

## 62mm Half Bridge IGBT Module

### DESCRIPTION :

- 1200V Trench / Field Stop Technology
- Low Switching Power Loss
- Positive Temperature Coefficient

### TYPICAL APPLICATIONS :

- Welder Inverter
- Induction Heating
- High Switching Frequency Application
- Inverter



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

## IGBT, Inverter

### MAXIMUM RATINGS

Characteristic	Condition	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	$t_p=1ms$	$I_{CRM}$	600	A
Gate emitter voltage		$V_{GE}$	$\pm 20$	V

### ELECTRICAL CHARATERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Collector-Emitter saturation voltage $V_{GE}=15V$ , $I_C=300A$ $T_{vj}=25^{\circ}C$ $V_{GE}=15V$ , $I_C=300A$ $T_{vj}=125^{\circ}C$ $V_{GE}=15V$ , $I_C=300A$ $T_{vj}=150^{\circ}C$	$V_{CE(SAT)}$		2.10 2.50 2.58	2.65	V
Gate-Emitter threshold voltage $I_C=8mA$ , $V_{GE}= V_{CE}$ $T_{vj}=25^{\circ}C$	$V_{GE(th)}$	5.5	6.1	6.7	V
Gate charge $V_{GE} = -15 V \dots +15 V$	$Q_G$		1.52		$\mu C$
Internal gate resistor ( $T_{vj} = 25^{\circ}C$ )	$R_{Gint}$		3.48		$\Omega$
Input capacitance $f=1\ MHz$ , $V_{CE}=25V$ , $V_{GE}=0V$ $T_{vj}=25^{\circ}C$	$C_{ies}$		27.38		nF

Reverse transfer capacitance f=1 MHz, VCE=25V, VGE=0V Tvj=25°C	C <sub>res</sub>		0.21		nF
Collector-emitter cut-off current VCE=1200V, VGE=0V Tvj=25°C	I <sub>CES</sub>			2	mA
Gate-emitter leakage current VCE=0V, VGE=20V Tvj=25°C	I <sub>GES</sub>			200	nA
Turn-on delay time IC=300A, VCE=600 V Tvj=25°C VGE=±15 V, RG=3.3Ω Tvj=125°C (inductive load) Tvj=150°C	td <sub>(ON)</sub>		350 362 363		ns
Rise time IC=300A, VCE=600 V Tvj=25°C VGE=±15 V, RG=3.3Ω Tvj=125°C (inductive load) Tvj=150°C	tr		87 99 96		ns
Turn-off delay time IC=300A, VCE=600 V Tvj=25°C VGE=±15 V, RG=3.3Ω Tvj=125°C (inductive load) Tvj=150°C	td <sub>(OFF)</sub>		227 272 281		ns
Fall time IC=300A, VCE=600 V Tvj=25°C VGE=±15 V, RG=3.3Ω Tvj=125°C (inductive load) Tvj=150°C	tf		60 94 96		ns
Turn-on energy loss per pulse IC=300A, VCE=600 V Tvj=25°C VGE=±15 V, RG=3.3Ω Tvj=125°C di/dt = 2477A/μs (Tvj = 150°C) Tvj=150°C (inductive load)	E <sub>(ON)</sub>		25.31 40.84 45.26		mJ
Turn-off energy loss per pulse IC=300A, VCE=600 V Tvj=25°C VGE=±15 V, RG=3.3Ω Tvj=125°C dv/dt = 8706V/μs (Tvj = 150°C) Tvj=150°C (inductive load)	E <sub>(OFF)</sub>		9.88 14.30 15.87		mJ
Temperature under switching conditions	Tvj op	-40		150	°C

## Diode, Inverter

## MAXIMUM RATINGS

Characteristic	Condition	Symbol	Value	Unit
Repetitive peak reverse voltage	Tvj=25°C	V <sub>RRM</sub>	1200	V
Continuous DC forward current		I <sub>F</sub>	300	A
Repetitive peak forward current	t <sub>P</sub> =1ms	I <sub>FRM</sub>	600	A
I <sup>2</sup> t -value	t <sub>P</sub> =10ms, sin180°, Tvj=125°C	I <sup>2</sup> t	34000	A <sup>2</sup> s

