AMG600G1200MED

IGBT Module 1200V 600A

Features

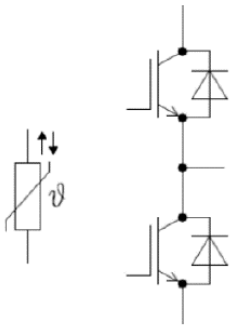
- 1200V 600A, $V_{CE(sat)}$=1.5V @25°C
- MPT Gate Technology
- Low Losses
- High RBSOA capability
- Low reverse-recovery loss

Typical Applications

- Motor Drives
- Solar Applications
- UPS Systems
- Energy Storage

Product summary

V_{CES}	1200V
I_C	600A



Equivalent Circuit Schematic

Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CES}	Collector-emitter voltage, T_{vj}=25°C	1200	V
V_{GES}	Gate-emitter voltage	±20	V
I_C	Collector current, DC, T_C=100°C,T_{vj}=175°C	620	A
I_{CRM}	Repetitive peak collector current	1200	A
T_{SC}	Short circuit withstand time, V_{GE}=15V/-8V, V_{CC}=600V, T_{vj}=150°C	10	μs
T_{stg}	Storage Temperature Range	-40 to +125	°C
T_{vJop}	Temperature under switching conditions	-40 to +150	°C

IGBT Electrical Characteristics

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
$V_{CE(sat)}$	Collector-emitter saturation voltage	I_C=600A, V_{GE}=15V, T_{vj}=25°C			1.50		V
		I_C=600A, V_{GE}=15V, T_{vj}=125°C			1.70		
		I_C=600A, V_{GE}=15V, T_{vj}=150°C			1.77		
I_{CES}	Collector-emitter cut-off	V_{CE}=1200V, V_{GE}=0V, T_{vj}=25°C				1	mA
I_{GES}	Gate-Emitter Leakage Current	V_{GE}=20V, V_{CE}=0V, T_{vj}=25°C				500	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{CE}=V_{GE}, I_D=24mA, T_{vj}=25°C		5.0	6.0	7.0	V
R_{Gint}	Internal Gate Resistir	T_{vj}=25°C			0.43		Ω
C_{ies}	Input Capacitance	V_{CE}=25V, f=100KHz, V_{GE}=0V			128		nF
C_{oes}	Output Capacitance				1587		
C_{res}	Reverse Transfer Capacitance				0.8		
E_{on}	Turn-on energy loss per pulse	V_{CC}=600V, V_{GE}=-8V/15V I_C=600A, R_{GON}=0.5Ω	T_{vj}=25°C		46.37		mJ
			T_{vj}=125°C		60.32		
			T_{vj}=150°C		64.81		
E_{off}	Turn-off energy loss per pulse	R_{GOFF}=3.6Ω Load=35nH	T_{vj}=25°C		54.24		mJ
			T_{vj}=125°C		69.01		
			T_{vj}=150°C		72.84		
Q_G	Gate Charge	V_{GS}=±15V			5.7		uC

td(on)	Turn-on delay time	V_{CE}=600V, V_{GS}=-8V/+15V I_C=600A, R_{GON}=0.5Ω R_{GOFF}=3.6Ω	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C		220 255 260		ns
tr	Rise time		T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C		85 95 95		
td(off)	Turn-off delay time		T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C		877 943 960		
tf	Fall time		T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C		72 119 151		
R_{thJC}	Thermal resistance, junction to case	Per IGBT			0.060		K/W

Diode Inverter
Maximum Rated Values

Symbol	Parameter	Conditions	Rating.	Unit
V_{RRM}	Repetitive peak reverse voltage	T_{vj}=25°C	1200	V
I_F	Forward current, DC	T_C=100°C, T_{vj}=150°C	600	A
I_{FRM}	Repetitive peak forward current	T_p=1ms	1200	A

