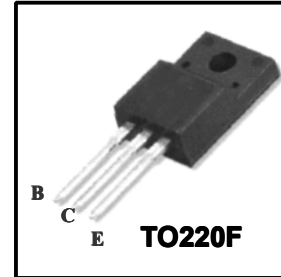


***High Voltage Fast-Switching NPN Power Transistor*****Features**

- ◆ Very High Switching Speed
- ◆ High Voltage Capability
- ◆ Wide Reverse Bias SOA
- ◆ Isolation Voltage (  $V_{ISO} = 4000V$  AC )

**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                | $V_{BE} = 0$    | 700        | 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 $T_c = 25^{\circ}C$ |                 | 40         | W           |
| $T_J$     | Operation Junction Temperature           |                 | - 40 ~ 150 | $^{\circ}C$ |
| $T_{STG}$ | Storage Temperature                      |                 | - 40 ~ 150 | $^{\circ}C$ |

Tc: Case temperature (good cooling)

**Thermal Characteristics**

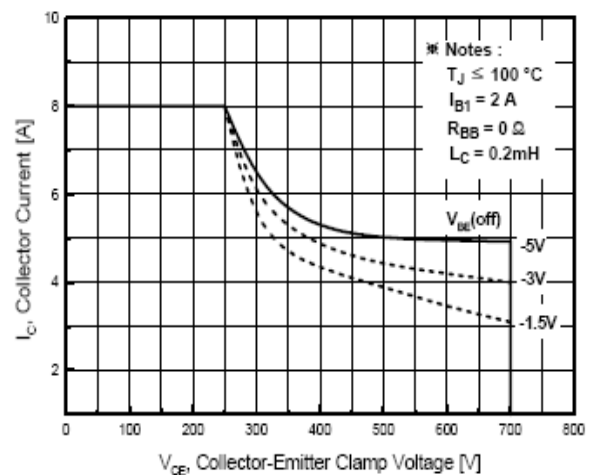
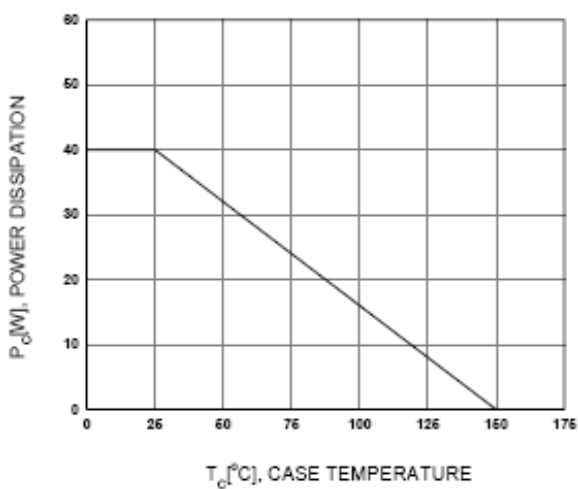
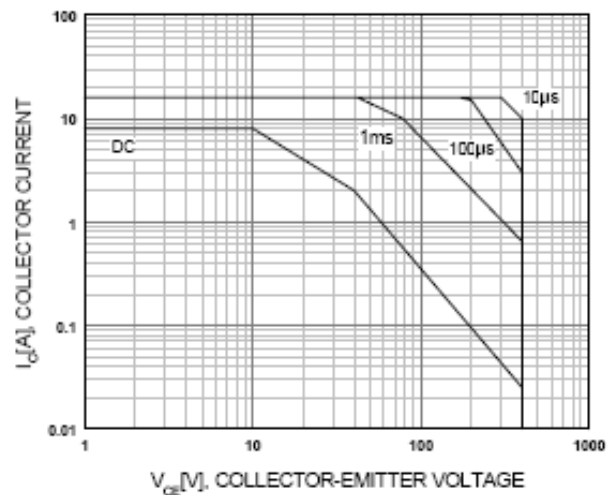
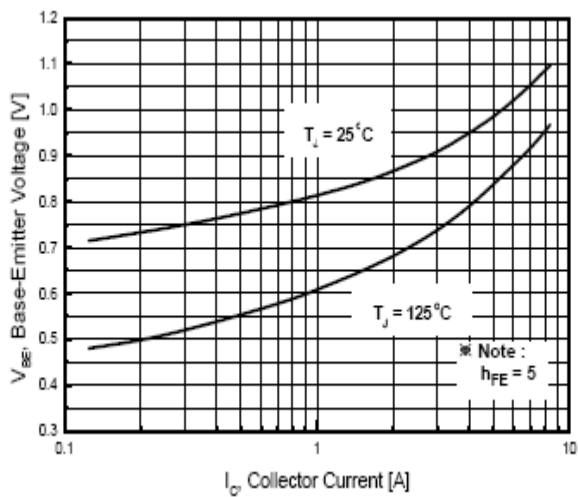
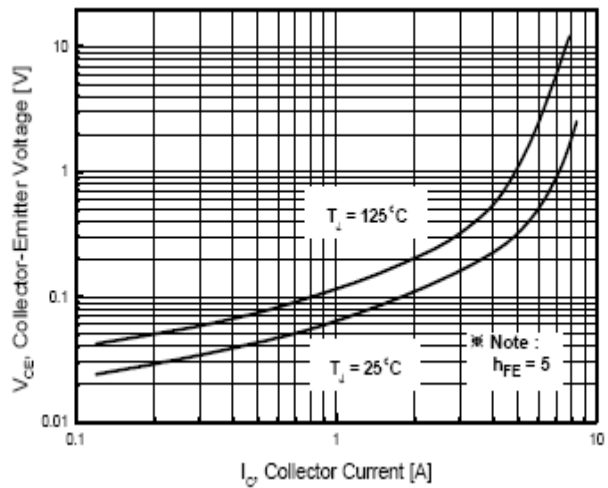
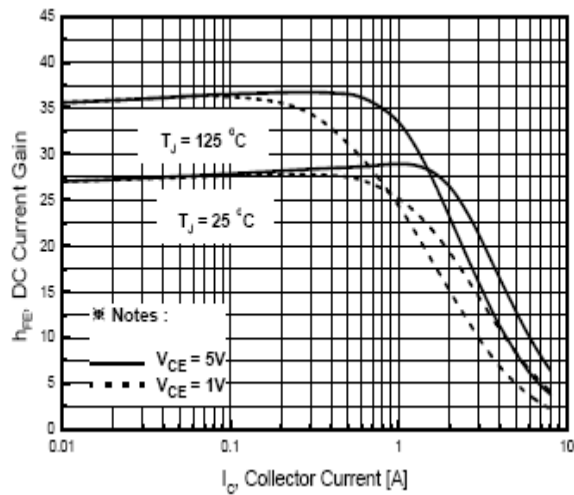
| Symbol          | Parameter                              | Value | Units         |
|-----------------|----------------------------------------|-------|---------------|
| $R_{\theta Jc}$ | Thermal Resistance Junction to Case    | 3.13  | $^{\circ}C/W$ |
| $R_{\theta JA}$ | Thermal Resistance Junction to Ambient | 62.5  | $^{\circ}C/W$ |

