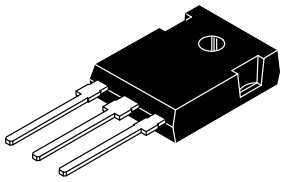
# Complementary Silicon Plastic Power Transistors

Specifically designed for power audio output, or high power drivers in audio amplifiers.

- DC Current Gain Specified up to 8.0 Amperes at Temperature
- All On Characteristics at Temperature
- High SOA: 20 A, 18 V, 100 ms
- TO–247AE Package

**NPN**
**MJW21192**
**PNP**
**MJW21191**

**8.0 AMPERES**
**POWER TRANSISTORS**
**COMPLEMENTARY**
**SILICON**
**150 VOLTS**
**100 WATTS**



**CASE 340K–01**
**TO–247AE**

**MAXIMUM RATINGS**

| Rating | Symbol | MJW21191 MJW21192 | Unit |
|---|---|---|---|
| Collector–Emitter Voltage | $V_{CEO}$ | 150 | Vdc |
| Collector–Base Voltage | $V_{CB}$ | 150 | Vdc |
| Emitter–Base Voltage | $V_{EB}$ | 5.0 | Vdc |
| Collector Current — Continuous<br>— Peak | $I_C$ | 8.0<br>16 | Adc |
| Base Current | $I_B$ | 2.0 | Adc |
| Total Power Dissipation @ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 100<br>0.65 | Watts<br>W/°C |
| Operating and Storage Junction Temperature Range | $T_J$, $T_{stg}$ | –65 to +150 | °C |

**THERMAL CHARACTERISTICS**

| Characteristic | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Case | $R_{\theta JC}$ | 0.65 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 50 | °C/W |

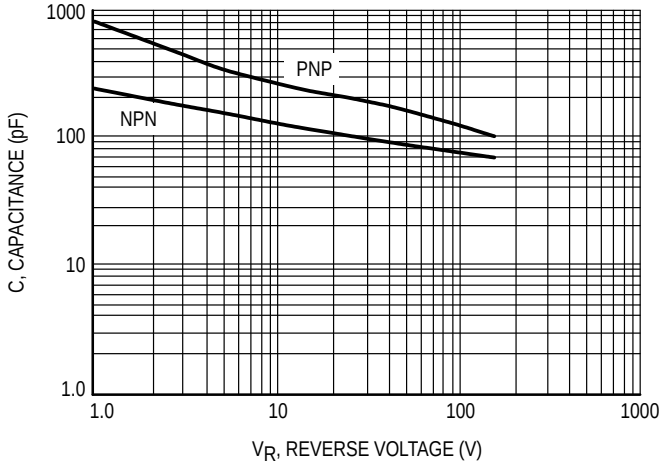



**Figure 1. Typical Capacitance @ 25°C**

**ELECTRICAL CHARACTERISTICS** ($T_C$ = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Max | Unit |
|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | |
| Collector–Emitter Sustaining Voltage (1)<br>($I_C$ = 10 mAdc, $I_B$ = 0) | $V_{CEO(sus)}$ | 150 | — | Vdc |
| Collector Cutoff Current<br>($V_{CB}$ = 250 Vdc, $I_E$ = 0) | $I_{CES}$ | — | 10 | μAdc |
| Emitter Cutoff Current<br>($V_{BE}$ = 5.0 Vdc, $I_C$ = 0) | $I_{EBO}$ | — | 10 | μAdc |
| **ON CHARACTERISTICS (1)** | | | | |
| DC Current Gain<br>($I_C$ = 4.0 Adc, $V_{CE}$ = 2.0 Vdc)<br>($I_C$ = 8.0 Adc, $V_{CE}$ = 2.0 Vdc) | $h_{FE}$ | 15<br>5.0 | —<br>— | —<br>100 |
| Collector–Emitter Saturation Voltage<br>($I_C$ = 4.0 Adc, $I_B$ = 0.4 Adc)<br>($I_C$ = 8.0 Adc, $I_B$ = 1.6 Adc) | $V_{CE(sat)}$ | —<br>— | 1.0<br>2.0 | Vdc |
| Base–Emitter On Voltage<br>($I_C$ = 4.0 Adc, $V_{CE}$ = 2.0 Vdc) | $V_{BE(on)}$ | — | 2.0 | Vdc |
| **DYNAMIC CHARACTERISTICS** | | | | |
| Current Gain — Bandwidth Product (2)<br>($I_C$ = 1.0 Adc, $V_{CE}$ = 10 Vdc, $f_{test}$ = 1.0 MHz) | $f_T$ | 4.0 | — | MHz |

