

# “HALF-BRIDGE” IGBT

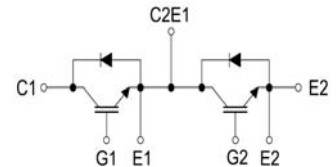
**$V_{CES} = 1200V$**   
 **$I_c = 200A$**   
 **$V_{CE(ON)} \text{ typ.} = 1.7V$**   
**@ $I_c = 200A$**

### 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
- 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	$V_{GE} = 0V, I_c = 250\mu A$	1200	V
$V_{GE}$	Gate emitter voltage		$\pm 20$	V
$I_c$	Continuous Collector Current	$T_c = 80^\circ C (25^\circ C)$	200 (260)	A
$I_{CP}$	Pulsed collector current	$T_c = 25^\circ C$	400	A
$I_F$	Diode Continuous Forward Current	$T_c = 80^\circ C (25^\circ C)$	200 (280)	A
$I_{FM}$	Diode Maximum Forward Current	$T_c = 25^\circ C$	400	A
$V_{iso}$	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 M5		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	1200	—	—	V	$V_{GE} = 0V, I_c = 3mA$
$V_{CE(ON)}$	Collector-to-Emitter Saturation Voltage	1.4	1.7	2.1		$I_c = 200A, V_{GE} = 15V$
$V_{GE(th)}$	Gate Threshold Voltage	5.0	5.8	6.5		$V_{CE} = V_{GE}, I_c = 3mA$
$I_{CES}$	Zero Gate Voltage Collector Current	—	—	350	$\mu A$	$V_{GE} = 0V, V_{CE} = 1200V$
$I_{GES}$	Gate-to-Emitter Leakage Current	—	—	500	nA	$V_{CE} = 0V, V_{GE} = 20V$
$V_{FM}$	Diode Forward Voltage Drop	—	1.6	2.2	V	$I_F = 200A, V_{GE} = 0V$
$R_{GINT}$	Integrated gate resistor	—	4	—	$\Omega$	

