

# MJE15034 (NPN), MJE15035 (PNP)

## Complementary Silicon Plastic Power Transistors

### TO-220, NPN & PNP Devices

Complementary silicon plastic power transistors are designed for use as high-frequency drivers in audio amplifiers.

#### Features

- High Current Gain – Bandwidth Product
- TO-220 Compact Package
- Epoxy meets UL 94 V-0 @ 0.125 in
- These Devices are Pb-Free and are RoHS Compliant\*

#### MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	$V_{CEO}$	350	Vdc
Collector-Base Voltage	$V_{CB}$	350	Vdc
Emitter-Base Voltage	$V_{EB}$	5.0	Vdc
Collector Current – Continuous	$I_C$	4.0	Adc
Collector Current – Peak	$I_{CM}$	8.0	Adc
Base Current	$I_B$	1.0	Adc
Total Power Dissipation @ $T_C = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	50 0.40	W W/ $^\circ\text{C}$
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above $25^\circ\text{C}$	$P_D$	2.0 0.016	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-Case	$R_{\theta JC}$	2.5	$^\circ\text{C/W}$
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^\circ\text{C/W}$

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

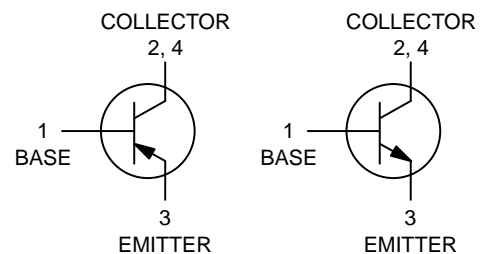


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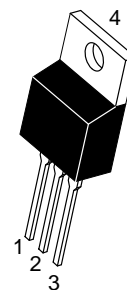
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### 4.0 AMPERES POWER TRANSISTORS COMPLEMENTARY SILICON 350 VOLTS, 50 WATTS

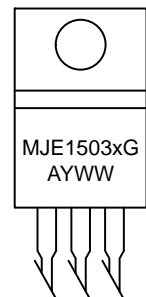
#### COMPLEMENTARY



#### MARKING DIAGRAM



TO-220  
CASE 221A  
STYLE 1



MJE1503x = Device Code  
                  x = 4 or 5  
A = Location Code  
Y = Year  
WW = Work Week  
G = Pb-Free Package

#### ORDERING INFORMATION

Device	Package	Shipping
MJE15034G	TO-220 (Pb-Free)	50 Units / Rail
MJE15035G	TO-220 (Pb-Free)	50 Units / Rail

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

Characteristic	Symbol	Min	Max	Unit
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### OFF CHARACTERISTICS

Collector-Emitter Sustaining Voltage (Note 1)	( $I_C = 10\text{ mAdc}, I_B = 0$ )	$V_{CEO(sus)}$	350	-	Vdc
Collector Cutoff Current	( $V_{CB} = 350\text{ Vdc}, I_E = 0$ )	$I_{CBO}$	-	10	$\mu\text{Adc}$
Emitter Cutoff Current	( $V_{BE} = 5.0\text{ Vdc}, I_C = 0$ )	$I_{EBO}$	-	10	$\mu\text{Adc}$

### ON CHARACTERISTICS (Note 1)

DC Current Gain	( $I_C = 0.1\text{ Adc}, V_{CE} = 5.0\text{ Vdc}$ ) ( $I_C = 0.5\text{ Adc}, V_{CE} = 5.0\text{ Vdc}$ ) ( $I_C = 1.0\text{ Adc}, V_{CE} = 5.0\text{ Vdc}$ ) ( $I_C = 2.0\text{ Adc}, V_{CE} = 5.0\text{ Vdc}$ )	$h_{FE}$	100 100 50 10	- - - -	- - - -
Collector-Emitter Saturation Voltage	( $I_C = 1.0\text{ Adc}, I_B = 0.1\text{ Adc}$ )	$V_{CE(sat)}$	-	0.5	Vdc
Base-Emitter On Voltage	( $I_C = 1.0\text{ Adc}, V_{CE} = 5.0\text{ Vdc}$ )	$V_{BE(on)}$	-	1.0	Vdc

### DYNAMIC CHARACTERISTICS

Current Gain - Bandwidth Product (Note 2) ( $I_C = 500\text{ mAdc}, V_{CE} = 10\text{ Vdc}, f_{test} = 1.0\text{ MHz}$ )	$f_T$	30	-	MHz
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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.

