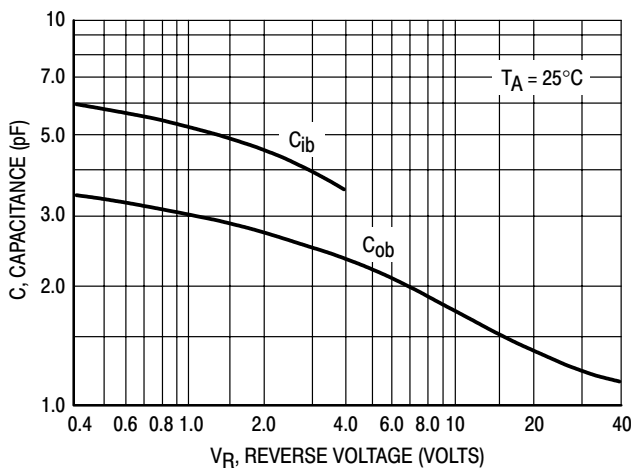


Figure 5. Capacitances

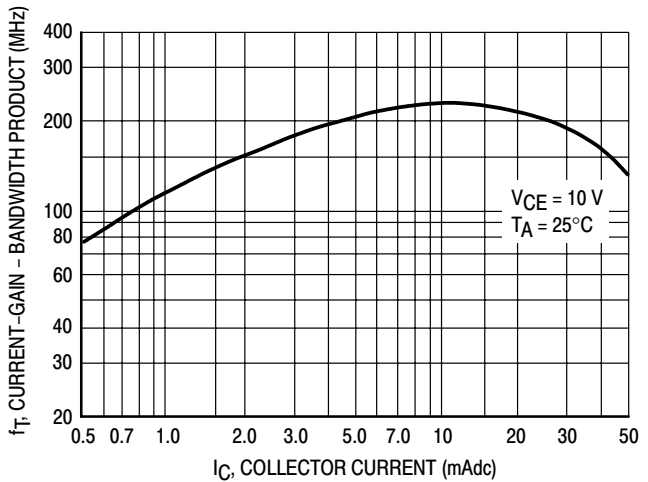


Figure 6. Current-Gain - Bandwidth Product

BC546

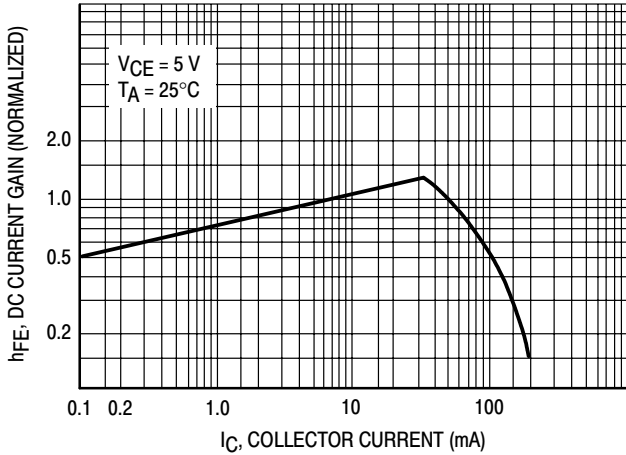


Figure 7. DC Current Gain

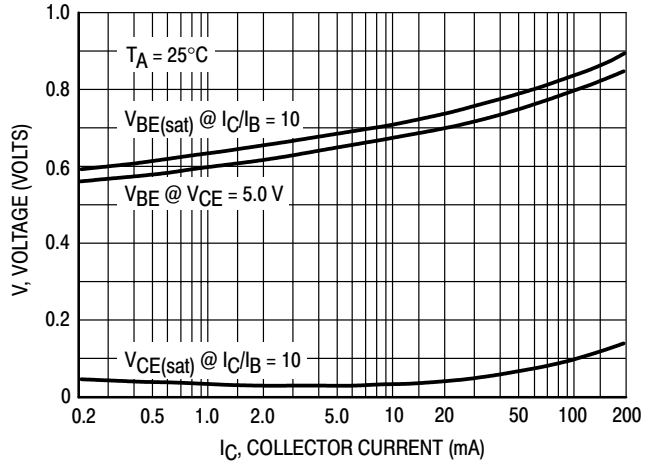


Figure 8. "On" Voltage

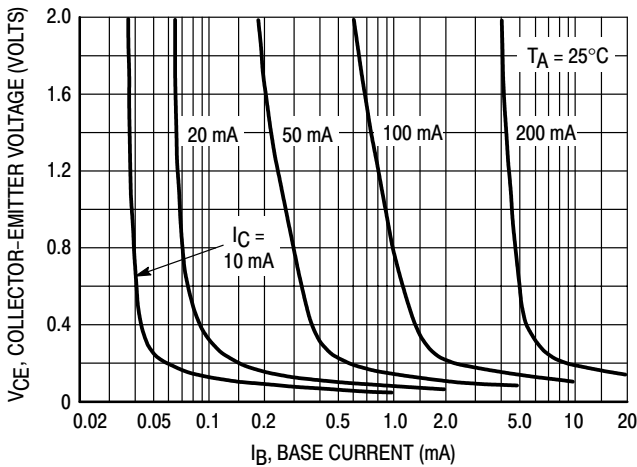


Figure 9. Collector Saturation Region

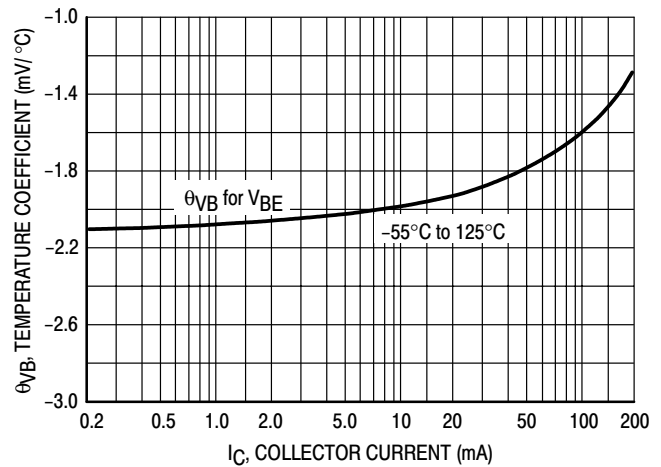


