DAHF600G120SG2

IGBT Power Module
1200V / 600A

Preliminary

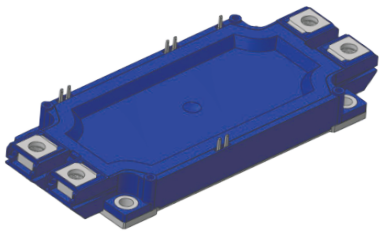
Features

- Fast Switching Trench / Field Stop IGBT Technology
- Low Switching Losses
- Super Fast Diodes
- High Short Circuit Capability

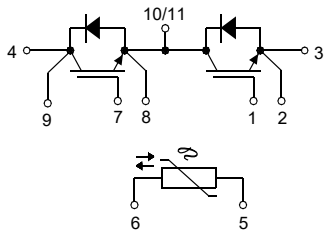
Applications

- Welder / Power Supply
- UPS / Inverter
- Industrial Motor Drive

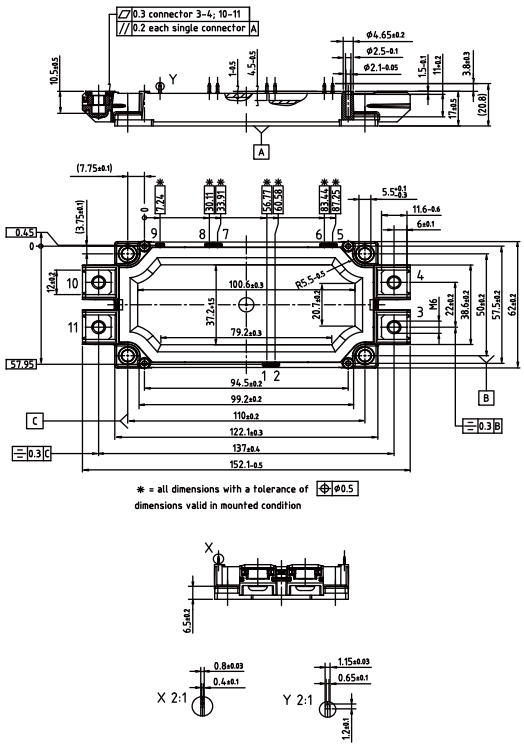
HDA-15262



Circuit Diagram Headline



Package Outlines



Dimensions in mm (1 mm = 0.0394")

Maximum Ratings (T_C= 25℃)

Item		Symbol	Rated Value	Unit
Collector-Emitter Voltage	T_{VJ} = 25℃	V_{CES}	1200	V
Gate-Emitter Peak Voltage		V_{GES}	±20	V
Continuous DC Collector Current	T_C = 100℃	$I_{C,nom.}$	600	A
Repetitive Peak Collector Current	tp =1ms	I_{CRM}	1200	A
Total Power Dissipation		P_{tot}	3380	W
Isolation Voltage	RMS, f=50Hz, t=1min	V_{iso}	2500	V
Continuous DC Forward Current		I_F	600	A
Repetitive Peak Forward Current	tp =1ms	I_{FRM}	1200	A
Temperature under switching conditions		$T_{VJ\ op}$	−40～+150	℃
Storage Temperature		T_{stg}	−40～+125	℃
Mounting Torque	Module Base to Heatsink (M5)		3～6	N.m
	Busbar to Terminal (M6)		3～6	

■ Electrical Characteristics (T_{VJ} = 25°C)

