

“HALF-BRIDGE” IGBT

$V_{CES} = 600V$
 $I_c = 400A$
 $V_{CE(ON)} \text{ typ.} = 1.5V$
@ $I_c = 400A$

Feature

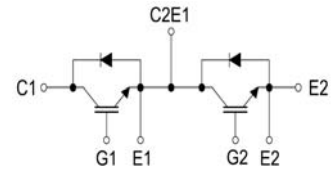
- IGBT New Technology
- Low $V_{CE} \text{ (sat)}$
- Low Turn-off losses
- Short tail current
- Positive temperature coefficient

Application

- AC & DC Motor controls
- General purpose inverters
- Optimized for high current inverter (AC TIG Welding machines)
- Servo Controls
- UPS, Robotics



Package : V3



Absolute Maximum Ratings @ $T_j = 25^\circ C$ (Per Leg)

| Symbol | Parameter | Condition | Ratings | Unit |
|-----------|---------------------------------------------------|----------------------------------|-----------|------------|
| V_{CES} | Collector-to-Emitter Voltage | $V_{GE} = 0V, I_c = 500\mu A$ | 600 | V |
| V_{GE} | Gate emitter voltage | | ± 20 | V |
| I_c | Continuous Collector Current | $T_c = 80^\circ C (25^\circ C)$ | 400 (500) | A |
| I_{CP} | Pulsed collector current | $T_c = 25^\circ C$ | 800 | A |
| I_F | Diode Continuous Forward Current | $T_c = 80^\circ C (25^\circ C)$ | 400 (500) | A |
| I_{FM} | Diode Maximum Forward Current | $T_c = 25^\circ C$ | 800 | A |
| t_p | Short circuit test, $V_{GE} = 15V, V_{CC} = 360V$ | $T_j = 150^\circ C (25^\circ C)$ | 6 (8) | μs |
| V_{iso} | Isolation Voltage test | AC @ 1 minute | 2500 | V |
| Weight | Weight of Module | | 360 | G |
| T_j | Junction Temperature | | -40 ~ 150 | $^\circ C$ |
| T_{stg} | Storage Temperature | | -40 ~ 125 | $^\circ C$ |
| Md | Mounting torque with screw M6 | | 4.0 | N.m |
| | Terminal connection torque | | 4.0 | N.m |

Static Characteristics @ $T_j = 25^\circ C$ (unless otherwise specified)

| Parameters | | Min | Typ | Max | Unit | Test conditions |
|---------------|-----------------------------------------|------|------|------|----------|-------------------------------|
| $V_{(BR)CES}$ | Collector-to-Emitter Breakdown Voltage | 600 | — | — | V | $V_{GE} = 0V, I_c = 500\mu A$ |
| $V_{CE(ON)}$ | Collector-to-Emitter Saturation Voltage | 1.05 | 1.50 | 1.90 | | $I_c = 400A, V_{GE} = 15V$ |
| $V_{GE(th)}$ | Gate Threshold Voltage | 5.0 | 5.8 | 6.5 | | $V_{CE} = V_{GE}, I_c = 2mA$ |
| I_{CES} | Zero Gate Voltage Collector Current | — | — | 500 | μA | $V_{GE} = 0V, V_{CE} = 600V$ |
| I_{GES} | Gate-to-Emitter Leakage Current | — | — | 600 | nA | $V_{CE} = 0V, V_{GE} = 20V$ |
| V_{FM} | Diode Forward Voltage Drop | — | 1.6 | 2.0 | V | $I_F = 400A, V_{GE} = 0V$ |
| R_{GINT} | Integrated gate resistor | — | 4 | — | Ω | |