Figure 10. Base-Emitter Temperature Coefficient

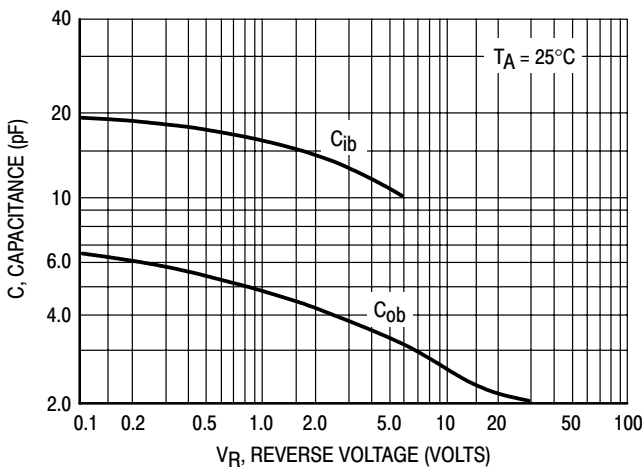


Figure 11. Capacitance

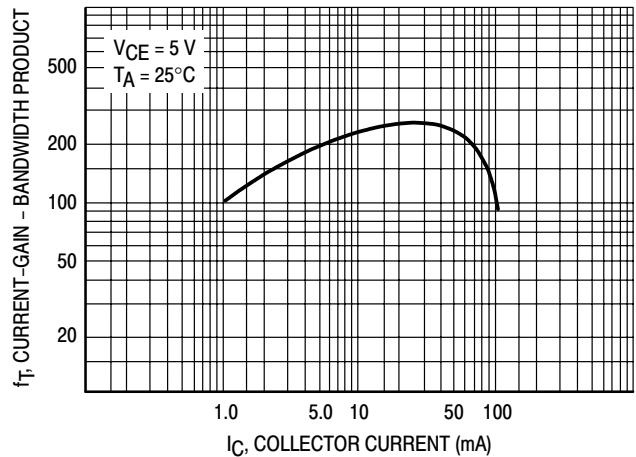
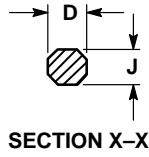
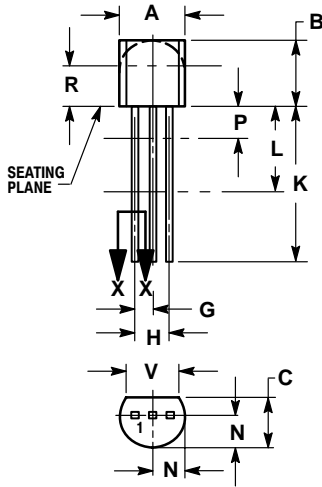


Figure 12. Current-Gain - Bandwidth Product

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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