



# THE DATASHEET OF MJW21192

# MJW21192 (NPN), MJW21191 (PNP)

## 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 A at Temperature
- All On Characteristics at Temperature
- High SOA: 20 A, 18 V, 100 ms
- TO-247AE Package
- Pb-Free Packages are Available\*

### MAXIMUM RATINGS

| Rating                                                                                | Symbol         | MJW21191<br>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 @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | $P_D$          | 125<br>0.65          | W<br>W/ $^\circ\text{C}$ |
| Operating and Storage Junction<br>Temperature Range                                   | $T_J, T_{stg}$ | -65 to<br>+150       | $^\circ\text{C}$         |

### THERMAL CHARACTERISTICS

| Characteristic                          | Symbol          | Max | Unit               |
|-----------------------------------------|-----------------|-----|--------------------|
| Thermal Resistance, Junction to Case    | $R_{\theta JC}$ | 1.0 | $^\circ\text{C/W}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 50  | $^\circ\text{C/W}$ |

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.

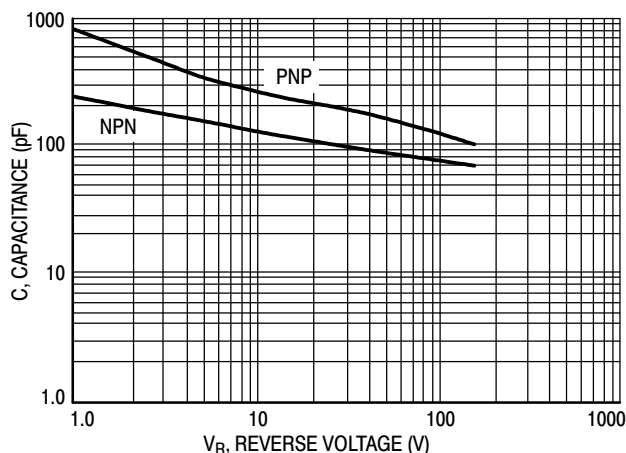


Figure 1. Typical Capacitance @  $25^\circ\text{C}$

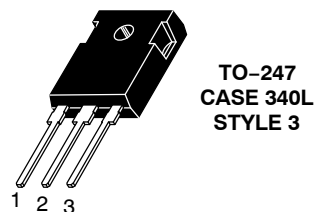
\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



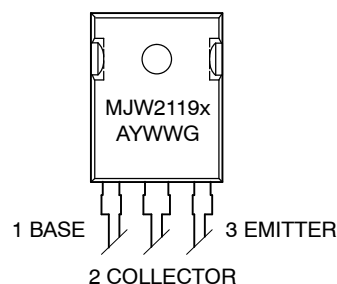
**ON Semiconductor®**

<http://onsemi.com>

**8.0 A  
POWER TRANSISTORS  
COMPLEMENTARY SILICON  
150 V, 125 W**



### MARKING DIAGRAM



x = 1 or 2  
A = Assembly Location  
Y = Year  
WW = Work Week  
G = Pb-Free Package

