

# 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  
 $f_T = 3.0 \text{ MHz (Min) @ } I_C = 500 \text{ mAdc}$
- 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 dc
Base Current	$I_B$	1.0		A dc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	40 0.32		Watts W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–65 to +150		$^\circ\text{C}$

### THERMAL CHARACTERISTICS

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

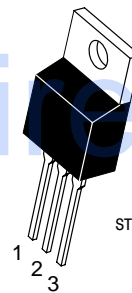


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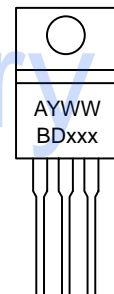
<http://onsemi.com>

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

### MARKING DIAGRAM



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

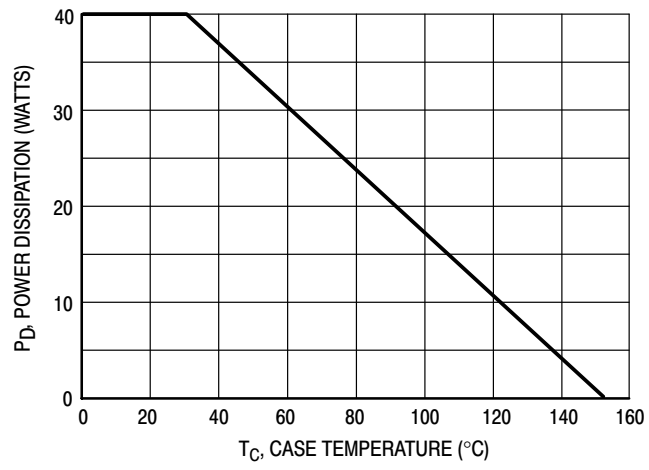


xxx = Specific Device Code:  
241C, 242B, 242C  
A = Assembly Location  
Y = Year  
WW = Work Week

### ORDERING INFORMATION

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

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



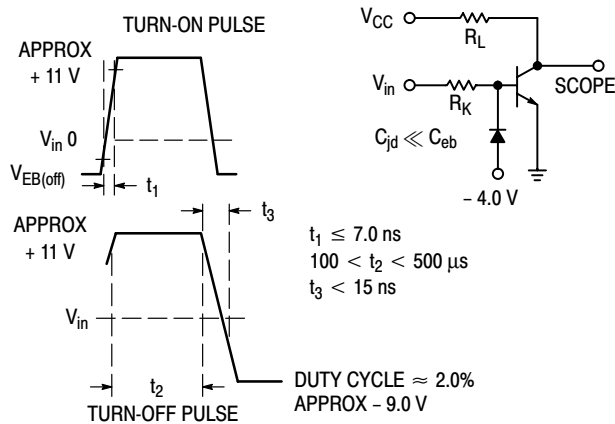
**Figure 1. Power Derating**

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

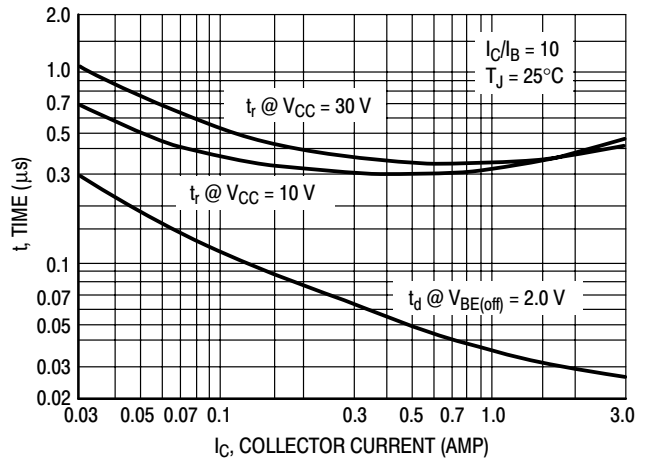
## ELECTRICAL CHARACTERISTICS (T<sub>C</sub> = 25°C unless otherwise noted)

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

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
2. f<sub>T</sub> = |h<sub>fe</sub>| • f<sub>test</sub>.

