芯盟半导体

Sep.2025

XMGM25TD120E3HZ

IGBT Power Module

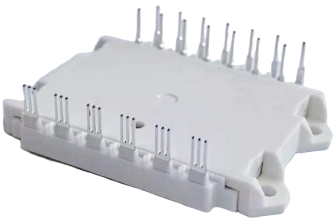
Features:

- V_{CE}=1200V I_C=25A
- Low $V_{CE(sat)}$
- V_{CEsat} with positive temperature coefficient
- Maximum junction temperature 175℃
- Isolation Type Package

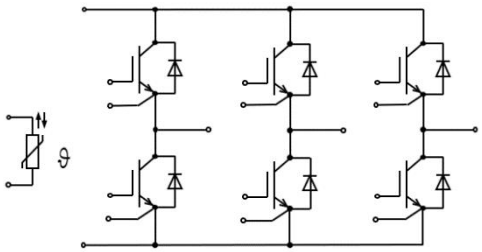
Applications:

- 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℃	1200	V
I_C	Continuous Collector Current	T_C=100℃	25	A
I_{CRM}	Peak Collector Current	I_{CRM}=2I_C	50	A
V_{GES}	Gate-Emitter Voltage	T_{vj}=25℃	±30	V
P_{tot}	Total Power Dissipation	T_C=25℃,T_{vjmax}=175℃	216	W

Maximum Rated Values（IGBT Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=25 A, V_{GE}=15 V, T_{vj}=25 ℃		1.8		V
		I_C=25 A, V_{GE}=15 V, T_{vj}=150 ℃		2.1		V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=6.0 mA,V_{CE}=V_{GE},T_{vj}= 25 ℃	6.0	6.5	7.0	V
I_{CES}	Collector-Emitter Cut-off Current	V_{CE}=1200 V, V_{GE}=0 V, T_{vj}=25 ℃			1.0	mA
I_{GES}	Gate-Emitter Leakage Current	V_{CE}=0 V, V_{GE}=15 V, T_{vj}=25 ℃			400	nA
$R_{g(int)}$	Internal gate resistor	V_{GE}=0 V, f=1 MHz		1.47		Ω
C_{ies}	Input capacitance	f = 1 MHz, T_{vj}= 25°C, V_{CE} = 25 V, V_{GE}= 0 V		2146		nF
C_{res}	Reverse transfer capacitance			72.5		pF
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=25 A,V_{CE}=600 V V_{GE}=±15 V R_G=20Ω T_{vj}=25 ℃		28.2		ns
t_r	Rise Time, Inductive Load			14.6		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			168		ns
t_f	Fall Time, Inductive Load			272		ns
E_{on}	Turn-on Energy Loss per Pulse			1.53		mJ
E_{off}	Turn-off Energy Loss per Pulse			1.89		mJ
$t_{d(on)}$	Turn-on Delay Time, Inductive Load	I_C=25 A,V_{CE}=600 V V_{GE}=±15 V R_G=20Ω T_{vj}=150 ℃		29.6		ns
t_r	Rise Time, Inductive Load			14.4		ns
$t_{d(off)}$	Turn-off Delay Time, Inductive Load			264		ns
t_f	Fall Time, Inductive Load			342		ns
E_{on}	Turn-on Energy Loss per Pulse			2.0		mJ
E_{off}	Turn-off Energy Loss per Pulse			2.6		mJ
R_{thJC}	Thermal resistance, junction to case	per IGBT		0.693		K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		150	°C
I_{sc}	SC	V_{GE}≤15V, V_{CE}=600V, tp≤10μS, T_{vj}=150℃, VCE_{max}=V_{CES}-L_{sCE} ·di/dt		100		A

Maximum Rated Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{RRM}	Repetitive Peak Reverse Voltage	T_{vj}= 25 ℃		1200		V
I_F	Continuous DC Forward Current			25		A
I_{FRM}	Repetitive Peak Forward Current	t_P=1 ms		50		A
I^2t	I^2t Value	V_R=0 V, t_P=10 ms, T_{vj}=150 ℃		220		A^2s