### ORDERING INFORMATION

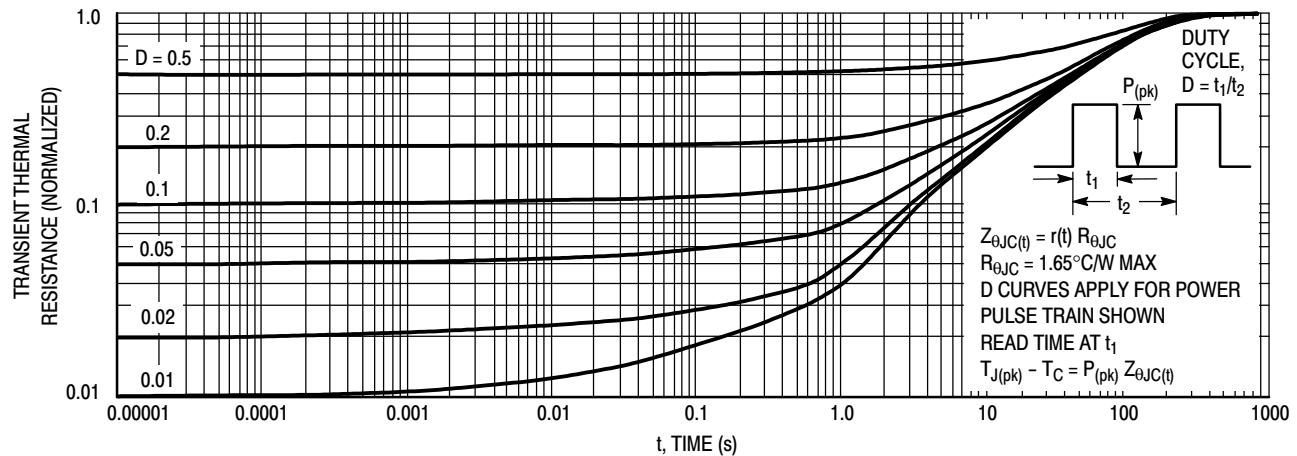
| Device    | Package             | Shipping      |
|-----------|---------------------|---------------|
| MJW21191  | TO-247              | 30 Units/Rail |
| MJW21191G | TO-247<br>(Pb-Free) | 30 Units/Rail |
| MJW21192  | TO-247              | 30 Units/Rail |
| MJW21192G | TO-247<br>(Pb-Free) | 30 Units/Rail |

# MJW21192 (NPN), MJW21191 (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>( $I_C = 10\text{ mAdc}$ , $I_B = 0$ )                                                            | $V_{CEO(sus)}$ | 150       | –          | Vdc             |
| Collector Cutoff Current<br>( $V_{CB} = 250\text{ Vdc}$ , $I_E = 0$ )                                                                              | $I_{CES}$      | –         | 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>( $I_C = 4.0\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )<br>( $I_C = 8.0\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )                | $h_{FE}$       | 15<br>5.0 | 100<br>–   | –               |
| Collector-Emitter Saturation Voltage<br>( $I_C = 4.0\text{ Adc}$ , $I_B = 0.4\text{ Adc}$ )<br>( $I_C = 8.0\text{ Adc}$ , $I_B = 1.6\text{ Adc}$ ) | $V_{CE(sat)}$  | –<br>–    | 1.0<br>2.0 | Vdc             |
| Base-Emitter On Voltage<br>( $I_C = 4.0\text{ Adc}$ , $V_{CE} = 2.0\text{ Vdc}$ )                                                                  | $V_{BE(on)}$   | –         | 2.0        | Vdc             |
| <b>DYNAMIC CHARACTERISTICS</b>                                                                                                                     |                |           |            |                 |
| Current Gain – Bandwidth Product (Note 2)<br>( $I_C = 1.0\text{ Adc}$ , $V_{CE} = 10\text{ Vdc}$ , $f_{test} = 1.0\text{ MHz}$ )                   | $f_T$          | 4.0       | –          | MHz             |

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



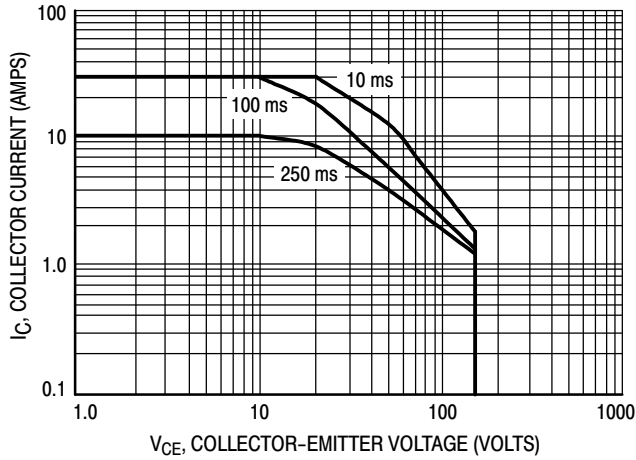
**Figure 2. Thermal Response**

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 than the curves indicate.

