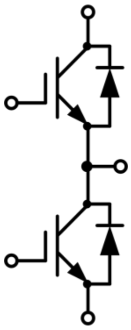
34mm Half Bridge IGBT Module

V_{CES}= 1200V, I_C= 75A, $V_{CE(sat)}$= 2.05V

Features

- 1200V Trench/Field Stop Technology
- Low switching losses
- Vcesat has a positive temperature coefficient



Applications

- Inverter Welding Machine
- Induction Heating
- High Frequency Switching
- Inverter

IGBT, Inverter

Maximum Ratings

Parameter	Symbol	Test Condition	Value	Unit
Collector-Emitter voltage	V_{CES}	T_{vj}=25℃	1200	V
Continuous DC collector current	$I_{C\ nom}$	T_C=100℃, $T_{vj\ max}$=175℃	75	A
Repetitive peak collector current	I_{CRM}	t_P=1ms	150	A
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=75A T_{vj}=25℃ V_{GE}=15V, I_C=75A T_{vj}=125℃ V_{GE}=15V, I_C=75A T_{vj}=150℃		2.05 2.45 2.56	2.5	V
Gate-Emitter threshold voltage	$V_{GE(th)}$	I_C=2.6mA, V_{GE}=V_{CE} T_{vj}=25℃	5.00	5.7	6.3	
Gate charge	Q_G	V_{GE}=-15V…+15V		0.63		μC
Internal gate resistor	R_{Gint}			None		Ω
Input capacitance	C_{ies}	f=100kHz, V_{CE}=25V, V_{GE}=0V T_{vj}=25℃		8.37		nF
Output capacitance	C_{oes}			0.35		
Reverse transfer capacitance	C_{res}			0.13		
Collector-emitter cut-off current	I_{CES}	V_{CE}=1200V, 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=60A, V_{CE}=600V T_{vj}=25℃ V_{GE}=±15V, R_G=15Ω T_{vj}=125℃ (inductive load) T_{vj}=150℃		77 75 70		ns

Rise time	t_r	I_C=60A, V_{CE}=600V V_{GE}=15 V, R_G=15Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		65 59 57		ns
Turn-off delay time	$t_{d\ off}$	I_C=60A, V_{CE}=600V V_{GE}=±15 V, R_G=15Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		228 237 244		
Fall time	t_f	I_C=60A, V_{CE}=600V V_{GE}=±15 V, R_G=15Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		68 155 157		
Turn-on energy loss per pulse	E_{on}	I_C=60A, V_{CE}=600V V_{GE}=±15V, R_G=15Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		3.68 5.18 5.85		mJ
Turn-off energy loss per pulse	E_{off}	I_C=60A, V_{CE}=600V V_{GE}=±15V, R_G=15Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		2.19 2.69 2.84		
Thermal resistance, junction to case	R_{thJC}	per IGBT				0.42	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℃	1200	V
Continuous DC forward current	I_F		60	A
Repetitive peak forward current	I_{FRM}	t_p=1ms	120	A
I^2t-value	I^2t	t_p=10ms, sin180°, T_j=25℃	1200	A^2S

Characteristics Values

Parameter	Symbol	Test Condition		Value			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F=75A, V_{GE}=0V I_F=75A, V_{GE}=0V I_F=75A, V_{GE}=0V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		2.05 1.7 1.6		V
Peak reverse recovery current	I_{RM}	I_F=60A, $-di_F/dt$=800A/us (T_{vj}=150℃) V_R=600V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		31 60 70		A
Recovered charge	Q_r	I_F=60A, $-di_F/dt$=800A/us (T_{vj}=150℃) V_R=600V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		5.1 11.8 14.1		μC
Reverse recovered energy	E_{rec}	I_F=60A, $-di_F/dt$=800A/μs (T_{vj}=150℃) V_R=600V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		2.19 5 5.84		mJ
Thermal resistance, junction to case	R_{thJC}	per diode				0.54	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}	R_{MS}, f=50Hz, t=1min	4000			V
Internal isolation			Al_2O_3			
Storage temperature	T_{stg}		-40		125	℃
Mounting torque for module mounting	M		3		5	Nm
Weight	W			163		g

