

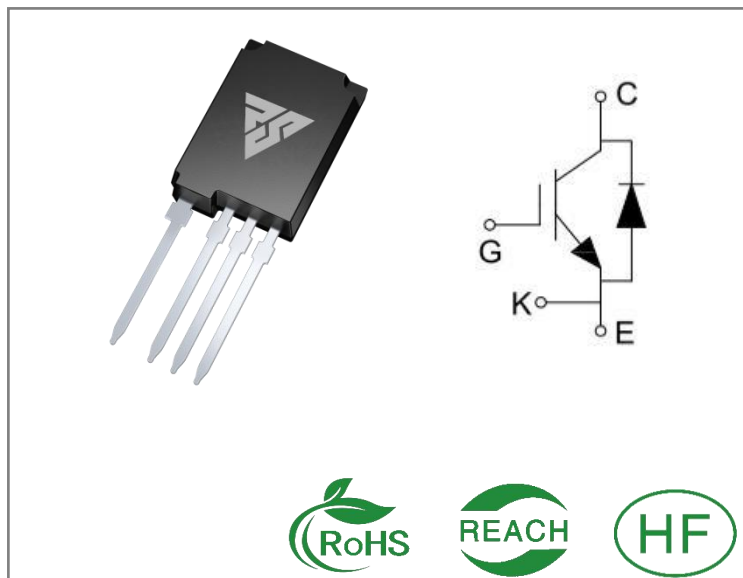
IF	V _{ce(sat)}	VCES
120A	1.69V	1200V

Applications:

- Energy storage inverter
- Uninterruptible Power Supply (UPS)
- Solar Inverter

Features:

- 1200V trench gate/field termination process
- Very low V_{ce(sat)}
- Low switching loss
- Positive temperature coefficient in V_{ce(sat)}


Ordering Information

Part Number	Package	Marking	Packing	Qty.
RSG120N120HWP	T0-247plus-4	RSG120N120HWP	Tube	30 PCS

Absolute Maximun Ratings T_c= 2 5℃ unless otherwise specified

Symbol	Parameter	RSG120N120HWP	Units
VCES	Collector-Emitter Voltage	1200	V
VGES	Gate- Emitter Voltage	±20	V
IC	Continuous DC collector current TC = 100 °C	120	A
ICrm	Repetitive peak collector current tp=1 ms	360	A
Ptot	Total Power Dissipation @ TC = 25°C	1250	W
Tstg	Operating Junction and Storage Temperature Range	-40to150	°C
TL	Maximum Temperature for Soldering	260	°C

Thermal Characteristic

Symbol	Parameter	RSG120N120HWP	Units
R _{thJC}	Thermal Resistance, Junction to case for IGBT	0.12	K/ W

Electrical Characteristics ($T_c=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Min.	Typ.	Max.	Units	Test Conditions	
Static Characteristics							
V(BR)CES	Collector-Emitter Breakdown Voltage	1200	-	--	V	V _{GE} =0V,I _{CE} =0.25mA	
ICES	Collector-Emitter Leakage Current	-	-	1	mA	V _{GE} =0V, V _{CE} =1200V	
IGES	Gate to Emitter Leakage current	-	-	200	nA	V _{GE} =+20V, V _{CE} =0V	
VCE(sat)	Collector-Emitter Saturation Voltage	-	1.69	2.1	V	I _C =120 A	T _j =25° C
	Gate Threshold Voltage	-	2.25	--	V	V _{GE} =15 V	T _j =175° C
VGE(th)	Collector-Emitter Breakdown Voltage	5.0	5.6	6.2	V	I _C =2.3mA,V _{CE} =V _{GE}	
Gfs	Transconductance		106		S	I _C =120A,V _{CE} =20V	
Dynamic Characteristics							
Cies	Input Capacitance	-	16800	--	PF	V _{CE} =25V, V _{GE} =0V, f=100KHz	
Coes	Output Capacitance	-	408	--			
Cres	Reverse Transfer Capacitance	-	126	--			
Qg	Total Gate Charge		1025		uC	IC = 120A, VGE = 15 V, VCE =960 V	
Switching Characteristics							
td(ON)	Turn-on Delay Time	-	205		ns	V _{CE} =600V, I _C =120A, V _{GE} =+/-15V, R _g =20Ω, Inductive Load	
t _r	Rise Time	-	115	--			
td(OFF)	Turn-Off Delay Time	-	150	--			
t _f	Fall Time	-	72				
E _{on}	Turn-On Switching Loss	-	12.5	--	mJ		
E _{off}	Turn-Off Switching Loss	-	4.2	--			