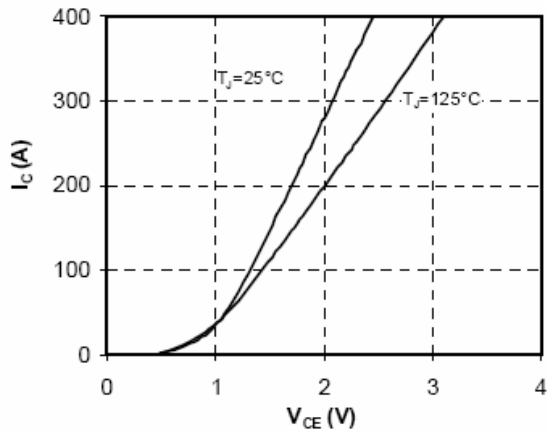
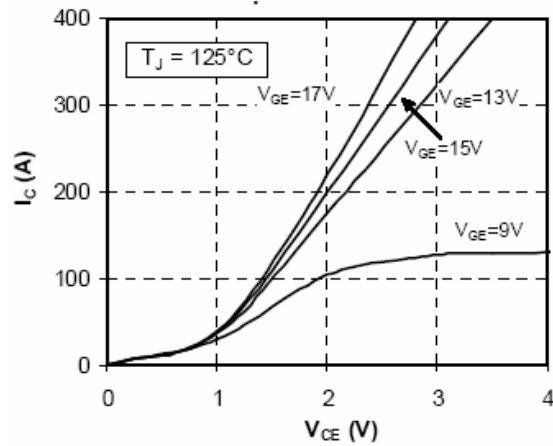
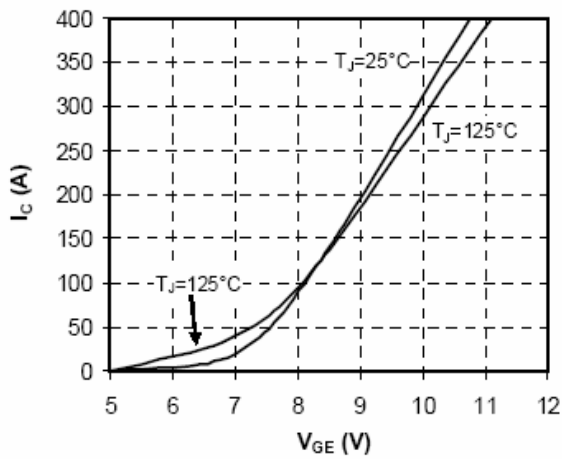
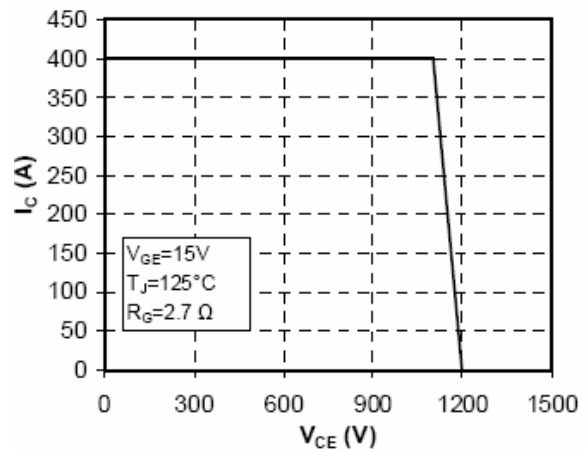
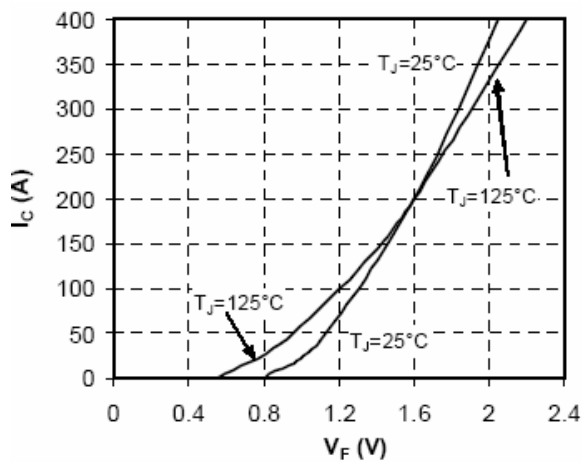
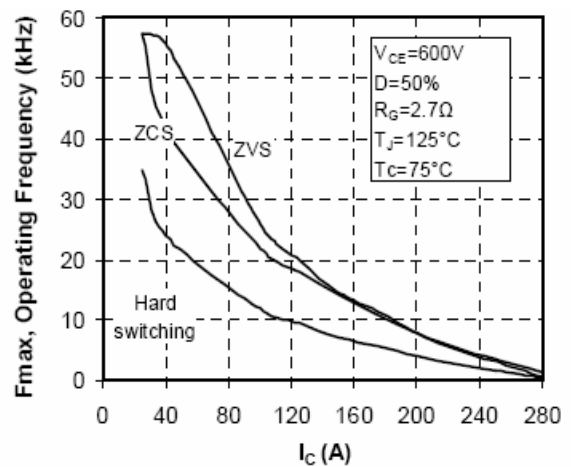
**Electrical Characteristic Values (IGBT / DIODE) @  $T_j = 25^\circ\text{C}$  (unless otherwise specified)**