Characteristics	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Collector-emitter saturation voltage	$V_{CE\ sat}$	I_C =600A, V_{GE} =15V	T_{vj} =25°C		1.75	2.1	V
		I_C =600A, V_{GE} =15V	T_{vj} =125°C		2.0		
Gate threshold voltage	V_{GEth}	I_C =11.5mA, V_{CE} =V_{GE}, T_{vj} =25°C		5.5	6.0	6.6	V
Gate charge	Q_G	I_C =600A, V_{CE} =600V,V_{GE} =15V			2287		nC
Internal gate resistor	R_{Gint}	T_{vj} =25°C			1.07		Ω
Input capacitance	C_{ies}	f = 100KHz, T_{vj} =25°C, V_{CE} =25V, V_{GE} =0V			30		nF
Output capacitance	C_{oes}	f = 100KHz, T_{vj} =25°C, V_{CE} =25V, V_{GE} =0V			2.5		nF
Reverse transfer capacitance	C_{res}	f = 100KHz, T_{vj} =25°C, V_{CE} =25V, V_{GE} =0V			15.1		nF
Collector-emitter cut-off current	I_{CES}	V_{CE} =1200V, V_{GE} =0V, T_{vj} =25°C				1	mA
Gate-emitter leakage current	I_{GES}	V_{CE} =0V, V_{GE} =20V, T_{vj} =25°C				100	nA
Turn-on delay time, inductive load	$t_{d\ on}$	I_C =600A, V_{CE} =600V	T_{vj} =25°C		356		ns
		V_{GE} = ±15V	T_{vj} =125°C		366		
		$R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω	T_{vj} =150°C		360		
Rise time, inductive load	t_r	I_C =600A, V_{CE} =600V	T_{vj} =25°C		100		ns
		V_{GE} = ±15V	T_{vj} =125°C		108		
		$R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω	T_{vj} =150°C		132		
Turn-off delay time, inductive load	$t_{d\ off}$	I_C =600A, V_{CE} =600V	T_{vj} =25°C		449		ns
		V_{GE} = ±15V	T_{vj} =125°C		492		
		$R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω	T_{vj} =150°C		508		
Fall time, inductive load	t_f	I_C =600A, V_{CE} =600V	T_{vj} =25°C		49		ns
		V_{GE} = ±15V	T_{vj} =125°C		74		
		$R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω	T_{vj} =150°C		76		
Turn-on energy loss per pulse	E_{on}	I_C =600A, V_{CE} =600V	T_{vj} =25°C		27		mJ
		V_{GE} = ±15V,	T_{vj} =125°C		64		
		$R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω	T_{vj} =150°C		74		
Turn-off energy loss per pulse	E_{off}	I_C =600A, V_{CE} =600V	T_{vj} =25°C		47		mJ
		V_{GE} = ±15V	T_{vj} =125°C		56		
		$R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω	T_{vj} =150°C		59		
SC data	I_{SC}	V_{GE} ≤15V, V_{CC} =800V	t_P ≤10μs,		2400		A
		V_{CEmax} =V_{CES} - L_{sCE} ·di/dt	T_{vj} =150°C				
Thermal resistance, junction to case	R_{thJC}	per IGBT				0.037	°C/W
Thermal resistance, case to heatsink	R_{thCH}	per IGBT			0.035		°C/W
External gate resistance	R_{Gext}	T_{vj} =25°C		0.5			Ω

■ Diode Ratings & Characteristics

Characteristics	Symbol	Test Conditions	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	T_{vj} =25°C	1200	V
Continuous DC forward current	I_F		600	A
Repetitive peak forward current	I_{FRM}	t_P =1ms	1200	A
I²t - value	I²t	V_R =0V, t_P =10ms, T_{vj} =125°C	40000	A²s
		V_R =0V, t_P =10ms, T_{vj} =150°C	37500	

Characteristics	Symbol	Test Conditions		Min.	Typ.	Max.	Unit
Forward voltage	V_F	I_F =600A, V_{GE} =0V	T_{vj} =25°C		2.3	2.6	V
		I_F =600A, V_{GE} =0V	T_{vj} =125°C		2.0		
Peak reverse recovery current	I_{RRM}	I_F =600A, -di$_F$/dt = 5000 A/µs	T_{vj} =25°C		216		A
		V_R =600V	T_{vj} =125°C		336		
		VGE = ±15V	T_{vj} =150°C		344		
Recovered charge	Qrr	I_F =600A, -di$_F$/dt = 5000 A/µs	T_{vj} =25°C		19610		nC
		V_R =600V	T_{vj} =125°C		44870		
		VGE = ±15V	T_{vj} =150°C		61250		
Reverse recovery energy	Erec	I_F =600A, -di$_F$/dt = 5000 A/µs	T_{vj} =25°C		8343		uJ
		V_R =600V	T_{vj} =125°C		13400		
		VGE = ±15V	T_{vj} =150°C		18700		
Reverse Recovery Time	Trr	I_F =600A, -diF/dt = 5000 A/µs , V_R =600V, VGE = ±15V, T_{vj}=25°C			183		ns
Thermal resistance, junction to case	R_{thJC}	per diode				0.065	°C/W
Thermal resistance, case to heatsink	R_{thCH}	per diode			0.039		°C/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150	°C