Diode, Characteristic Values

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_F	Continuous forward voltage	I_f=600A, V_{GE}=0V	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C		2.44 2.60 2.53	2.60	V
Q_r	Recovery Charge	V_{GE}=-8V, I_F=600A, V_R=600 V, dif/dt=5000 A/us, T_{vj}=150°C	T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C		19.4 33.8 45.3		uC
I_{rrm}	Peak Reverse Recovery Current		T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C		264 320 352		A
E_{rec}	Reverse recovery energy		T_{vj}=25°C T_{vj}=125°C T_{vj}=150°C		3.8 13.9 15.9		mJ
R_{thJC}	Thermal resistance, junction to case	Per doide			0.083		K/W

Thermal Characteristics
NTC-Thermistor

Symbol	Parametr	Test Conditions	Min.	Typ.	Max.	Unit
R_{25}	Rated resistance	T_c=25°C		5.00		kΩ
$_{\Delta}R/R$	Deviation of R_{100}	T_c = 100°C, R_{100} = 465Ω	-7.3		7.3	%
P_{25}	Power Dissipatio	T_{NTC} = 25°C			10	mW
$B_{25/50}$	B-value	$R_2 = R_{25\ exp}$ [$B_{25/50}(1/T_2$ - 1/(298,15 K))]		3380		k
$B_{25/80}$	B-value	$R_2 = R_{25\ exp}$ [$B_{25/80}(1/T_2$ - 1/(298,15 K))]		3470		k
$B_{25/100}$	B-value	$R_2 = R_{25\ exp}$ [$B_{25/100}(1/T_2$ - 1/(298,15 K))]		3520		k

Module

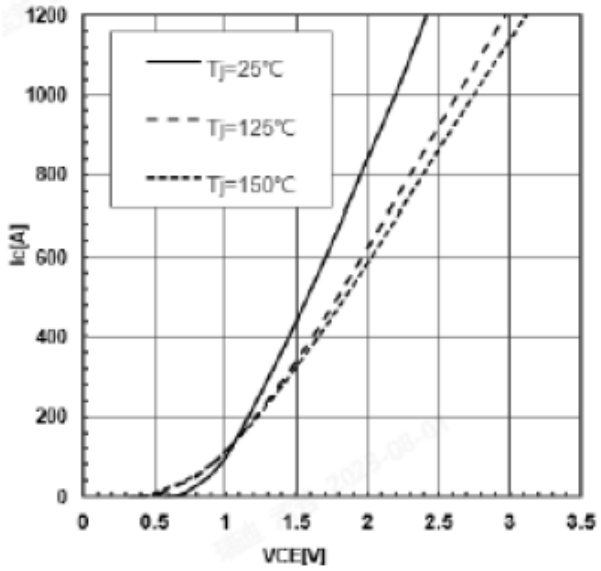
Symbol	Parameter	Conditions	Rating.	Unit
V_{ISOL}	Isolation voltage	Terminals to baseplate, RMS, f=50Hz, t=1min	3	V
	Material of module baseplate		Cu	A
	Internal isolation	Basic insulation	Al_2O_3	A
T_{stg}	Storage temperature		-40~125	°C

Symbol	Parameter	Test Conditions	Values			Unit
			Min.	Typ.	Max.	
M	Mounting torque for module mounting	Screw M5	3.0		6.0	Nm
LsCE	Stray inductance module			20		nH
ds	Creepage distance	Terminal to terminal		13		mm
		Terminal to base plate		14.5		
da	Clearance	Terminal to terminal		10		mm
		Terminal to base plate		12.5		
CTI	Comperative tracking index			>200		
m	Weight			345		g

