

BD241C* (NPN), BD242B (PNP), BD242C* (PNP)

*Preferred Devices

Complementary Silicon Plastic Power Transistors

Designed for use in general purpose amplifier and switching applications.

- Collector–Emitter Saturation Voltage –
 $V_{CE} = 1.2 \text{ Vdc (Max) @ } I_C = 3.0 \text{ Adc}$
- Collector–Emitter Sustaining Voltage –
 $V_{CE(sus)} = 100 \text{ Vdc (Min) BD241C, BD242C}$
- High Current Gain – Bandwidth Product
 $f_T = 3.0 \text{ MHz (Min) @ } I_C = 500 \text{ mA}$
- Compact TO–220 AB Package
- Epoxy Meets UL94, V–0 @ 0.125 in.
- ESD Ratings: Human Body Model, 3B > 8000 V
Machine Model, C > 400 V

MAXIMUM RATINGS

Rating	Symbol	BD242B	BD241C BD242C	Unit
Collector–Emitter Voltage	V_{CEO}	80	100	Vdc
Collector–Emitter Voltage	V_{CES}	90	115	Vdc
Emitter–Base Voltage	V_{EB}	5.0		Vdc
Collector Current Continuous Peak	I_C	3.0 5.0		A
Base Current	I_B	1.0		A
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	40 0.32		Watts W/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	–65 to +150		°C

THERMAL CHARACTERISTICS

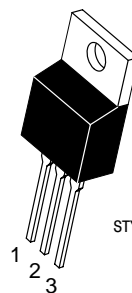
Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	3.125	°C/W



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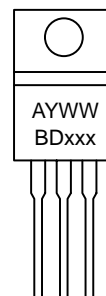
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POWER TRANSISTORS COMPLEMENTARY SILICON 3 AMPERES 80, 100 VOLTS 40 WATTS



STYLE 1:
PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

MARKING DIAGRAM



xxx = Specific Device Code:
241C, 242B, 242C
A = Assembly Location
Y = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
BD241C	TO–220AB	50 Units/Rail
BD242B	TO–220AB	50 Units/Rail
BD242C	TO–220AB	50 Units/Rail

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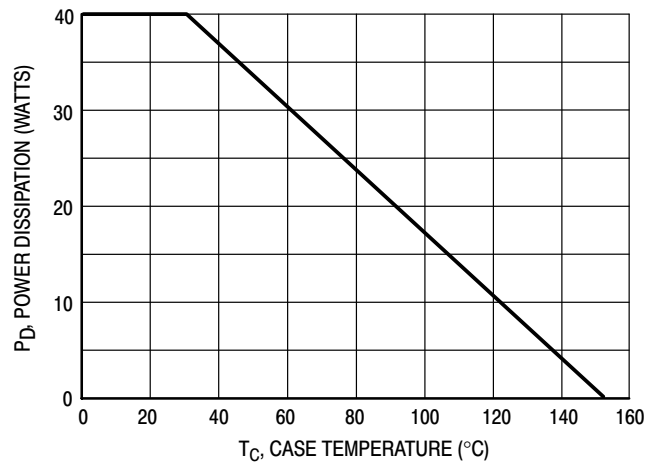


Figure 1. Power Derating

BD241C* (NPN), BD242B (PNP), BD242C* (PNP)