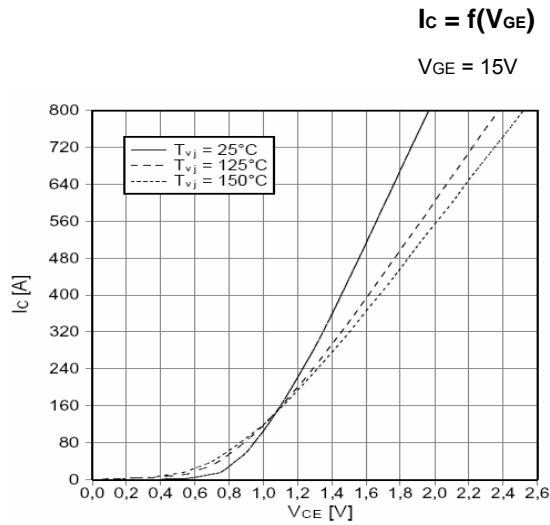
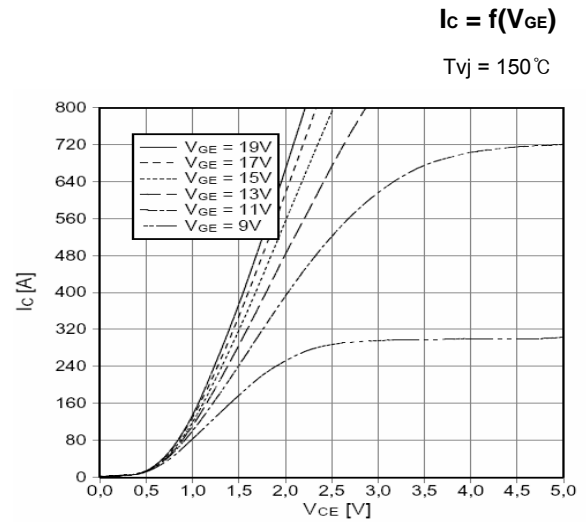
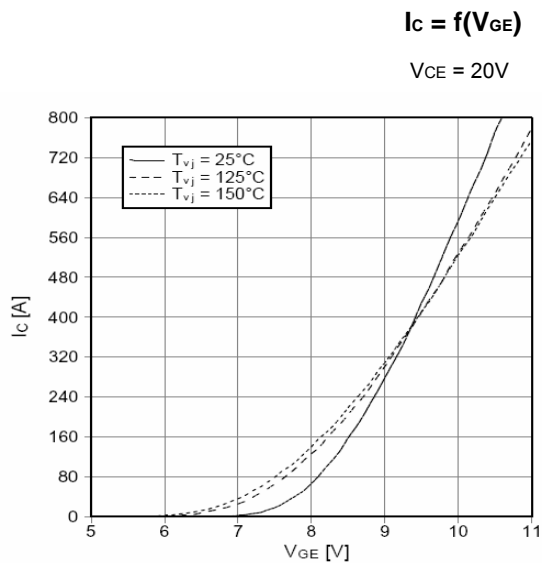
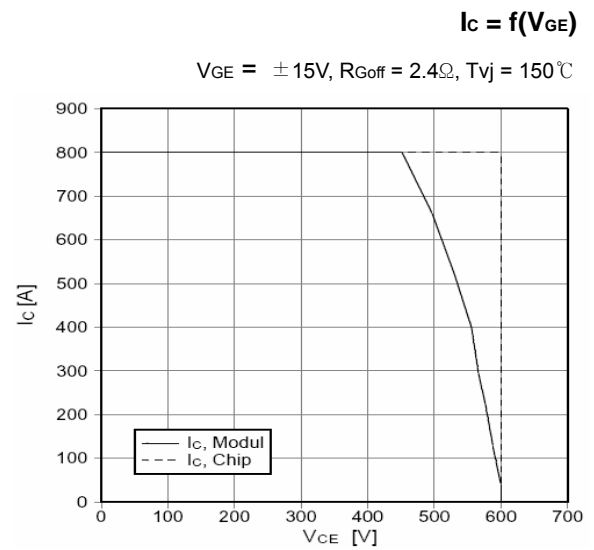
Electrical Characteristic Values (IGBT / DIODE) @ $T_j = 25^\circ\text{C}$ (unless otherwise specified)

| Parameters | | Min | Typ | Max | Unit | Test conditions |
|--------------|---------------------------------|-----|------|-----|---------|-------------------------------------------------------------------------------------------------------|
| C_{iss} | Input capacitance | — | 37 | — | nF | $V_{CE} = 25V$, $V_{GE} = 0V$ $f = 1\text{ MHz}$ |
| C_{oss} | Output capacitance | — | 2.3 | — | | |
| C_{rss} | Reverse transfer capacitance | — | 1.1 | — | | |
| $t_{d(on)}$ | Turn-on delay time | — | 145 | — | ns | $T_j = 125^\circ\text{C}$, $V_{CC} = 300V$ $I_C = 400A$, $V_{GE} = \pm 15V$ $R_G = 2.2\Omega$ |
| t_r | Rise time | — | 60 | — | | |
| $t_{d(off)}$ | Turn-off delay time | — | 320 | — | | |
| t_f | Fall time | — | 80 | — | | |
| V_{BR} | Cathode-Anode breakdown Voltage | 600 | — | — | V | $I_R = 0.5mA$ |
| I_{RM} | Maximum Reverse Leakage Current | — | — | 350 | μA | $V_R = 600V$ |
| t_{rr} | Reverse Recovery Time | — | 125 | — | ns | $I_F = 400A$, $V_R = 300V$ |
| Q_{rr} | Reverse Recovery Charge | — | 20.3 | — | μC | $di / dt = 4000A / \mu s$ |

Thermal Characteristics

| Symbol | Parameter | Min | Typ | Max | Unit |
|-----------------|-----------------------------------------------|-----|------|------|--------------------|
| $R_{\theta JC}$ | Junction-to-Case (IGBT Part, Per 1/2 Module) | - | - | 0.12 | $^\circ\text{C/W}$ |
| $R_{\theta JC}$ | Junction-to-Case (Diode Part, Per 1/2 Module) | - | - | 0.22 | |
| $R_{\theta CS}$ | Case-to-Heat Sink (Conductive grease applied) | - | 0.03 | - | |

※ Data and specifications subject to change without notice.

Output characteristic (typical)

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Transfer characteristic (typical)

Reverse bias safe operating area IGBT (RBSOA)

Forward characteristic of diode (typical)
