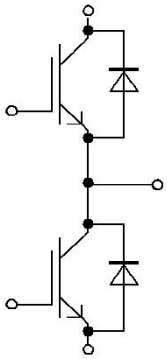
佳恩半导体
JIAENSEMI

GN450HF120T1SA1

Features

• Trench & Field Stop technology
  -Low saturation voltage
  -10μs Short Circuit current
  -Low turn-off losses
  -Positive temperature coefficient

• Free wheeling diodes with fast and soft reverse recovery
• Industrial standard package with copper base plate
• Low switching losses



62mm-B Modele

Applications

• High frequency switching application
• Medical applications
• Motion/servo control
• UPS systems

IGBT-inverter

ABSOLUTE MAXIMUM RATINGS(T C =25°C unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{CES}	Collector Emitter Voltage	T_J=25℃	1200	V
V_{GES}	Gate Emitter Voltage		±20	
I_C	DC Collector Current	T_C=25℃, T_{Jmax}=175℃	630	A
		T_C=90℃, T_{Jmax}=175℃	450	
I_{CM}	Repetitive Peak Collector Current	tp=1ms	900	
P_{tot}	Power Dissipation Per IGBT	T_C=25℃, T_{Jmax}=175℃	2143	W

Diode -inverter

ABSOLUTE MAXIMUM RATINGS(T C =25°C unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
V_{RRM}	Repetitive Reverse Voltage	T_J=25℃	1200	V
$I_{F(AV)}$	Average Forward Current		400	A
I_{FRM}	Repetitive Peak Forward Current	tp=1ms	800	
I^2t		T_J =125℃, t=10ms, V_R=0V	39.2	KA^2S

IGBT-inverter

ELECTRICAL CHARACTERISTICS (T C =25°C unless otherwise specified)

Symbol	Parameter/Test Conditions			Min.	Typ.	Max.	Unit
$V_{GE(th)}$	Gate Emitter Threshold Voltage	$V_{CE}=V_{GE}$, I_C=18mA		5.0	6.0	7.0	V
$V_{CE(sat)}$	Collector - Emitter Saturation Voltage	I_C=450A, V_{GE}=15V, T_J=25℃			1.65	2.10	V
		I_C=450A, V_{GE}=15V, T_J=125℃			2.10		
		I_C=450A, V_{GE}=15V, T_J=150℃			2.20		
I_{CES}	Collector Leakage Current	V_{CE}=1200V, V_{GE}=0V, T_J=25℃				1	μA
		V_{CE}=1200V, V_{GE}=0V, T_J=150℃				10	
I_{GES}	Gate Leakage Current	V_{CE}=0V,V_{GE}=±20V, T_J=25℃		-400		500	nA
R_{gint}	Integrated Gate Resistor				1.4		Ω
Q_g	Gate Charge	V_{CE}=600V, I_C=450A , V_{GE}=15V			2.25		μC
C_{ies}	Input Capacitance	V_{CE}=25V, V_{GE}=0V, f =1MHz			31.5		nF
C_{res}	Reverse Transfer Capacitance				1.5		nF
$t_{d(on)}$	Turn on Delay Time	V_{CC}=600V,I_C=450A R_G =2.0Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		100		ns
			T_J=125℃		120		ns
			T_J=150℃		130		ns
t_r	Rise Time		T_J=25℃		78		ns
			T_J=125℃		86		ns
			T_J=150℃		86		ns
$t_{d(off)}$	Turn off Delay Time	V_{CC}=600V,I_C=450A R_G =2.0Ω, V_{GE}=±15V, Inductive Load	T_J=25℃		550		ns
			T_J=125℃		590		ns
			T_J=150℃		610		ns
t_f	Fall Time		T_J=25℃		120		ns
			T_J=125℃		200		ns
			T_J=150℃		220		ns
E_{on}	Turn on Energy	V_{CC}=600V,I_C=450A R_G =2.0Ω, V_{GE}=±15V, Inductive Load	T_J=125℃		39		mJ
			T_J=150℃		42		mJ
E_{off}	Turn off Energy		T_J=125℃		52		mJ
			T_J=150℃		56		mJ
I_{SC}	Short Circuit Current	tpsc≤10μS , V_{GE}=15V T_J=125℃,V_{CC}=800V			1700		A
R_{thJC}	Junction to Case Thermal Resistance (Per IGBT)					0.07	K /W

