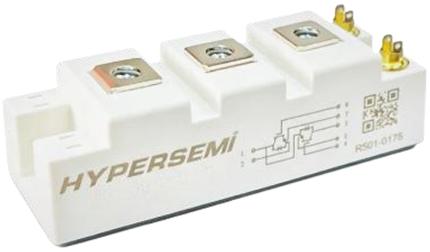
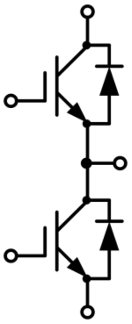
34mm Half Bridge IGBT Module

V_{CES}= 1700V, I_C= 100A, $V_{CE(sat)}$= 1.8V



Features

- 1700V Trench-Gate / Field-Stop Technology
- Low Switching Losses
- Vcesat has a positive temperature coefficient



Applications

- Variable-frequency Drive / VFD
- Uninterruptible Power Supply
- Servo Drive / Servo System
- DC-AC Power 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=100℃, $T_{vj\ max}$=175℃	100	A
Repetitive peak collector current	I_{CRM}	t_P=1ms	200	A
Total power dissipation	P_{tot}	T_C=25℃, $T_{vj\ max}$=175℃	1100	W
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=100A V_{GE}=15V,I_C=100A V_{GE}=15V,I_C=100A	Tvj=25℃ Tvj=125℃ Tvj=150℃		1.8 2.05 2.1	2.3	V
Gate-Emitter threshold voltage	$V_{GE(th)}$	I_C=6mA,V_{GE}=V_{CE}	Tvj=25℃	4.9	5.4	5.9	
Gate charge	Q_G	V_{GE}=-15V…+15V			0.98		μC
Internal gate resistor	R_{Gint}		T_{vj}=25℃		5		Ω
Input capacitance	C_{ies}	f=100KHz,V_{CE}=25V, V_{GE}=0V	T_{vj}=25℃		13.5		nF
Reverse transfer capacitance	C_{res}	f=100KHz,V_{CE}=25V, V_{GE}=0V	T_{vj}=25℃		0.4		
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℃			100	nA
Turn-on delay time	$t_{d\ on}$	I_C=100A,V_{CE}=900V V_{GE}=±5V,R_G=2.5Ω (inductiveload)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		169 186 191		ns

Rise time	t_r	I_C=100A,V_{CE}=900V, V_{GE}=±15V,R_G=2.5Ω (inductiveload)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		35 40 41		ns
Turn-off delay time	$t_{d\ off}$	I_C=100A,V_{CE}=900V V_{GE}=±15V, R_G=2.5Ω (inductiveload)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		319 395 414		ns
Fall time	t_f	I_C=100A,V_{CE}=900V V_{GE}=±15V,R_G=2.5Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		358 500 506		ns
Turn-on energy loss per pulse	E_{on}	I_C=100A, V_{CE}=900V V_{GE}=±15V,R_G=2.5Ω di/dt=1900A/μs (inductiveload)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		13.13 18.93 21.37		mJ
Turn-off energy loss per pulse	E_{off}	I_C=100A, V_{CE}=900V V_{GE}=±15V, R_G=2.5Ω dv/dt=4700V/μs (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		14.47 19.79 20.00		
SC data	I_{SC}	V_{GE}≤15V, V_{CE}=1000V V_{CEmax}=V_{CES}-LsCE·di/dt, tP≤10us,	T_{vj}=25℃		850		A
	I_{SC}	V_{GE}≤15V, V_{CE}=1000V V_{CEmax}=V_{CES}-LsCE·di/dt, t_P≤10us,	T_{vj}=150℃		690		A
Thermal resistance, junction to case	R_{thJC}	per IGBT				0.130	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		100	A
Repetitive peak forward current	I_{FRM}	t_p=1ms	200	A
I^2t-value	I^2t	t_p=10ms, sin180°, Tj=125℃	3200	A^2s

