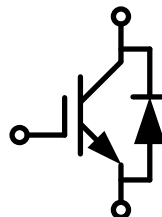


IGBT Discrete with Anti-Parallel Diode

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:

- 充电桩
- UPS
- 逆变器



$V_{CES} = 1200V$, $I_{C\ nom} = 40A$ / $I_{CRM} = 80A$

双极晶体管/IGBT

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	$T_C = 100^{\circ}C$, $T_{vj\ max} = 175^{\circ}C$	$I_{C\ nom}$	40	A
集电极重复峰值电流 Repetitive peak collector current	$t_p = 1\ ms$	I_{CRM}	80	A
总功率损耗 Total power dissipation	$T_C = 25^{\circ}C$, $T_{vj\ max} = 175^{\circ}C$	P_{tot}	270	W
栅极-发射极电压 Gate emitter voltage		V_{GE}	± 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	$V_{GE} = 15V$, $I_C = 40A$ $V_{GE} = 15V$, $I_C = 40A$ $V_{GE} = 15V$, $I_C = 40A$	$T_{vj} = 25^{\circ}C$ $T_{vj} = 125^{\circ}C$ $T_{vj} = 150^{\circ}C$	V_{CEsat}	1.60 1.90 2.00	2.20	V
栅极-发射极阈值电压 Gate-Emitter threshold voltage	$I_C = 0.5mA$, $V_{GE} = V_{CE}$	$T_{vj} = 25^{\circ}C$	$V_{GE(th)}$	4.8	5.5	6.2
跨导 Transconductance	$V_{CE} = 20V$, $I_C = 40A$		G_{fs}	27		S

输入电容 Input capacitance		C_{ies}		2.56			
输出电容 Output capacitance	$f=1\text{ MHz}, V_{CE}=25\text{ V}, V_{GE}=0\text{ V}$ $T_{vj}=25^\circ\text{C}$	C_{oes}		0.16		nF	
反向传输电容 Reverse transfer capacitance		C_{res}		0.12			
集电极-发射极截止电流 Collector-emitter cut-off current	$V_{CE}=1200\text{ V}, V_{GE}=0\text{ V}$ $T_{vj}=25^\circ\text{C}$	I_{CES}			1	mA	
栅极-发射极漏电流 Gate-emitter leakage current	$V_{CE}=0\text{ V}, V_{GE}=20\text{ V}$ $T_{vj}=25^\circ\text{C}$	I_{GES}			200	nA	
开通延迟时间 Turn-on delay time	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=12\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^\circ\text{C}$ $T_{vj}=125^\circ\text{C}$ $T_{vj}=150^\circ\text{C}$	$t_{d\ on}$		84		
					80		
					76		
上升时间 Rise time	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=12\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^\circ\text{C}$ $T_{vj}=125^\circ\text{C}$ $T_{vj}=150^\circ\text{C}$	t_r		50		
					60		
					60		
关断延迟时间 Turn-off delay time	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=12\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^\circ\text{C}$ $T_{vj}=125^\circ\text{C}$ $T_{vj}=150^\circ\text{C}$	$t_{d\ off}$		264	ns	
					298		
					304		
下降时间 Fall time	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=15\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^\circ\text{C}$ $T_{vj}=125^\circ\text{C}$ $T_{vj}=150^\circ\text{C}$	t_f		203		
					297		
					283		
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=12\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^\circ\text{C}$ $T_{vj}=125^\circ\text{C}$ $T_{vj}=150^\circ\text{C}$	E_{on}		2.50	mJ	
					4.15		
					4.50		
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	$I_C=40\text{ A}, V_{CE}=600\text{ V}$ $V_{GE}=\pm 15\text{ V}, R_G=12\Omega$ (电感负载) / (inductive load)	$T_{vj}=25^\circ\text{C}$ $T_{vj}=125^\circ\text{C}$ $T_{vj}=150^\circ\text{C}$	E_{off}		1.50		
					1.95		
					2.10		
结-外壳热阻 IGBT thermal resistance, junction		R_{thJC}		0.38		K/W	
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40		150	$^\circ\text{C}$	

