HCG800FH120A2E1

1200V / 800A 62 mm with Cu Baseplate

Features

- $V_{CE(SAT)}$ with positive temperature coefficient
- High power density
- High creepage and clearance distances

Applications

- Inverter for motor drives AC and DC servo drives
- High power converters
- UPS systems
- Solar power

Table 1 Key Performance and Package Parameters

Type	V_{CE}	I_C (T_C = 80°C)	$V_{CE(SAT)}$ (T_{vj} = 25°C, I_C = 800A, V_{GE} = 15V)	T_{vjmax}	Package
IGBT	1200V	800A	1.47 V	175°C	62mm

Table 2 Absolute Maximum ratings

Parameter	Symbol	Conditions	Value	Unit
Collector emitter voltage	V_{CE}	T_{vj} = 25°C	1200	V
Continuous DC collector current	I_{CDC}	T_C = 80°C	800	A
Repetitive peak collector current	I_{CRM}	Tp=1ms	1600	
Continuous DC forward current	I_F		800	A
Repetitive peak forward current	I_{FRM}	Tp=1ms	1600	A
Gate Source Voltage	V_{GE}	T_{vj} = 25°C	±20	V
Junction Temperature	T_{vj}		-40 to +175	°C
Storage Temperature	T_{stg}		-40 to +125	
Operating virtual junction temperature	T_{vjop}		175	°C

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Table 3 Thermal resistance

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
IGBT Thermal resistance junction - case	R_{thJC}	Per IGBT	-	0.041	-	°C / W
IGBT Thermal resistance case - heatsink	R_{thCH}	Per IGBT	-	0.053	-	°C / W
Diode Thermal resistance junction - case	R_{thJC}	Per diode	-	0.069	-	°C / W
Diode Thermal resistance case - heatsink	R_{thCH}	Per diode	-	0.056	-	°C / W

Table 4 Static characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector emitter voltage	$V_{(BR)CES}$	T_{vj} = 25°C	1200	-	-	V
Collector emitter saturation voltage	V_{CEsat}	V_{GE} = 15V, I_C = 800A T_{vj} = 25°C	-	1.47	-	V
		V_{GE} = 15V, I_C = 800A T_{vj} = 175°C	-	1.70	-	
Diode forward voltage	V_F	V_{GE} = 0V, I_C = 800A T_{vj} = 25°C	-	1.68	-	V
		V_{GE} = 0V, I_C = 800A T_{vj} = 175°C	-	1.76	-	
Gate-emitter threshold voltage	$V_{GE(th)}$	V_{CE} = V_{GE}, I_C = 16mA	-	5.93	-	V
Zero gate voltage collector current	I_{CES}	V_{CE} = 1200V, V_{GE} = 0V T_{vj} = 25°C	-	-	100	uA
Gate-emitter leakage current	I_{GES}	V_{GE} = 20V, V_{CE} = 0V	-	-	100	nA
Input Capacitance	C_{ies}	V_{GS} = 0 V V_{DS} = 25 V f = 100kHz	-	133	-	nF
Output Capacitance	C_{oes}		-	3.47	-	
Reverse Transfer Capacitance	C_{res}		-	0.80	-	
Gate input resistance	R_G	f = 1M Hz	-	0.42	-	Ω
Gate Charge	Q_G	V_{GE} = -15 V to 15 V V_{CE} = 600 V	-	11.2	-	μC

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Table 5 Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Turn-on delay time	t_{don}	T_{vj} = 25°C , V_{CC} = 600V, I_C = 800A , V_{GE} = -15/15V , $R_{G(on)}$=0.51Ω,$R_{G(off)}$= 0.51Ω	-	340	-	ns
Rise time	t_r		-	50	-	
Turn-off delay time	t_{doff}		-	470	-	
Fall time	t_f		-	110	-	
Turn-on energy	E_{on}		-	18.6	-	mJ
Turn-off energy	E_{off}		-	63	-	
Total switching energy	E_{ts}		-	81.6	-	
Turn-on delay time	t_{don}	T_{vj} = 175°C , V_{CC} = 600V, I_C = 800A , V_{GE} = -15/15V , $R_{G(on)}$=0.51Ω,$R_{G(off)}$= 0.51Ω	-	360	-	ns
Rise time	t_r		-	60	-	
Turn-off delay time	t_{doff}		-	560	-	
Fall time	t_f		-	225	-	
Turn-on energy	E_{on}		-	39	-	mJ
Turn-off energy	E_{off}		-	93	-	
Total switching energy	E_{ts}		-	132	-	
Short circuit current	I_{SC}	T_{vj} = 175°C , V_{CC} = 800V,V_{GE} = 15V , V_{CEmax} = V_{CES} -L_{sCE}*di/dt $T_P \leq 6$ us	-	2590	-	A

