

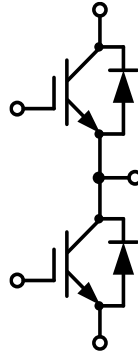
## 62mm Half Bridge IGBT Module 1200V/450A

### PRODUCT FEATURES 电气特性:

- 1200V 沟槽栅/场终止工艺
- 低开关损耗
- 正温度系数

#### 典型应用:

- 变频器
- UPS
- 伺服
- 逆变器



### Equivalent Circuit and Package E6 Series



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

## IGBT, 逆变器 / IGBT, Inverter

### 最大额定值 / Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
集电极-发射极电压 Collector-Emitter voltage	$T_{vj} = 25^{\circ}C$	$V_{CES}$	1200	V
连续集电极直流电流 Continuous DC collector current	$T_C = 100^{\circ}C$ , $T_{vj\ max} = 175^{\circ}C$	$I_{C\ nom}$	450	A
集电极重复峰值电流 Repetitive peak collector current	$t_p = 1\ ms$	$I_{CRM}$	900	A
总功率损耗 Total power dissipation	$T_C = 25^{\circ}C$ , $T_{vj\ max} = 175^{\circ}C$	$P_{tot}$	2400	W
栅极-发射极电压 Gate emitter voltage		$V_{GE}$	$\pm 20$	V

### 特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
集电极-发射极饱和电压 Collector-Emitter saturation voltage	$V_{GE} = 15V$ , $I_C = 450A$ $V_{GE} = 15V$ , $I_C = 450A$ $V_{GE} = 15V$ , $I_C = 450A$	$T_{vj} = 25^{\circ}C$ $T_{vj} = 125^{\circ}C$ $T_{vj} = 150^{\circ}C$	$V_{CEsat}$	2.15 2.72 2.86	2.55	V
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_C = 17mA$ , $V_{GE} = V_{CE}$	$T_{vj} = 25^{\circ}C$	$V_{GE(th)}$	5.20	5.80	6.40
栅电荷 Gate charge	$V_{GE} = -15V \dots +15V$		$Q_G$	2.20		$\mu C$
内部栅极电阻			$R_{Gint}$	2.10		$\Omega$

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Internal gate resistor							
输入电容 Input capacitance	f=1MHz, V <sub>CE</sub> =25 V, V <sub>GE</sub> =0 V	T <sub>vj</sub> =25°C	C <sub>ies</sub>	31.10		nF	
反向传输电容 Reverse transfer capacitance			C <sub>res</sub>	1.10		nF	
集电极-发射极截止电流 Collector-emitter cut-off current	V <sub>CE</sub> =1200V, V <sub>GE</sub> =0 V	T <sub>vj</sub> =25°C	I <sub>CES</sub>		2	mA	
栅极-发射极漏电流 Gate-emitter leakage current	V <sub>CE</sub> =0 V, V <sub>GE</sub> =20 V	T <sub>vj</sub> =25°C	I <sub>GES</sub>		200	nA	
开通延迟时间 Turn-on delay time	I <sub>C</sub> =450A, V <sub>CE</sub> =600 V V <sub>GE</sub> =±15 V, R <sub>G</sub> =1Ω (电感负载) / (inductive load)	T <sub>vj</sub> =25°C T <sub>vj</sub> =125°C T <sub>vj</sub> =150°C	t <sub>d on</sub>	160			
				180			
				185			
上升时间 Rise time	I <sub>C</sub> =450A, V <sub>CE</sub> =600 V V <sub>GE</sub> =±15 V, R <sub>G</sub> =1Ω (电感负载) / (inductive load)	T <sub>vj</sub> =25°C T <sub>vj</sub> =125°C T <sub>vj</sub> =150°C	t <sub>r</sub>	60			
				65			
				70			
关断延迟时间 Turn-off delay time	I <sub>C</sub> =450A, V <sub>CE</sub> =600 V V <sub>GE</sub> =±15 V, R <sub>G</sub> =1Ω (电感负载) / (inductive load)	T <sub>vj</sub> =25°C T <sub>vj</sub> =125°C T <sub>vj</sub> =150°C	t <sub>d off</sub>	270		ns	
				300			
				310			
下降时间 Fall time	I <sub>C</sub> =450A, V <sub>CE</sub> =600 V V <sub>GE</sub> =±15 V, R <sub>G</sub> =1Ω (电感负载) / (inductive load)	T <sub>vj</sub> =25°C T <sub>vj</sub> =125°C T <sub>vj</sub> =150°C	t <sub>f</sub>	200			
				210			
				250			
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I <sub>C</sub> =450A, V <sub>CE</sub> =600 V V <sub>GE</sub> =±15 V, R <sub>G</sub> =1Ω (电感负载) / (inductive load)	T <sub>vj</sub> =25°C T <sub>vj</sub> =125°C T <sub>vj</sub> =150°C	E <sub>on</sub>	16.70		mJ	
				28.60			
				35.90			
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I <sub>C</sub> =450A, V <sub>CE</sub> =600 V V <sub>GE</sub> =±15 V, R <sub>G</sub> =1Ω (电感负载) / (inductive load)	T <sub>vj</sub> =25°C T <sub>vj</sub> =125°C T <sub>vj</sub> =150°C	E <sub>off</sub>	40.90			
				44.70			
				48.30			
短路数据 SC data	V <sub>GE</sub> ≤15V, V <sub>CC</sub> =800V V <sub>CEmax</sub> =V <sub>CES</sub> -L <sub>sCE</sub> ·di/dt t <sub>p</sub> ≤10us, T <sub>vj</sub> =150°C		I <sub>SC</sub>	1600		A	
结-外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R <sub>thJC</sub>		0.062	K/W	
在开关状态下温度 Temperature under switching conditions			T <sub>vj op</sub>	-40	150	°C	

