

“HALF-BRIDGE” IGBT MODULE

Feature

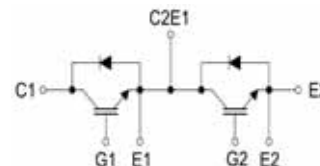
- Smart field stopper + Trench design technology
- Low V_{CE} (sat)
- Low Turn-off losses
- Short tail current for over 20KHz
- Motor controls
- VVVF inverters
- Inverter-type welding MC over 18KHZ
- SMPS, Electrolysis
- UPS/EPS, Robotics

Applications



Package : V1

$V_{CES} = 600V$
 $I_c = 150A$
 $V_{CE(ON)} \text{ typ.} = 1.5V$
 @ $I_c = 150A$



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

Symbol	Parameter	Condition	Ratings	Unit
V_{CES}	Collector-to-Emitter Voltage	$T_c = 25^\circ C$	600	V
V_{GES}	Gate emitter voltage		± 20	V
I_c	Continuous Collector Current	$T_c = 80^\circ C (25^\circ C)$	150 (210)	A
I_{CP}	Pulsed collector current	$T_c = 25^\circ C$	300	A
I_F	Diode Continuous Forward Current	$T_c = 80^\circ C (25^\circ C)$	150 (210)	A
I_{FM}	Diode Maximum Forward Current	$T_c = 25^\circ C$	300	A
t_p	Short circuit test, $V_{GE} = 15V$, $V_{CC} = 360V$	$T_c = 150^\circ C (25^\circ C)$	6 (8)	μs
V_{iso}	Isolation Voltage test	AC @ 1 minute	2500	V
T_j	Junction Temperature		$-40 \sim 150$	$^\circ C$
T_{stg}	Storage Temperature		$-40 \sim 125$	$^\circ C$
Weight	Weight of Module		190	g
M_d	Mounting torque with screw : M5		2.0	N.m
T_d	Terminal connection torque : M5		2.0	N.m

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

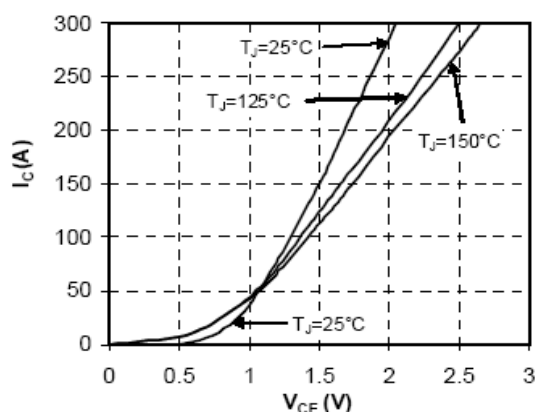
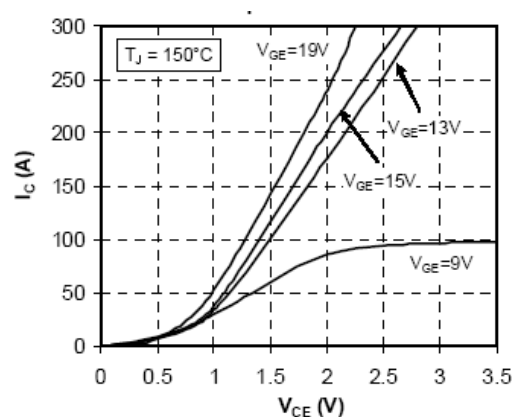
Parameters		Min	Typ	Max	Unit	Test conditions
$V_{CE(ON)}$	Collector-to-Emitter Saturation Voltage		1.50	1.95	V	$I_c = 150A$, $V_{GE} = 15V$
$V_{GE(th)}$	Gate Threshold Voltage		5.8	6.5		$V_{CE} = V_{GE}$, $I_c = 4mA$
I_{CES}	Zero Gate Voltage Collector Current	—	—	5.0	mA	$V_{GE} = 0V$, $V_{CE} = 600V$
I_{GES}	Gate-to-Emitter Leakage Current	—	—	400	nA	$V_{CE} = 0V$, $V_{GE} = 20V$
V_F	Forward voltage drop		1.6	1.9	V	$I_F = 150A$
R_{GINT}	Integrated gate resistor	—	2	—	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	—	9200	—	pF	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$ $f = 1\text{ MHz}$
C_{oss}	Output capacitance	—	580	—		
C_{rss}	Reverse transfer capacitance	—	270	—		
$t_{d(on)}$	Turn-on delay time	—	125	—	ns	Inductive Switching (125°C) $V_{CC} = 300\text{V}$ $I_C = 150\text{A}$, $V_{GE} = \pm 15\text{V}$ $R_G = 3.3\Omega$
t_r	Rise time	—	30	—		
$t_{d(off)}$	Turn-off delay time	—	340	—		
t_f	Fall time	—	60	—		
V_{BR}	Cathode-Anode breakdown Voltage	600	650	—	V	
I_{RM}	Maximum Reverse Leakage Current	—	—	250	μA	$V_R = 600\text{V}$
t_{rr}	Reverse Recovery Time	—	130	—	ns	$I_F = 150\text{A}$, $V_R = 300\text{V}$ $di/dt = 2100\text{A}/\mu\text{s}$
Q_{rr}	Reverse Recovery Charge	—	6.9	—	μC	

