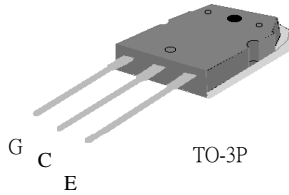


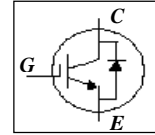


**Features**

- ▼ High speed switching
- ▼ Low Saturation Voltage  
 $V_{CE(sat)}=3.0V@I_C=30A$
- ▼ CO-PAK, IGBT with FRD
- ▼ RoHS Compliant



|           |       |
|-----------|-------|
| $V_{CES}$ | 1200V |
| $I_C$     | 30A   |



**Absolute Maximum Ratings**

| Symbol                | Parameter   | Rating     | Units      |
|-----------------------|---|------------|------------|
| $V_{CES}$             | Collector-Emitter Voltage   | 1200       | V          |
| $V_{GE}$              | Gate-Emitter Voltage  | $\pm 30$   | V          |
| $I_C@T_C=25^\circ C$  | Continuous Collector Current  | 60         | A          |
| $I_C@T_C=100^\circ C$ | Continuous Collector Current  | 30         | A          |
| $I_{CM}$              | Pulsed Collector Current <sup>1</sup>   | 160        | A          |
| $I_F@T_C=100^\circ C$ | Diode Continuous Forward Current  | 12         | A          |
| $I_{FM}$              | Diode Pulse Forward Current   | 75         | A          |
| $P_D@T_C=25^\circ C$  | Maximum Power Dissipation   | 208        | W          |
| $T_{STG}$             | Storage Temperature Range   | -55 to 150 | $^\circ C$ |
| $T_J$                 | Operating Junction Temperature Range  | -55 to 150 | $^\circ C$ |
| $T_L$                 | Maximum Lead Temp. for Soldering Purposes<br>, 1/8" from case for 5 seconds . | 300        | $^\circ C$ |

**Notes:**

1.Repetitive rating : Pulse width limited by max . junction temperature .

**Thermal Data**

| Symbol        | Parameter                           | Value | Units        |
|---------------|-------------------------------------|-------|--------------|
| Rthj-c(IGBT)  | Thermal Resistance Junction-Case    | 0.6   | $^\circ C/W$ |
| Rthj-c(Diode) | Thermal Resistance Junction-Case    | 1.6   | $^\circ C/W$ |
| Rthj-a        | Thermal Resistance Junction-Ambient | 40    | $^\circ C/W$ |

**Electrical Characteristics@ $T_J=25^\circ C$ (unless otherwise specified)**

| Symbol        | Parameter                            | Test Conditions                 | Min. | Typ. | Max.      | Units |
|---------------|--------------------------------------|---------------------------------|------|------|-----------|-------|
| $BV_{CES}$    | Collect-to-Emitter Breakdown Voltage | $V_{GE}=0V, I_C=250\mu A$       | 1200 | -    | -         | V     |
| $I_{GES}$     | Gate-to-Emitter Leakage Current      | $V_{GE}=\pm 30V, V_{CE}=0V$     | -    | -    | $\pm 500$ | nA    |
| $I_{CES}$     | Collector-Emitter Leakage Current    | $V_{CE}=1200V, V_{GE}=0V$       | -    | -    | 1         | mA    |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage | $V_{GE}=15V, I_C=30A$           | -    | 3    | 3.6       | V     |
|               |                                      | $V_{GE}=15V, I_C=60A$           | -    | 3.8  | -         | V     |
| $V_{GE(th)}$  | Gate Threshold Voltage               | $V_{CE}=V_{GE}, I_C=1mA$        | 3    | 4.4  | 7         | V     |
| $Q_g$         | Total Gate Charge                    | $I_C=30A$                       | -    | 55   | 88        | nC    |
| $Q_{ge}$      | Gate-Emitter Charge                  | $V_{CC}=500V$                   | -    | 12   | -         | nC    |
| $Q_{gc}$      | Gate-Collector Charge                | $V_{GE}=15V$                    | -    | 27   | -         | nC    |
| $t_{d(on)}$   | Turn-on Delay Time                   | $V_{CC}=600V,$<br>$I_C=30A,$    | -    | 20   | -         | ns    |
| $t_r$         | Rise Time                            | $V_{GE}=15V,$<br>$R_G=5\Omega,$ | -    | 65   | -         | ns    |
| $t_{d(off)}$  | Turn-off Delay Time                  | Inductive Load                  | -    | 200  | 300       | ns    |
| $t_f$         | Fall Time                            |                                 | -    | 1.8  | -         | mJ    |
| $E_{on}$      | Turn-On Switching Loss               |                                 | -    | 1.1  | -         | mJ    |
| $E_{off}$     | Turn-Off Switching Loss              |                                 | -    | 1320 | 2110      | pF    |
| $C_{ies}$     | Input Capacitance                    | $V_{GE}=0V$                     | -    | 105  | -         | pF    |
| $C_{oes}$     | Output Capacitance                   | $V_{CE}=30V$                    | -    | 9    | -         | pF    |
| $C_{res}$     | Reverse Transfer Capacitance         | $f=1.0MHz$                      | -    | -    | -         | pF    |