■ Package

Parameter	Symbol	Test Conditions	Value	Unit
Creepage distance	$d_{Creep\ nom}$	terminal to baseplate, nom.	> 15	mm
Creepage distance	$d_{Creep\ min}$	terminal to baseplate, min.	14.7	mm
Creepage distance	$d_{Creep\ nom}$	terminal to terminal, nom.	> 19.3	mm
Creepage distance	$d_{Creep\ min}$	terminal to terminal, min.	19.3	mm
Clearance	$d_{Clear\ nom}$	terminal to baseplate, nom.	> 12.5	mm
Clearance	$d_{Clear\ min}$	terminal to baseplate, min.	12.5	mm
Clearance	$d_{Clear\ nom}$	terminal to terminal, nom.	> 10	mm
Clearance	$d_{Clear\ min}$	terminal to terminal, min.	9.6	mm

Typical Characteristics

Preliminary Data

Fig.1 Output characteristic IGBT,Inverter (typical)

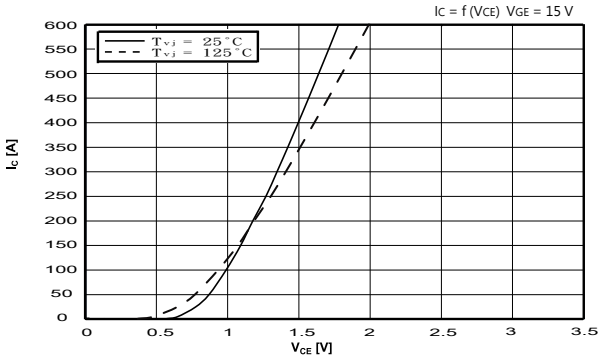


Fig.2 Output characteristic IGBT,Inverter (typical)

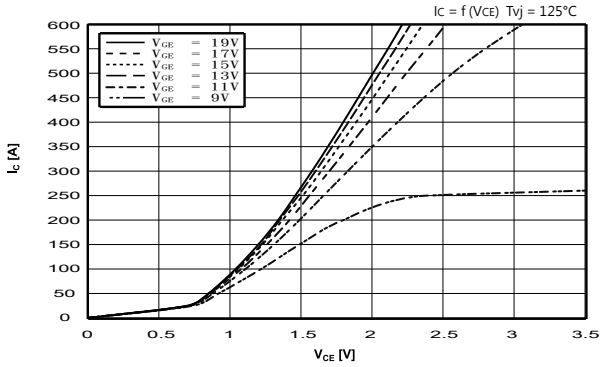


Fig.3 Transfer characteristic IGBT,Inverter (typical)

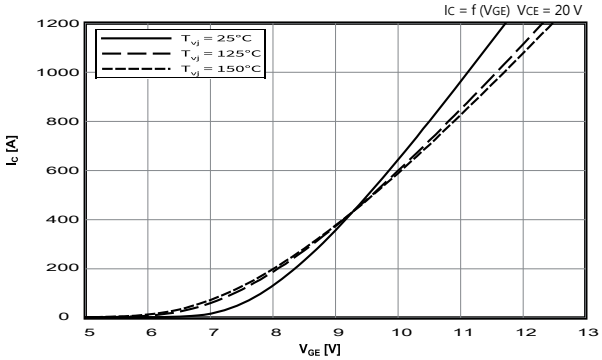


Fig.4 Switching losses IGBT,Inverter (typical)

