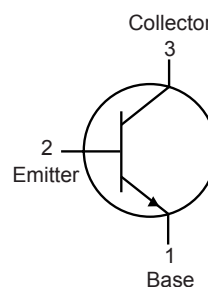


RoHS  
Compliant



NPN



## Features:

- High Collector Sustaining Voltage :  $V_{CEO} = 80V @ I_C = 200mA$
- Low Collector Emitter saturation Voltage  $V_{CE(sat)} 1V @ I_C = 10A$

## Description:

High power, NPN, TO-3, Silicon Transistor Designed for use in power amplifier and switching circuits applications

## Maximum Ratings:

| Characteristic                                                                  | Symbol    | Rating      | Unit                 |
|---------------------------------------------------------------------------------|-----------|-------------|----------------------|
| Collector-Base Voltage                                                          | $V_{CBO}$ | 80          | V                    |
| Collector-Emitter Voltage                                                       | $V_{CEO}$ |             |                      |
| Continuous Collector Current                                                    | $I_C$     | 20          | A                    |
| Base Current                                                                    | $I_B$     | 7.5         |                      |
| Total Device Dissipation ( $T_C = +25^{\circ}C$ )<br>Derate Above $25^{\circ}C$ | $P_D$     | 200<br>1.14 | W<br>mW/ $^{\circ}C$ |
| Operating Junction Temperature Range,                                           | $T_J$     | -65 to +200 | $^{\circ}C$          |
| Storage Temperature Range                                                       | $T_{stg}$ |             |                      |

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

| Parameter | Symbol | Test Conditions | Min. | Max. | Unit |
|-----------|--------|-----------------|------|------|------|
|-----------|--------|-----------------|------|------|------|

### OFF Characteristics

|                                     |               |                                                  |    |   |    |
|-------------------------------------|---------------|--------------------------------------------------|----|---|----|
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C = 200\text{mA}, I_B = 0$                    | 80 | - | V  |
| Collector Cut-Off Current           | $I_{CEO}$     | $V_{CB} = 80\text{V}, I_B = 0$                   | -  | 5 | mA |
|                                     | $I_{CEX}$     | $V_{CE} = 80\text{V}, V_{EB(off)} = 1.5\text{V}$ |    | 1 |    |
|                                     | $I_{CBO}$     | $V_{CB} = 80\text{V}, I_E = 0$                   |    |   |    |
| Emitter Cut-Off Current             | $I_{EBO}$     | $V_{EB} = 5\text{V}, I_C = 0$                    |    | 5 |    |

### ON Characteristics ( See Note 1)

|                                        |               |                                        |    |     |   |
|----------------------------------------|---------------|----------------------------------------|----|-----|---|
| DC Current Gain                        | $h_{FE}$      | $V_{CE} = 2\text{V}, I_C = 1\text{A}$  | 40 | -   | - |
|                                        |               | $V_{CE} = 2\text{V}, I_C = 10\text{A}$ | 15 | 60  |   |
|                                        |               | $V_{CE} = 4\text{V}, I_C = 20\text{A}$ | 5  | -   |   |
| Collector - Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = 10\text{A}, I_B = 1\text{A}$    | -  | 1   | V |
|                                        |               | $I_C = 15\text{A}, I_B = 1.5\text{A}$  |    | 1.5 |   |
|                                        |               | $I_C = 20\text{A}, I_B = 4\text{A}$    |    | 2   |   |
| Base - Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = 10\text{A}, I_B = 1\text{A}$    |    | 1.7 |   |
|                                        |               | $I_C = 15\text{A}, I_B = 1.5\text{A}$  |    | 2   |   |
|                                        |               | $I_C = 20\text{A}, I_B = 4\text{A}$    |    | 2.5 |   |
| Base - Emitter on Voltage              | $V_{BE(on)}$  | $I_C = 20\text{A}, V_{CE} = 4\text{V}$ |    | 2.5 |   |

### Small Signal Characteristics

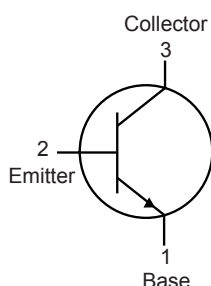
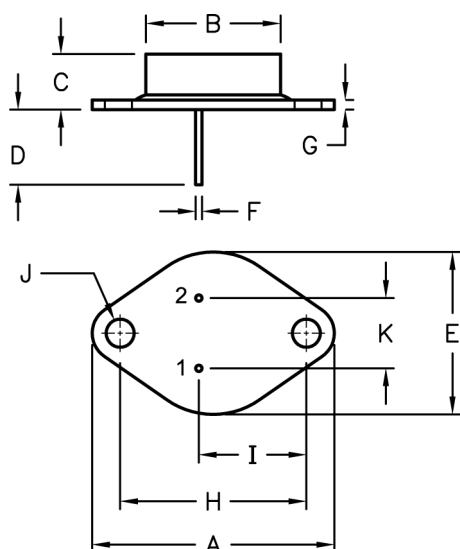
|                                |          |                                                         |   |    |     |
|--------------------------------|----------|---------------------------------------------------------|---|----|-----|
| Current Gain-Bandwidth Product | $f_T$    | $V_{CE} = 10\text{V}, I_C = 1\text{A}, f = 1\text{MHz}$ | 2 | -  | MHz |
| Small-Signal Current Gain      | $h_{fe}$ | $V_{CE} = 10\text{V}, I_C = 1\text{A}, f = 1\text{kHz}$ | - | 40 | -   |

### Switching Characteristics

|              |       |                                                  |   |   |    |
|--------------|-------|--------------------------------------------------|---|---|----|
| Rise Time    | $t_r$ | $V_{CC} = 30V, I_C = 10A, I_{B1} = I_{B2} = 1A$  | - | 1 | us |
| Storage Time | $t_s$ | $V_{CC} = 30V, I_C = 10mA, I_{B1} = I_{B2} = 1A$ |   | 2 |    |
| Fall Time    | $t_f$ |                                                  |   | 1 |    |

Note 1 : Pulse Test : Pulse Width  $\leq 300\mu\text{s}$ , Duty Cycle  $\leq 2\%$

# Bipolar Transistor



| Dimensions | Min.  | Max.  |
|------------|-------|-------|
| A          | 38.75 | 39.96 |
| B          | 19.28 | 22.23 |
| C          | 7.96  | 9.28  |
| 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, NPN, 20A, 80V, TO-3 | 2N5303      |

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