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\theta JC}$	Junction-to-Case (IGBT Part, Per 1/2 Module)	-	-	0.44	$^\circ\text{C/W}$
$R_{\theta JC}$	Junction-to-Case (Diode Part, Per 1/2 Module)	-	-	0.77	
$R_{\theta CS}$	Case-to-Heat Sink (Conductive grease applied)	-	0.05	-	


Fig 1. Typ. IGBT Output Characteristics

Fig 2. Typ. IGBT Out Characteristics

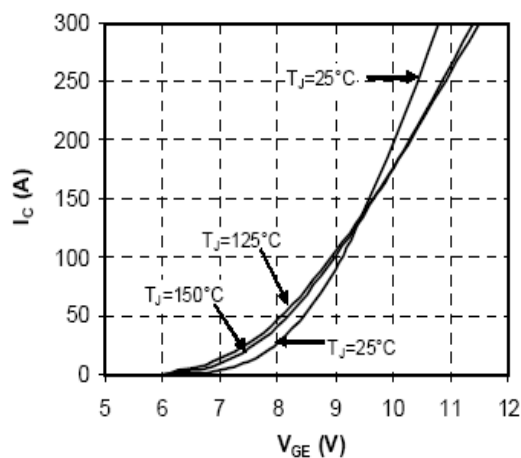