Typical Characteristics

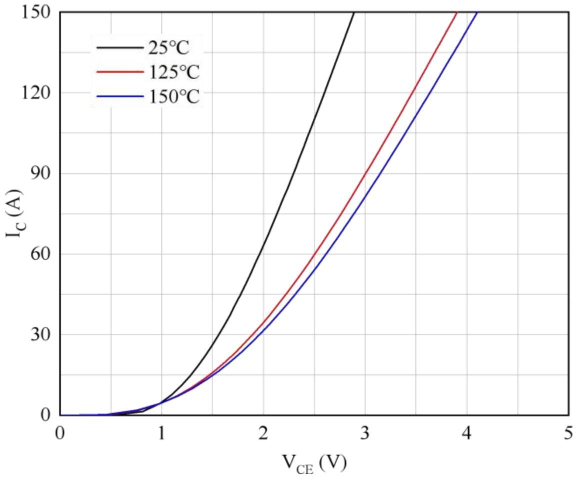


Fig 1. Typical output characteristics (V_{GE}=15V)

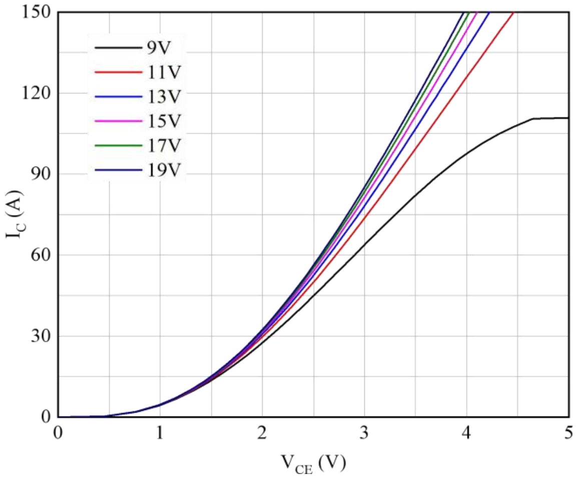


Fig 2. Typical output characteristics T_{vj}=150℃)

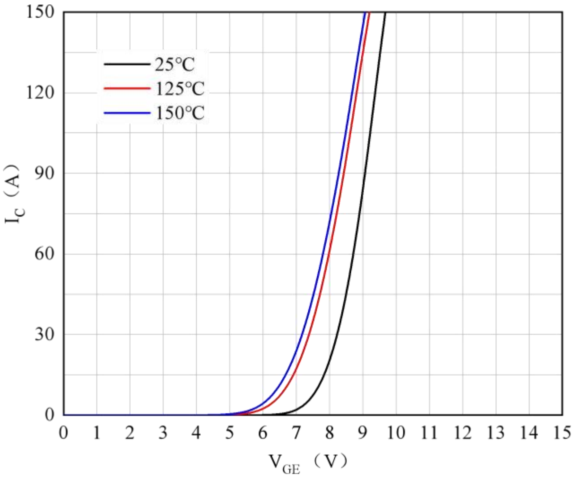


Fig 3. Typical transfer characteristic (V_{CE}=20V)

