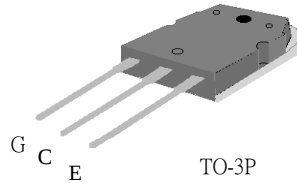


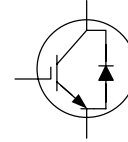


## Features

- ▼ High Speed Switching
- ▼ NPT Technology
- ▼ RoHS Compliant & Halogen-Free



|           |       |
|-----------|-------|
| $V_{CES}$ | 1200V |
| $I_C$     | 10.5A |



## Absolute Maximum Ratings

| Symbol                          | Parameter                                                                     | Rating     | Units            |
|---------------------------------|-------------------------------------------------------------------------------|------------|------------------|
| $V_{CES}$                       | Collector-Emitter Voltage                                                     | 1200       | V                |
| $V_{GE}$                        | Gate-Emitter Voltage                                                          | $\pm 30$   | V                |
| $I_C @ T_C = 25^\circ\text{C}$  | Collector Current                                                             | 21         | A                |
| $I_C @ T_C = 100^\circ\text{C}$ | Collector Current                                                             | 10.5       | A                |
| $I_{CM}$                        | Pulsed Collector Current <sup>1</sup>                                         | 42         | A                |
| $I_F @ T_C = 100^\circ\text{C}$ | Diode Forward Current                                                         | 8          | A                |
| $I_{FM}$                        | Diode Pulse Forward Current                                                   | 40         | A                |
| $P_D @ T_C = 25^\circ\text{C}$  | Maximum Power Dissipation                                                     | 125        | W                |
| $T_{STG}$                       | Storage Temperature Range                                                     | -55 to 150 | $^\circ\text{C}$ |
| $T_J$                           | Operating Junction Temperature Range                                          | -55 to 150 | $^\circ\text{C}$ |
| $T_L$                           | Maximum Lead Temp. for Soldering Purposes<br>, 1/8" from case for 5 seconds . | 300        | $^\circ\text{C}$ |

### Notes:

1. Pulse width limited by max . junction temperature .

## Thermal Data

| Symbol        | Parameter                           | Value | Units                     |
|---------------|-------------------------------------|-------|---------------------------|
| Rthj-c(IGBT)  | Thermal Resistance Junction-Case    | 1     | $^\circ\text{C}/\text{W}$ |
| Rthj-c(Diode) | Thermal Resistance Junction-Case    | 2     | $^\circ\text{C}/\text{W}$ |
| Rthj-a        | Thermal Resistance Junction-Ambient | 40    | $^\circ\text{C}/\text{W}$ |

## Electrical Characteristics@ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

| Symbol        | Parameter                            | Test Conditions                                  | Min. | Typ. | Max.      | Units |
|---------------|--------------------------------------|--------------------------------------------------|------|------|-----------|-------|
| $I_{GES}$     | Gate-to-Emitter Leakage Current      | $V_{GE} = \pm 30\text{V}$ , $V_{CE} = 0\text{V}$ | -    | -    | $\pm 500$ | nA    |
| $I_{CES}$     | Collector-Emitter Leakage Current    | $V_{CE} = 1200\text{V}$ , $V_{GE} = 0\text{V}$   | -    | -    | 1         | mA    |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $V_{GE} = 15\text{V}$ , $I_C = 5\text{A}$        | -    | 2    | 2.7       | V     |
|               |                                      | $V_{GE} = 15\text{V}$ , $I_C = 10\text{A}$       | -    | 2.5  | -         | V     |
| $V_{GE(th)}$  | Gate Threshold Voltage               | $V_{CE} = V_{GE}$ , $I_C = 10\text{mA}$          | 3.5  | -    | 8         | V     |
| $Q_g$         | Total Gate Charge                    | $I_C = 5\text{A}$                                | -    | 33   | 53        | nC    |
| $Q_{ge}$      | Gate-Emitter Charge                  | $V_{CC} = 600\text{V}$                           | -    | 6.5  | -         | nC    |
| $Q_{gc}$      | Gate-Collector Charge                | $V_{GE} = 15\text{V}$                            | -    | 16.5 | -         | nC    |
| $t_{d(on)}$   | Turn-on Delay Time                   | $V_{CC} = 960\text{V}$ ,                         | -    | 8    | -         | ns    |
| $t_r$         | Rise Time                            | $I_C = 5\text{A}$ ,                              | -    | 20   | -         | ns    |
| $t_{d(off)}$  | Turn-off Delay Time                  | $V_{GE} = 15\text{V}$ ,                          | -    | 50   | -         | ns    |
| $t_f$         | Fall Time                            | $R_G = 22\Omega$ ,                               | -    | 400  | 800       | ns    |
|               |                                      | Inductive Load                                   | -    | -    | -         | -     |
| $E_{on}$      | Turn-On Switching Loss               |                                                  | -    | 0.7  | -         | mJ    |
| $E_{off}$     | Turn-Off Switching Loss              |                                                  | -    | 1.1  | -         | mJ    |
| $C_{ies}$     | Input Capacitance                    | $V_{GE} = 0\text{V}$                             | -    | 690  | 1100      | pF    |
| $C_{oes}$     | Output Capacitance                   | $V_{CE} = 30\text{V}$                            | -    | 65   | -         | pF    |
| $C_{res}$     | Reverse Transfer Capacitance         | $f = 1.0\text{MHz}$                              | -    | 9    | -         | pF    |

