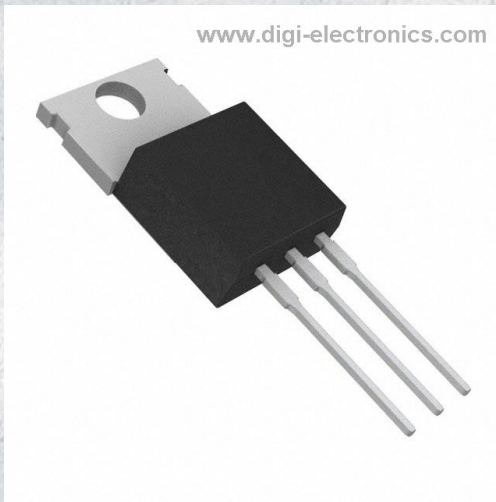


# BD241CG Datasheet



<https://www.DiGi-Electronics.com>

DiGi Electronics Part Number	BD241CG-DG
Manufacturer	<a href="#">onsemi</a>
Manufacturer Product Number	BD241CG
Description	TRANS NPN 100V 3A TO220
Detailed Description	Bipolar (BJT) Transistor NPN 100 V 3 A 3MHz 40 W Through Hole TO-220



Tel: +00 852-30501935

RFQ Email: [Info@DiGi-Electronics.com](mailto:Info@DiGi-Electronics.com)

DiGi is a global authorized distributor of electronic components.

## Purchase and inquiry

Manufacturer Product Number:

BD241CG

Series:

-

Transistor Type:

NPN

Voltage - Collector Emitter Breakdown (Max):

100 V

Current - Collector Cutoff (Max):

300µA

Power - Max:

40 W

Operating Temperature:

-65°C ~ 150°C (TJ)

Package / Case:

TO-220-3

Base Product Number:

BD241

Manufacturer:

onsemi

Product Status:

Active

Current - Collector (Ic) (Max):

3 A

Vce Saturation (Max) @ Ib, Ic:

1.2V @ 600mA, 3A

DC Current Gain (hFE) (Min) @ Ic, Vce:

25 @ 1A, 4V

Frequency - Transition:

3MHz

Mounting Type:

Through Hole

Supplier Device Package:

TO-220

## Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8541.29.0095

Moisture Sensitivity Level (MSL):

Not Applicable

ECCN:

EAR99

# Complementary Silicon Plastic Power Transistors

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

Designed for use in general purpose amplifier and switching applications.

### Features

- High Current Gain – Bandwidth Product
- Compact TO–220 AB Package
- Epoxy Meets UL94 V–0 @ 0.125 in
- These Devices are Pb–Free and are RoHS Compliant\*

### 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	$I_C$	3.0		Adc
Collector Current – Peak	$I_{CM}$	5.0		Adc
Base Current	$I_B$	1.0		Adc
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	40 0.32		W W/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	$T_J, T_{stg}$	–65 to +150		$^\circ\text{C}$
ESD – Human Body Model	HBM	3B		V
ESD – Machine Model	MM	C		V

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

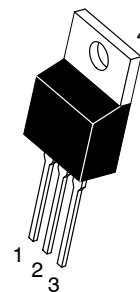
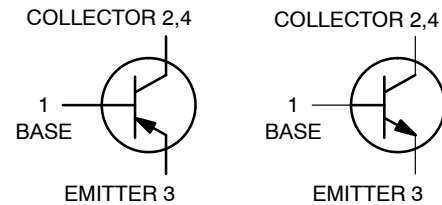
### THERMAL CHARACTERISTICS

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

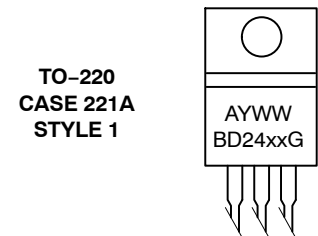
\*For additional information on our Pb–Free strategy and soldering details, please download the **onsemi** Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

## POWER TRANSISTORS COMPLEMENTARY SILICON 3 AMP 80–100 VOLTS 40 WATTS

### COMPLEMENTARY



### MARKING DIAGRAM



TO–220  
CASE 221A  
STYLE 1

BD24xx = Device Code  
 xx = 1C, 2B, or 2C  
 A = Assembly Location  
 Y = Year  
 WW = Work Week  
 G = Pb–Free Package

### ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
BD241CG	TO–220 (Pb–Free)	50 Units/Rail
BD242CG	TO–220 (Pb–Free)	50 Units/Rail

<sup>†</sup>For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

### DISCONTINUED (Note 1)

BD242BG	TO–220 (Pb–Free)	50 Units/Rail
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1. **DISCONTINUED:** This device is not recommended for new design. Please contact your **onsemi** representative for information. The most current information on this device may be available on [www.onsemi.com](http://www.onsemi.com).