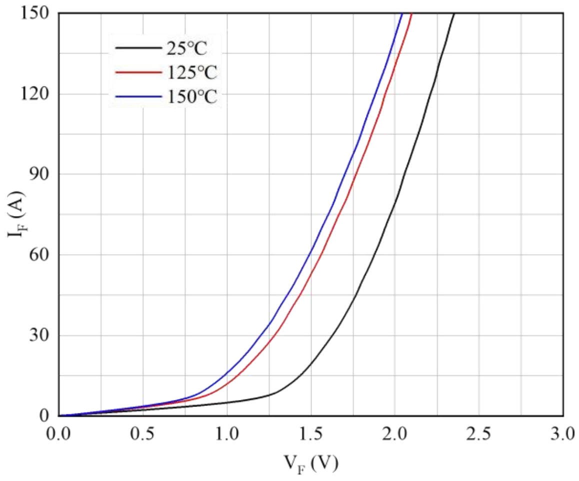


Fig 4. Forward characteristic of Diode

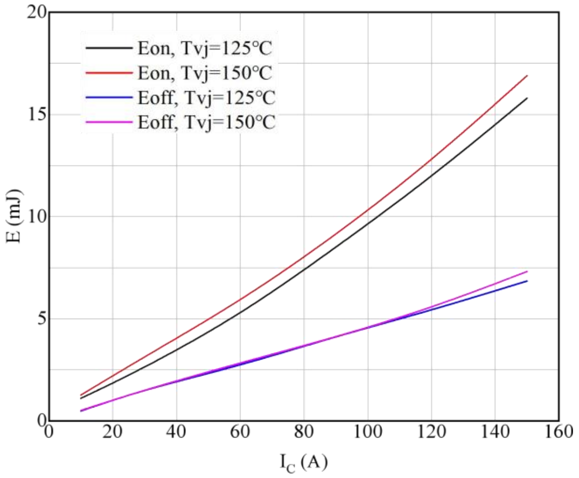


Fig 5. Switching losses of IGBT
V_{GE}=±15V, R_{Gon}=15Ω, R_{Goff}=15Ω, V_{CE}=600V