Diode-inverter

ELECTRICAL CHARACTERISTICS (T C =25°C unless otherwise specified)

Symbol	Parameter/Test Conditions		Min.	Typ.	Max.	Unit
V_F	Forward Voltage	I_F=400A , V_{GE}=0V, T_J =25℃		1.65	2.1	V
		I_F=400A , V_{GE}=0V, T_J =125℃		1.4		
		I_F=400A , V_{GE}=0V, T_J =150℃		1.35		
t_{rr}	Reverse Recovery Time	I_F=450A , V_R=600V dI_F/dt=-5300A/μs T_J =150℃		530		ns
I_{RRM}	Max. Reverse Recovery Current			485		A
Q_{RR}	Reverse Recovery Charge			133		μC
E_{rec}	Reverse Recovery Energy			59.5		mJ
R_{thJCD}	Junction to Case Thermal Resistance （Per Diode）				0.12	K /W

MODULE CHARACTERISTICS (T C =25°C unless otherwise specified)

Symbol	Parameter/Test Conditions		Values	Unit
T_{Jmax}	Max. Junction Temperature		175	℃
T_{Jop}	Operating Temperature		-40~150	
T_{stg}	Storage Temperature		-40~125	
V_{isol}	Isolation Breakdown Voltage	AC, 50Hz(R.M.S), t=1minute	3000	V
CTI	Comparative Tracking Index		＞225	
Torque	to heatsink	Recommended（M6）	3~5	Nm
	to terminal	Recommended（M6）	2.5~5	Nm
Weight			305	g