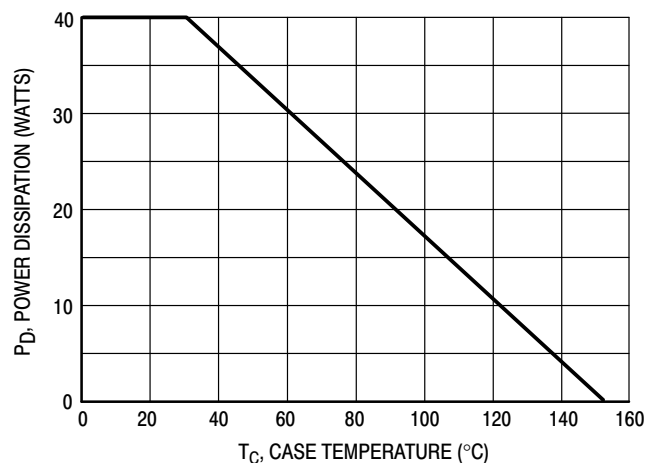
**BD241C (NPN), BD242B (PNP), BD242C (PNP)****ELECTRICAL CHARACTERISTICS** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

Characteristic	Symbol	Min	Max	Unit
<b>OFF CHARACTERISTICS</b>				
Collector–Emitter Sustaining Voltage (Note 2) ( $I_C = 30\text{ mA}$ , $I_B = 0$ )	$V_{CEO}$	80 100		Vdc
Collector Cutoff Current ( $V_{CE} = 50\text{ Vdc}$ , $I_B = 0$ ) ( $V_{CE} = 60\text{ Vdc}$ , $I_B = 0$ )	$I_{CEO}$		0.3	mAdc
Collector Cutoff Current ( $V_{CE} = 80\text{ Vdc}$ , $V_{EB} = 0$ ) ( $V_{CE} = 100\text{ Vdc}$ , $V_{EB} = 0$ )	$I_{CES}$		200	$\mu\text{Adc}$
Emitter Cutoff Current ( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )	$I_{EBO}$		1.0	mAdc
<b>ON CHARACTERISTICS</b> (Note 2)				
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 ( $I_C = 3.0\text{ Adc}$ , $I_B = 0.6\text{ Adc}$ )	$V_{CE(sat)}$		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
<b>DYNAMIC CHARACTERISTICS</b>				
Current Gain – Bandwidth Product (Note 3) ( $I_C = 500\text{ mA}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 1.0\text{ MHz}$ )	$f_T$	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		

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

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

3.  $f_T = |h_{fe}| \cdot f_{test}$ .



