

# Complementary Silicon Plastic Power Transistors

... designed for use in general purpose amplifier and switching applications.

- Collector – Emitter Saturation Voltage —  
 $V_{CE(sat)} = 1.5 \text{ Vdc (Max) @ } I_C = 6.0 \text{ Adc}$
- Collector Emitter Sustaining Voltage —  
 $V_{CEO(sus)} = 80 \text{ Vdc (Min) — BD243B, BD244B}$   
 $= 100 \text{ Vdc (Min) — BD243C, BD244C}$
- High Current Gain Bandwidth Product  
 $f_T = 3.0 \text{ MHz (Min) @ } I_C = 500 \text{ mAdc}$
- Compact TO–220 AB Package

## MAXIMUM RATINGS

Rating	Symbol	BD243B BD244B	BD243C BD244C	Unit
Collector–Emitter Voltage	$V_{CEO}$	80	100	Vdc
Collector–Base Voltage	$V_{CB}$	80	100	Vdc
Emitter–Base Voltage	$V_{EB}$	5.0	5.0	Vdc
Collector Current — Continuous Peak	$I_C$	6 10	6 10	Adc
Base Current	$I_B$	2.0	2.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	65 0.52	65 0.52	Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–65 to +150	–65 to +150	$^\circ\text{C}$

## THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	1.92	$^\circ\text{C/W}$

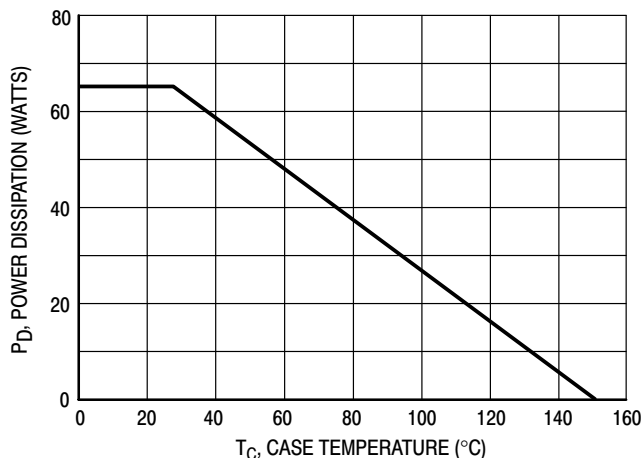


Figure 1. Power Derating

**NPN**  
**BD243B**

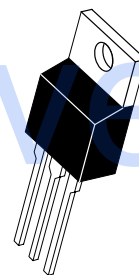
**BD243C\***

**PNP**  
**BD244B**

**BD244C\***

\*ON Semiconductor Preferred Device

**6 AMPERE  
POWER TRANSISTORS  
COMPLEMENTARY  
SILICON  
80–100 VOLTS  
65 WATTS**



**CASE 221A–06  
TO–220AB**

# BD243B BD243C BD244B BD244C

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

Characteristic	Symbol	Min	Max	Unit
Collector-Emitter Sustaining Voltage (1) ( $I_C = 30\text{ mAdc}$ , $I_B = 0$ )	$V_{CEO(sus)}$	80 100	— —	Vdc
Collector Cutoff Current ( $V_{CE} = 60\text{ Vdc}$ , $I_B = 0$ )	$I_{CEO}$	—	0.7	mAdc
Collector Cutoff Current ( $V_{CE} = 80\text{ Vdc}$ , $V_{EB} = 0$ ) ( $V_{CE} = 100\text{ Vdc}$ , $V_{EB} = 0$ )	$I_{CES}$	— —	400 400	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$	—	1.0	mAdc

### ON CHARACTERISTICS (1)

DC Current Gain ( $I_C = 0.3\text{ Adc}$ , $V_{CE} = 4.0\text{ Vdc}$ ) ( $I_C = 3.0\text{ Adc}$ , $V_{CE} = 4.0\text{ Vdc}$ )	$h_{FE}$	30 15	— —	—
Collector-Emitter Saturation Voltage ( $I_C = 6.0\text{ Adc}$ , $I_B = 1.0\text{ Adc}$ )	$V_{CE(sat)}$	—	1.5	Vdc
Base-Emitter On Voltage ( $I_C = 6.0\text{ Adc}$ , $V_{CE} = 4.0\text{ Vdc}$ )	$V_{BE(on)}$	—	2.0	Vdc