## 二极管，逆变器 / Diode, Inverter

### 最大额定值 / Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
反向重复峰值电压 Repetitive peak reverse voltage	T <sub>vj</sub> =25°C	V <sub>RRM</sub>	1200	V
连续正向直流电流 Continuous DC forward current		I <sub>F</sub>	450	A
正向重复峰值电流 Repetitive peak forward current	t <sub>p</sub> =1ms	I <sub>FRM</sub>	900	A
I <sup>2</sup> t 值 I <sup>2</sup> t-value	t <sub>p</sub> =10ms, sin180°, T <sub>j</sub> =125°C	I <sup>2</sup> t	6000	A <sup>2</sup> s

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## 特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	$I_F=450A, V_{GE}=0V$ $I_F=450A, V_{GE}=0V$ $I_F=450A, V_{GE}=0V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$V_F$		2.38 2.55 2.47	2.80   V
反向恢复峰值电流 Peak reverse recovery current	$I_F=450A$ $-di_F/dt=5300A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$I_{RM}$		285 315 325	A
恢复电荷 Recovered charge	$I_F=450A$ $-di_F/dt=5300A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$Q_r$		29.0 42.0 60.0	$\mu C$
反向恢复损耗（每脉冲） Reverse recovered energy	$I_F=450A$ $-di_F/dt=5300A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	$E_{rec}$		15.0 20.0 27.0	mJ
结-外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode		$R_{thJC}$			0.11 K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj op}$	-40		150 $^{\circ}C$

## 模块 / Module

Parameter	Conditions	Symbol	Value			Unit
绝缘测试电压 Isolation test voltage	RMS, $f=50Hz, t=1min$	$V_{ISOL}$		4000		V
内部绝缘 Internal isolation				$Al_2O_3$		
储存温度 Storage temperature		$T_{stg}$	-40		125	$^{\circ}C$
模块安装的扭矩 Mounting torque for modul mounting		M	3.0		6.0	Nm
重量 Weight		W		317		g