**Figure 1. Power Derating**

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

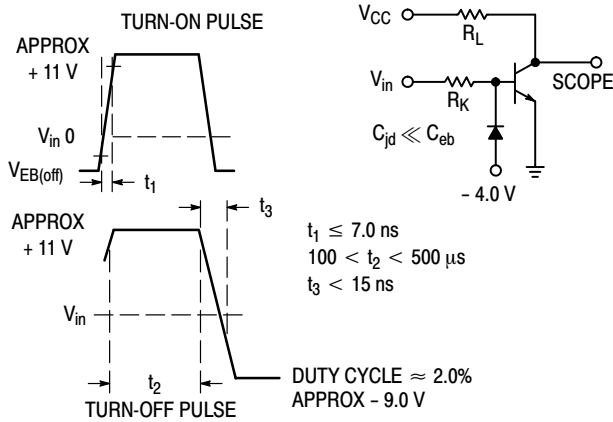


Figure 2. Switching Time Equivalent Circuit

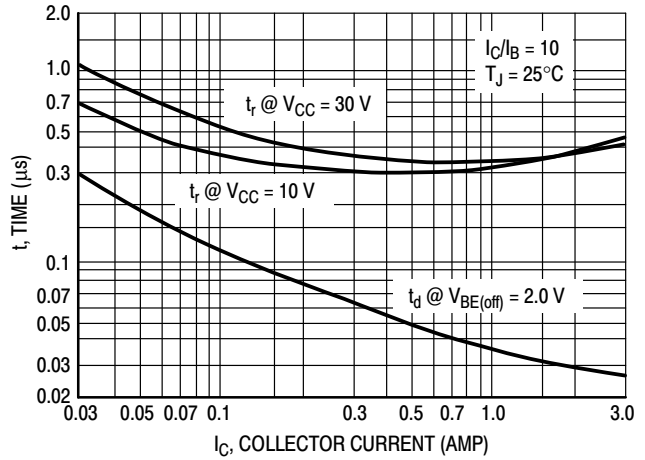


Figure 3. Turn-On Time

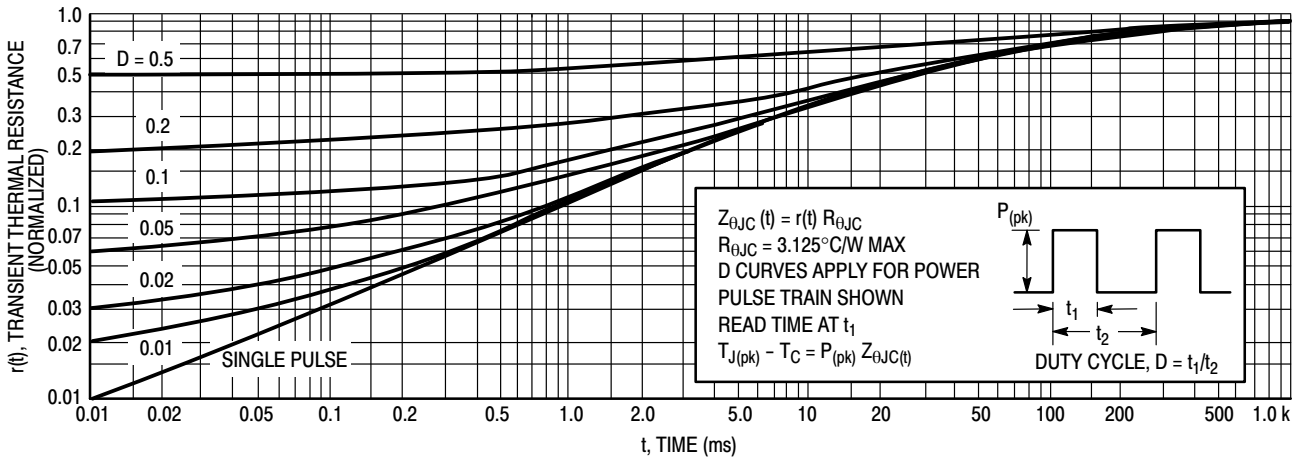


Figure 4. Thermal Response

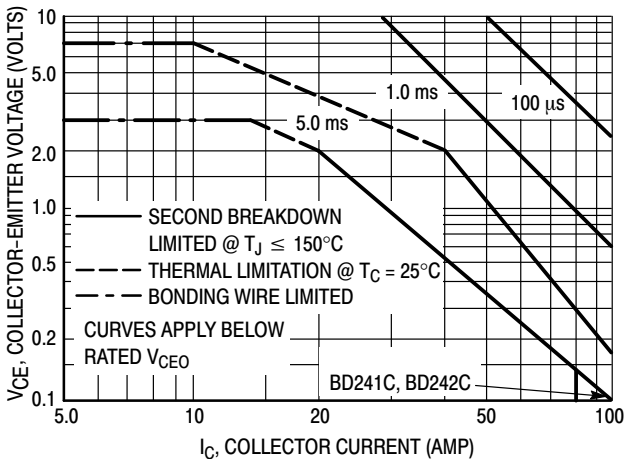
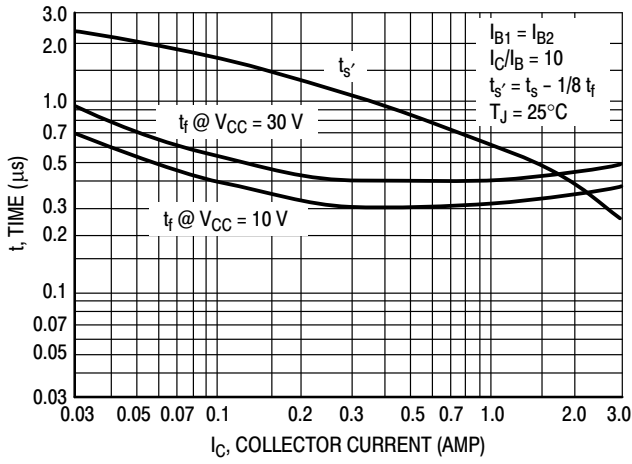


