DAHF075G120SA2

IGBT Power Module
1200V/75A

Preliminary

HD-9434

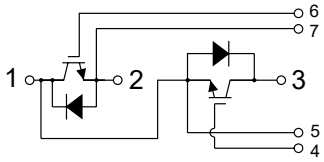
Features

- 34mm 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

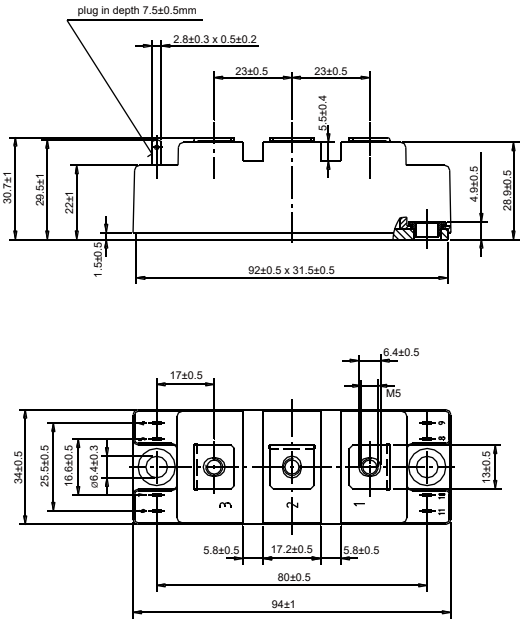
Circuit Diagram Headline



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℃ T_{VJ} max. = 175℃	$I_{C,nom.}$	75	A
Repetitive Peak Collector Current	tp =1ms	I_{CRM}	150	A
Total Power Dissipation	T_C = 25℃ T_{VJ} max. = 175℃	P_{tot}	395	W
Isolation Voltage	RMS, f=60Hz, t=1min	V_{iso}	2500	V
Continuous DC Forward Current		I_F	75	A
Repetitive Peak Forward Current	tp =1ms	I_{FRM}	150	A
Max. Junction Temperature		$T_{VJ\ max.}$	175	℃
Temperature under switching conditions		$T_{VJ\ op}$	−40～+150	℃
Storage Temperature		T_{stg}	−40～+125	℃
Mounting Torque	Module Base to Heatsink (M6)		3～5	N.m
	Busbar to Terminal (M5)		2.5～5	

Package Outlines



Dimensions in mm (1 mm = 0.0394")

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

Characteristics	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Collector-emitter saturation voltage	$V_{CE\ sat}$	I_C =75A, V_{GE} =15V T_{vj} =25°C I_C =75A, V_{GE} =15V T_{vj} =125°C		1.8 2.1	2.15	V
Gate threshold voltage	V_{GEth}	I_C =5.3mA, V_{CE} =V_{GE}, T_{vj} =25°C	5.5	6.1	6.7	V
Gate charge	Q_G	I_C =75A, V_{CE} =600V,V_{GE} =15V		365		nC
Internal gate resistor	R_{Gint}	T_{vj} =25°C		5.4		Ω
Input capacitance	C_{ies}	f = 100KHz, T_{vj} =25°C, V_{CE} =25V, V_{GE} =0V		7.0		nF
Output capacitance	C_{oes}	f = 100KHz, T_{vj} =25°C, V_{CE} =25V, V_{GE} =0V		0.36		nF
Reverse transfer capacitance	C_{res}	f = 100KHz, T_{vj} =25°C, V_{CE} =25V, V_{GE} =0V		0.063		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 =75A, V_{CE} =600V T_{vj} =25°C V_{GE} = ±15V T_{vj} =125°C $R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω T_{vj} =150°C		101 114 105		ns
Rise time, inductive load	t_r	I_C =75A, V_{CE} =600V T_{vj} =25°C V_{GE} = ±15V T_{vj} =125°C $R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω T_{vj} =150°C		46 60 68		ns
Turn-off delay time, inductive load	$t_{d\ off}$	I_C =75A, V_{CE} =600V T_{vj} =25°C V_{GE} = ±15V T_{vj} =125°C $R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω T_{vj} =150°C		218 254 262		ns
Fall time, inductive load	t_f	I_C =75A, V_{CE} =600V T_{vj} =25°C V_{GE} = ±15V T_{vj} =125°C $R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω T_{vj} =150°C		66 138 152		ns
Turn-on energy loss per pulse	E_{on}	I_C =75A, V_{CE} =600V T_{vj} =25°C V_{GE} = ±15V T_{vj} =125°C $R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω T_{vj} =150°C		2.7 7.2 9.2		mJ
Turn-off energy loss per pulse	E_{off}	I_C =75A, V_{CE} =600V T_{vj} =25°C V_{GE} = ±15V T_{vj} =125°C $R_{G(on)}$ =0.5Ω, $R_{G(off)}$ =0.5Ω T_{vj} =150°C		4.6 6.2 7.1		mJ
SC data	I_{SC}	V_{GE} ≤15V, V_{CC} =800V t_P ≤10μs, V_{CEmax} =V_{CES} - L_{sCE} ·di/dt T_{vj} =150°C		270		A
Thermal resistance, junction to case	R_{thJC}	per IGBT			0.38	°C/W
Thermal resistance, case to heatsink	R_{thCH}	per IGBT		0.083		°C/W
External gate resistance	R_{Gext}	T_{vj} =25°C	0.5			Ω

