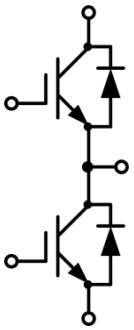
62mm Half Bridge IGBT Module

V_{CES}= 1700V, I_C= 400A, $V_{CE(sat)}$= 2.05V

Features

- 1700V Trench/Field Stop Technology
- Low switching losses
- Vcesat has a positive temperature coefficient



Applications

- Power Converters
- Uninterruptible power supplies
- Servo Drives
- Inverter

IGBT, Inverter

Maximum Ratings

Parameter	Symbol	Test Condition	Value	Unit
Collector-Emitter voltage	V_{CES}	T_{vj}=25℃	1700	V
Continuous DC collector current	$I_{C\ nom}$	T_C=80℃, $T_{vj\ max}$=150℃	400	A
Repetitive peak collector current	I_{CRM}	t_P=1ms	800	
Gate-Emitter voltage	V_{GE}		±20	V

Characteristics Values

Parameter	Symbol	Test Condition		Value			Unit
				Min.	Typ.	Max.	
Collector-Emitter saturation voltage	V_{CEsat}	V_{GE}=15V, I_C=400A V_{GE}=15V, I_C=400A V_{GE}=15V, I_C=400A	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		2.05 2.45 2.55	2.45	V
Gate-Emitter threshold voltage	$V_{GE(th)}$	I_C=16mA, V_{GE}=V_{CE}	T_{vj}=25℃	5.20	5.80	6.40	
Internal gate resistor	R_{Gint}				1.00		Ω
Input capacitance	C_{ies}	f=1MHz, V_{CE}=25V, V_{GE}=0V	T_{vj}=25℃		51.20		nF
Reverse transfer capacitance	C_{res}				0.34		
Collector-Emitter cut-off current	I_{CES}	V_{CE}=1700V, V_{GE}=0V	T_{vj}=25℃			1	mA
Gate-Emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V	T_{vj}=25℃			400	nA
Turn-on delay time	$t_{d\ on}$	I_C=400A, V_{CE}=900V V_{GE}=±15V, R_G=1Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		139 180 185		ns
Rise time	t_r	I_C=400A, V_{CE}=900V V_{GE}=±15V, R_G=1Ω	T_{vj}=25℃ T_{vj}=125℃		41 54		

		(inductive load)	T_{vj}=150℃		56		ns
Turn-off delay time	$t_{d\ off}$	I_C=400A, V_{CE}=900V V_{GE}=±15V, R_G=1Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		260 321 336		
Fall time	t_f	I_C=400A, V_{CE}=900V V_{GE}=±15V, R_G=1Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		303 521 554		
Turn-on energy loss per pulse	E_{on}	I_C=400A,V_{CE}=900V di/dt=5600A/μs(T_{vj}=150℃) V_{GE}=±15V, R_G=1Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		67.5 99.0 107.3		mJ
Turn-off energy loss per pulse	E_{off}	I_C=400A,V_{CE}=900V dv/dt=6400V/μs(T_{vj}=150℃) V_{GE}=±15V, R_G=1Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		48.2 75.6 80.6		
SC data	I_{SC}	V_{GE}≤15V, V_{CE}=1000V V_{CEmax}=V_{CES}-L_{sCE}·di/dt, t_P≤10us	T_{vj}=125℃		2200		A
Thermal resistance, junction to case	R_{thJC}	per IGBT				0.058	K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150	℃

Diode, Inverter
Maximum Ratings

Parameter	Symbol	Test Condition	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	T_{vj}=25℃	1700	V
Continuous DC forward current	I_F		400	A
Repetitive peak forward current	I_{FRM}	t_p=1ms	800	A
I^2t-value	I^2t	t_p=10ms, sin180°, T_{vj}=125℃	17000	A^2s

