

## 62mm Chopper IGBT Module

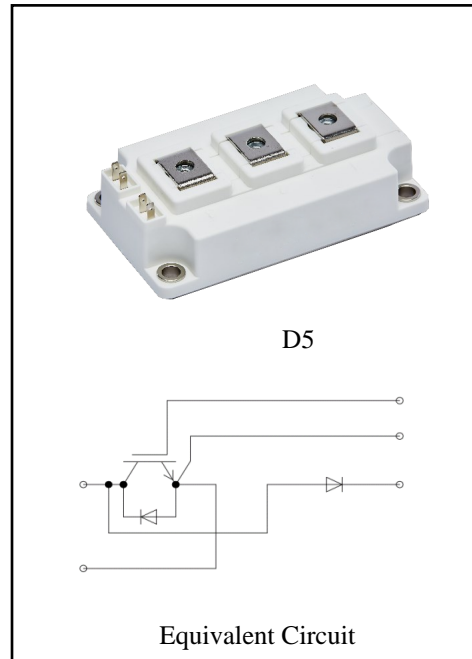
$V_{CES}=1200V$ ,  $I_{C\ nom}=300A$  /  $I_{CRM}=600A$

### Features :

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

### Applications:

- High Frequency Power Supplies
- UPS
- Variable Frequency Drive



## 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	$T_C = 25^{\circ}C$ , $T_{vj\ max} = 175^{\circ}C$	$P_{tot}$	1470	W
Gate emitter voltage		$V_{GE}$	$\pm 20$	V

**Characteristic Values**

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Collector-Emitter saturation voltage	$V_{GE}=15V, I_C=300A$ $T_{vj}=25^{\circ}C$ $V_{GE}=15V, I_C=300A$ $T_{vj}=125^{\circ}C$ $V_{GE}=15V, I_C=300A$ $T_{vj}=150^{\circ}C$	$V_{CEsat}$		2.23 2.74 2.86	2.70	V
Gate-Emitter threshold voltage	$I_C=8mA, V_{GE}=V_{CE}$ $T_{vj}=25^{\circ}C$	$V_{GE(th)}$	5.00	5.65	6.20	
Gate charge	$V_{GE}=-15V...+15V$	$Q_G$		1.52		$\mu C$
Internal gate resistor		$R_{Gint}$		2.0		$\Omega$
Input capacitance	$f=1\text{ MHz}, V_{CE}=25\text{ V}, V_{GE}=0\text{ V}$ $T_{vj}=25^{\circ}C$	$C_{ies}$		22.53		nF
Reverse transfer capacitance		$C_{res}$		0.85		nF
Collector-emitter cut-off current	$V_{CE}=1200V, V_{GE}=0\text{ V}$ $T_{vj}=25^{\circ}C$	$I_{CES}$			1	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	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=2.5\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	$t_{d\ on}$		196 205 209		ns
Rise time	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=2.5\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	$t_r$		56 61 62		
Turn-off delay time	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=2.5\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	$t_{d\ off}$		257 294 303		
Fall time	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=2.5\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	$t_f$		85 141 136		
Turn-on energy loss per pulse	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=2.5\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	$E_{on}$		9.47 19.02 22.82		mJ
Turn-off energy loss per pulse	$I_C=300A, V_{CE}=600\text{ V}$ $T_{vj}=25^{\circ}C$ $V_{GE}=\pm 15\text{ V}, R_G=2.5\Omega$ $T_{vj}=125^{\circ}C$ (inductive load) $T_{vj}=150^{\circ}C$	$E_{off}$		18.28 22.20 23.10		
SC data	$V_{GE}\leq 15V, V_{cc}=800V$ $V_{CEmax}=V_{CES}-L_{sCE}\cdot di/dt$ $t_p\leq 10\mu s, T_{vj}=150^{\circ}C$	$I_{sc}$		979		A
Thermal resistance, junction to case	per IGBT	$R_{thJC}$			0.10	K/W
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		$I_F$	300	A
Repetitive peak forward current	$t_p=1\text{ms}$	$I_{FRM}$	600	A
$I^2t$ -value	$t_p=10\text{ms}$ , $\sin 180^{\circ}$ , $T_j=125^{\circ}\text{C}$	$I^2t$	4050	$\text{A}^2\text{s}$

### Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
Forward voltage	$I_F=300\text{A}$ , $V_{GE}=0\text{V}$ $T_{vj}=25^{\circ}\text{C}$ $I_F=300\text{A}$ , $V_{GE}=0\text{V}$ $T_{vj}=125^{\circ}\text{C}$ $I_F=300\text{A}$ , $V_{GE}=0\text{V}$ $T_{vj}=150^{\circ}\text{C}$	$V_F$		2.23 2.31 2.24	2.75	V
Peak reverse recovery current	$I_F=300\text{A}$ , $T_{vj}=25^{\circ}\text{C}$ $-\text{di}_F/\text{dt}=4233\text{A}/\mu\text{s}$ ( $T_{vj}=150^{\circ}\text{C}$ ) $T_{vj}=125^{\circ}\text{C}$ $V_R=600\text{V}$ , $V_{GE}=-15\text{V}$ $T_{vj}=150^{\circ}\text{C}$	$I_{RM}$		186 218 230		A
Recovered charge	$I_F=300\text{A}$ , $T_{vj}=25^{\circ}\text{C}$ $-\text{di}_F/\text{dt}=4233\text{A}/\mu\text{s}$ ( $T_{vj}=150^{\circ}\text{C}$ ) $T_{vj}=125^{\circ}\text{C}$ $V_R=600\text{V}$ , $V_{GE}=-15\text{V}$ $T_{vj}=150^{\circ}\text{C}$	$Q_F$		11.30 29.50 38.40		$\mu\text{C}$
Reverse recovered energy	$I_F=300\text{A}$ , $T_{vj}=25^{\circ}\text{C}$ $-\text{di}_F/\text{dt}=4233\text{A}/\mu\text{s}$ ( $T_{vj}=150^{\circ}\text{C}$ ) $T_{vj}=125^{\circ}\text{C}$ $V_R=600\text{V}$ , $V_{GE}=-15\text{V}$ $T_{vj}=150^{\circ}\text{C}$	$E_{rec}$		5.25 12.71 16.10		mJ
Thermal resistance, junction to case	per diode	$R_{thJC}$			0.15	K/W
Temperature under switching conditions		$T_{vj\ op}$	-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 <sub>2</sub> O <sub>3</sub>			
Storage temperature		$T_{stg}$	-40		125	$^{\circ}\text{C}$
Mounting torque for modul mounting		M	3.0		6.0	Nm
Weight		W		313		g

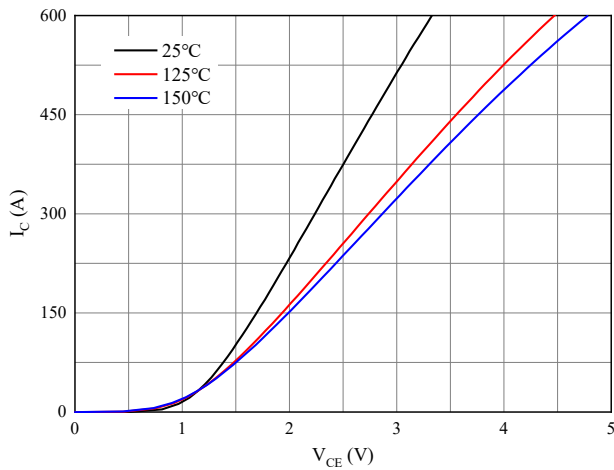


Fig 1. Typical output characteristics ( $V_{GE}=15V$ )

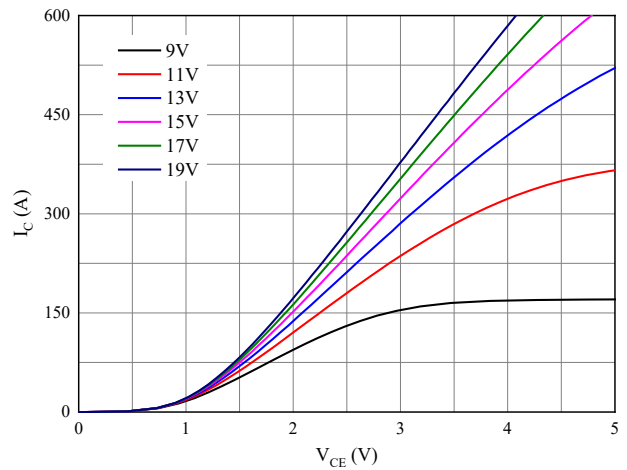


Fig 2. Typical output characteristics ( $T_{vj}=150^{\circ}C$ )

