

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°C | P_D | 50 0.40 | W W/ $^\circ\text{C}$ |
| Total Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°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.

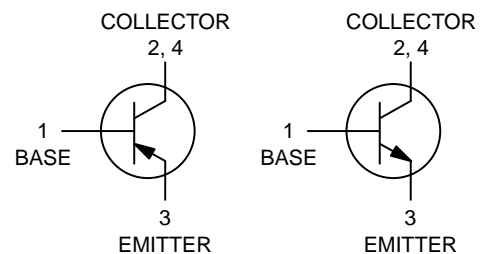


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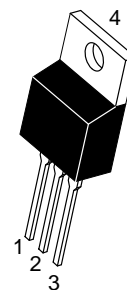
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4.0 AMPERES POWER TRANSISTORS COMPLEMENTARY SILICON 350 VOLTS, 50 WATTS

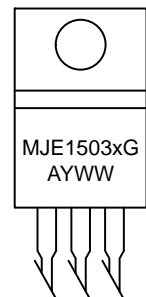
COMPLEMENTARY



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 | |
|---|--|----------------|------------------------|------------------|-----------------|
| 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 | μAdc |
| Emitter Cutoff Current | ($V_{BE} = 5.0\text{ Vdc}, I_C = 0$) | I_{EBO} | – | 10 | μAdc |
| 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 |