The data of Figures 3 and 4 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  $T_{J(pk)} < 150^\circ\text{C}$ .  $T_{J(pk)}$  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.

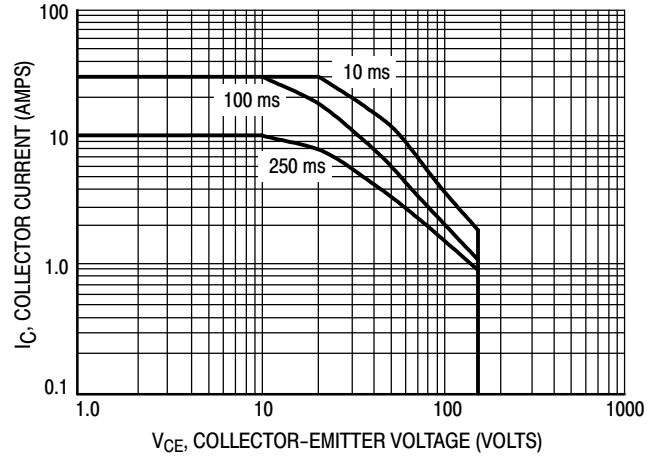
# MJW21192 (NPN), MJW21191 (PNP)

**NPN — MJW21192**



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

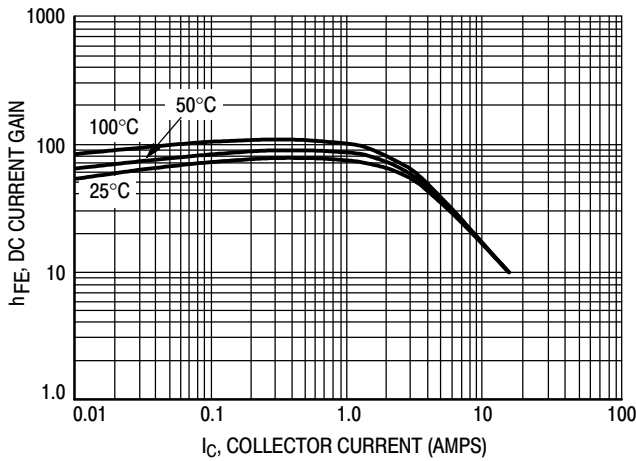
