

XMGM15TD120E3HZ

IGBT Power Module

Features:

- $V_{CE}=1200V$ $I_C=15A$
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature $175^{\circ}C$
- Isolation Type Package

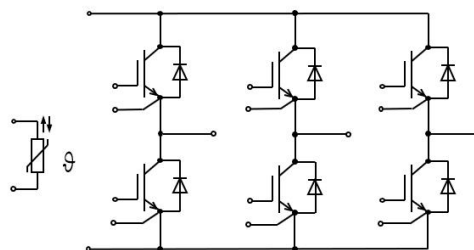
Applications:

- The inverter
- Motor control and drives

Package Type & Internal Circuit



E3



Internal Circuit

Maximum Rated Values (IGBT Inverter)

Symbol	Parameter	Conditions	Ratings	Unit
V_{CES}	Collector-emitter voltage	$V_{EC}=0V, I_C=1mA, T_{vj}=25^{\circ}C$	1200	V
I_C	Continuous Collector Current	$T_C=100^{\circ}C$	15	A
I_{CRM}	Peak Collector Current	$I_{CRM}=2I_C$	30	A
V_{GES}	Gate-Emitter Voltage	$T_{vj}=25^{\circ}C$	± 30	V
P_{tot}	Total Power Dissipation	$T_C=25^{\circ}C, T_{vjmax}=175^{\circ}C$	136	W

Characteristics Values (IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C=15\text{ A}, V_{GE}=15\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$		1.8		V
		$I_C=15\text{ A}, V_{GE}=15\text{ V}, T_{vj}=150\text{ }^{\circ}\text{C}$		2.0		V
$V_{GE(th)}$	Gate Threshold Voltage	$I_C=0.6\text{ mA}, V_{CE}=V_{GE}, T_{vj}=25\text{ }^{\circ}\text{C}$	6.1	6.5	7.0	V
I_{CES}	Collector-Emitter Cut-off Current	$V_{CE}=1200\text{ V}, V_{GE}=0\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	$V_{CE}=0\text{ V}, V_{GE}=15\text{ V}, T_{vj}=25\text{ }^{\circ}\text{C}$			410	nA
C_{ies}	Input capacitance	$f = 1\text{ MHz}, T_{vj} = 25\text{ }^{\circ}\text{C},$ $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}$		1294		pF
C_{res}	Reverse transfer capacitance			41.6		pF
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=15\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=35\Omega$ $T_{vj}=25\text{ }^{\circ}\text{C}$		30		ns
t_r	Rise Time, Inductive Load			11		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			214		ns
t_f	Fall Time, Inductive Load			134		ns
E_{on}	Turn-on Energy Loss per Pulse			0.73		mJ
E_{off}	Turn-off Energy Loss per Pulse			0.89		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	$I_C=15\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}$ $R_G=35\Omega$ $T_{vj}=150\text{ }^{\circ}\text{C}$		26.5		ns
t_r	Rise Time, Inductive Load			12		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			280		ns
t_f	Fall Time, Inductive Load			272		ns
E_{on}	Turn-on Energy Loss per Pulse			0.99		mJ
E_{off}	Turn-off Energy Loss per Pulse			1.57		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT			1.102	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		150	$^{\circ}\text{C}$
I_{sc}	SC	$V_{GE}\leq 15\text{ V}, V_{CE}=600\text{ V},$ $t_p\leq 10\mu\text{s}, T_{vj}=150\text{ }^{\circ}\text{C},$ $V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt$		60		A

Maximum Rated Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	$T_{vj} = 25\text{ }^{\circ}\text{C}$		1200		V
I_F	Continuous DC Forward Current			15		A
I_{FRM}	Repetitive Peak Forward Current	$t_p = 1\text{ ms}$		30		A

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	$I_F = 15\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 25\text{ }^{\circ}\text{C}$		2.37		V
		$I_F = 15\text{ A}, V_{CE} = 0\text{ V}, T_{vj} = 150\text{ }^{\circ}\text{C}$		2.46		V
I_{rr}	Peak reverse recovery current	$I_F = 15\text{ A}, V_R = 600\text{ V}$ $-di/dt = 800\text{ A/us}$ $T_{vj} = 25\text{ }^{\circ}\text{C}$		21		A
Q_r	Recovered Charge			0.85		μC
E_{rec}	Reverse Recovery Energy			0.17		mJ
I_{rr}	Peak reverse recovery current	$I_F = 15\text{ A}, V_R = 600\text{ V}$ $-di/dt = 800\text{ A/us}$ $T_{vj} = 150\text{ }^{\circ}\text{C}$		24		A
Q_r	Recovered Charge			1.64		μC
E_{rec}	Reverse Recovery Energy			0.43		mJ
R_{thJC}	Thermal resistance, junction to case				2.1	K/W
$T_{vj\text{ op}}$	Temperature under switching conditions		-40		150	$^{\circ}\text{C}$