(1) Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.
(2) $f_T = |h_{fe}| \bullet f_{test}$.

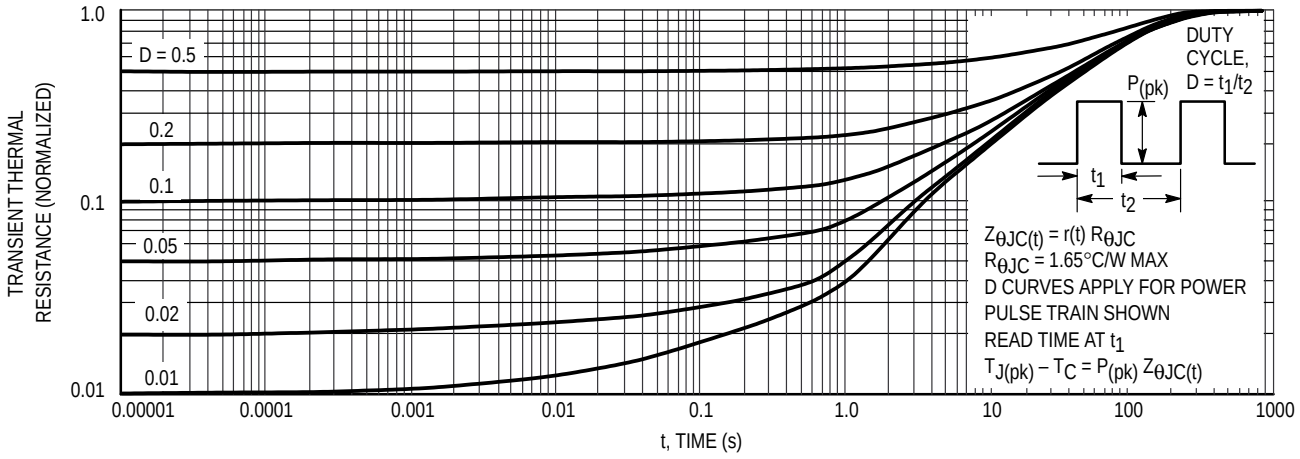



**Figure 2. Thermal Response**

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 then the curves indicate.

The data of Figures 3 and 4 is based on $T_{J(pk)} = 150°C$; $T_C$ is variable depending on conditions. Second breakdown pulse limits are valid for duty cycles to 10% provided $T_{J(pk)} < 150°C$. $T_{J(pk)}$ may be calculated from the data in Figure 2. At high case temperatures, thermal limitations will reduce the power that can be handled to values less than the limitations imposed by second breakdown.