Figure 5. Active Region Safe Operating Area

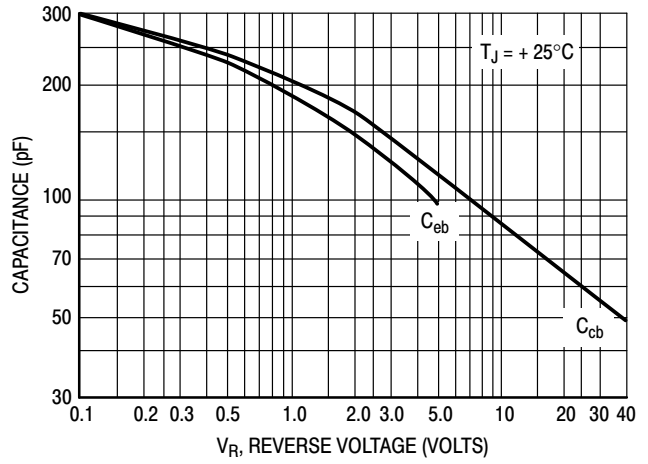
There are two limitations on the power handling ability of a transistor: average junction temperature and second breakdown. Safe operating area curves indicate  $I_C - V_{CE}$  limits of the transistor that must be observed for reliable operation, i.e., the transistor must not be subjected to greater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

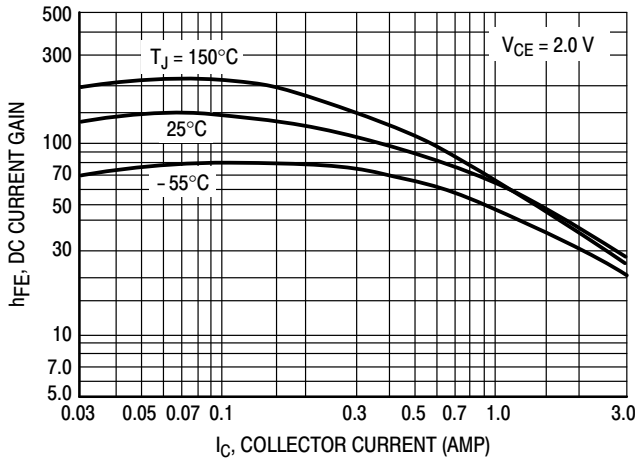
**BD241C (NPN), BD242B (PNP), BD242C (PNP)**