1. Pulse Test: Pulse Width  $\leq 300\ \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .
2.  $f_T = |h_{fe}| \cdot f_{test}$ .

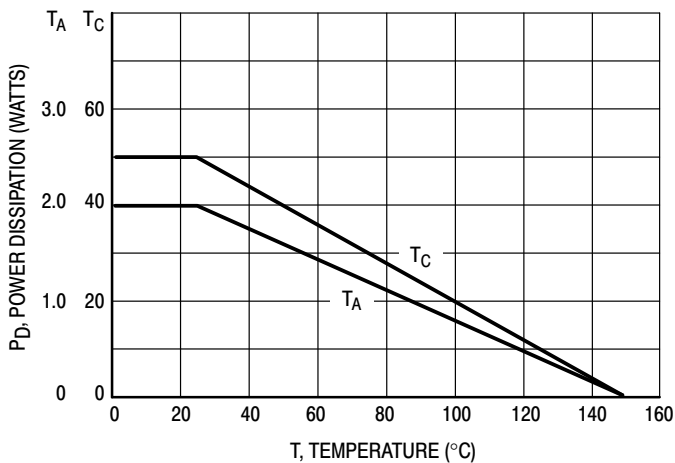


Figure 1. Power Derating

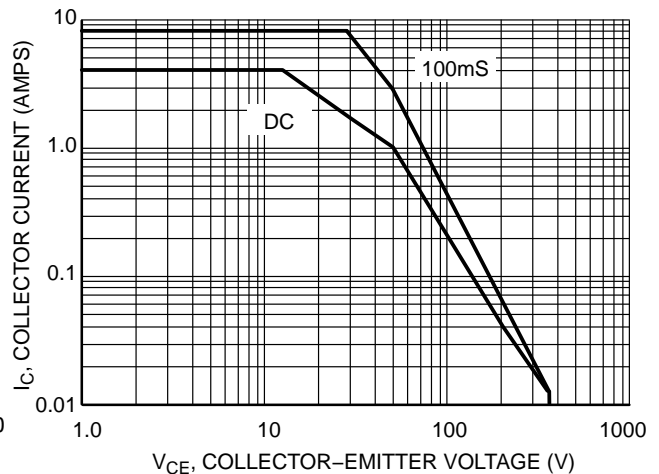


Figure 2. Active Region Safe Operating Area

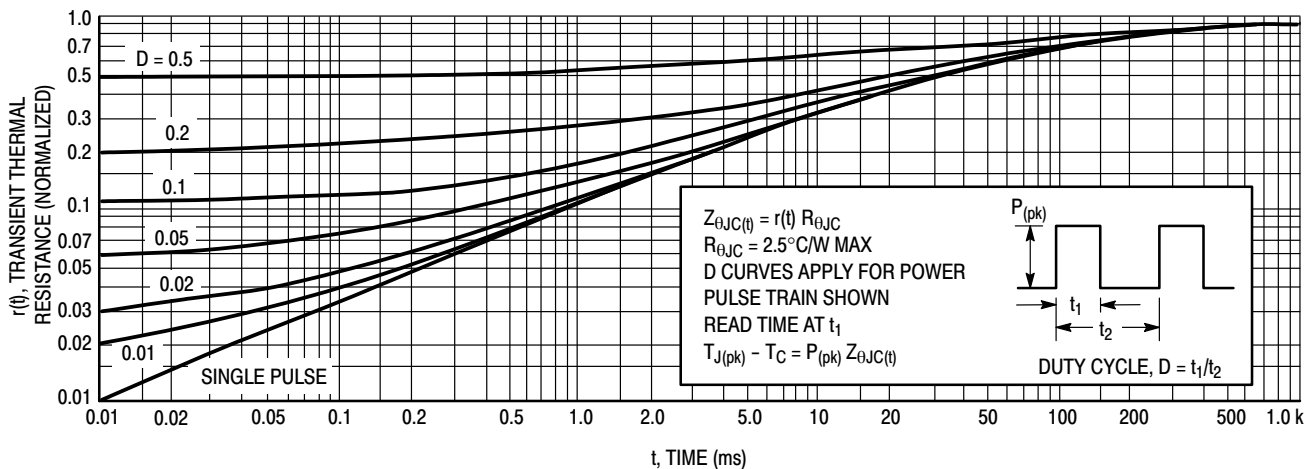