Table 6 Diode Recovery characteristics

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reverse Recovery Time	T_{rr}	T_{vj} = 25°C , V_{CC} = 600V, I_C = 800A , V_{GE} = -15/15V , $R_{G(on)}$ = 0.51Ω, $R_{G(off)}$ =0.51Ω	-	270	-	ns
Peak reverse recovery current	I_{rrm}		-	450	-	A
Reverse recovery charge	Q_{rr}		-	48	-	μC
Reverse recovery energy	E_{rec}		-	31.5	-	mJ
Reverse Recovery Time	T_{rr}	T_{vj} = 175°C , V_{CC} = 600V, I_C = 800A , V_{GE} = -15/15V , $R_{G(on)}$ = 0.51Ω, $R_{G(off)}$ = 0.51Ω	-	470	-	ns
Peak reverse recovery current	I_{rrm}		-	580	-	A
Reverse recovery charge	Q_{rr}		-	110	-	μC
Reverse recovery energy	E_{rec}		-	63.3	-	mJ

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Table 7 Module characteristics

Parameter	Symbol	Conditions	Value	Unit
Isolation test voltage	V_{ISOL}	RMS, f = 50 Hz，t = 1min	4.0	kV
Material of module baseplate			Cu+Ni	
Internal isolation		Basic insulation	Improved Al_2O_3 ceramic	
Mounting torque of screws to heat sink	Ms	M5	3.0-6.0	N·m
Mounting torque of screws to terminals	Mt	M6	2.5-5.0	N·m
Comparative tracking index	CTI		>175	

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Characteristics Diagrams

Fig.1 Typical Output Characteristic, IGBT, Inverter
I_C= f (V_{CE})
V_{GE} = 15V

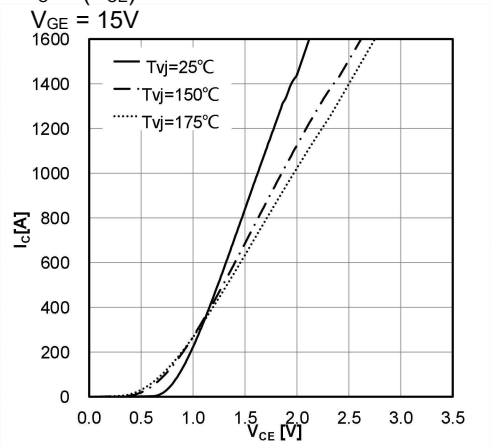


Fig.2 Typical Output Characteristic, IGBT, Inverter
I_C = f (V_{CE})
T_{Vj} = 175°C

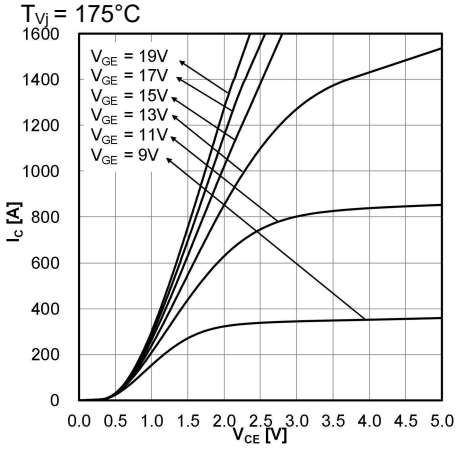


Fig.3 Typical Output Characteristic, IGBT, Inverter
I_C = f (V_{GE})
V_{CE} = 20V

