SemiWell SEMICONDUCTOR™

Preliminary

SIM400D06AV3

"HALF-BRIDGE" IGBT MODULE

V_{CES} = 600V
Ic=400A
$V_{CE(ON)}$ typ. = 1.6V
@Ic=400A

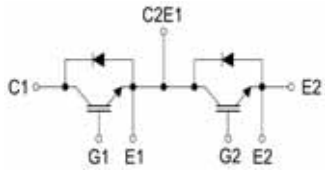
Feature

- 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



Absolute Maximum Ratings @ Tj=25℃ (Per Leg)

Symbol	Parameter	Condition	Ratings	Unit
V_{CES}	Collector-to-Emitter Voltage	Tc = 25℃	600	V
V_{GE}	Gate emitter voltage		± 20	V
I_C	Continuous Collector Current	Tc = 80℃ (25℃)	400 (500)	A
I_{CP}	Pulsed collector current	Tc = 25℃	800	A
I_F	Diode Continuous Forward Current	Tc = 80℃ (25℃)	400 (500)	A
I_{FM}	Diode Maximum Forward Current	Tc = 25℃	800	A
t_p	Short circuit test, V_{GE} = 15V, V_{CC} = 360V	Tc = 150℃ (25℃)	6 (8)	μs
V_{iso}	Isolation Voltage test	AC @ 1 minute	2500	V
Weight	Weight of Module		360	g
Tj	Junction Temperature		-40 ~ 150	℃
Tstg	Storage Temperature		-40 ~ 125	℃
Md	Mounting torque with screw : M6		4.0	N.m

Static Characteristics @ Tj = 25℃ (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}, Ic = 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) @ Tj = 25℃ (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
tr	Rise time	—	60	—		
$t_{d(off)}$	Turn-off delay time	—	320	—		
tf	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
Q_{rr}	Reverse Recovery Charge	—	20.3	—	μC	di / dt = 4000A /μs

Thermal Characteristics

Symbol	Parameter	Min	Typ	Max	Unit
$R_{\Theta JC}$	Junction-to-Case (IGBT Part, Per 1/2 Module)	-	-	0.12	°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	-	

Fig.1, Output characteristic (typical)

$I_C = f(T_{VJ})$

V_{GE} = 15V

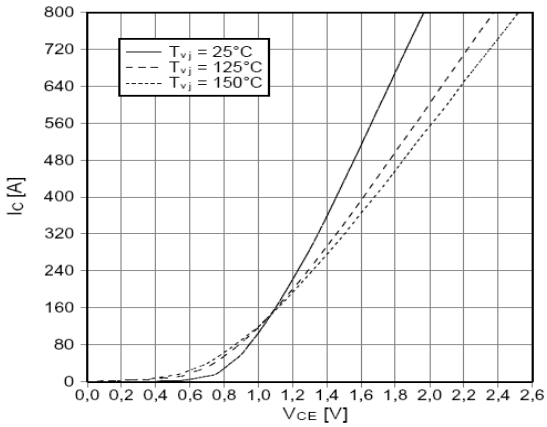


Fig.2 Output characteristic (typical)

$I_C = f(V_{GE})$

Tvj = 150°C

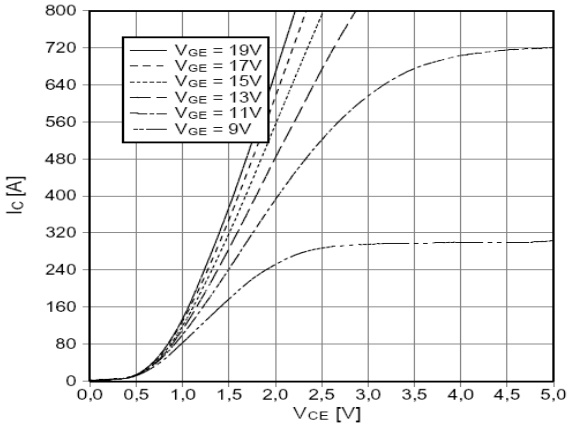


Fig.3, Transfer characteristic (typical)

