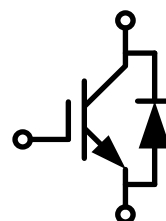


## IGBT Discrete with Anti-Parallel Diode

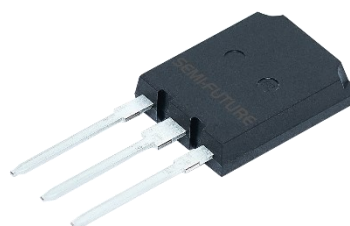
### 电气特性:

- 1200V 沟槽栅/场终止工艺
- 低开关损耗
- 正温度系数



### 典型应用:

- Solar Inverter
- Welding Machine
- UPS



$V_{CES} = 1200V$ ,  $I_{C\ nom} = 75A$

### 最大额定值 / Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
集电极-发射极电压 Collector-Emitter voltage	$T_{vj} = 25^{\circ}C$	$V_{CE}$	1200	V
栅极-发射电压 Gate to Emitter Voltage		$V_{GE}$	$\pm 20$	V
瞬态栅极-发射电压 Transient Gate to Emitter Voltage			$\pm 30$	V
集电极电流 collector current	$T_c = 25^{\circ}C$ $T_c = 100^{\circ}C$	$I_C$	150 75	A
脉冲集电极电流 Pulsed Collector Current	Pulse width limited by max junction temperature	$I_{pulse}$	300	A
二极管正向电流 Diode Forward Current	$T_c = 25^{\circ}C$ $T_c = 100^{\circ}C$	$I_F$	150 75	
工作结温 Operating Junction Temperature		$T_J$	-55 to +175	$^{\circ}C$
储存温度范围 Storage Temperature Range		$T_{stg}$	-55 to +150	$^{\circ}C$
结-环境热阻 Thermal resistance junction - ambient		$R_{th(j-a)}$	40	K/W

**IGBT 特性/IGBT Characteristic**

Parameter	Conditions	Symbol	Value			Unit		
			Min.	Typ.	Max.			
<b>静态特性/Static Characteristic</b>								
集电极-发射极击穿电压 Collector-emitter breakdown voltage	$V_{GE} = 0V, I_C = 0.25mA$	$V_{(BR)CES}$	1200			V		
集电极-发射极饱和电压 Collector-Emitter saturation voltage	$V_{GE}=15V, I_C=75A$ $V_{GE}=15V, I_C=75A$	$T_{vj}=25^{\circ}C$ $T_{vj}=175^{\circ}C$	$V_{CEsat}$	2.11 3.03	2.60	V		
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_C=2.6mA, V_{GE}=V_{CE}$	$T_{vj}=25^{\circ}C$	$V_{GE(th)}$	5.0	5.6	6.5	V	
跨导 Transconductance	$V_{CE}=20V, I_C=75A$		$G_{fs}$	98.8		S		
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE}=1200V, V_{GE}=0V$	$T_{vj}=25^{\circ}C$	$I_{CES}$		1	mA		
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE}=0V, V_{GE}=20V$	$T_{vj}=25^{\circ}C$	$I_{GES}$		200	nA		
<b>动态特性/Dynamic Characteristic</b>								
输入电容 Input capacitance	$f=1MHz, V_{CE}=25V, V_{GE}=0V$	$T_{vj}=25^{\circ}C$	$C_{ies}$	7.72		nF		
输出电容 Output capacitance			$C_{oes}$	0.28				
反向传输电容 Reverse transfer capacitance			$C_{res}$	0.13				
<b>开关特性/ Switching Characteristic</b>								
开通延迟时间 Turn-on delay time	$I_C=75A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=10\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^{\circ}C$	$t_{d on}$	51		ns		
上升时间 Rise time			$t_r$	193				
关断延迟时间 Turn-off delay time			$t_{d off}$	180				
下降时间 Fall time					$t_f$	98		mJ
开通损耗能量 (每脉冲) Turn-on energy loss per pulse			$E_{on}$	9.5				
关断损耗能量 (每脉冲) Turn-off energy loss per pulse			$E_{off}$	2.7				
总损耗能量 Total switching energy			$E_{tot}$	12.2				
开通延迟时间 Turn-on delay time	$I_C=75A, V_{CE}=600V$ $V_{GE}=\pm 15V, R_G=10\Omega$	$T_{vj}=175^{\circ}C$	$t_{don}$	40		mJ		