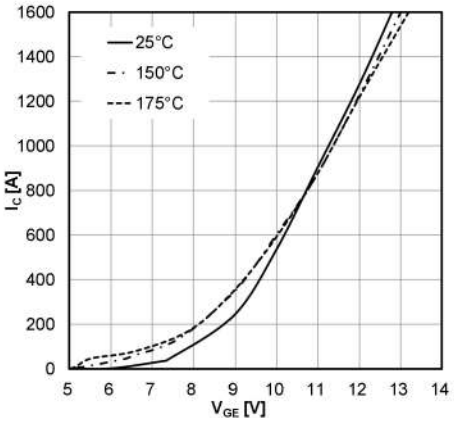


Fig.4 Switching losses, IGBT, Inverter
E = f(I_C)
R_{Goff} = 0.51Ω, R_{Gon} = 0.51Ω, V_{CE} = 600V, V_{GE} = ±15V

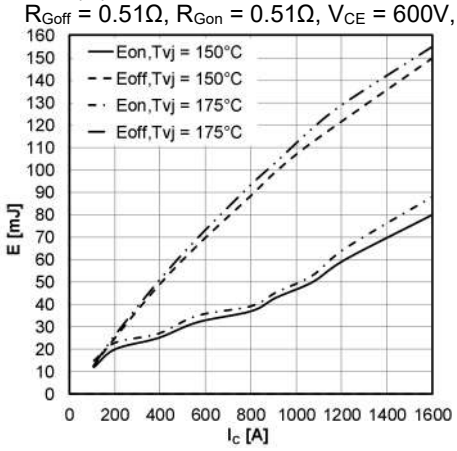


Fig.5 Switching losses, IGBT, Inverter
E = f (R_G)
I_C = 800A, V_{CE} = 600V, V_{GE} = ±15V

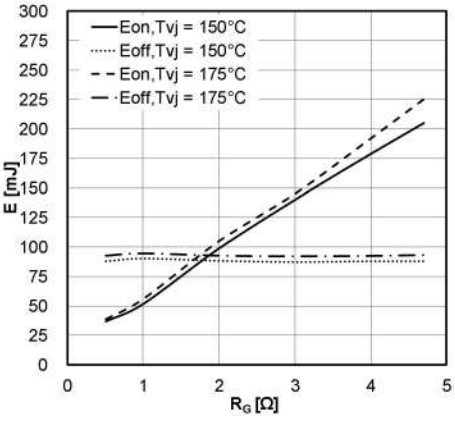
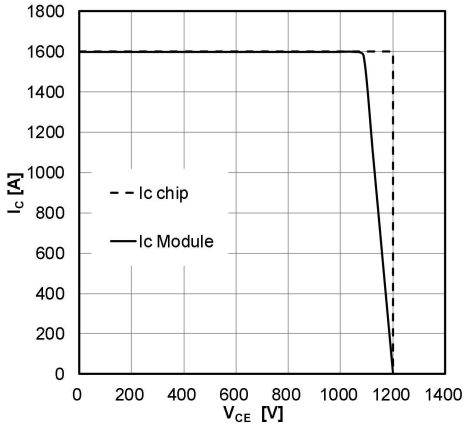


Fig.6 Reverse bias safe operating area (RBOSA), IGBT, Inverter
I_C = f (V_{CE})
R_{Goff} = 0.51Ω, V_{GE} = ±15V, T_{vj} = 175°C



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Characteristics Diagrams

Fig.7 Capacity characteristic, IGBT, Inverter
C= f (V_{CE})
f = 100 KHz, V_{GE} = 0V, T_{vj}= 25°C

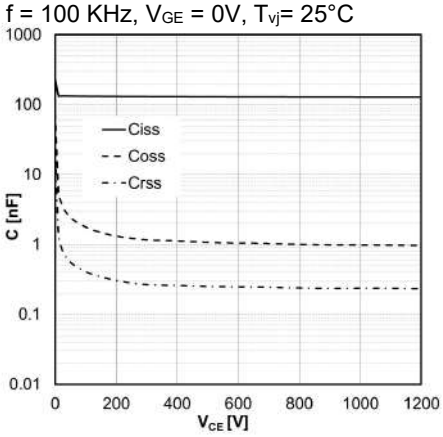


Fig.8 Forward characteristic, Diode, Inverter
I_F = f (V_F)