■ Diode Ratings & Characteristics

Symbol	Test Conditions	Value	Unit
V_{RRM}	T_{vj} =25°C	1200	V
I_F		75	A
I_{FRM}	t_P =1ms	150	A
I^2t	V_R =0V, t_P =10ms, T_{vj} =125°C V_R =0V, t_P =10ms, T_{vj} =150°C	1200 1100	A^2s

Symbol	Test Conditions		Min.	Typ.	Max.	Unit
V_F	I_F =75A, V_{GE} =0V I_F =75A, V_{GE} =0V	T_{vj} =25°C T_{vj} =125°C		2.1 1.7	2.3	V
I_{RRM}	I_F =75A, -di$_F$/dt =1300A/µs (T_{vj}=150°C) V_R =600V V_{GE} = ±15V	T_{vj} =25°C T_{vj} =125°C T_{vj} =150°C		74 88 88		A
Qrr	I_F =75A, -di$_F$/dt =1300A/µs (T_{vj}=150°C) V_R =600V V_{GE} = ±15V	T_{vj} =25°C T_{vj} =125°C T_{vj} =150°C		3034 9917 10480		nC
Erec	I_F =75A, -di$_F$/dt =1300A/µs (T_{vj}=150°C) V_R =600V V_{GE} = ±15V	T_{vj} =25°C T_{vj} =125°C T_{vj} =150°C		1.32 3.52 3.31		mJ
Trr	I_F =75A, -diF/dt =1300A/µs , V_R =600V, V_{GE} = ±15V, T_{vj}=25°C			82		ns
R_{thJC}	per diode				0.58	°C/W
R_{thCH}	per diode			0.125		°C/W
$T_{vj\ op}$			-40		150	°C

■ Module Ratings & Characteristics

Characteristics	Symbol	Test Conditions	Value	Unit
Material of module baseplate			Cu	
Internal isolation		basic insulation (class 1, IEC 61140)	Al_2O_3	
Creepage distance		terminal to heatsink terminal to terminal	17 20	mm
Clearance		terminal to heatsink terminal to terminal	17 9.5	mm
Comperative tracking index	CTI		>200	

Typical Characteristics

Preliminary Data

Fig.1 Output characteristic IGBT,Inverter (typical)

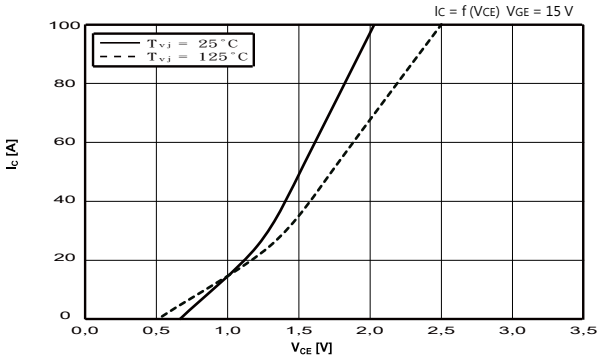


Fig.2 Output characteristic IGBT,Inverter (typical)

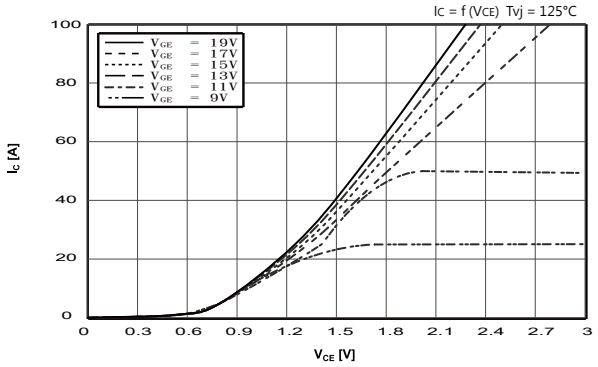


Fig.3 Transfer characteristic IGBT,Inverter (typical)