## ELECTRICAL CHARATERISTICS

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Forward voltage IF=300A, VGE=0 V    Tvj=25°C IF=300A, VGE=0 V    Tvj=125°C IF=300A, VGE=0 V    Tvj=150°C	V <sub>F</sub>		2.08 1.74 1.66	2.55	V
Peak reverse recovery current IF=300 A,                      Tvj=25°C -diF/dt =2477A/μs(Tvj=150°C)    Tvj=125°C VR=600 V ,VGE= -15 V         Tvj=150°C	I <sub>RM</sub>		122 224 243		A
Recovered charge IF=300 A,                      Tvj=25°C -diF/dt =2477A/μs(Tvj=150°C)    Tvj=125°C VR=600 V ,VGE= -15 V         Tvj=150°C	Q <sub>r</sub>		18.96 50.12 60.12		uC
Reverse recovered energy IF=300 A,                      Tvj=25°C -diF/dt =2477A/μs(Tvj=150°C)    Tvj=125°C VR=600 V ,VGE= -15 V         Tvj=150°C	E <sub>rec</sub>		7.05 17.91 21.72		mJ
Temperature under switching conditions	Tvj op	-40		150	°C

## Module

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Isolation test voltage RMS, f=50Hz, t=1min	V <sub>ISOL</sub>	4000			V
Internal isolation		Al <sub>2</sub> O <sub>3</sub>			

Storage temperature	$T_{STG}$	-40		125	°C
Mounting torque for modul mounting	M	3.0		6.0	Nm
Terminal Connection Torque	M	2.5		5.0	Nm
Weight	W		313		g

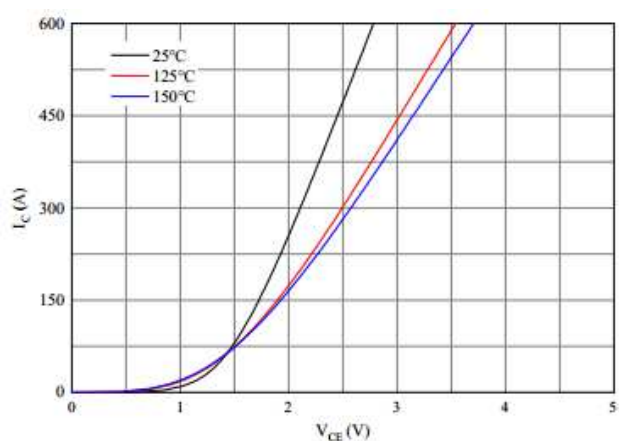


Figure 1. Typical output characteristics (VGE=15V)

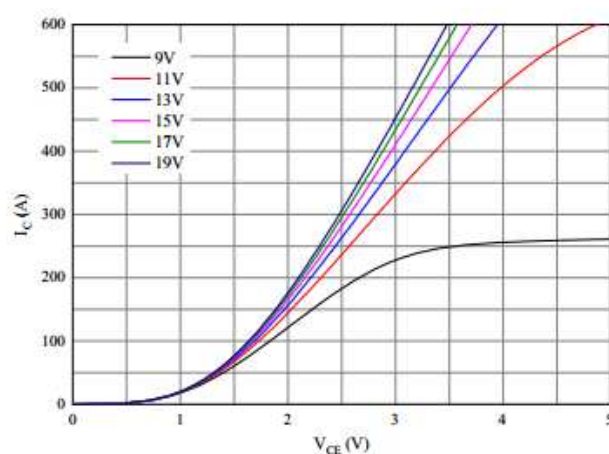


Figure 2. Typical output characteristics (Tvj=150°C)

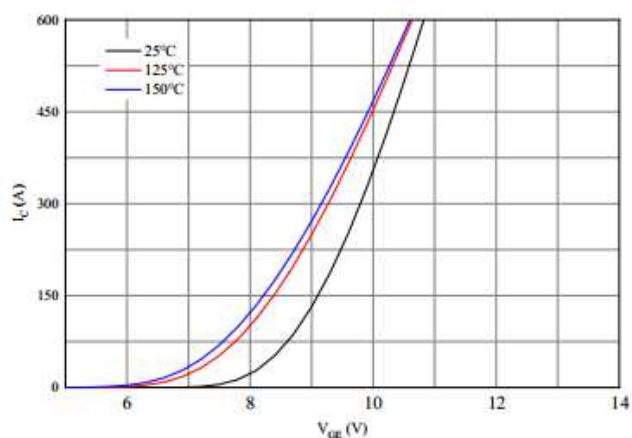


Figure 3. Typical transfer characteristic(VCE=20V)

