

## COMPLEMENTARY SILICON POWER TRANSISTORS

...Designed for use in 220V line-operated switchmode power supplies and electronic light ballast

### DESCRIPTION :

- Collector-Base Breakdown Voltage-  
 $V_{(BR)CBO} = 1000V(\text{Min})$
- High Switching Speed
- Minimum Lot-to-Lot variations for robust device performance and reliable operation

### MAXIMUM RATINGS

| Rating                                | Symbol            | MJE18004    | Unit  |
|---------------------------------------|-------------------|-------------|-------|
| Collector-Emitter Voltage             | $V_{CEO}$         | 450         | V     |
| Collector-Base Voltage                | $V_{CBO}$         | 1000        | V     |
| Emitter-Base Voltage                  | $V_{EBO}$         | 9.0         | V     |
| Collector Current-Continuous<br>-Peak | $I_C$<br>$I_{CM}$ | 5<br>10     | A     |
| Base Current                          | $I_B$             | 2.0         | A     |
| Total Power Dissipation @TC=25°C      | $P_D$             | 100         | Watts |
| Junction Temperature                  | $T_J$             | 150         | °C    |
| Storage Temperature                   | $T_{STG}$         | -65 to +150 | °C    |

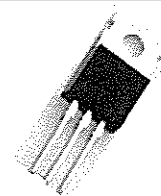
### THERMAL CHARACTERISTICS

| Characteristic                          | Symbol        | Max  | Unit |
|-----------------------------------------|---------------|------|------|
| Thermal Resistance, Junction to Case    | $R_{th\ j-c}$ | 1.25 | °C/W |
| Thermal Resistance, Junction to Ambient | $R_{th\ j-a}$ | 62.5 | °C/W |

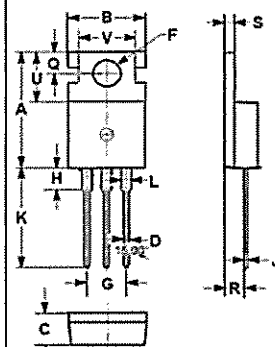
**NPN**

**MJE18004**

**5 AMPERES  
COMPLEMENTARY  
SILICON  
POWER TRANSISTOR  
1000 VOLTS  
100 WATTS**



**TO-220**



PIN 1.BASE.  
2.COLLECTOR  
3.EMITTER

| DIM | MILLIMETERS |       |
|-----|-------------|-------|
|     | MIN         | MAX   |
| A   | 15.50       | 15.90 |
| B   | 9.80        | 10.20 |
| C   | 4.20        | 4.50  |
| D   | 0.70        | 0.90  |
| F   | 3.40        | 3.70  |
| G   | 4.98        | 5.18  |
| H   | 2.68        | 2.90  |
| J   | 0.44        | 0.60  |
| K   | 12.80       | 13.40 |
| L   | 1.20        | 1.45  |
| O   | 2.70        | 2.90  |
| R   | 2.30        | 2.70  |
| S   | 1.29        | 1.35  |
| U   | 6.45        | 6.65  |
| V   | 8.66        | 8.86  |

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

| Characteristic | Symbol | Min. | Max | Unit |
|----------------|--------|------|-----|------|
|----------------|--------|------|-----|------|

**OFF CHARACTERISTICS**

|                                                                              |               |     |     |    |
|------------------------------------------------------------------------------|---------------|-----|-----|----|
| Collector-Emitter Sustaining Voltage<br>( $I_C = 30\text{ mA}$ , $I_B = 0$ ) | $V_{CE(SUS)}$ | 450 |     | V  |
| Collector Cutoff Current<br>( $V_{CE} = 450\text{ V}$ , $I_B = 0$ )          | $I_{CEO}$     |     | 0.1 | mA |
| Emitter Cutoff Current<br>( $V_{EB} = 9.0\text{ V}$ , $I_C = 0$ )            | $I_{EBO}$     |     | 0.1 | mA |

**ON CHARACTERISTICS**

|                                                                                                                                                                                      |               |               |                      |   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|----------------------|---|
| DC Current Gain<br>( $I_C = 1\text{ A}$ , $V_{CE} = 5.0\text{ V}$ )<br>( $I_C = 2\text{ A}$ , $V_{CE} = 1.0\text{ V}$ )<br>( $I_C = 10\text{ mA}$ , $V_{CE} = 5.0\text{ V}$ )        | $h_{FE}$      | 14<br>6<br>10 | 36                   |   |
| Collector-Emitter Saturation Voltage<br>( $I_C = 2.5\text{ A}$ , $I_B = 0.5\text{ A}$ )                                                                                              | $V_{CE(sat)}$ |               | 0.75                 | V |
| Base-Emitter Saturation Voltage<br>( $I_C = 1\text{ A}$ , $I_B = 0.1\text{ A}$ )<br>( $I_C = 2\text{ A}$ , $I_B = 0.4\text{ A}$ )<br>( $I_C = 2.5\text{ A}$ , $I_B = 0.5\text{ A}$ ) | $V_{BE(sat)}$ |               | 1.10<br>1.25<br>1.30 | V |

**DYNAMIC CHARACTERISTICS**

|                                                                                                                   |       |          |  |     |
|-------------------------------------------------------------------------------------------------------------------|-------|----------|--|-----|
| Current gain-Bandwidth product<br>( $I_C = 0.5\text{ A}$ , $V_{CE} = 10\text{ V}$ , $f_{TEST} = 1.0\text{ MHz}$ ) | $f_T$ | 13 (typ) |  | MHz |
|-------------------------------------------------------------------------------------------------------------------|-------|----------|--|-----|

**SWITCHING CHARACTERISTICS**

|               |                                                                                    |          |             |     |    |
|---------------|------------------------------------------------------------------------------------|----------|-------------|-----|----|
| Turn-on Time  | $V_{CC} = 250\text{ V}$ , $I_C = 2.5\text{ V}$<br>$I_{B1} = I_{B2} = 0.5\text{ A}$ | $t_{ON}$ | 450 (typ)   | 600 | ns |
| Storage Time  |                                                                                    | $t_S$    | 2 (typ)     | 3   | us |
| Turn-off Time |                                                                                    | $t_f$    | 0.275 (typ) | 0.4 | us |

※Switching Times Resistive Load, Duty Cycle ≤ 10%, Pulse Width = 20 μs

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