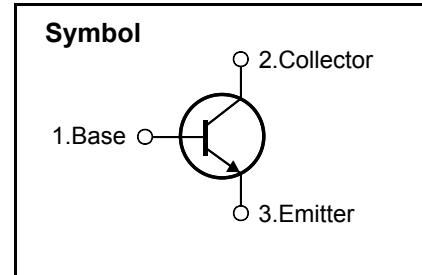


High Voltage Fast-Switching NPN Power Transistor

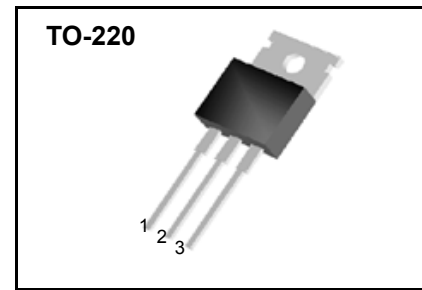
Features

- Very High Switching Speed (Typical 60ns@5.0A)
- Minimum Lot-to-Lot hFE Variation
- Short storage time
- Wide Reverse Bias S.O.A



General Description

This device is designed for high voltage, high speed switching characteristic, especially suitable for ballast system.



Absolute Maximum Ratings

| Symbol | Parameter | 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_{CM} | Collector Peak Current ($t_p < 5$ ms) | 16 | A |
| I_B | Base Current | 4.0 | A |
| I_{BM} | Base Peak Current ($t_p < 5$ ms) | 8.0 | A |
| P_C | Total Dissipation at $T_C = 25$ °C | 80 | W |
| T_{STG} | Storage Temperature | - 65 ~ 150 | °C |
| T_J | Max. Operating Junction Temperature | 150 | °C |

Thermal Characteristics

| Symbol | Parameter | Value | Units |
|-----------------|---|-------|-------|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | 1.56 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 62.5 | °C/W |

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

| Symbol | Parameter | Condition | Min | Typ | Max | Units |
|----------------|---|---|---------|-------------|--------------------------|---------|
| I_{CEV} | Collector Cut-off Current ($V_{BE} = -1.5V$) | $V_{CE} = 700V$ $V_{CE} = 700V$ $T_C = 100^\circ\text{C}$ | - | - | 1.0 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 | $I_C = 2.0A$ $I_C = 5.0A$ $I_C = 8.0A$ $I_C = 5.0A$ $I_B = 0.4A$ $I_B = 1.0A$ $I_B = 2.0A$ $I_B = 1.0A$ $T_C = 100^\circ\text{C}$ | - | - | 0.6 1.5 3.0 3.0 | V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C = 2.0A$ $I_C = 5.0A$ $I_C = 5.0A$ $I_B = 0.4A$ $I_B = 1.0A$ $I_B = 1.0A$ $T_C = 100^\circ\text{C}$ | - | - | 1.2 1.6 1.5 | V |
| h_{FE} | DC Current Gain | $I_C = 2.0A$ $I_C = 5.0A$ $V_{CE} = 5V$ $V_{CE} = 5V$ | 10 5 | - | 40 40 | |
| t_s t_f | Resistive Load Storage Time Fall Time | $I_C = 5.0A$ $I_{B1} = 1.0A$ $T_P = 25\mu s$ $V_{CC} = 125V$ $I_{B2} = -1.0A$ | - | 1.3 0.17 | 2.5 0.4 | μs |
| t_s t_f | Inductive Load Storage Time Fall Time | $V_{CC} = 15V$ $I_{B1} = 1.0A$ $L_C = 0.35mH$ $I_C = 5.0A$ $I_{B2} = -2.5A$ $V_{clamp} = 300V$ | - | 0.6 0.06 | 1.8 0.12 | μs |
| t_s t_f | Inductive Load Storage Time Fall Time | $V_{CC} = 15V$ $I_{B1} = 1.0A$ $L_C = 0.35mH$ $I_C = 5.0A$ $I_{B2} = -2.5A$ $V_{clamp} = 300V$ $T_C = 100^\circ\text{C}$ | - | 0.8 0.07 | 2.5 0.15 | μs |