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

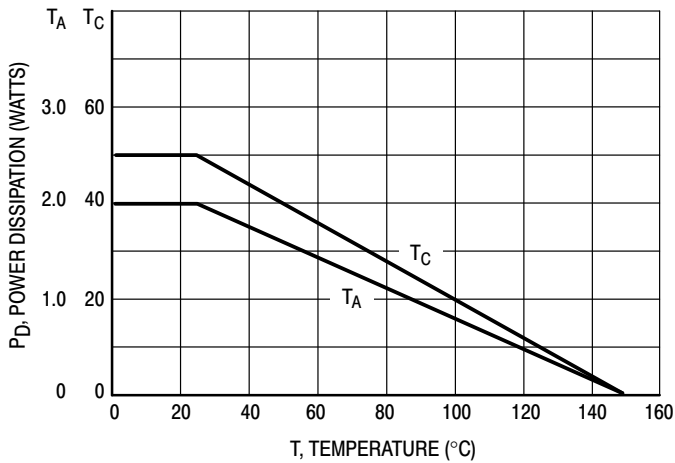


Figure 1. Power Derating

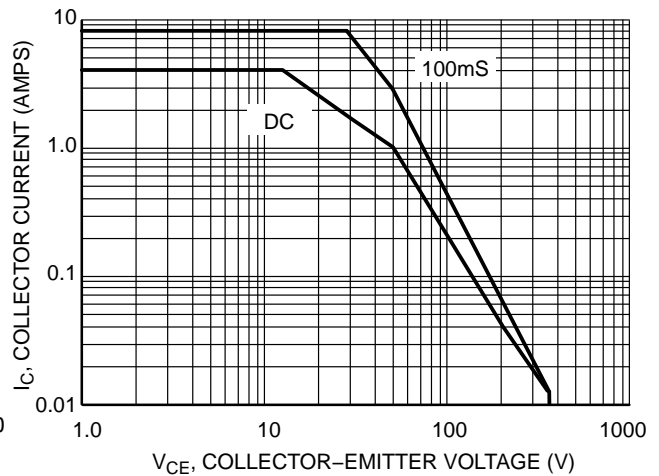


Figure 2. Active Region Safe Operating Area

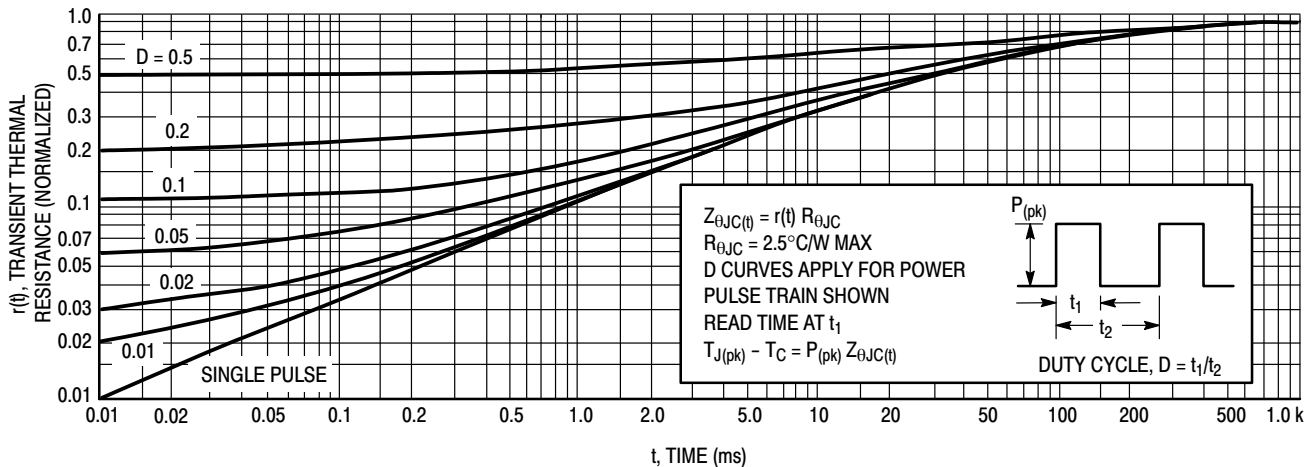
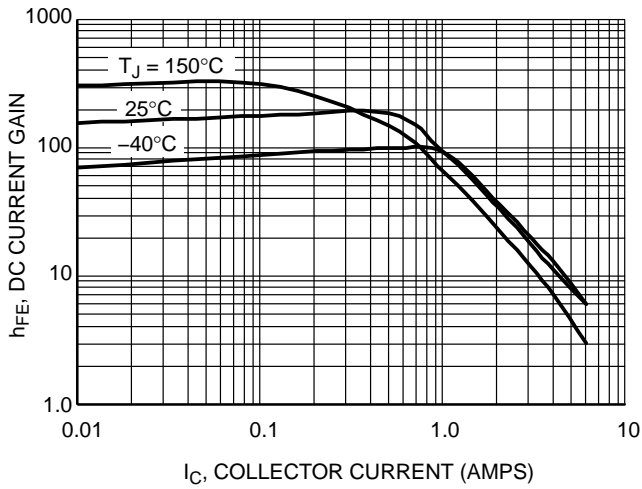
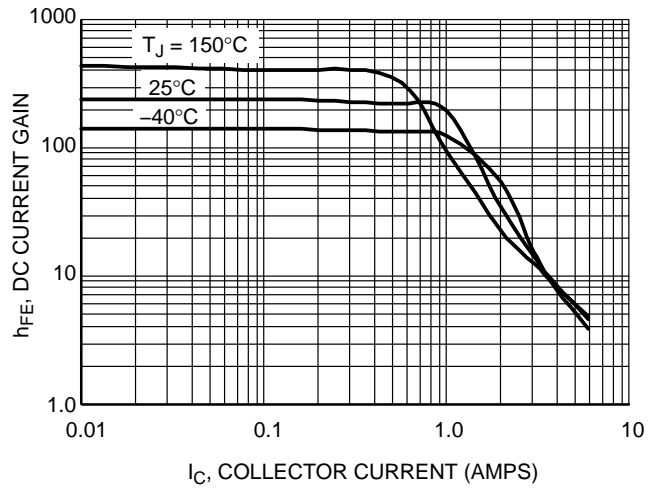


