

# 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

- $h_{FE} = 100$  (Min) @  $I_C = 0.5$  Adc  
= 10 (Min) @  $I_C = 2.0$  Adc
- Collector-Emitter Sustaining Voltage –  
 $V_{CEO(sus)} = 350$  Vdc (Min) – MJE15034, MJE15035
- High Current Gain – Bandwidth Product  
 $f_T = 30$  MHz (Min) @  $I_C = 500$  mAdc
- TO-220AB Compact Package
- Epoxy meets UL 94 V-0 @ 0.125 in
- ESD Ratings: Machine Model: C  
Human Body Model: 3B
- Pb-Free Packages are Available\*

#### 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<br>– Peak                                              | $I_C$          | 4.0<br>8.0   | Adc                      |
| Base Current                                                                          | $I_B$          | 1.0          | Adc                      |
| Total Power Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 50<br>0.40   | W<br>W/ $^\circ\text{C}$ |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 2.0<br>0.016 | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                   | $T_J, T_{stg}$ | -65 to +150  | $^\circ\text{C}$         |

#### 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 | $^\circ\text{C/W}$ |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

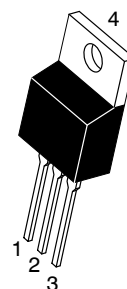
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



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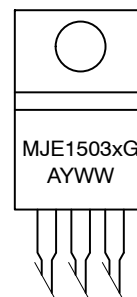
<http://onsemi.com>

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



TO-220AB  
CASE 221A  
STYLE 1

#### MARKING DIAGRAM



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

#### ORDERING INFORMATION

| Device    | Package               | Shipping        |
|-----------|-----------------------|-----------------|
| MJE15034  | TO-220AB              | 50 Units / Rail |
| MJE15034G | TO-220AB<br>(Pb-Free) | 50 Units / Rail |
| MJE15035  | TO-220AB              | 50 Units / Rail |
| MJE15035G | TO-220AB<br>(Pb-Free) | 50 Units / Rail |

# MJE15034 NPN, MJE15035 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 1)<br>( $I_C = 10\text{ mAdc}$ , $I_B = 0$ )                                                                                                                                                                 | $V_{CEO(sus)}$ | 350                    | –                | Vdc             |
| Collector Cutoff Current<br>( $V_{CB} = 350\text{ Vdc}$ , $I_E = 0$ )                                                                                                                                                                                   | $I_{CBO}$      | –                      | 10               | $\mu\text{Adc}$ |
| Emitter Cutoff Current<br>( $V_{BE} = 5.0\text{ Vdc}$ , $I_C = 0$ )                                                                                                                                                                                     | $I_{EBO}$      | –                      | 10               | $\mu\text{Adc}$ |
| <b>ON CHARACTERISTICS (Note 1)</b>                                                                                                                                                                                                                      |                |                        |                  |                 |
| DC Current Gain<br>( $I_C = 0.1\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )<br>( $I_C = 0.5\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )<br>( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )<br>( $I_C = 2.0\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ ) | $h_{FE}$       | 100<br>100<br>50<br>10 | –<br>–<br>–<br>– | –               |
| Collector-Emitter Saturation Voltage<br>( $I_C = 1.0\text{ Adc}$ , $I_B = 0.1\text{ Adc}$ )                                                                                                                                                             | $V_{CE(sat)}$  | –                      | 0.5              | Vdc             |
| Base-Emitter On Voltage<br>( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 5.0\text{ Vdc}$ )                                                                                                                                                                       | $V_{BE(on)}$   | –                      | 1.0              | Vdc             |
| <b>DYNAMIC CHARACTERISTICS</b>                                                                                                                                                                                                                          |                |                        |                  |                 |
| Current Gain – Bandwidth Product (Note 2)<br>( $I_C = 500\text{ mAdc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 1.0\text{ MHz}$ )                                                                                                                       | $f_T$          | 30                     | –                | MHz             |