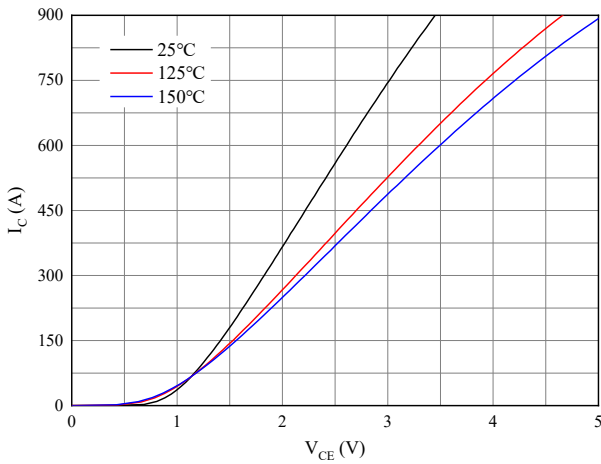


图 1. 典型输出特性 ( $V_{GE}=15V$ )

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

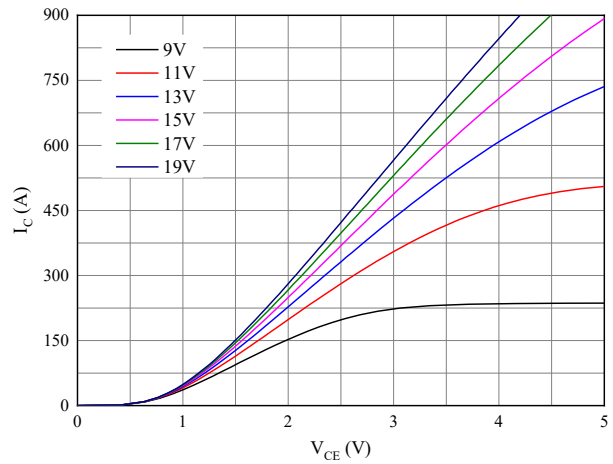


图 2. 典型输出特性 ( $T_{vj}=150^{\circ}C$ )

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

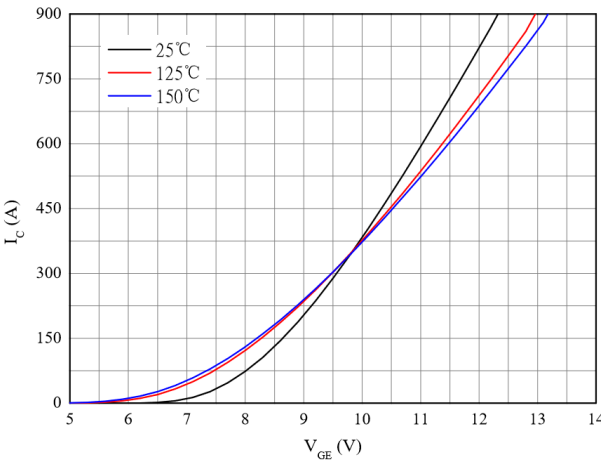


图 3. 典型传输特性 ( $V_{CE}=20V$ )