Typical Performance

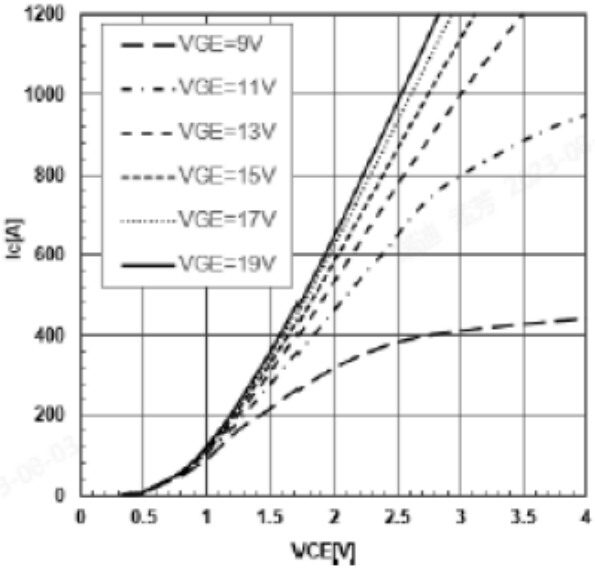
Output characteristic IGBT, Inverter(typical)

Ic=f(Vcc), VGE=15V



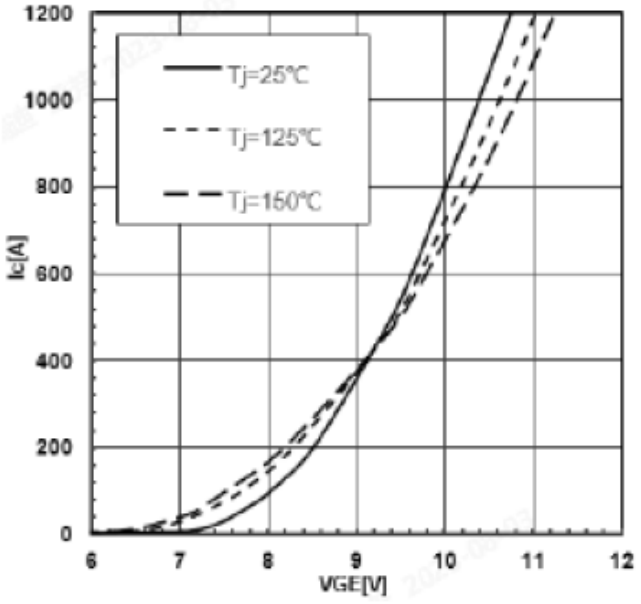
Output characteristic IGBT, Inverter(typical)

Ic=f(Vcc),VGE=15V Inclusive RCC′+EE′



transfer characteristic IGBT, Inverter(typical)

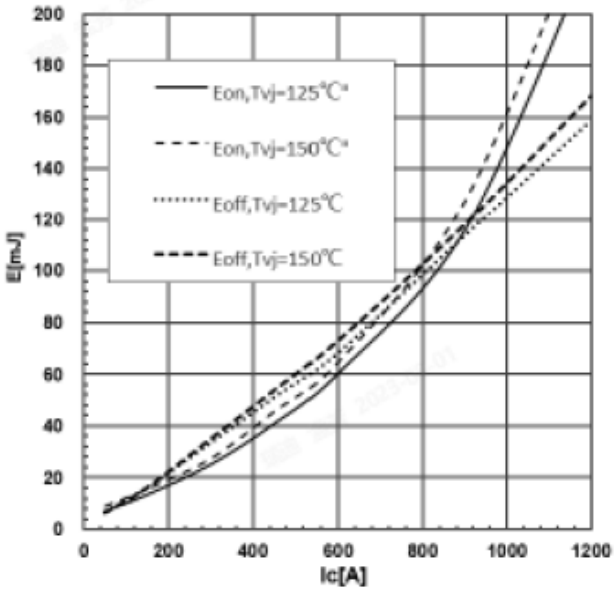
Ic=f(VGE), V_{CE}=20V



Switching losses IGBT, Inverter(typical)

Eon=f(Ic), Eoff= f(Ic)