Diode Maximum Ratings (T_J = 25°C unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
VRRM	Repetitive Peak Reverse Voltage	1200	V	TC = 25°C
IF	Forward Current	120	A	TC = 100°C
IFRM	Repetitive Peak Forward Surge Current	360	A	tp=1 ms

Characteristics Values (T_C=25°C unless otherwise noted)

Symbol	Parameter	Min.	Typ.	Max.	Test Conditions	Unit
VF	Forward Voltage		2.1 1.85	2.6	IF = 120A, V _{GE} =0V T _J = 25°C IF = 120A, V _{GE} =0V T _J = 175°C	V
IRM	Peak reverse recovery current		35 81		VR = 600V, IF = 120A, V _{GE} =-15V diF/dt=700A/us T _J = 25°C VR = 600V, IF = 120A, V _{GE} =-15V diF/dt=700A/us T _J = 175°C	A
Qrr	Reverse Recovery Charge		7 24		VR = 600V, IF = 120A, V _{GE} =-15V diF/dt=700A/us T _J = 25°C VR = 600V, IF = 120A, V _{GE} =-15V diF/dt=700A/us T _J = 175°C	uC
trr	Reverse Recovery time		425 720		VR = 600V, IF = 120A, V _{GE} =-15V diF/dt=700A/us T _J = 25°C VR = 600V, IF = 120A, V _{GE} =-15V diF/dt=700A/us T _J = 175°C	ns
Erec	Reverse recovered energy		2.4 9.2		VR = 600V, IF = 120A, V _{GE} =-15V diF/dt=700A/us T _J = 25°C VR = 600V, IF = 120A, V _{GE} =-15V diF/dt=700A/us T _J = 175°C	mJ
R _{thJC}	Diode Thermal Resistance, Junction		0.22			K/ W
Tvj op	Temperature under switching conditions	-40		175		°C

Typical Feature Curve

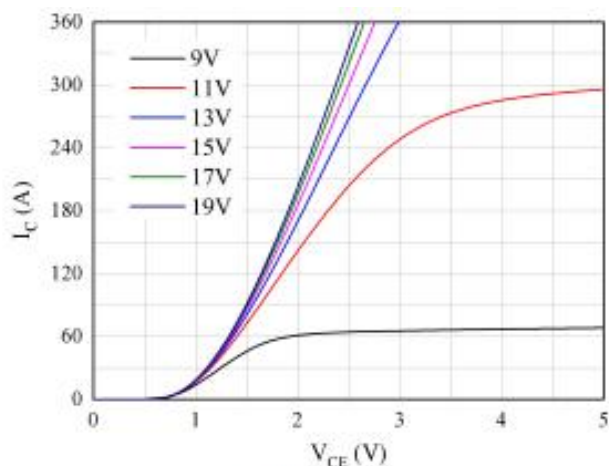


图 1. 典型输出特性 ($T_{vj}=25^{\circ}\text{C}$)

Figure 1. Typical output characteristics ($T_{vj}=25^{\circ}\text{C}$)