**PNP — MJW21191**



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

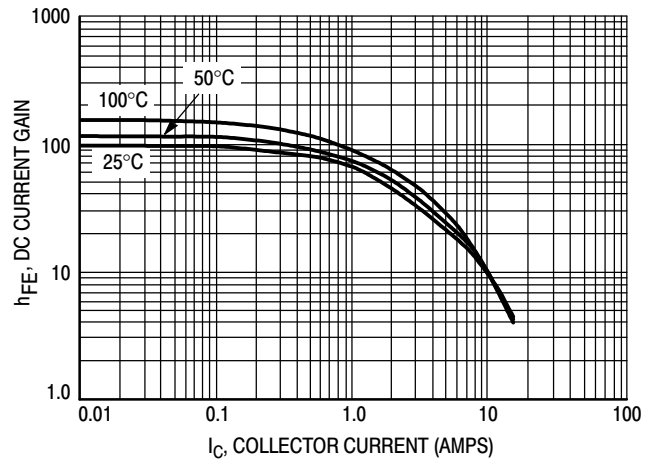
## TYPICAL CHARACTERISTICS

**NPN — MJW21192**



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

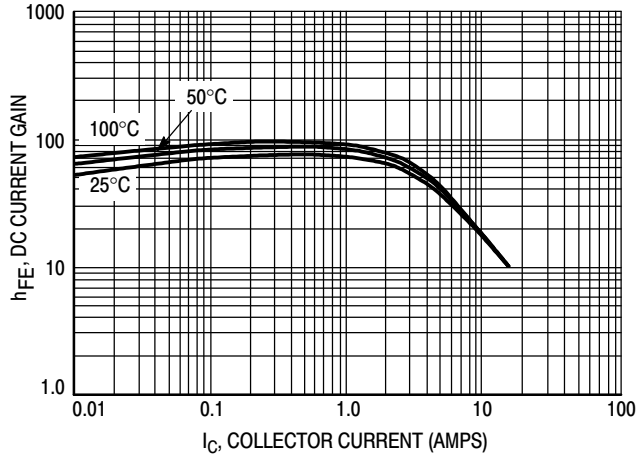
**PNP — MJW21191**



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

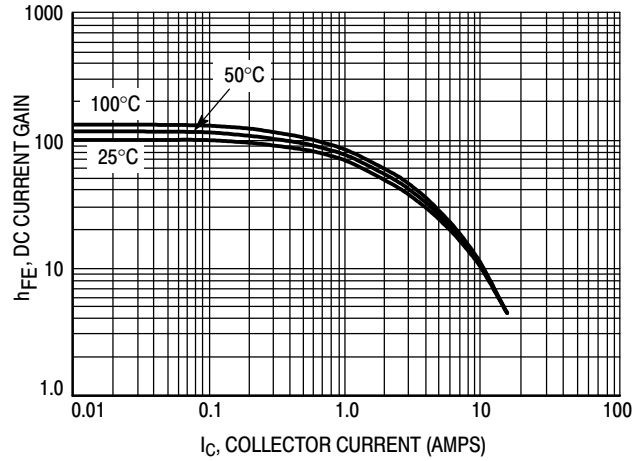
# MJW21192 (NPN), MJW21191 (PNP)