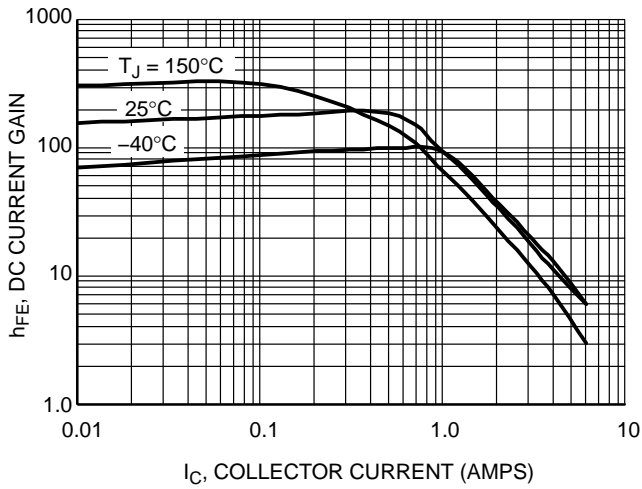
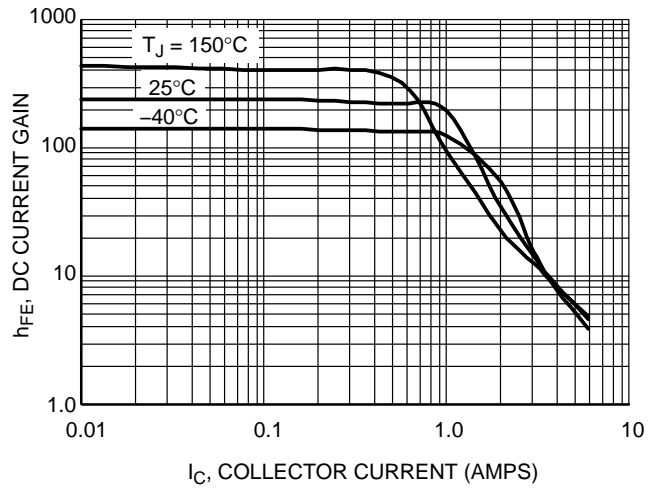


Figure 3. Thermal Response

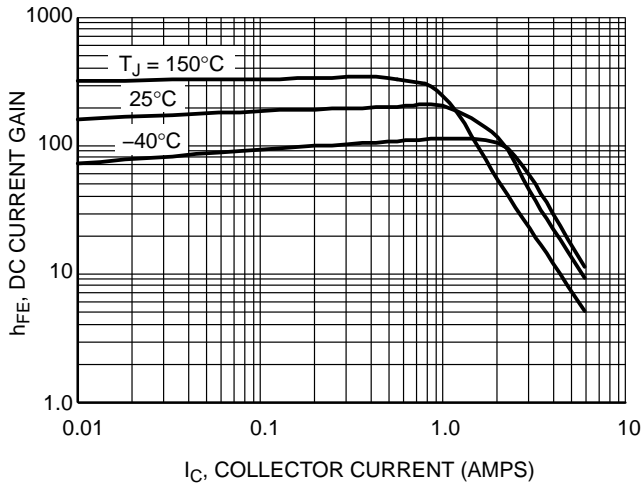
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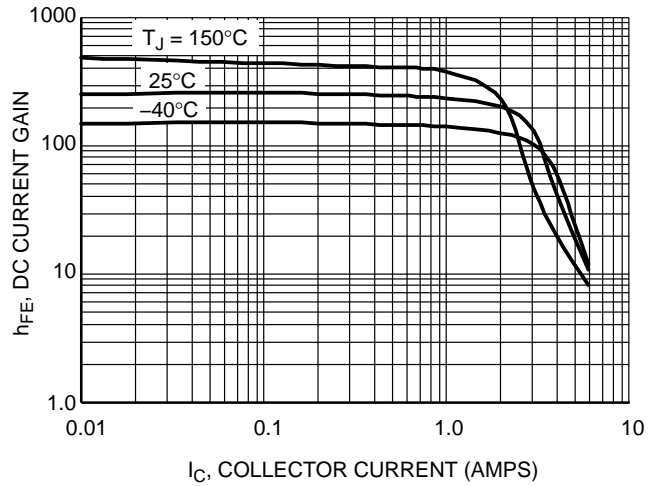
**Figure 4. DC Current Gain,  $V_{CE} = 5.0$  V  
NPN MJE15034**