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
OFF CHARACTERISTICS				
Collector–Emitter Sustaining Voltage (Note 1) (I _C = 30 mA, I _B = 0)	V _{CEO}	80		Vdc
BD242B BD241C, BD242C		100		
Collector Cutoff Current (V _{CE} = 50 Vdc, I _B = 0) (V _{CE} = 60 Vdc, I _B = 0)	I _{CEO}		0.3	mA
BD242B BD241C, BD242C				
Collector Cutoff Current (V _{CE} = 80 Vdc, V _{EB} = 0) (V _{CE} = 100 Vdc, V _{EB} = 0)	I _{CES}		200	μA
BD242B BD241C, BD242C				
Emitter Cutoff Current (V _{BE} = 5.0 Vdc, I _C = 0)	I _{EBO}		1.0	mA
ON CHARACTERISTICS (Note 1)				
DC Current Gain (I _C = 1.0 A, V _{CE} = 4.0 Vdc) (I _C = 3.0 A, V _{CE} = 4.0 Vdc)	h _{FE}	25		
		10		
Collector–Emitter Saturation Voltage (I _C = 3.0 A, I _B = 0.6 A)	V _{CE(sat)}		1.2	Vdc
Base–Emitter On Voltage (I _C = 3.0 A, V _{CE} = 4.0 Vdc)	V _{BE(on)}		1.8	Vdc
DYNAMIC CHARACTERISTICS				
Current Gain – Bandwidth Product (Note 2) (I _C = 500 mA, V _{CE} = 10 Vdc, f _{test} = 1.0 MHz)	f _T	3.0		MHz
Small–Signal Current Gain (I _C = 0.5 A, V _{CE} = 10 Vdc, f = 1.0 kHz)	h _{fe}	20		

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. f_T = |h_{fe}| • f_{test}.

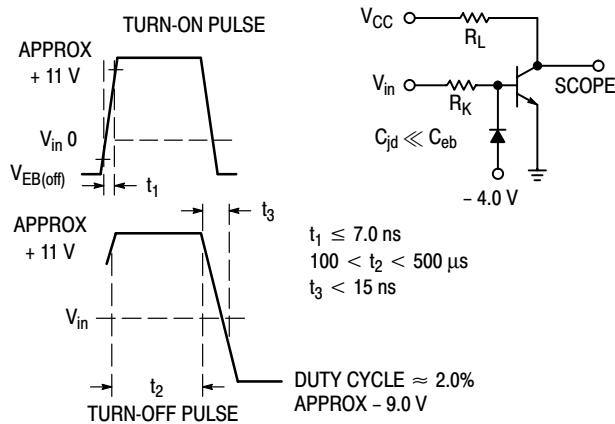


Figure 2. Switching Time Equivalent Circuit

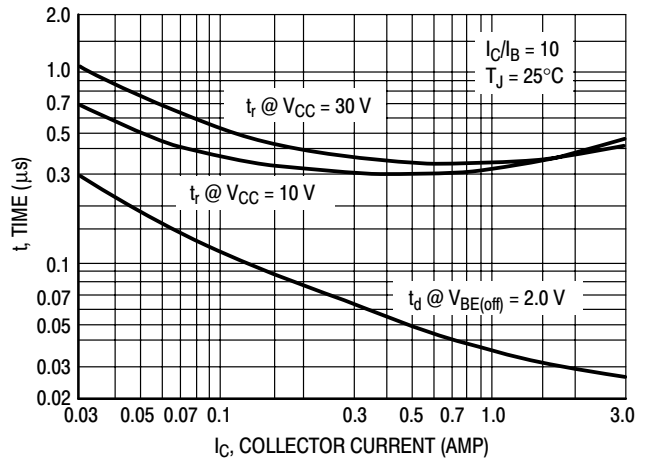


Figure 3. Turn-On Time

BD241C* (NPN), BD242B (PNP), BD242C* (PNP)

