

62mm Half Bridge IGBT Module

$V_{CES} = 1700V$, $I_C = 300A$, $V_{CE(sat)} = 2.07V$

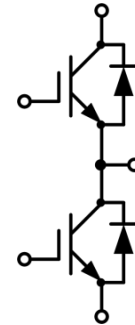


Features

- 1700V Trench/Field Stop Technology
- Low switching losses
- V_{cesat} has a positive temperature coefficient

Applications

- Power Converters
- Uninterruptible power supplies
- Servo Drives
- Inverter



IGBT, Inverter Maximum Ratings

Parameter	Symbol	Test Condition	Value	Unit
Collector-Emitter voltage	V_{CES}	$T_{vj}=25^{\circ}C$	1700	V
Continuous DC collector current	$I_{C\ noM}$	$T_C=100^{\circ}C$, $T_{vj\ max}=175^{\circ}C$	300	A
Repetitive peak collector current	I_{CRM}	$t_p=1ms$	600	A
Total power dissipation	P_{tot}	$T_C=25^{\circ}C$, $T_{vj\ max}=175^{\circ}C$	1800	W
Gate-Emitter voltage	V_{GE}		± 20	V

Characteristics Values

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Collector-Emitter saturation voltage	V_{CEsat}	$V_{GE}=15V$, $I_C=300A$ $V_{GE}=15V$, $I_C=300A$ $V_{GE}=15V$, $I_C=300A$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	2.07 2.47 2.57	2.55	V
Gate-Emitter threshold voltage	$V_{GE(th)}$	$I_C=12mA$, $V_{GE}=V_{CE}$	$T_{vj}=25^{\circ}C$	4.90	5.50	6.10
Internal gate resistor	R_{Gint}			2.50		Ω
Input capacitance	C_{ies}	$f=1MHz$, $V_{CE}=25V$, $V_{GE}=0V$	$T_{vj}=25^{\circ}C$	21.30		nF
Reverse transfer capacitance	C_{res}	$f=1MHz$, $V_{CE}=25V$, $V_{GE}=0V$	$T_{vj}=25^{\circ}C$	0.86		nF
Collector-Emitter cut-off current	I_{CES}	$V_{CE}=1700V$, $V_{GE}=0V$	$T_{vj}=25^{\circ}C$		2	mA
Gate-Emitter leakage current	I_{GES}	$V_{CE}=0V$, $V_{GE}=20V$	$T_{vj}=25^{\circ}C$		200	nA
Turn-on delay time	t_{don}	$I_C=300A$, $V_{CE}=900V$ $V_{GE}=\pm 15V$, $R_G=2.5\Omega$ (inductive load)	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	198 230 297		ns

Rise time	t_r	$I_C=300A, V_{CE}=900V$ $V_{GE}= \pm 15V, R_G=2.5\Omega$ (inductive load)	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		63 69 73		
Turn-off delay time	$t_{d\ off}$	$I_C=300A, V_{CE}=900V$ $V_{GE}= \pm 15V, R_G=2.5\Omega$ (inductive load)	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		431 485 498		ns
Fall time	t_f	$I_C=300A, V_{CE}=900V$ $V_{GE}= \pm 15V, R_G=2.5\Omega$ (inductive load)	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		314 380 380		
Turn-on energy loss per pulse	E_{on}	$I_C=300A, V_{CE}=900V$ $V_{GE}= \pm 15V, R_G=2.5\Omega$ (inductive load)	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		54.94 73.05 80.71		mJ
Turn-off energy loss per pulse	E_{off}	$I_C=300A, V_{CE}=900V$ $V_{GE}= \pm 15V, R_G=2.5\Omega$ (inductive load)	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		57.48 68.22 65.84		
SC data	I_{SC}	$V_{GE} \leq 15V, V_{CE}=1000V$ $V_{CEmax}=V_{CES}-L_{sCE} \cdot di/dt,$ $t_p \leq 10\mu s$	$T_{vj}=150^\circ C$		1400		A
Thermal resistance, junction to case	R_{thJC}	per IGBT				0.08	K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150	$^\circ C$

Diode, Inverter Maximum Ratings

Parameter	Symbol	Test Condition	Value	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj}=25^\circ C$	1700	V
Continuous DC forward current	I_F		300	A
Repetitive peak forward current	I_{FRM}	$t_p=1ms$	600	A
I^2t -value	I^2t	$t_p=10ms, \sin 180^\circ, T_{vj}=125^\circ C$	14500	A^2s

