

# One Watt Amplifier Transistor

## NPN Silicon

### MAXIMUM RATINGS

Rating	Symbol	BDC01D	Unit
Collector–Emitter Voltage	$V_{CEO}$	100	Vdc
Collector–Base Voltage	$V_{CBO}$	100	Vdc
Emitter–Base Voltage	$V_{EBO}$	5.0	Vdc
Collector Current — Continuous	$I_C$	0.5	Adc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	1.0 8.0	Watts mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	2.5 20	Watts 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	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case	$R_{\theta JC}$	50	$^\circ\text{C/W}$

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

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector–Emitter Voltage ( $I_C = 10\text{ mA}$ , $I_B = 0$ )	$V_{(BR)C}$ EO	100	—	Vdc
Collector Cutoff Current ( $V_{CB} = 100\text{ V}$ , $I_E = 0$ )	$I_{CBO}$	—	0.1	$\mu\text{Adc}$
Emitter Cutoff Current ( $I_C = 0$ , $V_{EB} = 5.0\text{ V}$ )	$I_{EBO}$	—	100	nAdc

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

Characteristic	Symbol	Min	Max	Unit
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### ON CHARACTERISTICS

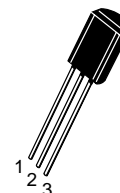
DC Current Gain ( $I_C = 100\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ ) ( $I_C = 500\text{ mA}$ , $V_{CE} = 2.0\text{ V}$ )	$h_{FE}$	40 25	400 —	—
Collector–Emitter Saturation Voltage <sup>(1)</sup> ( $I_C = 1000\text{ mA}$ , $I_B = 100\text{ mA}$ )	$V_{CE(sat)}$	—	0.7	Vdc
Collector–Emitter On Voltage <sup>(1)</sup> ( $I_C = 1000\text{ mA}$ , $V_{CE} = 1.0\text{ V}$ )	$V_{BE(on)}$	—	1.2	Vdc

### DYNAMIC CHARACTERISTICS

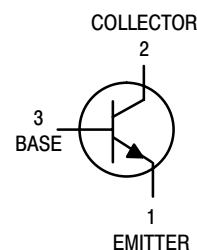
Current Gain Bandwidth Product ( $I_C = 200\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ , $f = 20\text{ MHz}$ )	$f_T$	50	—	MHz
Output Capacitance ( $V_{CB} = 10\text{ V}$ , $I_E = 0$ , $f = 1.0\text{ MHz}$ )	$C_{ob}$	—	30	pF

1. Pulse Test: Pulse Width  $\leq 300\text{ }\mu\text{s}$ ; Duty Cycle 2.0%.

# BDC01D



CASE 29–10, STYLE 14  
TO–92 (TO–226AE)