### DYNAMIC CHARACTERISTICS

Current-Gain — Bandwidth Product (2) ( $I_C = 500\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 1.0\text{ MHz}$ )	$f_T$	3.0	—	MHz
Small-Signal Current Gain ( $I_C = 0.5\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1.0\text{ kHz}$ )	$h_{fe}$	20	—	—

(1) Pulse Test: Pulsewidth  $\leq 300\text{ }\mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

(2)  $f_T = h_{fe} \cdot f_{test}$

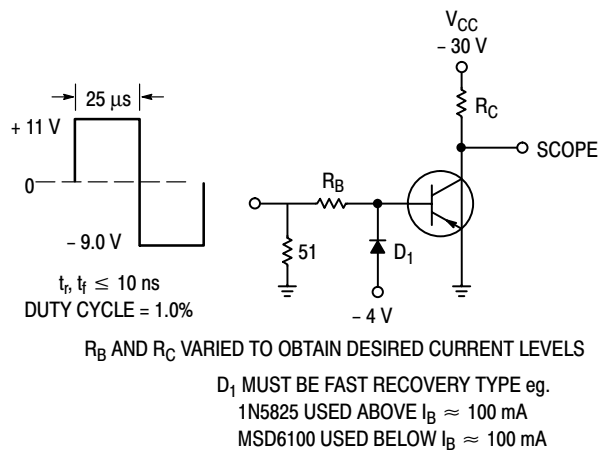


Figure 2. Switching Time Test Circuit

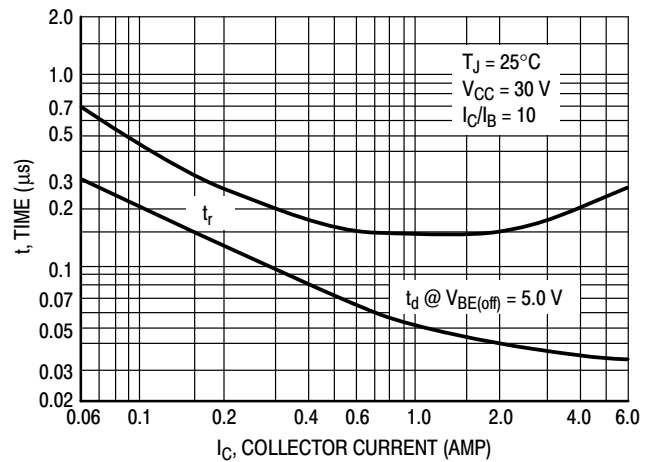


Figure 3. Turn-On Time

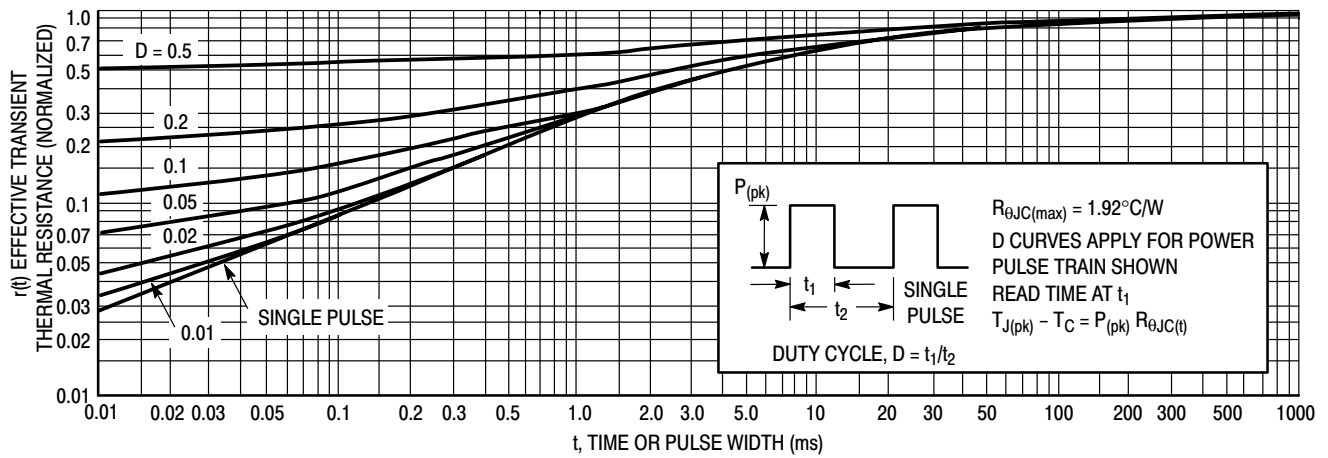


Figure 4. Thermal Response

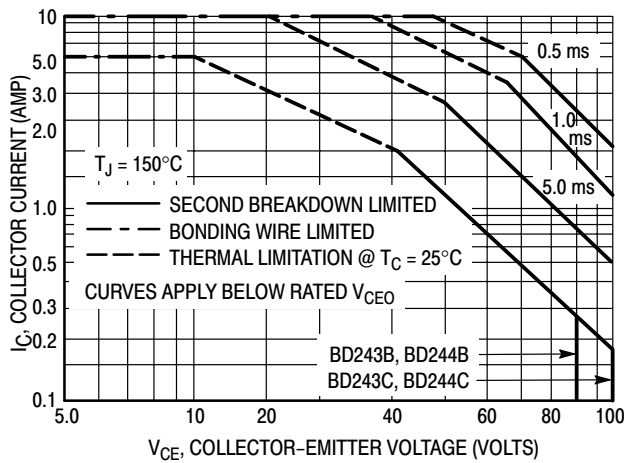


Figure 5. Active Region Safe Operating Area

There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation, i.e., the transistor must not be subjected to greater dissipation than the curves indicate.

The data of Figure 5 is based on  $T_{J(pk)} = 150^\circ\text{C}$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} \leq 150^\circ\text{C}$ .  $T_{J(pk)}$  may be calculated from the data in Figure 4. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