Figure 3. Thermal Response

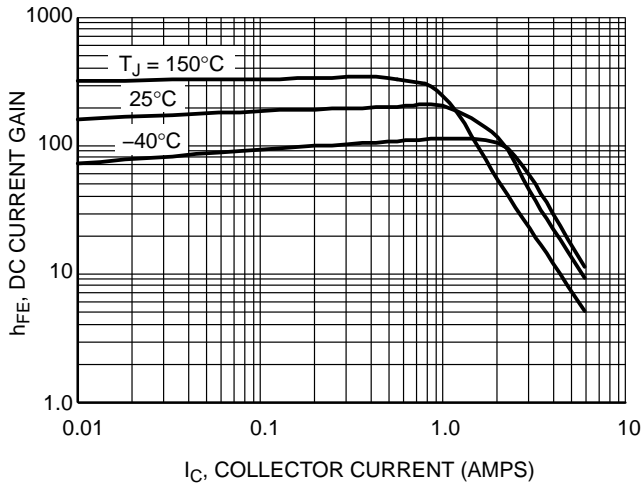
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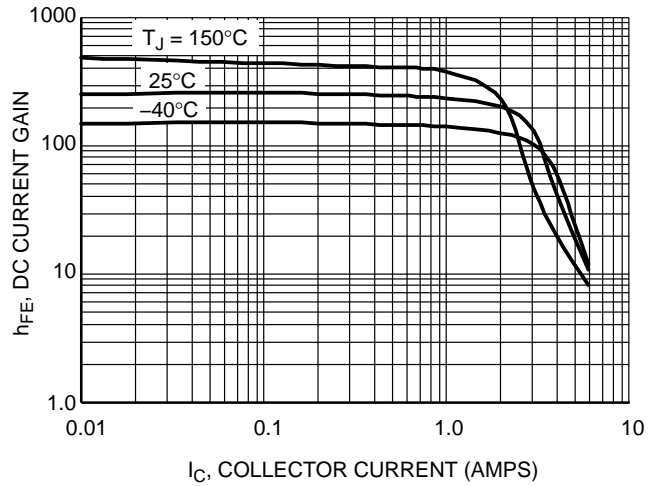
**Figure 4. DC Current Gain, $V_{CE} = 5.0$ V
NPN MJE15034**



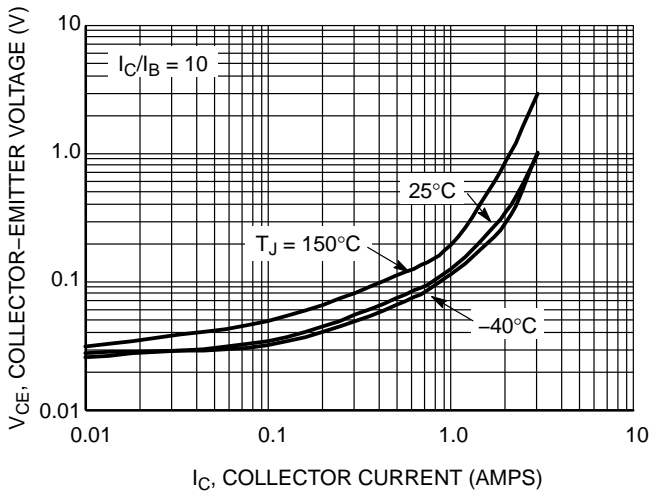
**Figure 5. DC Current Gain, $V_{CE} = 5.0$ V
PNP MJE15035**



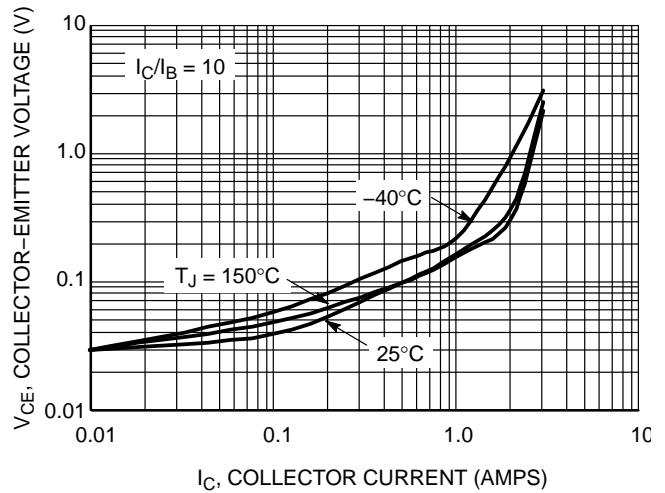
**Figure 6. DC Current Gain, $V_{CE} = 20$ V
NPN MJE15034**