Characteristics Values

Parameter	Symbol	Test Condition	Value			Unit
			Min.	Typ.	Max.	
Forward voltage	V_F	$I_F=300A, V_{GE}=0V$ $I_F=300A, V_{GE}=0V$ $I_F=300A, V_{GE}=0V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		2.03 2.18 2.15	2.45 V
Peak reverse recovery current	I_{RM}	$I_F=300A$ $-diF/dt=2720A/\mu s(T_{vj}=150^\circ C)$ $V_R=900V, V_{GE}=-15V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		147 165 171	A
Recovered charge	Q_r	$I_F=300A$ $-diF/dt=2720A/\mu s(T_{vj}=150^\circ C)$ $V_R=900V, V_{GE}=-15V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		41.60 72.20 79.90	$^\circ C$
Reverse recovered energy	E_{rec}	$I_F=300A$ $-diF/dt=2720A/\mu s(T_{vj}=150^\circ C)$ $V_R=900V, V_{GE}=-15V$	$T_{vj}=25^\circ C$ $T_{vj}=125^\circ C$ $T_{vj}=150^\circ C$		24.07 42.59 46.96	mJ
Thermal resistance, junction to case	R_{thJC}	per diode				0.13 K/W
Temperature under switching conditions	$T_{vj\ op}$			-40		150 $^\circ C$

Characteristics Values(Module)

Parameter	Symbol	Test Condition	Value	Unit	
Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=1min	4000	V	
Internal isolation			Al ₂ O ₃		
Storage temperature	T_{stg}		-40	125	°C
Mounting torque for module mounting	M		3.0	6.0	Nm
Weight	W		318		g

Typical Characteristics

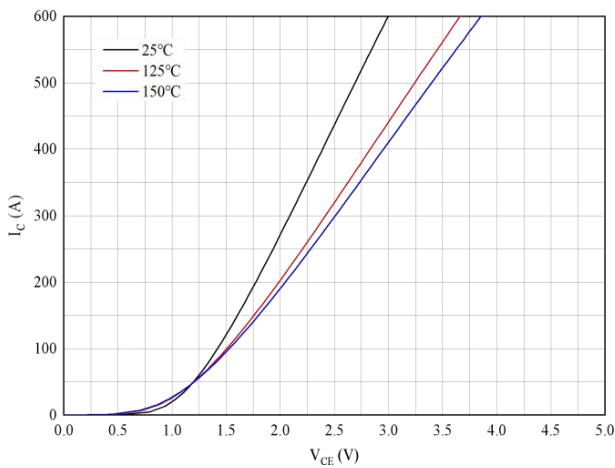


Fig 1. Typical output characteristics ($V_{GE}=15V$)

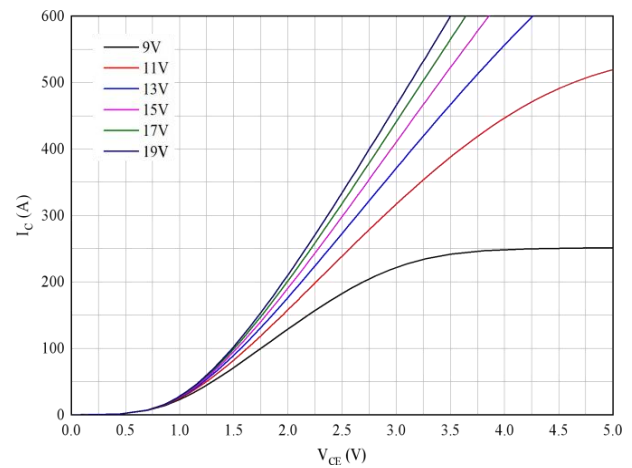


Fig 2. Typical output characteristics ($T_{vj}=150^{\circ}C$)

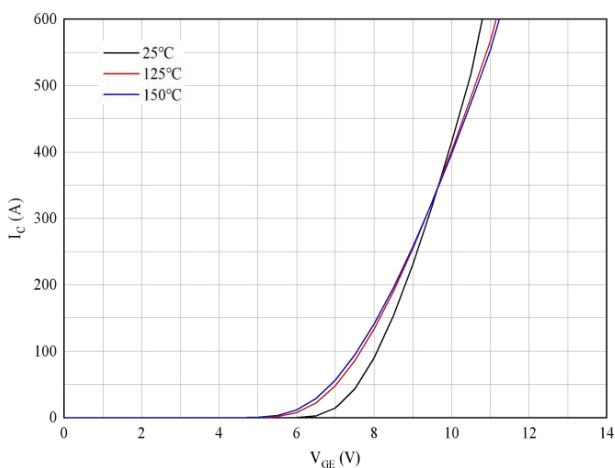


Fig 3. Typical transfer characteristic ($V_{CE}=20V$)