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

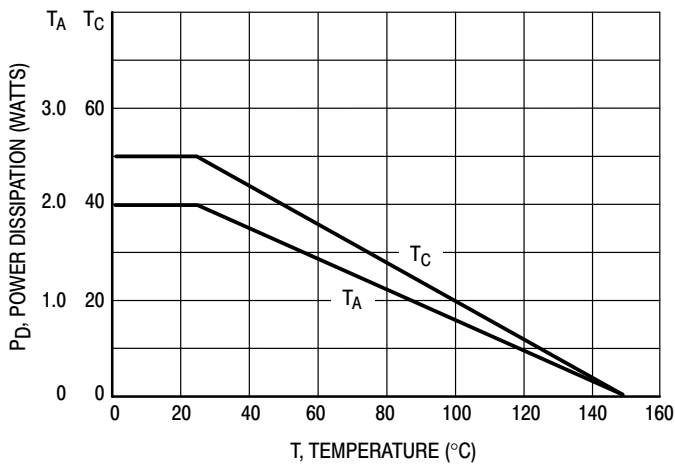


Figure 1. Power Derating

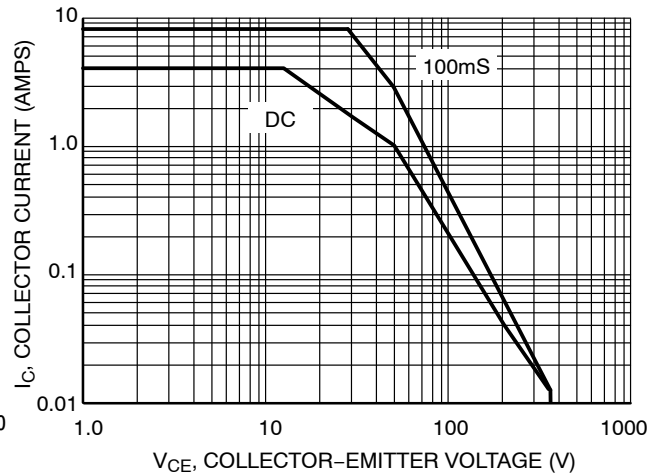


