

X2G200TD06P2

HIGH POWER Trench TYPE 2-PACK IGBT MODULE

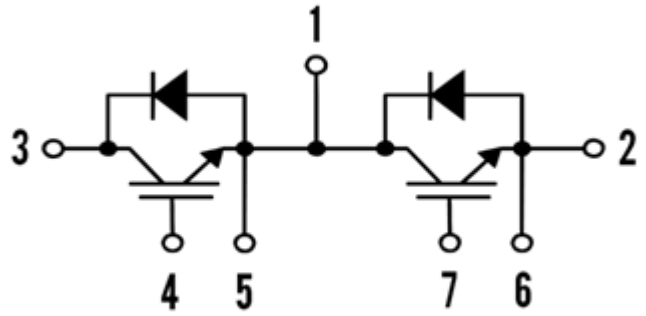


600V
200A

PACKAGE : M2

PRELIMINARY

■ CIRCUIT DIAGRAM



■ FEATURES

- IGBT3 Trench Technology
- 6us short circuit capability at $T_{vj} = 150^{\circ}\text{C}$
- Positive $V_{CE(on)}$ temperature coefficient
- Industry standard package

■ APPLICATIONS

- High power inverter
- Switched mode power supplies (SMPS)
- UPS
- Electrical welding machine

■ ABSOLUTE MAXIMUM RATINGS

$T_c=25^{\circ}\text{C}$, unless otherwise specified

| Symbol | Parameter | Conditions | Ratings | Unit |
|--------------|---------------------------------------|---|-----------|--------------------|
| V_{CES} | Collector-emitter voltage | - | 600 | V |
| I_C | DC-collector current | $T_C = 25^{\circ}\text{C}$ | 260 | A |
| | | $T_C = 80^{\circ}\text{C}$ | 200 | A |
| I_{CRM} | Repetitive peak collector current | 1ms | 400 | A |
| V_{GES} | Gate-emitter peak voltage | - | ± 20 | V |
| I_F | Diode continuous forward current | - | 200 | A |
| I_{FRM} | Diode repetitive peak forward current | - | 400 | A |
| $T_{vj,max}$ | Maximum junction temperature | - | -40 ~ 175 | $^{\circ}\text{C}$ |
| $T_{vj,op}$ | Operating temperature range | - | -40 ~ 150 | $^{\circ}\text{C}$ |
| T_{stg} | Storage temperature range | - | -40 ~ 125 | $^{\circ}\text{C}$ |
| V_{ISOL} | Insulation test voltage | 50/60Hz, $t=1\text{min}$ $I_{ISOL}=1\text{mA}$ | 2.5 | kV |
| M_S | Mounting screw torque | M6 | 3.0 ~ 6.0 | N.m |
| M_t | Mounting terminals screw torque | M5 | 2.5 ~ 5.0 | N.m |

Technical information and specification subject to change without notice.