上升时间 Rise time	(电感负载) / (inductive load)	$t_r$		171		
关断延迟时间 Turn-off delay time		$t_{doff}$		202		
下降时间 Fall time		$t_f$		119		
开通损耗能量 (每脉冲) Turn-on energy loss per pulse		$E_{on}$		14.6		
关断损耗能量 (每脉冲) Turn-off energy loss per pulse		$E_{off}$		3.5		
总损耗能量 Total switching energy		$E_{tot}$		18.1		
IGBT 热阻, 结-壳 IGBT thermal resistance, junction - case			$R_{th(j-C)}$		0.27	

## 二极管特性/Diode Characteristic

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
<b>静态特性/Static Characteristic</b>						
正向电压 Forward voltage	$I_F=75A$ $I_F=75A$	$T_{vj}=25^{\circ}C$ $T_{vj}=175^{\circ}C$	$V_F$	1.93 1.67	2.40	V
<b>开关特性/ Switching Characteristic</b>						
反向恢复峰值电流 Peak reverse recovery current	$I_F=75A, -di_F/dt=320A/\mu s$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$	$I_{RM}$	18		A
反向恢复电荷 Reverse Recovered charge			$Q_{rr}$	4.21		$\mu C$
反向恢复时间 Reverse Recovery Time			$t_{rr}$	444		ns
反向恢复损耗 (每脉冲) Reverse recovered energy			$E_{rec}$	1.7		mJ
反向恢复峰值电流 Peak reverse recovery current	$I_F=75A, -di_F/dt=320A/\mu s$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=175^{\circ}C$	$I_{RM}$	43		A
反向恢复电荷 Reverse Recovered charge			$Q_{rr}$	15.36		$\mu C$
反向恢复时间 Reverse Recovery Time			$t_{rr}$	767		ns

反向恢复损耗（每脉冲） Reverse recovered energy		$E_{rec}$	6.2	mJ
二极管热阻，结-壳 Diode thermal resistance, junction - case		$R_{th(j-c)}$	0.28	K/W

## Typical Characteristic

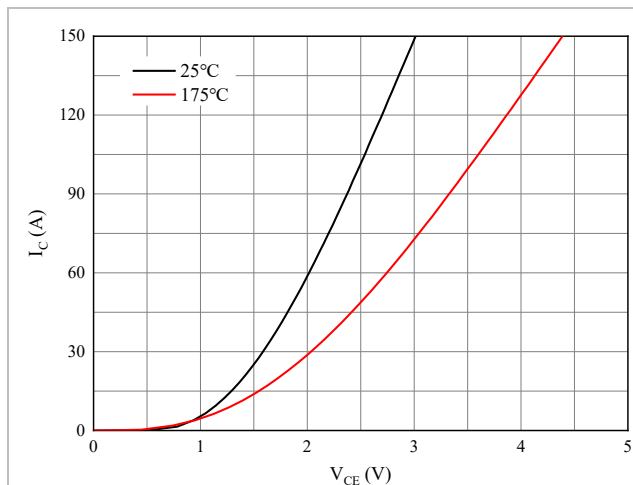


图 1. 典型输出特性 ( $V_{GE}=15V$ )

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

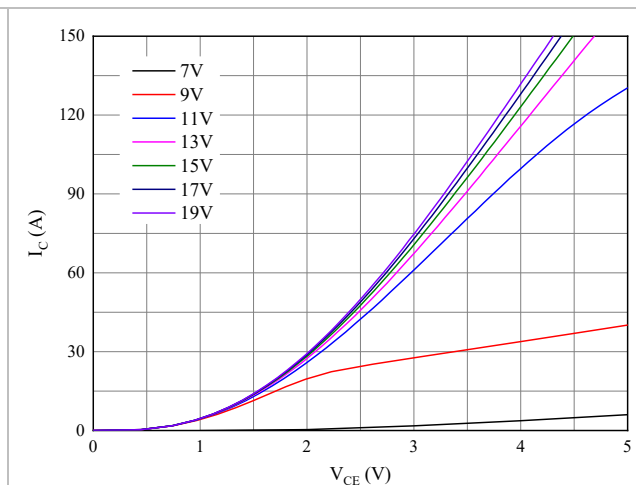


图 2. 典型输出特性 ( $T_{vj}=175^{\circ}C$ )

