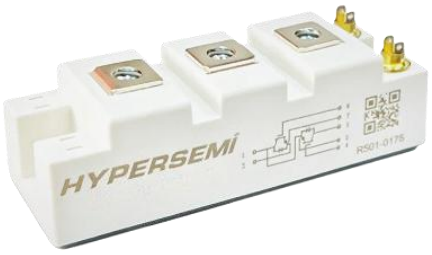
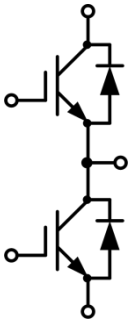
34mm Half Bridge IGBT Module

V_{CES}= 1200V, I_C= 150A, $V_{CE(sat)}$= 1.96V



Features

- 1200V Trench-Gate / 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℃	150	A
Repetitive peak collector current	I_{CRM}	t_P=1ms	300	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=150A V_{GE}=15V, I_C=150A V_{GE}=15V, I_C=150A	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		1.96 2.46 2.58	2.56	V
Gate-Emitter threshold voltage	$V_{GE(th)}$	I_C=5.3mA, V_{GE}=V_{CE}	T_{vj}=25℃	5.1	5.7	6.3	
Internal gate resistor	R_{Gint}				NA		Ω
Input capacitance	C_{ies}	f=100kHz,V_{CE}=25V,V_{GE}=0V	T_{vj}=25℃		16.69		nF
Reverse transfer capacitance	C_{res}				0.25		
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℃			150	nA
Turn-on delay time	$t_{d\ on}$	I_C=150A, V_{CE}=600V V_{GE}=±15 V, R_G=15Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		137 116 108		ns
Rise time	t_r	I_C=150A, V_{CE}=600V V_{GE}=±15 V, R_G=15Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		70 69 69		

Turn-off delay time	$t_{d\,off}$	I_C=150A, V_{CE}=600V V_{GE}=±15 V, R_G=15Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		379 406 412		ns
Fall time	t_f	I_C=150A, V_{CE}=600V V_{GE}=±15 V, R_G=15Ω (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		63 102 115		
Turn-on energy loss per pulse	E_{on}	I_C=150A, V_{CE}=600V V_{GE}=±15V, R_G=15Ω di/dt=1729A/μs(T_{vj}=150℃) (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		9.08 11.54 12.30		mJ
Turn-off energy loss per pulse	E_{off}	I_C=150A, V_{CE}=600V V_{GE}=±15V, R_G=15Ω dv/dt=8288V/μs(T_{vj}=150℃) (inductive load)	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		5.08 6.65 7.08		
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		150	A
Repetitive peak forward current	I_{FRM}	t_p=1ms	300	A
I^2t value	I^2t	t_p=10ms, sin180°, T_{vj}=125℃	3280	A^2s

Characteristics Values

Parameter	Symbol	Test Condition		Value			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F=150A,V_{GE}=0V I_F=150A,V_{GE}=0V I_F=150A,V_{GE}=0V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		2.62 2.13 2	3.22	V
Peak reverse recovery current	I_{RM}	I_F=150A, -diF/dt=2527A/us(T_{vj}=150℃) V_R=600V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		77 139 159		A
Recovered charge	Q_r	I_F=150A, -diF/dt=2527A/us(T_{vj}=150℃) V_R=600V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		6.4 15.6 18.9		μC
Reverse recovered energy	E_{rec}	I_F=150A, -diF/dt=2527A/us(T_{vj}=150℃) V_R=600V, V_{GE}=-15V	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃		2.39 6.18 7.66		mJ
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		5	Nm
Terminal Connection Torque	M		2.5		5	Nm
Weight	W			158		g