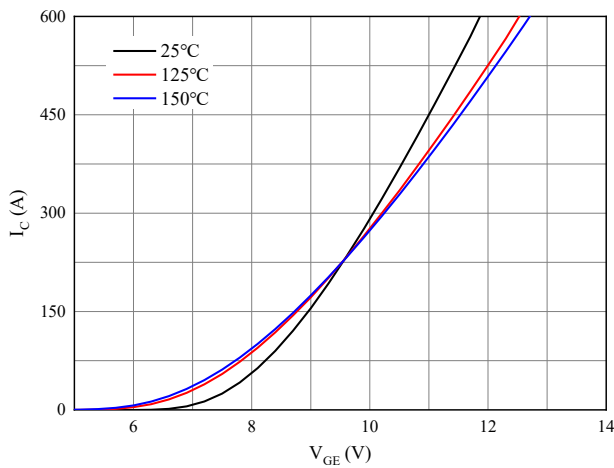


Fig 3. Typical transfer characteristic ( $V_{CE}=20V$ )

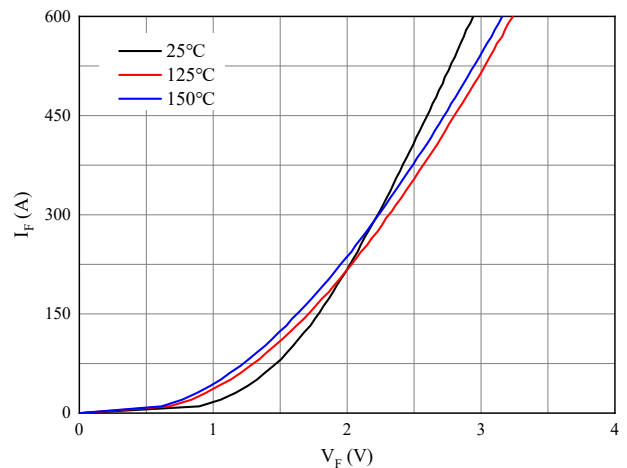


Fig 4. Forward characteristic of Diode

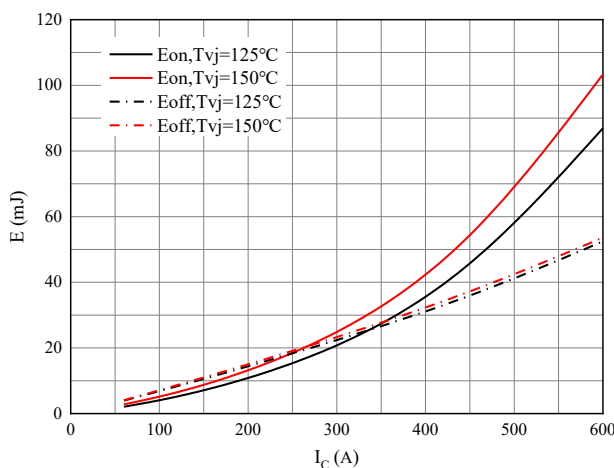


Fig 5. Switching losses of IGBT  
 $V_{GE}=\pm 15V, R_{Gon}=2.5\Omega, R_{Goff}=2.5\Omega, V_{CE}=600V$