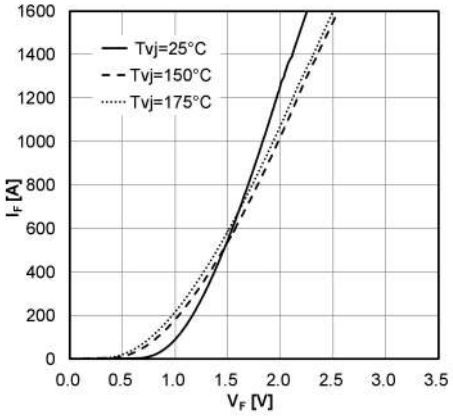


Fig.9 Switching losses, Diode, Inverter
E_{rec} = f (R_G)
V_{CE} = 600V, I_F= 800A

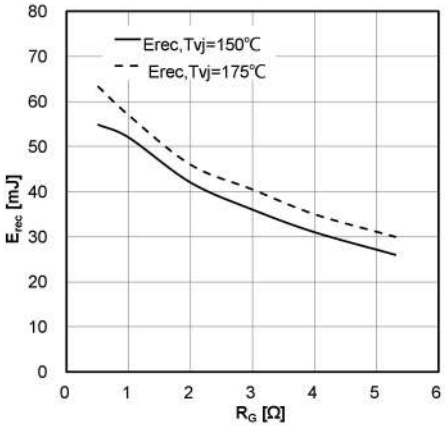


Fig.10 Switching losses, Diode, Inverter
E_{rec} = f (I_F)
V_{CE} = 600V, R_{Goff} = 0.51Ω, R_{Gon} = 0.51Ω, V_{GE} = ±15V

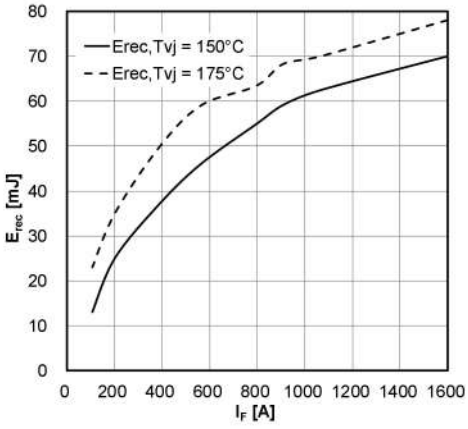


Fig.11 Transient thermal impedance IGBT, Inverter
Z_{thJC} = f (t)

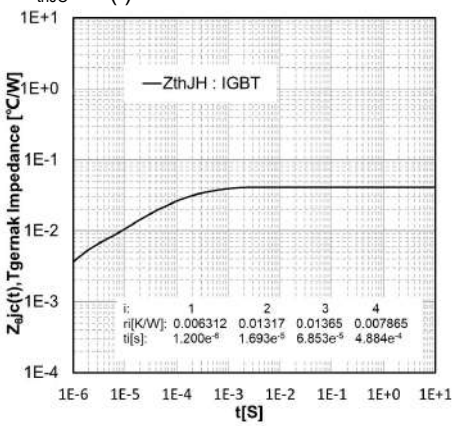
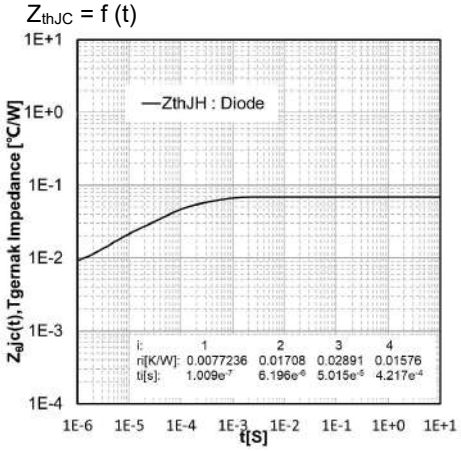


Fig.12 Transient thermal impedance Diode, Inverter
Z_{thJC} = f (t)