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

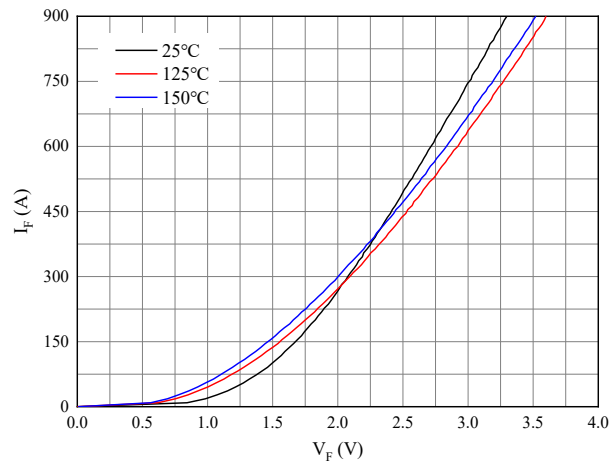


图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

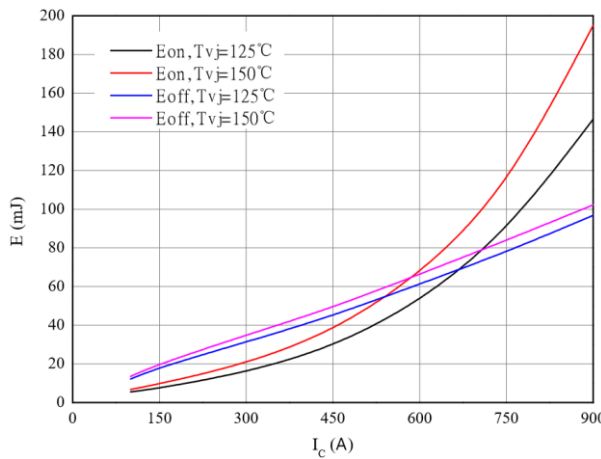


图 5. 开关损耗 逆变器

Figure 5. Switching losses of IGBT  
 $V_{GE}=\pm 15V, R_{Gon}=1\Omega, R_{Goff}=1\Omega, V_{CE}=600V$

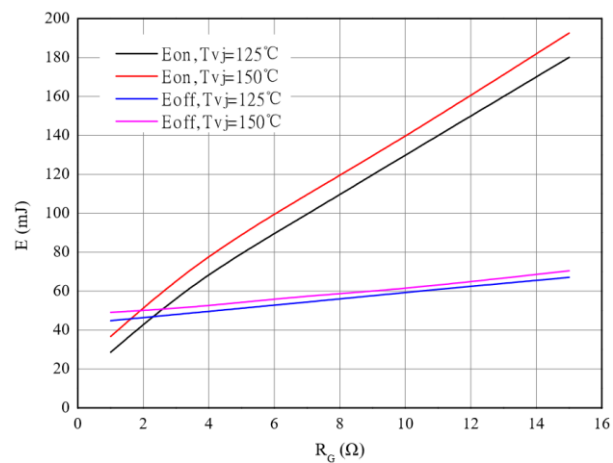


图 6. 开关损耗 逆变器

Figure 6. Switching losses of IGBT  
 $V_{GE}=\pm 15V, I_C=450A, V_{CE}=600V$

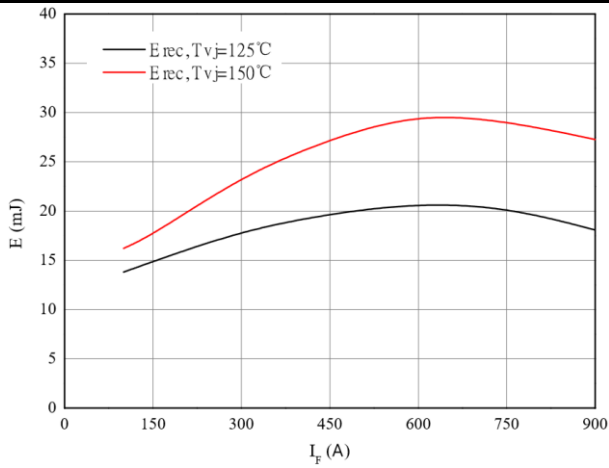


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode  
 $R_{Gon}=1\Omega$ ,  $V_{CE}=600V$

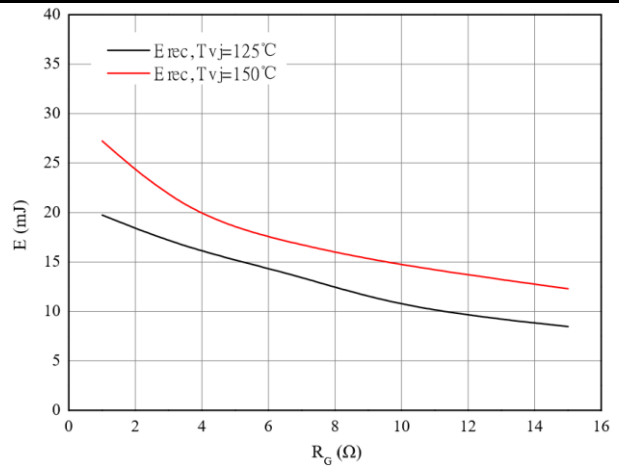


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode  
 $I_F=450A$ ,  $V_{CE}=600V$