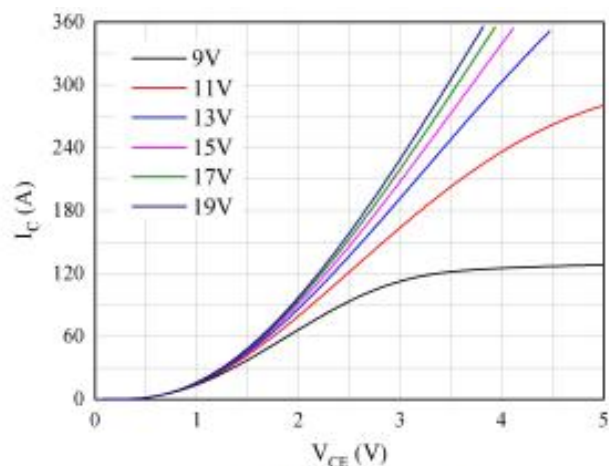


图 2. 典型输出特性 ($T_{vj}=175^{\circ}\text{C}$)

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

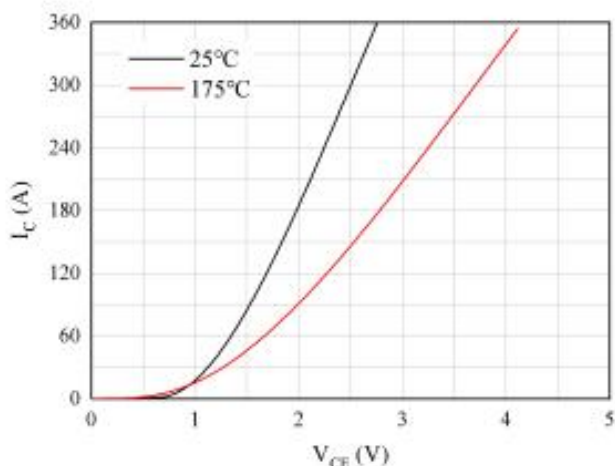


图 3. 典型输出特性 ($V_{ge}=15\text{V}$)

Figure 3. Typical output characteristics ($V_{ge}=15\text{V}$)

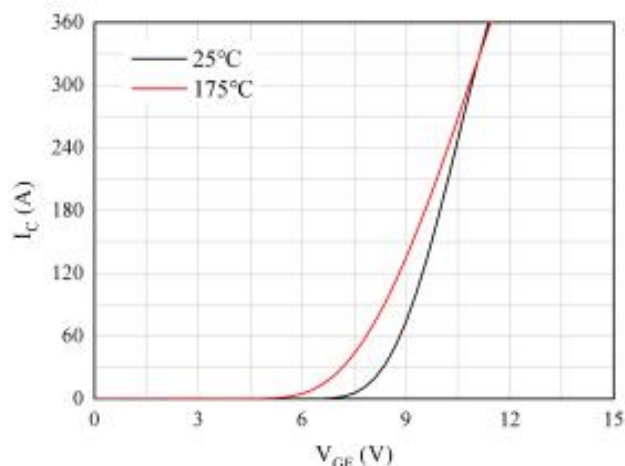


图 4. 典型传输特性 ($V_{ce}=20\text{V}$)

Figure 4. Typical transfer characteristic ($V_{ce}=20\text{V}$)