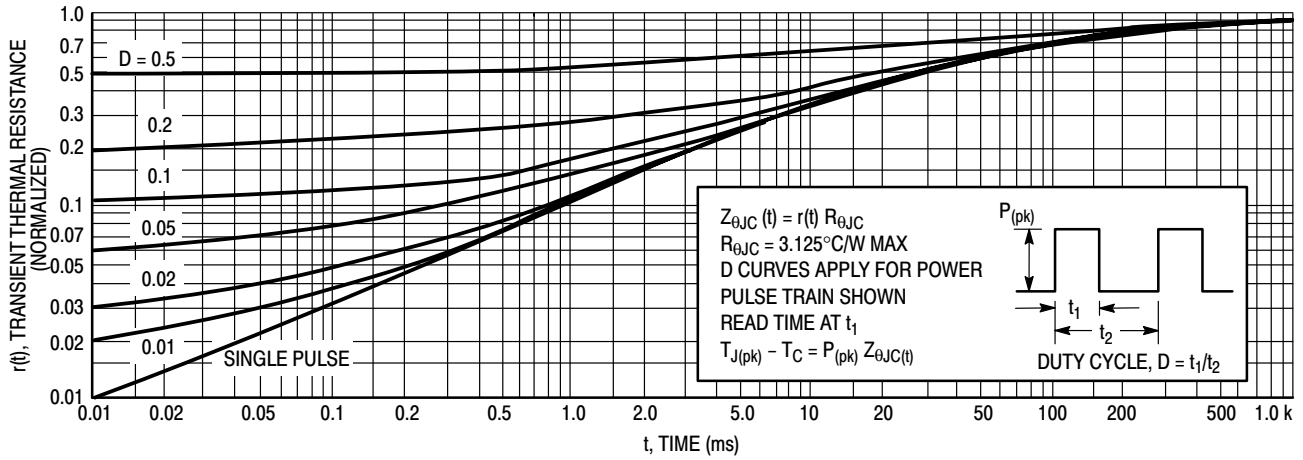


Figure 4. Thermal Response

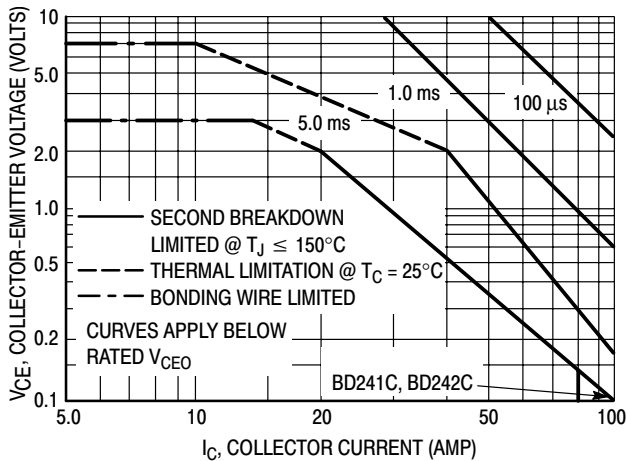


Figure 5. Active Region Safe Operating Area

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.

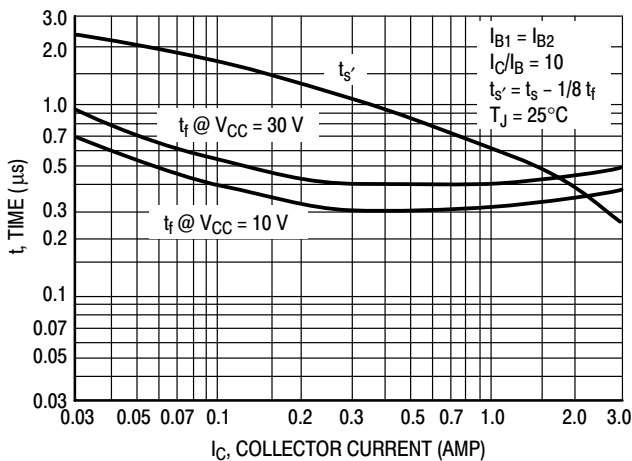


Figure 6. Turn-Off Time

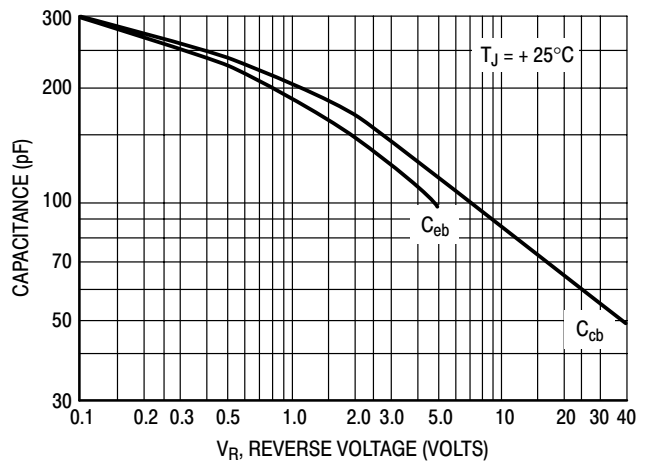


Figure 7. Capacitance

BD241C* (NPN), BD242B (PNP), BD242C* (PNP)

