

“HALF-BRIDGE” IGBT MODULE

Feature

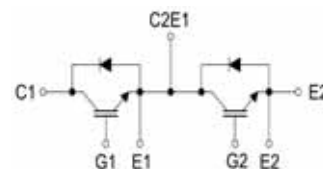
- Smart field stopper + Trench design technology
- Low $V_{CE(sat)}$
- Low Turn-off losses
- Short tail current for over 20KHz

Applications

- Motor controls
- VVVF inverters
- Inverter-type welding MC over 18KHZ
- SMPS, Electrolysis
- UPS/EPS, Robotics



Package : V3



$V_{CES} = 600V$

$I_C = 400A$

$V_{CE(ON)} \text{ typ.} = 1.6V$
 @ $I_C = 400A$

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_{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, $V_{GE} = 15V$, $V_{CC} = 360V$	$T_c = 150^\circ C (25^\circ C)$	6 (8)	μs
V_{iso}	Isolation Voltage test	AC @ 1 minute	2500	V
Weight	Weight of Module		360	g
T_J	Junction Temperature		$-40 \sim 150$	$^\circ C$
T_{stg}	Storage Temperature		$-40 \sim 125$	$^\circ C$
Md	Mounting torque with screw : M6		4.0	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		1.60	1.95	V	$I_C = 400A$, $V_{GE} = 15V$
$V_{GE(th)}$	Gate Threshold Voltage		5.8	6.5		$V_{CE} = V_{GE}$, $I_C = 8mA$
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	Diode Forward Voltage Drop	—	1.6	2.0	V	$I_F = 400A$, $V_{GE} = 0V$
R_{GINT}	Integrated gate resistor	—	1	—	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	—	24670	—	pF	V _{CE} = 25V, V _{GE} = 0V f = 1 MHz
C _{oss}	Output capacitance	—	1540	—		
C _{rss}	Reverse transfer capacitance	—	732	—		
t _{d(on)}	Turn-on delay time	—	145	—	ns	Inductive Switching (125°C) V _{CC} = 300V I _C = 400A, V _{GE} = ±15V R _G = 2.2Ω
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 _{RM}	Maximum Reverse Leakage Current	—	—	350	μA	V _R = 600V
t _{rr}	Reverse Recovery Time	—	125	—	ns	I _F = 400A, V _R = 300V di / dt = 4000A / μs
Q _{rr}	Reverse Recovery Charge	—	20.3	—	μC	

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
R _{θJC}	Junction-to-Case (IGBT Part, Per 1/2 Module)	-	-	0.12	°C/W
R _{θJC}	Junction-to-Case (Diode Part, Per 1/2 Module)	-	-	0.22	
R _{θCS}	Case-to-Heat Sink (Conductive grease applied)	-	0.03	-	

Fig.1, Output characteristic (typical)

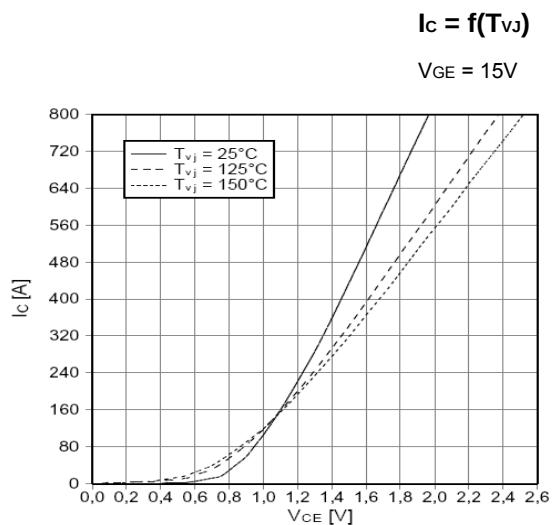


Fig.2 Output characteristic (typical)