**NPN — MJW21192**

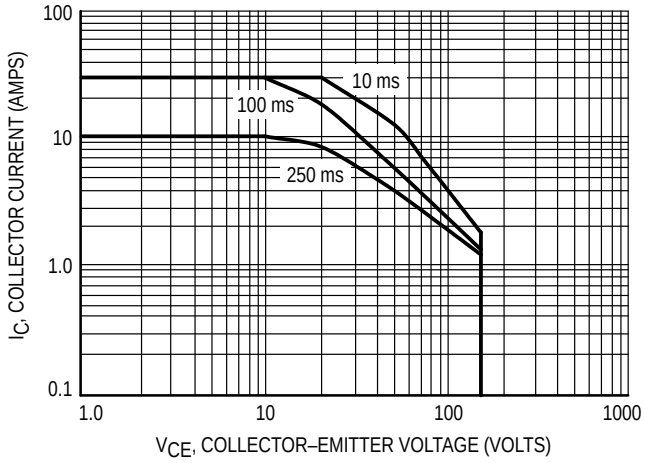



**Figure 3. NPN — MJW21192 Safe Operating Area**

**PNP — MJW21191**

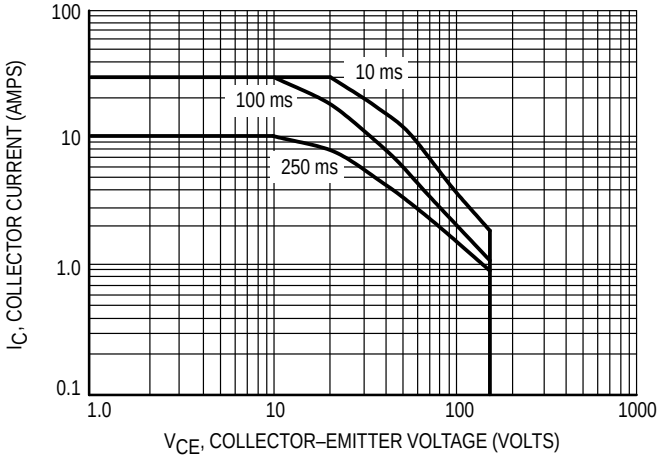



**Figure 4. PNP — MJW21191 Safe Operating Area**

## TYPICAL CHARACTERISTICS

**NPN — MJW21192**

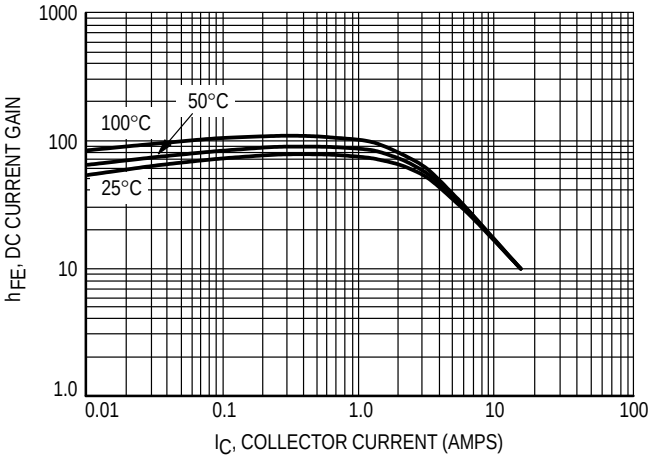



**Figure 5. NPN — MJW21192 $V_{CE}$ = 2.0 V DC Current Gain**

**PNP — MJW21191**

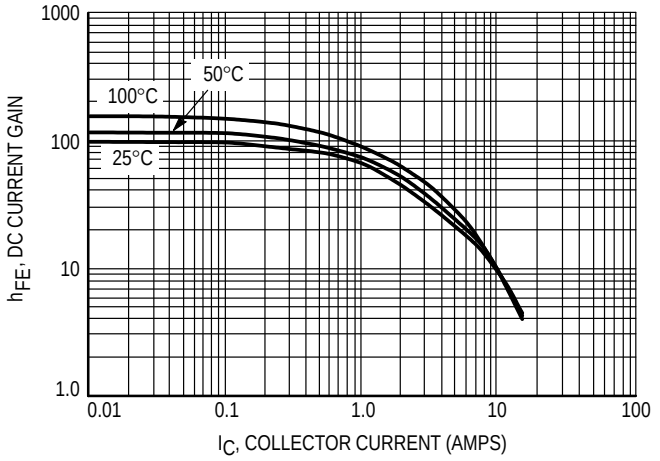



**Figure 6. PNP — MJW21191 $V_{CE}$ = 2.0 V DC Current Gain**

NPN — MJW21192

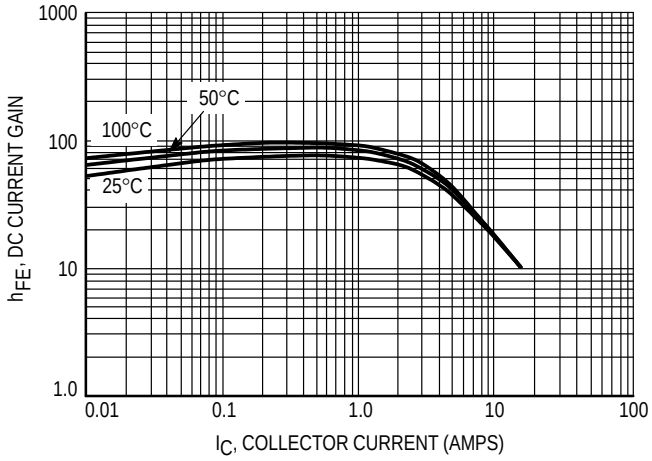



