

**isc Silicon NPN Power Transistors**
**TIP31**
**DESCRIPTION**

- Collector-Emitter Saturation Voltage-  
:  $V_{CE(sat)} = 1.2V(\text{Max.})@I_C = 3A$
- Collector-Emitter Breakdown Voltage-  
:  $V_{(BR)CEO} = 40V(\text{Min})$
- Complement to Type TIP32
- Minimum Lot-to-Lot variations for robust device performance and reliable operation

**APPLICATIONS**

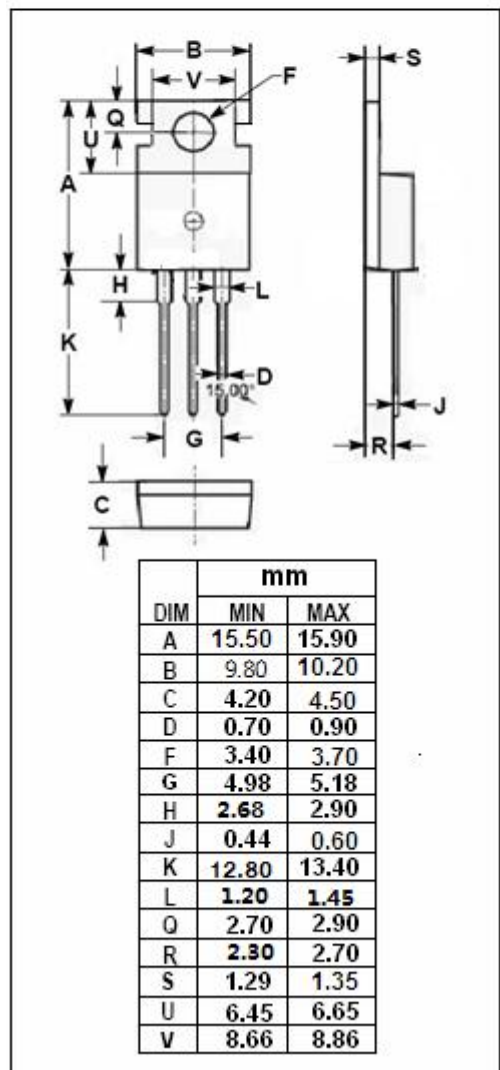
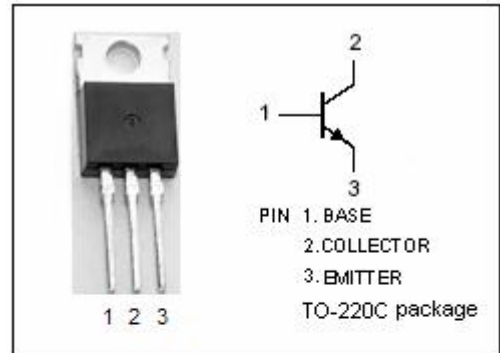
- Designed for use in general purpose amplifier and switching applications.

**ABSOLUTE MAXIMUM RATINGS( $T_a=25^\circ\text{C}$ )**

| SYMBOL    | PARAMETER   | VALUE   | UNIT             |
|-----------|---|---------|------------------|
| $V_{CBO}$ | Collector-Base Voltage                                | 40      | V                |
| $V_{CEO}$ | Collector-Emitter Voltage                             | 40      | V                |
| $V_{EBO}$ | Emitter-Base Voltage                                  | 5       | V                |
| $I_C$     | Collector Current-Continuous                          | 3       | A                |
| $I_{CM}$  | Collector Current-Pulse                               | 5       | A                |
| $I_B$     | Base Current  | 1       | A                |
| $P_C$     | Collector Power Dissipation<br>$T_c=25^\circ\text{C}$ | 40      | W                |
| $T_j$     | Junction Temperature                                  | 150     | $^\circ\text{C}$ |
| $T_{stg}$ | Storage Temperature Range                             | -65~150 | $^\circ\text{C}$ |

**THERMAL CHARACTERISTICS**

| SYMBOL        | PARAMETER                               | MAX   | UNIT                      |
|---------------|---|-------|---------------------------|
| $R_{th\ j-c}$ | Thermal Resistance, Junction to Case    | 3.125 | $^\circ\text{C}/\text{W}$ |
| $R_{th\ j-a}$ | Thermal Resistance, Junction to Ambient | 62.5  | $^\circ\text{C}/\text{W}$ |



## isc Silicon NPN Power Transistors

## TIP31

## ELECTRICAL CHARACTERISTICS

T<sub>C</sub>=25°C unless otherwise specified

| SYMBOL               | PARAMETER                            | CONDITIONS                                    | MIN | MAX | UNIT |
|----------------------|--------------------------------------|---|-----|-----|------|
| V <sub>(BR)CEO</sub> | Collector-Emitter Breakdown Voltage  | I <sub>C</sub> = 30mA; I <sub>B</sub> = 0     | 40  |     | V    |
| V <sub>CE(sat)</sub> | Collector-Emitter Saturation Voltage | I <sub>C</sub> = 3A; I <sub>B</sub> = 0.375A  |     | 1.2 | V    |
| V <sub>BE(on)</sub>  | Base-Emitter On Voltage              | I <sub>C</sub> = 3A; V <sub>CE</sub> = 4V     |     | 1.8 | V    |
| I <sub>CES</sub>     | Collector Cutoff Current             | V <sub>CE</sub> = 40V; V <sub>EB</sub> = 0    |     | 0.2 | mA   |
| I <sub>CEO</sub>     | Collector Cutoff Current             | V <sub>CE</sub> = 30V; I <sub>B</sub> = 0     |     | 0.3 | mA   |
| I <sub>EBO</sub>     | Emitter Cutoff Current               | V <sub>EB</sub> = 5V; I <sub>C</sub> = 0      |     | 1.0 | mA   |
| h <sub>FE-1</sub>    | DC Current Gain                      | I <sub>C</sub> = 1A ; V <sub>CE</sub> = 4V    | 25  |     |      |
| h <sub>FE-2</sub>    | DC Current Gain                      | I <sub>C</sub> = 3A ; V <sub>CE</sub> = 4V    | 10  | 50  |      |
| f <sub>T</sub>       | Current-Gain—Bandwidth Product       | I <sub>C</sub> = 0.5A ; V <sub>CE</sub> = 10V | 3   |     | MHz  |

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