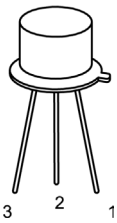
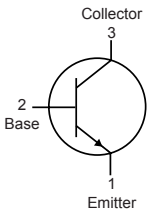
# Bipolar Transistor

RoHS Compliant

**NPN**




## Description:

This is a Silicon NPN transistor in a TO-39 type case designed primarily for amplifier and switching applications. This device features high breakdown voltage, low leakage current, low capacity, and beta useful over an extremely wide current range

**Pin Configuration:**

1. Emitter
2. Base
3. Collector

## Maximum Ratings:

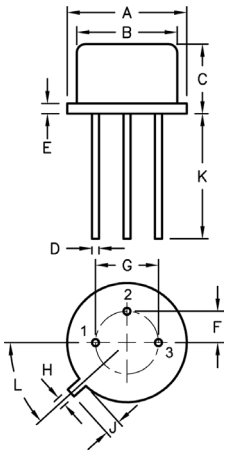
| Characteristic | Symbol | Rating | Unit |
|---|---|---|---|
| Collector-Base Voltage | $V_{CBO}$ | 80 | V |
| Collector-Emitter Voltage | $V_{CEO}$ | 60 | |
| Emitter-Base Voltage | $V_{EBO}$ | 5 | |
| Continuous Collector Current | $I_C$ | 0.7 | A |
| Total Device Dissipation ($T_A$ = +25°C), Derate above 25°C | $P_D$ | 800<br>4.6 | mW<br>mW/°C |
| Total Device Dissipation ($T_C$ = +25°C), Derate above 25°C | | 5<br>28.6 | W<br>mW/°C |
| Operating Junction Temperature Range | $T_J$ | -65 to +150 | °C |
| Storage Temperature Range | $T_{stg}$ | | |

# Bipolar Transistor

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

| Parameter | Symbol | Test Conditions | Min. | Max. | Unit |
|---|---|---|---|---|---|
| **OFF Characteristics** | | | | | |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$ = 0.1mA, $I_B$ = 0 | 60 | - | V |
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$ = 100µA, $I_E$ = 0 | 80 | | |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$ = 100µA, $I_C$ = 0 | 5 | | |
| Emitter Cut-Off Current | $I_{EBO}$ | $V_{BE}$ = 4V, $I_C$ = 0 | - | 0.25 | µA |
| **ON Characteristics, Note 1** | | | | | |
| DC Current Gain | $h_{FE}$ | $V_{CE}$ = 10V, $I_C$ = 150mA | 50 | - | 250 |
| | | $V_{CE}$ = 2.5V, $I_C$ = 150mA | 25 | | - |
| Collector - Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C$ = 150mA, $I_B$ = 15mA | - | 1.4 | V |
| Base - Emitter Saturation Voltage | $V_{BE(sat)}$ | | | 1 | |
| Small Signal Characteristics | | | | | |
| Current Gain-Bandwidth Product | $f_T$ | $V_{CE}$ = 10V, $I_C$ = 50mA, f = 20MHz | 100 | - | MHz |
| Output Capacitance | $C_{ObO}$ | $V_{CB}$ = 10V, $I_E$ = 0, f = 1MHz | - | 12 | pF |
| Input Capacitance | $C_{ibO}$ | $V_{BE}$ = 500mV, $I_C$ = 0, f = 1MHz | | 80 | |

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




| Dim. | A | B | C | D | E | F | G | H | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Min. | 8.5 | 7.74 | 6.09 | 0.4 | - | 2.41 | 4.82 | 0.71 | 0.73 | 12.7 | 42° |
| Max. | 9.39 | 8.5 | 6.6 | 0.53 | 0.88 | 2.66 | 5.33 | 0.86 | 1.02 | - | 48° |

Dimensions : Millimetres

**Pin Configuration:**
1. Emitter
2. Base
3. Collector

## Part Number Table

| Description | Part Number |
|---|---|
| Transistor, NPN, 0.7A, 60V, TO-39 | 2N3053A |