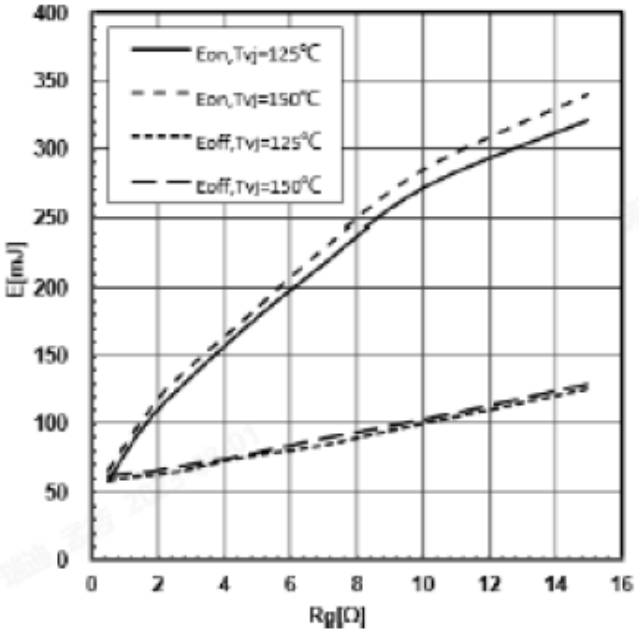
V_{GE}=+15V/-8V, RGon=0.5Ω， RGoff=3.6Ω，VCE=600V



Turn-on loss IGBT, Inverter(typical)

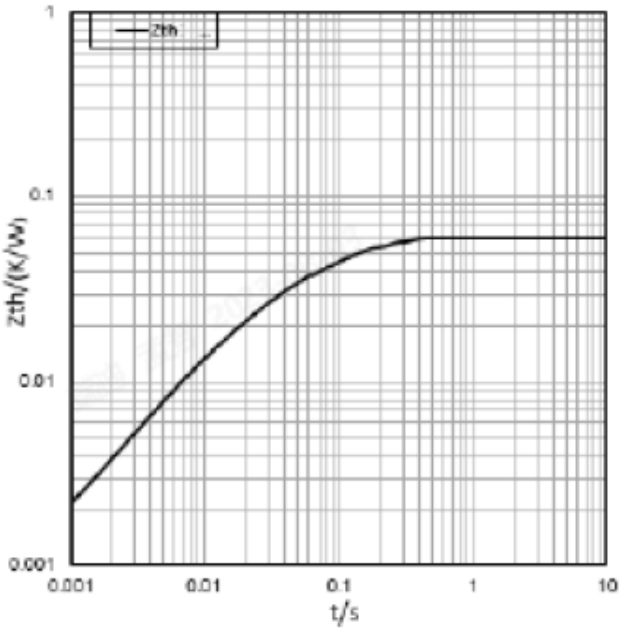
Eon=f(Rg), Eoff= f(Ic)

V_{GE}=+15V/-8V, R_{Gon}=0.5Ω， RGoff=3.6Ω，V_{CC}=600V



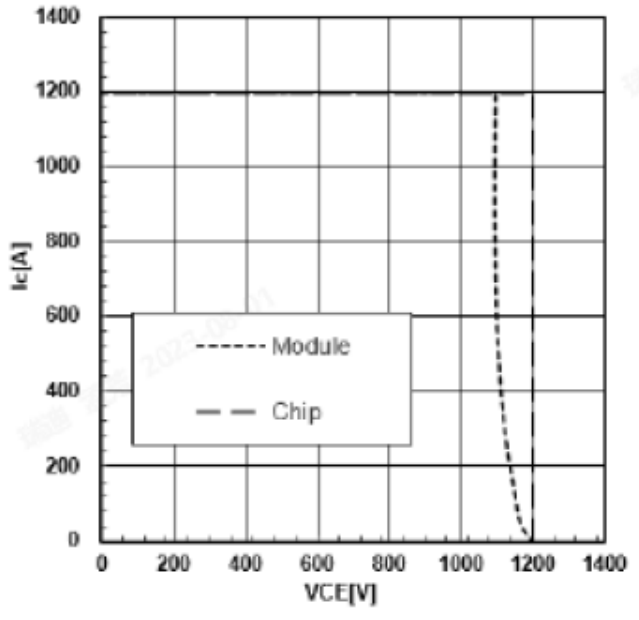
Transient thermal impedance IGBT, Inverter