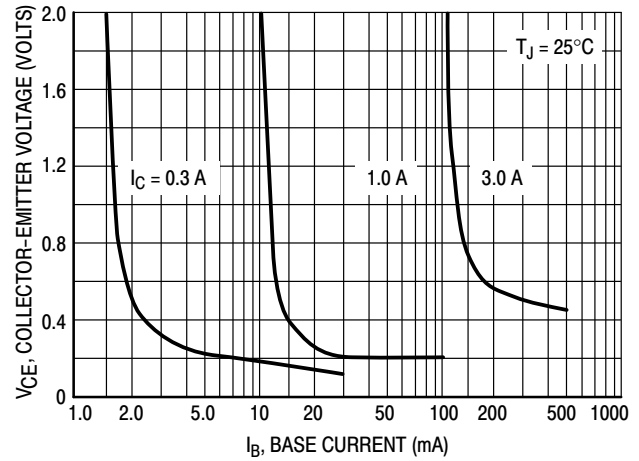
**Figure 6. Turn-Off Time**



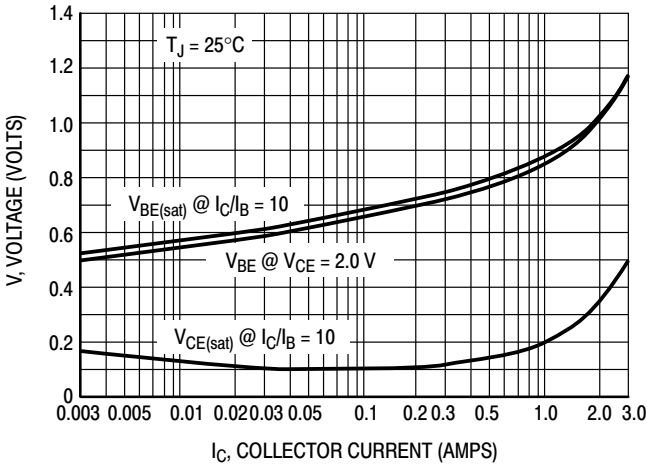
**Figure 7. Capacitance**



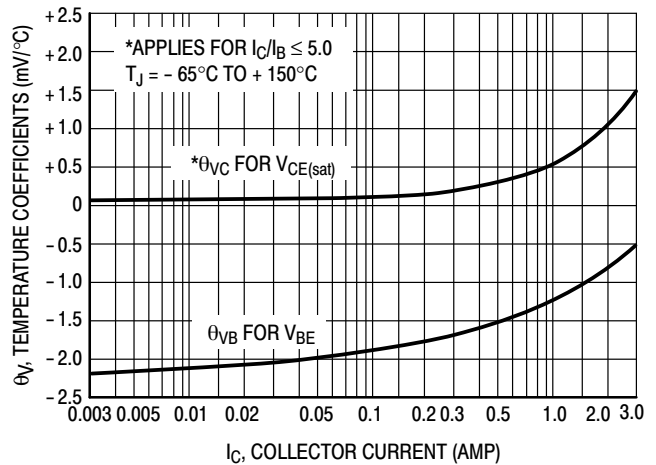
**Figure 8. DC Current Gain**



**Figure 9. Collector Saturation Region**

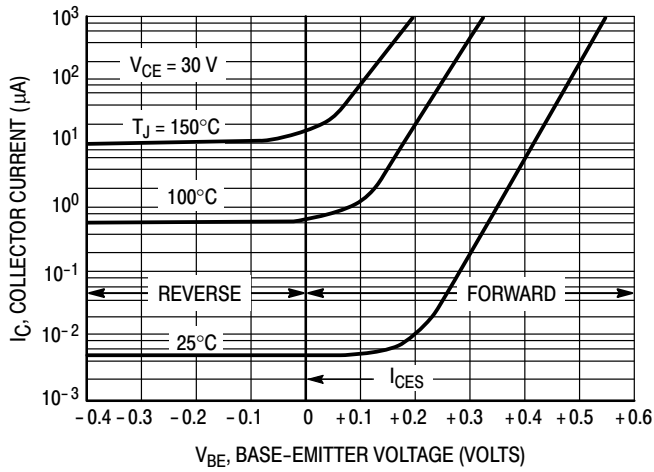


**Figure 10. "On" Voltages**

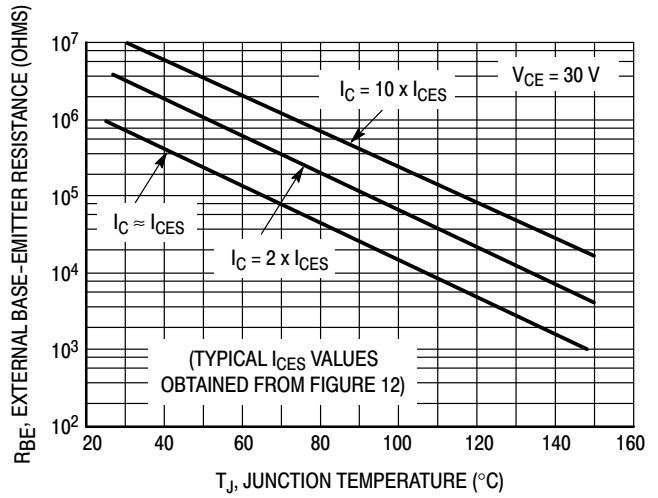


**Figure 11. Temperature Coefficients**

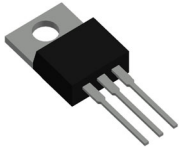
**BD241C (NPN), BD242B (PNP), BD242C (PNP)**