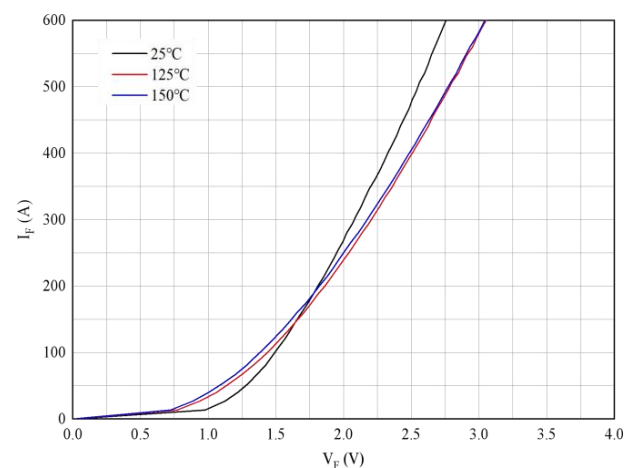


Fig 4. Forward characteristic of Diode

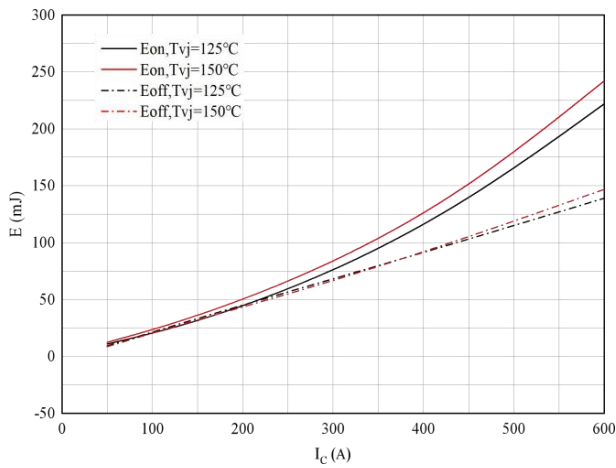


Fig 5. Switching losses of IGBT
 $V_{GE}=\pm 15V$, $R_{Gon}=2.5\Omega$, $R_{Goff}=2.5\Omega$, $V_{CE}=900V$

