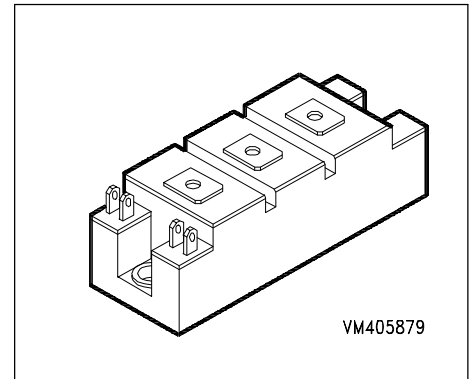


IGBT Power Module

- 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 50 GAL 120 DN2	1200V	78A	HALF BRIDGE GAL 1	C67076-A2010-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	78	A
$T_C = 25 \text{ }^\circ\text{C}$			
$T_C = 80 \text{ }^\circ\text{C}$		50	
Pulsed collector current, $t_p = 1 \text{ ms}$	I_{Cpuls}	156	
$T_C = 25 \text{ }^\circ\text{C}$			
$T_C = 80 \text{ }^\circ\text{C}$		100	
Power dissipation per IGBT	P_{tot}	400	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}	≤ 0.3	K/W
Diode thermal resistance, chip case	R_{thJCD}	≤ 0.6	
Diode thermal resistance, chip-case,chopper	R_{thJCDC}	≤ 0.5	
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 $V_{GE} = V_{CE}, I_C = 2\text{ mA}$	$V_{GE(th)}$	4.5	5.5	6.5	V
Collector-emitter saturation voltage $V_{GE} = 15\text{ V}, I_C = 50\text{ A}, T_j = 25\text{ °C}$ $V_{GE} = 15\text{ V}, I_C = 50\text{ A}, T_j = 125\text{ °C}$	$V_{CE(sat)}$	- -	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}	- -	0.8 4	1 -	mA
Gate-emitter leakage current $V_{GE} = 20\text{ V}, V_{CE} = 0\text{ V}$	I_{GES}	-	-	400	

AC Characteristics

Transconductance $V_{CE} = 20\text{ V}, I_C = 50\text{ A}$	g_{fs}	23	-	-	S
Input capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{iss}	-	3.3	-	nF
Output capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{oss}	-	0.5	-	
Reverse transfer capacitance $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	C_{rss}	-	0.25	-	

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 $V_{CC} = 600\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 50\text{ A}$ $R_{Gon} = 22\text{ }\Omega$	$t_{d(on)}$	-	44	100	ns
Rise time $V_{CC} = 600\text{ V}$, $V_{GE} = 15\text{ V}$, $I_C = 50\text{ A}$ $R_{Gon} = 22\text{ }\Omega$	t_r	-	56	100	
Turn-off delay time $V_{CC} = 600\text{ V}$, $V_{GE} = -15\text{ V}$, $I_C = 50\text{ A}$ $R_{Goff} = 22\text{ }\Omega$	$t_{d(off)}$	-	380	500	
Fall time $V_{CC} = 600\text{ V}$, $V_{GE} = -15\text{ V}$, $I_C = 50\text{ A}$ $R_{Goff} = 22\text{ }\Omega$	t_f	-	70	100	

Free-Wheel Diode

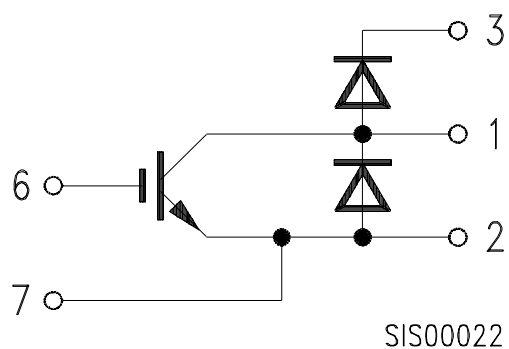
Diode forward voltage $I_F = 50\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 25\text{ °C}$ $I_F = 50\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 125\text{ °C}$	V_F	- -	2 1.8	2.5 -	V
Reverse recovery time $I_F = 50\text{ A}$, $V_R = -600\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -800\text{ A}/\mu\text{s}$, $T_j = 125\text{ °C}$	t_{rr}	-	0.2	-	
Reverse recovery charge $I_F = 50\text{ A}$, $V_R = -600\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -800\text{ A}/\mu\text{s}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	Q_{rr}	- -	2.8 8	- -	μC

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

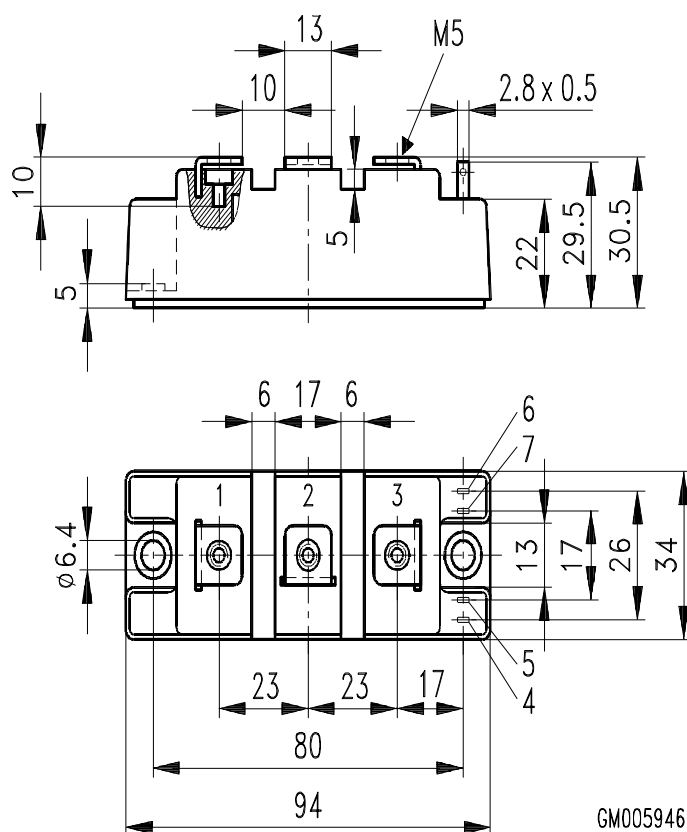
Chopper Diode

Chopper diode forward voltage $I_{FC} = 75\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 25\text{ °C}$ $I_{FC} = 75\text{ A}$, $V_{GE} = 0\text{ V}$, $T_j = 125\text{ °C}$	V_{FC}	- -	2 1.8	2.5 -	V
Reverse recovery time, chopper $I_{FC} = 75\text{ A}$, $V_R = -600\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -800\text{ A}/\mu\text{s}$, $T_j = 125\text{ °C}$	t_{rrC}	-	0.25	-	μs
Reverse recovery charge, chopper $I_{FC} = 75\text{ A}$, $V_R = -600\text{ V}$, $V_{GE} = 0\text{ V}$ $di_F/dt = -900\text{ A}/\mu\text{s}$ $T_j = 25\text{ °C}$ $T_j = 125\text{ °C}$	Q_{rrC}	- -	3.2 12	- -	μC

Circuit Diagram**Package Outlines**

Dimensions in mm

Weight: 250 g



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