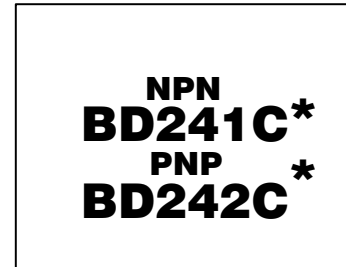


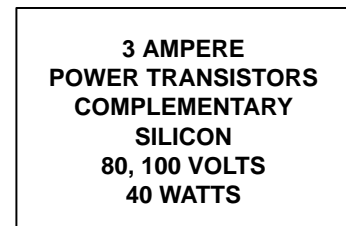
# Complementary Silicon Plastic Power Transistors

... 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 —  
 $V_{CEO(sus)} = 100 \text{ Vdc (Min.) BD241C, BD242C}$
- High Current Gain — Bandwidth Product  
 $f_T = 3.0 \text{ MHz (Min) @ } I_C = 500 \text{ mAdc}$
- Compact TO–220 AB Package

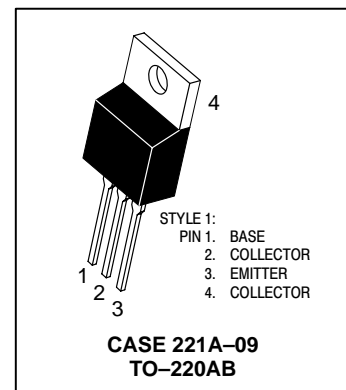


\*ON Semiconductor Preferred Device



## MAXIMUM RATINGS

Rating	Symbol	BD241C BD242C	Unit
Collector–Emitter Voltage	$V_{CEO}$	100	Vdc
Collector–Emitter Voltage	$V_{CES}$	115	Vdc
Emitter–Base Voltage	$V_{EB}$	5.0	Vdc
Collector Current — Continuous	$I_C$	3.0	Adc
Peak		5.0	Adc
Base Current	$I_B$	1.0	Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$	$P_D$	40	Watts
Derate above $25^\circ\text{C}$		0.32	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	$^\circ\text{C/W}$

Preferred devices are ON Semiconductor recommended choices for future use and best overall value.

# BD241C BD242C

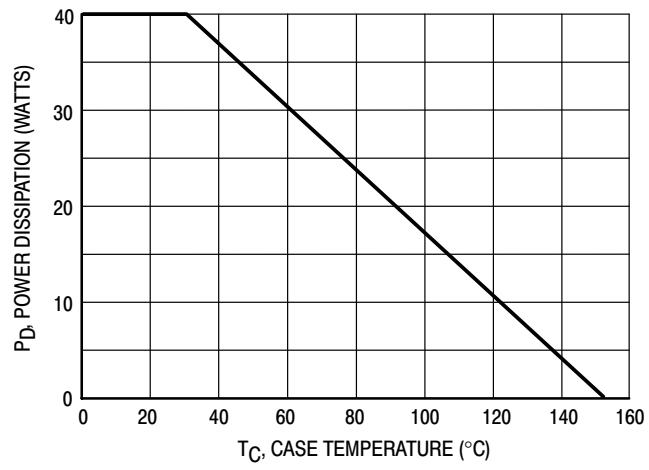


Figure 1. Power Derating

# BD241C BD242C

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

Characteristic	Symbol	Min.	Max.	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Sustaining Voltage <sup>1</sup> ( $I_C = 30\text{ mAdc}$ , $I_B = 0$ )	BD241C, BD242C	$V_{CEO}$	100	Vdc
Collector Cutoff Current ( $V_{CE} = 60\text{ Vdc}$ , $I_B = 0$ )	BD241C, BD242C	$I_{CEO}$	0.3	mAdc
Collector Cutoff Current ( $V_{CE} = 100\text{ Vdc}$ , $V_{EB} = 0$ )	BD241C, BD242C	$I_{CES}$	200	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )		$I_{EBO}$	1.0	mAdc