※ Notes :

Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$



Fig 1. Static Characteristics

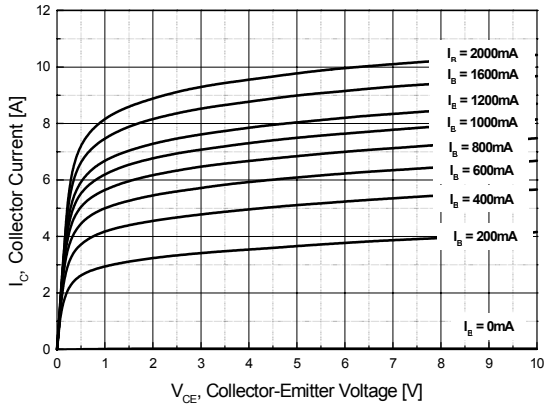


Fig 2. DC Current Gain

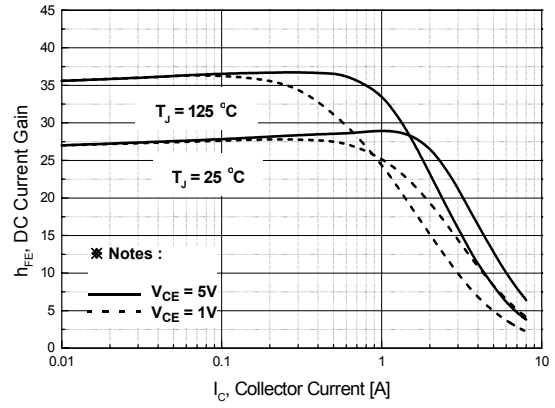


Fig 3. Collector-Emitter Saturation Voltage

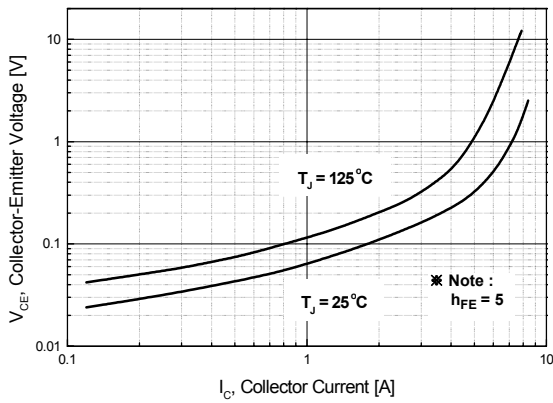


Fig 4. Base-Emitter Saturation Voltage

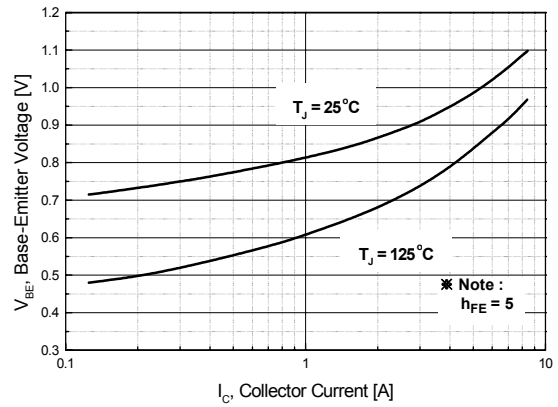


Fig 5. Resistive Load Fall Time