**Electrical Characteristics of Diode@ $T_J=25^\circ C$ (unless otherwise specified)**

|           |                         |                       |   |     |     |    |
|-----------|-------------------------|-----------------------|---|-----|-----|----|
| $V_{F-1}$ | Forward Voltage         | $I_F=10A$             | - | 1.7 | 2   | V  |
| $V_{F-2}$ | Forward Voltage         | $I_F=20A$             | - | 1.8 | 2.4 | V  |
| $t_{rr}$  | Reverse Recovery Time   | $I_F=10A$             | - | 80  | -   | ns |
| $Q_{rr}$  | Reverse Recovery Charge | $di/dt = 100 A/\mu s$ | - | 22  | -   | nC |

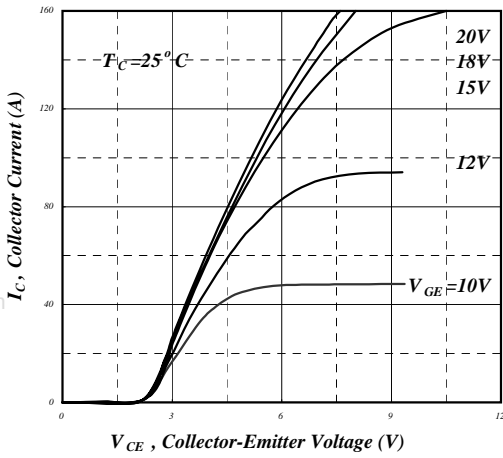


Fig 1. Typical Output Characteristics

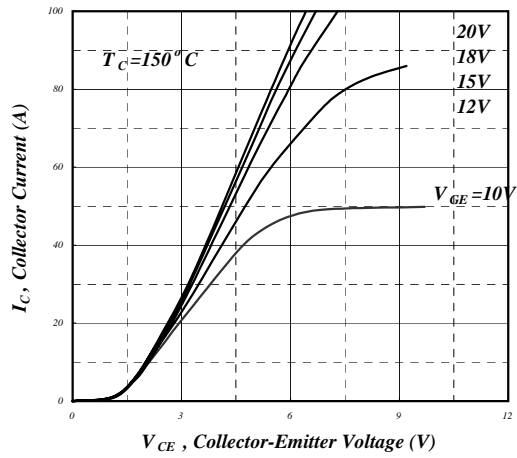


Fig 2. Typical Output Characteristics

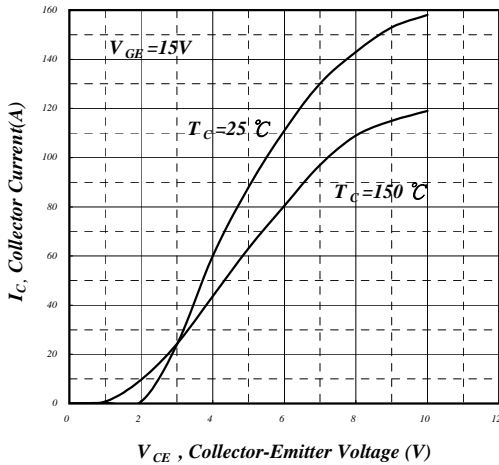


Fig 3. Typical Saturation Voltage Characteristics

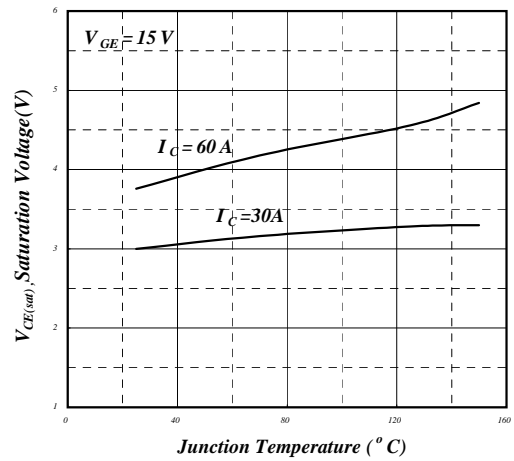


Fig 4. Typical Collector-Emitter Voltage v.s. Junction Temperature

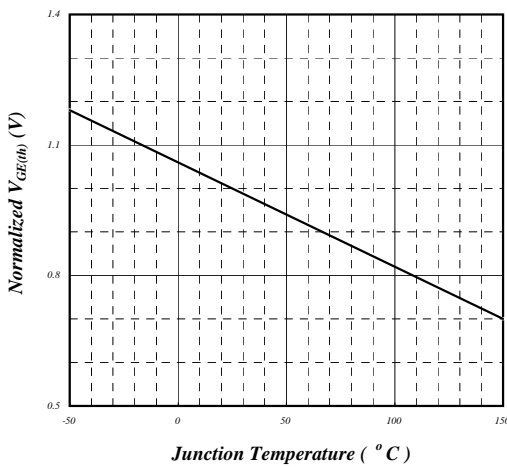


Fig 5. Gate Threshold Voltage v.s. Junction Temperature