二极管/Diode

最大额定值 / Maximum Ratings

Parameter	Conditions	Symbol	Value	Unit
反向重复峰值电压 Repetitive peak reverse voltage	$T_{vj}=25^\circ\text{C}$	V_{RRM}	1200	V
连续正向直流电流 Continuous DC forward current	$T_C=100^\circ\text{C}, T_{vj\ max}=175^\circ\text{C}$	I_F	8	A
正向重复峰值电流 Repetitive peak forward current	$t_p=1\text{ ms}$	I_{FRM}	16	A

特征值 / Characteristic Values

Parameter	Conditions	Symbol	Value			Unit
			Min.	Typ.	Max.	
正向电压 Forward voltage	$I_F=8A, V_{GE}=0V$ $I_F=8A, V_{GE}=0V$ $I_F=8A, V_{GE}=0V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	V_F	1.73 1.53 1.48	2.8	V
反向恢复峰值电流 Peak reverse recovery current	$I_F=8A,$ $-di_F/dt=356A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	I_{RM}	18 22 25		A
反向恢复电荷 Reverse Recovered charge	$I_F=8A,$ $-di_F/dt=356A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	Q_{rr}	2.45 3.38 3.73		μC
反向恢复时间 Reverse Recovery Time	$I_F=8A,$ $-di_F/dt=356A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	t_{rr}	186 207 218		ns
反向恢复损耗（每脉冲） Reverse recovered energy	$I_F=8A,$ $-di_F/dt=356A/\mu s(T_{vj}=150^{\circ}C)$ $V_R=600V, V_{GE}=-15V$	$T_{vj}=25^{\circ}C$ $T_{vj}=125^{\circ}C$ $T_{vj}=150^{\circ}C$	E_{rec}	0.65 0.88 0.95		mJ
结-外壳热阻 Diode thermal resistance, junction			R_{thJC}	0.45		K/W
在开关状态下温度 Temperature under switching conditions			$T_{vj\ op}$	-40	175	$^{\circ}C$

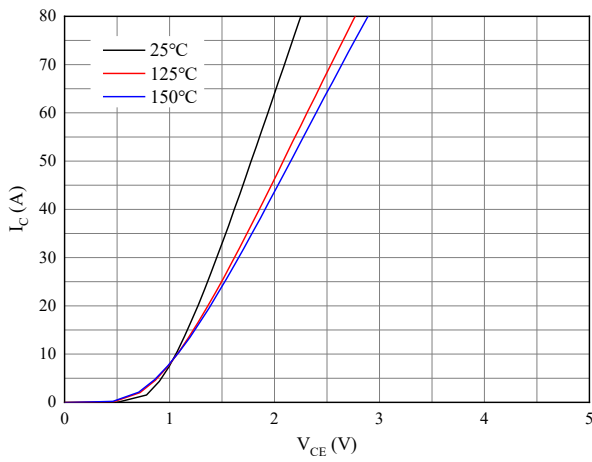


图 1. 典型输出特性 ($V_{GE}=15V$)

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

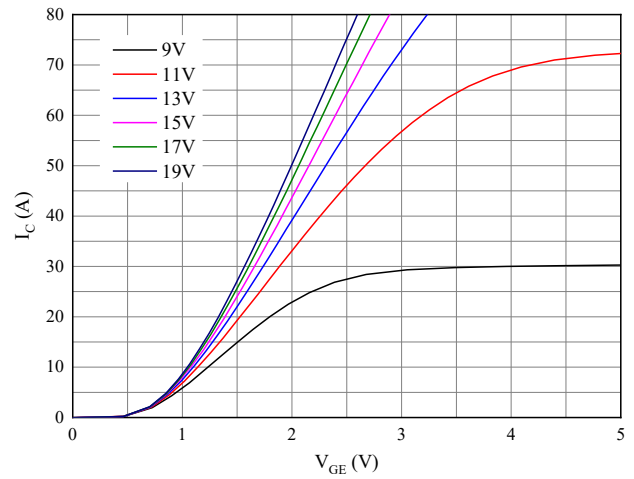


图 2. 典型输出特性 ($T_{vj}=150^{\circ}C$)