Figure 2. Active Region Safe Operating Area

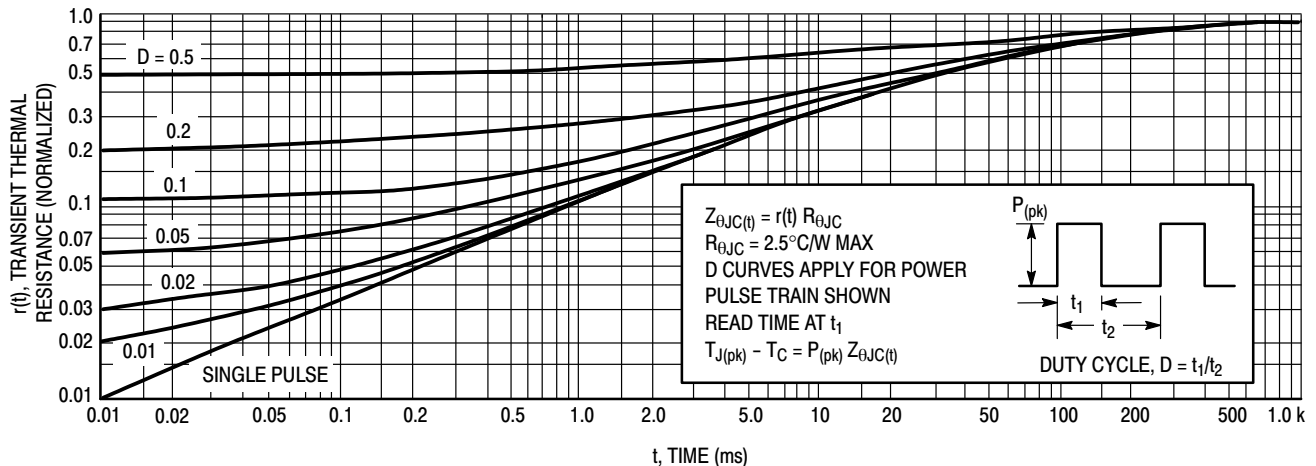
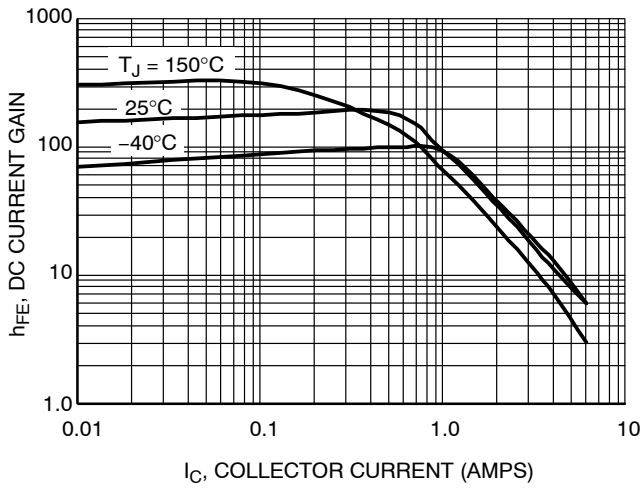
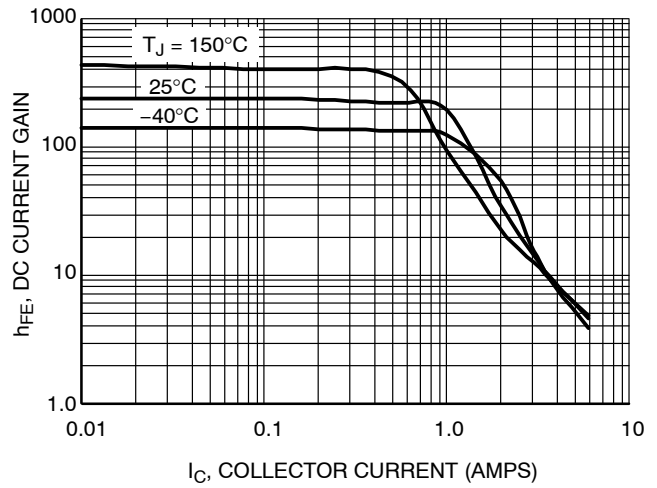