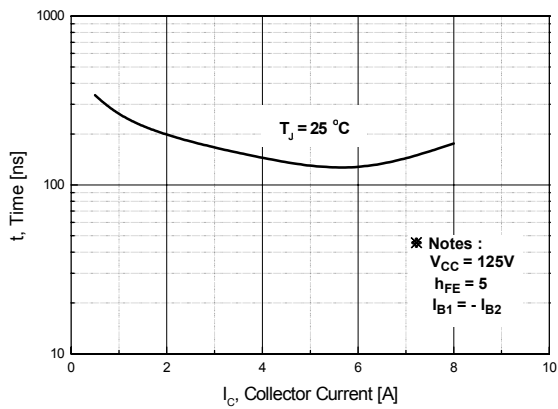
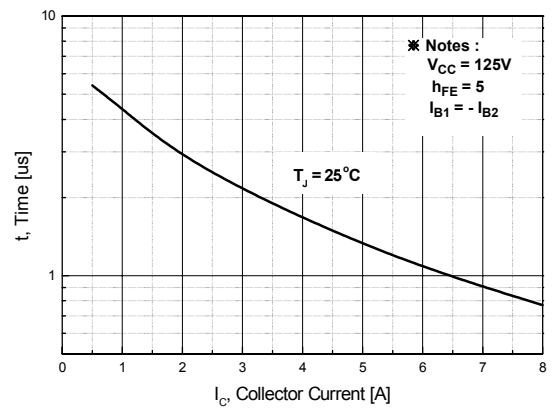


Fig 6. Resistive Load Storage Time



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Fig 7. Safe Operation Areas

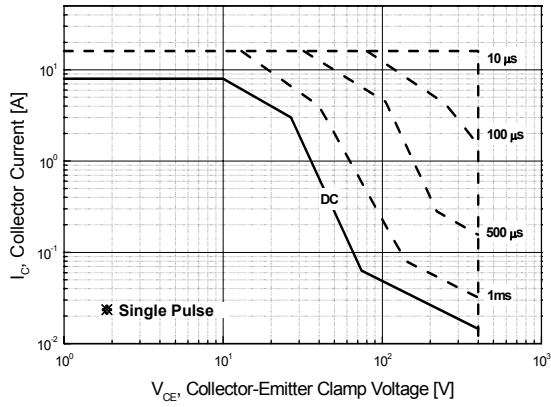


Fig 8. Reverse Biased Safe Operation Areas

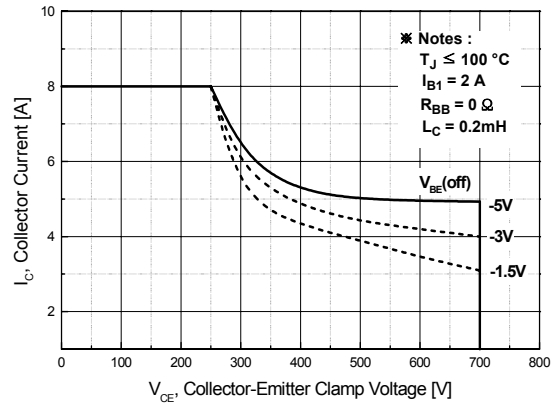
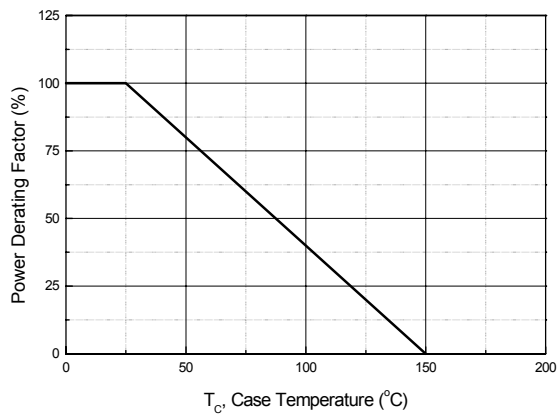
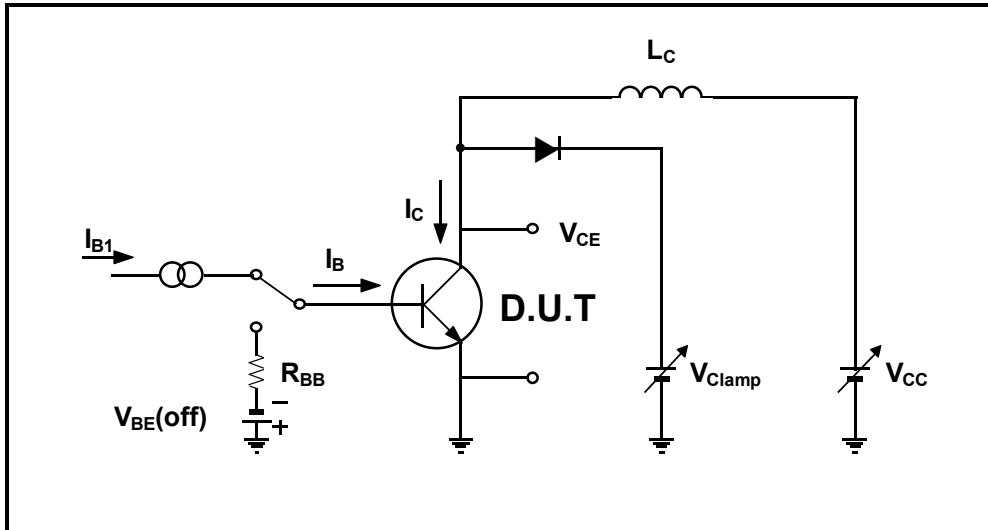