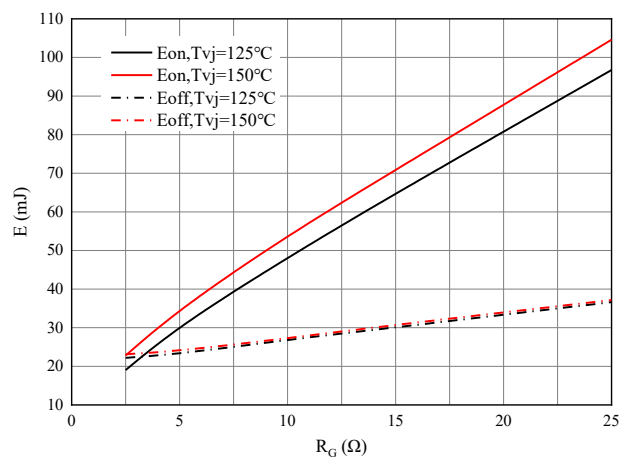
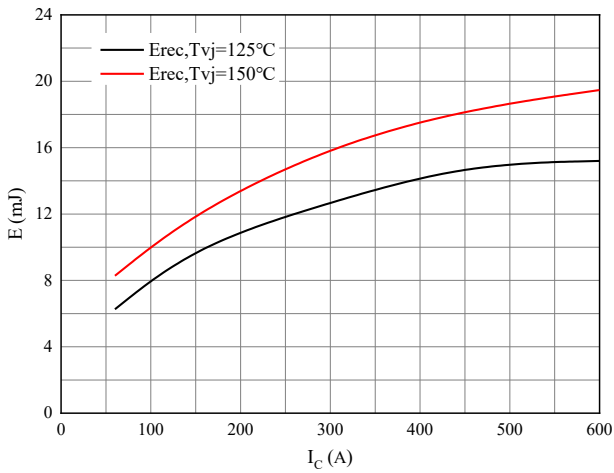
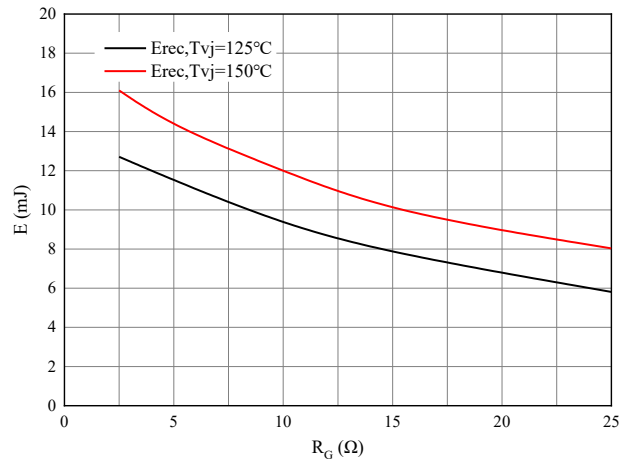


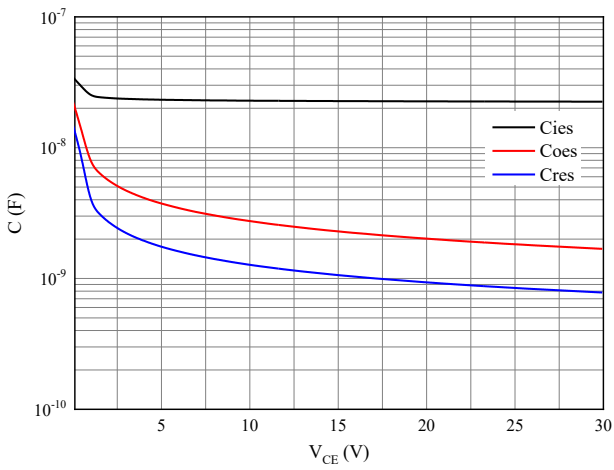
Fig 6. Switching losses of IGBT  
 $V_{GE}=\pm 15V, I_C=300A, V_{CE}=600V$



**Fig 7. Switching losses of Diode**  
 $R_{Gon}=2.5\Omega, V_{CE}=600V$

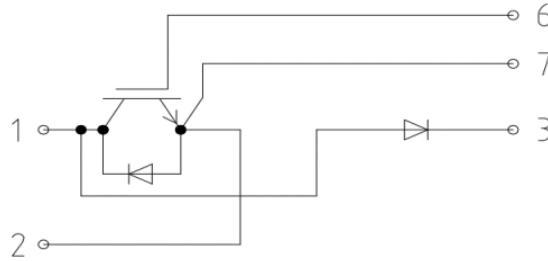


**Fig 8. Switching losses of Diode**  
 $I_F=300A, V_{CE}=600V$



**Fig 9. Capacitance characteristic**

**Circuit diagram**



**Package outlines**