**Figure 7. NPN — MJW21192**
**$V_{CE}$ = 5.0 V DC Current Gain**

PNP — MJW21191

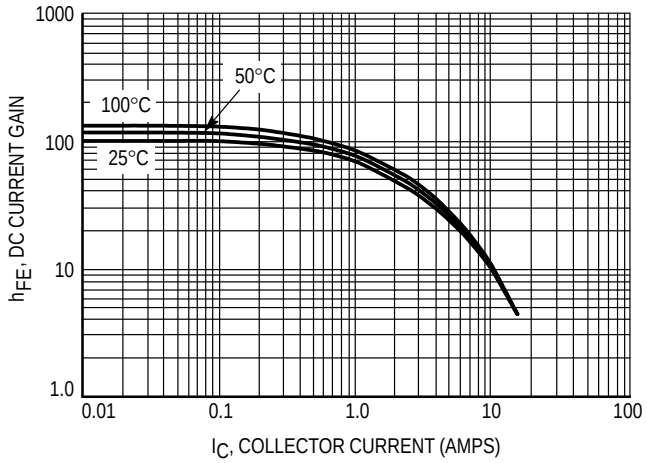



**Figure 8. PNP — MJW21191**
**$V_{CE}$ = 5.0 V DC Current Gain**

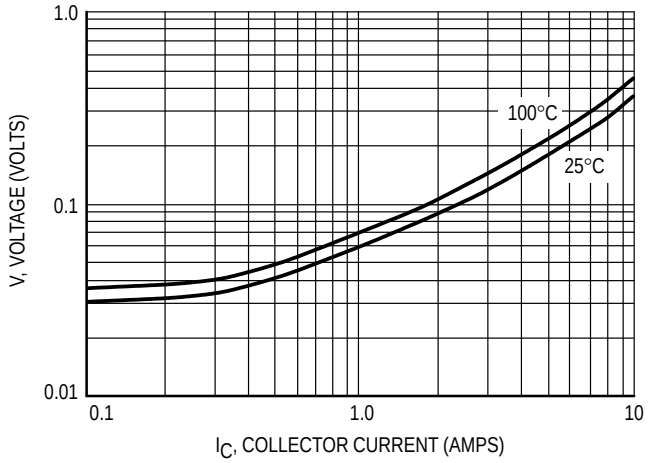



**Figure 9. NPN — MJW21192**
**$V_{CE(sat)}$ $I_C/I_B$ = 5.0**

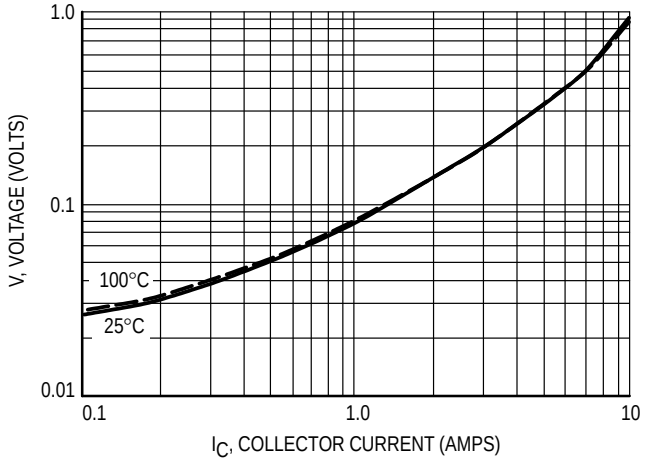



**Figure 10. PNP — MJW21191**
**$V_{CE(sat)}$ $I_C/I_B$ = 5.0**

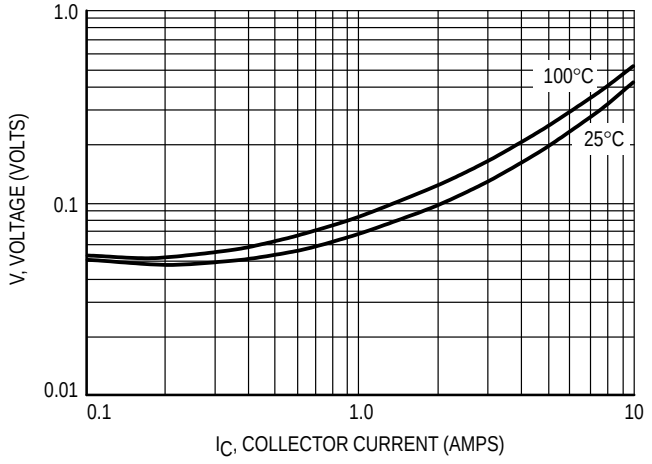



**Figure 11. NPN — MJW21192**
**$V_{CE(sat)}$ $I_C/I_B$ = 10**

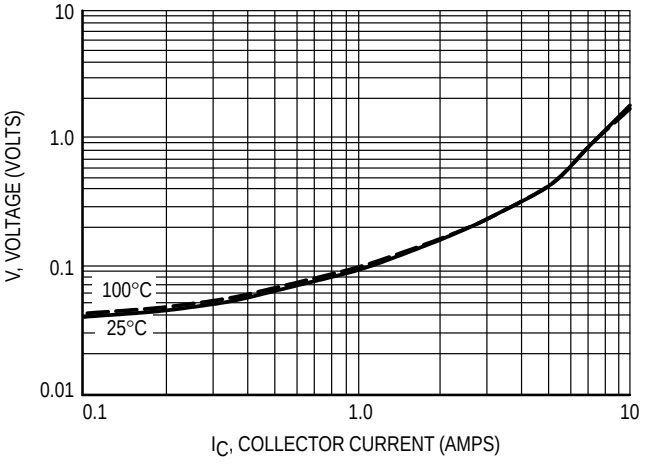



