

**isc Silicon NPN Power Transistor**

**BUL49D**

**DESCRIPTION**

- Collector–Emitter Sustaining Voltage  
:  $V_{CEO(SUS)} = 450V(\text{Min.})$
- Collector Saturation Voltage  
:  $V_{CE(sat)} = 0.3V(\text{Max}) @ I_C = 1.0A$
- Very High Switching Speed

**APPLICATIONS**

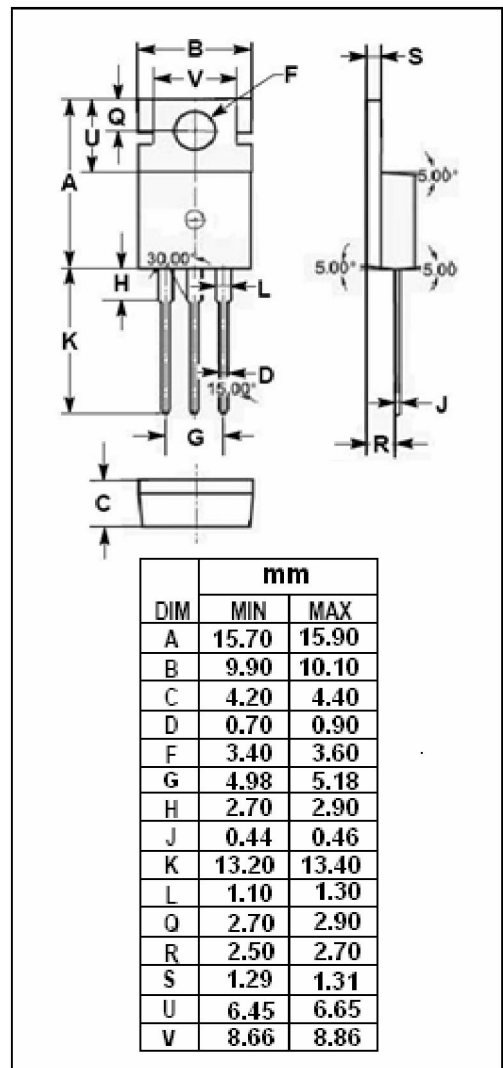
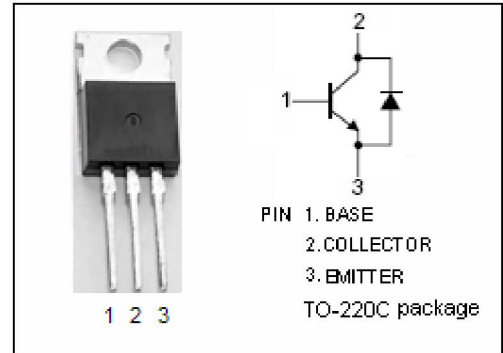
- Electronic transformers for halogen lamps
- Flyback and forward single transistor low power converters

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

| SYMBOL    | PARAMETER   | VALUE   | UNIT             |
|-----------|---|---------|------------------|
| $V_{CES}$ | Collector-Emitter Voltage                               | 850     | V                |
| $V_{CEO}$ | Collector-Emitter Voltage                               | 450     | V                |
| $V_{EBO}$ | Emitter-Base Voltage                                    | 10      | V                |
| $I_C$     | Collector Current-Continuous                            | 5       | A                |
| $I_{CM}$  | Collector Current-peak $t_p < 5\text{ms}$               | 10      | A                |
| $I_B$     | Base Current-Continuous                                 | 2       | A                |
| $I_{BM}$  | Base Current-peak $t_p < 5\text{ms}$                    | 4       | A                |
| $P_C$     | Collector Power Dissipation<br>$T_C = 25^\circ\text{C}$ | 80      | 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    | 1.56 | $^\circ\text{C}/\text{W}$ |
| $R_{th\ j-a}$ | Thermal Resistance, Junction to Ambient | 62.5 | $^\circ\text{C}/\text{W}$ |



