

62mm Half Bridge IGBT Module

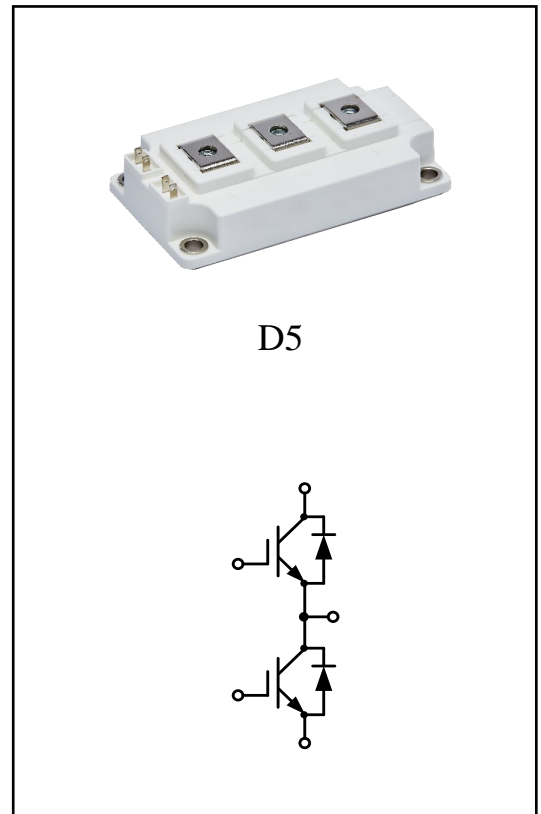
$V_{CES}=1200V$, $I_{C\ nom}=300A$ / $I_{CRM}=600A$

Electrical characteristics :

- 1200V Trench /Field Stop process
- Low switching losses
- V_{cesat} has a positive temperature coefficient

Applications:

- Inverter welding machine
- induction heating
- high-frequency switch power supply
- inverter



IGBT, Inverter

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Collector-Emitter voltage	$T_{vj}=25^{\circ}C$	V_{CES}	1200	V
Continuous DC collector current	$T_C=100^{\circ}C$, $T_{vj\ max}=175^{\circ}C$	$I_{C\ nom}$	300	A
Repetitive peak collector current	$t_p=1\ ms$	I_{CRM}	600	A
Total power dissipation	$T_C = 25^{\circ}C$, $T_{vj\ max} = 175^{\circ}C$	P_{tot}	1400	W
Gate emitter voltage		V_{GE}	± 20	V

Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Collector-Emitter saturation voltage	$V_{GE}=15V, I_C=300A$ $T_{vj}=25^{\circ}C$ $V_{GE}=15V, I_C=300A$ $T_{vj}=125^{\circ}C$ $V_{GE}=15V, I_C=300A$ $T_{vj}=150^{\circ}C$	V_{CEsat}		2.15 2.65 2.90	2.65	V
Gate-Emitter threshold voltage	$I_C = 8mA, V_{GE} = V_{CE}$ $T_{vj}=25^{\circ}C$	$V_{GE(th)}$	5.10	5.70	6.30	
Gate charge	$V_{GE}=-15V...+15V$	Q_G		1.56		μC
Internal gate resistor		R_{Gint}		1.74		Ω
Input capacitance	$f=1\text{ MHz}, V_{CE}=25\text{ V}, V_{GE}=0\text{ V}$ $T_{vj}=25^{\circ}C$	C_{ies}		22.46		nF
Reverse transfer capacitance		C_{res}		0.84		
Collector-emitter cut-off current	$V_{CE}=1200V, V_{GE}=0\text{ V}$ $T_{vj}=25^{\circ}C$	I_{CES}			2	mA
Gate-emitter leakage current	$V_{CE}=0\text{ V}, V_{GE}=20\text{ V}$ $T_{vj}=25^{\circ}C$	I_{GES}			200	nA
Turn-on delay time	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=3\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	t_{don}		225 230 231		ns
Rise time	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=3\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	t_r		57 62 64		
Turn-off delay time	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=3\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	t_{doff}		268 305 317		
Fall time	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=3\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	t_f		105 147 156		
Turn-on energy loss per pulse	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=3\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	E_{on}		7.53 9.90 11.03		
Turn-off energy loss per pulse	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=3\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	E_{off}		14.42 18.12 19.34		
SC data	$V_{GE}\leq 15V, V_{cc}=800V$ $V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt$ $t_p\leq 10\mu s, T_{vj}=150^{\circ}C$	I_{sc}		897		A
Thermal resistance, junction to case	per IGBT	R_{thJC}			0.064	K/W
Temperature under switching conditions		$T_{vj\text{ op}}$	-40		150	$^{\circ}C$