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

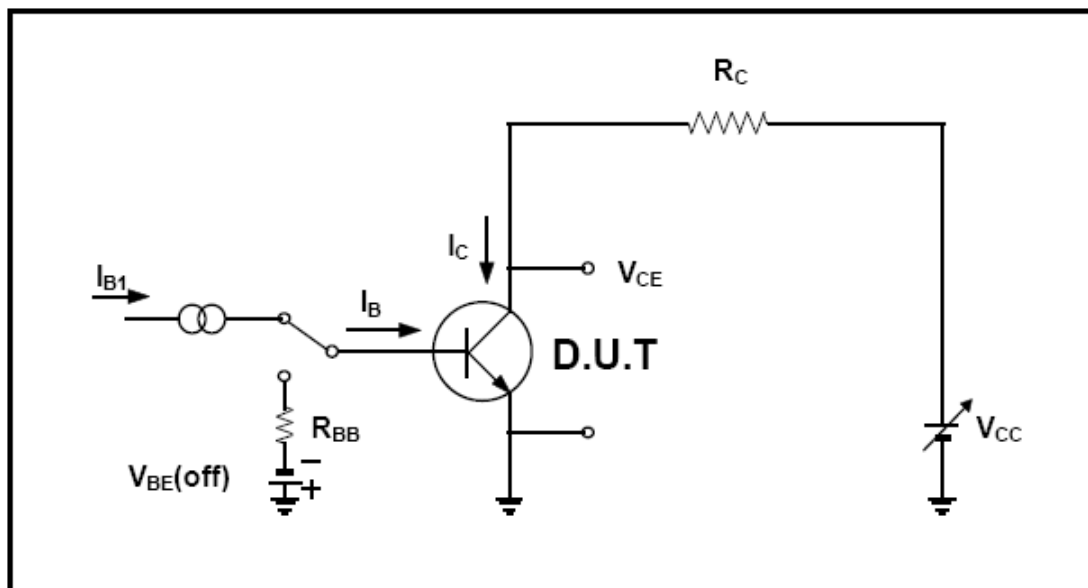
| Symbol         | Parameter                                                  | Test Conditions                                                 | Value |     |     | Units         |
|----------------|------------------------------------------------------------|-----------------------------------------------------------------|-------|-----|-----|---------------|
|                |                                                            |                                                                 | Min   | Typ | Max |               |
| $V_{CEO(sus)}$ | Collector-Emitter Breakdown Voltage                        | $I_C=10\text{mA}, I_B=0$                                        | 400   | -   | -   | V             |
| $V_{CE(sat)}$  | Collector-Emitter Saturation Voltage                       | $I_C=2.0\text{A}, I_B=0.4\text{A}$                              | -     | -   | 1.0 | V             |
|                |                                                            | $I_C=5.0\text{A}, I_B=1.0\text{A}$                              | -     | -   | 2.0 |               |
|                |                                                            | $I_C=8.0\text{A}, I_B=2.0\text{A}$                              | -     | -   | 3.0 |               |
|                |                                                            | $I_C=5.0\text{A}, I_B=1.0\text{A}$<br>$T_C=100^{\circ}\text{C}$ | -     | -   | 2.5 | V             |
| $V_{BE(sat)}$  | Base-Emitter Saturation Voltage                            | $I_C=2.0\text{A}, I_B=0.4\text{A}$                              | -     | -   | 1.2 | V             |
|                |                                                            | $I_C=5.0\text{A}, I_B=1.0\text{A}$                              | -     | -   | 1.6 |               |