Characteristic Values (Diode Inverter)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=25 A, V_{CE}=0 V,T_{vj}= 25 ℃		1.85		V
		I_F=25 A, V_{CE}=0 V,T_{vj}=150 ℃		1.84		V
t_{rr}	Reverse Recovery time	I_F=25 A,V_R=600 V -di/dt=1260A/us T_{vj}=25 ℃		91.3		ns
Q_r	Recovered Charge			2.47		uC
E_{rec}	Reverse Recovery Energy			0.66		mJ
t_{rr}	Reverse Recovery time	I_F=25A,V_R=600 V -di/dt=1260A/us T_{vj}=150 ℃		396		ns
Q_r	Recovered Charge			4.91		uC
E_{rec}	Reverse Recovery Energy			1.69		mJ
R_{thJC}	Thermal resistance, junction to case	per Diode		0.997		K/W
$T_{vj\ op}$	Temperature under switching conditions		-40		150	℃

NTC-Thermistor (Characteristic Values)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated resistance	T_c=25 ℃		5		KΩ
ΔR/R	Deviation of R100	T_c=100 ℃	-5		5	%
P_{25}	Power dissipation	T_c=25 ℃		20		mW
$B_{25/50}$	B-value	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298,15K))]$		3380		K
$B_{25/100}$	B-value	$R_2=R_{25}\exp[B_{25/100}(1/T_2-1/(298,15K))]$		3450		K

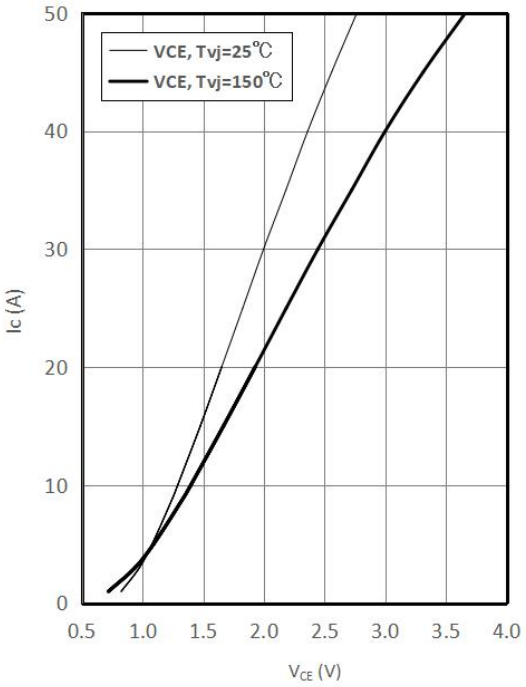
Module Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{isol}	Isolation voltage	t=1min,f=50Hz	2500			V
T_{stg}	Storage Temperature		-40		150	℃
M_s	Module-to-Sink Torque	Recommended(M3)	0.75		0.85	N·m
G	Weight of Module			45		g

Output characteristic of IGBT,Inverter (typical)

$I_c = f(V_{CE})$

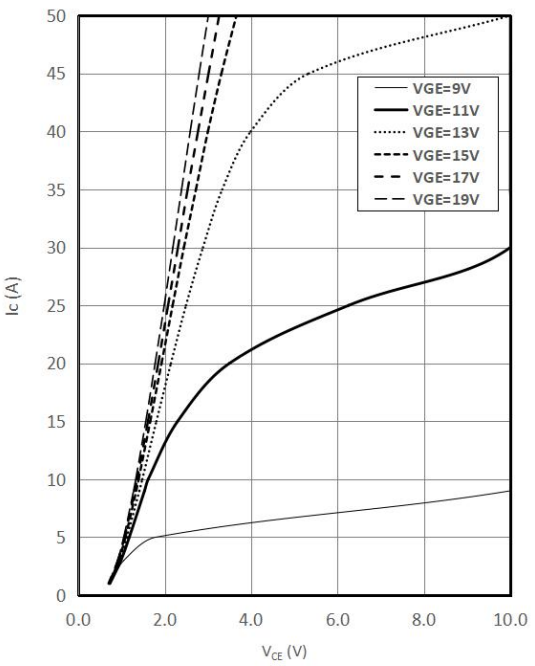
$V_{GE} = 15V$



Output characteristic IGBT , Inverter (typical)