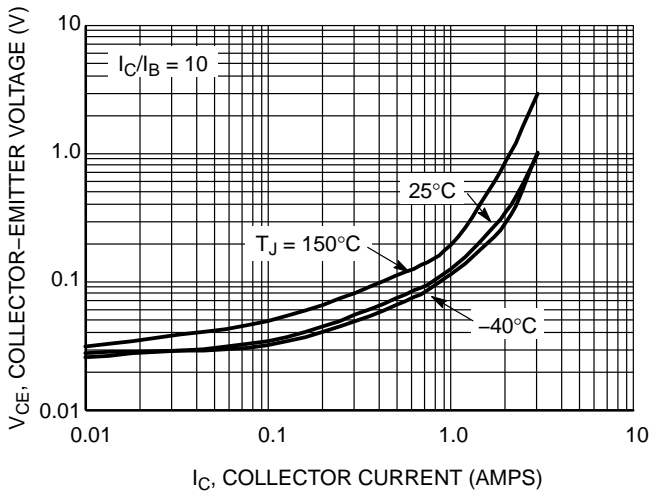
**Figure 5. DC Current Gain,  $V_{CE} = 5.0$  V  
PNP MJE15035**



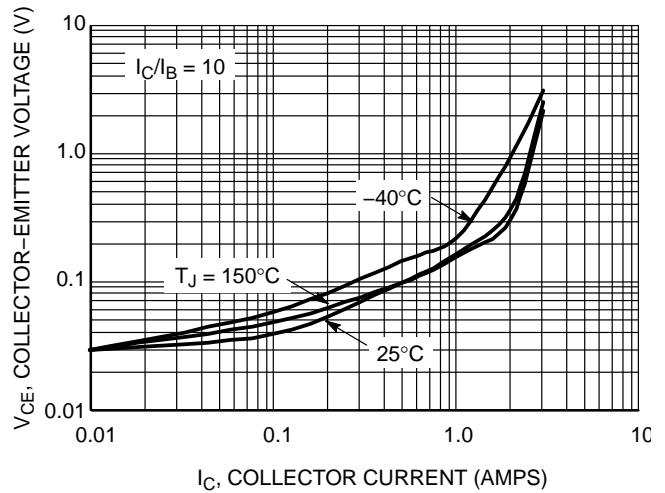
**Figure 6. DC Current Gain,  $V_{CE} = 20$  V  
NPN MJE15034**