**NPN — MJW21192**

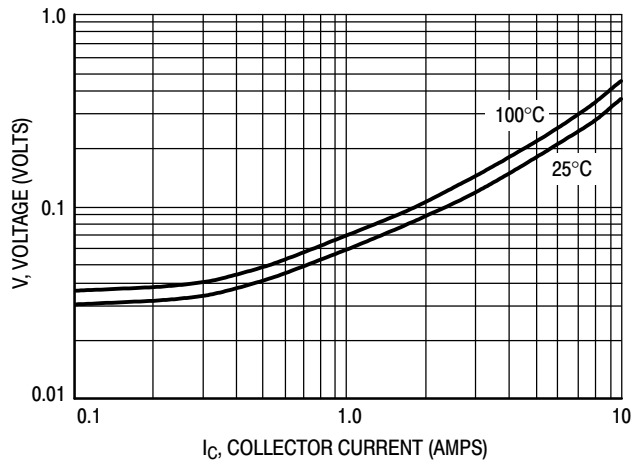


**Figure 7. NPN — MJW21192**  
 **$V_{CE} = 5.0$  V DC Current Gain**

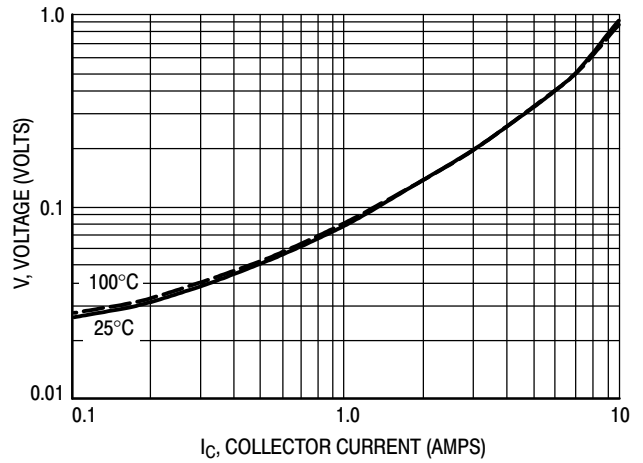
**PNP — MJW21191**



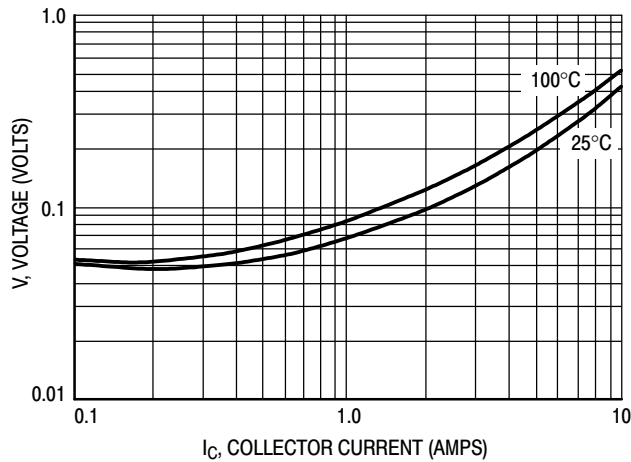
**Figure 8. PNP — MJW21191**  
 **$V_{CE} = 5.0$  V DC Current Gain**



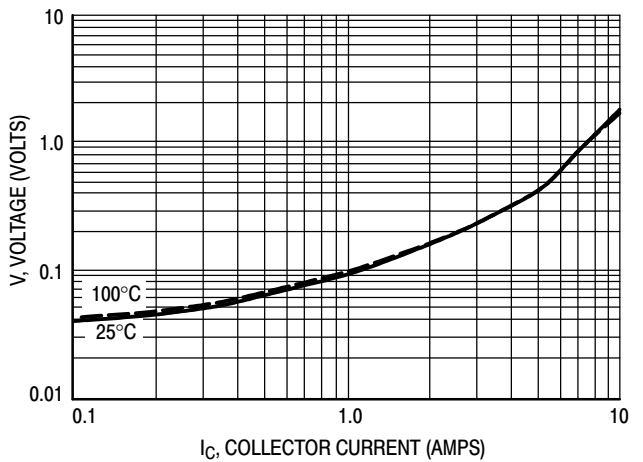
**Figure 9. NPN — MJW21192**  
 **$V_{CE(sat)}$   $I_C/I_B = 5.0$**