PRELIMINARY

$T_J=25^\circ\text{C}$ unless otherwise specified

ELECTRICAL CHARACTERISTICS OF IGBT

| Symbol | Parameter | Min | Typ | Max | Unit | Conditions |
|---------------|-------------------------------------|-----|------|-----|---------------|---|
| $V_{CE(Sat)}$ | C-E saturation voltage | - | 1.45 | - | V | $I_C = 200\text{A}, V_{GE} = 15\text{V}, T_{vj} = 25^\circ\text{C}$ |
| | | - | 1.70 | - | V | $I_C = 200\text{A}, V_{GE} = 15\text{V}, T_{vj} = 150^\circ\text{C}$ |
| $V_{GE(th)}$ | G-E threshold voltage | 5.0 | 5.8 | 6.5 | V | $I_C = 3200\mu\text{A}, V_{CE} = V_{GE}$ |
| I_{CES} | Zero gate voltage collector current | - | - | 5 | mA | $V_{GE} = 0\text{V}, V_{CE} = 600\text{V}$ |
| I_{GES} | G-E leakage current | - | - | 0.4 | μA | $V_{GE} = \pm 20\text{V}$ |
| R_{Gint} | Internal gate resistance | - | 1.0 | - | Ω | - |
| C_{ies} | Input capacitance | - | 13 | - | nF | $V_{GE} = 0\text{V},$ $f = 1\text{MHz},$ $V_{CE} = 25\text{V},$ $T_{vj} = 25^\circ\text{C}$ |
| C_{oes} | Output capacitance | - | 1.2 | - | | |
| C_{res} | Reverse transfer capacitance | - | 0.38 | - | | |
| Q_g | Total gate charge | - | 2.1 | - | μC | $V_{GE} = \pm 15\text{V}$ |
| $t_{d(on)}$ | Turn off delay time | - | 130 | - | ns | $V_{CE} = 300\text{V},$ $I_C = 200\text{A},$ $V_{GE} = \pm 15\text{V},$ $R_G = 3.9\Omega,$ $T_{vj} = 150^\circ\text{C}$ |
| t_r | Turn-on rise time | - | 60 | - | | |
| $t_{d(off)}$ | Turn-off delay time | - | 530 | - | | |
| t_f | Turn-off fall time | - | 70 | - | | |
| E_{ON} | Turn-on Energy loss | - | 3.3 | - | mJ | |
| E_{OFF} | Turn-off Energy loss | - | 8.3 | - | | |

ELECTRICAL CHARACTERISTICS OF FRD

$T_J=25^\circ\text{C}$ unless otherwise specified

| Symbol | Parameter | Min | Typ | Max | Unit | Conditions |
|----------|-------------------------------|-----|------|-----|---------------|---|
| V_F | Diode Forward Voltage Drop | - | 1.4 | - | V | $T_{vj} = 25^\circ\text{C}$ |
| | | - | 1.35 | - | | $T_{vj} = 150^\circ\text{C}$ |
| I_{rr} | Peak Reverse Recovery Current | - | 200 | - | A | $I_F = 200\text{A}, V_{CE} = 300\text{V}$ $V_{GE} = -15\text{V}, T_{vj} = 150^\circ\text{C}$ |
| Q_{rr} | Diode Recovery Charge | - | 32 | - | μC | |

THERMAL AND MECHANICAL CHARACTERISTICS

$T_J=25^\circ\text{C}$ unless otherwise specified

| Symbol | Parameter | Min | Typ | Max | Unit | Condition |
|---------------|--|-----|------|-----|------|-----------|
| $R_{th(j-c)}$ | Junction-to-Case (IGBT Part, Per 1/2 Module) | - | 0.22 | - | K/W | |
| $R_{th(j-c)}$ | Junction-to-Case (FRD Part, Per 1/2 Module) | - | 0.4 | - | K/W | |
| $R_{th(c-f)}$ | Case-to-Heat Sink (With Thermal Compound) | - | 0.04 | - | K/W | |
| Weight | Module | | 220 | | g | |

Technical information and specification subject to change without notice.

PRELIMINARY

■ PERFORMANCE CURVES (I)