## isc Silicon NPN Power Transistor

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## ELECTRICAL CHARACTERISTICS

 $T_C = 25^\circ\text{C}$  unless otherwise specified

| SYMBOL          | PARAMETER                            | CONDITIONS   | MIN | TYP. | MAX        | UNIT |
|-----------------|--------------------------------------|--|-----|------|------------|------|
| $V_{CE0(SUS)}$  | Collector-Emitter Sustaining Voltage | $I_C = 10\text{mA}$ ; $L = 25\text{mH}$  | 450 |      |            | V    |
| $V_{(BR)EBO}$   | Emitter-Base Breakdown Voltage       | $I_E = 10\text{mA}$ ; $I_C = 0$  | 10  |      | 18         | V    |
| $V_{CE(sat)-1}$ | Collector-Emitter Saturation Voltage | $I_C = 1\text{A}$ ; $I_B = 0.2\text{A}$  |     |      | 0.3        | V    |
| $V_{CE(sat)-2}$ | Collector-Emitter Saturation Voltage | $I_C = 2\text{A}$ ; $I_B = 0.4\text{A}$  |     |      | 0.6        | V    |
| $V_{CE(sat)-3}$ | Collector-Emitter Saturation Voltage | $I_C = 4\text{A}$ ; $I_B = 0.8\text{A}$  |     |      | 1.2        | V    |
| $V_{BE(sat)-1}$ | Base-Emitter Saturation Voltage      | $I_C = 1\text{A}$ ; $I_B = 0.2\text{A}$  |     |      | 1.0        | V    |
| $V_{BE(sat)-2}$ | Base-Emitter Saturation Voltage      | $I_C = 4\text{A}$ ; $I_B = 0.8\text{A}$  |     |      | 1.3        | V    |
| $I_{CES}$       | Collector Cutoff Current             | $V_{CE} = 850\text{V}$ ; $V_{BE} = 0$<br>$V_{CE} = 850\text{V}$ ; $V_{BE} = 0$ , $T_C = 125^\circ\text{C}$ |     |      | 0.1<br>0.5 | mA   |
| $I_{EBO}$       | Emitter Cutoff Current               | $V_{EB} = 9\text{V}$ ; $I_C = 0$   |     |      | 0.1        | mA   |
| $h_{FE-1}$      | DC Current Gain                      | $I_C = 10\text{mA}$ ; $V_{CE} = 5\text{V}$   | 10  |      |            |      |
| $h_{FE-2}$      | DC Current Gain                      | $I_C = 0.5\text{A}$ ; $V_{CE} = 5\text{V}$   |     |      | 60         |      |
| $h_{FE-3}$      | DC Current Gain                      | $I_C = 7\text{A}$ ; $V_{CE} = 10\text{V}$  | 4   |      | 10         |      |
| $V_F$           | Diode Forward Voltage                | $I_C = 3\text{A}$  |     |      | 1.5        | V    |

## Switching Times, Resistive Load

|       |              |  |  |  |     |               |
|-------|--------------|--|--|--|-----|---------------|
| $t_s$ | Storage Time | $I_C = 2\text{A}$ ; $V_{CC} = 250\text{V}$ ;<br>$I_{B1} = -I_{B2} = 0.4\text{A}$ |  |  | 3   | $\mu\text{s}$ |
| $t_f$ | Fall Time    |  |  |  | 0.8 | $\mu\text{s}$ |

## Switching Times, Inductive Load

|       |              |  |  |  |     |               |
|-------|--------------|--|--|--|-----|---------------|
| $t_s$ | Storage Time | $I_C = 4\text{A}$ ; $I_{B1} = 0.8\text{A}$<br>$V_{BE(off)} = -5\text{V}$ ; $R_{BB} = 0\ \Omega$<br>$V_{CL} = 300\text{V}$ ; $L = 1\text{mH}$ |  |  | 1.3 | $\mu\text{s}$ |
| $t_f$ | Fall Time    |  |  |  | 0.1 | $\mu\text{s}$ |