Characteristics Values

Parameter	Symbol	Test Condition		Value			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F=400A, V_{GE}=0V I_F=400A, V_{GE}=0V I_F=400A, V_{GE}=0V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		1.80 2.00 2.05	2.20	V
Peak reverse recovery current	I_{RM}	I_F=400A -di_F/dt=7300A/us(T_{vj}=150℃) V_R=900V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		541 469 456		A
Recovered charge	Q_r	I_F=400A -di_F/dt=7300A/us(T_{vj}=150℃) V_R=900V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		91 143 158		℃
Reverse recovered energy	E_{rec}	I_F=400A -di_F/dt=7300A/us(T_{vj}=150℃) V_R=900V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		49.6 83.6 93.1		mJ
Thermal resistance, junction to case	R_{thJC}	per diode				0.099	K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150	℃

Characteristics Values(Module)

Parameter	Symbol	Test Condition	Value			Unit
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=1min	4000			V
Internal isolation			Al_2O_3			
Storage temperature	T_{stg}		-40		125	℃
Mounting torque for module mounting	M		3.0		6.0	Nm
Weight	W			320		g

Typical Characteristics

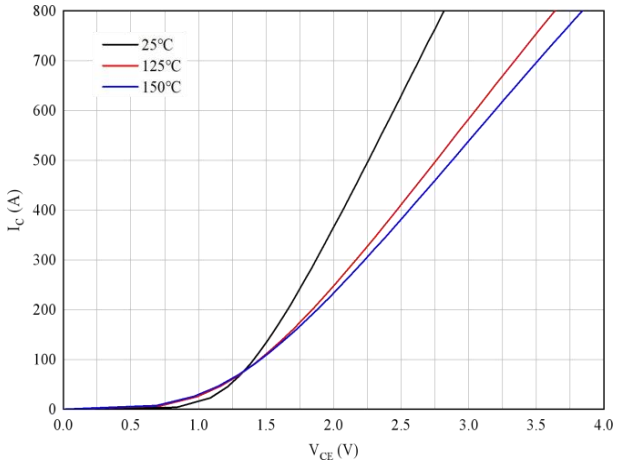


Fig 1. Typical output characteristics(V_{GE}=15V)

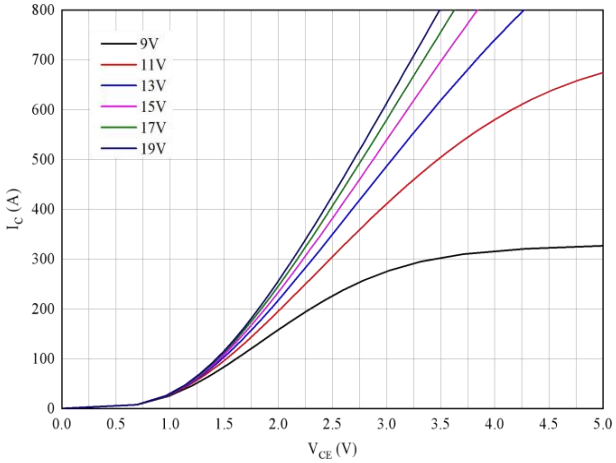


Fig 2. Typical output characteristics (T_{vj}=150℃)

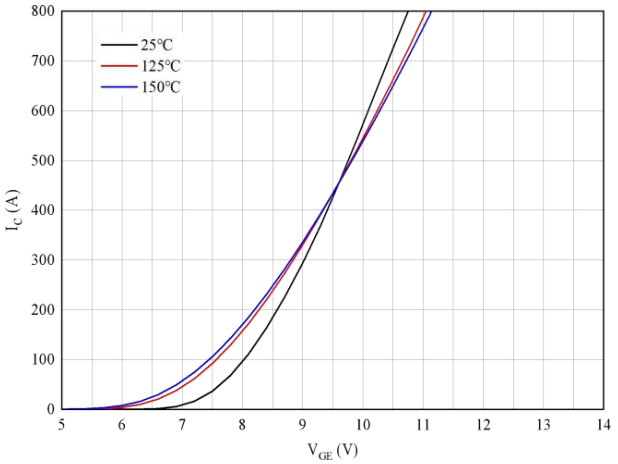


Fig 3. Typical transfer characteristic(V_{CE}=20V)