Figure 2. Typical output characteristics ( $T_{vj}=175^{\circ}C$ )

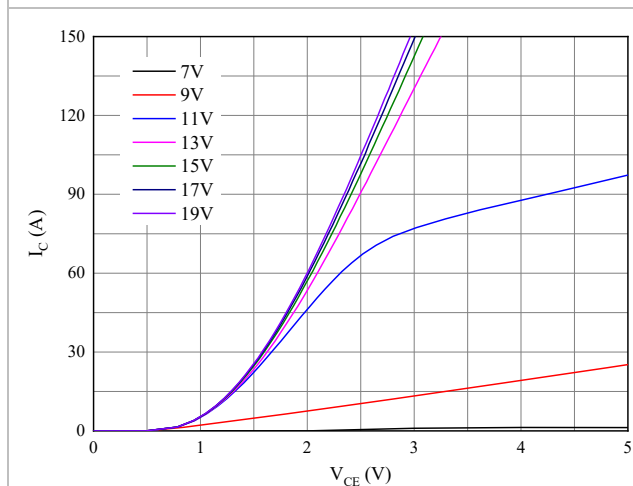


图 3. 典型输出特性 ( $T_{vj}=25^{\circ}C$ )

Figure 3. Typical output characteristics ( $T_{vj}=25^{\circ}C$ )

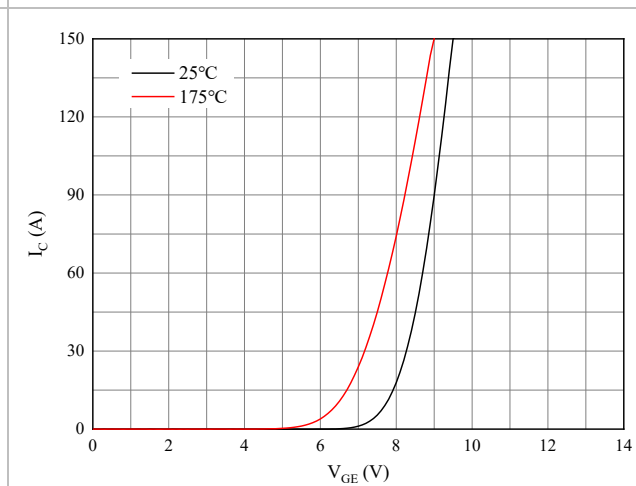


图 4. 典型传输特性 ( $V_{CE}=20V$ )

Figure 4. Typical transfer characteristic ( $V_{CE}=20V$ )

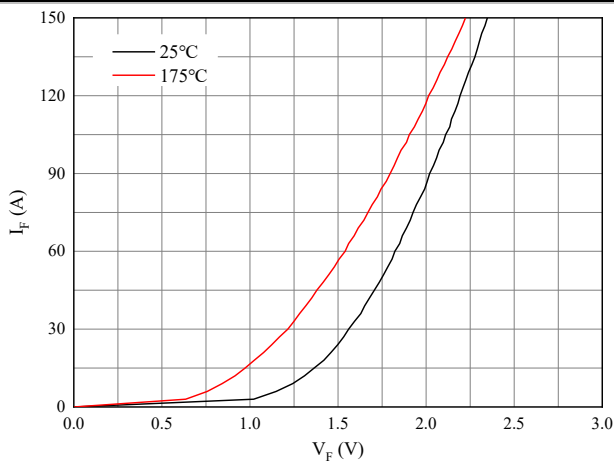


图 5. 正向偏压特性 二极管  
Figure 5.Forward characteristic of Diode

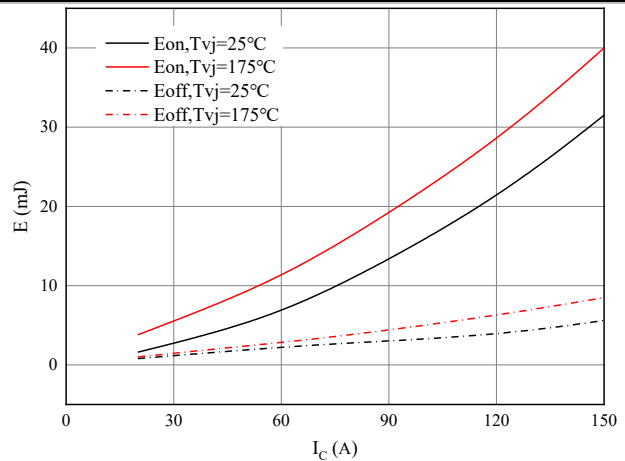


图 6. 开关损耗  
Figure 6.Switching losses of IGBT  
VGE=±15V, Rgon=10Ω, Rgoff=10Ω, VCE=600V