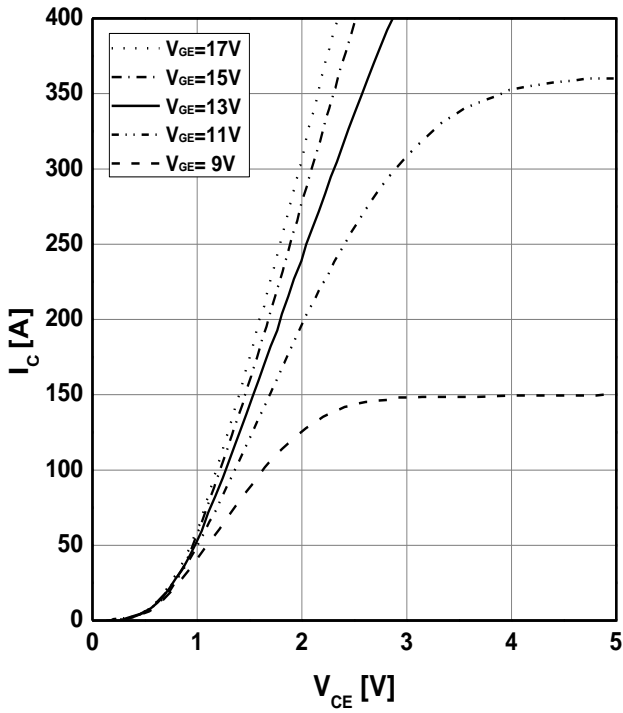


Fig1. Typical Output Characteristics

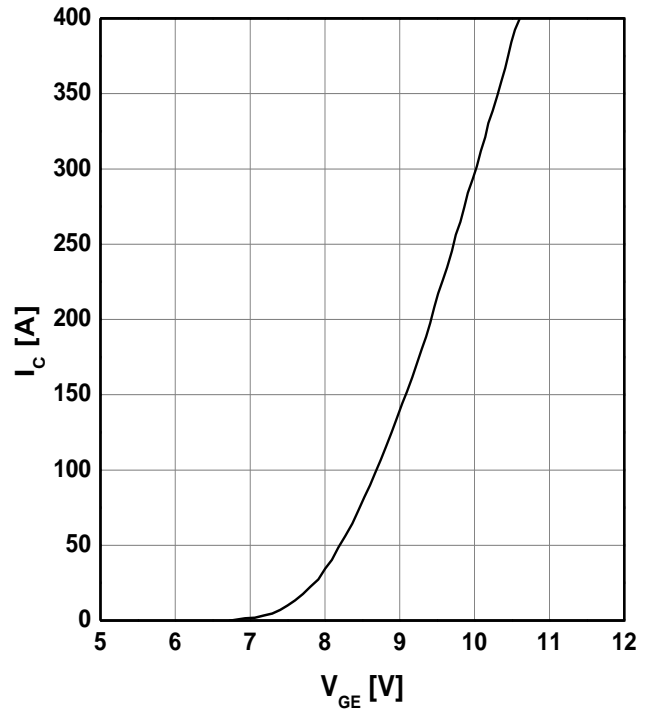


Fig2. Transfer Characteristics

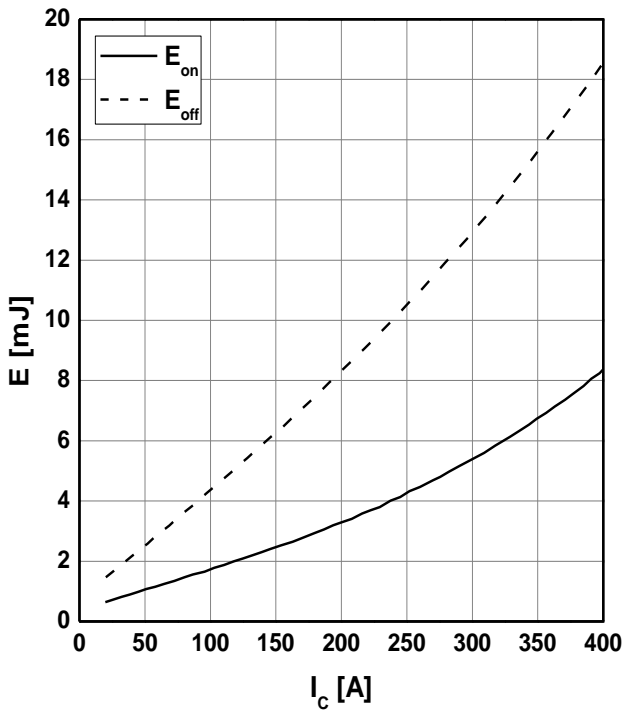


Fig3. Energy Loss vs. I_c

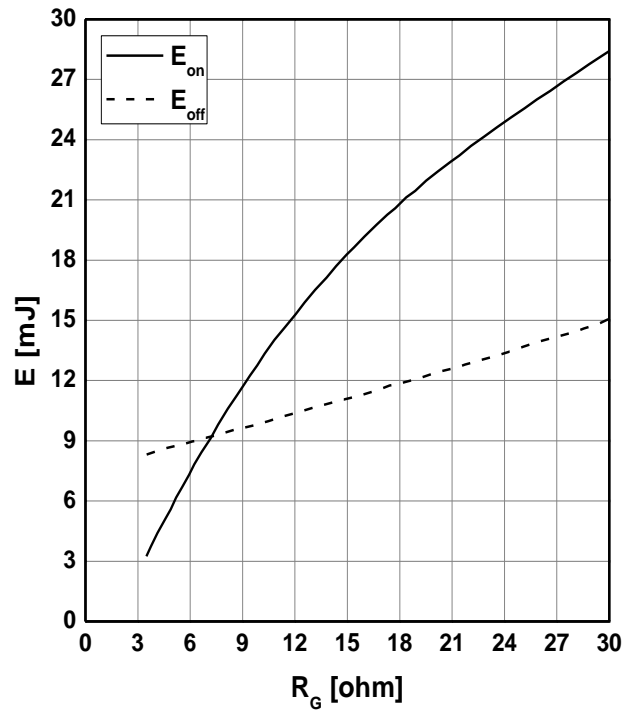


Fig4. Energy Loss vs. R_G

PRELIMINARY

■ PERFORMANCE CURVES (II)

