

62mm Half Bridge IGBT Module

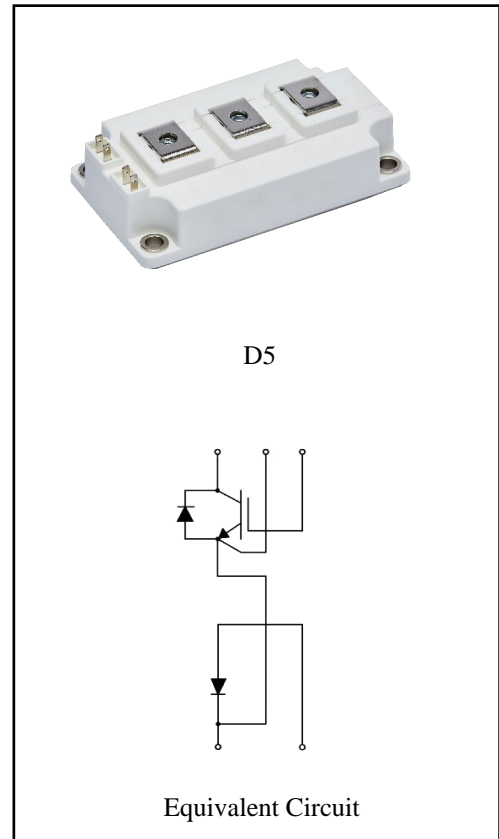
$V_{CES} = 1200V$, $I_{C\ nom} = 450A$ / $I_{CRM} = 900A$

Features :

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

Applications:

- UPS
- Motor control and drive
- 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	$T_C = 100^{\circ}C$, $T_{vj\ max} = 175^{\circ}C$	$I_{C\ nom}$	450	A
Repetitive peak collector current	$t_p = 1\ ms$	I_{CRM}	900	A
Gate emitter voltage		V_{GE}	± 20	V

Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Collector-Emitter saturation voltage	$V_{GE}=15V, I_C=450A$ $V_{GE}=15V, I_C=450A$ $V_{GE}=15V, I_C=450A$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	V_{CEsat}	1.85 2.13 2.19	2.20	V
Gate-Emitter threshold voltage	$I_C=17mA, V_{GE}=V_{CE}$	$T_{vj}=25^{\circ}C$	$V_{GE(th)}$	5.3	5.9	6.5
Gate charge	$V_{GE}=-15V...+15V$		Q_G	3.10		μC
Internal gate resistor	$T_{vj}=25^{\circ}C$		R_{Gint}	1.84		Ω
Input capacitance	$f=1MHz, V_{CE}=25V, V_{GE}=0V$	$T_{vj}=25^{\circ}C$	C_{ies}	34.62		nF
Reverse transfer capacitance			C_{res}	1.37		nF
Collector-emitter cut-off current	$V_{CE}=1200V, V_{GE}=0V$	$T_{vj}=25^{\circ}C$	I_{CES}		2	mA
Gate-emitter leakage current	$V_{CE}=0V, V_{GE}=20V$	$T_{vj}=25^{\circ}C$	I_{GES}		200	nA
Turn-on delay time	$I_C=450A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=1\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_{don}	217 228 230		ns
Rise time	$I_C=450A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=1\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_r	83 89 92		
Turn-off delay time	$I_C=450A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=1\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_{doff}	380 425 439		
Fall time	$I_C=450A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=1\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_f	102 109 109		
Turn-on energy loss per pulse	$I_C=450A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=1\Omega$ $di/dt = 3900A/\mu s (T_{vj} = 150^{\circ}C)$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{on}	26.38 36.60 41.24		mJ
Turn-off energy loss per pulse	$I_C=450A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=1\Omega$ $dv/dt = 4900V/\mu s (T_{vj} = 150^{\circ}C)$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{off}	35.87 40.24 41.81		
SC data	$V_{GE}\leq 15V, V_{ce}=800V$ $V_{CEmax}=V_{CES}-L_{sCE} \cdot di/dt \quad t_p\leq 10\mu s, T_{vj}=150^{\circ}C$		I_{SC}	2512		A
Temperature under switching conditions			$T_{vj op}$	-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	450	A
Repetitive peak forward current	$t_p=1\text{ms}$	I_{FRM}	900	A
I^2t -value	$t_p=10\text{ms}$, $\sin 180^{\circ}$, $T_j=125^{\circ}\text{C}$	I^2t	40000	A^2S

Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Forward voltage	$I_F=450\text{A}$, $V_{GE}=0\text{V}$, $T_{vj}=25^{\circ}\text{C}$ $I_F=450\text{A}$, $V_{GE}=0\text{V}$, $T_{vj}=125^{\circ}\text{C}$ $I_F=450\text{A}$, $V_{GE}=0\text{V}$, $T_{vj}=150^{\circ}\text{C}$	V_F		2.30 2.46 2.38	2.80	V
Peak reverse recovery current	$I_F=450\text{A}$, $T_{vj}=25^{\circ}\text{C}$ $-di_F/dt=3900\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$) $V_R=600\text{V}$, $V_{GE}=-15\text{V}$, $T_{vj}=150^{\circ}\text{C}$	I_{RM}		250 288 307		A
Recovered charge	$I_F=450\text{A}$, $T_{vj}=25^{\circ}\text{C}$ $-di_F/dt=3900\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$) $V_R=600\text{V}$, $V_{GE}=-15\text{V}$, $T_{vj}=150^{\circ}\text{C}$	Q_r		34 51 61		μC
Reverse recovered energy	$I_F=450\text{A}$, $T_{vj}=25^{\circ}\text{C}$ $-di_F/dt=3900\text{A}/\mu\text{s}$ ($T_{vj}=150^{\circ}\text{C}$) $V_R=600\text{V}$, $V_{GE}=-15\text{V}$, $T_{vj}=150^{\circ}\text{C}$	E_{rec}		14.53 21.06 25.04		mJ
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
Terminal Connection Torque		M	2.5		5.0	Nm
Weight		W	312			g

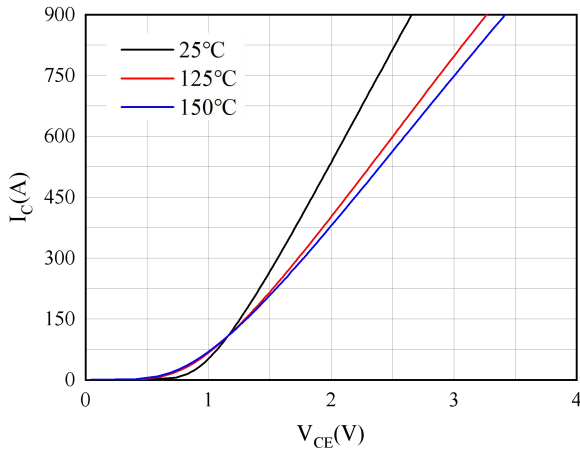


Fig 1. Typical output characteristics ($V_{GE}=15V$)

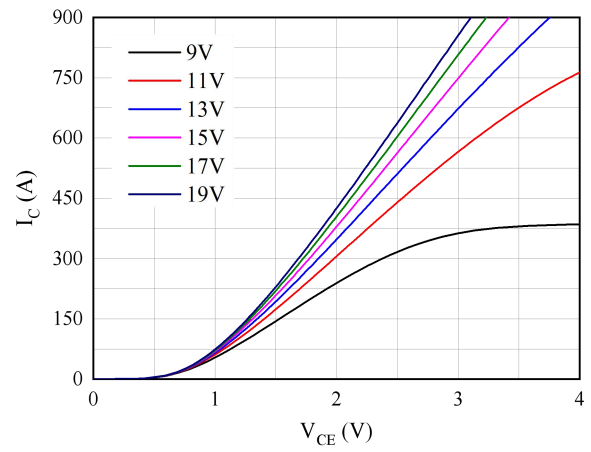


Fig 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)

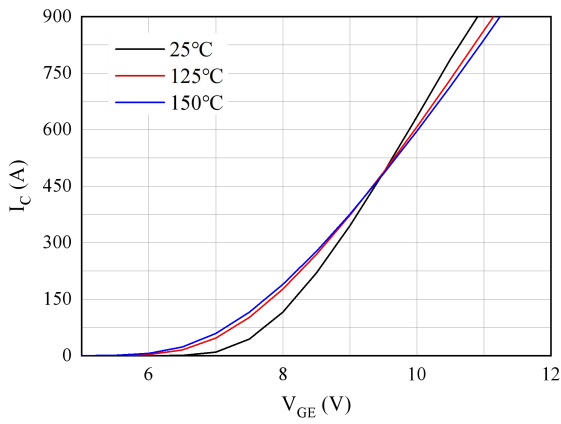


Fig 3. Typical transfer characteristic($V_{CE}=20V$)