Characteristics Values

Parameter	Symbol	Test Condition		Value			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F=100A, V_{GE}=0V I_F=100A, V_{GE}=0V I_F=100A, V_{GE}=0V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		2.05 2.25 2.2	2.55	V
Peak reverse recovery current	I_{RM}	I_F=100A -diF/dt=1900A/us(T_{vj}=150℃) V_R=900V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		70 73 76		A
Recovered charge	Q_r	I_F=100A -diF/dt=1900A/us(T_{vj}=150℃) V_R=900V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		10.9 20.6 23.1		℃
Reverse recovered energy	E_{rec}	I_F=100A -diF/dt=1900A/us(T_{vj}=150℃) V_R=900V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		5.97 12.36 13.75		mJ

Thermal resistance, junction to case	R_{thJC}	per diode			0.348	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		6	Nm
Weight	W			149		g

Typical Characteristics

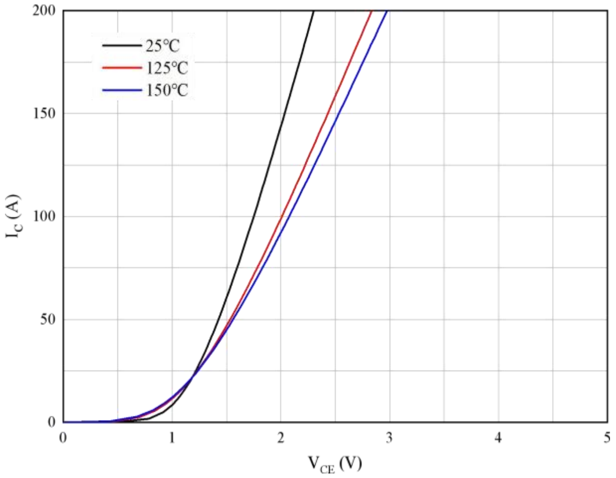


Fig 1. Typical output characteristics (V_{GE}=15V)

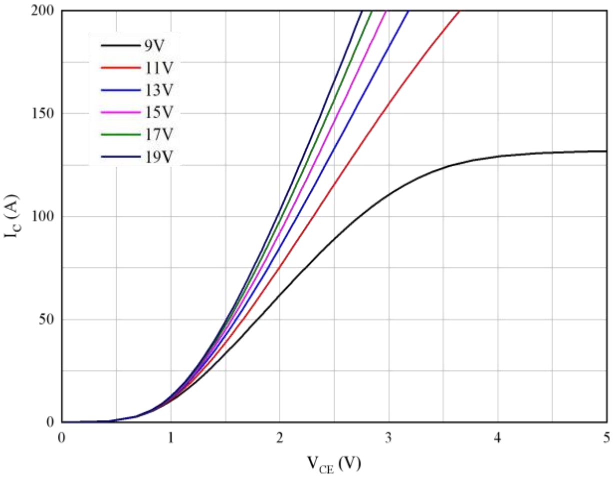


Fig 2. Typical output characteristics (T_{vj}=150℃)

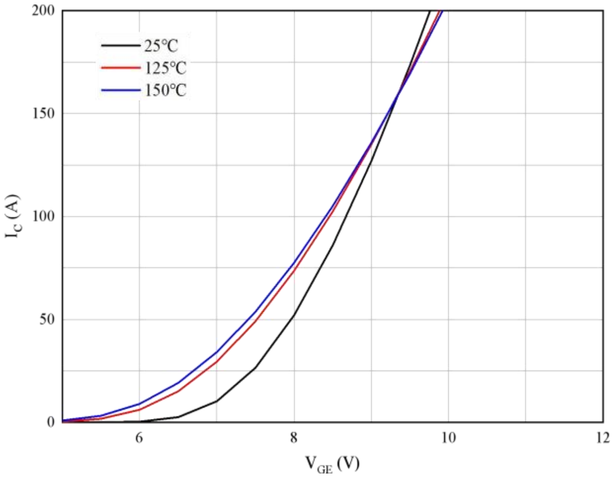


Fig 3. Typical transfer characteristics (V_{CE}=20V)