Fig 3. Typ. Transfer Characteristics

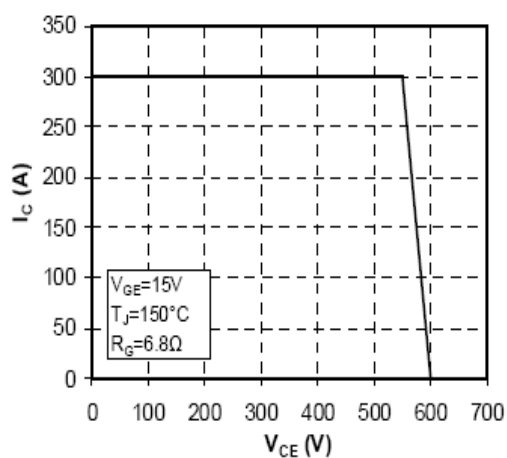


Fig 4. Reverse Bias Operating Area

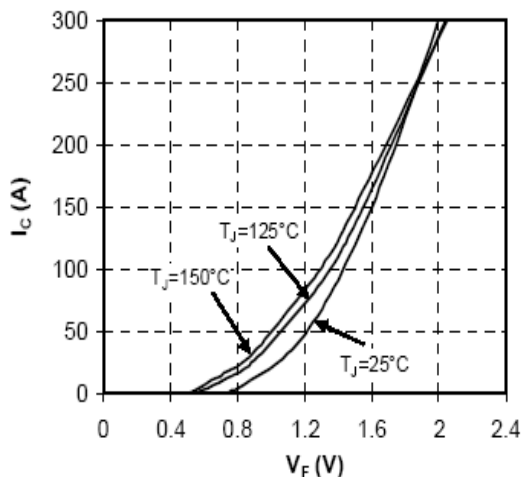


Fig 5. Forward Characteristics of Diode

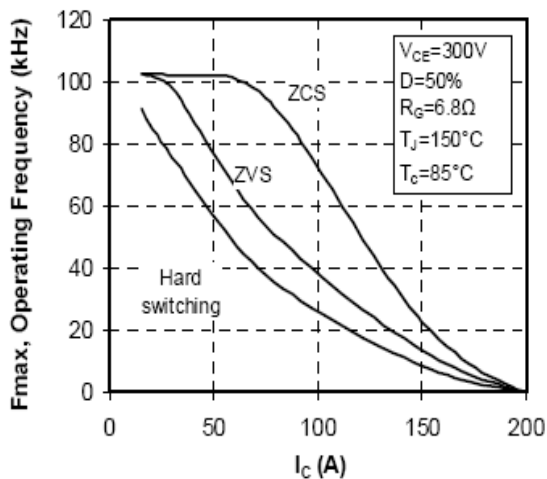
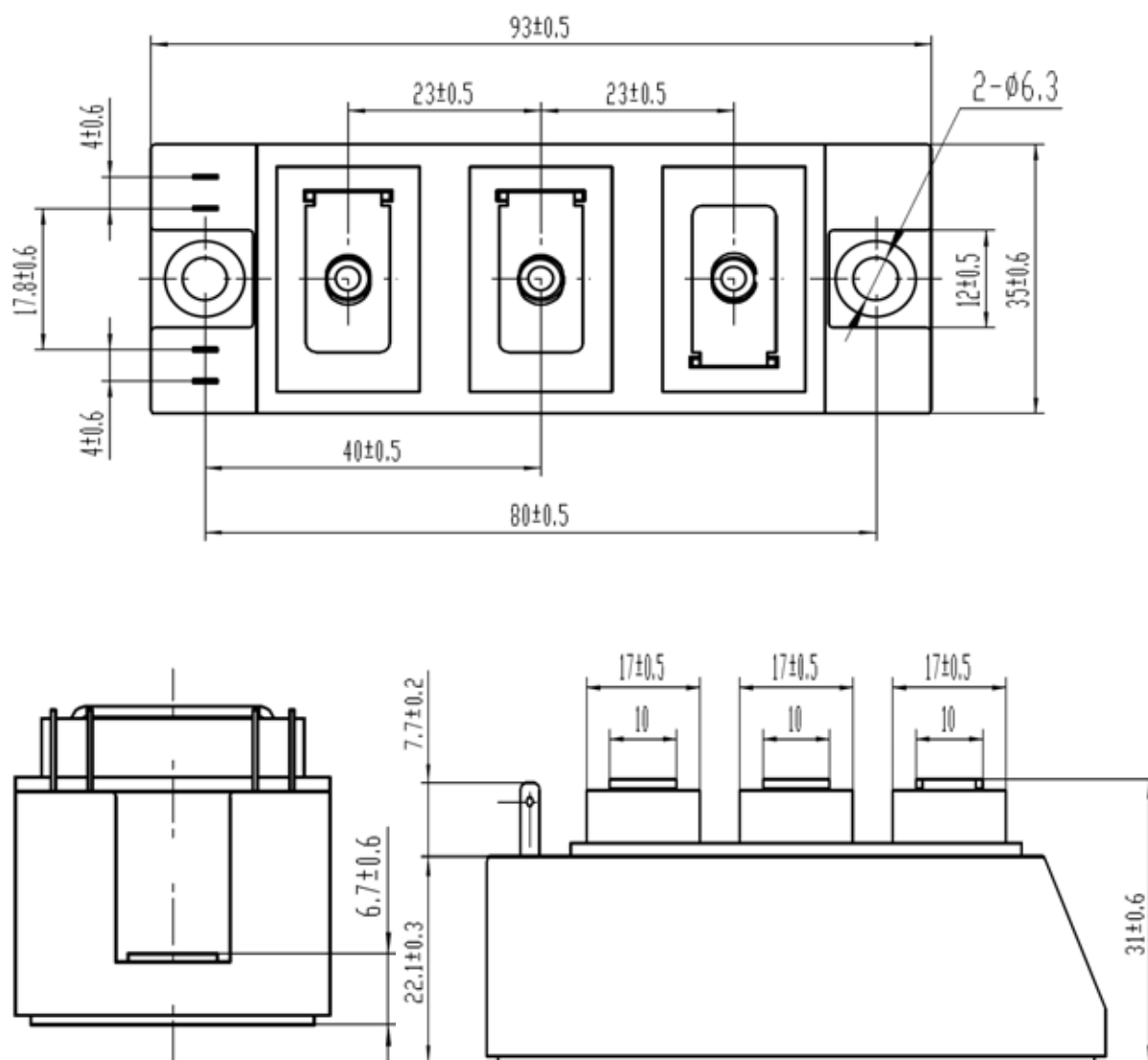


Fig 6. Operating Frequency vs Collector Current

Package Outline (dimensions in mm)

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