$I_C = f(T_{VJ})$

V_{CE} = 20V

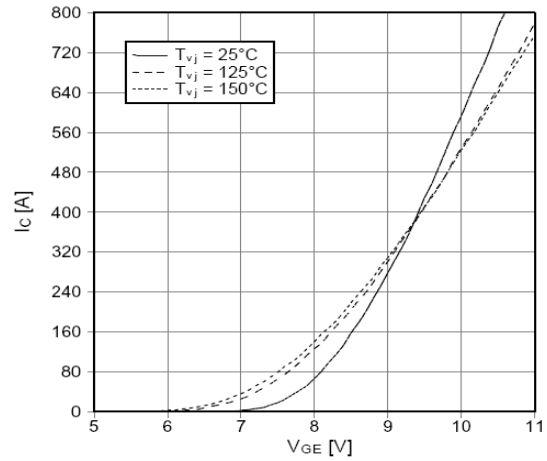


Fig.4, Reverse bias RBSOA

V_{GE} = ±15V, R_{Goff} = 2.4Ω, Tvj = 150℃

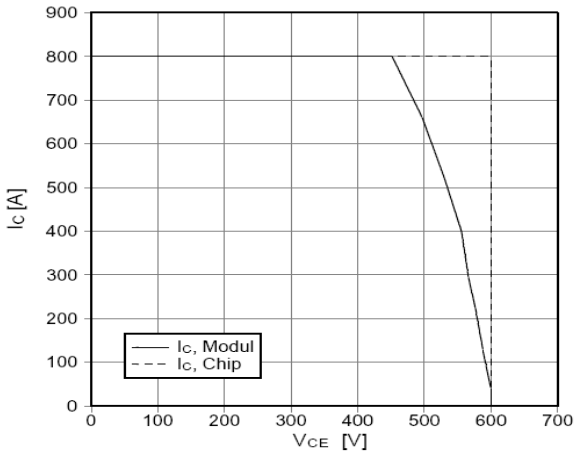
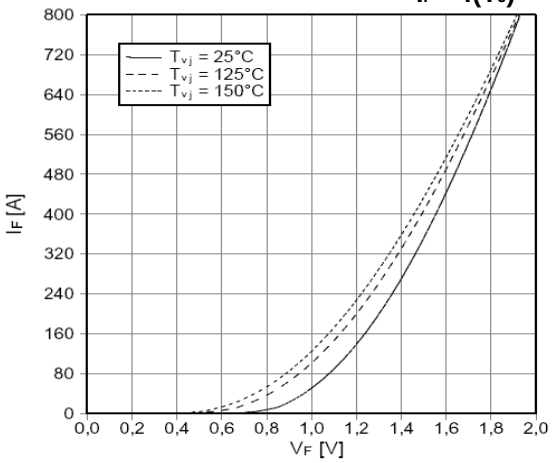
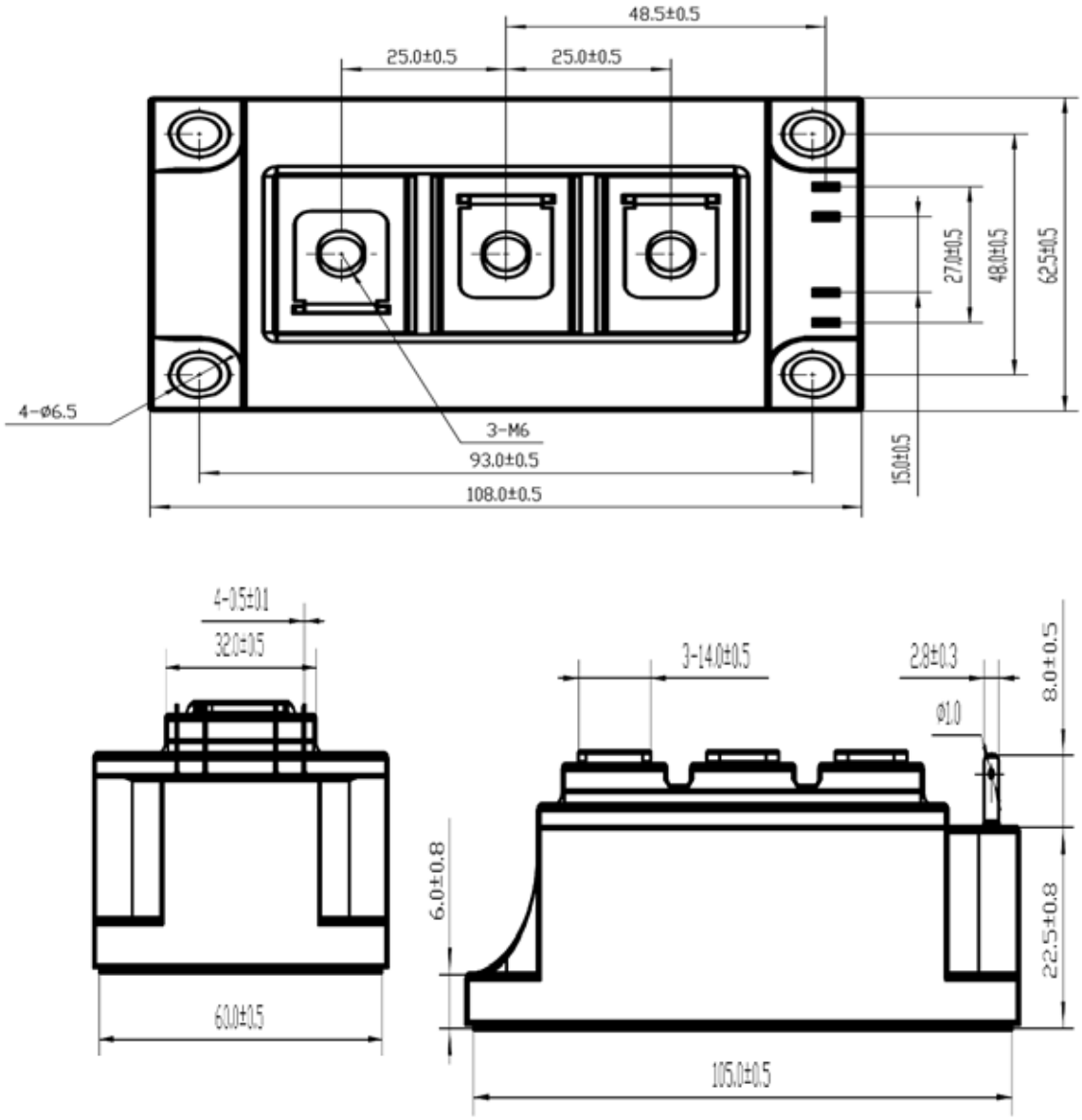


Fig.5, Forward characteristic of diode

$I_F = f(T_J)$



Package Outline (dimensions in mm)



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