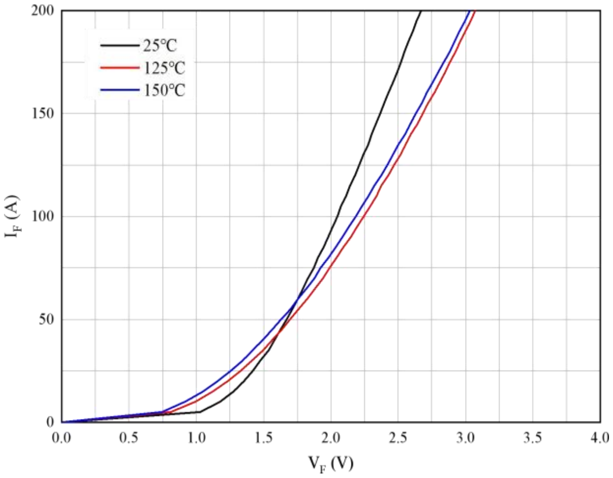


Fig 4. Forward characteristics of Diode

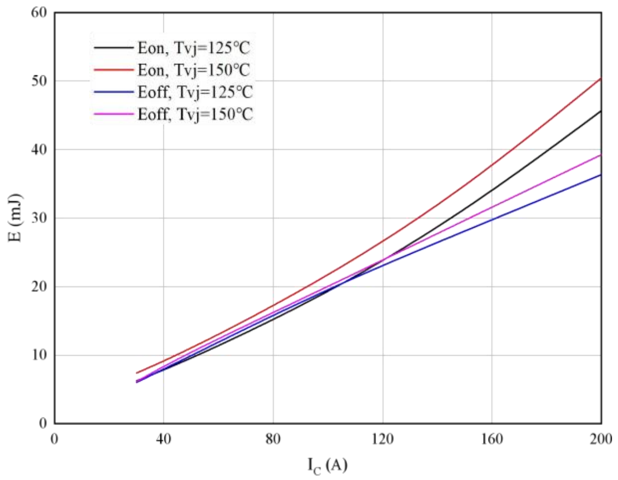


Fig 5. Switching losses of IGBT

V_{GE}=±15V, R_{Gon}=2.5Ω, R_{Goff}=2.5Ω, V_{CE}=900V

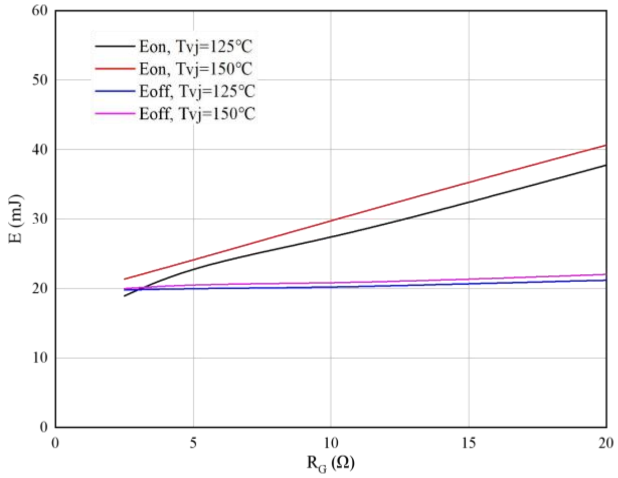


Fig 6. Switching losses of IGBT

V_{GE}=±15V, I_C=100A, V_{CE}=900V

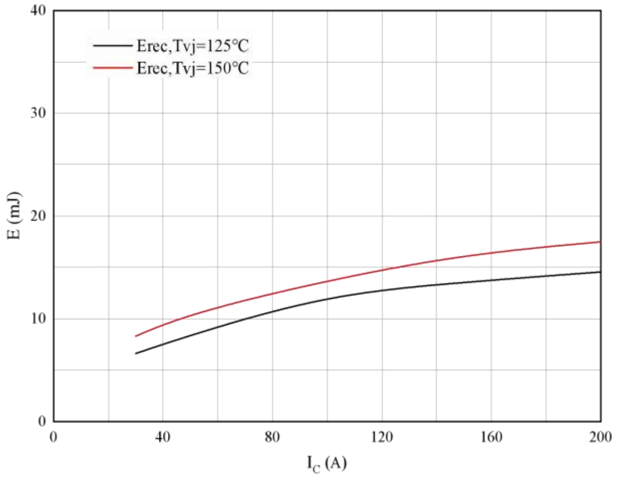


Fig 7. Switching losses of Diode