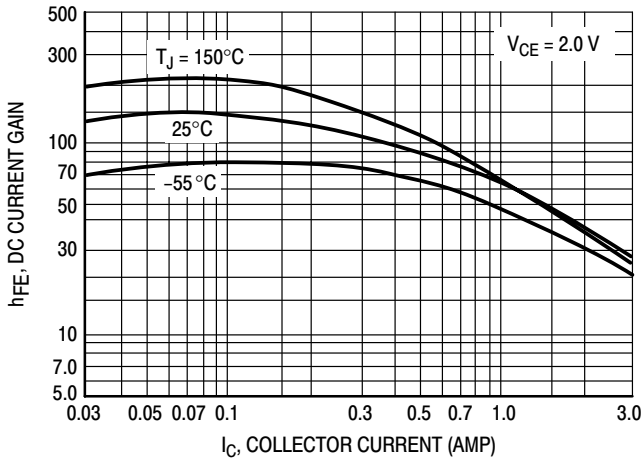


Figure 8. DC Current Gain

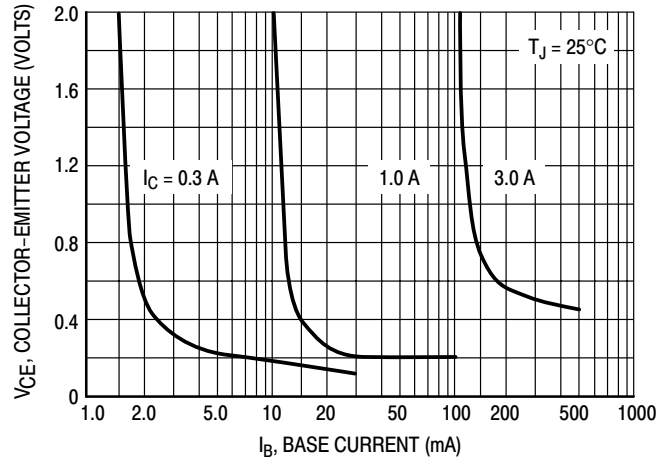


Figure 9. Collector Saturation Region

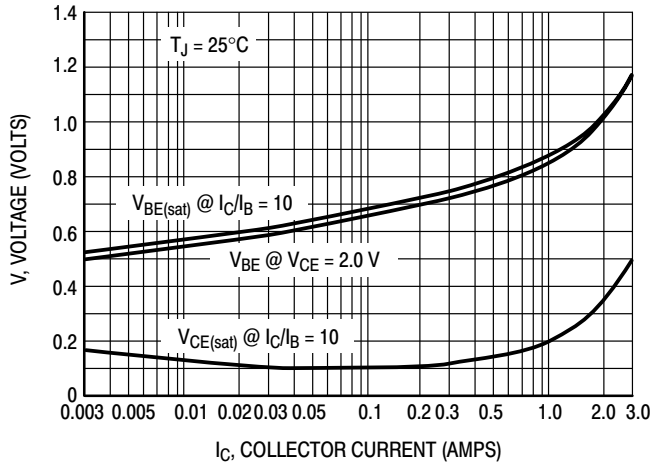


Figure 10. "On" Voltages

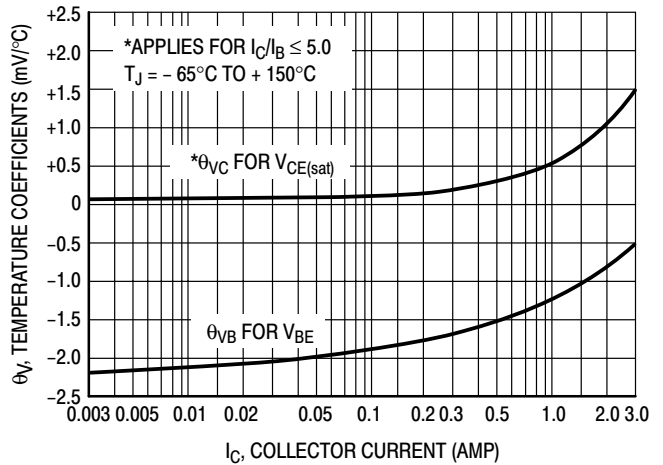


Figure 11. Temperature Coefficients

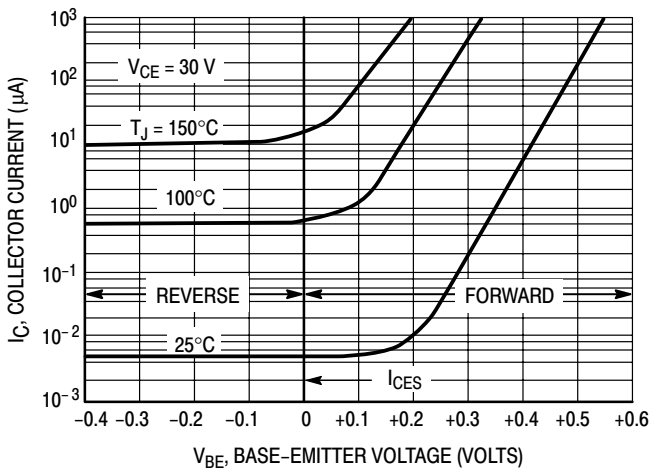