Typical Performance Characteristics

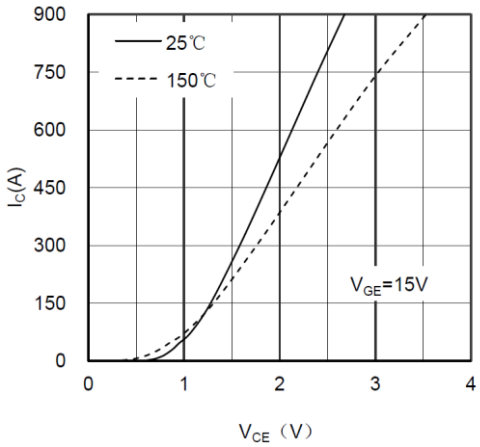


Figure 1. Typical Output Characteristics IGBT-inverter

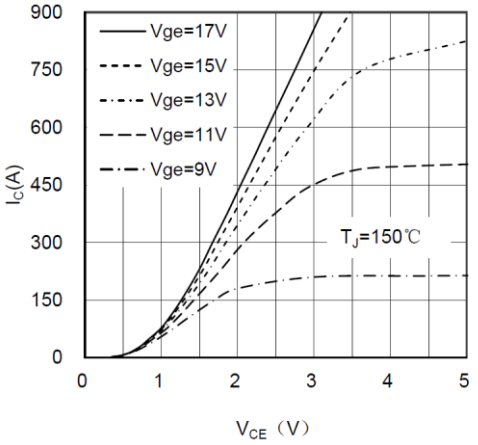


Figure 2. Typical Output Characteristics IGBT-inverter

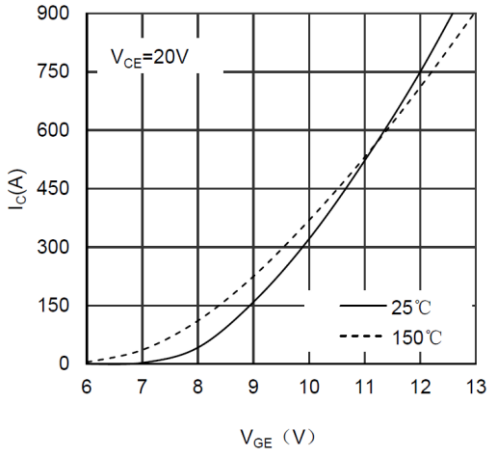


Figure 3. Typical Transfer characteristics IGBT-inverter

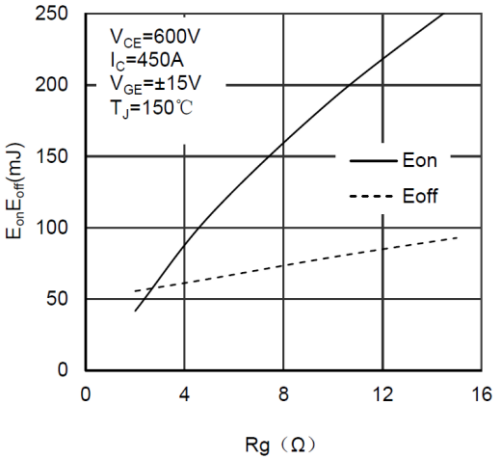


Figure 4. Switching Energy vs Gate Resistor IGBT-inverter

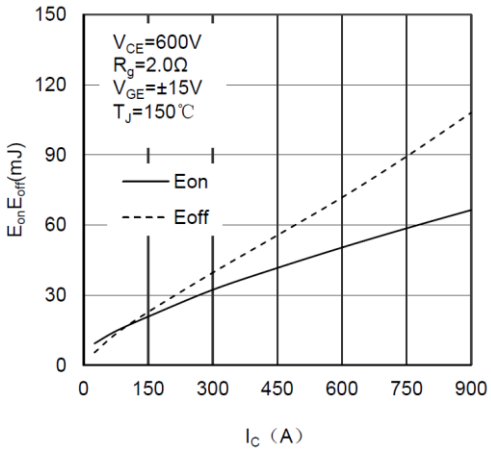