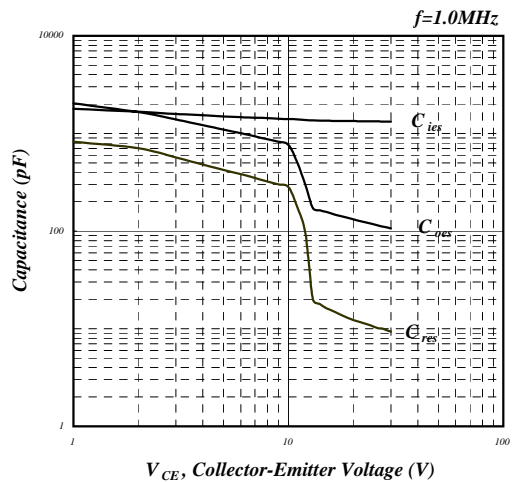


Fig 6. Typical Capacitance Characteristics

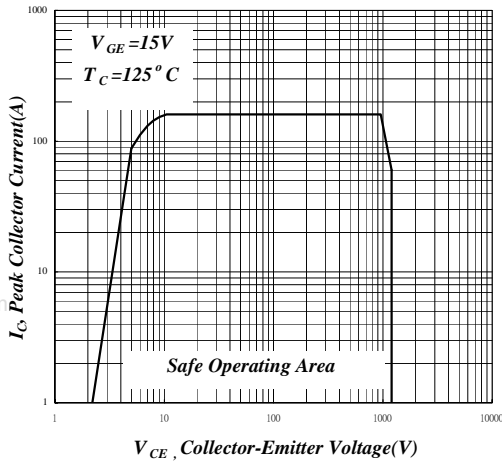


Fig 7. Turn-off SOA

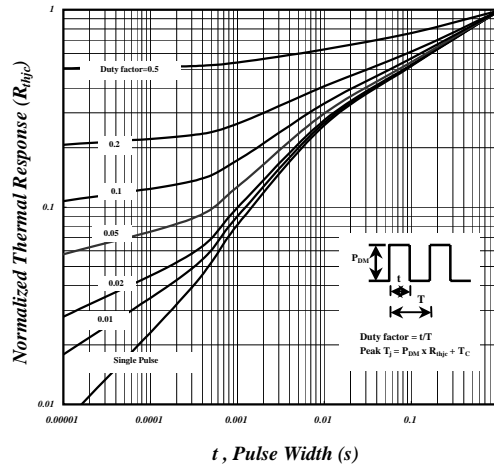


Fig 8. Effective Transient Thermal Impedance

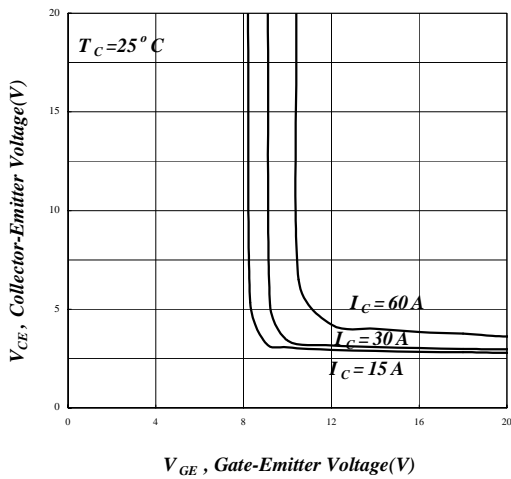


Fig 9. Saturation Voltage vs. V\_GE

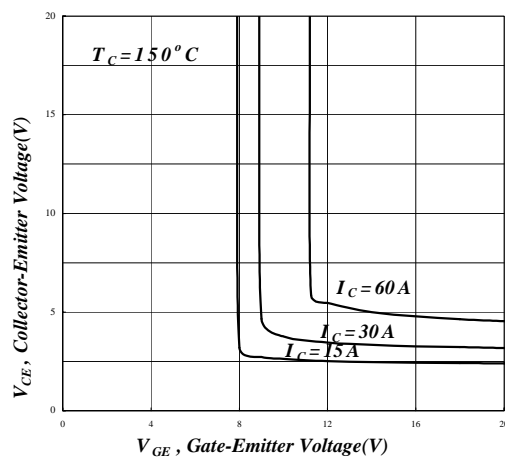


Fig 10. Saturation Voltage vs. V\_GE

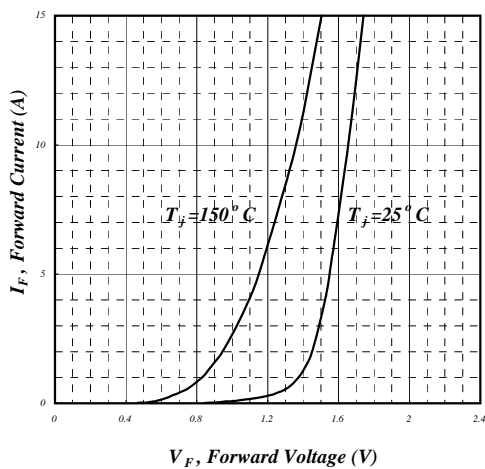


Fig11. Forward Characteristic of Diode

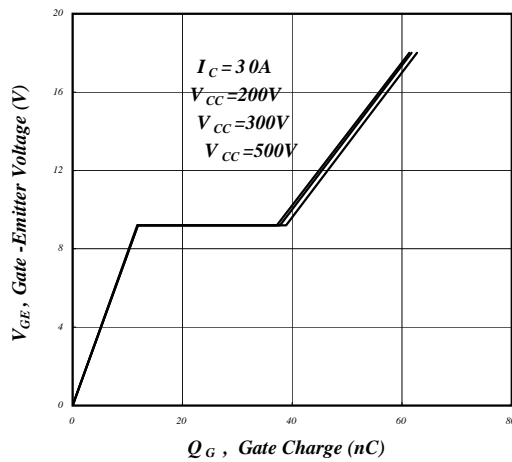


Fig 12. Gate Charge Characteristics