Diode, Inverter

Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
Repetitive peak reverse voltage	$T_{vj}=25^{\circ}\text{C}$	V_{RRM}	1200	V
Continuous DC forward current		I_F	160	A
Repetitive peak forward current	$t_p=1\text{ms}$	I_{FRM}	320	A
I^2t -value	$t_p=10\text{ms}$, $\sin 180^{\circ}$, $T_j=125^{\circ}\text{C}$	I^2t	8500	A^2s

Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Forward voltage	$I_F=160\text{A}$ $T_{vj}=25^{\circ}\text{C}$ $I_F=160\text{A}$ $T_{vj}=125^{\circ}\text{C}$ $I_F=160\text{A}$ $T_{vj}=150^{\circ}\text{C}$	V_F		1.56 1.87 2.09	2.10	V
Peak reverse recovery current	$I_F=160\text{A}$, $T_{vj}=25^{\circ}\text{C}$ $-\text{di}_F/\text{dt}=3397\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$) $T_{vj}=125^{\circ}\text{C}$ $V_R=600\text{V}$, $V_{GE}=-15\text{V}$ $T_{vj}=150^{\circ}\text{C}$	I_{RM}		38 42 42		A
Recovered charge	$I_F=160\text{A}$, $T_{vj}=25^{\circ}\text{C}$ $-\text{di}_F/\text{dt}=3397\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$) $T_{vj}=125^{\circ}\text{C}$ $V_R=600\text{V}$, $V_{GE}=-15\text{V}$ $T_{vj}=150^{\circ}\text{C}$	Q_r		1.64 1.71 1.75		μC
Reverse recovered energy	$I_F=160\text{A}$, $T_{vj}=25^{\circ}\text{C}$ $-\text{di}_F/\text{dt}=3397\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$) $T_{vj}=125^{\circ}\text{C}$ $V_R=600\text{V}$, $V_{GE}=-15\text{V}$ $T_{vj}=150^{\circ}\text{C}$	E_{rec}		0.37 0.55 0.56		mJ
Thermal resistance, junction to case	per diode	R_{thJC}			0.10	K/W
Temperature under switching conditions		$T_{vj\text{ op}}$	-40		150	$^{\circ}\text{C}$

Module

Parameter	Conditions	Symbol	Value			Unit
Isolation test voltage	RMS, $f=50\text{Hz}$, $t=1\text{min}$	V_{ISOL}	4000			V
Internal isolation			Al_2O_3			
Storage temperature		T_{stg}	-40		125	$^{\circ}\text{C}$
Mounting torque for modul mounting		M	3.0		6.0	Nm
Weight		W				g

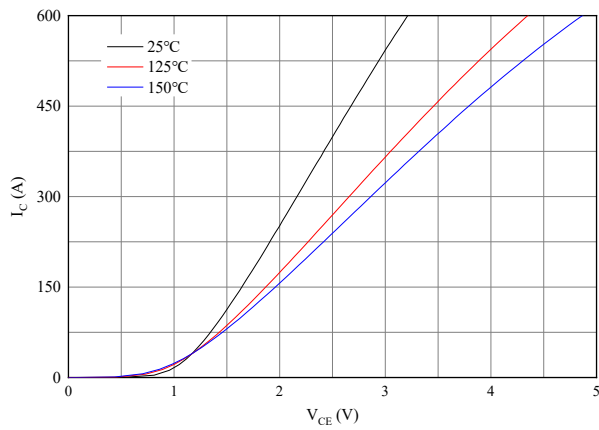


Fig 1. Typical output characteristics ($V_{GE}=15V$)

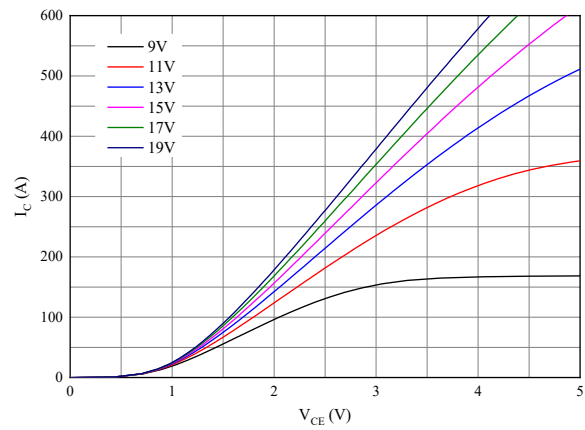


Fig 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)

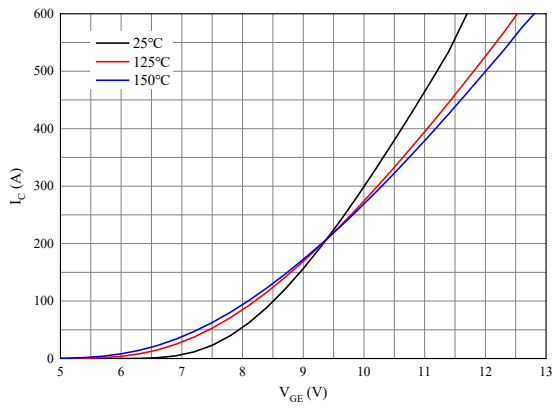


Fig 3. Typical transfer characteristic ($V_{CE}=20V$)