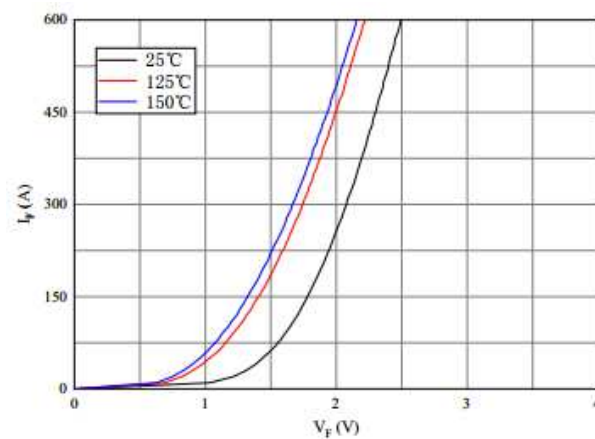


Figure 4. Forward characteristic of Diode

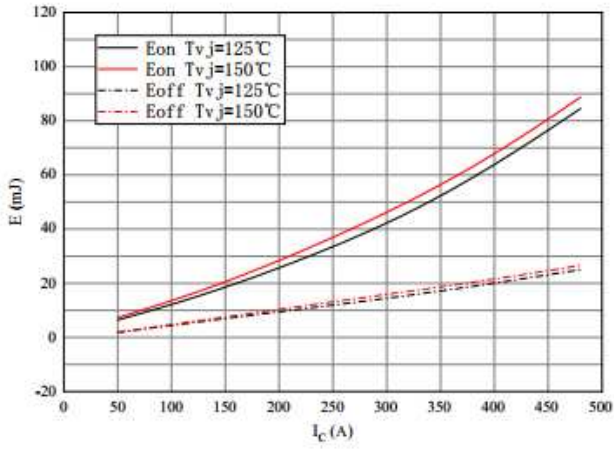


Figure 5. Switching losses of IGBT  
VGE=± 15V, RGon=3.3Ω, RGoff=3.3Ω, VCE=600V

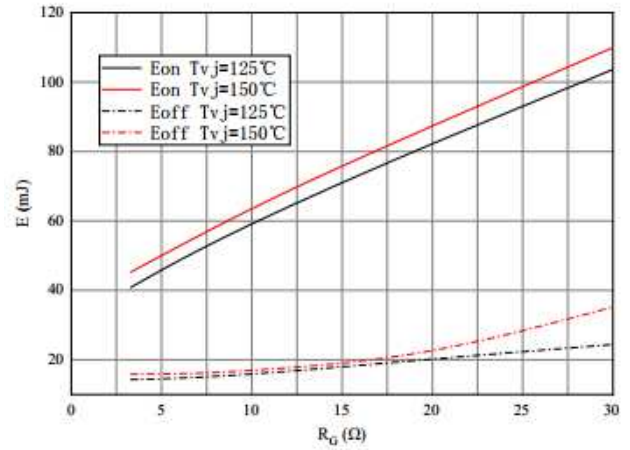


Figure 6. Switching losses of IGBT  
VGE=± 15V, IC=300A, VCE=600V

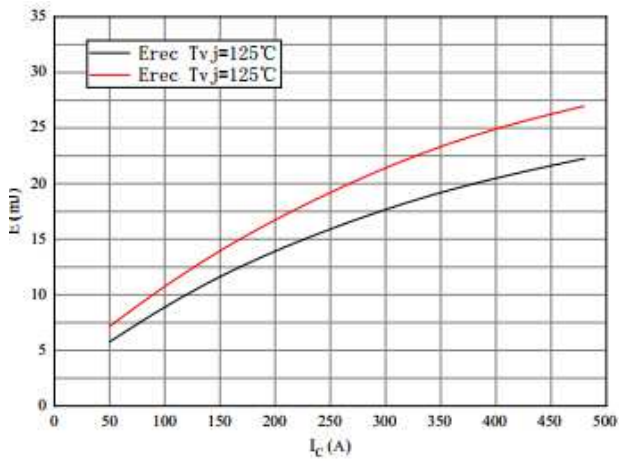


Figure 7. Switching losses of Diode  
RGon=3.3Ω, VCE=600V

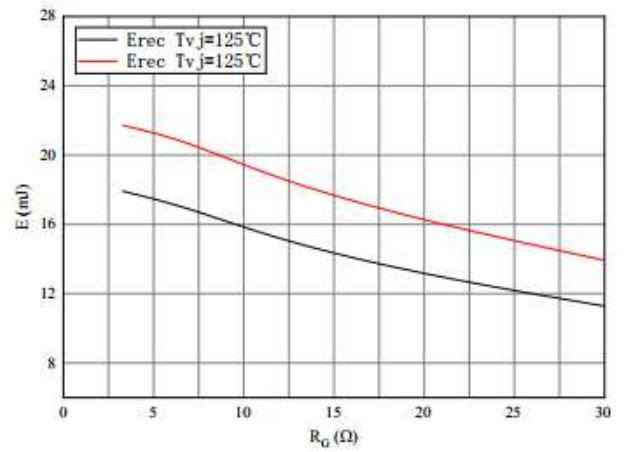


