# Bipolar Transistor

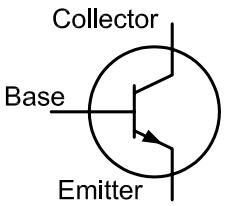
multicomp PRO

RoHS Compliant

## Description:

This TO-3 NPN Transistor is 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.

NPN




## Features:

- Switching Regulators
- Inverters
- Solenoid and Relay Drivers
- Motor Controls
- Deflection Circuits

## Absolute Maximum Ratings:

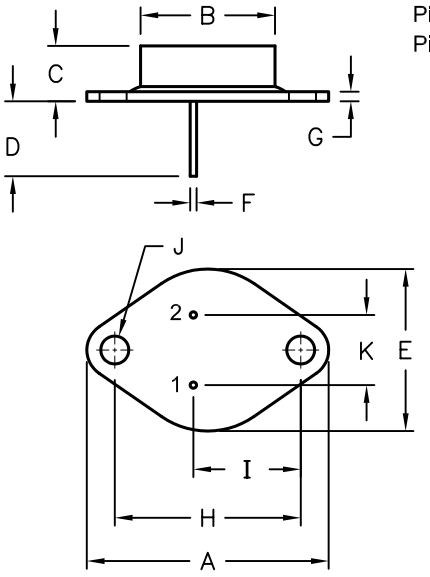
| Characteristic | Symbol | Rating |
|---|---|---|
| Collector - Emitter Voltage | $V_{CEV}$ | 700V |
| Collector - Emitter Voltage | $V_{CEO}$ | 400V |
| Emitter - Base Voltage | $V_{EBO}$ | 6V |
| Continuous Collector Current | $I_C$ | 20A |
| Base Current | $I_B$ | 10A |
| Total Device Dissipation ($T_C$ = +25°C)<br>Derate above 25°C | $P_D$ | 175W<br>1W/°C |
| Operating Junction Temperature Range | $T_J$ | -65°C to +200°C |
| Storage Temperature Range | $T_{STG}$ | -65°C to +200°C |

## Electrical Characteristics ($T_A$ = 25°C unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min. | Max. | Unit |
|---|---|---|---|---|---|
| **OFF Characteristics** | | | | | |
| Collector - Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$ = 100mA, $I_B$ = 0 | 400 | - | V |
| Collector Cut-off Current | $I_{CEV}$ | $V_{CE}$ = 700V, $V_{EB(off)}$ = 1.5V | - | 0.25 | mA |
| | $I_{CER}$ | $V_{CE}$ = 700V, $R_{BE}$ = 50Ω, $T_C$ = +100°C | - | 5 | mA |
| Emitter Cut-off Current | $I_{EBO}$ | $V_{EB}$ = 6V, $I_C$ = 0 | - | 1 | mA |
| **ON Characteristics (Note 1)** | | | | | |
| DC Current Gain | $h_{FE}$ | $V_{CE}$ 5V, $I_C$ = 5A | 10 | 60 | - |
| Collector - Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C$ = 10A, $I_B$ = 2A | - | 1.8 | V |
| | | $I_C$ = 20A, $I_B$ = 6.7A | - | 0.5 | |
| Base - Emitter Saturation Voltage | $V_{BE(sat)}$ | $I_C$ = 10A, $I_B$ = 2A | - | 1.8 | |

| Parameter | Symbol | Test Conditions | Min. | Max. | Unit |
|---|---|---|---|---|---|
| **Small-Signal Characteristics** | | | | | |
| Output Capacitance | $C_{OBO}$ | $V_{CB}$ = 10V, $I_E$ = 0, f = 1kHz | 125 | 500 | pF |
| **Switching Characteristics** | | | | | |
| Delay Time | $t_d$ | $V_{CC}$ = 250V, $I_C$ = 10A, $V_{BE(off)}$ = 5V, $I_{B1}$ = 2A | - | 0.1 | µs |
| Rise Time | $t_r$ | | - | 0.7 | |
| Storage Time | $t_s$ | $V_{CC}$ = 250V, $I_C$ = 10A, $V_{BE(off)}$ = 5V, $I_{B1}$ = 2A | - | 4 | |
| Fall Time | $t_f$ | | - | 0.7 | |

**Note 1**: Pulse Test : Pulse Width ≦ 300µs, Duty Cycle ≦ 2%




Pin 1 = Base
Pin 2 = Emitter
Collector (Case)

| Dim. | Min. | Max. |
|---|---|---|
| A | 38.75 | 39.96 |
| B | 19.28 | 22.23 |
| C | 7.96 | 9.23 |
| D | 11.18 | 12.19 |
| E | 25.2 | 26.67 |
| F | 0.92 | 1.09 |
| G | 1.38 | 1.62 |
| H | 29.9 | 30.4 |
| I | 16.64 | 17.3 |
| J | 3.88 | 4.36 |
| K | 10.67 | 11.18 |

Dimensions : Millimetres

## Part Number Table

| Description | Part Number |
|---|---|
| Transistor, Power Switching, High Voltage, Bipolar, TO-3, NPN, 20A, 400V | MJ13333 |