$I_C = f(V_{CE})$

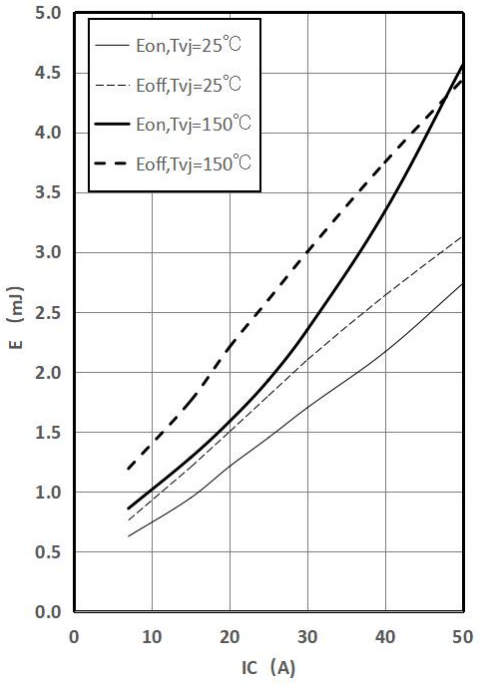
T_{vj}=150°C



Switching losses of IGBT,Inverter (typical)

$E_{on} = f(I_C)$, $E_{off} = f(I_C)$

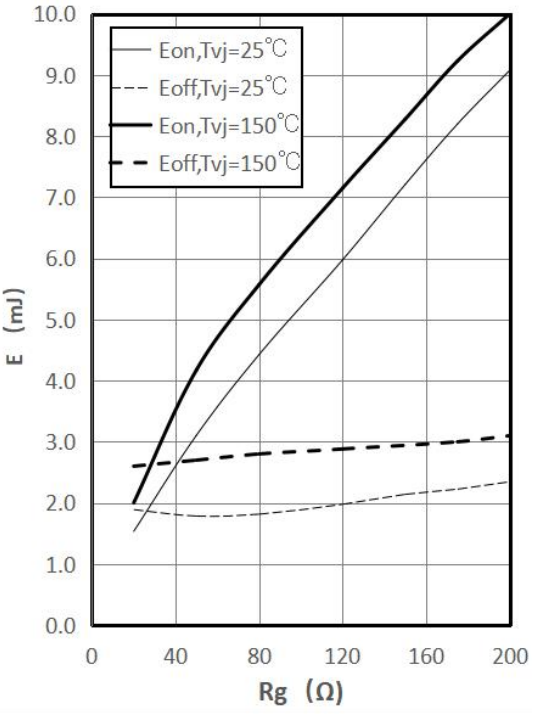
$V_{GE} = \pm 15V$, $R_G = 20\Omega$, $V_{CE} = 600V$



Switching losses of IGBT,Inverter (typical)

$E_{on} = f(R_G)$, $E_{off} = f(R_G)$

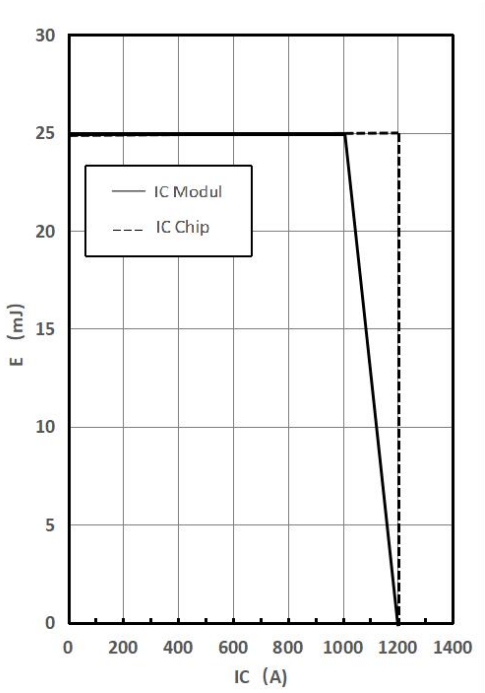
$V_{GE} = \pm 15V$, $I_C = 25A$, $V_{CE} = 600V$



RBSOA IGBT,Inverter (typical)