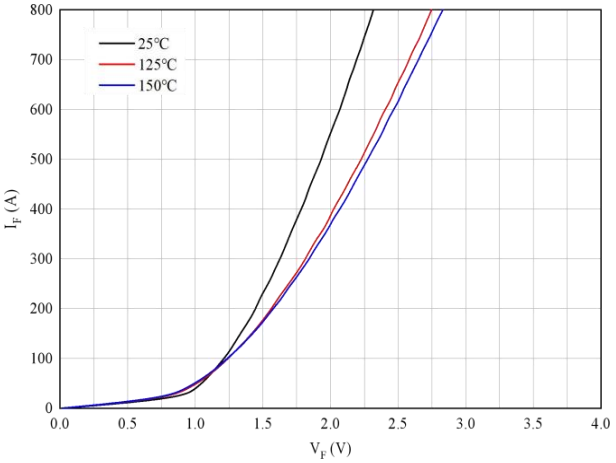


Fig 4. Forward characteristic of Diode

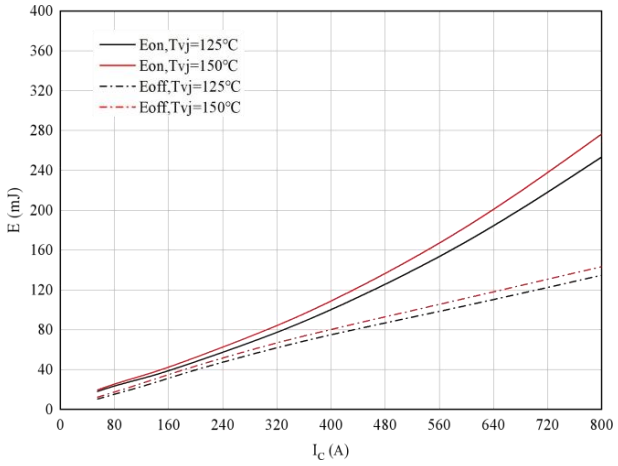


Fig 5. Switching losses of IGBT
V_{GE}=±15V, R_{Gon}=1Ω, R_{Goff}=1Ω, V_{CE}=900V

