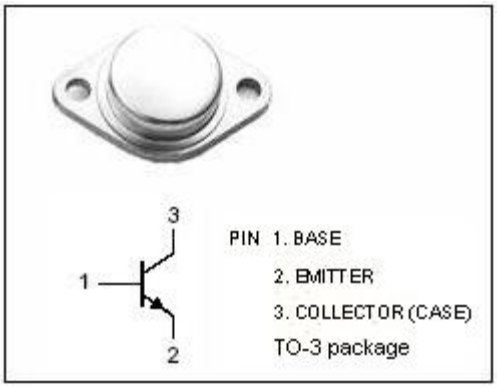
# isc Silicon NPN Power Transistors — MJ13090/13091

## DESCRIPTION

- Collector-Emitter Sustaining Voltage-
  : $V_{CEO(SUS)}$ = 400V(Min)—MJ13090
  = 450V(Min)—MJ13091
- High Switching Speed
- Minimum Lot-to-Lot variations for robust device performance and reliable operation

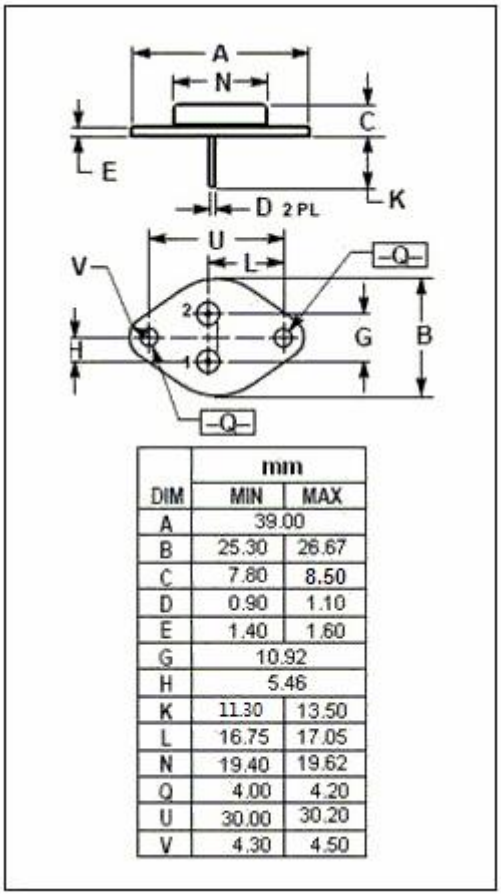
## APPLICATIONS

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




## ABSOLUTE MAXIMUM RATINGS($T_a$=25℃)

| SYMBOL | PARAMETER | | VALUE | UNIT |
|---|---|---|---|---|
| $V_{CBO}$ | Collector- Base Voltage | MJ13090 | 650 | V |
| | | MJ13091 | 750 | |
| $V_{CEO(SUS)}$ | Collector-Emitter Voltage | MJ13090 | 400 | V |
| | | MJ13091 | 450 | |
| $V_{EBO}$ | Emitter-Base Voltage | | 6 | V |
| $I_C$ | Collector Current-Continuous | | 15 | A |
| $I_{CM}$ | Collector Current-Peak | | 20 | A |
| $I_B$ | Base Current-Continuous | | 5 | A |
| $I_{BM}$ | Base Current-Peak | | 10 | A |
| $P_C$ | Collector Power Dissipation@$T_C$=25℃ | | 175 | W |
| $T_J$ | Junction Temperature | | 200 | ℃ |
| $T_{stg}$ | Storage Temperature | | -65~200 | ℃ |




| DIM | mm MIN | MAX |
|---|---|---|
| A | 39.00 | |
| B | 25.30 | 26.67 |
| C | 7.80 | 8.50 |
| D | 0.90 | 1.10 |
| E | 1.40 | 1.60 |
| G | 10.92 | |
| H | 5.46 | |
| K | 11.30 | 13.50 |
| L | 16.75 | 17.05 |
| N | 19.40 | 19.62 |
| Q | 4.00 | 4.20 |
| U | 30.00 | 30.20 |
| V | 4.30 | 4.50 |

## THERMAL CHARACTERISTICS

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

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## ELECTRICAL CHARACTERISTICS

**$T_C$=25℃ unless otherwise specified**

| SYMBOL | PARAMETER | | CONDITIONS | MIN | TYP. | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{CEO(SUS)}$ | Collector-Emitter Sustaining Voltage | MJ13090 | $I_C$=50mA ; $I_B$=0 | 400 | | | V |
| | | MJ13091 | | 450 | | | |
| $V_{CE(sat)-1}$ | Collector-Emitter Saturation Voltage | | $I_C$= 10A; $I_B$= 2A<br>$I_C$= 10A; $I_B$= 2A;$T_C$=100℃ | | | 1.0<br>2.0 | V |
| $V_{CE(sat)-2}$ | Collector-Emitter Saturation Voltage | | $I_C$= 15A; $I_B$= 3A | | | 3.0 | V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | | $I_C$= 10A; $I_B$= 2A<br>$I_C$= 10A; $I_B$= 2A;$T_C$=100℃ | | | 1.5<br>1.5 | V |
| $I_{CBO}$ | Collector Cutoff Current | MJ13090 | $V_{CB}$=650V;$I_E$=0<br>$V_{CB}$=650V;$I_E$=0;$T_C$=100℃ | | | 0.5<br>2.5 | mA |
| | | MJ13091 | $V_{CB}$=750V;$I_E$=0<br>$V_{CB}$=750V;$I_E$=0;$T_C$=100℃ | | | 0.5<br>2.5 | |
| $I_{EBO}$ | Emitter Cutoff Current | | $V_{EB}$= 6V; $I_C$=0 | | | 1.0 | mA |
| $h_{FE}$ | DC Current Gain | | $I_C$= 10A ; $V_{CE}$= 3V | 8 | | | |
| $C_{OB}$ | Output Capacitance | | $I_E$= 0; $V_{CB}$= 10V; $f_{test}$=1.0kHz | | 350 | | pF |