Figure 3. Thermal Response

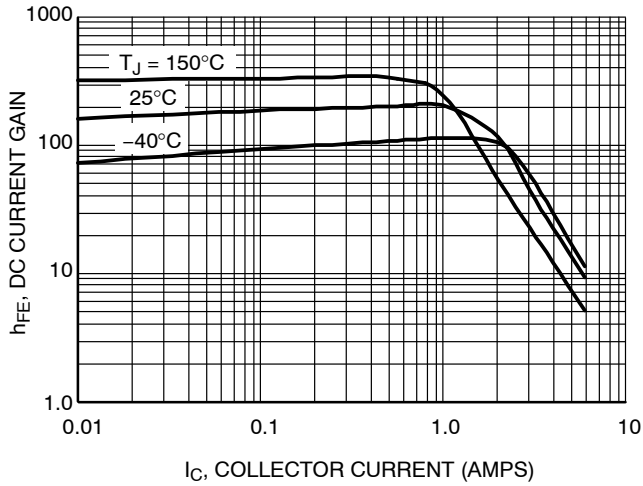
# MJE15034 NPN, MJE15035 PNP



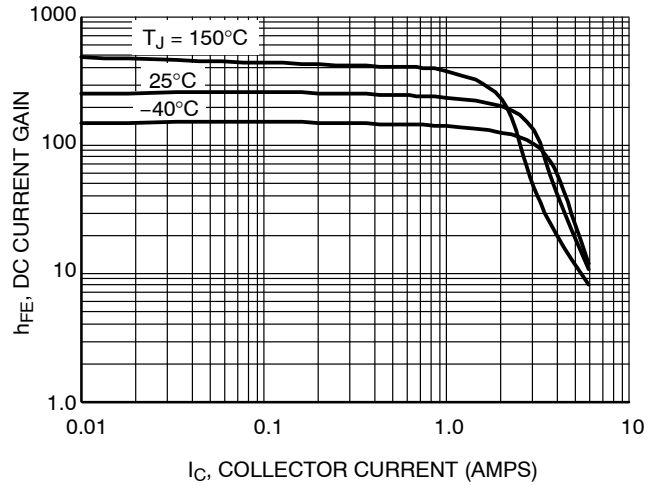
**Figure 4. DC Current Gain,  $V_{CE} = 5.0$  V  
NPN MJE15034**



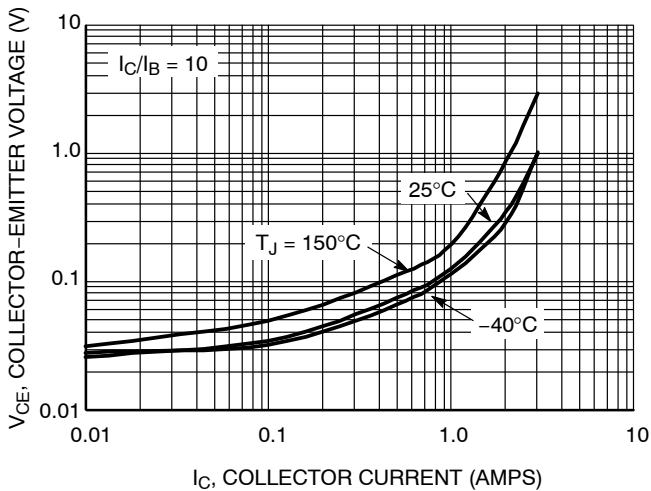
**Figure 5. DC Current Gain,  $V_{CE} = 5.0$  V  
PNP MJE15035**



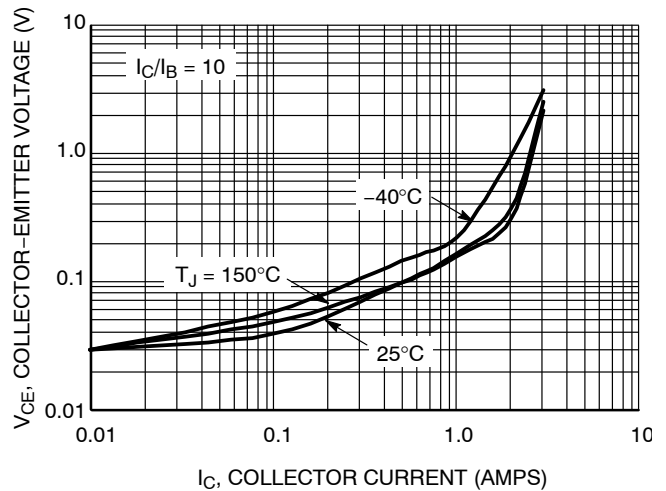
**Figure 6. DC Current Gain,  $V_{CE} = 20$  V  
NPN MJE15034**