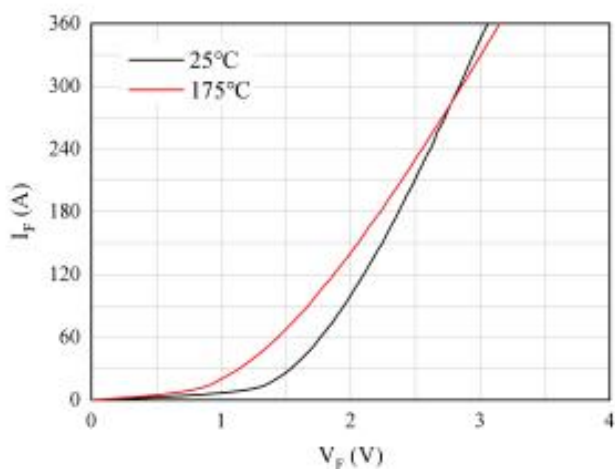


图 5. 正向偏压特性 二极管

Figure 5. Forward characteristic of Diode

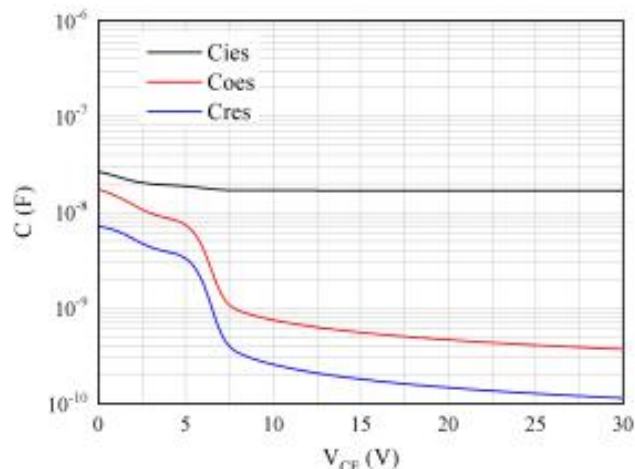


图 6. 电容特性

Figure 6. Capacitance characteristic

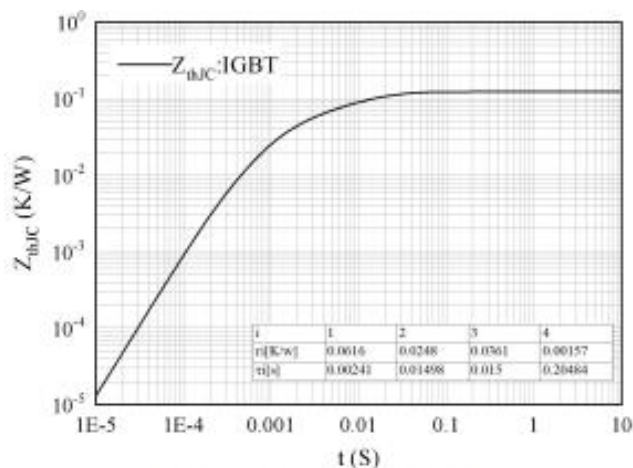


图 7. 瞬态热阻抗 IGBT

Figure 7. Transient thermal impedance IGBT,
 $Z_{thJC}=f(t)$

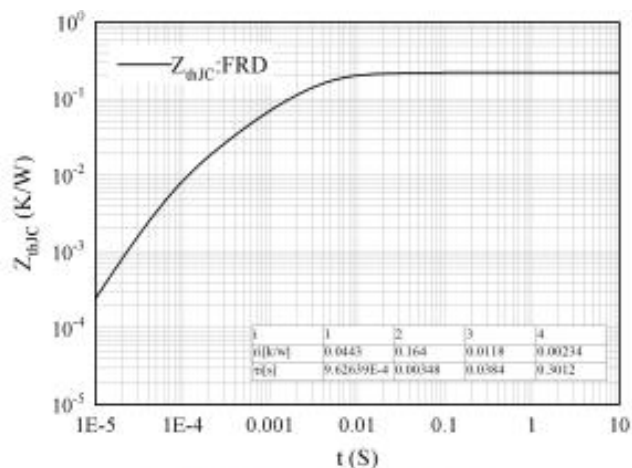


图 8. 瞬态热阻抗 FRD

Figure 8. Transient thermal impedance FRD,
 $Z_{thJC}=f(t)$

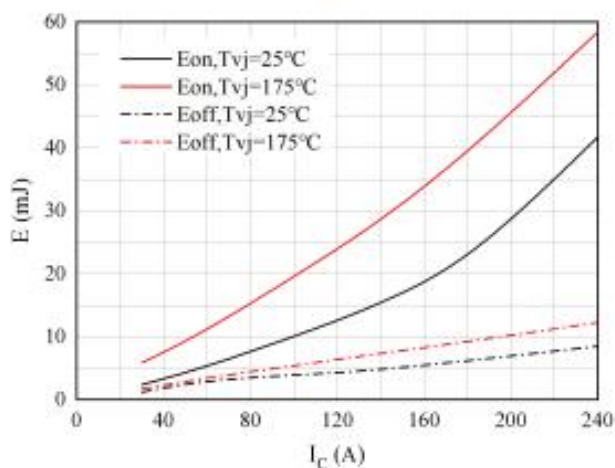


图 9. 开关损耗

Figure 9. Switching losses of IGBT
 $V_{GE}=\pm 15V, R_{gon}=20\Omega, R_{goff}=20\Omega, V_{CE}=600V$