**Figure 12. PNP — MJW21191**
**$V_{CE(sat)}$ $I_C/I_B$ = 10**

**NPN — MJW21192**

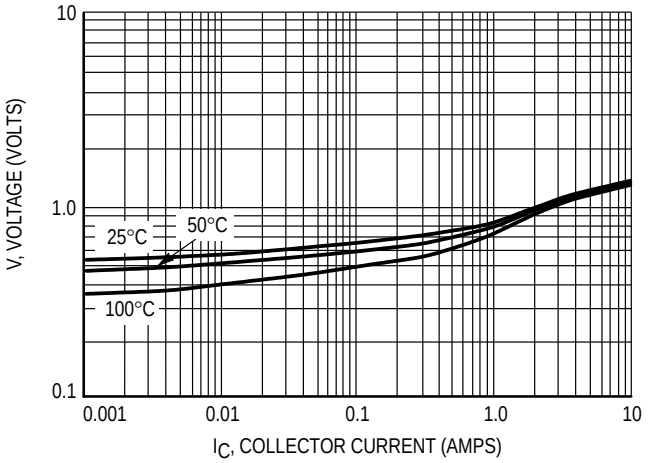



**Figure 13. NPN — MJW21192**
**$V_{CE}$ = 2.0 V $V_{BE(on)}$ Curve**

**PNP — MJW21191**

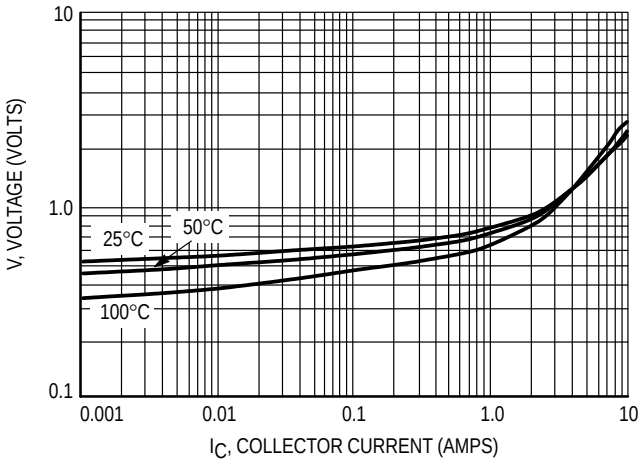
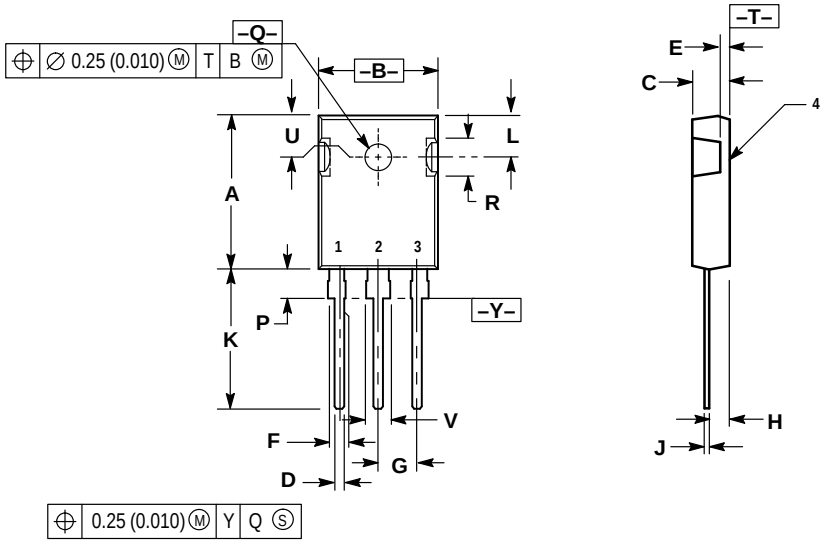



**Figure 14. PNP — MJW21191**
**$V_{CE}$ = 2.0 V $V_{BE(on)}$ Curve**

## PACKAGE DIMENSIONS




NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.

| | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX |
| A | 19.7 | 20.3 | 0.776 | 0.799 |
| B | 15.3 | 15.9 | 0.602 | 0.626 |
| C | 4.7 | 5.3 | 0.185 | 0.209 |
| D | 1.0 | 1.4 | 0.039 | 0.055 |
| E | 1.27 REF | | 0.050 REF | |
| F | 2.0 | 2.4 | 0.079 | 0.094 |
| G | 5.5 BSC | | 0.216 BSC | |
| H | 2.2 | 2.6 | 0.087 | 0.102 |
| J | 0.4 | 0.8 | 0.016 | 0.031 |
| K | 14.2 | 14.8 | 0.559 | 0.583 |
| L | 5.5 NOM | | 0.217 NOM | |
| P | 3.7 | 4.3 | 0.146 | 0.169 |
| Q | 3.55 | 3.65 | 0.140 | 0.144 |
| R | 5.0 NOM | | 0.197 NOM | |
| U | 5.5 BSC | | 0.217 BSC | |
| V | 3.0 | 3.4 | 0.118 | 0.134 |

**CASE 340K–03**
**(TO–247AE)**
**ISSUE A**

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