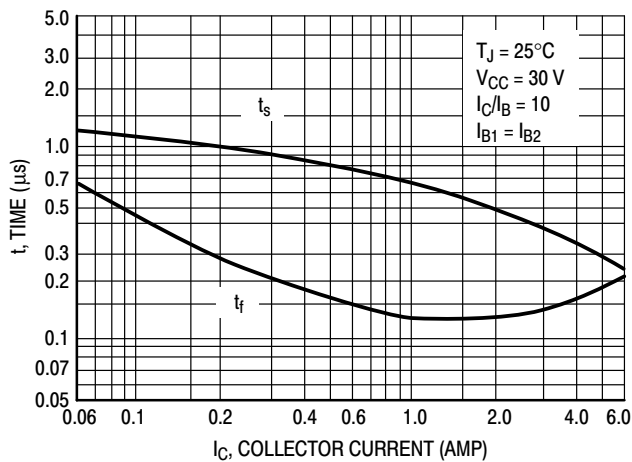


Figure 6. Turn-Off Time

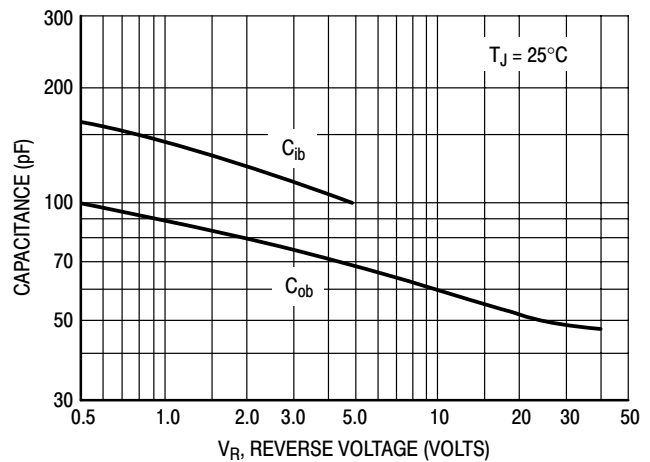


Figure 7. Capacitance

# BD243B BD243C BD244B BD244C

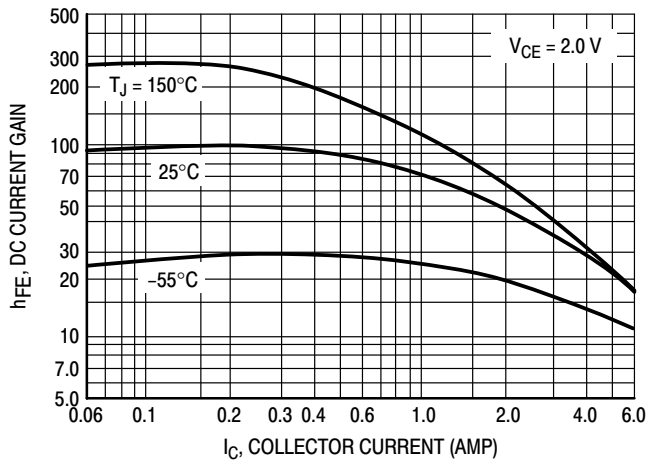


Figure 8. DC Current Gain

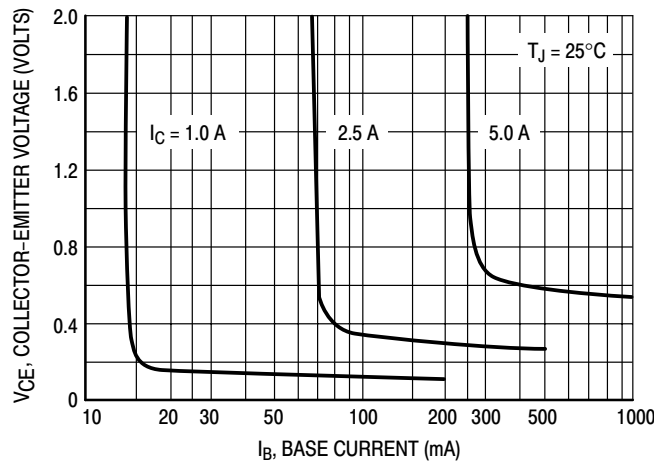


Figure 9. Collector Saturation Region

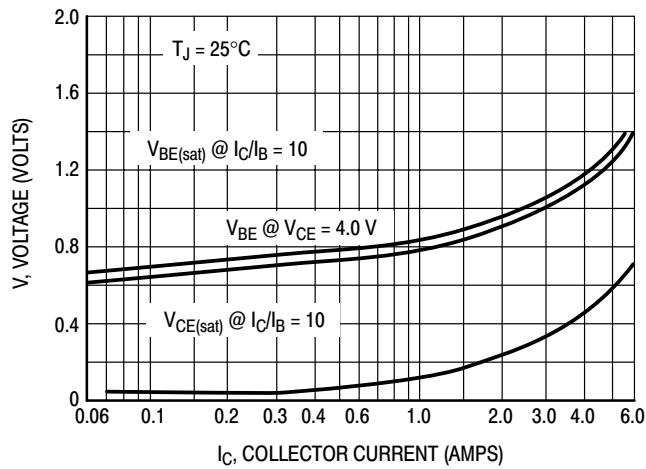


Figure 10. "On" Voltages

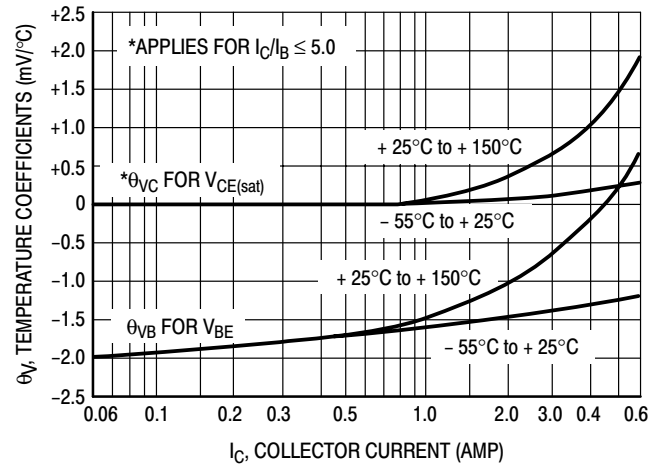