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

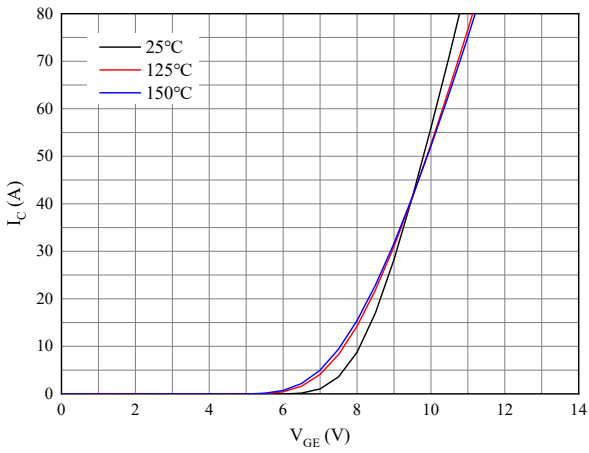


图 3. 典型传输特性 ($V_{CE}=20V$)

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

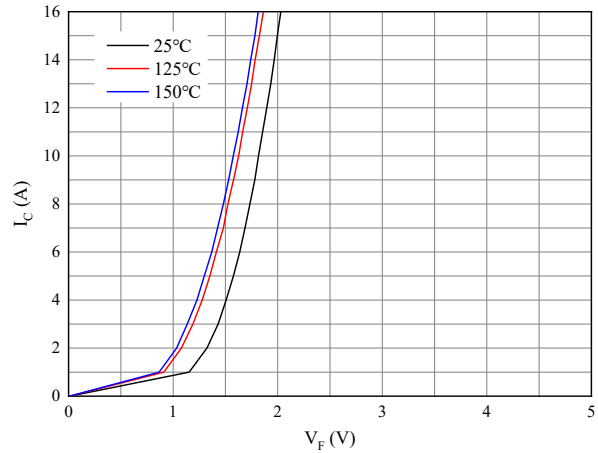


图 4. 正向偏压特性 二极管

Figure 4. Forward characteristic of Diode

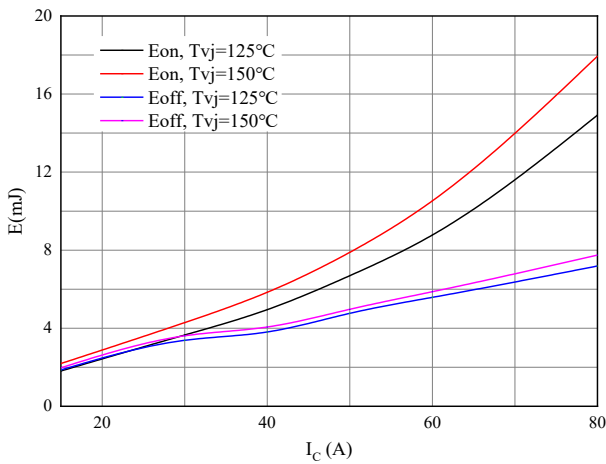


图 5. 开关损耗

Figure 5. Switching losses of IGBT

$V_{GE}=\pm 15V, R_{Gon}=12\Omega, R_{Goff}=12\Omega, V_{CE}=600V$