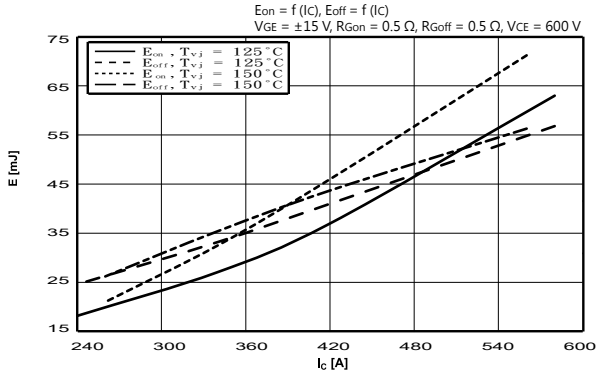


Fig.5 Switching losses IGBT,Inverter (typical)

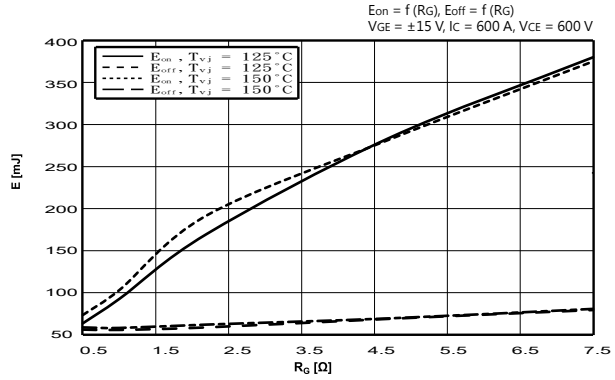


Fig.6 Transient thermal impedance IGBT,Inverter

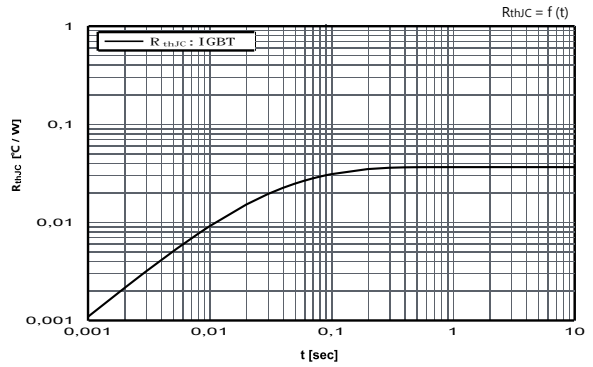


Fig.7 Reverse bias safe operating area IGBT,Inverter (RBSOA)

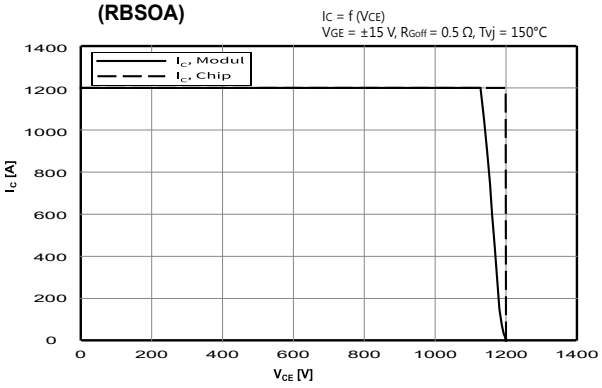
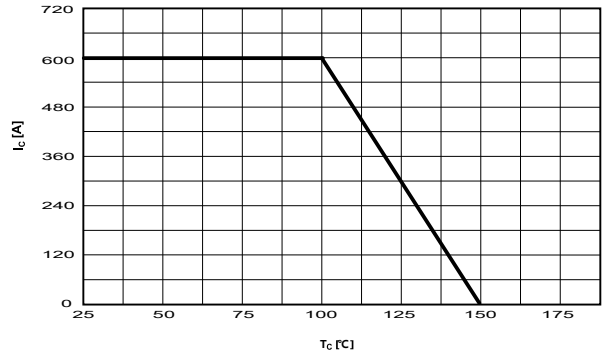


Fig.8 Output characteristic IGBT,Inverter (typical)



Typical Characteristics

Preliminary Data

Fig.9 Gate Charge Characteristics(typical)