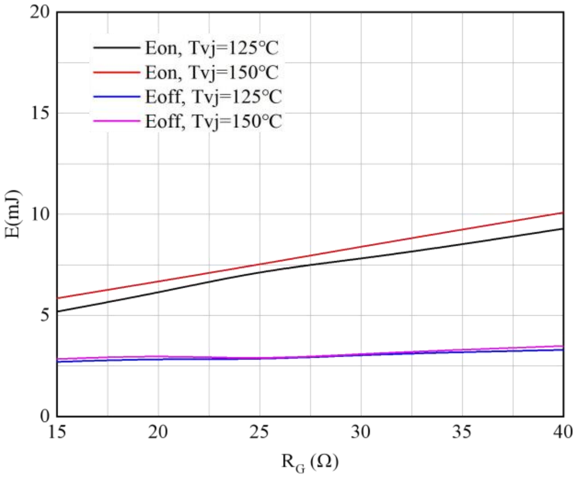


Fig 6. Switching losses of IGBT
V_{GE}=±15V, I_C=60A, V_{CE}=600V

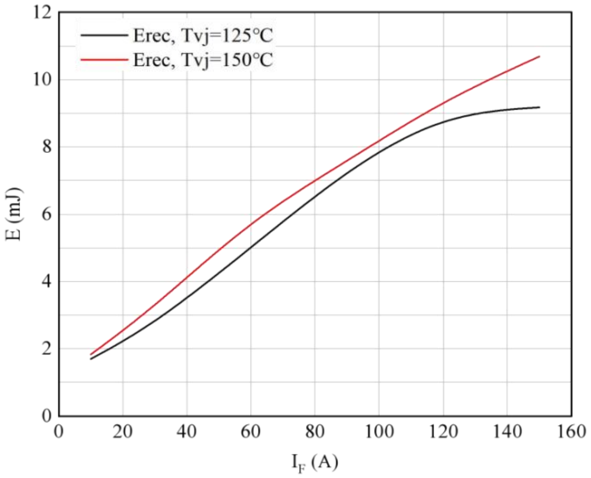


Fig 7. Switching losses of Diode
R_{Gon}=15Ω, V_{CE}=600V

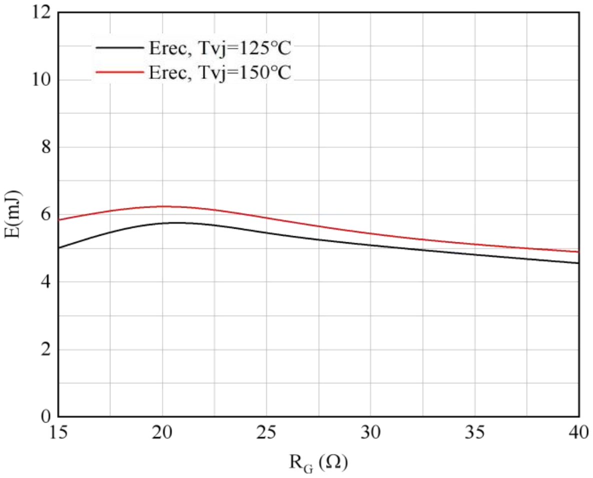
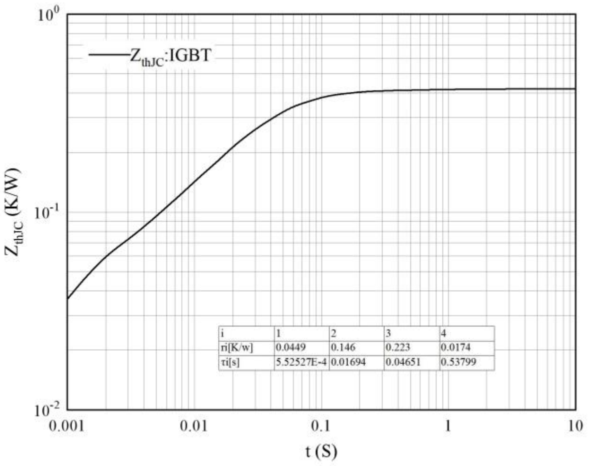
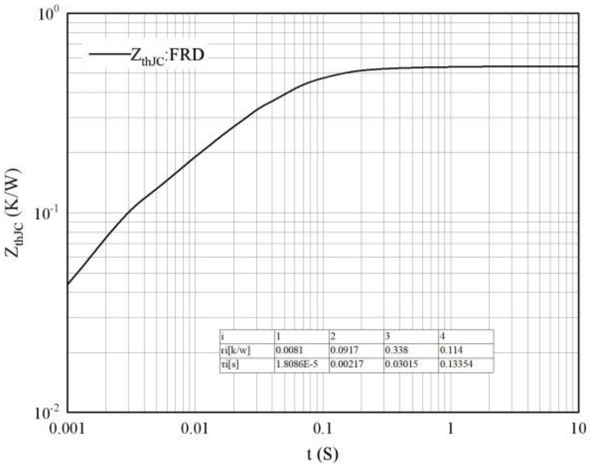


Fig 8. Switching losses of Diode
I_F=60A, V_{CE}=600V



i	1	2	3	4
ri[K/w]	0.0449	0.146	0.223	0.0174
τi[s]	5.52527E-4	0.01694	0.04651	0.53799

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



i	1	2	3	4
ri[k/w]	0.0081	0.0917	0.338	0.114
τi[s]	1.8086E-5	0.00217	0.03015	0.13354