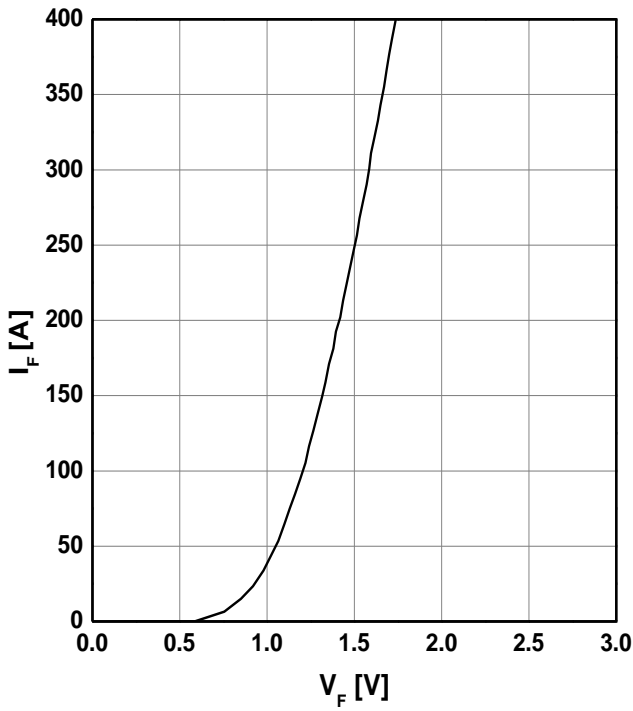


Fig5. DIODE Forward Characteristic

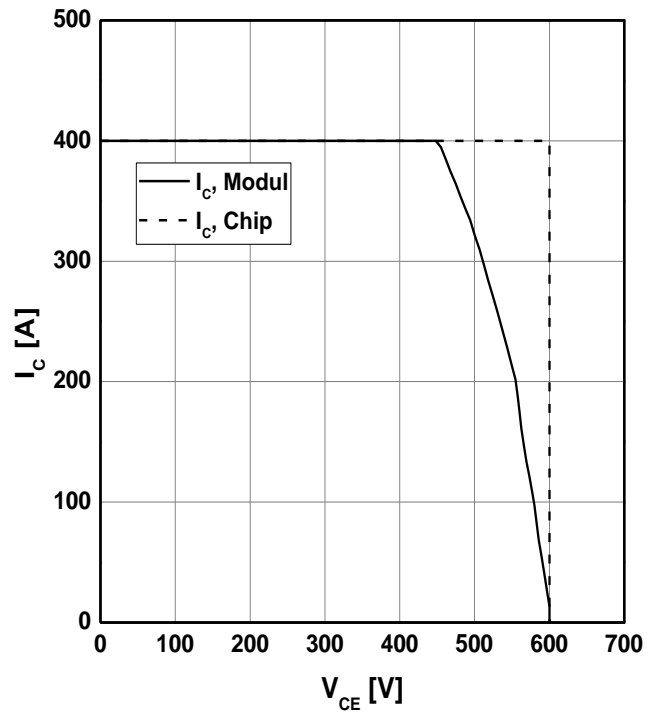


Fig6. Reverse Bias SOA ($T_{vj} = 150^\circ\text{C}$)

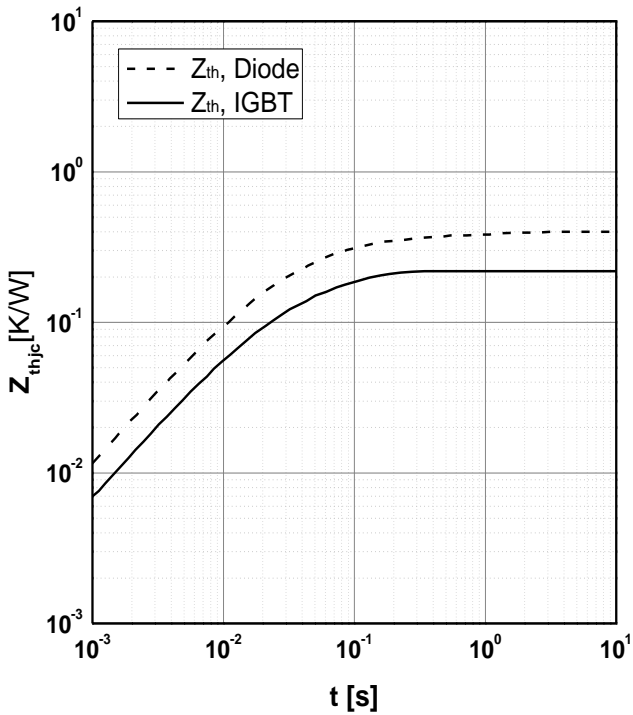