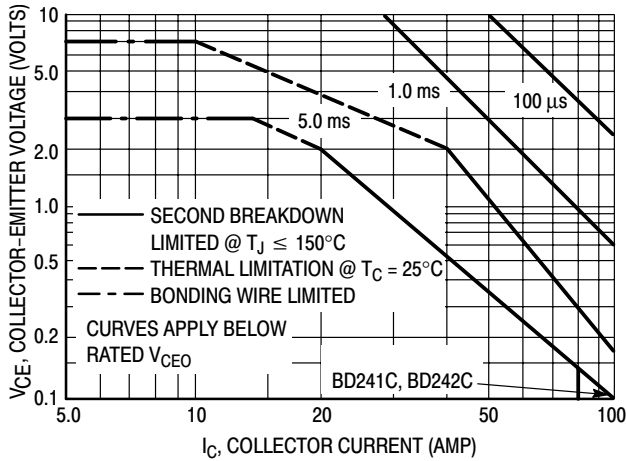
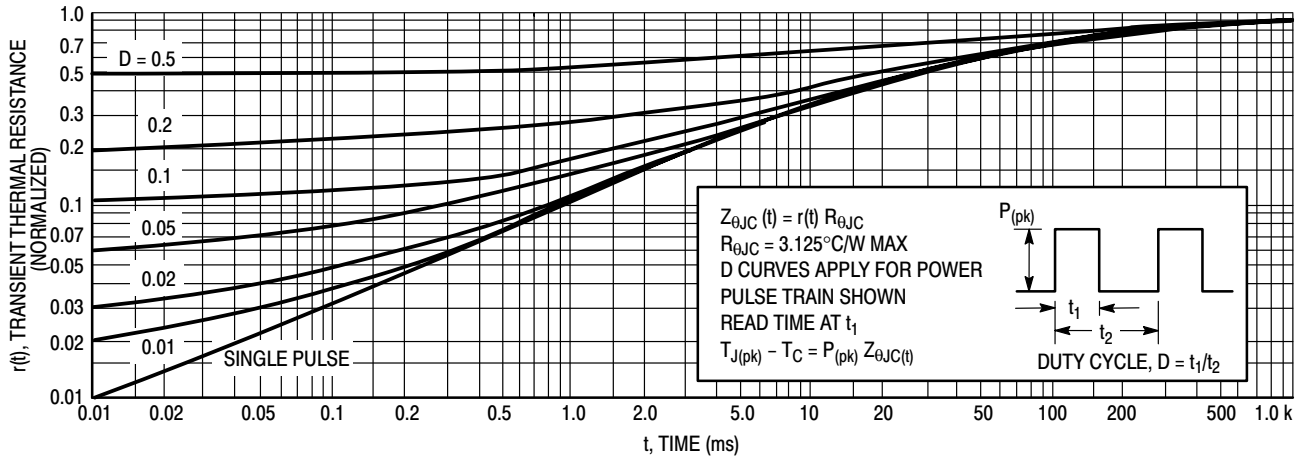


**Figure 2. Switching Time Equivalent Circuit**



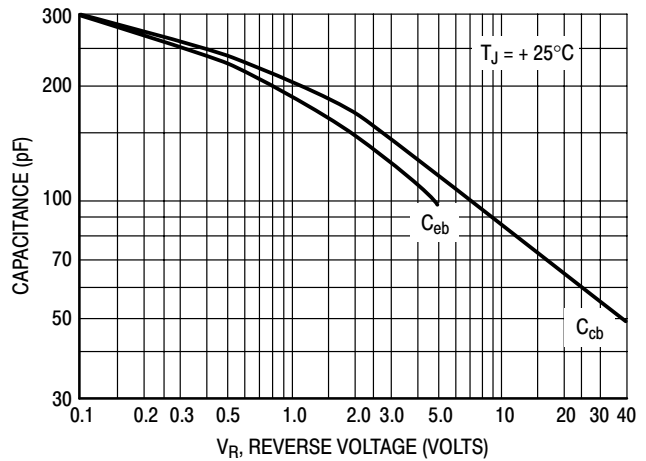
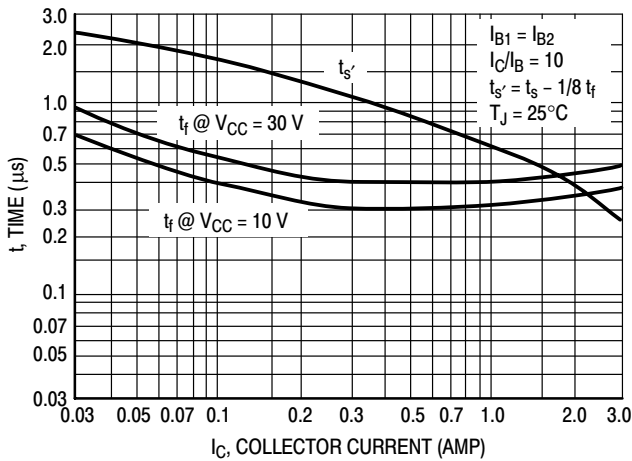
**Figure 3. Turn-On Time**