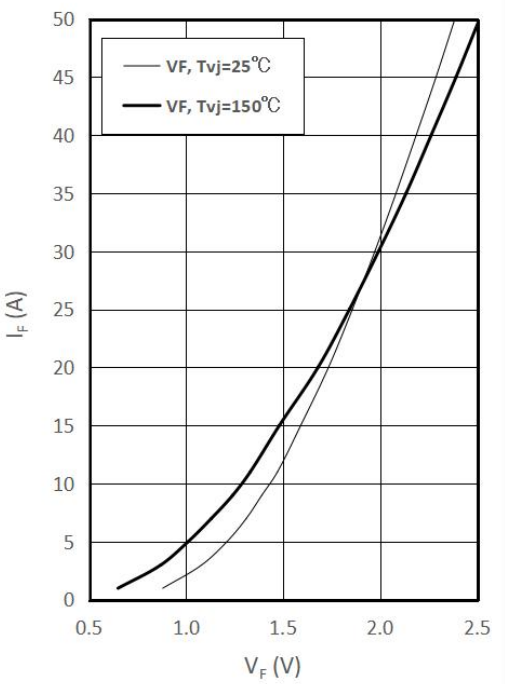
I_C= f (V_{CE})

V_{GE} = ±15V, R_{Goff} = 20Ω, T_{vj} =125 ℃



Forward characteristic of Diode,Inverter (typical)

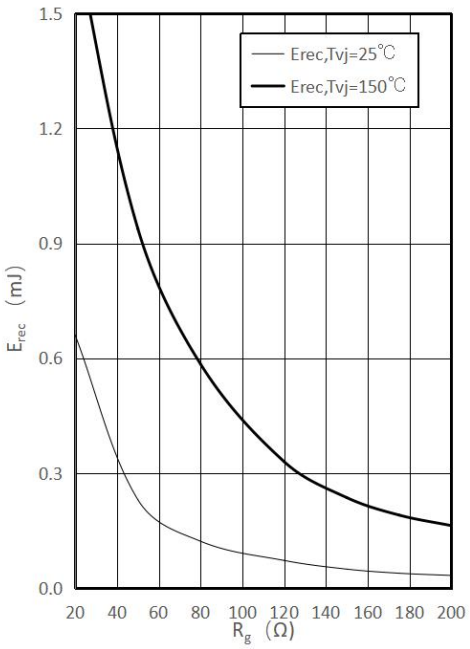
I_F = f(V_F)



Switching losses of Diode, Inverter (typical)

E_{rec} = f(R_G),

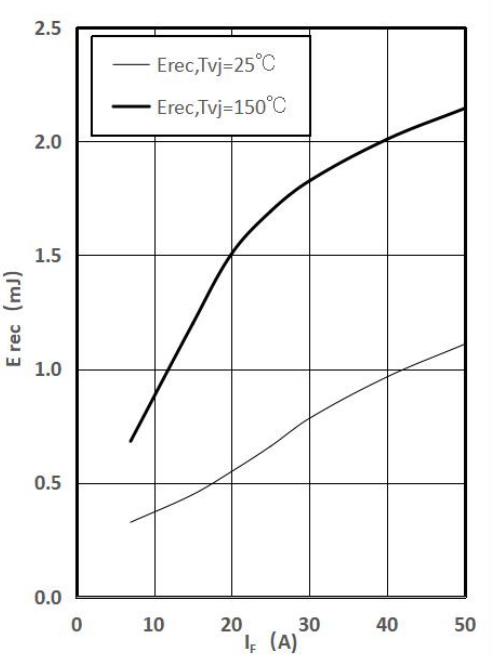
I_F = 25A，V_{CE} = 600V



Switching losses of Diode, Inverter (typical)