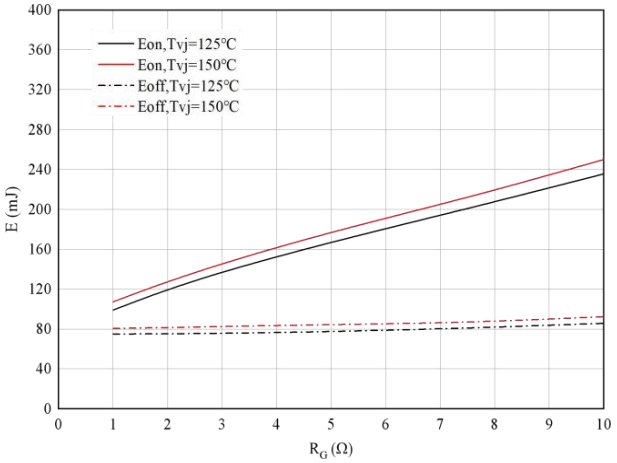


Fig 6. Switching losses of IGBT
V_{GE}=±15V, I_C=400A, V_{CE}=900V

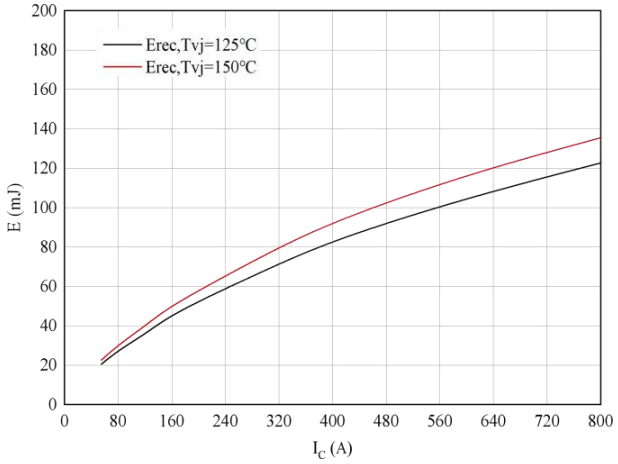


Fig 7. Switching losses of Diode
R_{Gon}=1Ω, V_{CE}=900V

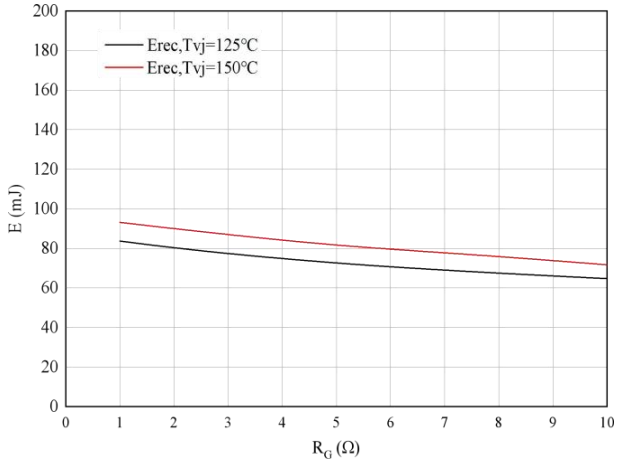


Fig 8. Switching losses of Diode
I_F=400A, V_{CE}=900V

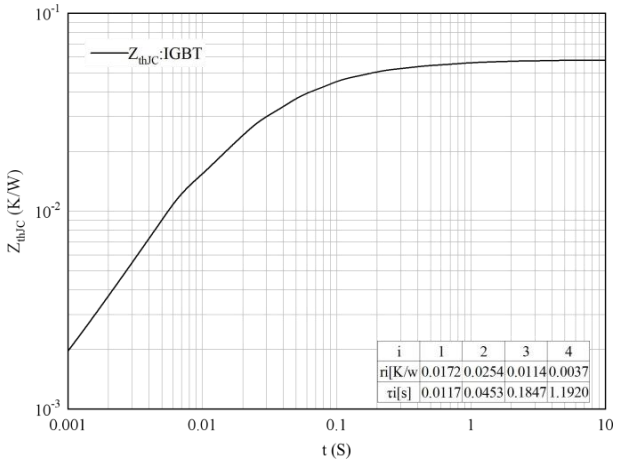


Fig 9. Transient thermal impedance IGBT, Inverter Z_{thJC}=f(t)

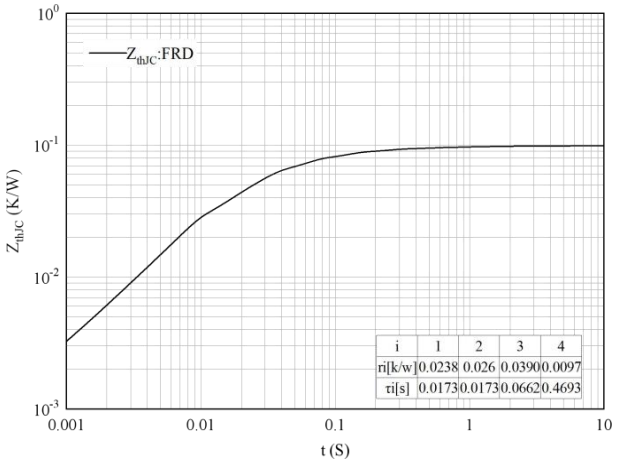


Fig 10. Transient thermal impedance FRD, Inverter Z_{thJC}=f(t)