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

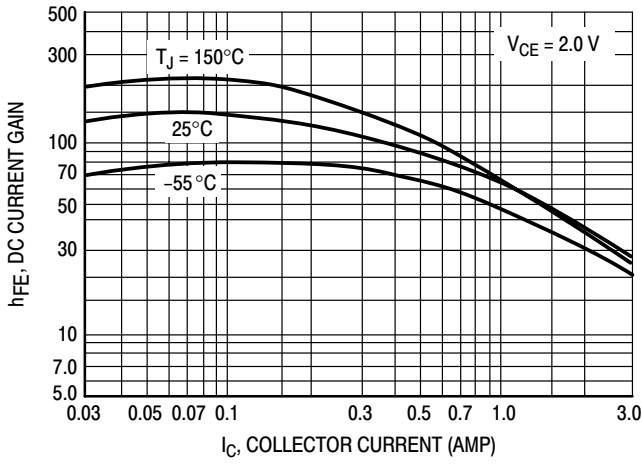


There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation, i.e., the transistor must not be subjected to greater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

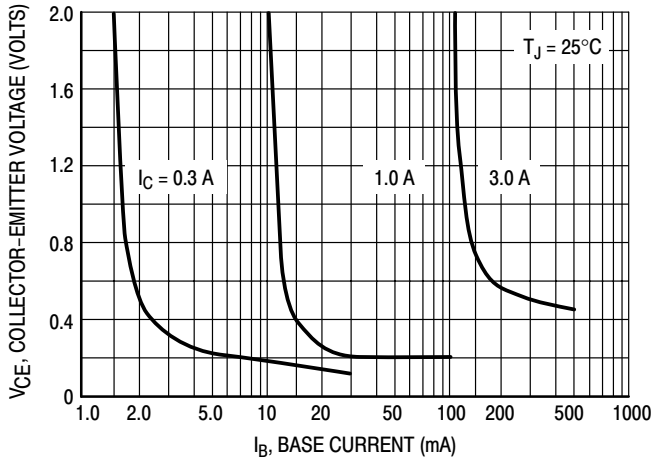
The data of Figure 5 is based on  $T_{J(pk)} = 150^{\circ}C$ ;  $T_C$  is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided  $T_{J(pk)} \leq 150^{\circ}C$ ,  $T_{J(pk)}$  may be calculated from the data in Figure 4. At high case temperatures, thermal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



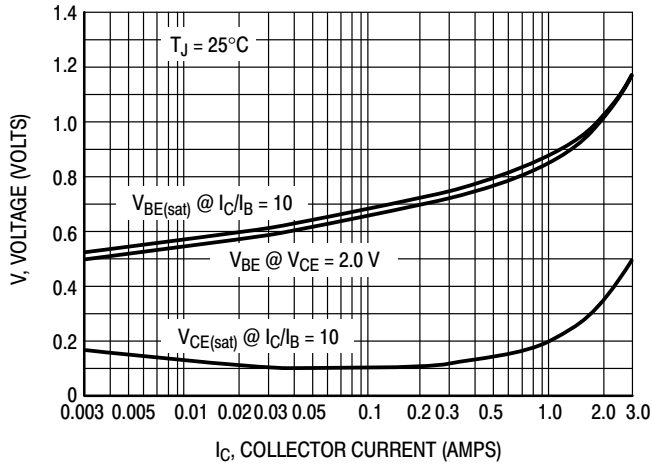
# BD241C\* (NPN), BD242B (PNP), BD242C\* (PNP)