Figure 11. Temperature Coefficients

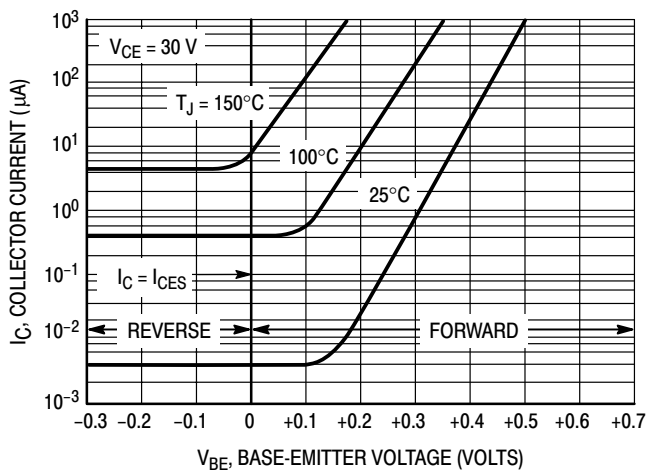


Figure 12. Collector Cut-Off Region

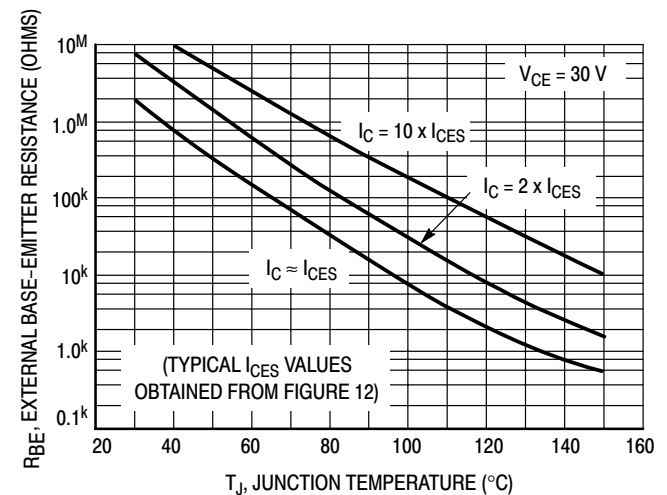
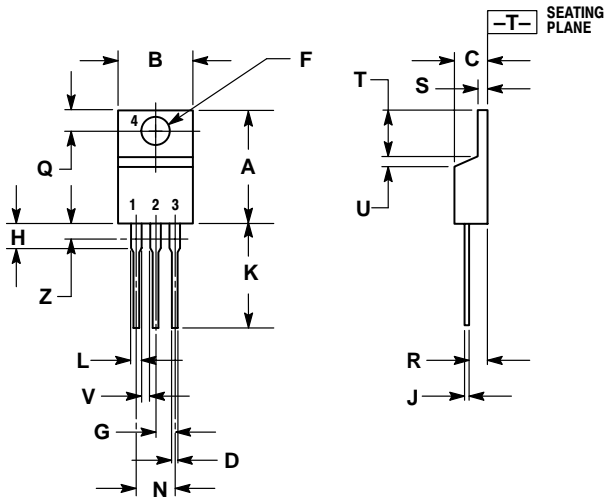


Figure 13. Effects of Base-Emitter Resistance

# BD243B BD243C BD244B BD244C

## PACKAGE DIMENSIONS

TO-220  
CASE 221A-09  
ISSUE AA



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.570	0.620	14.48	15.75
B	0.380	0.405	9.66	10.28
C	0.160	0.190	4.07	4.82
D	0.025	0.035	0.64	0.88
F	0.142	0.147	3.61	3.73
G	0.095	0.105	2.42	2.66
H	0.110	0.155	2.80	3.93
J	0.018	0.025	0.46	0.64
K	0.500	0.562	12.70	14.27
L	0.045	0.060	1.15	1.52
N	0.190	0.210	4.83	5.33
Q	0.100	0.120	2.54	3.04
R	0.080	0.110	2.04	2.79
S	0.045	0.055	1.15	1.39
T	0.235	0.255	5.97	6.47
U	0.000	0.050	0.00	1.27
V	0.045	---	1.15	---
Z	---	0.080	---	2.04

## **Notes**

## **Notes**

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