Typical Characteristics

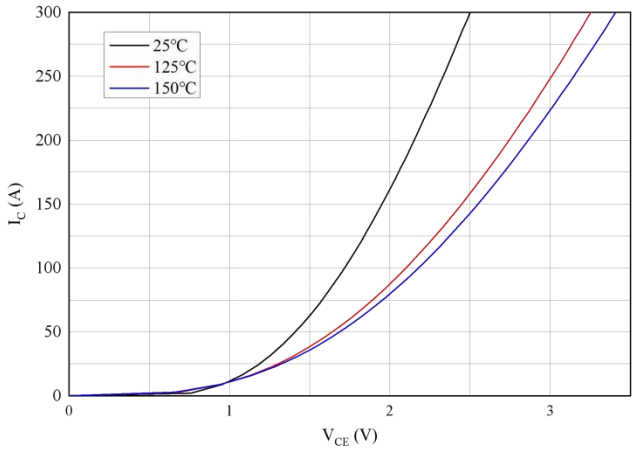


Fig 1. Typical output characteristics(V_{GE}=15V)

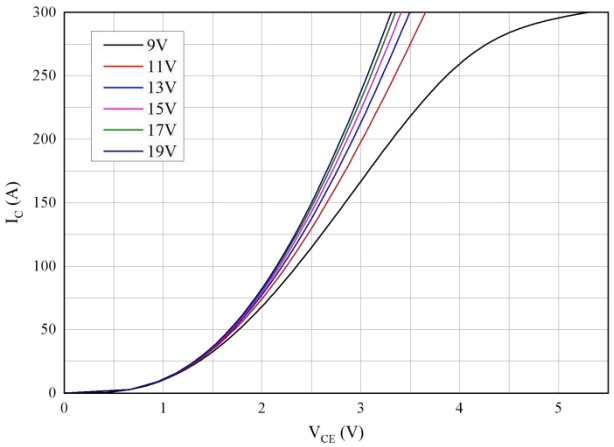


Fig 2. Typical output characteristics(T_{vj}=150℃)

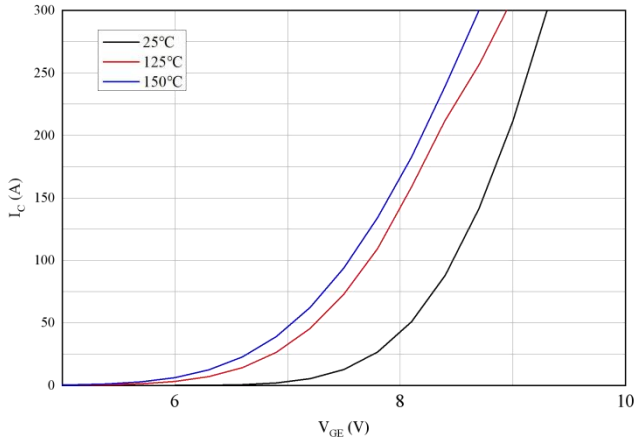


Fig 3. Typical transfer characteristic(V_{CE}=20V)

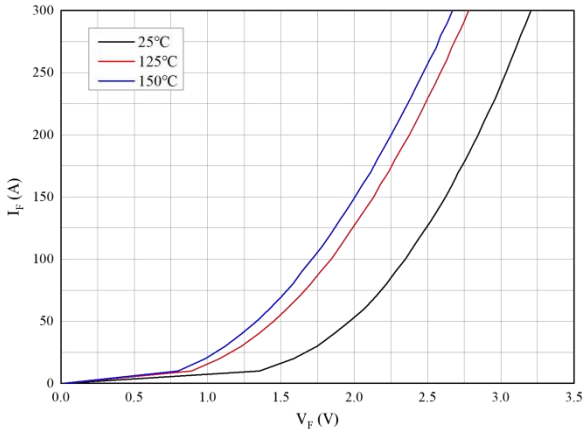


Fig 4. Forward characteristic of Diode

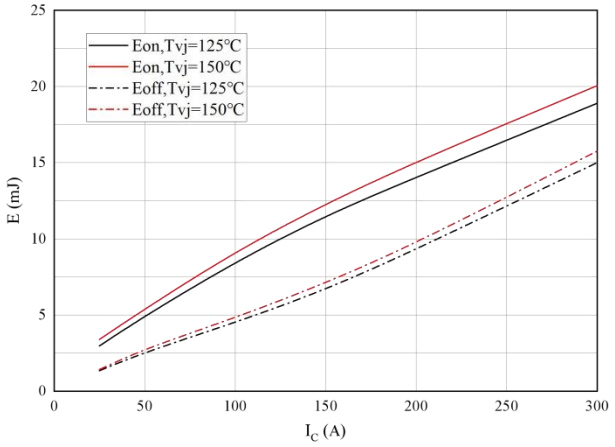


Fig 5. Switching losses of IGBT
V_{GE}=±15V, R_{Gon}=15Ω, R_{Goff}=15Ω, V_{CE}=600V