### ON CHARACTERISTICS<sup>1</sup>

DC Current Gain ( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 4.0\text{ Vdc}$ ) ( $I_C = 3.0\text{ Adc}$ , $V_{CE} = 4.0\text{ Vdc}$ )	$h_{FE}$	25 10		
Collector–Emitter Saturation Voltage ( $I_C = 3.0\text{ Adc}$ , $I_B = 600\text{ Adc}$ )	$V_{CE(sat)}$		1.2	Vdc
Base–Emitter On Voltage ( $I_C = 3.0\text{ Adc}$ , $V_{CE} = 4.0\text{ Vdc}$ )	$V_{BE(on)}$		1.8	Vdc

### DYNAMIC CHARACTERISTICS

Current Gain – Bandwidth Product <sup>2</sup> ( $I_C = 500\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 1\text{ MHz}$ )	$f_T$	3.0		MHz
Small–Signal Current Gain ( $I_C = 0.5\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f = 1\text{ kHz}$ )	$h_{fe}$	20		

<sup>1</sup> Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .

<sup>2</sup>  $f_T = |h_{fe}| \cdot f_{test}$ .

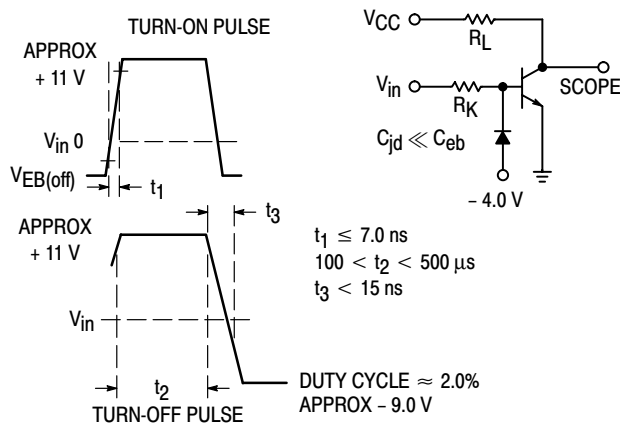


Figure 2. Switching Time Equivalent Circuit

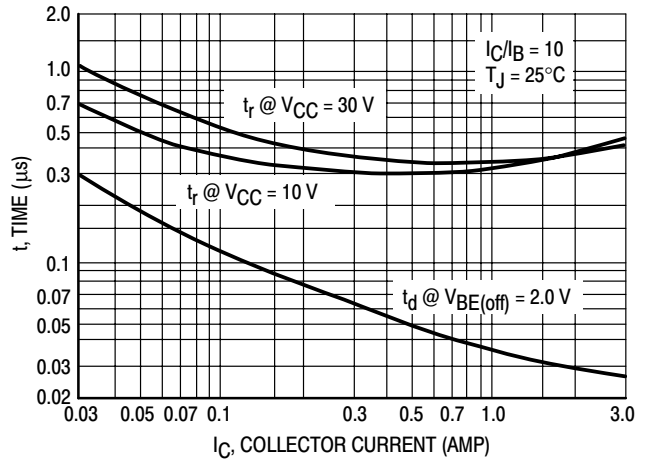


Figure 3. Turn–On Time

# BD241C BD242C

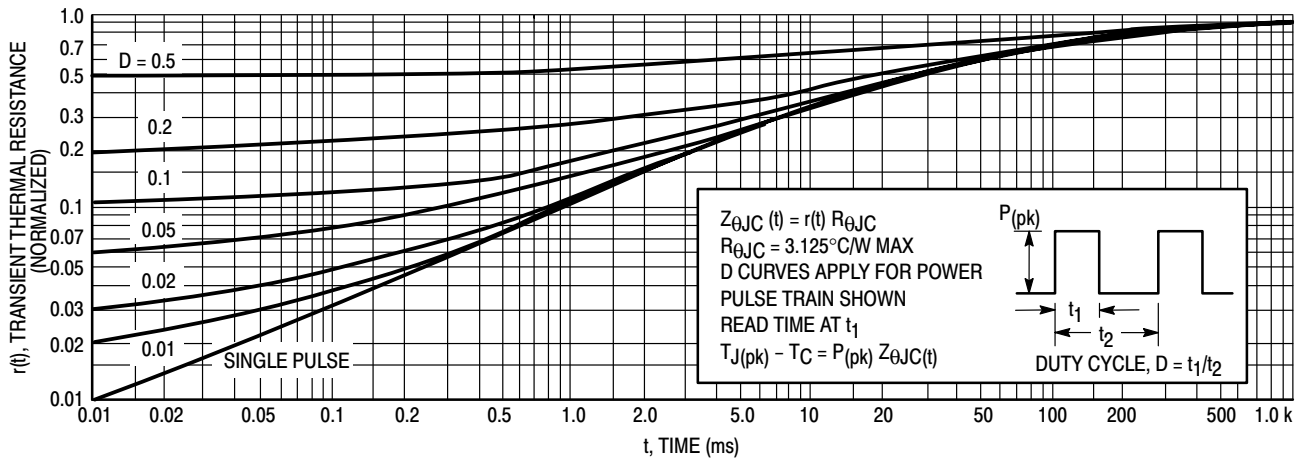


Figure 4. Thermal Response

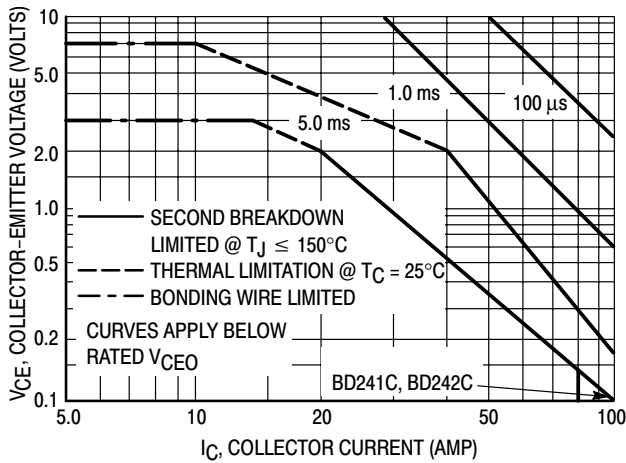


Figure 5. Active Region Safe Operating Area

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.

