

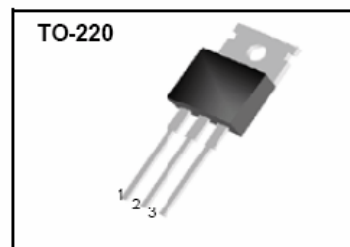
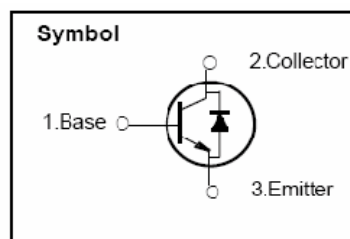
## *High Voltage Fast-Switching NPN Power Transistor*

### Features

- ◆ Very High Switching Speed
- ◆ Minimum Lot-to-Lot  $h_{FE}$  Variation
- ◆ Wide Reverse Bias SOA
- ◆ Built-in free wheeling diode

### General Description

This Device is designed for high voltage, High speed switching characteristics required such as lighting system, switching mode power supply.



### Absolute Maximum Ratings

| Symbol    | Parameter                               | Test Conditions | Value      | Units      |
|-----------|-----------------------------------------|-----------------|------------|------------|
| $V_{CES}$ | Collector-Emitter Voltage               | $V_{BE} = 0$    | <b>700</b> | V          |
| $V_{CEO}$ | Collector-Emitter Voltage               | $I_B = 0$       | 400        | V          |
| $V_{EBO}$ | Emitter-Base Voltage                    | $I_C = 0$       | 9.0        | V          |
| $I_C$     | Collector Current                       |                 | 8.0        | A          |
| $I_{CP}$  | Collector pulse Current                 |                 | 16         | A          |
| $I_B$     | Base Current                            |                 | 4.0        | A          |
| $I_{BM}$  | Base Peak Current                       | $t_P = 5ms$     | 8.0        | A          |
| $P_C$     | Total Dissipation at $T_C = 25^\circ C$ |                 | 80         | W          |
| $T_J$     | Operation Junction Temperature          |                 | - 40 ~ 150 | $^\circ C$ |
| $T_{STG}$ | Storage Temperature                     |                 | - 40 ~ 150 | $^\circ C$ |

### Thermal Characteristics

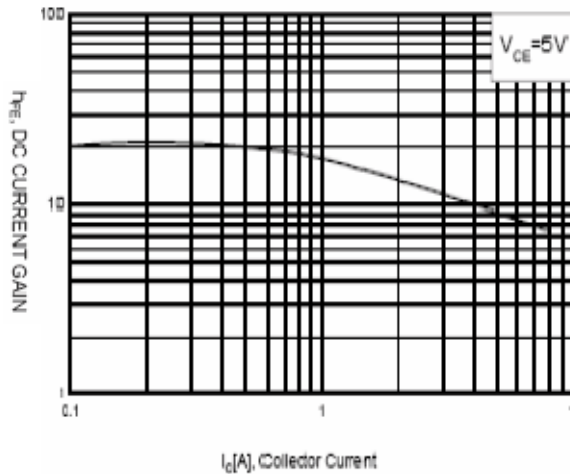
| Symbol          | Parameter                              | Value | Units        |
|-----------------|----------------------------------------|-------|--------------|
| $R_{\theta JC}$ | Thermal Resistance Junction to Case    | 1.67  | $^\circ C/W$ |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | 62.5  | $^\circ C/W$ |