**Figure 7. DC Current Gain,  $V_{CE} = 20$  V  
PNP MJE15035**

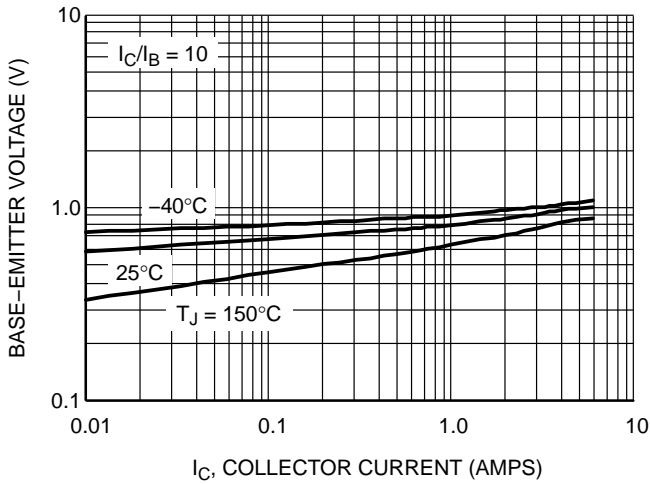


**Figure 8.  $V_{CE(sat)}$   
NPN MJE15034**

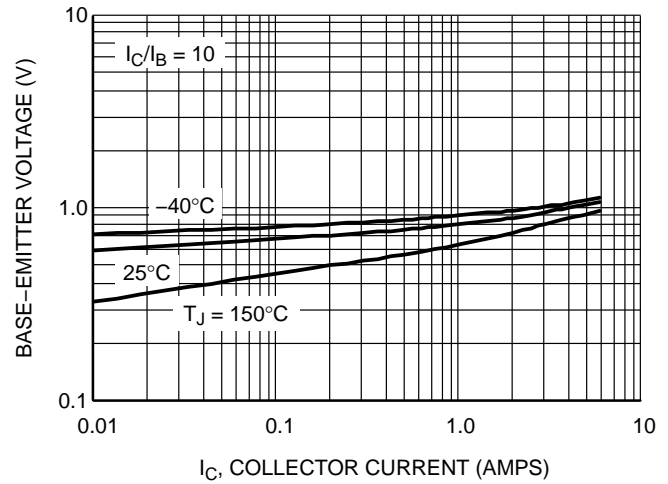


**Figure 9.  $V_{CE(sat)}$   
PNP MJE15035**

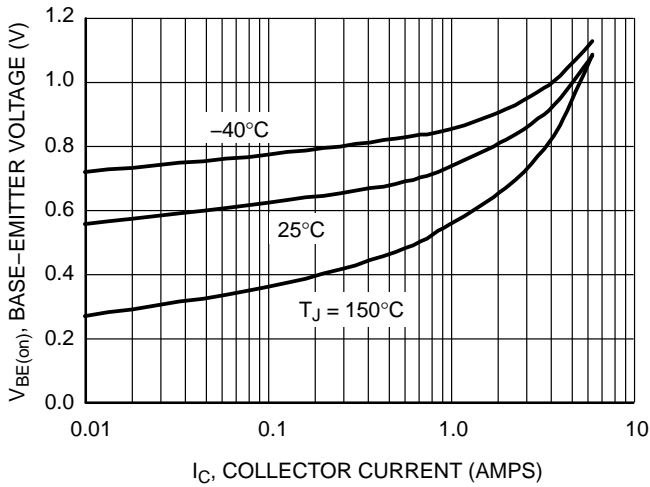
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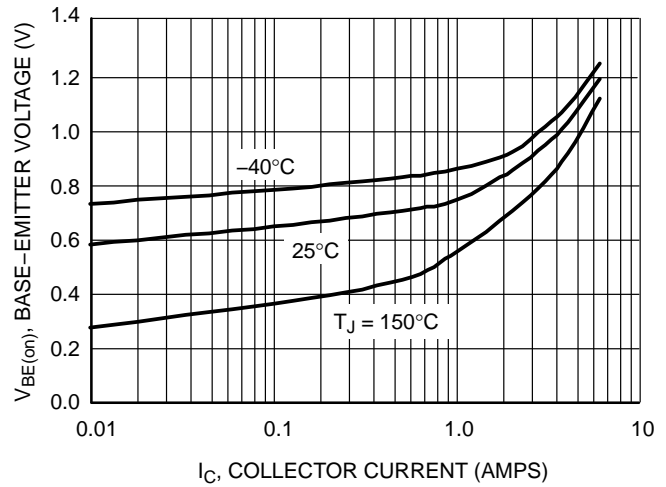
**Figure 10.  $V_{BE(sat)}$   
NPN MJE15034**



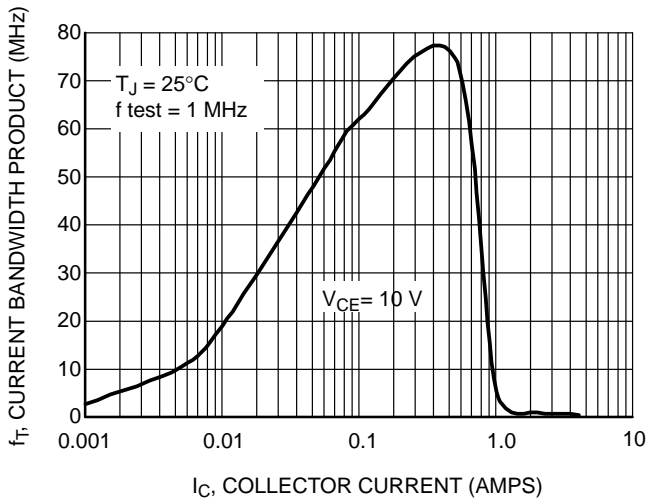
**Figure 11.  $V_{BE(sat)}$   
PNP MJE15035**