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

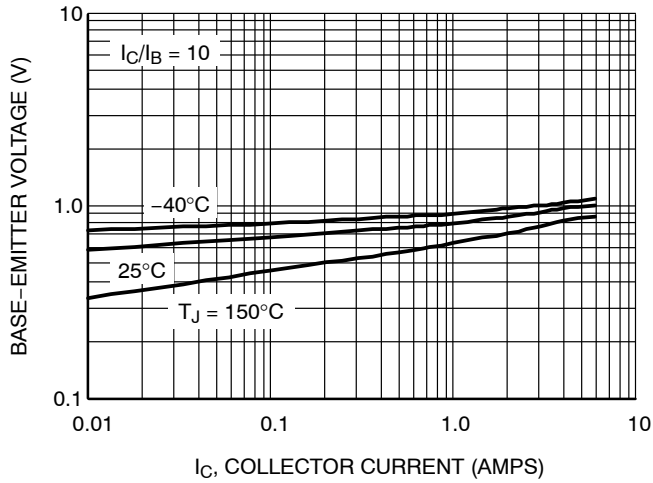


**Figure 8.  $V_{CE(sat)}$   
NPN MJE15034**

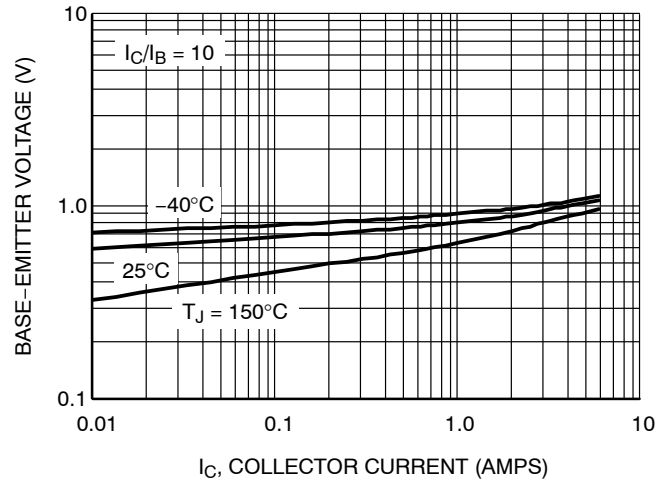


**Figure 9.  $V_{CE(sat)}$   
PNP MJE15035**

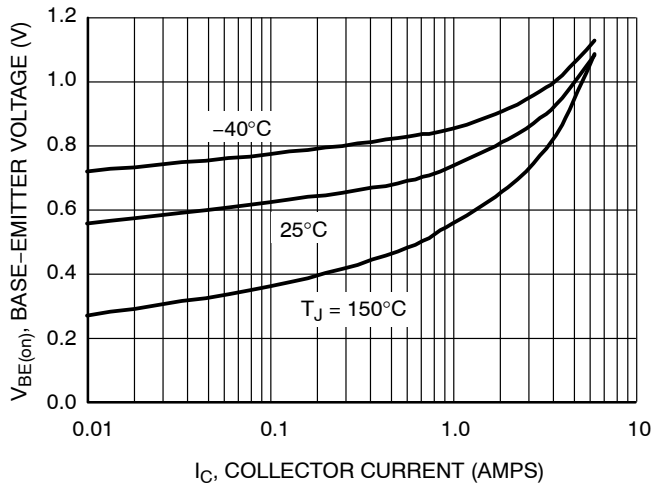
# MJE15034 NPN, MJE15035 PNP



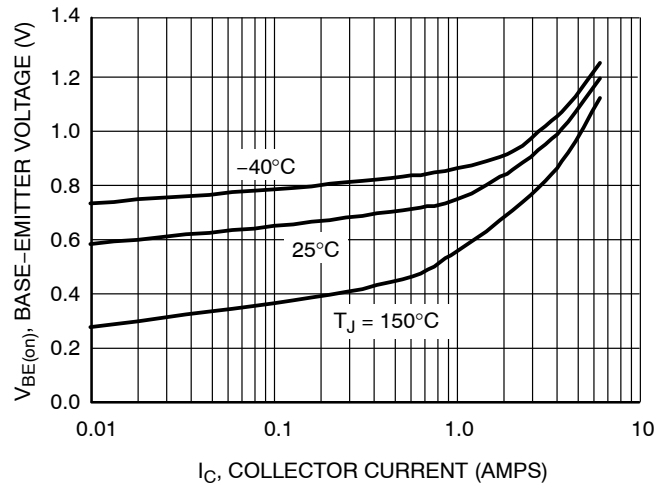
**Figure 10.  $V_{BE(sat)}$   
NPN MJE15034**