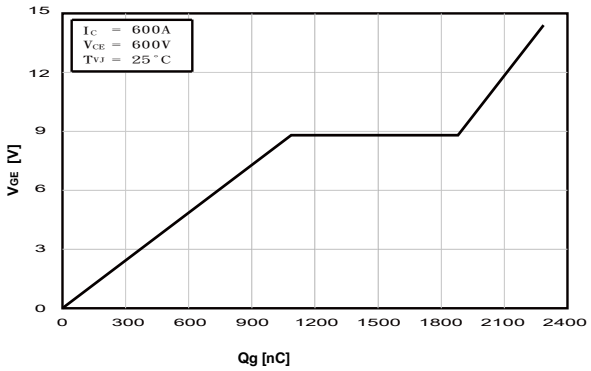


Fig.10 Forward characteristic of Diode, Inverter (typical)

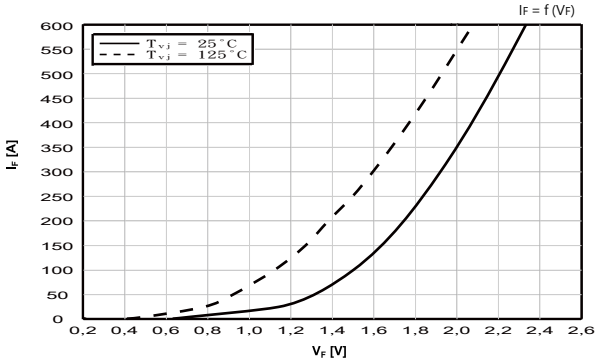


Fig.11 Switching losses Diode, Inverter (typical)

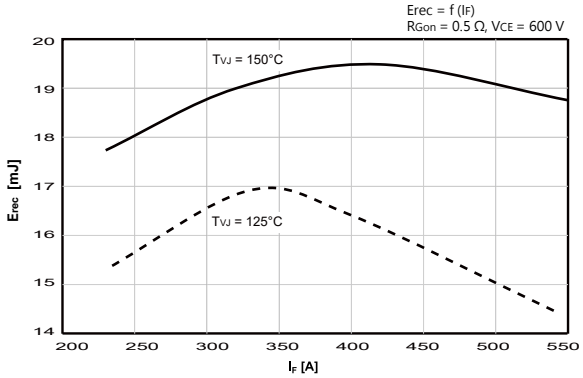


Fig.12 Switching losses Diode, Inverter (typical)

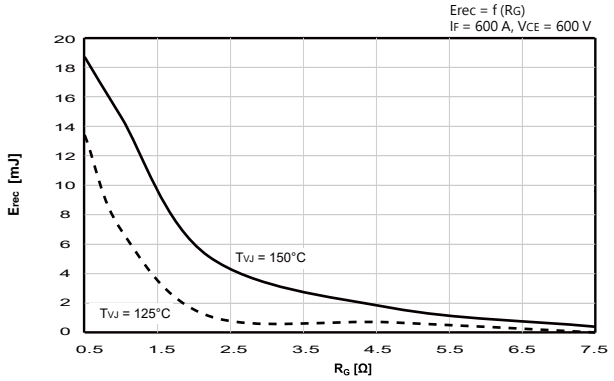
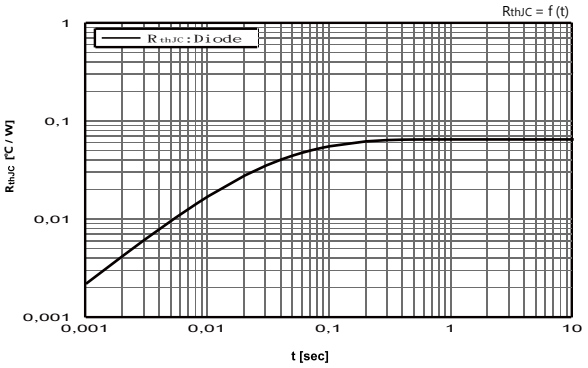


Fig.13 Transient thermal impedance Diode, Inverter



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