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

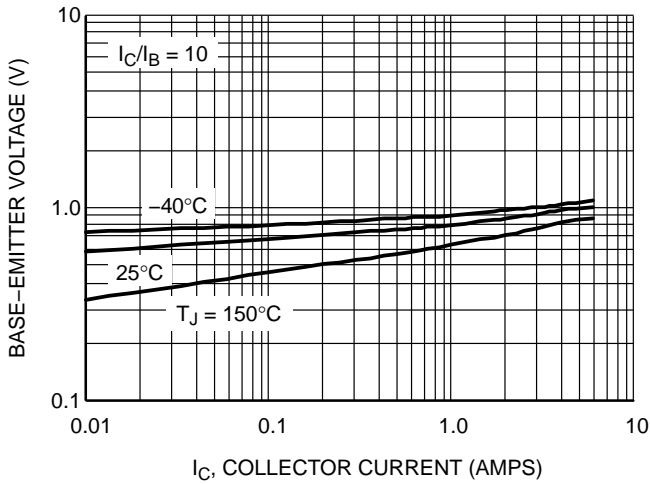


**Figure 8. $V_{CE(sat)}$
NPN MJE15034**

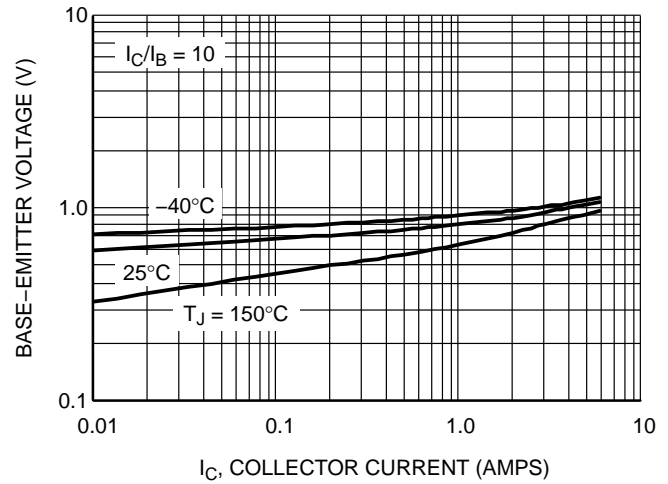


**Figure 9. $V_{CE(sat)}$
PNP MJE15035**

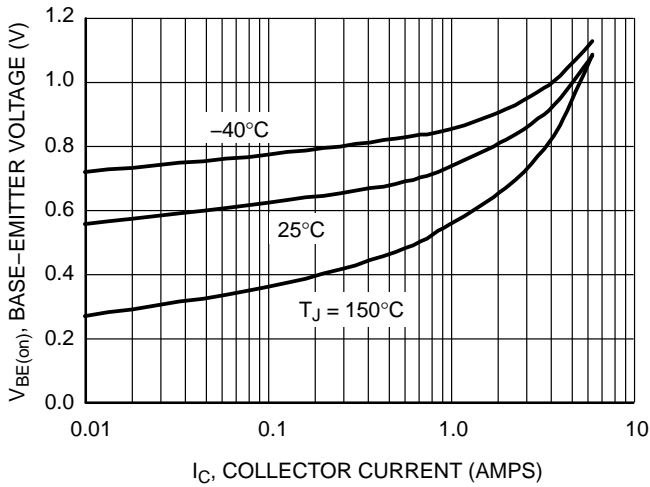
MJE15034 (NPN), MJE15035 (PNP)



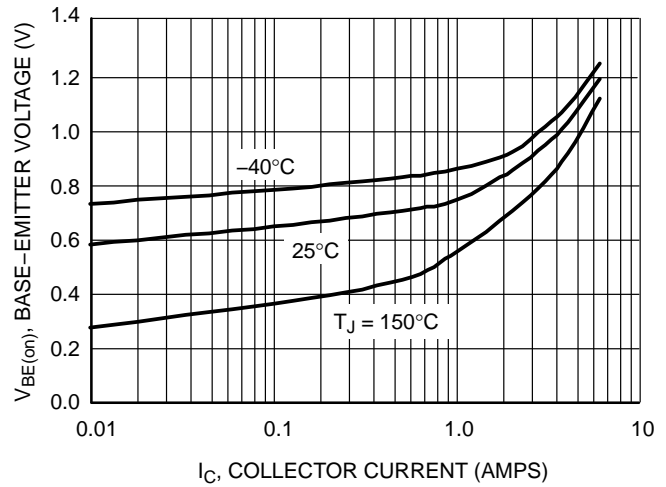
**Figure 10. $V_{BE(sat)}$
NPN MJE15034**