# BDC01D

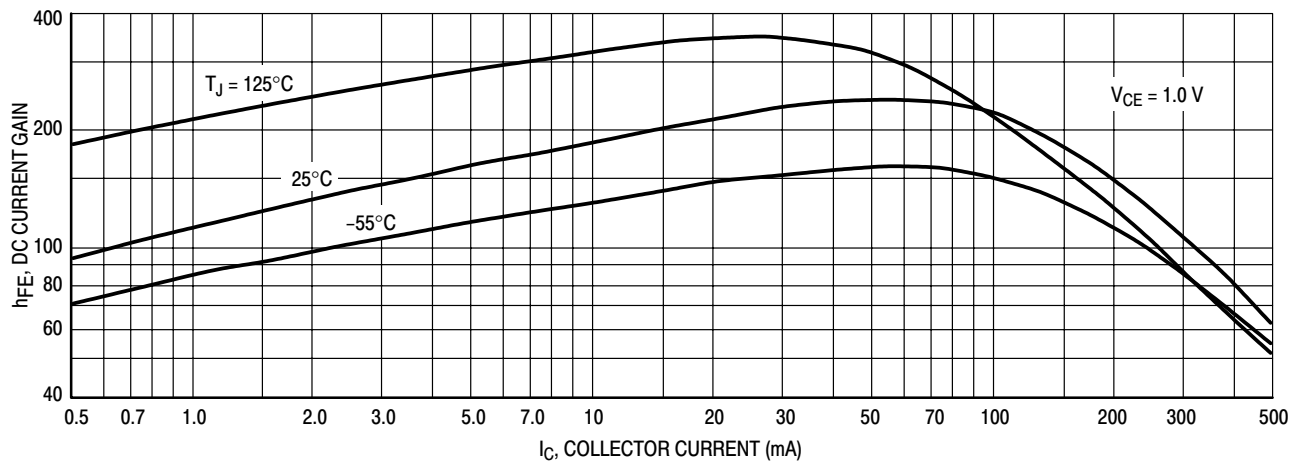


Figure 1. DC Current Gain

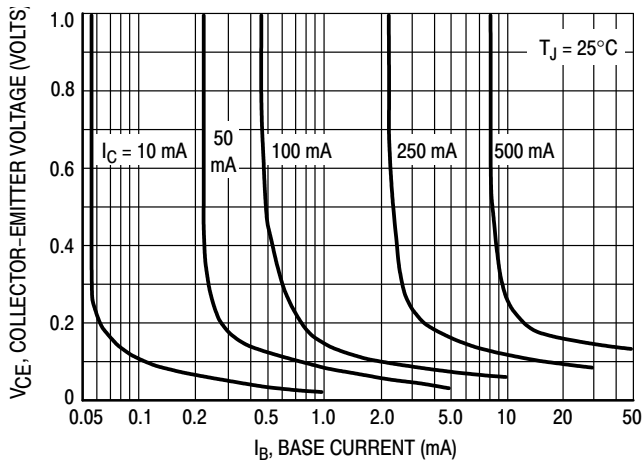


Figure 2. Collector Saturation Region

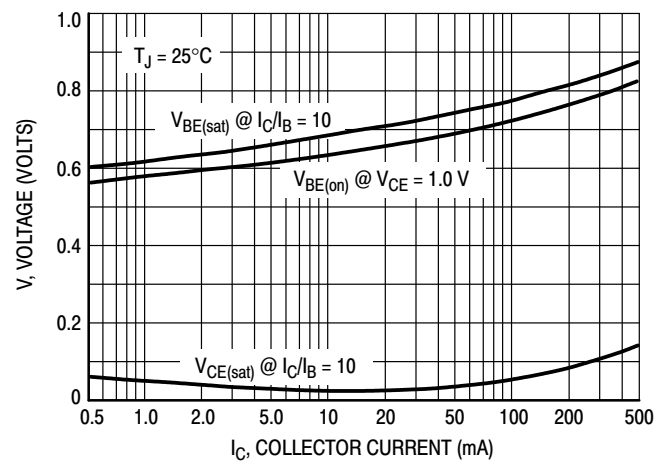


Figure 3. "On" Voltages

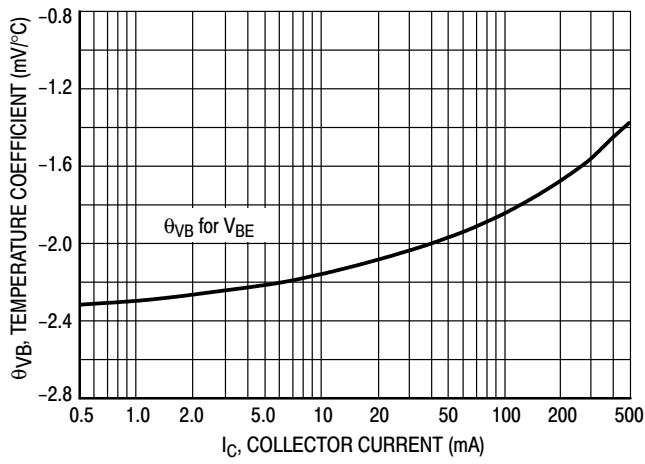


Figure 4. Base-Emitter Temperature Coefficient

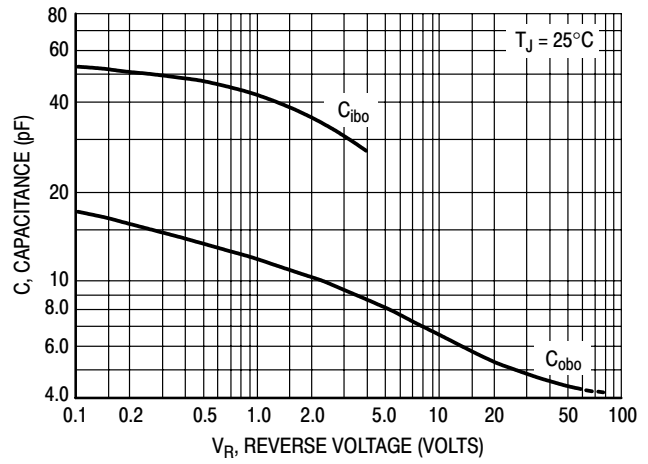


Figure 5. Capacitance

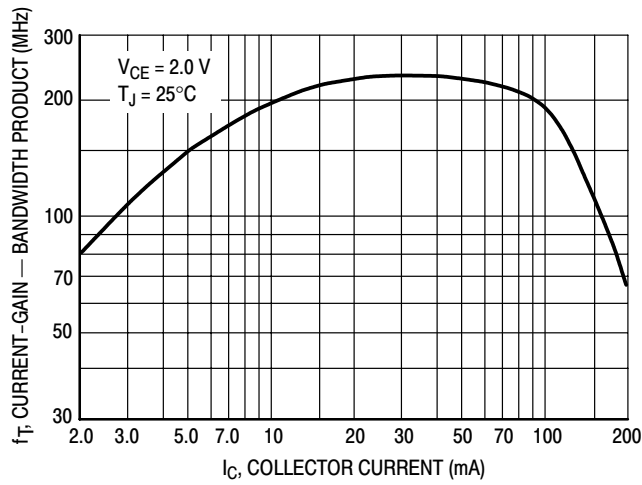


Figure 6. Current-Gain — Bandwidth Product

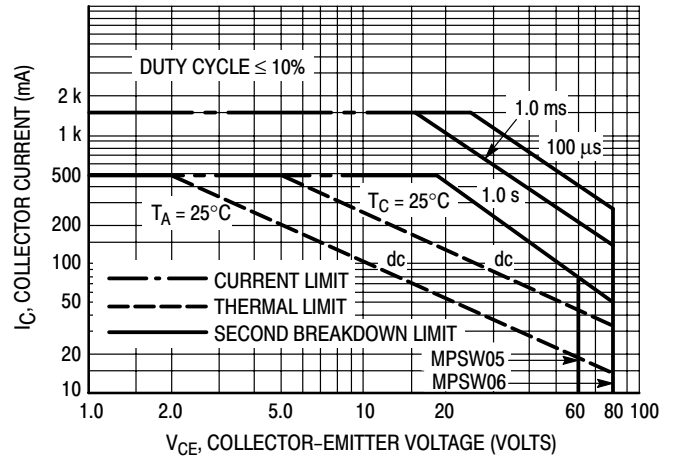
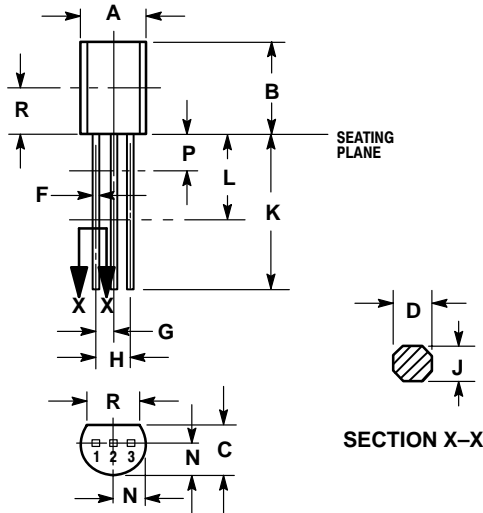


Figure 7. Active Region — Safe Operating Area

# BDC01D

## PACKAGE DIMENSIONS

TO-92 (TO-226)  
CASE 29-10  
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. DIMENSION F APPLIES BETWEEN P AND L. DIMENSIONS 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	4.44	5.21
B	0.290	0.310	7.37	7.87
C	0.125	0.165	3.18	4.19
D	0.018	0.021	0.457	0.533
F	0.016	0.019	0.407	0.482
G	0.045	0.055	1.15	1.39
H	0.095	0.105	2.42	2.66
J	0.018	0.024	0.46	0.61
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	0.135	---	3.43	---

### YLE 14:

- PIN 1. EMITTER  
2. COLLECTOR  
3. BASE

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