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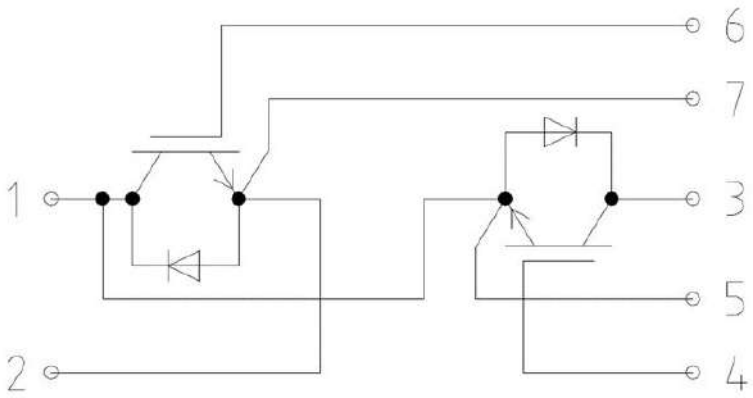
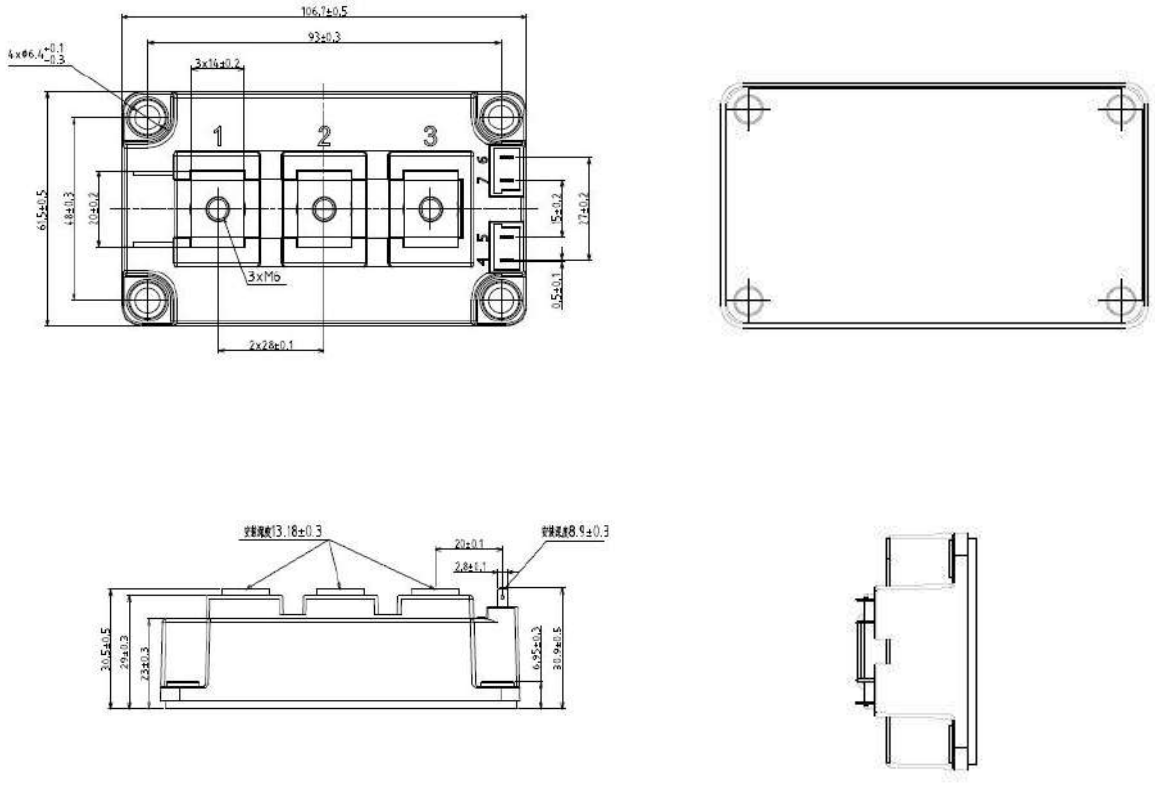
Package information

Circuit diagram



Package outlines



Revision History

Document Version	Description of Changes
RevX.0.1	Released

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