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

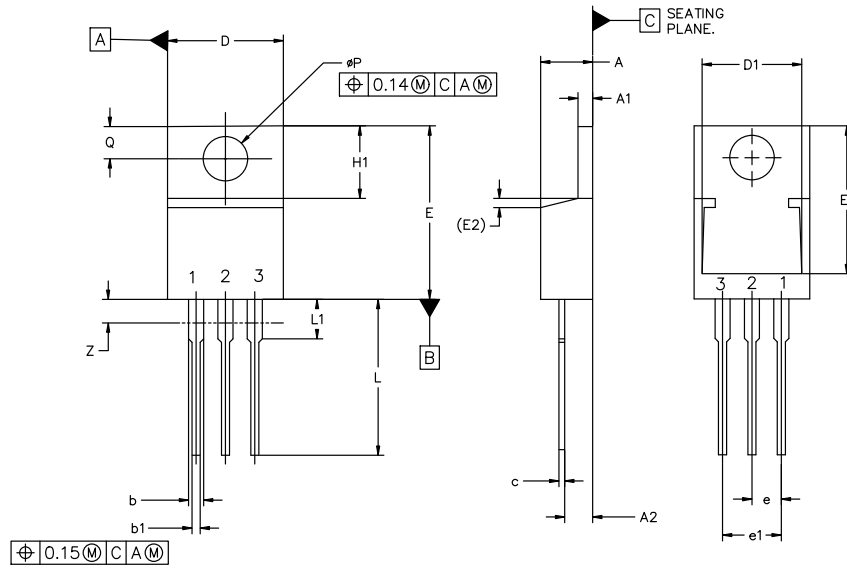


**Figure 13. Effects of Base-Emitter Resistance**



**TO-220-3 10.10x15.12x4.45, 2.54P**  
**CASE 221A**  
**ISSUE AL**

DATE 05 FEB 2025



$\phi$  0.15 (M) C A (M)

MILLIMETERS			
DIM	MIN	NOM	MAX
A	4.07	4.45	4.83
A1	1.15	1.28	1.41
A2	2.04	2.42	2.79
b	1.15	1.34	1.52
b1	0.64	0.80	0.96
c	0.36	0.49	0.61
D	9.66	10.10	10.53
D1	8.43	8.63	8.83
E	14.48	15.12	15.75
E1	12.58	12.78	12.98
E2	1.27 REF		

MILLIMETERS			
DIM	MIN	NOM	MAX
e	2.42	2.54	2.66
e1	4.83	5.08	5.33
H1	5.97	6.22	6.47
L	12.70	13.49	14.27
L1	2.80	3.45	4.10
Q	2.54	2.79	3.04
$\phi$ P	3.60	3.85	4.09
Z	---	---	3.48

- NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
  2. CONTROLLING DIMENSION: MILLIMETERS.
  3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.

- |  |  |   |  |
|--|--|---|--|
| <p>STYLE 1:<br/>PIN 1. BASE<br/>2. COLLECTOR<br/>3. EMITTER<br/>4. COLLECTOR</p> | <p>STYLE 2:<br/>PIN 1. BASE<br/>2. EMITTER<br/>3. COLLECTOR<br/>4. EMITTER</p> | <p>STYLE 3:<br/>PIN 1. CATHODE<br/>2. ANODE<br/>3. GATE<br/>4. ANODE</p>    | <p>STYLE 4:<br/>PIN 1. MAIN TERMINAL 1<br/>2. MAIN TERMINAL 2<br/>3. GATE<br/>4. MAIN TERMINAL 2</p> |
| <p>STYLE 5:<br/>PIN 1. GATE<br/>2. DRAIN<br/>3. SOURCE<br/>4. DRAIN</p>          | <p>STYLE 6:<br/>PIN 1. ANODE<br/>2. CATHODE<br/>3. ANODE<br/>4. CATHODE</p>    | <p>STYLE 7:<br/>PIN 1. CATHODE<br/>2. ANODE<br/>3. CATHODE<br/>4. ANODE</p> | <p>STYLE 8:<br/>PIN 1. CATHODE<br/>2. ANODE<br/>3. EXTERNAL TRIP/DELAY<br/>4. ANODE</p>              |
| <p>STYLE 9:<br/>PIN 1. GATE<br/>2. COLLECTOR<br/>3. EMITTER<br/>4. COLLECTOR</p> | <p>STYLE 10:<br/>PIN 1. GATE<br/>2. SOURCE<br/>3. DRAIN<br/>4. SOURCE</p>      | <p>STYLE 11:<br/>PIN 1. DRAIN<br/>2. SOURCE<br/>3. GATE<br/>4. SOURCE</p>   | <p>STYLE 12:<br/>PIN 1. MAIN TERMINAL 1<br/>2. MAIN TERMINAL 2<br/>3. GATE<br/>4. NOT CONNECTED</p>  |

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<b>DESCRIPTION:</b>	<b>TO-220-3 10.10x15.12x4.45, 2.54P</b>	<b>PAGE 1 OF 1</b>

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