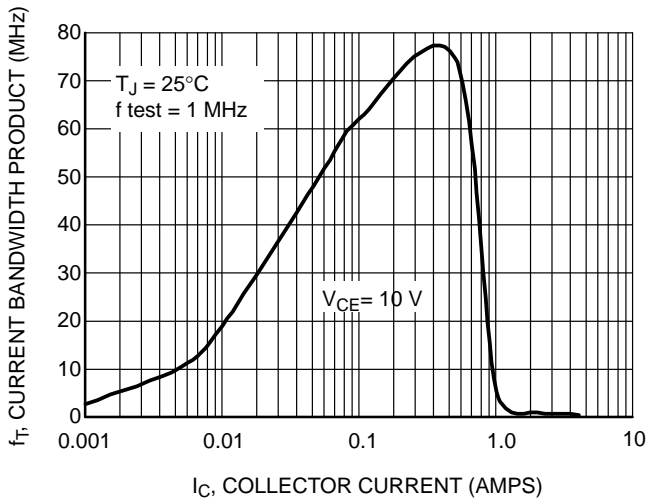
**Figure 11. $V_{BE(sat)}$
PNP MJE15035**



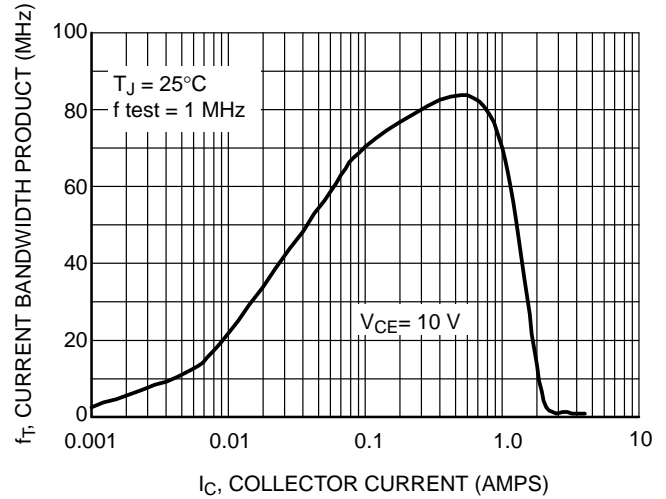
**Figure 12. $V_{BE(on)}$
NPN MJE15034**



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



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

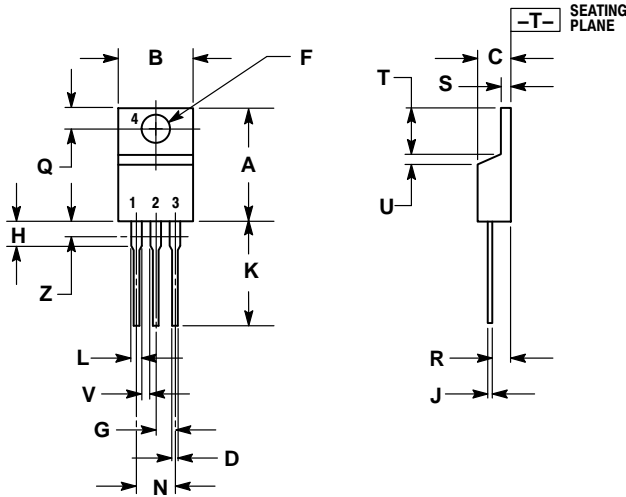


**Figure 15. Typical Current Gain Bandwidth Product
PNP MJE15035**

MJE15034 (NPN), MJE15035 (PNP)

PACKAGE DIMENSIONS

TO-220
CASE 221A-09
ISSUE AH




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 | 0.415 | 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 | 3.61 | 4.09 |
| G | 0.095 | 0.105 | 2.42 | 2.66 |
| H | 0.110 | 0.161 | 2.80 | 4.10 |
| J | 0.014 | 0.024 | 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 | 1.39 |
| 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
- COLLECTOR
- EMITTER
- COLLECTOR

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