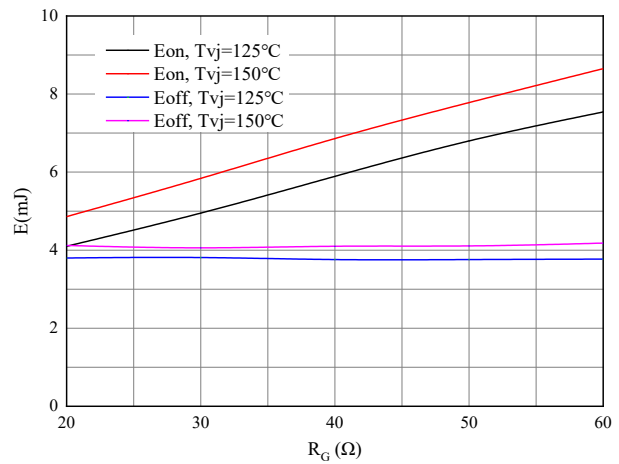


图 6. 开关损耗

Figure 6. Switching losses of IGBT

$V_{GE}=\pm 15V, I_C=8A, V_{CE}=600V$

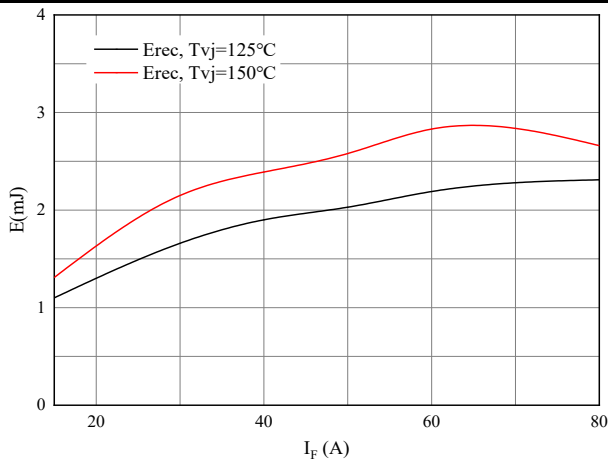


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode

$R_{gon}=12\Omega, V_{CE}=600V$

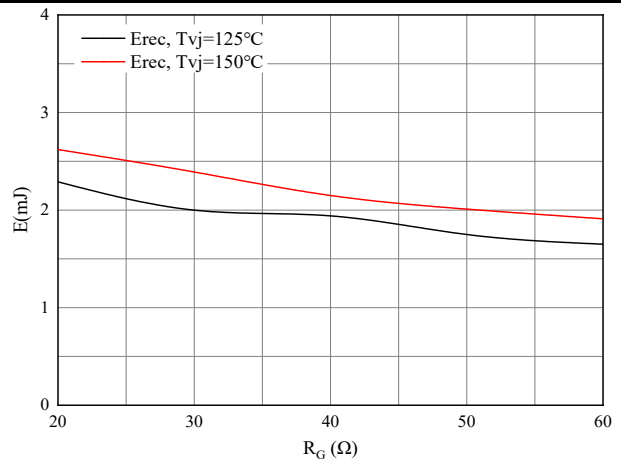


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode

$I_F=8A, V_{CE}=600V$

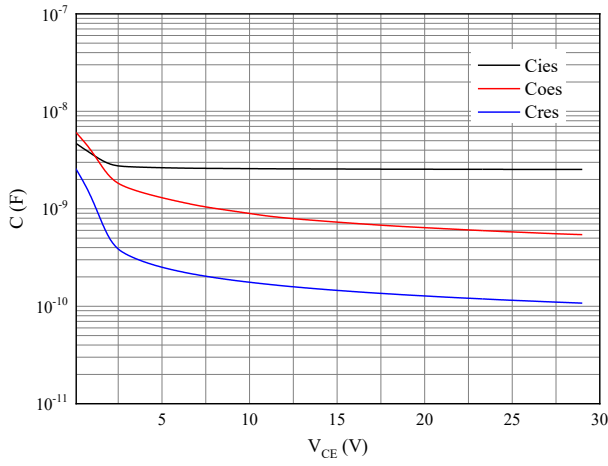
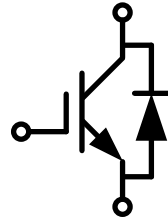