Figure 5. Switching Energy vs Collector Current IGBT-inverter

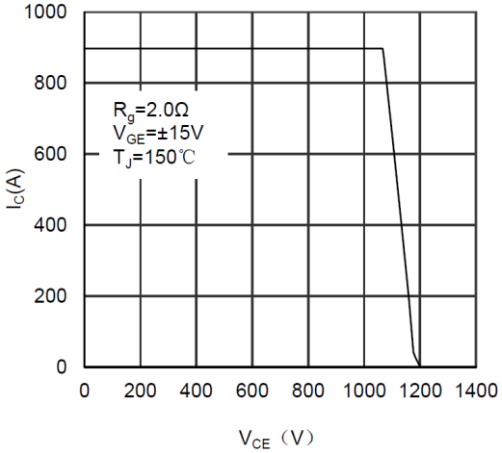


Figure 6. Reverse Biased Safe Operating Area IGBT-inverter

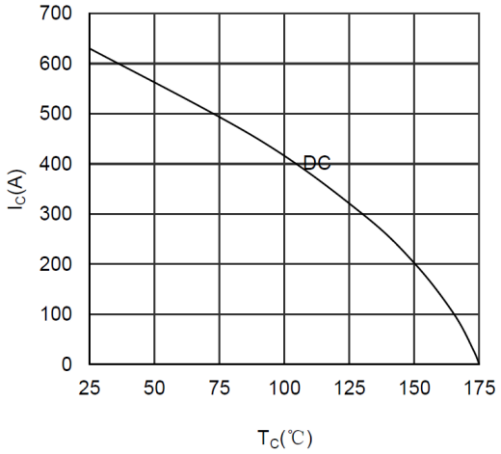


Figure 7. Collector Current vs Case temperature
IGBT -inverter

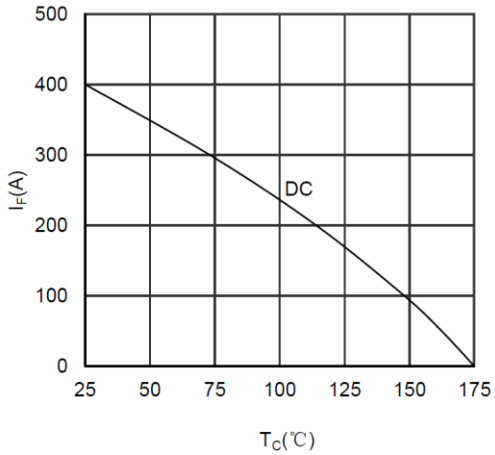


Figure 8. Forward current vs Case temperature
Diode -inverter

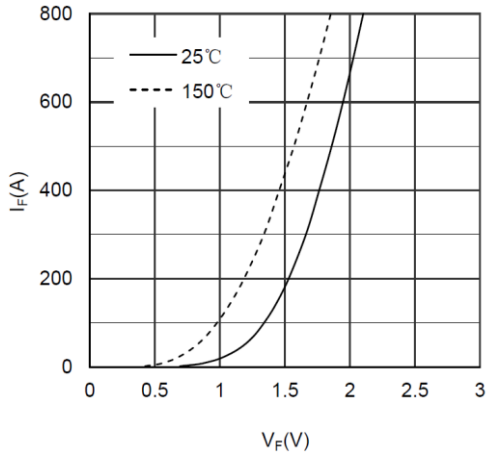


Figure 9. Diode Forward Characteristics Diode -inverter