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

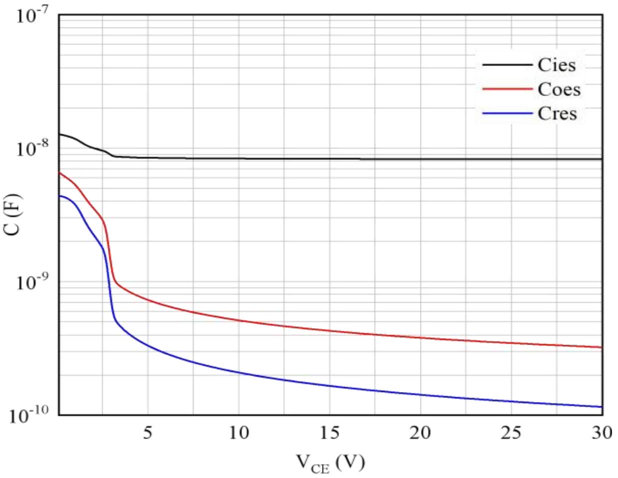
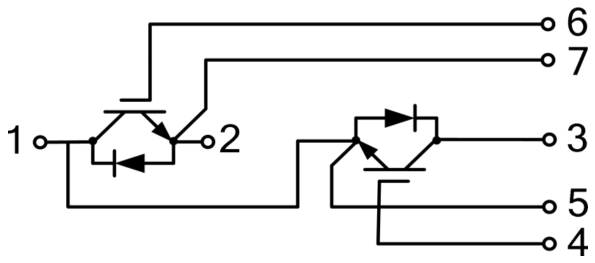
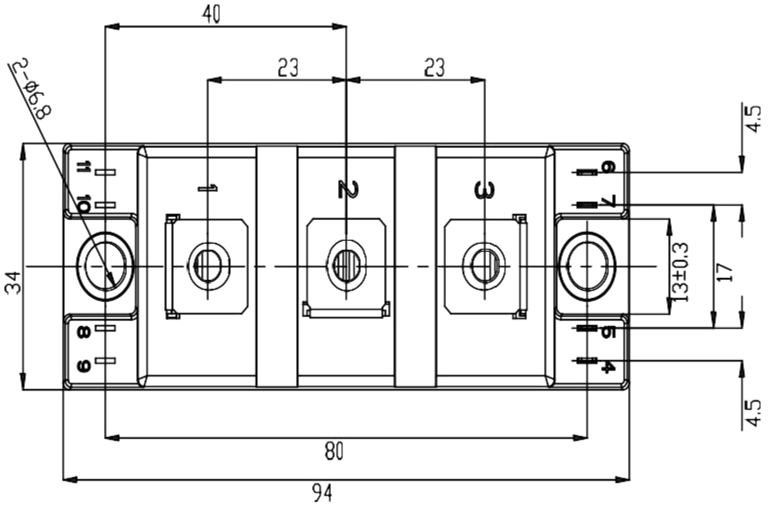


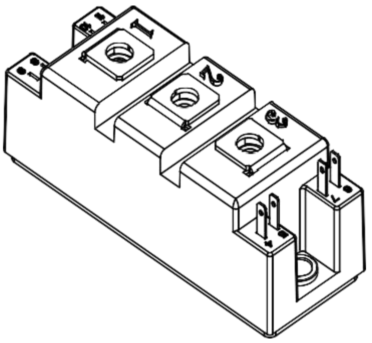
Fig 11. Capacitance characteristic

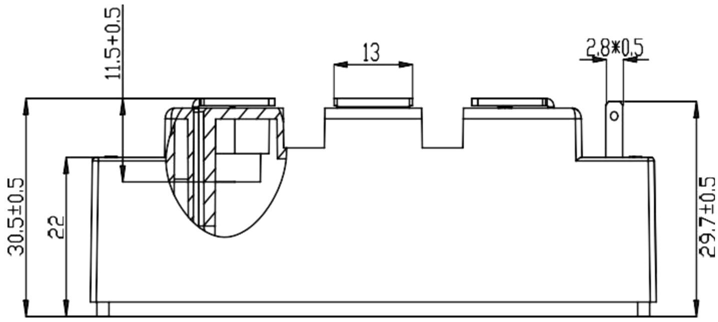
Circuit Diagram

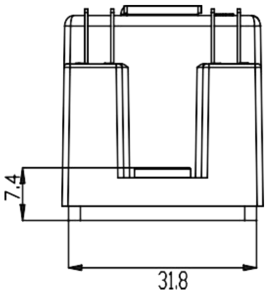


Package Outlines(Unit：mm)









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