

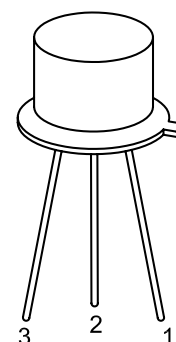
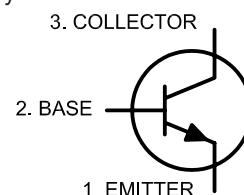


## Description:

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.

**RoHS  
Compliant**

**NPN**



## Absolute Maximum Ratings:

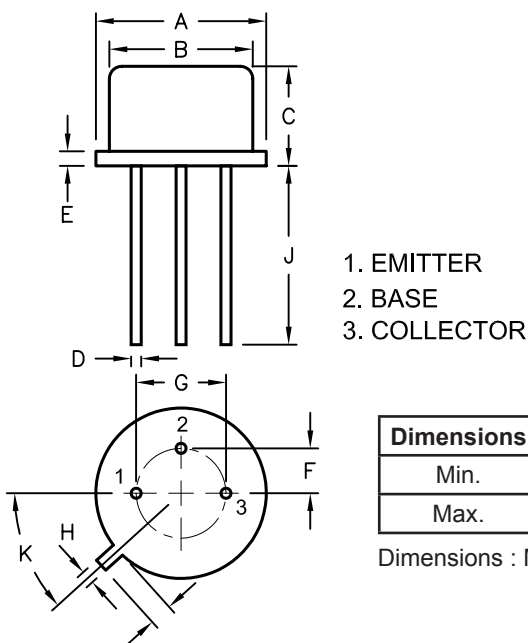
| Characteristic                                                                            | Symbol     | Rating                                      |
|-------------------------------------------------------------------------------------------|------------|---------------------------------------------|
| Collector-Base Voltage                                                                    | $V_{CB0}$  | 60V                                         |
| Collector-Emitter Voltage                                                                 | $V_{CE0}$  | 40V                                         |
| Emitter - Base Voltage                                                                    | $V_{EB0}$  | 5V                                          |
| Continuous Collector Current                                                              | $I_C$      | 0.7A                                        |
| Total Device Dissipation ( $T_c = +25^\circ\text{C}$ )<br>Derate above $25^\circ\text{C}$ | $P_D$      | 800mW<br>4.6mW/ $^\circ\text{C}$            |
| Total Device Dissipation ( $T_c = +25^\circ\text{C}$ )<br>Derate above $25^\circ\text{C}$ | $P_D$      | 5W<br>28.6mW/ $^\circ\text{C}$              |
| Operating Junction Temperature Range                                                      | $T_J$      | $-65^\circ\text{C}$ to $+200^\circ\text{C}$ |
| Storage Temperature Range                                                                 | $T_{STG}$  | $-65^\circ\text{C}$ to $+200^\circ\text{C}$ |
| Thermal Resistance, Junction-to-Case                                                      | $R_{thJC}$ | $35^\circ\text{C/W}$                        |
| Lead Temperature<br>(During Soldering, 1/16" from case, 60sec max.)                       | $T_L$      | $300^\circ\text{C}$                         |

## Electrical Characteristics: ( $T_A = +25^\circ\text{C}$ Unless otherwise specified)

| Parameter                            | Symbol        | Test Conditions                               | Min. | Max. | Unit.         |
|--------------------------------------|---------------|-----------------------------------------------|------|------|---------------|
| <b>OFF Characteristics</b>           |               |                                               |      |      |               |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CE0}$ | $I_C = 0.1\text{mA}$ , $I_B = 0$              | 40   | -    | V             |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C = 100\mu\text{A}$ , $I_E = 0$            | 60   | -    |               |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E = 100\mu\text{A}$ , $I_C = 0$            | 5    | -    |               |
| Emitter Cut-Off Current              | $I_{EBO}$     | $V_{BE} = 4\text{V}$ , $I_C = 0$              | -    | 0.01 | $\mu\text{A}$ |
| <b>On Characteristics (Note 1)</b>   |               |                                               |      |      |               |
| DC Current Gain                      | $h_{FE}$      | $V_{CE} = 10\text{V}$ , $I_C = 150\text{mA}$  | 50   | -    | -             |
|                                      |               | $V_{CE} = 2.5\text{V}$ , $I_C = 150\text{mA}$ | 40   | -    | -             |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 150\text{mA}$ , $I_B = 15\text{mA}$    | -    | 1.4  | V             |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = 150\text{mA}$ , $I_B = 15\text{mA}$    | -    | 1.7  | V             |

| Parameter                           | Symbol    | Test Conditions                       | Min. | Max. | Unit. |
|-------------------------------------|-----------|---------------------------------------|------|------|-------|
| <b>Small-Signal Characteristics</b> |           |                                       |      |      |       |
| Current Gain-Bandwidth Product      | $f_r$     | $V_{CE} = 10V, I_C = 50mA, f = 20MHz$ | 100  | 400  | MHz   |
| Output Capacitance                  | $C_{obo}$ | $V_{CB} = 10V, I_E = 0, f = 1MHz$     | -    | 12   | pF    |
| Input Capacitance                   | $C_{ibo}$ | $V_{BE} = 500mV, I_C = 0, f = 1MHz$   | -    | 60   | pF    |

**Note 1.** Pulse Test: Pulse Width  $\leq 300\mu s$ , Duty Cycle  $\leq 1\%$



| Dimensions | A    | B    | C    | D    | E    | F    | G    | H    | I    | J    | K   |
|------------|------|------|------|------|------|------|------|------|------|------|-----|
| Min.       | 8.5  | 7.74 | 6.09 | 0.4  | -    | 2.41 | 4.82 | 0.71 | 0.73 | 12.7 | 42° |
| Max.       | 9.39 | 8.50 | 6.6  | 0.53 | 0.88 | 2.66 | 5.33 | 0.86 | 1.02 | -    | 48° |

Dimensions : Millimetres

## Part Number Table

| Description                                | Part Number |
|--------------------------------------------|-------------|
| Bipolar Transistor, NPN, 700mA, 40V, TO-39 | 2N3053      |

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