Figure 12. Collector Cut-Off Region

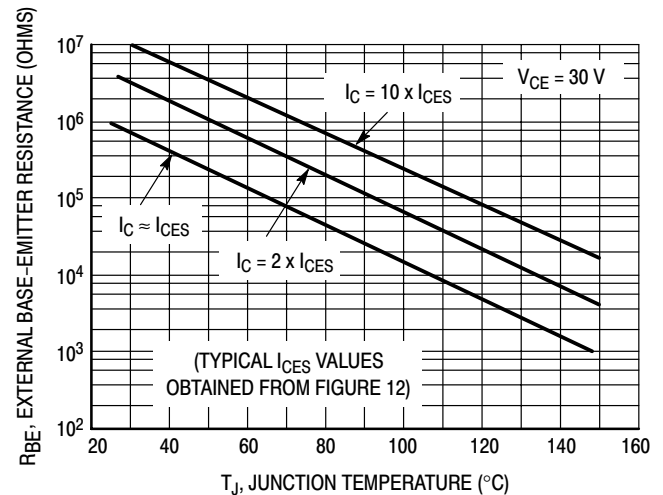
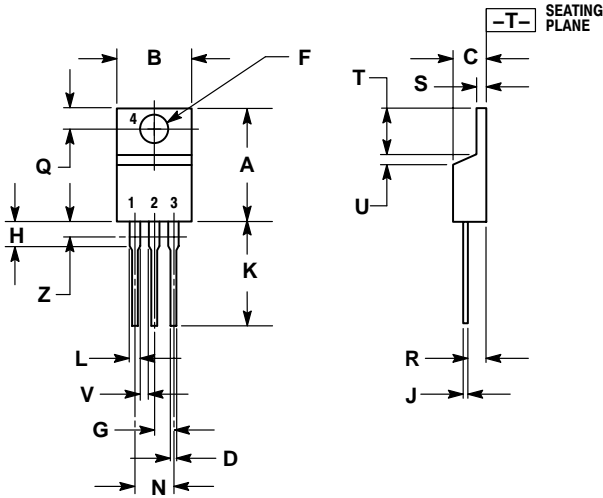


Figure 13. Effects of Base-Emitter Resistance

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PACKAGE DIMENSIONS

TO-220AB
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

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