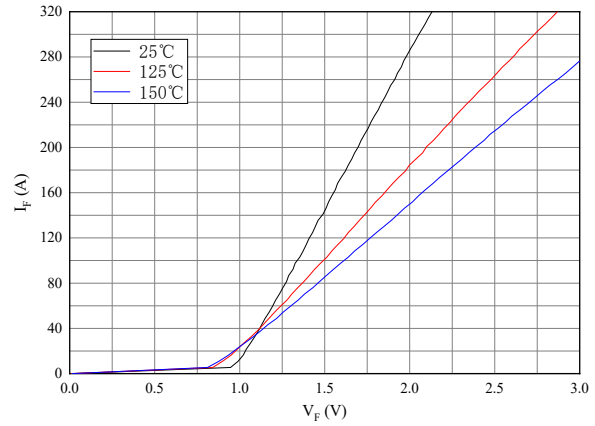


Fig 4. Forward characteristic of Diode

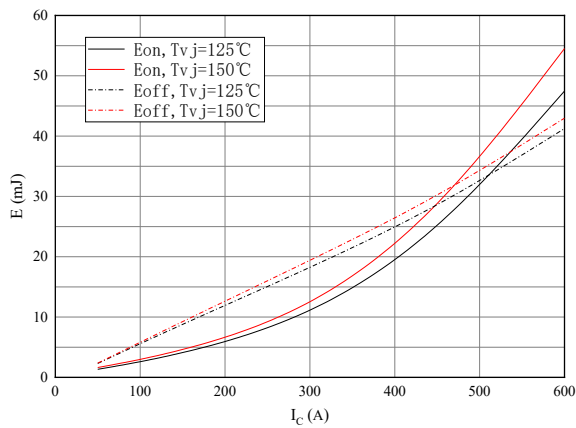


Fig 5. Switching losses of IGBT
 $V_{GE}=\pm 15V, R_{Gon}=3\Omega, R_{Goff}=3\Omega, V_{CE}=600V$

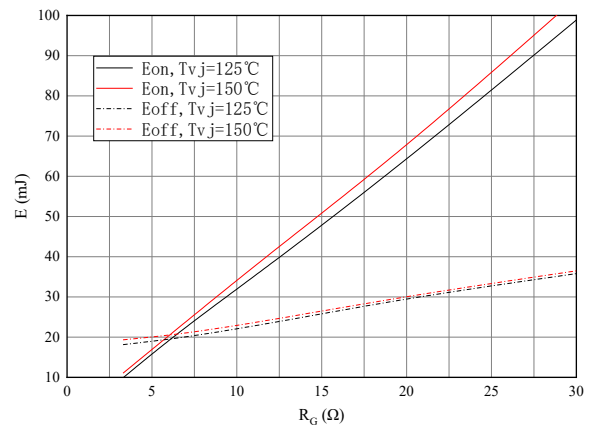


Fig 6. Switching losses of IGBT
 $V_{GE}=\pm 15V, I_C=300A, V_{CE}=600V$

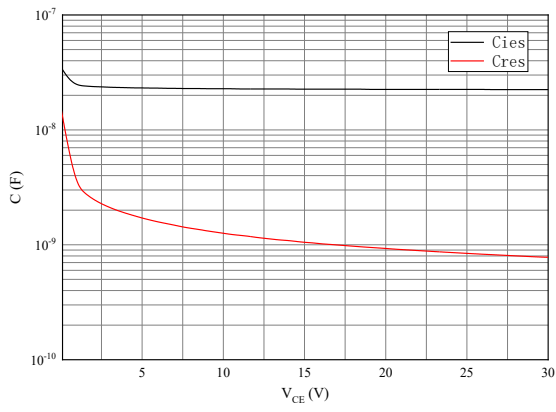
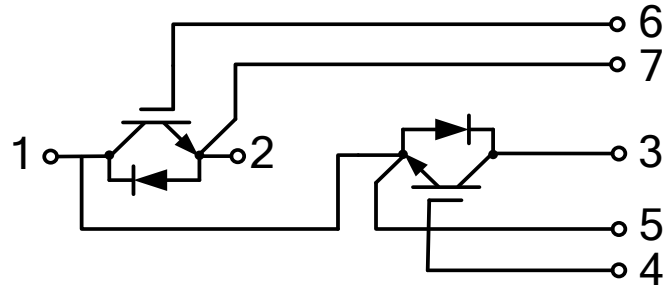


Fig 7. Capacitance characteristic

Circuit diagram



Package outlines