Fig7. Transient Thermal

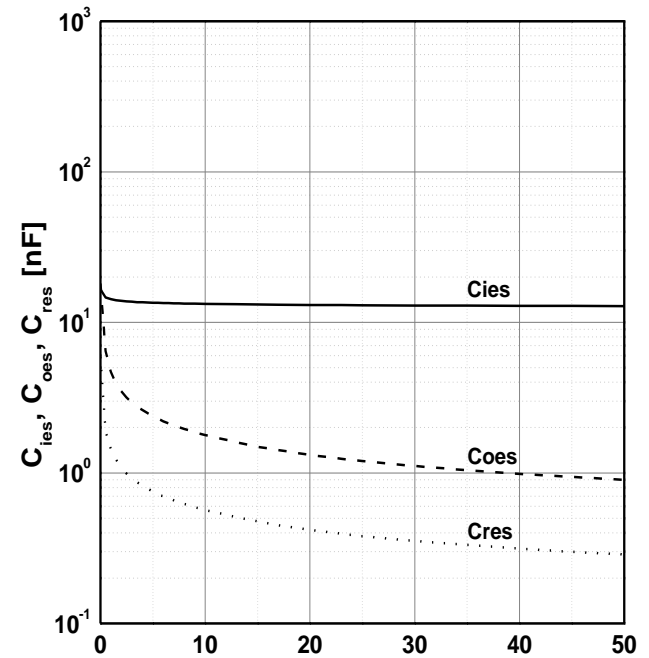


Fig8. Typ. Capacitance

Technical information and specification subject to change without notice.

PRELIMINARY

PACKAGE OUTLINES