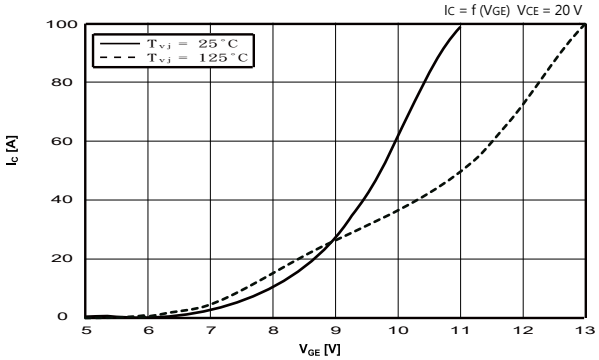


Fig.4 Switching losses IGBT,Inverter (typical)

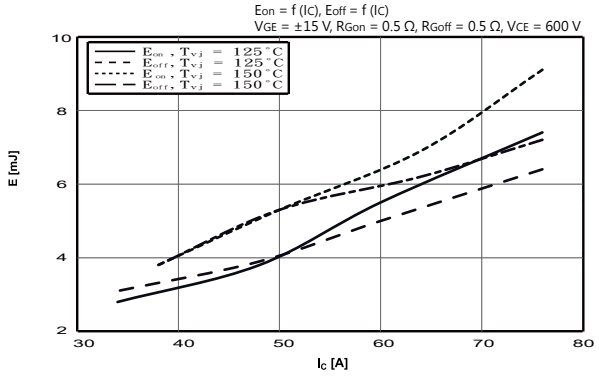


Fig.5 Switching losses IGBT,Inverter (typical)

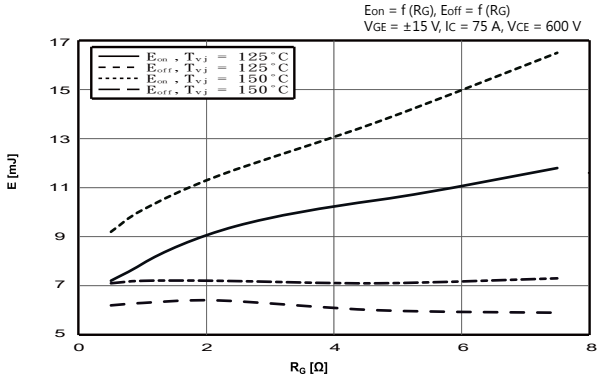


Fig.6 Transient thermal impedance IGBT,Inverter

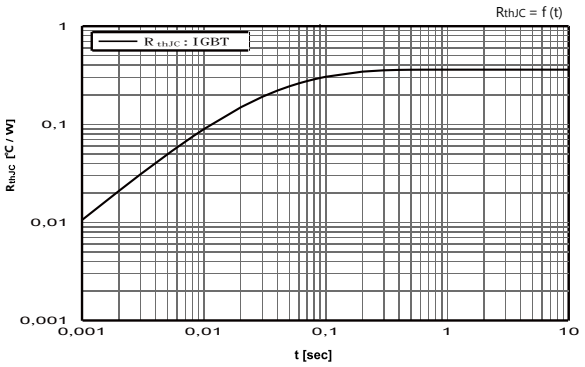


Fig.7 Reverse bias safe operating area IGBT,Inverter (RBSOA)

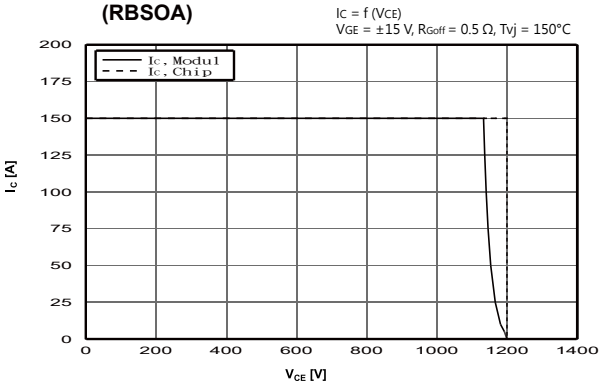
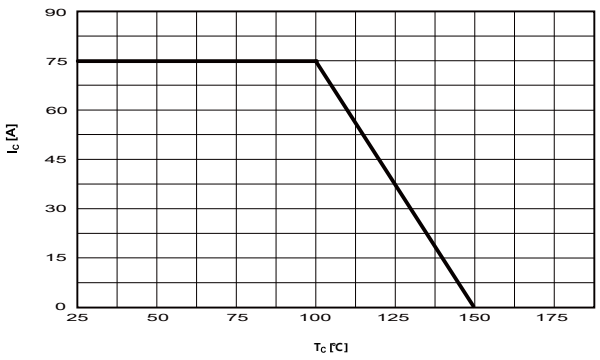