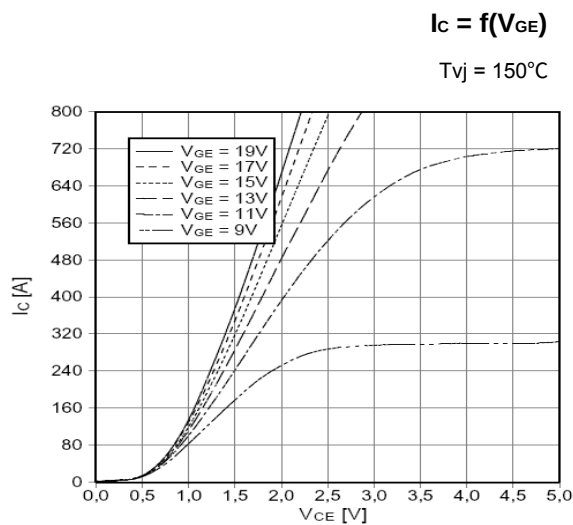


Fig.3, Transfer characteristic (typical)

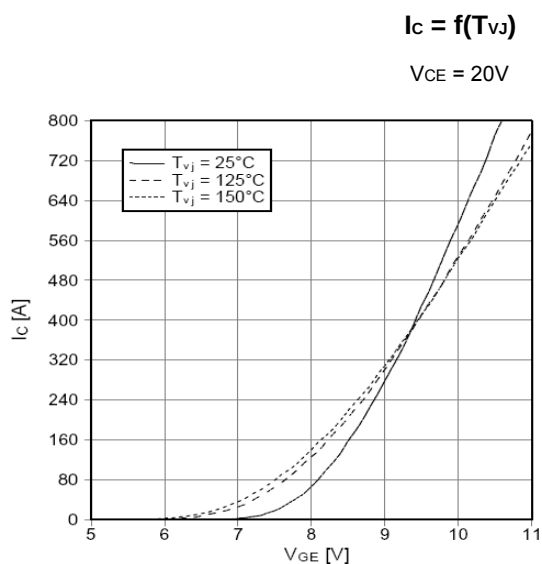


Fig.4, Reverse bias RBSOA

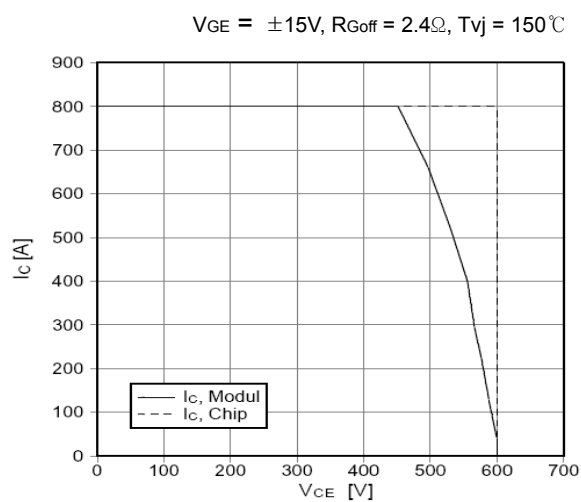