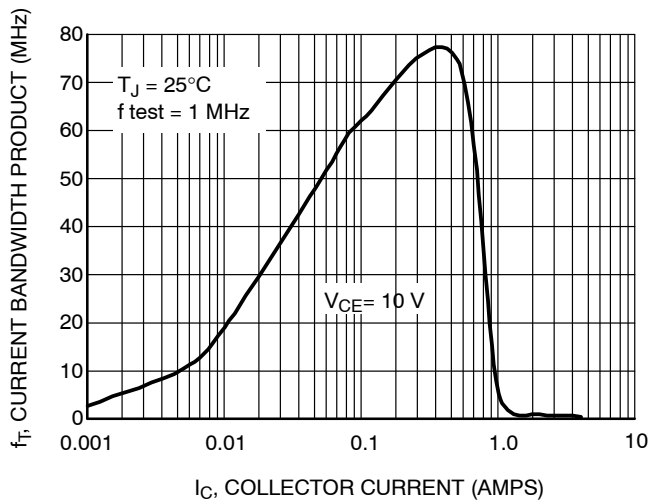
**Figure 11.  $V_{BE(sat)}$   
PNP MJE15035**



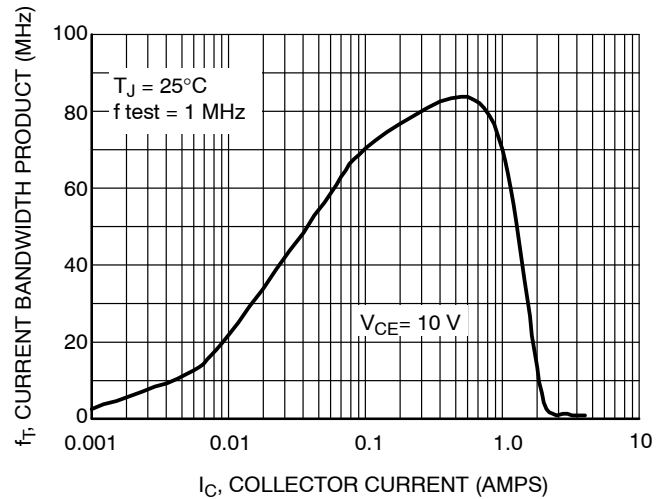
**Figure 12.  $V_{BE(on)}$   
NPN MJE15034**



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



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

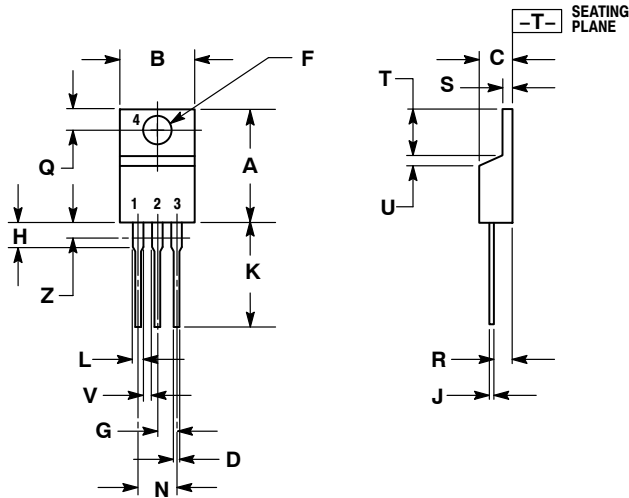


**Figure 15. Typical Current Gain Bandwidth Product  
PNP MJE15035**

# MJE15034 NPN, MJE15035 PNP

## PACKAGE DIMENSIONS

TO-220  
CASE 221A-09  
ISSUE AG



### 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  | 0.036 | 0.64        | 0.91  |
| F   | 0.142  | 0.161 | 3.61        | 4.09  |
| G   | 0.095  | 0.105 | 2.42        | 2.66  |
| H   | 0.110  | 0.161 | 2.80        | 4.10  |
| J   | 0.014  | 0.025 | 0.36        | 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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