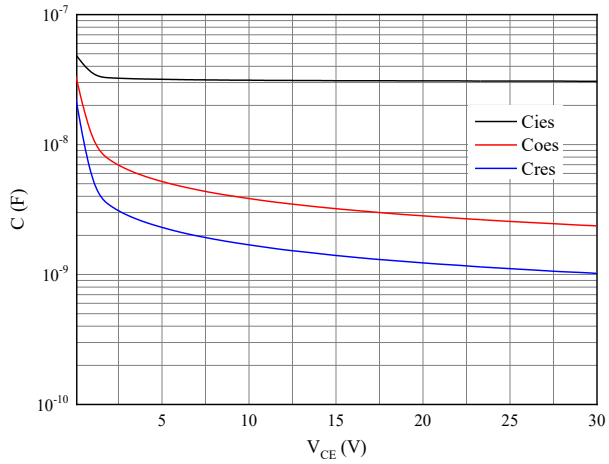
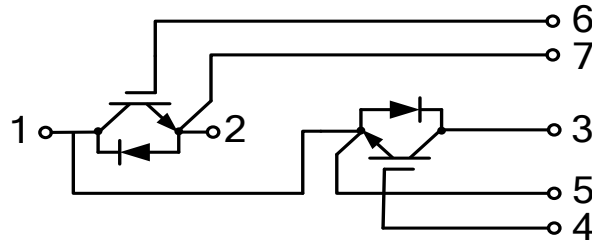


图 9. 电容特性

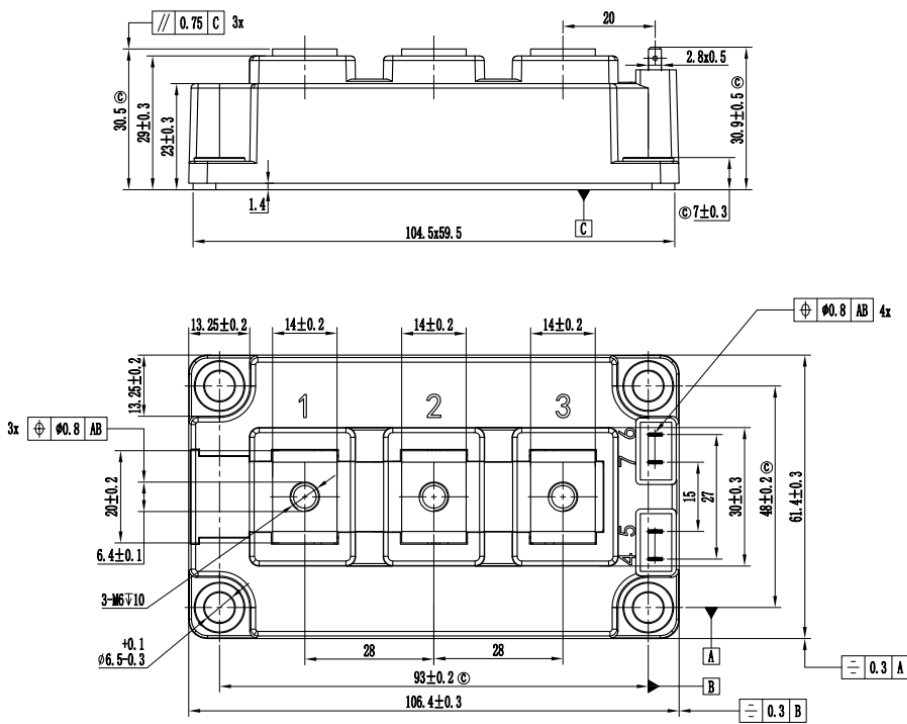
Figure 9. Capacitance characteristic

# SLG450R120E6H

## 接线图 / Circuit diagram



## 封装尺寸 / Package outlines



注: 1. © 尺寸为关键管控尺寸  
2. 未标注公差按GB/T1804-m执行

Unit:mm

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