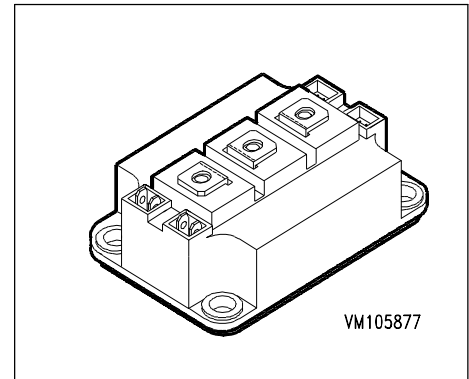


IGBT Power Module

- Single switch with chopper diode at collector
- Including fast free-wheeling diodes
- Package with insulated metal base plate



Type	V_{CE}	I_C	Package	Ordering Code
BSM 100 GAL 120 DN2	1200V	150A	HALF BRIDGE GAL 2	C67076-A2012-A70

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE}	1200	V
Collector-gate voltage	V_{CGR}	1200	
$R_{GE} = 20 \text{ k}\Omega$			
Gate-emitter voltage	V_{GE}	± 20	
DC collector current	I_C	150	A
$T_C = 25 \text{ }^\circ\text{C}$			
$T_C = 80 \text{ }^\circ\text{C}$		100	
Pulsed collector current, $t_p = 1 \text{ ms}$	I_{Cpuls}	300	
$T_C = 25 \text{ }^\circ\text{C}$			
$T_C = 80 \text{ }^\circ\text{C}$		200	
Power dissipation per IGBT	P_{tot}	800	W
$T_C = 25 \text{ }^\circ\text{C}$			
Chip temperature	T_j	+ 150	$^\circ\text{C}$
Storage temperature	T_{stg}	-40 ... + 125	
Thermal resistance, chip case	R_{thJC}	≤ 0.16	K/W
Diode thermal resistance, chip case	R_{thJCD}	≤ 0.3	
Diode thermal resistance, chip-case,chopper	R_{thJCDC}	≤ 0.25	
Insulation test voltage, $t = 1\text{min.}$	V_{is}	2500	Vac
Creepage distance	-	20	mm
Clearance	-	11	
DIN humidity category, DIN 40 040	-	F	sec
IEC climatic category, DIN IEC 68-1	-	40 / 125 / 56	

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Static Characteristics

Gate threshold voltage $V_{GE} = V_{CE}, I_C = 4\text{ mA}$	$V_{GE(th)}$	4.5	5.5	6.5	V
Collector-emitter saturation voltage $V_{GE} = 15\text{ V}, I_C = 100\text{ A}, T_j = 25\text{ °C}$ $V_{GE} = 15\text{ V}, I_C = 100\text{ A}, T_j = 125\text{ °C}$	$V_{CE(sat)}$	- -	2.5 3.1	3 3.7	
Zero gate voltage collector current $V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_j = 25\text{ °C}$ $V_{CE} = 1200\text{ V}, V_{GE} = 0\text{ V}, T_j = 125\text{ °C}$	I_{CES}	- -	1.5 6	2 -	mA
Gate-emitter leakage current $V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$	I_{GES}	-	-	400	

AC Characteristics

Transconductance $V_{CE} = 20\text{ V}, I_C = 100\text{ A}$	g_{fs}	54	-	-	S
Input capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{iss}	-	6.5	-	nF
Output capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{oss}	-	1	-	
Reverse transfer capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{rss}	-	0.5	-	

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Switching Characteristics, Inductive Load at $T_j = 125\text{ °C}$

Turn-on delay time $V_{CC} = 600\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 100\text{ A}$ $R_{Gon} = 6.8\text{ }\Omega$	$t_{d(on)}$	-	130	260	ns
Rise time $V_{CC} = 600\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 100\text{ A}$ $R_{Gon} = 6.8\text{ }\Omega$	t_r	-	80	160	
Turn-off delay time $V_{CC} = 600\text{ V}$, $V_{GE} = -15\text{ V}$, $I_C = 100\text{ A}$ $R_{Goff} = 6.8\text{ }\Omega$	$t_{d(off)}$	-	400	600	
Fall time $V_{CC} = 600\text{ V}$, $V_{GE} = -15\text{ V}$, $I_C = 100\text{ A}$ $R_{Goff} = 6.8\text{ }\Omega$	t_f	-	70	100	

Free-Wheel Diode

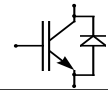
Diode forward voltage $I_F = 100\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 25\text{ °C}$ $I_F = 100\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 125\text{ °C}$	V_F	-	2 1.8	2.5 -	V
Reverse recovery time $I_F = 100\text{ A}$, $V_R = -600\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -1000\text{ A}/\mu\text{s}$, $T_j = 125\text{ °C}$	t_{rr}	-	0.3	-	
Reverse recovery charge $I_F = 100\text{ A}$, $V_R = -600\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -1000\text{ A}/\mu\text{s}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	Q_{rr}	-	4 14	- -	μC
		-			

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

Chopper Diode

Chopper diode forward voltage $I_{FC} = 150\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 25\text{ °C}$ $I_{FC} = 150\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 125\text{ °C}$	V_{FC}	- -	2 1.8	2.5 -	V
Reverse recovery time, chopper $I_{FC} = 150\text{ A}$, $V_R = -600\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -1500\text{ A}/\mu\text{s}$, $T_j = 125\text{ °C}$	t_{rrC}	-	0.4	-	μs
Reverse recovery charge, chopper $I_{FC} = 150\text{ A}$, $V_R = -600\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -1500\text{ A}/\mu\text{s}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	Q_{rrC}	- -	5 18	- -	μC

[illegible]

The circuit diagram shows a 74148 3-to-8 decoder with inputs 1, 2, and 3. The decoder's output 6 is connected to input 1 of a 7400 NAND gate. The decoder's output 7 is connected to input 2 of the same NAND gate. The output of the NAND gate is labeled 3. The decoder's output 3 is also connected to output 6 of the NAND gate. The decoder's output 4 is connected to output 7 of the NAND gate. The decoder's output 5 is connected to output 3 of the NAND gate. The decoder's output 2 is connected to output 4 of the NAND gate. The decoder's output 1 is connected to output 5 of the NAND gate. The decoder's output 0 is connected to output 6 of the NAND gate.

GAR type

1

2

3

4