

Silicon NPN Power Transistor

DESCRIPTION

- Collector-Emitter Sustaining Voltage
: $V_{CE(SUS)} = 400V(\text{Min.})$
- Collector Saturation Voltage
: $V_{CE(sat)} = 1.5 (\text{Max}) @ I_C = 8.0A$
- Switching Time
: $t_f = 0.7 \mu s(\text{Max.}) @ I_C = 8.0A$

APPLICATIONS

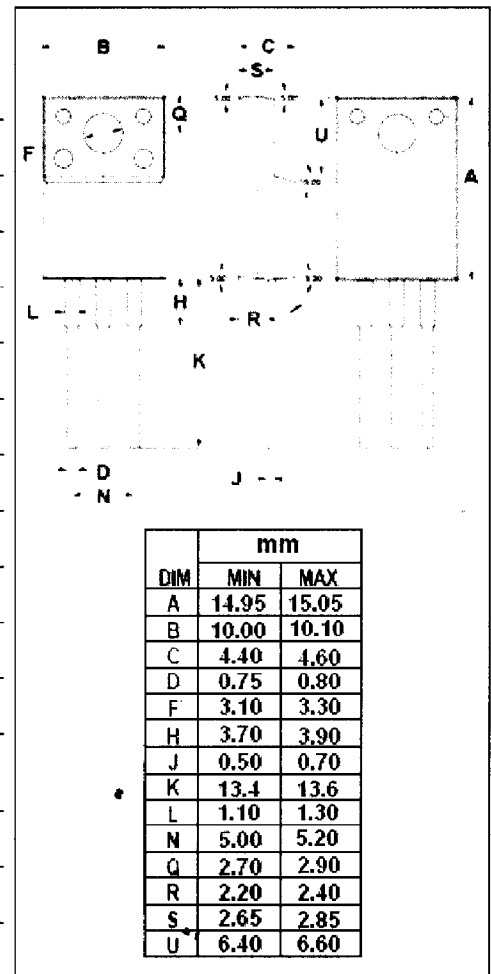
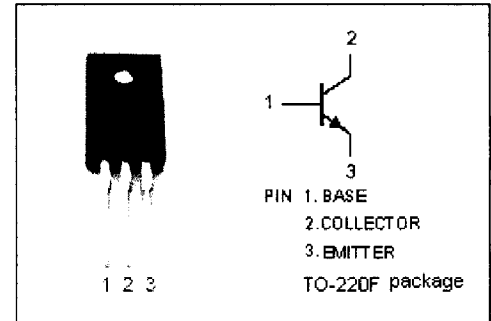
- Designed for use in high-voltage, high-speed, power switching in inductive circuit, they are particularly suited for 115 and 220V switchmode applications such as switching regulators, inverters, Motor controls, Solenoid/Relay drivers and deflection circuits.

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

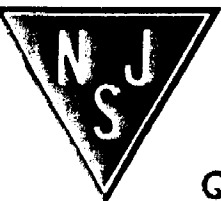
| SYMBOL | PARAMETER | VALUE | UNIT |
|-----------|---|---------|------------------|
| V_{CEV} | Collector-Emitter Voltage | 700 | V |
| V_{CEO} | Collector-Emitter Voltage | 400 | V |
| V_{EBO} | Emitter-Base Voltage | 9 | V |
| I_C | Collector Current-Continuous | 12 | A |
| I_{CM} | Collector Current-peak | 24 | A |
| I_B | Base Current | 6 | A |
| I_{BM} | Base Current-Peak | 12 | A |
| P_C | Collector Power Dissipation $T_C=25^\circ\text{C}$ | 50 | W |
| T_J | Junction Temperature | 150 | $^\circ\text{C}$ |
| T_{stg} | Storage Temperature Range | -65~150 | $^\circ\text{C}$ |

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | MAX | UNIT |
|--------------|---|------|--------------------|
| $R_{th j-c}$ | Thermal Resistance, Junction to Case | 2.5 | $^\circ\text{C/W}$ |
| $R_{th j-a}$ | Thermal Resistance, Junction to Ambient | 62.5 | $^\circ\text{C/W}$ |



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Silicon NPN Power Transistor

MJF13009

ELECTRICAL CHARACTERISTICS

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

| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP. | MAX | UNIT |
|-----------------|--------------------------------------|---|-----|------|--------|------|
| $V_{CEO(SUS)}$ | Collector-Emitter Sustaining Voltage | $I_C = 10\text{mA}; I_B = 0$ | 400 | | | V |
| $V_{CE(sat)-1}$ | Collector-Emitter Saturation Voltage | $I_C = 5\text{A}; I_B = 1\text{A}$ | | | 1.0 | V |
| $V_{CE(sat)-2}$ | Collector-Emitter Saturation Voltage | $I_C = 8\text{A}; I_B = 1.6\text{A}$ | | | 1.5 | V |
| $V_{CE(sat)-3}$ | Collector-Emitter Saturation Voltage | $I_C = 12\text{A}; I_B = 3\text{A}$ | | | 3.0 | V |
| $V_{BE(sat)-1}$ | Base-Emitter Saturation Voltage | $I_C = 5\text{A}; I_B = 1\text{A}$ | | | 1.2 | V |
| $V_{BE(sat)-2}$ | Base-Emitter Saturation Voltage | $I_C = 8\text{A}; I_B = 1.6\text{A}$ | | | 1.6 | V |
| I_{CEV} | Collector Cutoff Current | $V_{CEV} = 700\text{V}; V_{BE(off)} = 1.5\text{V}$ $T_C = 100^\circ\text{C}$ | | | 1 5 | mA |
| I_{EBO} | Emitter Cutoff Current | $V_{EB} = 9\text{V}; I_C = 0$ | | | 1 | mA |
| h_{FE-1} | DC Current Gain | $I_C = 5\text{A}; V_{CE} = 5\text{V}$ | 8 | | 40 | |
| h_{FE-2} | DC Current Gain | $I_C = 8\text{A}; V_{CE} = 5\text{V}$ | 6 | | 30 | |
| f_T | Current-Gain—Bandwidth Product | $I_C = 0.5\text{A}; V_{CE} = 10\text{V};$ | 4 | | | MHz |
| C_{OB} | Output Capacitance | $I_E = 0; V_{CB} = 10\text{V}; f_{test} = 0.1\text{MHz}$ | | 180 | | pF |

Switching Times; Resistive Load

| | | | | | | |
|----------|--------------|--|--|--|-----|---------------|
| t_{on} | Storage Time | $I_C = 8\text{A}; V_{CC} = 125\text{V};$ $I_{B1} = I_{B2} = 1.6\text{A}; t_p = 25\ \mu\text{s};$ Duty Cycle $\leq 1\%$ | | | 1.1 | μs |
| t_s | Storage Time | | | | 3.0 | μs |
| t_f | Fall Time | | | | 0.7 | μs |