**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**  
 **$V_{CE(sat)}$   $I_C/I_B = 10$**

## MJW21192 (NPN), MJW21191 (PNP)

NPN — MJW21192

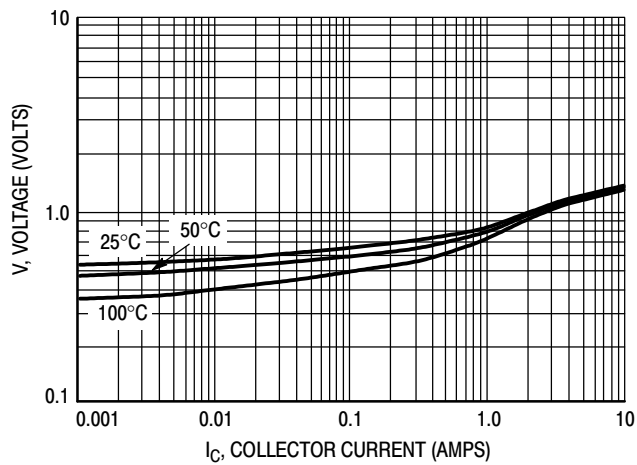


Figure 13. NPN — MJW21192  
 $V_{CE} = 2.0 \text{ V } V_{BE(on)}$  Curve

PNP — MJW21191

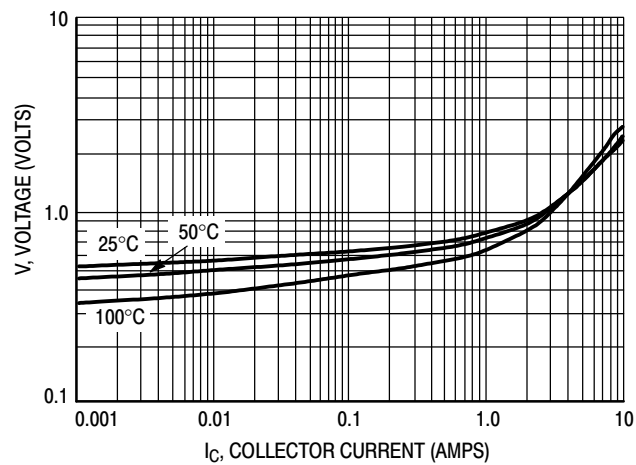
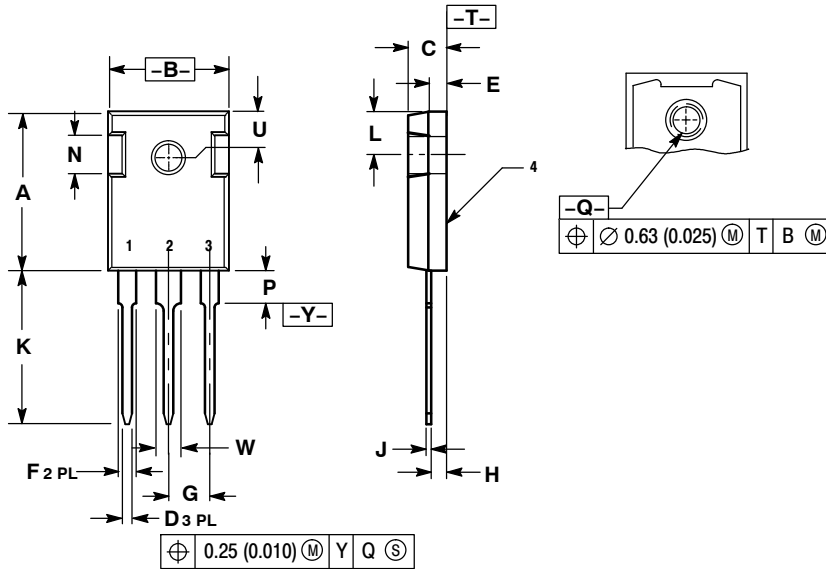


Figure 14. PNP — MJW21191  
 $V_{CE} = 2.0 \text{ V } V_{BE(on)}$  Curve

# MJW21192 (NPN), MJW21191 (PNP)

## PACKAGE DIMENSIONS

### TO-247 CASE 340L-02 ISSUE E



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

| DIM | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 20.32       | 21.08 | 0.800     | 0.830 |
| B   | 15.75       | 16.26 | 0.620     | 0.640 |
| C   | 4.70        | 5.30  | 0.185     | 0.209 |
| D   | 1.00        | 1.40  | 0.040     | 0.055 |
| E   | 1.90        | 2.60  | 0.075     | 0.102 |
| F   | 1.65        | 2.13  | 0.065     | 0.084 |
| G   | 5.45 BSC    |       | 0.215 BSC |       |
| H   | 1.50        | 2.49  | 0.059     | 0.098 |
| J   | 0.40        | 0.80  | 0.016     | 0.031 |
| K   | 19.81       | 20.83 | 0.780     | 0.820 |
| L   | 5.40        | 6.20  | 0.212     | 0.244 |
| N   | 4.32        | 5.49  | 0.170     | 0.216 |
| P   | ---         | 4.50  | ---       | 0.177 |
| Q   | 3.55        | 3.65  | 0.140     | 0.144 |
| U   | 6.15 BSC    |       | 0.242 BSC |       |
| W   | 2.87        | 3.12  | 0.113     | 0.123 |

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

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