**Electrical Characteristics** ( $T_C=25^{\circ}\text{C}$  unless otherwise noted)

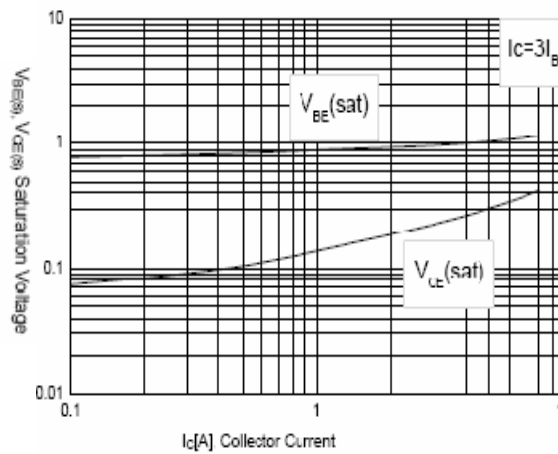
| Symbol         | Parameter                                                | Test Conditions                                                                                                            | Value    |     |                   | Units         |
|----------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------|-----|-------------------|---------------|
|                |                                                          |                                                                                                                            | Min      | Typ | Max               |               |
| $I_{CEV}$      | Collector Cut-off Current<br>( $V_{BE} = -1.5\text{V}$ ) | $V_{CE} = 700\text{V}$<br>$V_{CE} = 700\text{V}, T_C = 100^{\circ}\text{C}$                                                | -        | -   | 1.0<br>5.0        | mA            |
| $V_{CEO(SUS)}$ | Collector-Emitter Sustaining Voltage                     | $I_B = 0, I_C = 10\text{mA}$                                                                                               | 400      | -   | -                 | V             |
| $V_{CE(sat)}$  | Collector-Emitter Saturation Voltage                     | $I_C = 2.0\text{A}, I_B = 0.4\text{A}$<br>$I_C = 5.0\text{A}, I_B = 1.0\text{A}$<br>$I_C = 8.0\text{A}, I_B = 2.0\text{A}$ | -        | -   | 0.6<br>1.5<br>3.0 | V             |
| $V_{BE(sat)}$  | Base-Emitter Saturation Voltage                          | $I_C = 2.0\text{A}, I_B = 0.4\text{A}$<br>$I_C = 5.0\text{A}, I_B = 1.0\text{A}$                                           | -        | -   | 1.2<br>1.6        | V             |
| $h_{FE}$       | DC Current Gain                                          | $I_C = 2.0\text{A}, V_{CE} = 5\text{V}$<br>$I_C = 5.0\text{A}, V_{CE} = 5\text{V}$                                         | 10<br>10 |     | 40<br>30          |               |
| $t_s$<br>$t_f$ | Storage Time<br>Fall Time                                | $I_C = 5.0\text{A}, V_{CC} = 125\text{V}$<br>$I_{B1} = 1.0\text{A}, I_{B2} = -1.0\text{A}$<br>$T_P = 25\mu\text{s}$        | -        | -   | 3.6<br>1.6        | $\mu\text{s}$ |
| $f_T$          | Current Gain Bandwidth Product                           | $I_C=0.5\text{A}, V_{CE}=10\text{V}$                                                                                       | 4        | -   | -                 | MHz           |
| $V_F$          | Diode Forward Voltage                                    | $I_F=2\text{A}$                                                                                                            | -        | -   | 2.5               | V             |
| $C_{OB}$       | Output Capacitance                                       | $I_C=0.5\text{A}, V_{CE}=10\text{V}$                                                                                       | -        | 6.5 |                   | pF            |

**Note:**

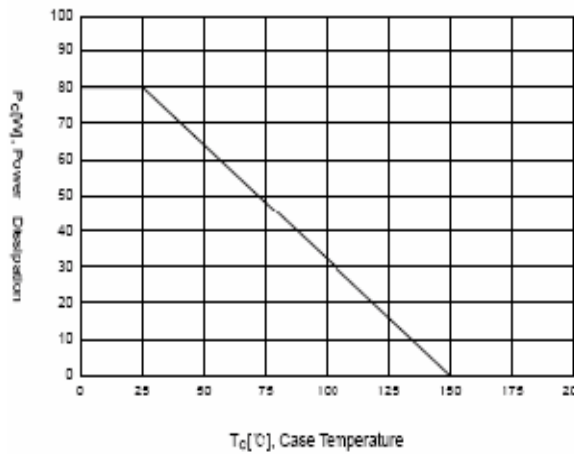
Pulse Test : Pulse width 300, Duty cycle 2%



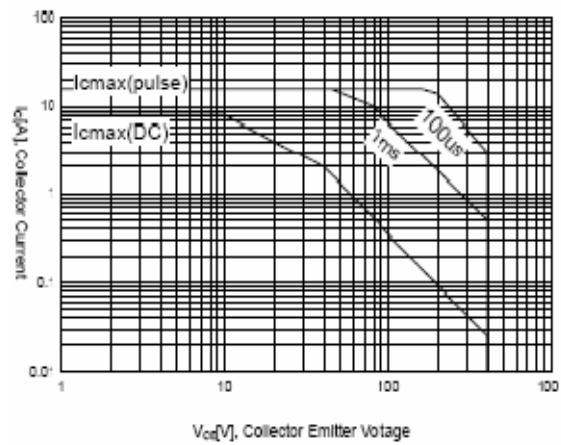
**Fig. 1 DC Current Gain**



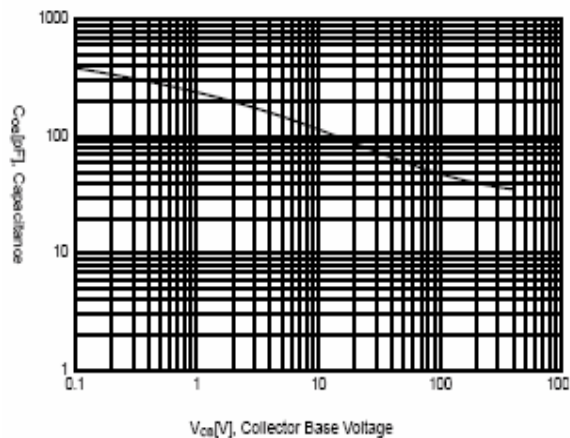
**Fig. 2 Saturation Voltage**



**Fig. 3 Power Derating**



**Fig. 4 Safe Operation Area**



**Fig. 5 Collect output capacitance**

## TO-220 Package Dimension

