

**Silicon NPN Power Transistor**

**MJ13334**

**DESCRIPTION**

- Collector-Emitter Sustaining Voltage-  
:  $V_{CEO(SUS)} = 450V(\text{Min})$
- High Switching Speed

**APPLICATIONS**

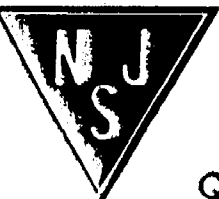
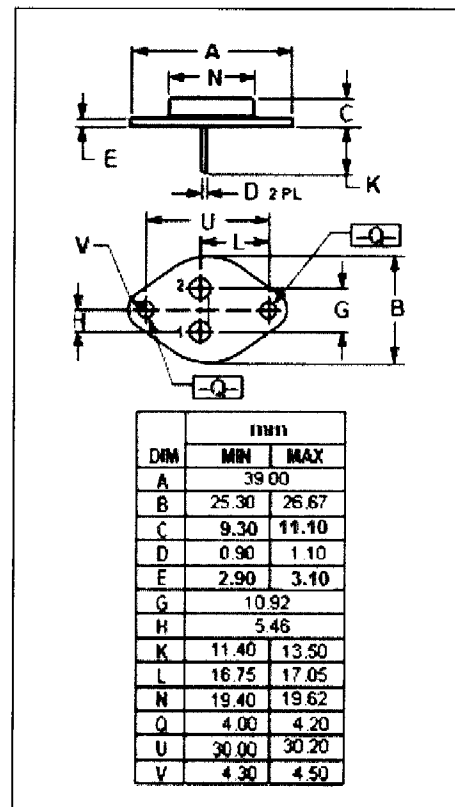
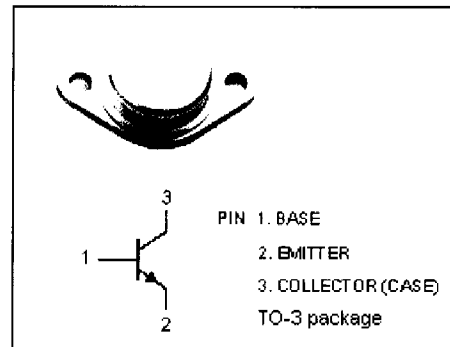
- Designed for high-voltage ,high-speed, power switching in inductive circuits where fall time is critical. They are particularly suited for line operated switchmode applications.
- Switching regulators
- Inverters
- Solenoid and relay drivers
- Motor controls
- Deflection circuits

**ABSOLUTE MAXIMUM RATINGS( $T_a=25^\circ\text{C}$ )**

| SYMBOL    | PARAMETER   | VALUE   | UNIT             |
|-----------|---|---------|------------------|
| $V_{CEV}$ | Collector-Emitter Voltage                           | 750     | V                |
| $V_{CEO}$ | Collector-Emitter Voltage                           | 450     | V                |
| $V_{EBO}$ | Emitter-Base Voltage                                | 6       | V                |
| $I_C$     | Collector Current-Continuous                        | 20      | A                |
| $I_{CM}$  | Collector Current-Peak                              | 30      | A                |
| $I_B$     | Base Current-Continuous                             | 10      | A                |
| $I_{BM}$  | Base Current-Peak                                   | 15      | A                |
| $P_C$     | Collector Power Dissipation@ $T_c=25^\circ\text{C}$ | 175     | W                |
| $T_J$     | Junction Temperature                                | 200     | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature                                 | -65~200 | $^\circ\text{C}$ |

**THERMAL CHARACTERISTICS**

| SYMBOL        | PARAMETER                            | MAX | UNIT               |
|---------------|--------------------------------------|-----|--------------------|
| $R_{th\ j-c}$ | Thermal Resistance, Junction to Case | 1.0 | $^\circ\text{C/W}$ |



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## ELECTRICAL CHARACTERISTICS

$T_C=25^\circ\text{C}$  unless otherwise specified

| SYMBOL          | PARAMETER                            | CONDITIONS  | MIN | TYP. | MAX         | UNIT |
|-----------------|--------------------------------------|---|-----|------|-------------|------|
| $V_{CE0(SUS)}$  | Collector-Emitter Sustaining Voltage | $I_C=100\text{mA}; I_B=0$   | 450 |      |             | V    |
| $V_{CE(sat)-1}$ | Collector-Emitter Saturation Voltage | $I_C=10\text{A}; I_B=2\text{A}$<br>$I_C=10\text{A}; I_B=2\text{A}, T_C=100^\circ\text{C}$                               |     |      | 1.8<br>2.4  | V    |
| $V_{CE(sat)-2}$ | Collector-Emitter Saturation Voltage | $I_C=20\text{A}; I_B=6.7\text{A}$   |     |      | 5           | V    |
| $V_{BE(sat)}$   | Base-Emitter Saturation Voltage      | $I_C=10\text{A}; I_B=2\text{A}$<br>$I_C=10\text{A}; I_B=2\text{A}, T_C=100^\circ\text{C}$                               |     |      | 1.8<br>1.8  | V    |
| $I_{CEV}$       | Collector Cutoff Current             | $V_{CEV}=450\text{V}; V_{BE(off)}=1.5\text{V}$<br>$V_{CEV}=450\text{V}; V_{BE(off)}=1.5\text{V}; T_C=150^\circ\text{C}$ |     |      | 0.25<br>5.0 | mA   |
| $I_{CER}$       | Collector Cutoff Current             | $V_{CE}=450\text{V}; R_{BE}=50\Omega; T_C=100^\circ\text{C}$  |     |      | 5.0         | mA   |
| $I_{EBO}$       | Emitter Cutoff Current               | $V_{EB}=6\text{V}; I_C=0$   |     |      | 1           | mA   |
| $h_{FE}$        | DC Current Gain                      | $I_C=5\text{A}; V_{CE}=5\text{V}$   | 10  |      | 60          |      |
| $f_T$           | Current Gain-Bandwidth Product       | $I_C=0.3\text{A}; V_{CE}=10\text{V}; f_{test}=1\text{MHz}$  | 5   |      | 40          | MHz  |
| $C_{OB}$        | Output Capacitance                   | $I_E=0; V_{CB}=10\text{V}; f_{test}=1\text{kHz}$  | 125 |      | 500         | pF   |

Switching times; Resistive Load

|       |              |  |  |      |     |               |
|-------|--------------|--|--|------|-----|---------------|
| $t_d$ | Delay Time   | $I_C=10\text{A}; V_{CC}=250\text{V}; I_{B1}=2\text{A}$<br>$V_{BE(off)}=5\text{V}; t_p=10\mu\text{s};$<br>Duty Cycle $\leq 2.0\%$ |  | 0.02 | 0.1 | $\mu\text{s}$ |
| $t_r$ | Rise Time    |  |  | 0.3  | 0.7 | $\mu\text{s}$ |
| $t_s$ | Storage Time |  |  | 1.6  | 4.0 | $\mu\text{s}$ |
| $t_f$ | Fall Time    |  |  | 0.3  | 0.7 | $\mu\text{s}$ |