Zth=f(t)

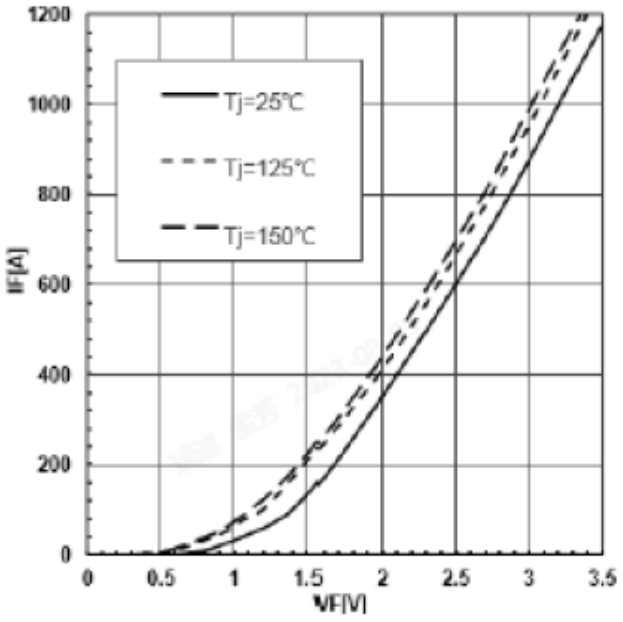


Reverse bias safe operating area IGBT, Inverter(RBSOA)

IC=f(VCE), V_{GE}=+15V/-8V, RGoff=3.6Ω，TVj=150℃

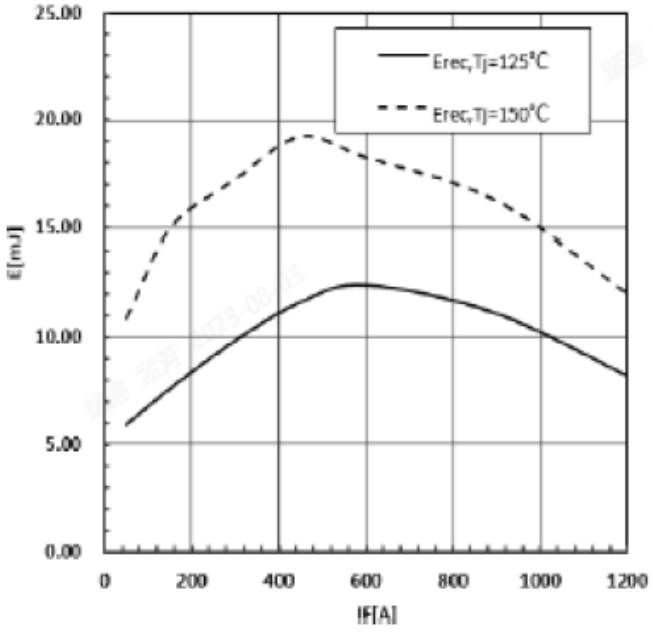


Output characteristic FRD, Inverter(typical) Inclusive RCC′+EE′ IF=f(VF)



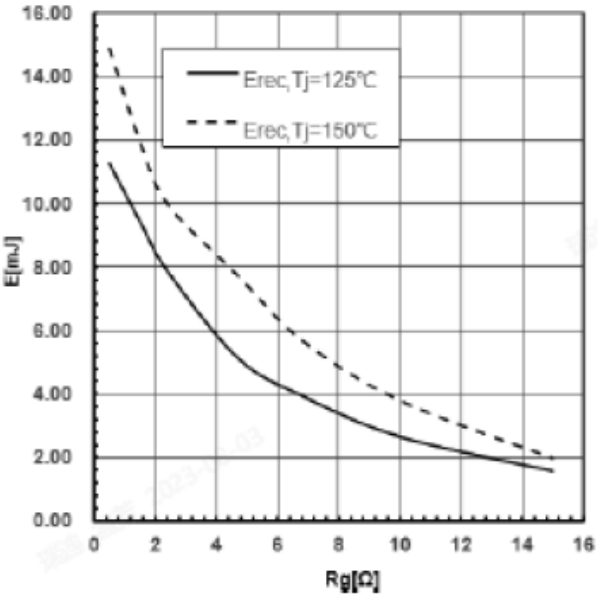
Switching losses FRD, Inverter(typical)