## Electrical Characteristics of Diode@ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

| Symbol   | Parameter               | Test Conditions                    | Min. | Typ. | Max. | Units |
|----------|-------------------------|------------------------------------|------|------|------|-------|
| $V_F$    | Forward Voltage         | $I_F = 8\text{A}$                  | -    | 2.5  | 3.2  | V     |
| $t_{rr}$ | Reverse Recovery Time   | $I_F = 8\text{A}$                  | -    | 70   | -    | ns    |
| $Q_{rr}$ | Reverse Recovery Charge | $di/dt = 100\text{ A}/\mu\text{s}$ | -    | 170  | -    | nC    |

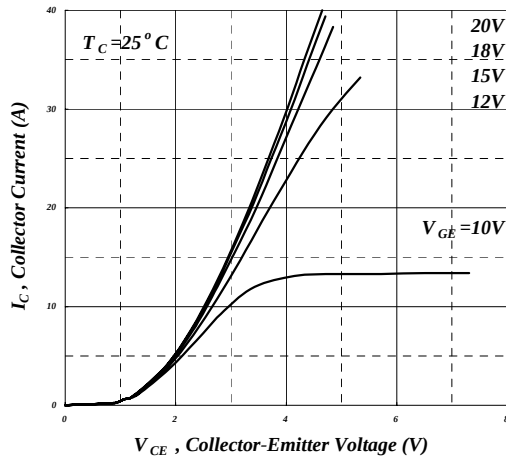


Fig 1. Typical Output Characteristics

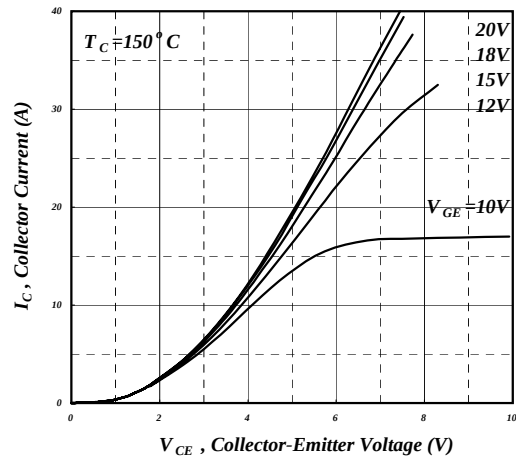


Fig 2. Typical Output Characteristics

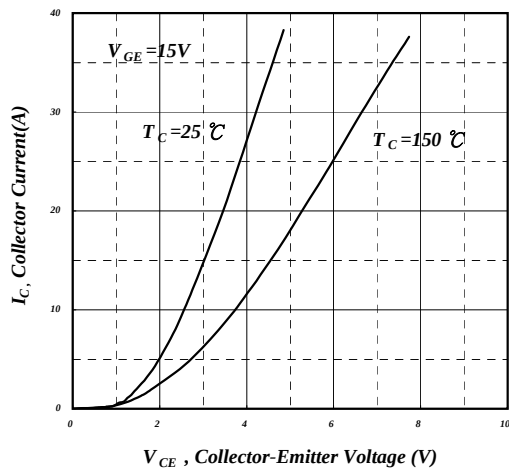


Fig 3. Typical Saturation Voltage Characteristics

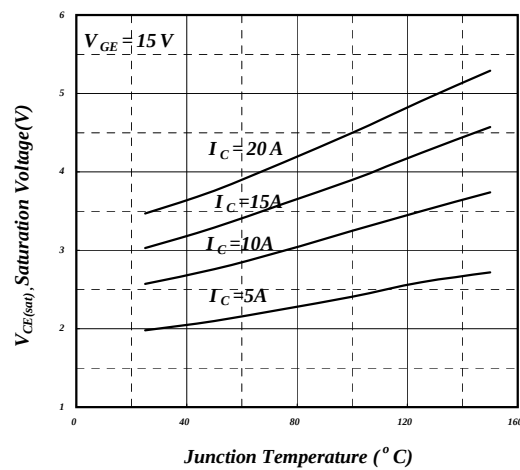


Fig 4. Typical Collector- Emitter Voltage v.s. Junction Temperature

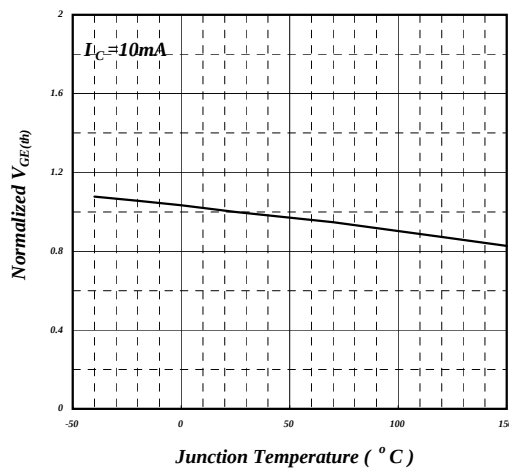


Fig 5. Gate Threshold Voltage v.s. Junction Temperature