|                |                                                            | $I_C=5.0\text{A}, I_B=1.0\text{A}$<br>$T_C=100^{\circ}\text{C}$ | -     | -   | 1.5 | V             |
| $I_{CBO}$      | Collector-Base Cutoff Current<br>( $V_{BE}=-1.5\text{V}$ ) | $V_{CB}=700\text{V}$                                            | -     | -   | 1.0 | mA            |
|                |                                                            | $V_{CB}=700\text{V}, T_C=100^{\circ}\text{C}$                   | -     | -   | 5.0 |               |
| $I_{EBO}$      | Emitter -Base Cutoff Current                               | $V_{EB}=9\text{V}$                                              | -     | -   | 1.0 | mA            |
| $h_{FE}$       | DC Current Gain                                            | $V_{CE}=5\text{V}, I_C=2.0\text{A}$                             | 10    | -   | 40  |               |
|                |                                                            | $V_{CE}=5\text{V}, I_C=5.0\text{A}$                             | 5     | -   | 40  |               |
| $f_T$          | Current Gain Bandwidth Product                             | $V_{CE} = 10\text{V}, I_C = 0.5\text{A}$                        | 4     |     |     | MHz           |
| $t_{on}$       | Turn on Time                                               | $V_{CC}=125\text{V}, I_C=5\text{A}$                             | -     | -   | 1.6 | $\mu\text{s}$ |
| $t_s$          | Storage Time                                               | $I_{B1}=I_{B2}=-1.0\text{A}$                                    | -     | -   | 3.0 |               |
| $t_f$          | Fall Time                                                  | $R_L=50\Omega$                                                  | -     | -   | 0.7 |               |

**Note:**

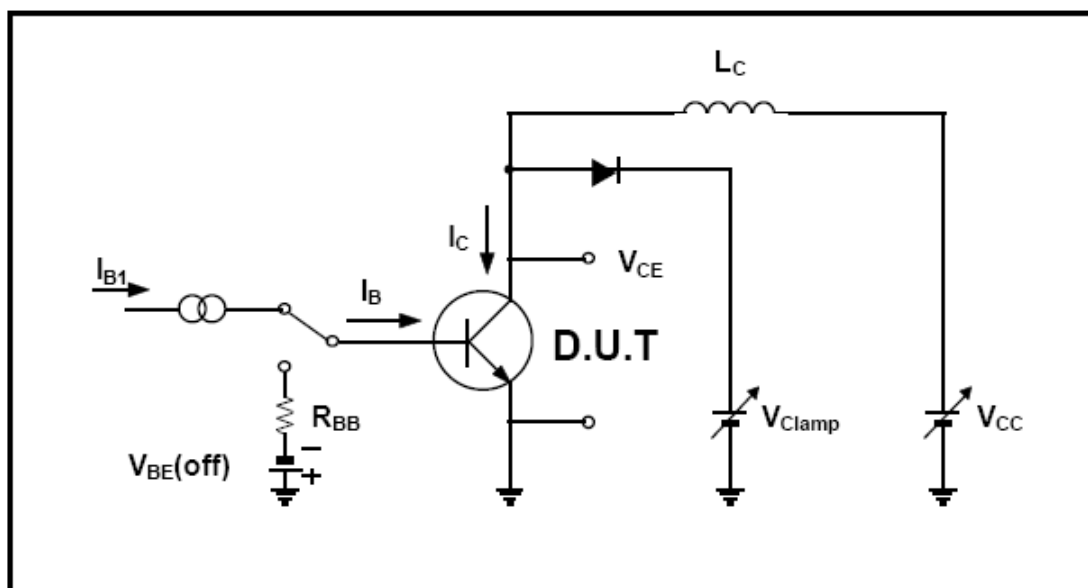
Pulse Test : Pulse width 300, Duty cycle 2%



## Resistive Load Switching Test Circuit



## Inductive Load Switching & RBSOA Test Circuit



## TO-220F Package Dimension