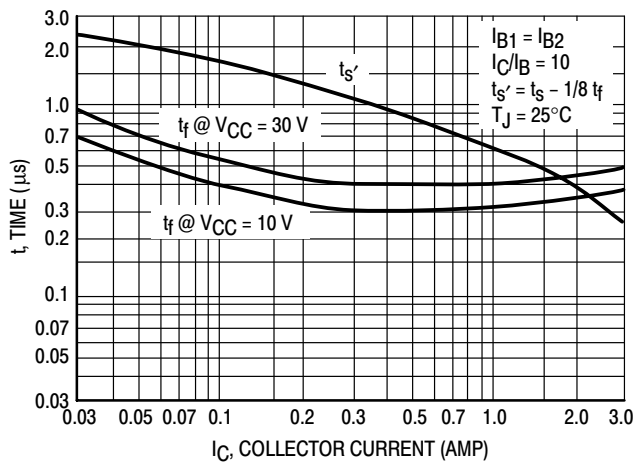


Figure 6. Turn-Off Time

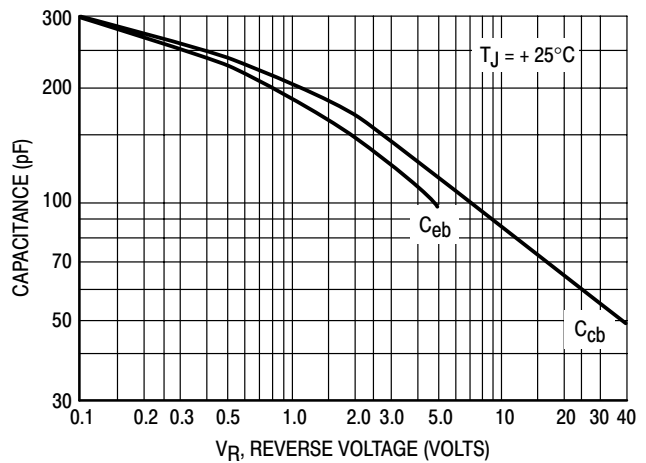
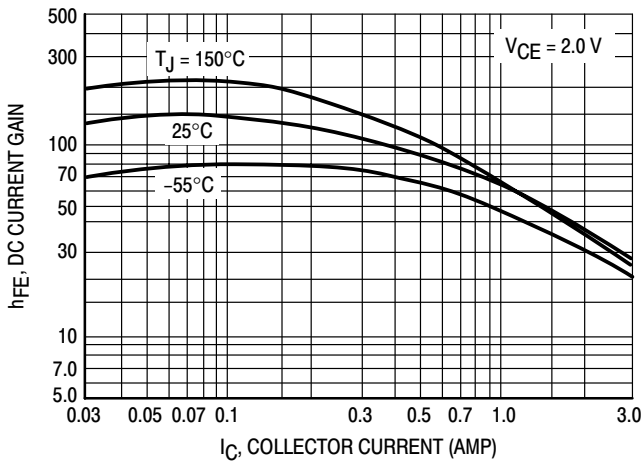
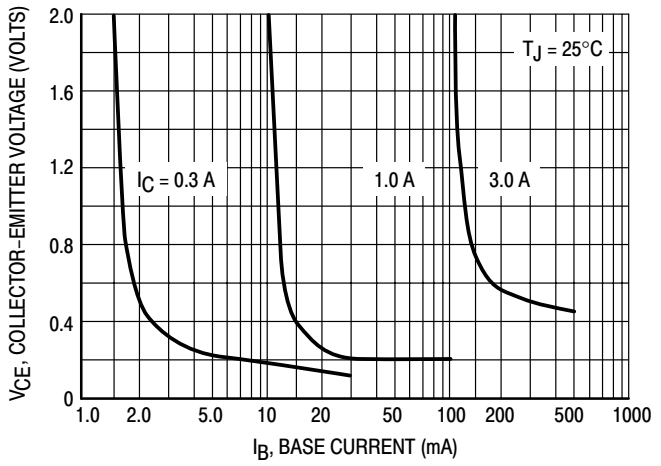