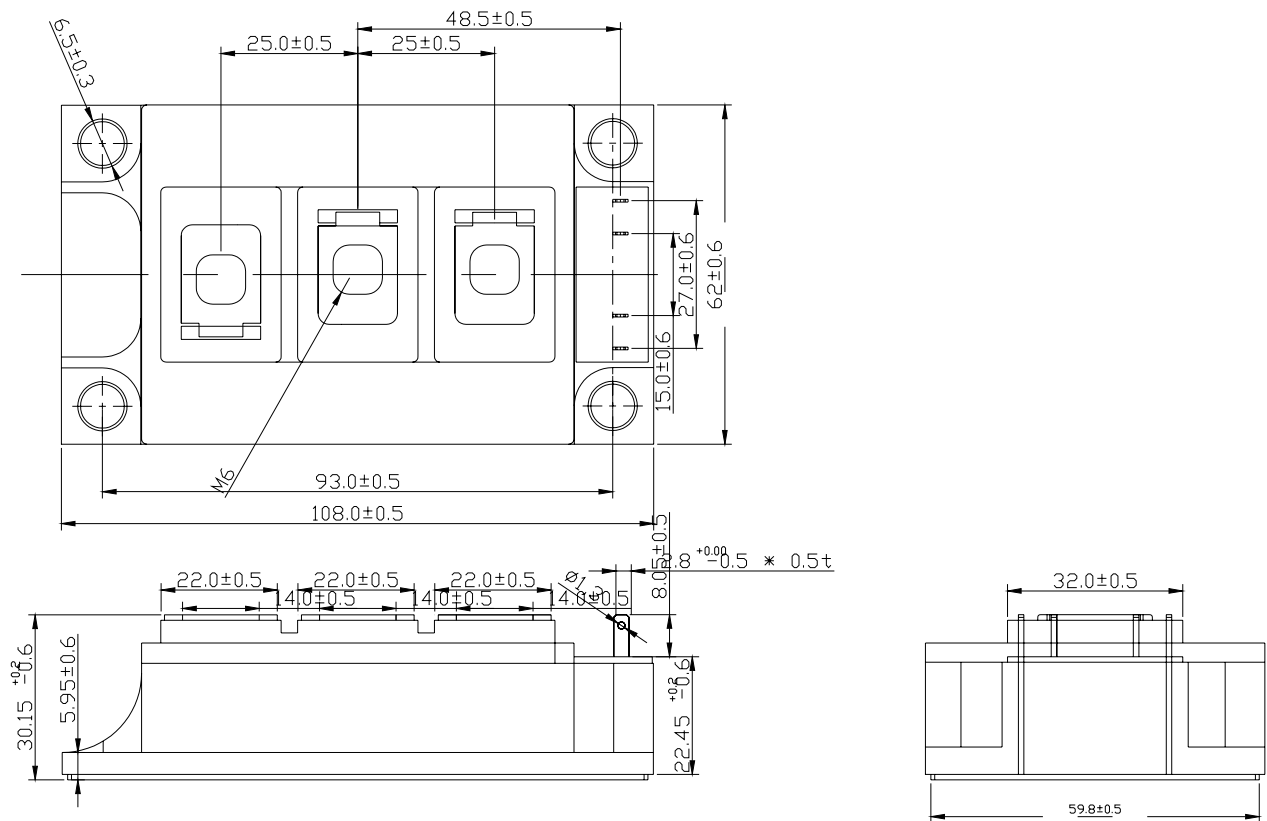
Parameters		Min	Typ	Max	Unit	Test conditions
$C_{iss}$	Input capacitance	—	14	—	nF	$V_{CE} = 25\text{V}$ , $V_{GE} = 0\text{V}$ $f = 1\text{ MHz}$
$C_{oss}$	Output capacitance	—	0.8	—		
$C_{rss}$	Reverse transfer capacitance	—	0.6	—		
$t_{d(on)}$	Turn-on delay time	—	290	—	ns	$T_j = 125^\circ\text{C}$ , $V_{CC} = 600\text{V}$ $I_C = 200\text{A}$ , $V_{GE} = \pm 15\text{V}$ $R_G = 2.7\Omega$
$t_r$	Rise time	—	50	—		
$t_{d(off)}$	Turn-off delay time	—	520	—		
$t_f$	Fall time	—	90	—		
$V_{BR}$	Cathode-Anode breakdown Voltage	1200	—	—	V	$I_R = 3500\mu\text{A}$
$I_{RM}$	Maximum Reverse Leakage Current	—	—	350	$\mu\text{A}$	$V_R = 1200\text{V}$
$t_{rr}$	Reverse Recovery Time	—	170	—	ns	$I_F = 200\text{A}$ , $V_R = 600\text{V}$
$Q_{rr}$	Reverse Recovery Charge	—	18	—	$\mu\text{C}$	$di / dt = 2500\text{A} / \mu\text{s}$

**Thermal Characteristics**

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-Case (IGBT Part, Per 1/2 Module)	-	-	0.14	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Junction-to-Case (Diode Part, Per 1/2 Module)	-	-	0.25	
$R_{\theta CS}$	Case-to-Heat Sink (Conductive grease applied)	-	0.03	-	

※ Data and specifications subject to change without notice.


**Fig 1. Typ. IGBT Output Characteristics**

**Fig 2. Typ. IGBT Out Characteristics**

**Fig 3. Typ. Transfer Characteristics**

**Fig 4. Reverse Bias Operating Area**

**Fig 5. Forward Characteristics of Diode**

**Fig 6. Operating Frequency vs Collector Current**

**Package Outline** (dimensions in mm)


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May 2006