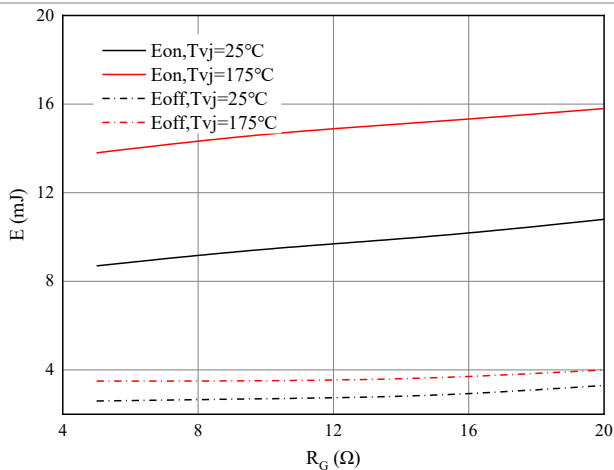


图 7. 开关损耗  
Figure 7.Switching losses of IGBT  
VGE=±15V, IC=75A, VCE=600V

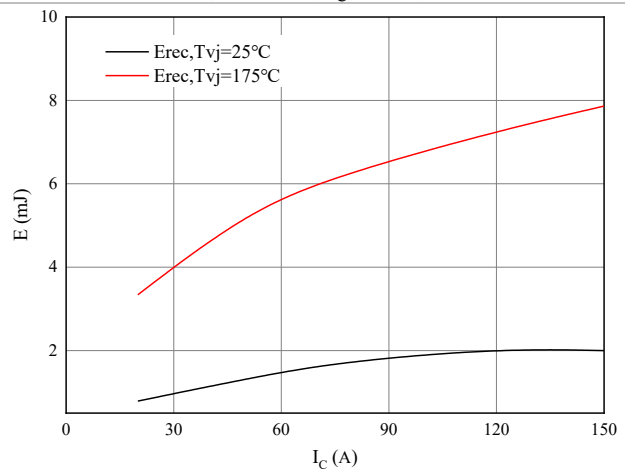


图 8. 开关损耗 二极管  
Figure 8.Switching losses of Diode  
Rgon=10Ω, VCE=600V

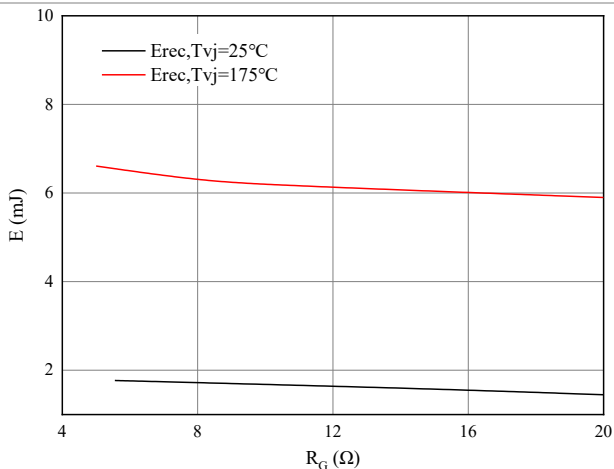


图 9. 开关损耗 二极管  
Figure 9.Switching losses of Diode  
IF=75A, VCE=600V

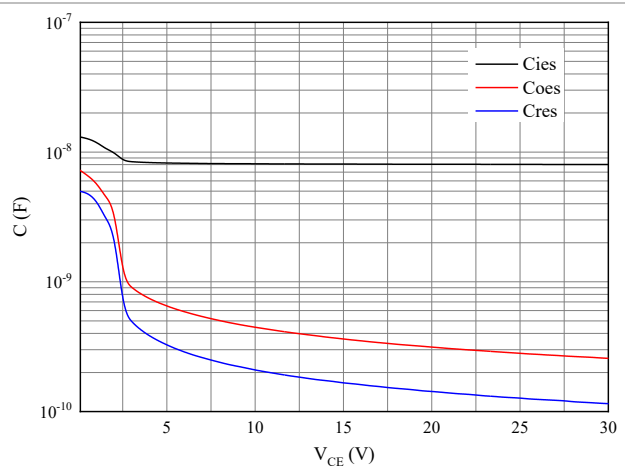
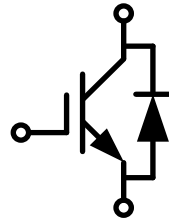
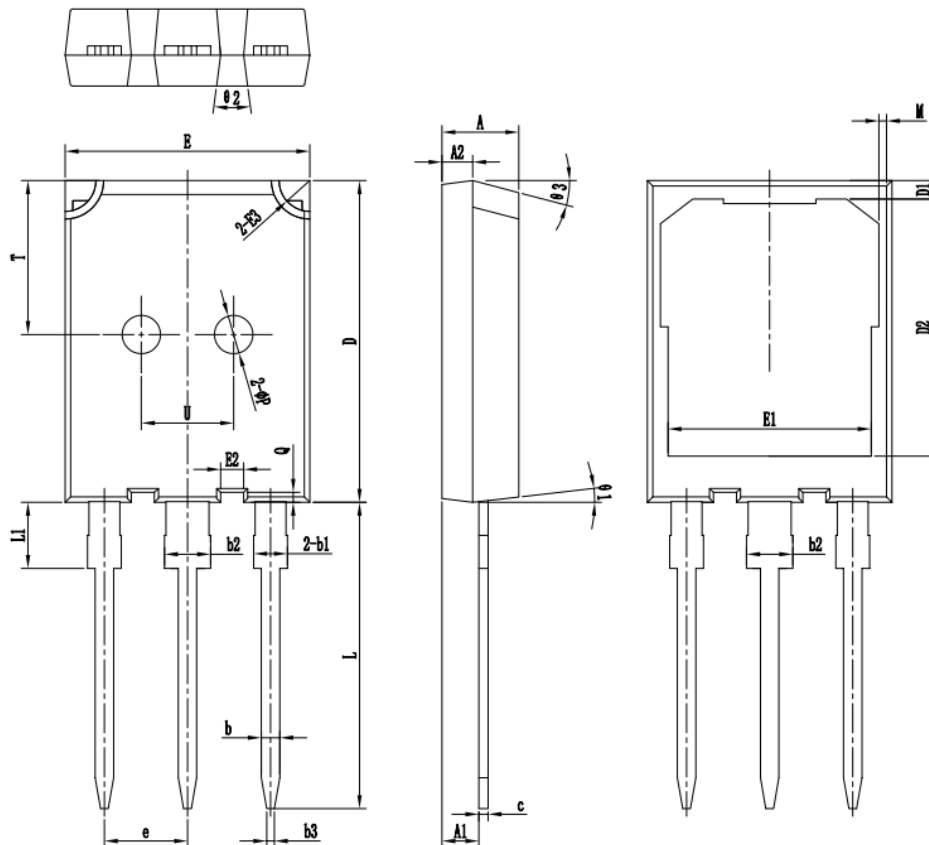


图 10. 电容特性  
Figure 10.Capacitance characteristic

## 接线图 / Circuit diagram



## 封装尺寸 / Package outlines



符号	单位: mm		
	MIN	NOM	MAX
∅A	4.90	5.00	5.10
∅A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
∅b	1.15	1.20	1.25
∅b1	1.95	2.10	2.25
∅b2	2.95	3.10	3.25
b3	0.45	0.60	0.75
∅c	0.55	0.60	0.68
∅D	20.90	21.00	21.10
D1	1.00	1.20	1.40
D2	15.25	16.55	16.85
∅E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	1.25	1.45	1.65
E3	1.80	2.00	2.20
∅e	5.40	5.44	5.48
∅L	19.80	19.92	20.10
∅L1	-	-	4.30
∅P	2.30	2.50	2.70
Q	0.50	0.68	0.80
T	9.80	10.00	10.20
U	5.80	6.00	6.20
∅1	5°	7°	9°
∅2	13°	16°	19°
∅3	13°	15°	17°

\*为关键管控尺寸