Figure 8. Switching losses of Diode  
IF=300A, VCE=600V

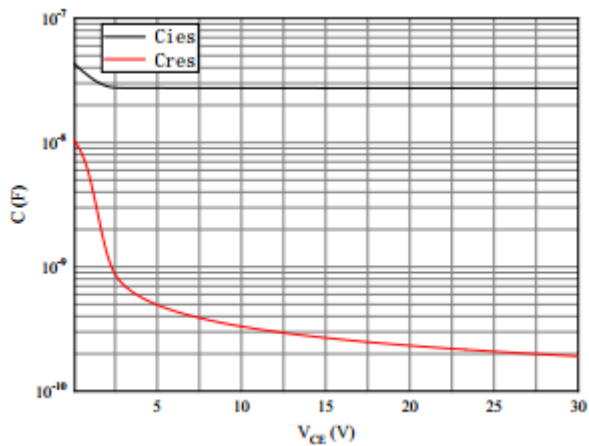
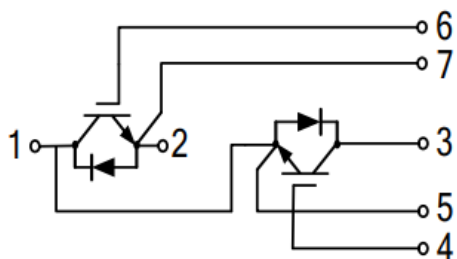
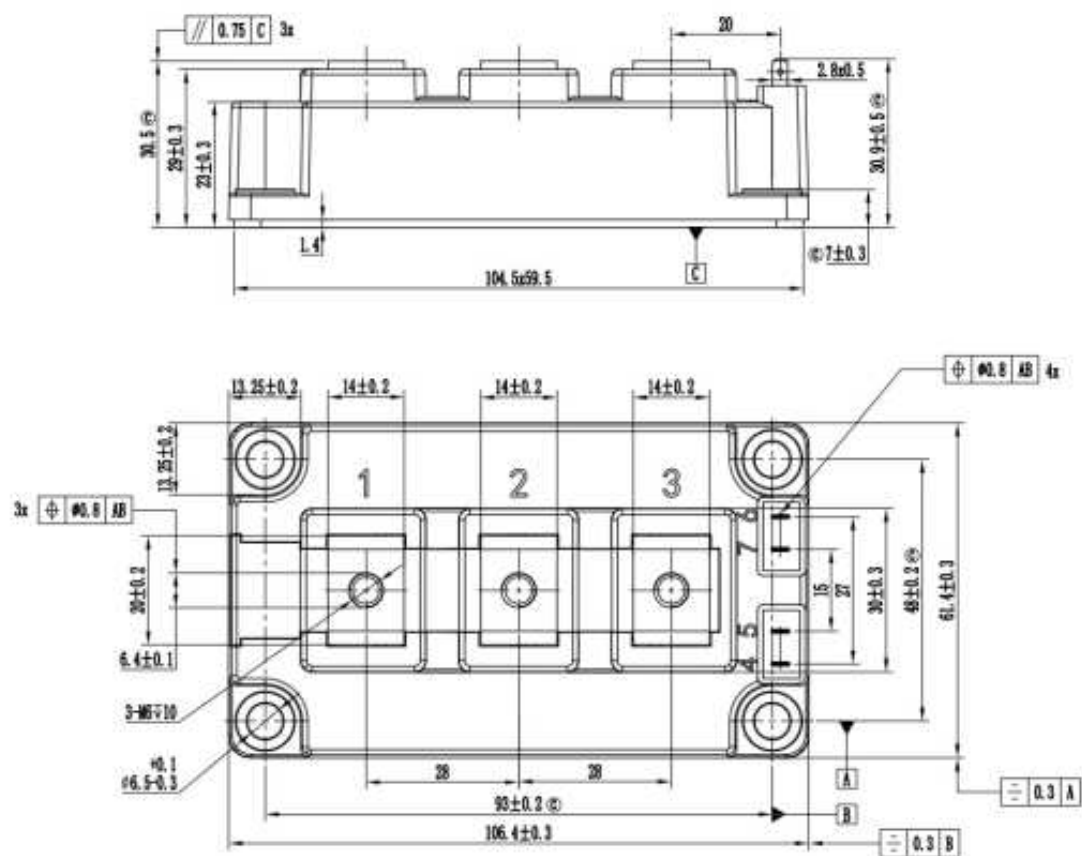


Figure 9. Capacitance characteristic

- Circuit diagram



- Package outlines : Dimensions in (mm)



Remark: 1. © control key dimensions

2. Unmarked tolerances shall be implemented in accordance with GB/T1804-m

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