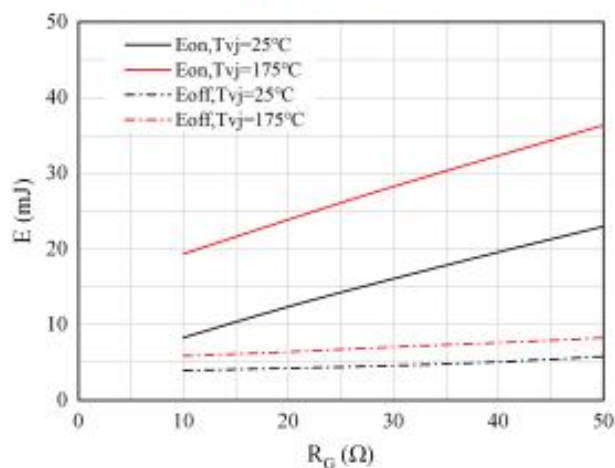


图 10. 开关损耗

Figure 10. Switching losses of IGBT
 $V_{GE}=\pm 15V, I_C=120A, V_{CE}=600V$

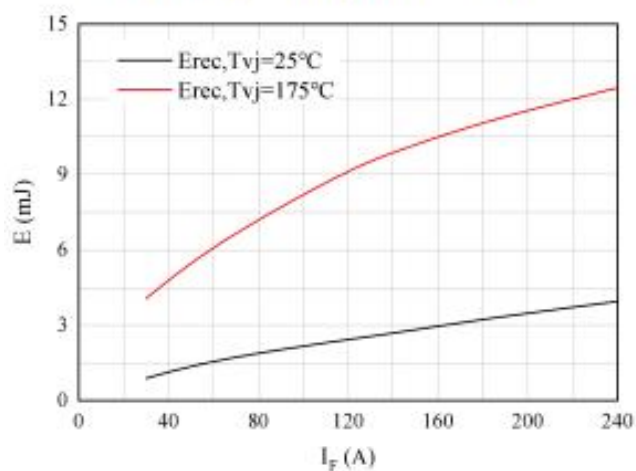


图 11. 开关损耗 二极管

Figure 11. Switching losses of Diode
 $R_{gon}=20\Omega, V_{CE}=600V$

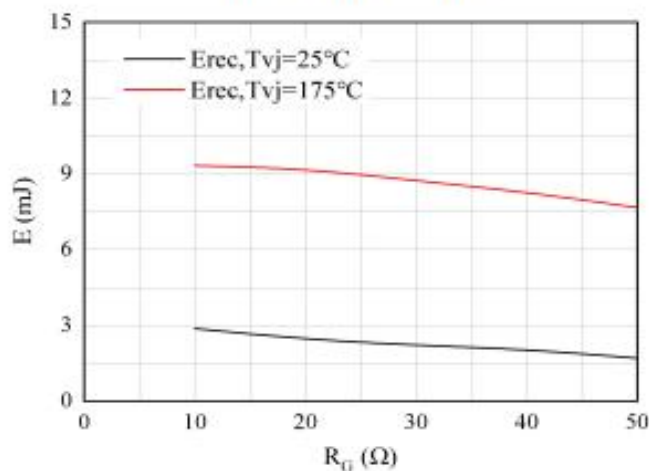
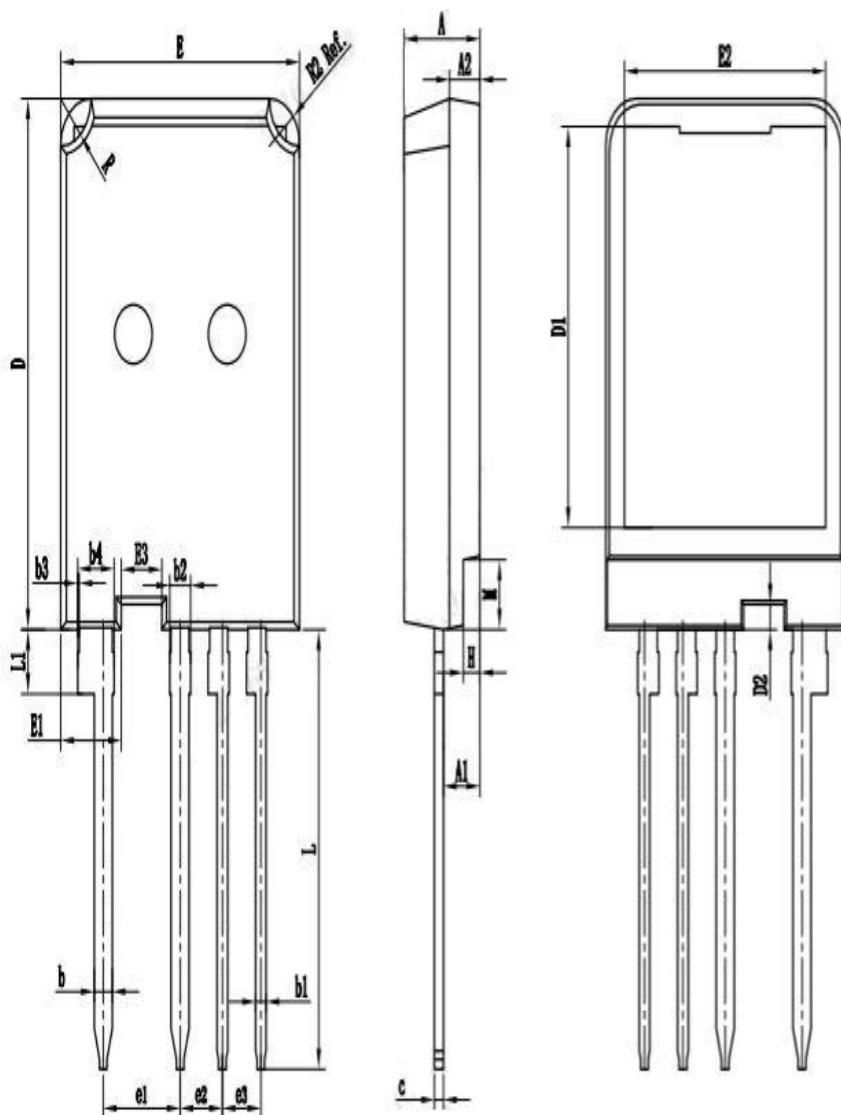


图 12. 开关损耗 二极管

Figure 12. Switching losses of Diode
 $I_F=120A, V_{CE}=600V$

Package outline drawing (TO-247PLUS-4 Unit: mm)



Symbol	Dimensions In Millimeters	
	Min	Max
A	4.900	5.100
A1	2.310	2.510
A2	1.900	2.100
b	1.160	1.290
b1	0.650	0.790
b2	1.360	1.490
b3	0.000	0.200
b4	2.160	2.290
c	0.590	0.660
D	22.300	22.500
D1	16.650	17.250
D2	1.000	1.100
E	15.700	15.900
E1	3.900	4.100
E2	13.100	13.500
E3	2.580	2.780
e1	5.080 BSC	
e2	2.790 BSC	
e3	2.540 BSC	
H	1.000	1.200
L	18.460	18.660
L1	2.620	2.820
M	2.850	3.050
R	1.900	2.100

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