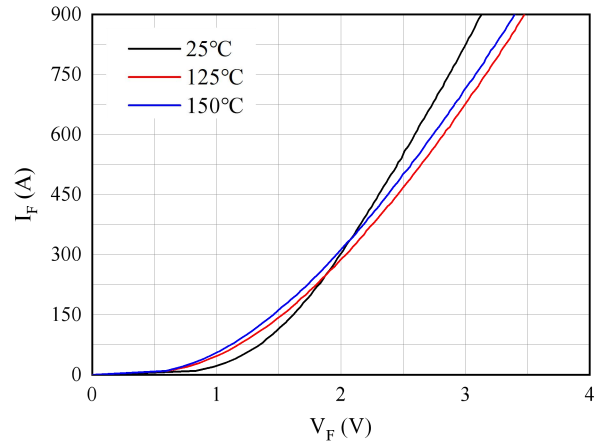


Fig 4. Forward characteristic of Diode

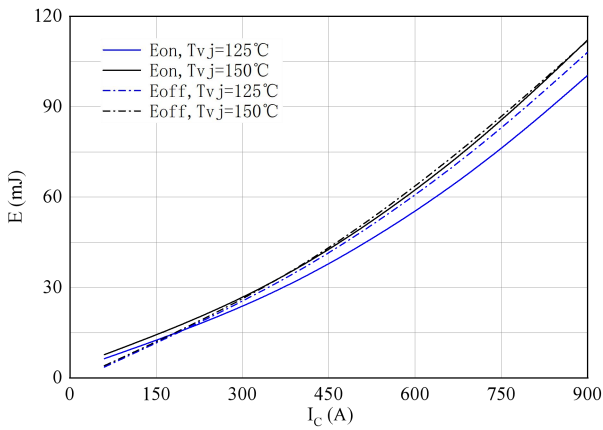


Fig 5. Switching losses of IGBT

$V_{GE}=\pm 15V, R_{Gon}=1\Omega, R_{Goff}=1\Omega, V_{CE}=600V$

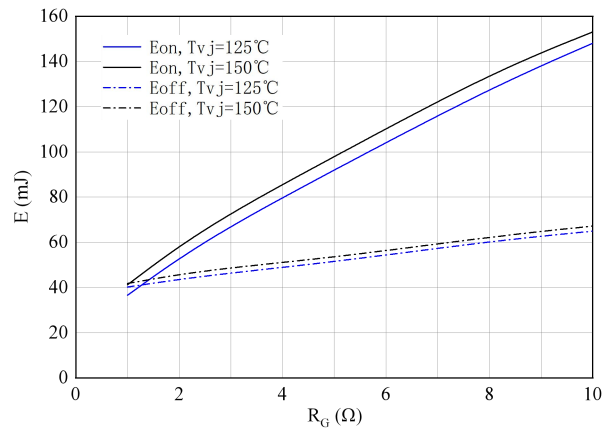


Fig 6. Switching losses of IGBT

$V_{GE}=\pm 15V, I_C=450A, V_{CE}=600V$

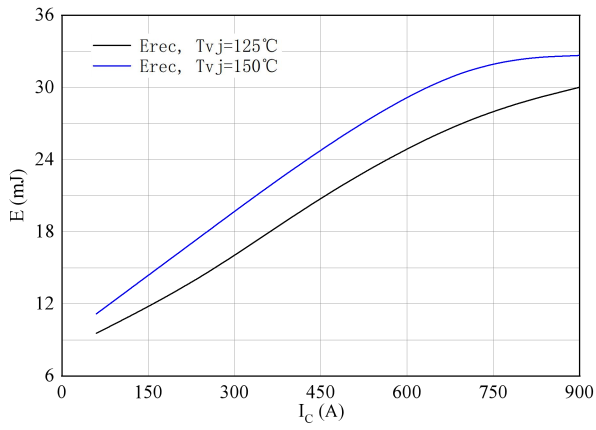


Fig 7. Switching losses of Diode

$R_{Gon}=1\Omega, V_{CE}=600V$

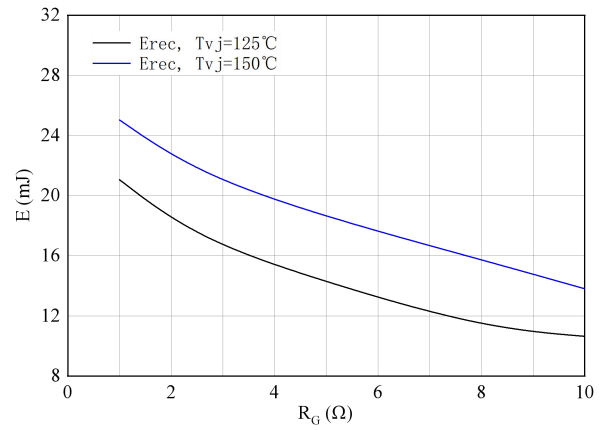


Fig 8. Switching losses of Diode

$I_F=450A, V_{CE}=600V$

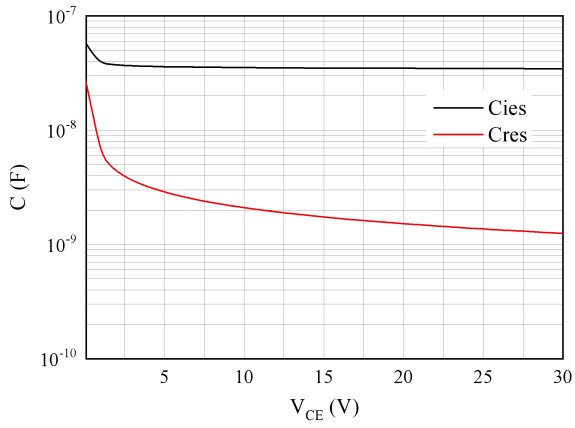
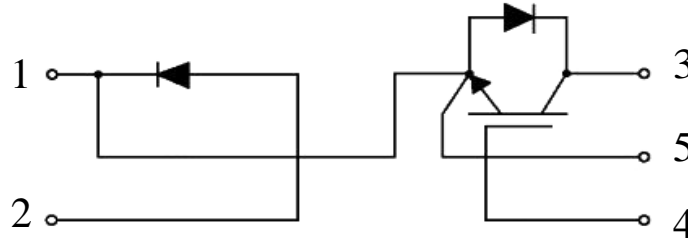


Fig 9. Capacitance characteristic

Circuit diagram



Package outlines