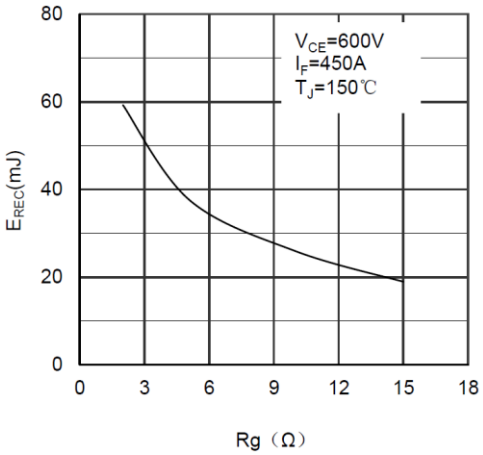


Figure 10. Switching Energy vs Gate Resistor Diode - inverter

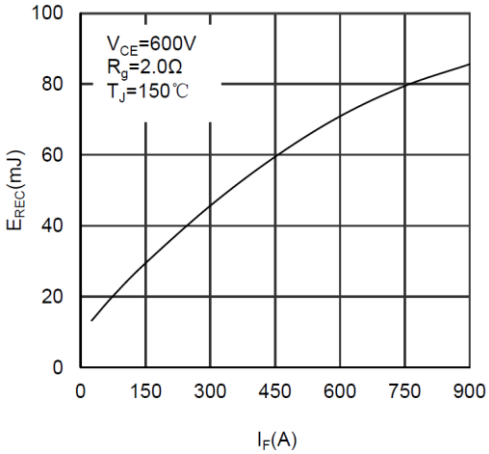


Figure 11. Switching Energy vs Forward Current
Diode-inverter

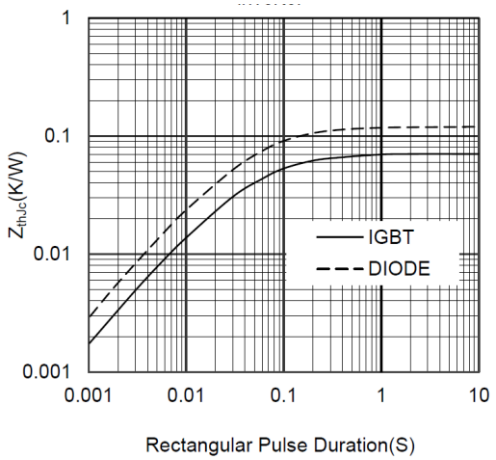
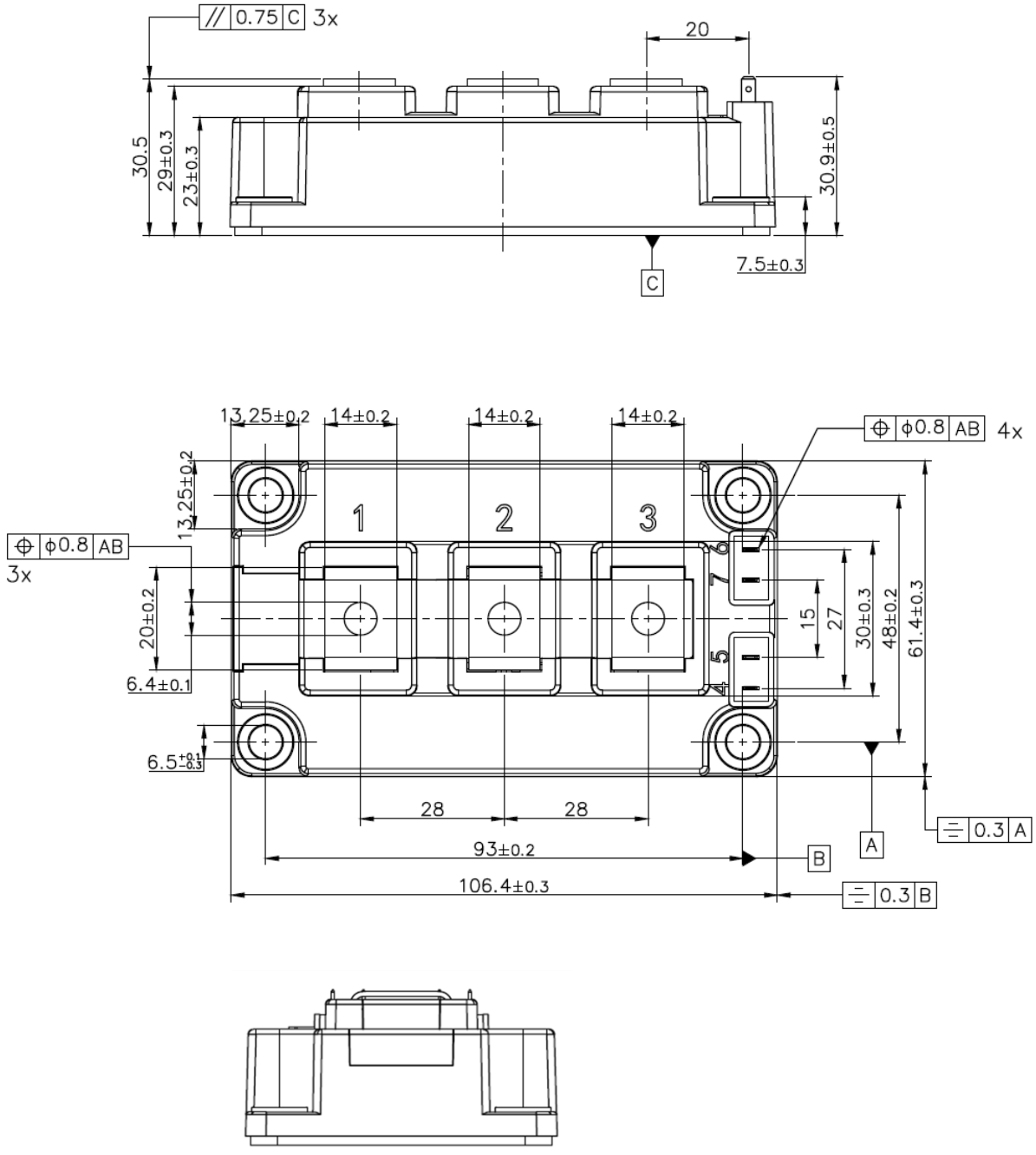


Figure 12. Transient Thermal Impedance of Diode and
IGBT-inverter

Mechanical Dimensions



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