Figure 7. Capacitance

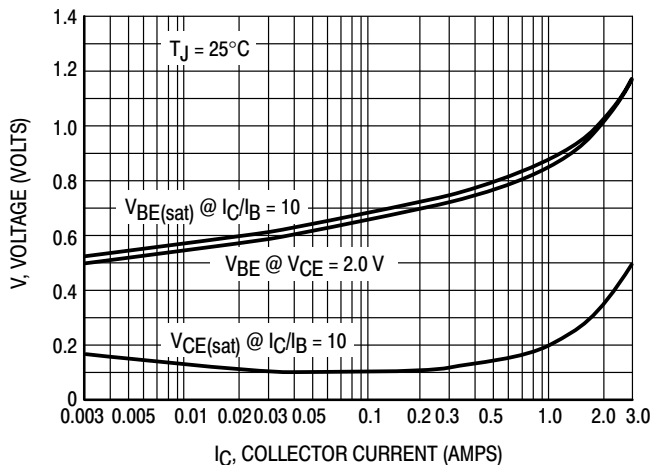
# BD241C BD242C



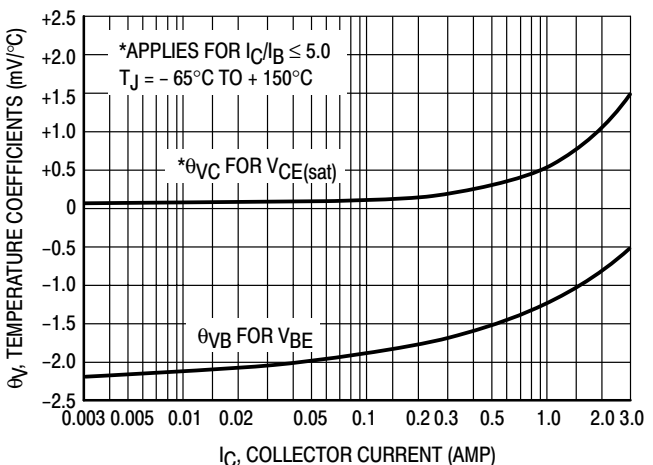
**Figure 8. DC Current Gain**



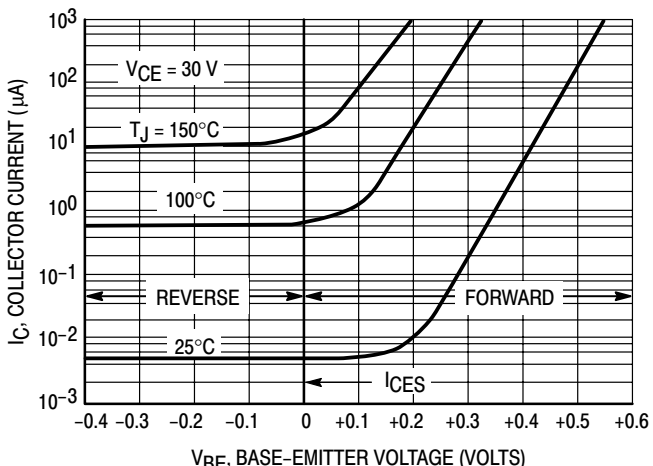
**Figure 9. Collector Saturation Region**



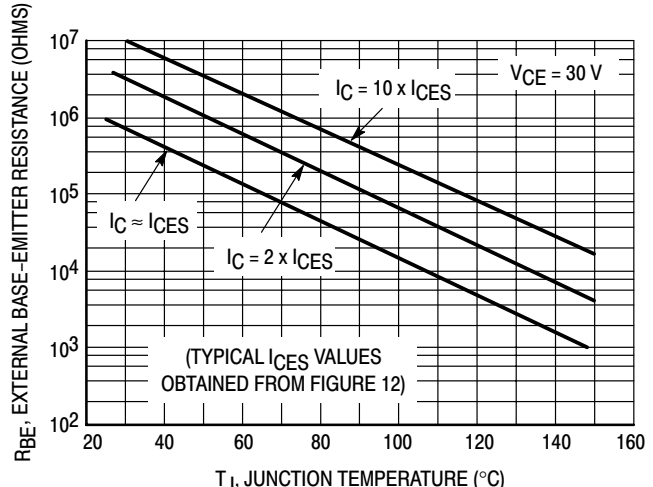
**Figure 10. "On" Voltages**



**Figure 11. Temperature Coefficients**



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

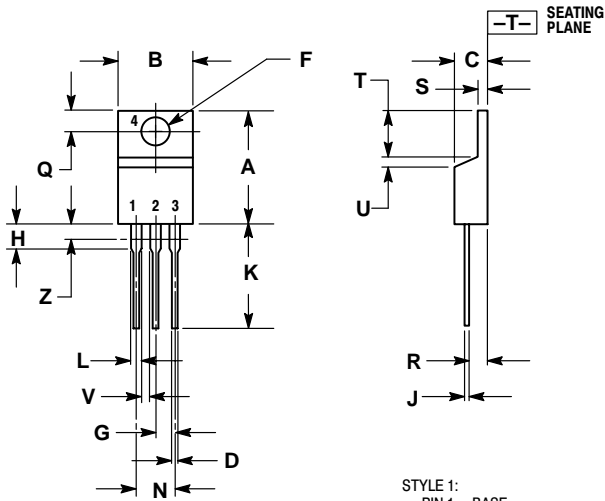


**Figure 13. Effects of Base-Emitter Resistance**

# BD241C BD242C

## PACKAGE DIMENSIONS

### TO-220AB CASE 221A-09 ISSUE AB




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

- 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**

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