Erec=f(Ic), RGon=0.5Ω， VCE=600V



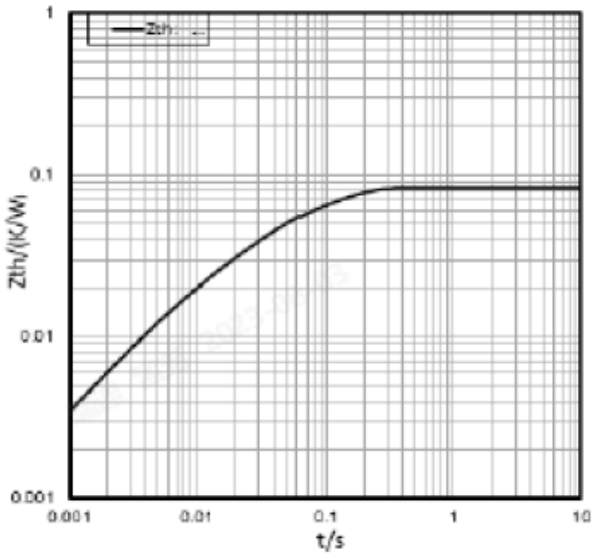
Switching losses FRD, Inverter(typical)

Erec=f(Rg), IF=600A， VCE=600V



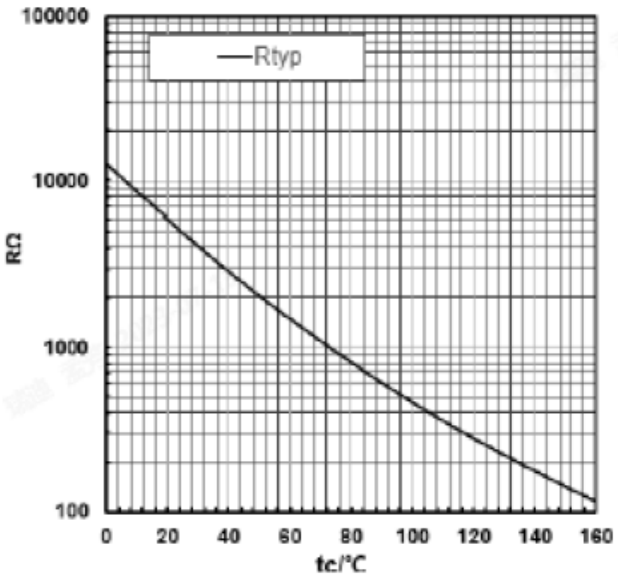
Transient thermal impedance FRD, Inverter

Zth=f(t)

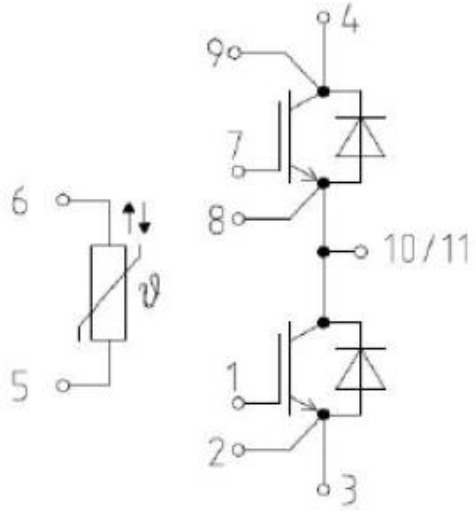


NTC- thermistor-temperature characteristic(typical)

R=f(T)



Circuit Diagram Headline



Package outlines (Unit: mm)