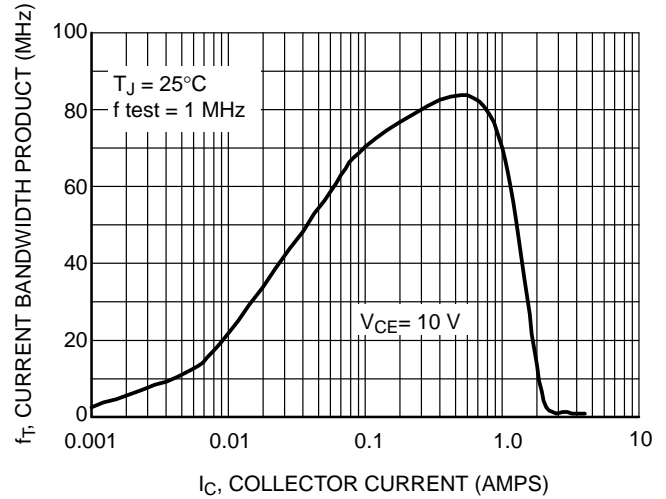
**Figure 12.  $V_{BE(on)}$   
NPN MJE15034**



**Figure 13.  $V_{BE(on)}$   
PNP MJE15035**



**Figure 14. Typical Current Gain Bandwidth Product  
NPN MJE15034**

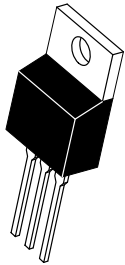


**Figure 15. Typical Current Gain Bandwidth Product  
PNP MJE15035**

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

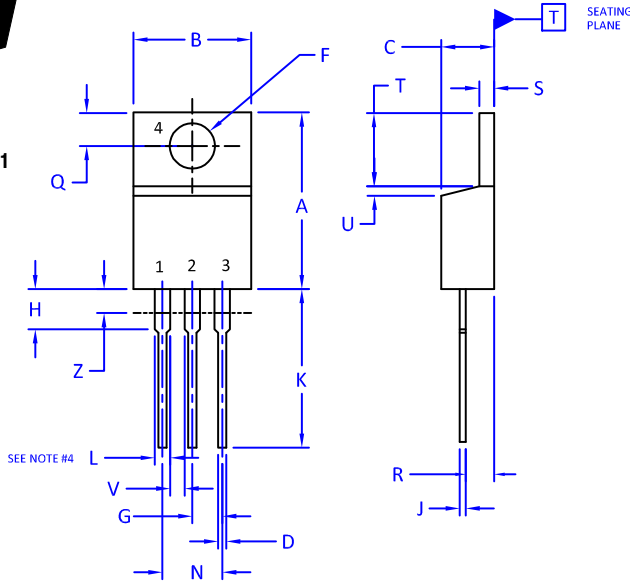
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SCALE 1:1

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

DATE 05 NOV 2019



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 2009.
2. CONTROLLING DIMENSION: INCHES
3. DIMENSION Z DEFINES A ZONE WHERE ALL BODY AND LEAD IRREGULARITIES ARE ALLOWED.
4. MAX WIDTH FOR F102 DEVICE = 1.35MM

DIM	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	0.570	0.620	14.48	15.75
B	0.380	0.415	9.66	10.53
C	0.160	0.190	4.07	4.83
D	0.025	0.038	0.64	0.96
F	0.142	0.161	3.60	4.09
G	0.095	0.105	2.42	2.66
H	0.110	0.161	2.80	4.10
J	0.014	0.024	0.36	0.61
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	1.41
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

STYLE 2:

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

STYLE 3:

- PIN 1. CATHODE
- 2. ANODE
- 3. GATE
- 4. ANODE

STYLE 4:

- PIN 1. MAIN TERMINAL 1
- 2. MAIN TERMINAL 2
- 3. GATE
- 4. MAIN TERMINAL 2

STYLE 5:

- PIN 1. GATE
- 2. DRAIN
- 3. SOURCE
- 4. DRAIN

STYLE 6:

- PIN 1. ANODE
- 2. CATHODE
- 3. ANODE
- 4. CATHODE

STYLE 7:

- PIN 1. CATHODE
- 2. ANODE
- 3. CATHODE
- 4. ANODE

STYLE 8:

- PIN 1. CATHODE
- 2. ANODE
- 3. EXTERNAL TRIP/DELAY
- 4. ANODE

STYLE 9:

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

STYLE 10:

- PIN 1. GATE
- 2. SOURCE
- 3. DRAIN
- 4. SOURCE

STYLE 11:

- PIN 1. DRAIN
- 2. SOURCE
- 3. GATE
- 4. SOURCE

STYLE 12:

- PIN 1. MAIN TERMINAL 1
- 2. MAIN TERMINAL 2
- 3. GATE
- 4. NOT CONNECTED

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