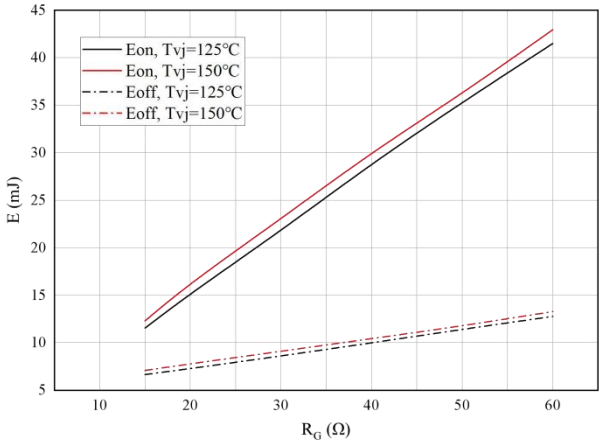


Fig 6. Switching losses of IGBT
V_{GE}=±15V, I_C=150A, V_{CE}=600V

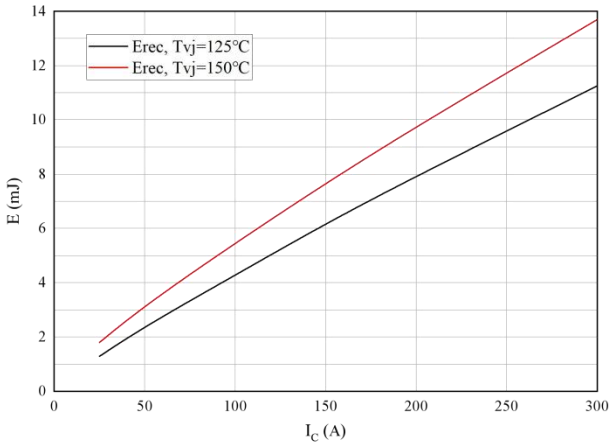


Fig 7. Switching losses of Diode
R_{Gon}=15Ω, V_{CE}=600V

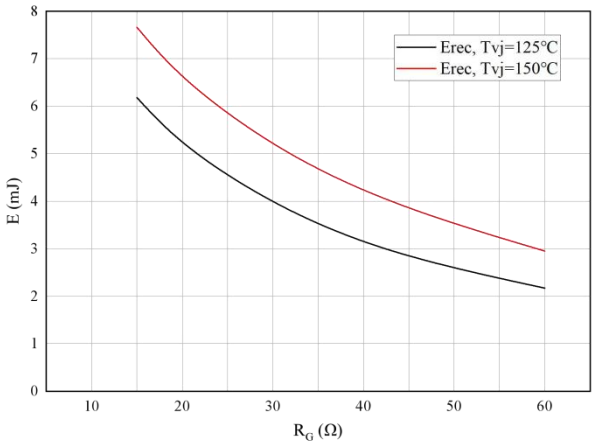


Fig 8. Switching losses of Diode
I_F=150A, V_{CE}=600V

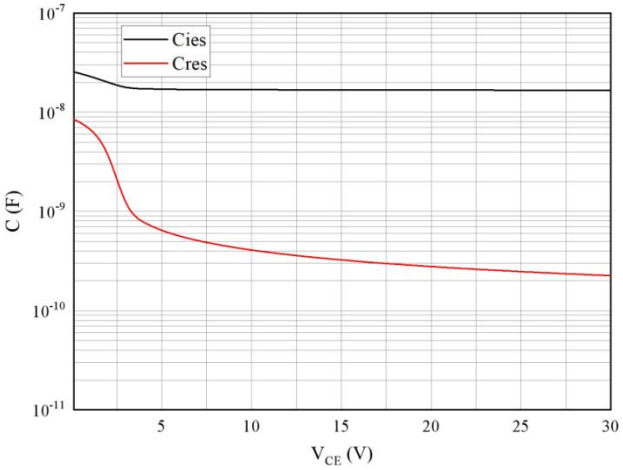