R_{Gon}=2.5Ω, V_{CE}=900V

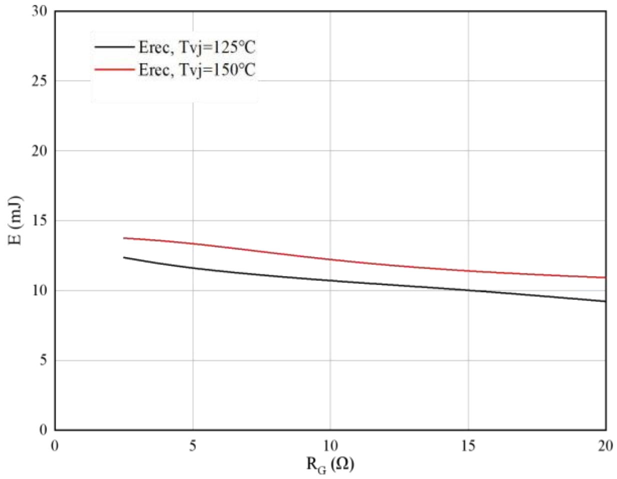
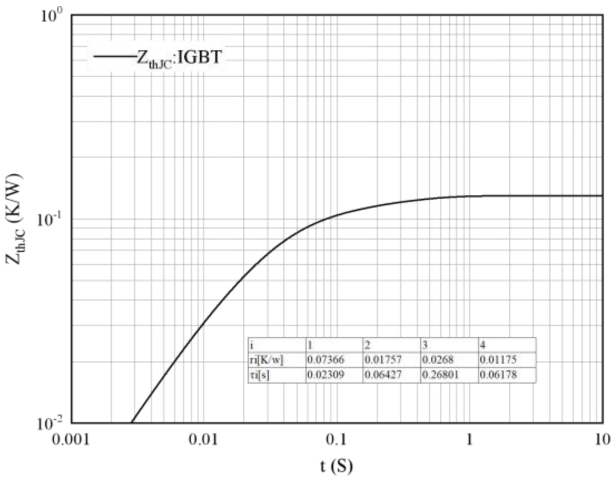


Fig 8. Switching losses of Diode

I_F=100A, V_{CE}=900V



i	1	2	3	4
ri[K/w]	0.07366	0.01757	0.0268	0.01175
τi[s]	0.02309	0.06427	0.26801	0.06178

Fig 9. Transient thermal impedance IGBT, Inverter

Z_{thJC}=f(t)

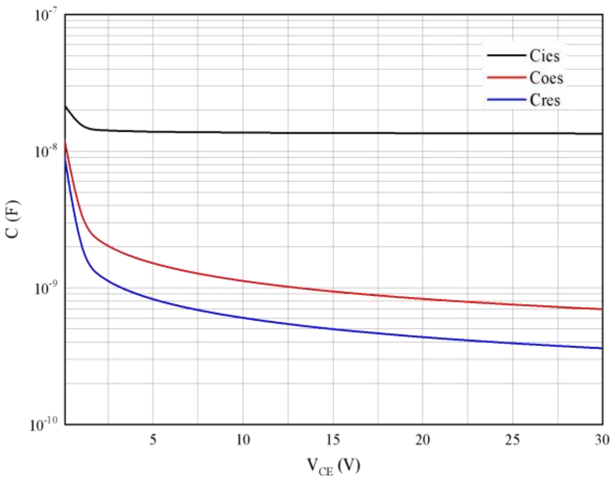
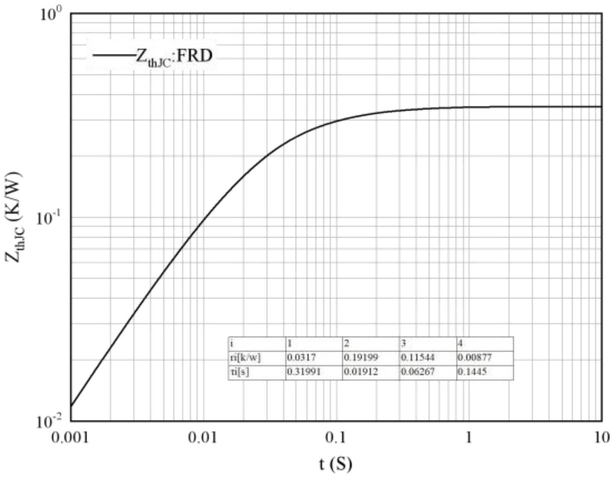