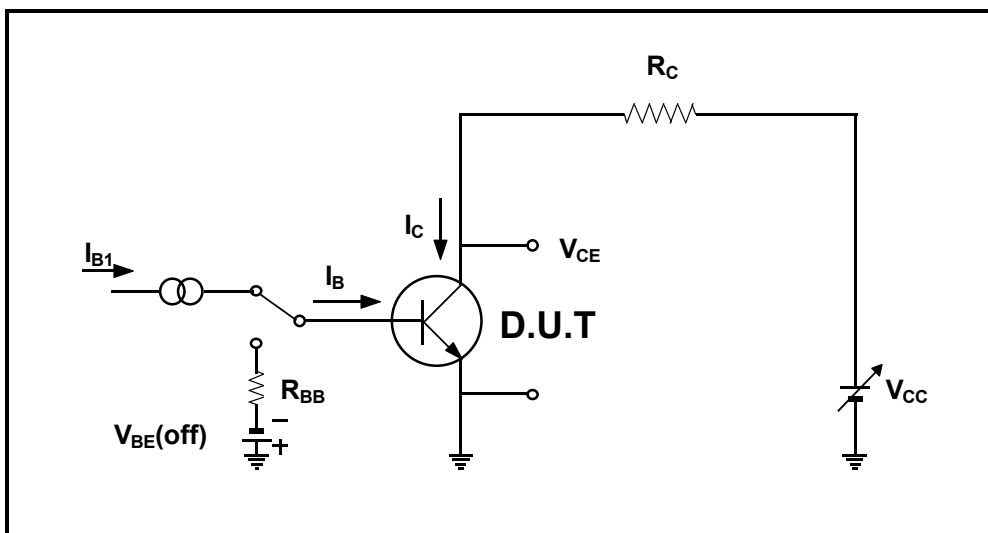
Fig 9. Power Derating Curve



Inductive Load Switching & RBSOA Test Circuit



Resistive Load Switching Test Circuit



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TO-220 Package Dimension

| Dim. | mm | | | Inch | | |
|--------|------|------|------|-------|-------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 9.7 | | 10.1 | 0.382 | | 0.398 |
| B | 6.3 | | 6.7 | 0.248 | | 0.264 |
| C | 9.0 | | 9.47 | 0.354 | | 0.373 |
| D | 12.8 | | 13.3 | 0.504 | | 0.524 |
| E | 1.2 | | 1.4 | 0.047 | | 0.055 |
| F | | 1.7 | | | 0.067 | |
| G | | 2.5 | | | 0.098 | |
| H | 3.0 | | 3.4 | 0.118 | | 0.134 |
| I | 1.25 | | 1.4 | 0.049 | | 0.055 |
| J | 2.4 | | 2.7 | 0.094 | | 0.106 |
| K | 5.0 | | 5.15 | 0.197 | | 0.203 |
| L | 2.2 | | 2.6 | 0.087 | | 0.102 |
| M | 1.42 | | 1.62 | 0.056 | | 0.064 |
| N | 0.45 | | 0.6 | 0.018 | | 0.024 |
| O | 0.7 | | 0.9 | 0.027 | | 0.035 |
| ϕ | | 3.6 | | | 0.142 | |