Fig.8 Output characteristic IGBT,Inverter (typical)



Typical Characteristics

Preliminary Data

Fig.9 Gate Charge Characteristics(typical)

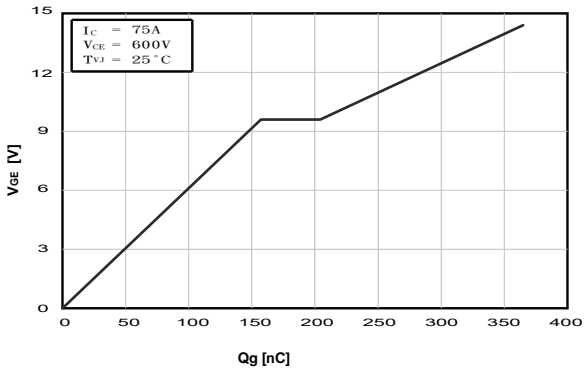


Fig.10 Forward characteristic of Diode, Inverter (typical)

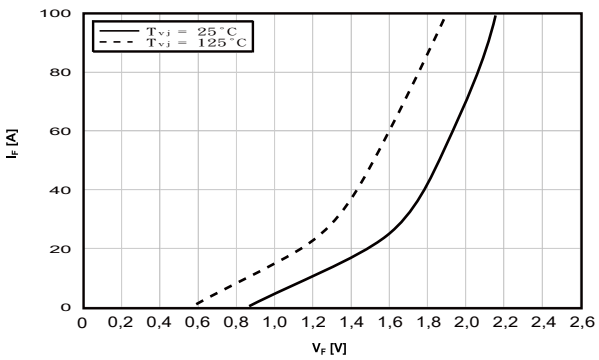


Fig.11 Switching losses Diode, Inverter (typical)

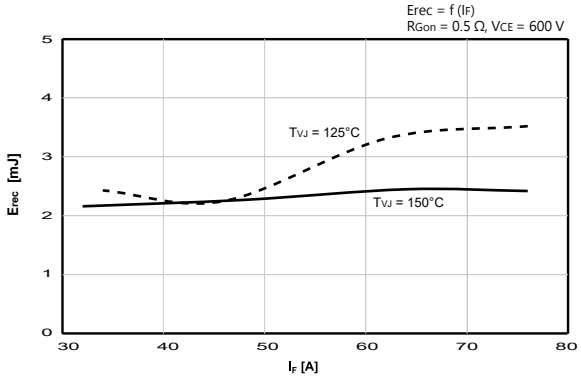


Fig.12 Switching losses Diode, Inverter (typical)

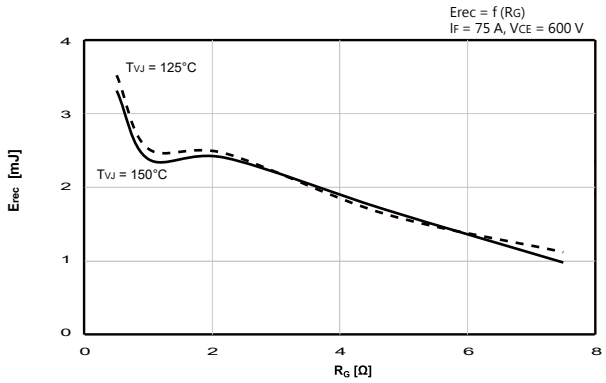
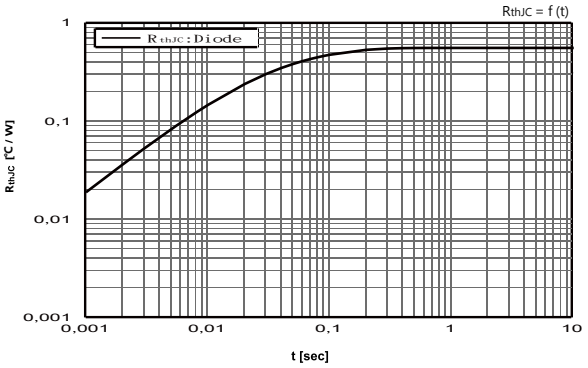


Fig.13 Transient thermal impedance Diode, Inverter



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