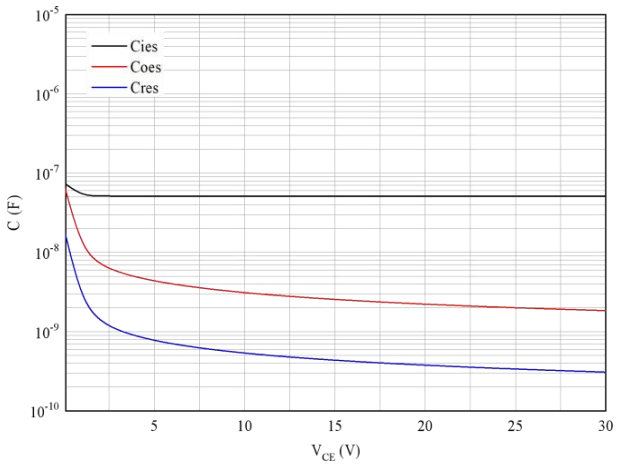
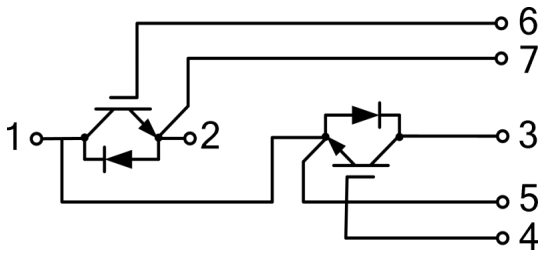
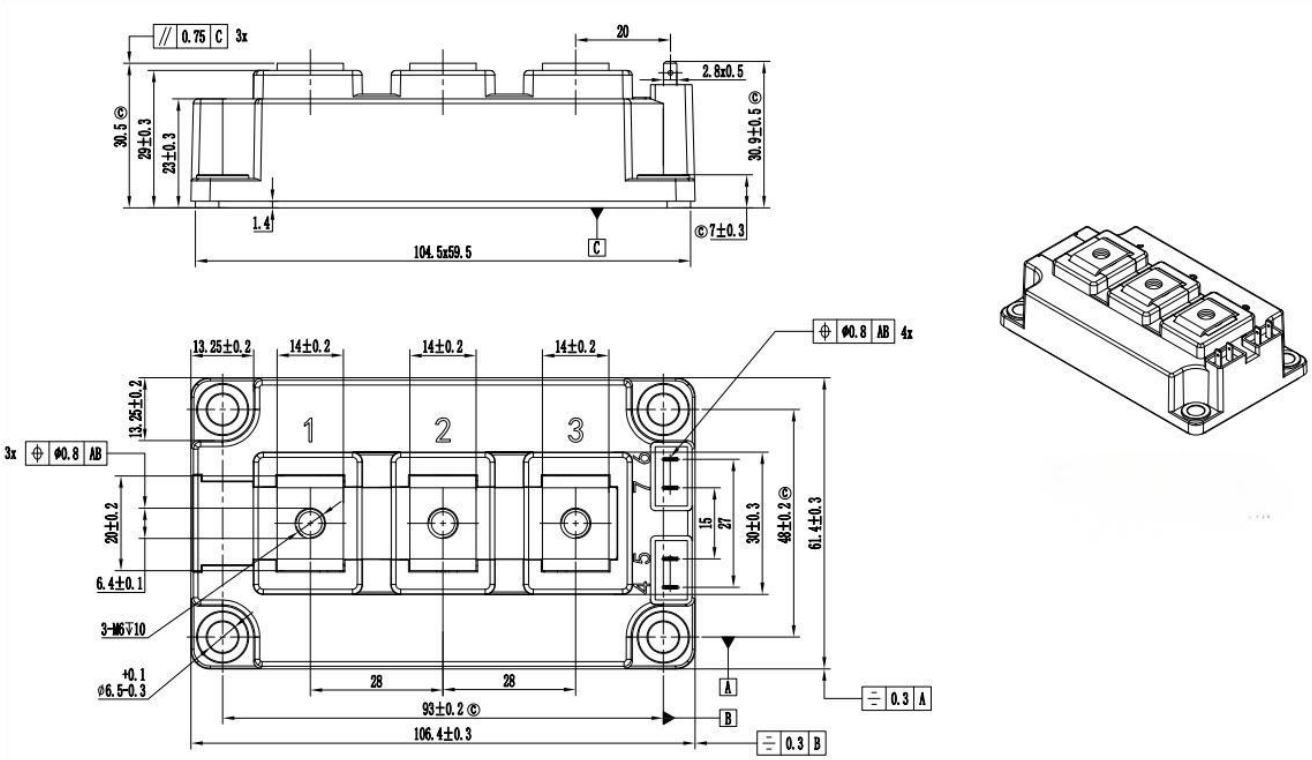


Fig 11. Capacitance characteristic

Circuit Diagram



Package Outlines(Unit: mm)



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