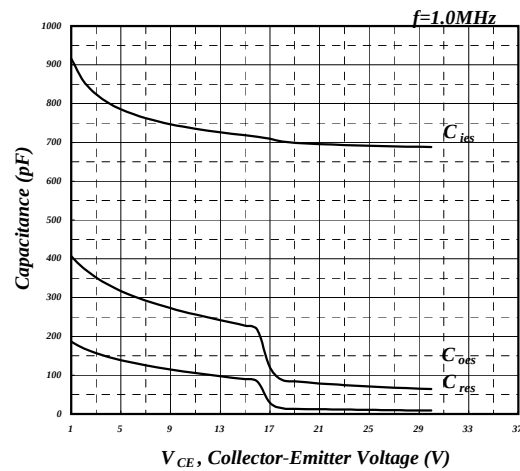


Fig 6. Typical Capacitance Characteristics

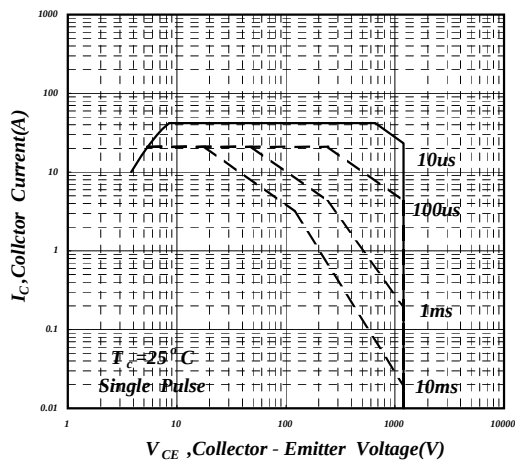


Fig 7. SOA Characteristics

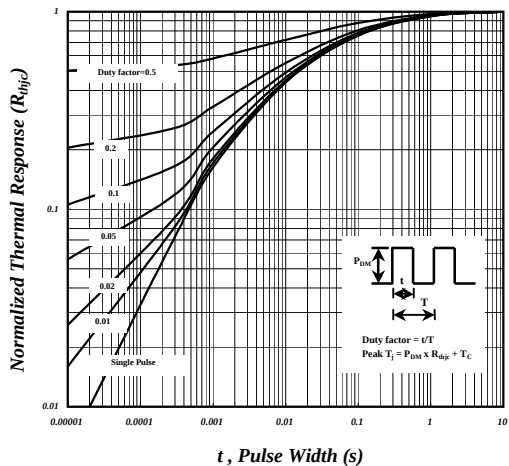


Fig 8. Effective Transient Thermal Impedance

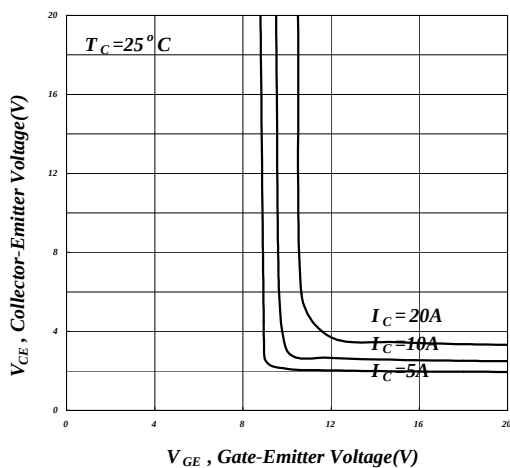


Fig 9. Saturation Voltage vs.  $V_{GE}$

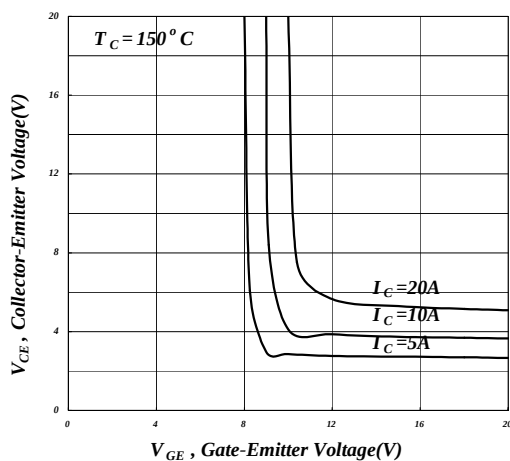


Fig 10. Saturation Voltage vs.  $V_{GE}$

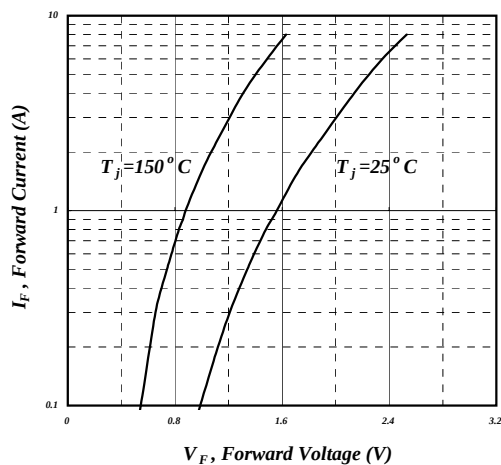


Fig11. Forward Characteristic of Diode

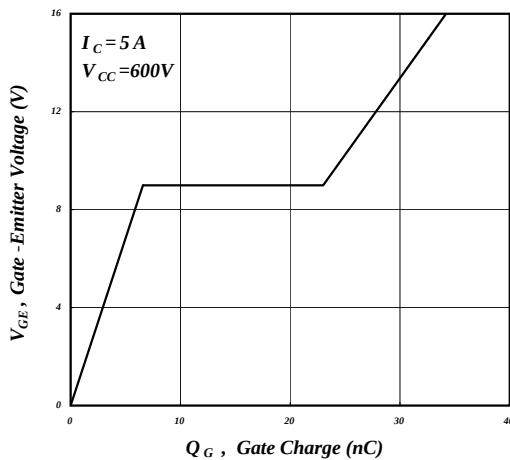


Fig 12. Gate Charge Characteristics