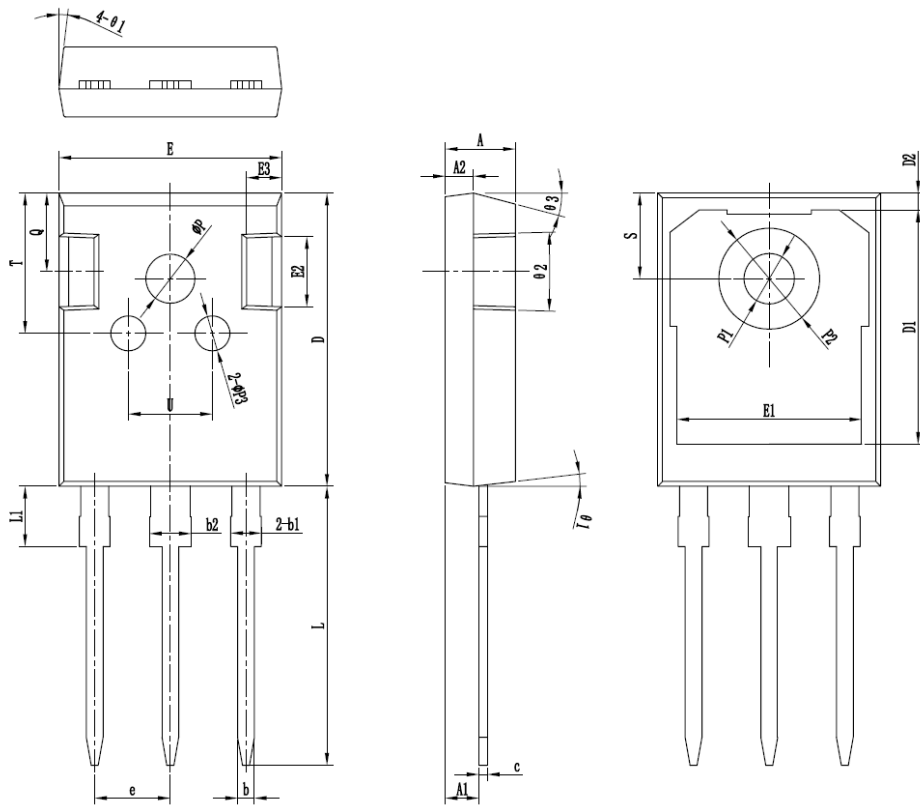
图 9. 电容特性

Figure 9. Capacitance characteristic

接线图 / Circuit diagram



封装尺寸 / Package outlines



符号	单位:mm		
	MIN	NOM	MAX
±h	4.90	5.00	5.10
±h1	2.31	2.41	2.51
A2	1.90	2.00	2.10
±h2	1.15	1.20	1.25
±h3	1.95	2.10	2.25
±h4	2.95	3.10	3.25
±c	0.65	0.60	0.65
±d	20.90	21.00	21.10
D1	16.35	16.55	16.75
D2	1.05	1.20	1.35
±e	15.70	15.80	15.90
E1	13.10	13.25	13.40
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
±e	5.40	5.44	5.48
±f	19.80	19.92	20.10
±f1	-	-	4.30
±g	3.70	3.80	3.90
±g1	3.50	3.60	3.70
±g2	7.00	7.20	7.40
±g3	2.40	2.50	2.60
Q	5.60	5.80	6.00
±s	6.05	6.15	6.25
T	9.80	10.00	10.20
U	6.00	6.20	6.40
θ1	5°	7°	9°
θ2	1°	3°	5°
θ3	13°	15°	17°

*为关键管控尺寸