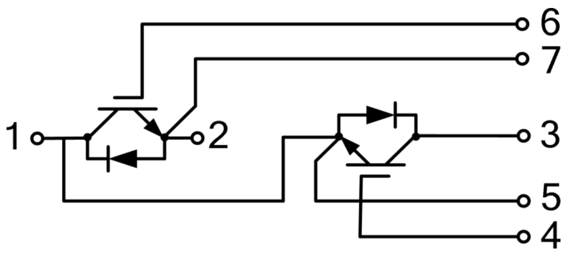
Fig 10. Capacitance characteristics



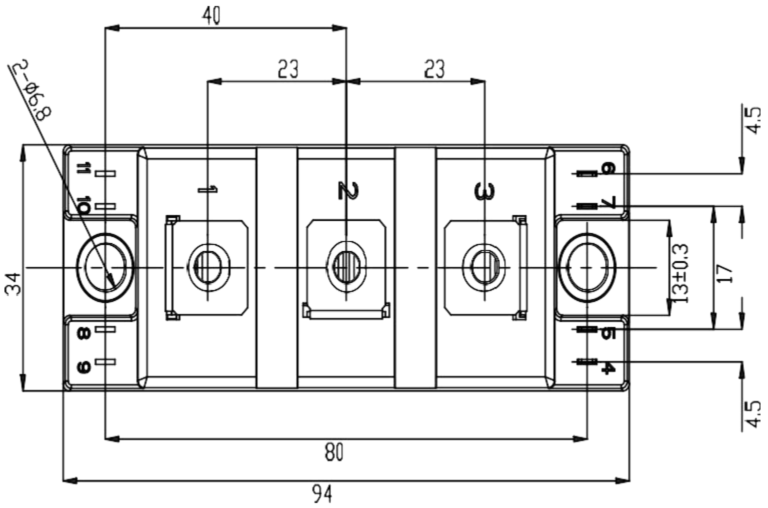
i	1	2	3	4
ri[k/w]	0.0317	0.19199	0.11544	0.00877
ti[s]	0.31991	0.01912	0.06267	0.1445

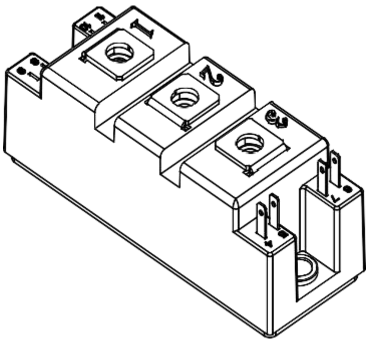
Fig 11. Transient thermal impedance FRD,Inverter
Z_{thJC}=f(t)

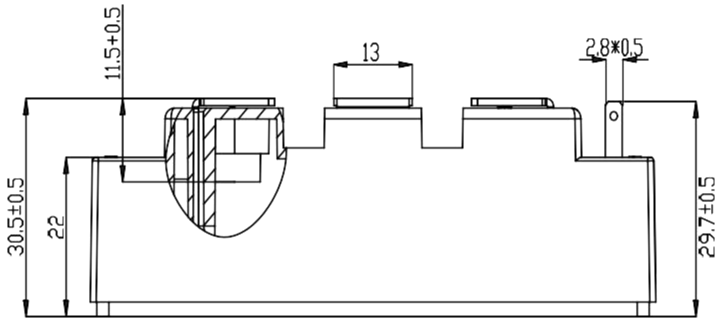
Circuit Diagram

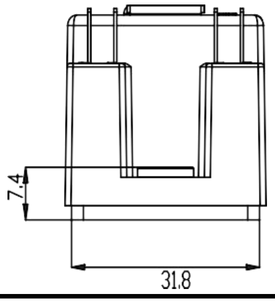


Package Outlines(Unit：mm)









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