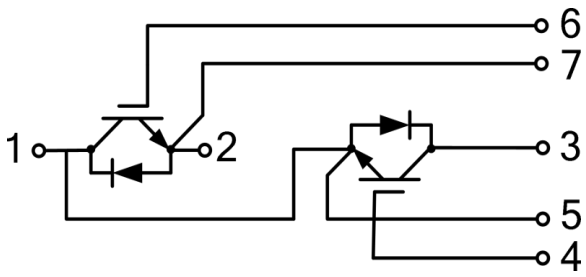
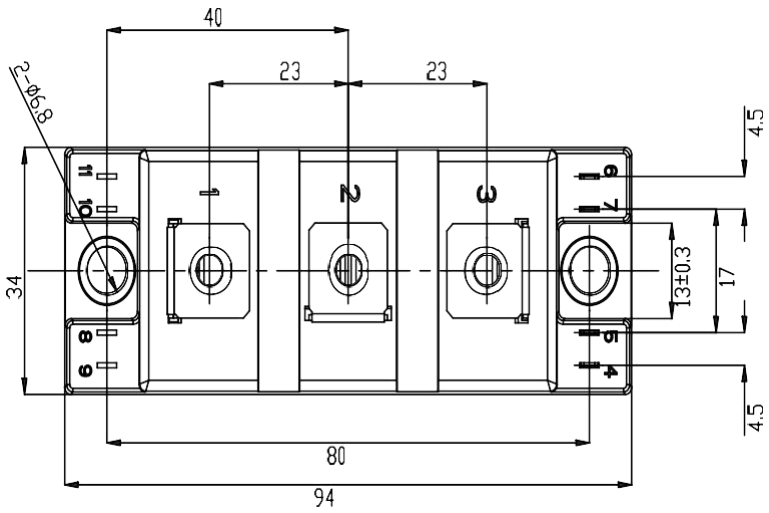


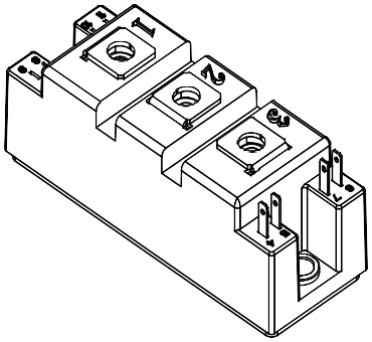
Fig 9. Capacitance characteristic

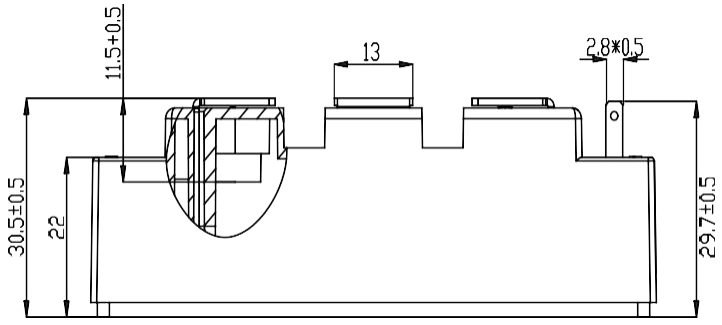
Circuit Diagram

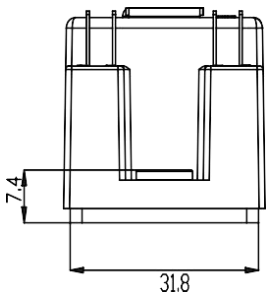


Package Outlines(Unit: mm)









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