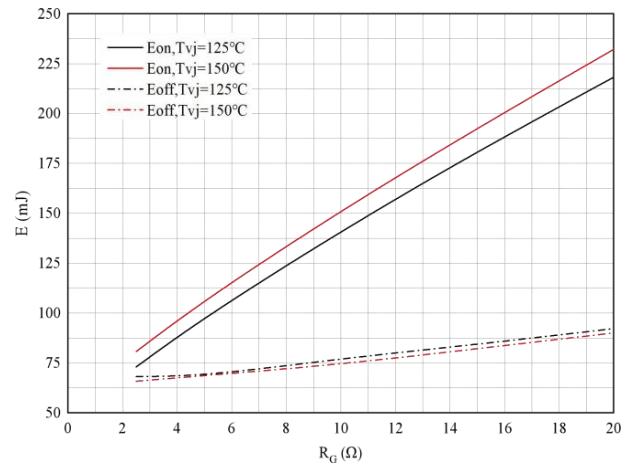


Fig 6. Switching losses of IGBT
 $V_{GE}=\pm 15V$, $I_c=300A$, $V_{CE}=900V$

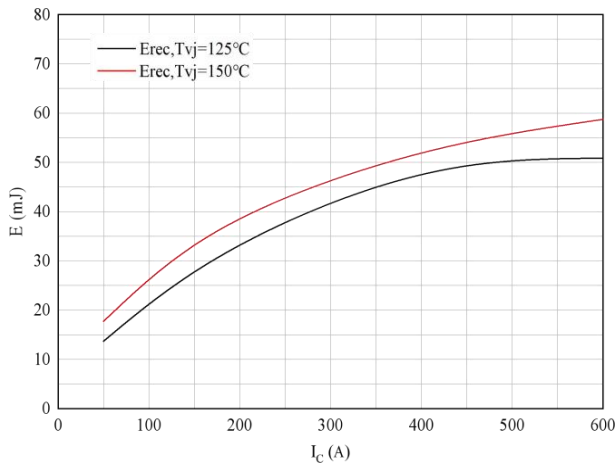


Fig 7. Switching losses of Diode
 $R_{Gon}=2.5\Omega$, $V_{CE}=900V$

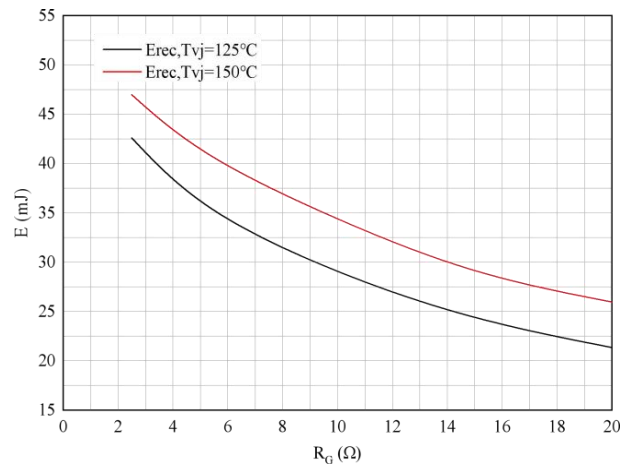


Fig 8. Switching losses of Diode
 $I_F=300A$, $V_{CE}=900V$

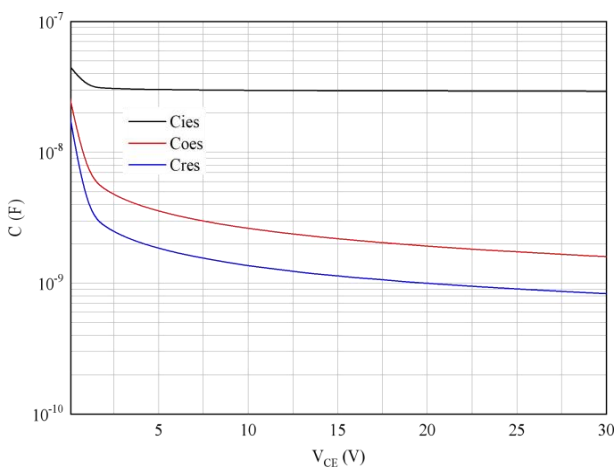
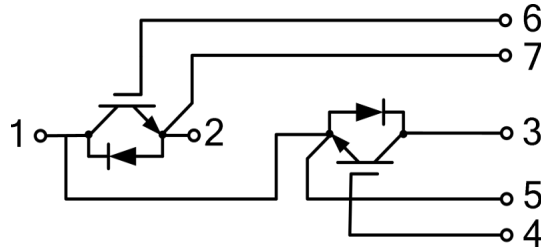
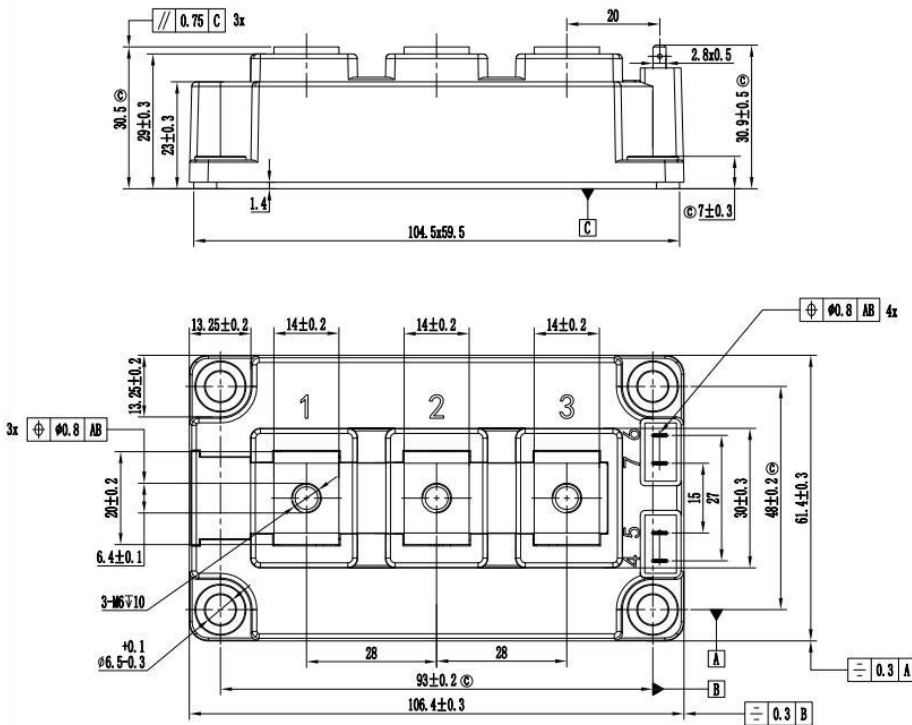


Fig 9. Capacitance characteristic

Circuit Diagram



Package Outlines(Unit: mm)



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