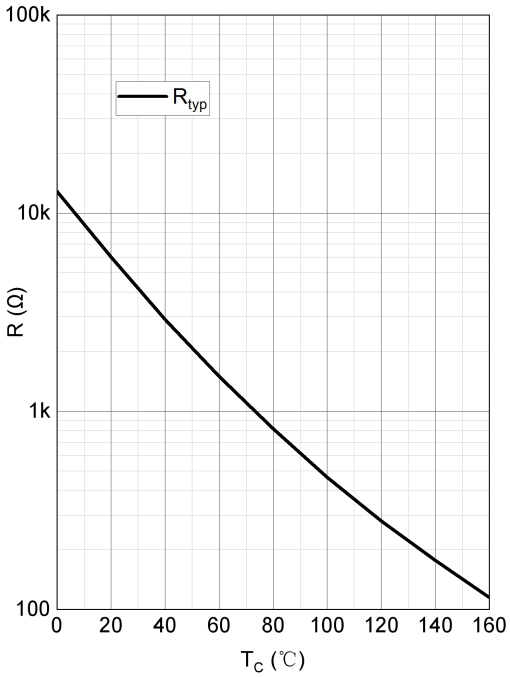
E_{rec} = f(I_F),

R_G =20 Ω，V_{CE} = 600V

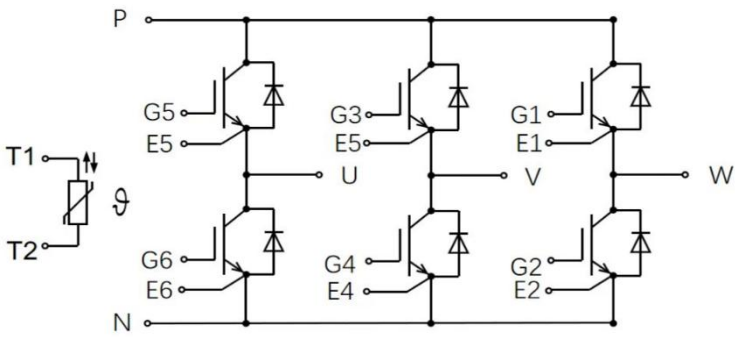


NTC-thermistor-temperature characteristic (typical)

$R = f(T_{NTC})$,

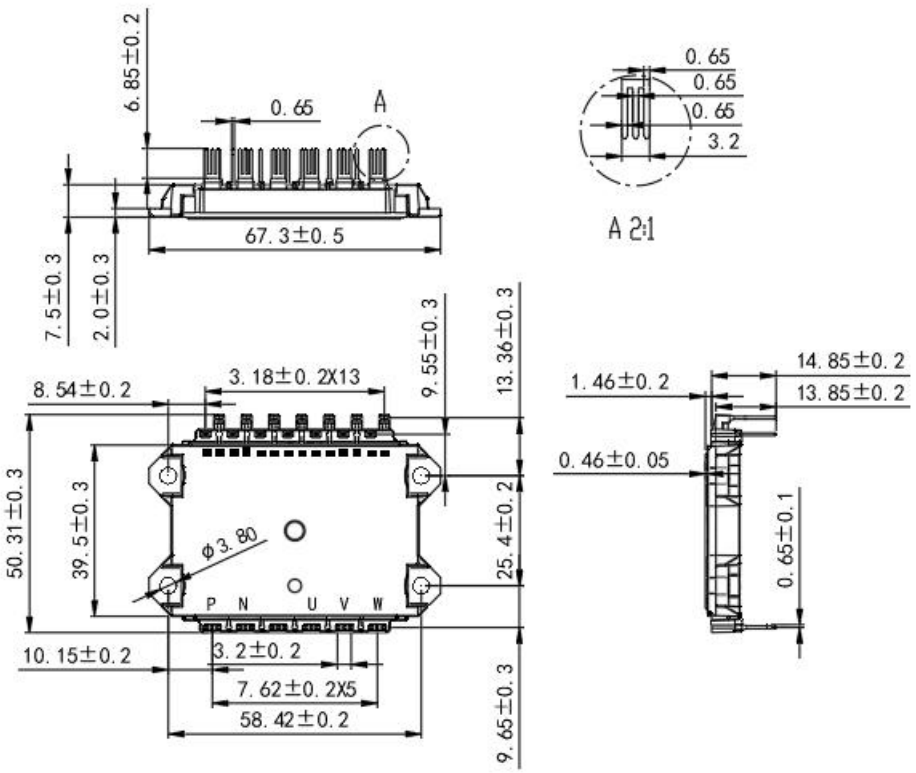


Circuit Diagram



Package Dimensions

(Dimensions in Millimeters)



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