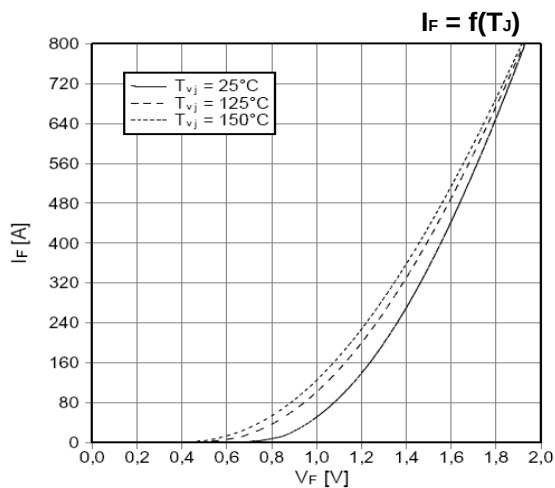
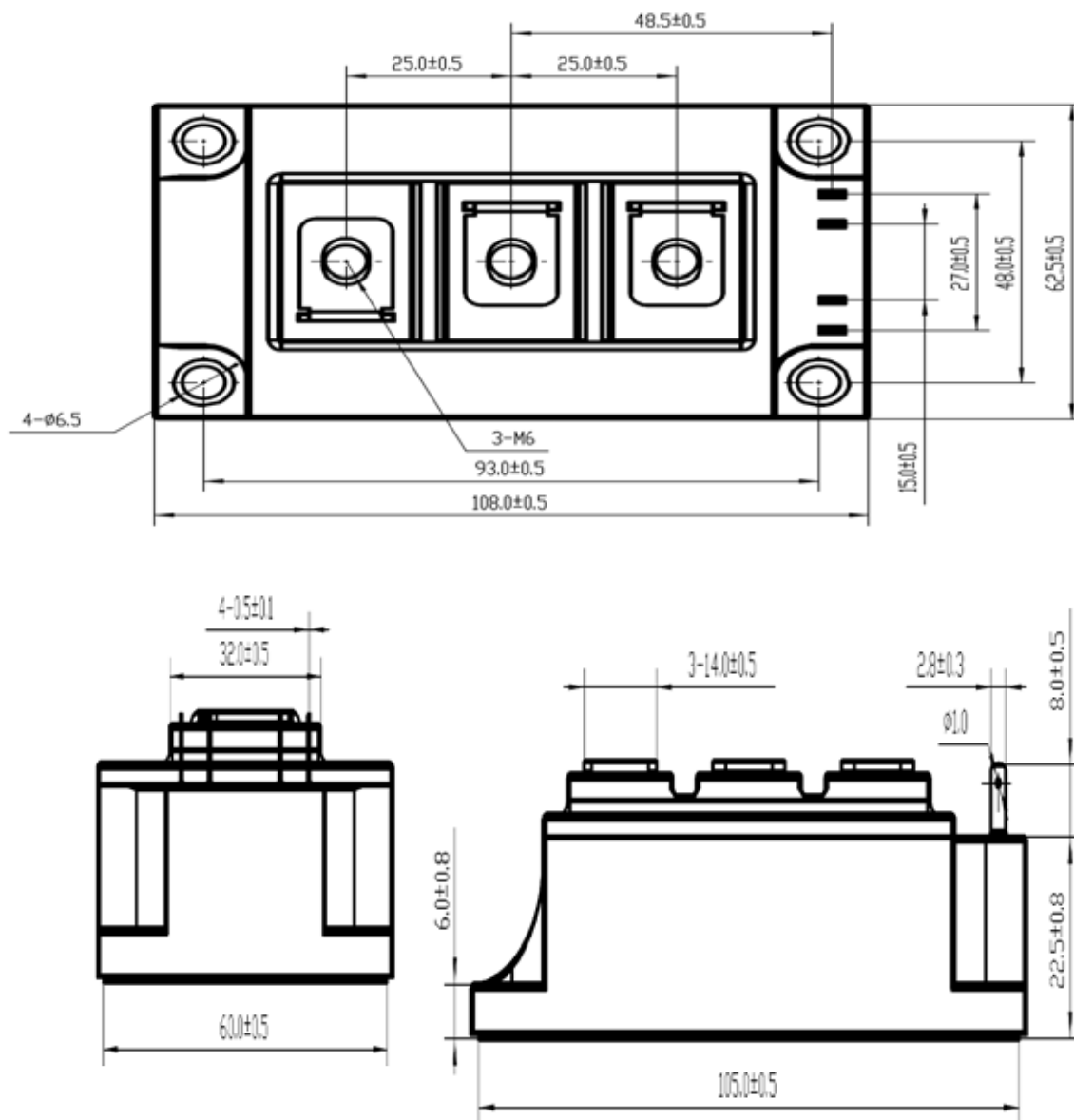


Fig.5, Forward characteristic of diode



Package Outline (dimensions in mm)



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