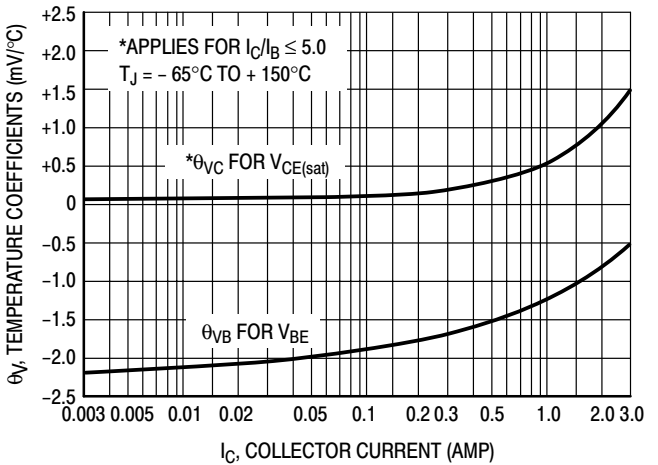
**Figure 8. DC Current Gain**



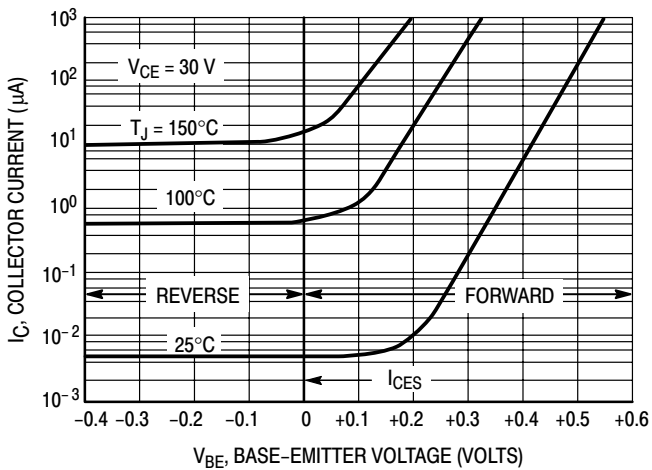
**Figure 9. Collector Saturation Region**



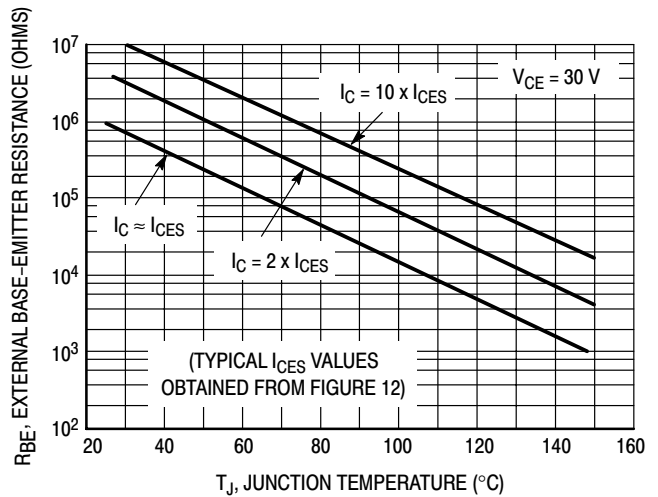
**Figure 10. "On" Voltages**



**Figure 11. Temperature Coefficients**



**Figure 12. Collector Cut-Off Region**

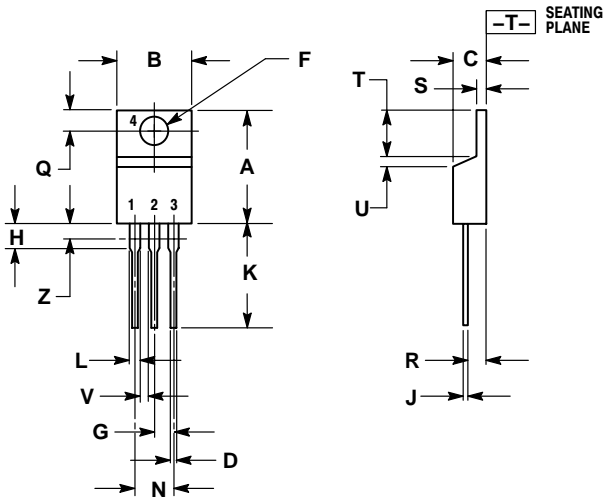


**Figure 13. Effects of Base-Emitter Resistance**

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

## 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

### STYLE 1:

- PIN 1. BASE
2. COLLECTOR
3. EMITTER
4. COLLECTOR

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