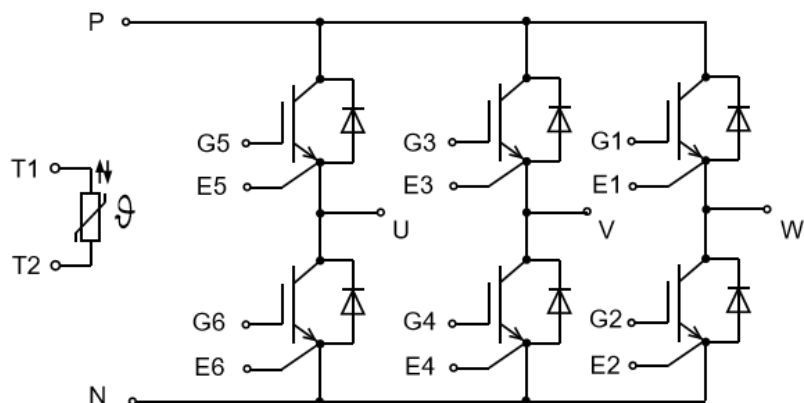
NTC-Thermistor (Characteristic Values)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R ₂₅	Rated resistance	T _c =25 °C		22		KΩ
ΔR/R	Deviation of R100	T _c =100 °C	-5		5	%
P ₂₅	Power dissipation	T _c =25 °C		210		mW
B _{25/50}	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298,15K))]$		3950		K
B _{25/100}	B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298,15K))]$		3998		K

Module Characteristics

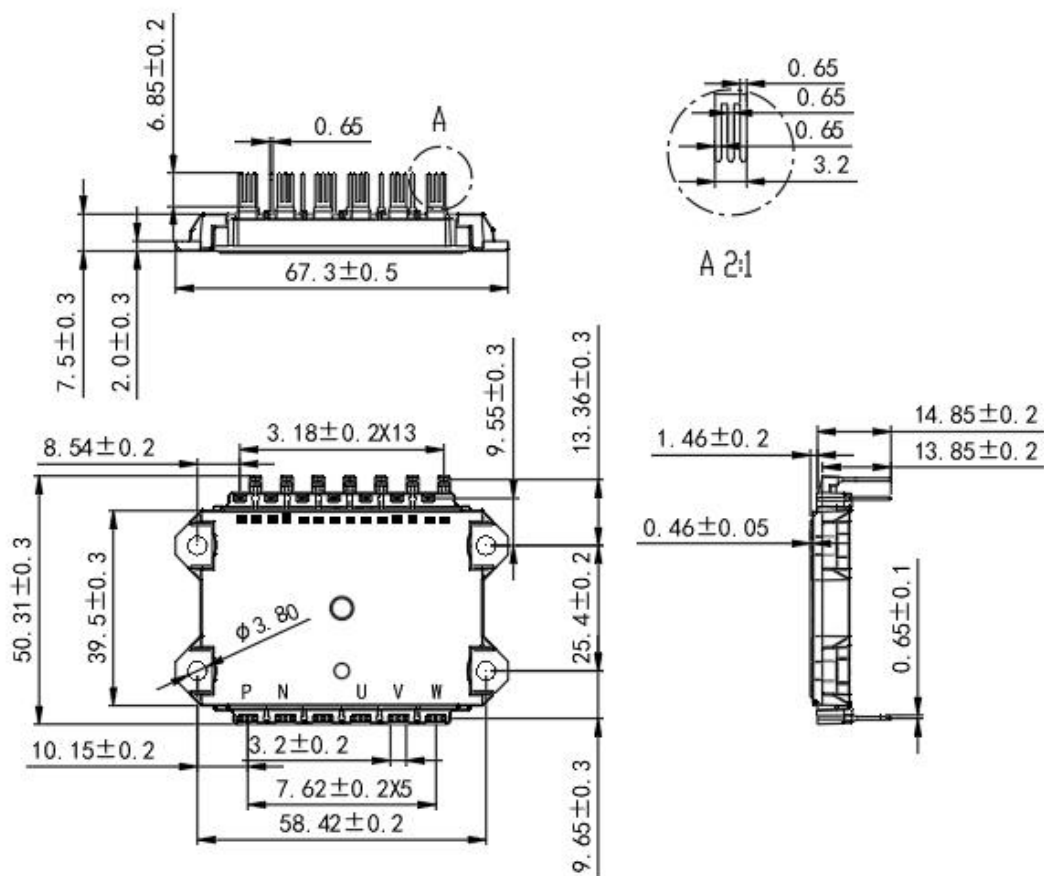
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V _{isol}	Isolation voltage	t=1min,f=50Hz	2500			V
T _{stg}	Storage Temperature		-40		125	°C
M _s	Module-to-Sink Torque	Recommended(M3)	0.75		0.85	N·m
G	Weight of Module			39		g

Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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