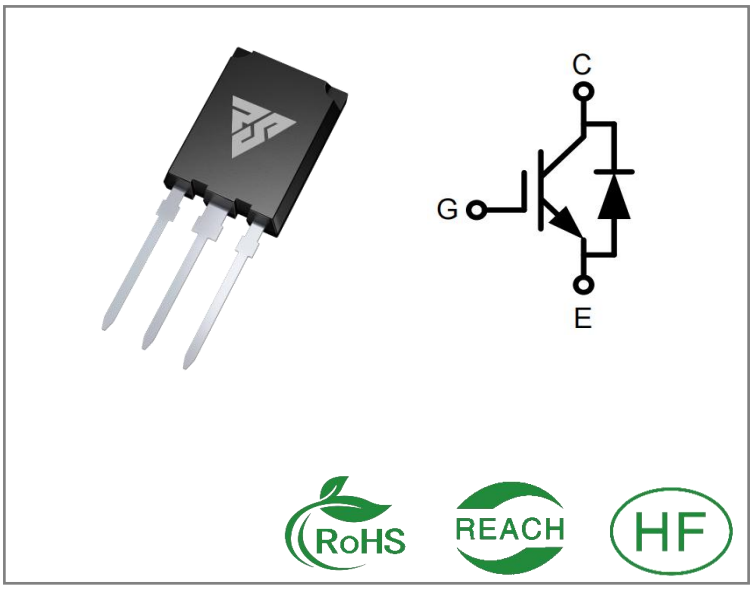
IF	V_{ce}(sat)	VCES
120A	1.82V	1200V



Applications:

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

Features:

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

Ordering Information

Part Number	Package	Marking	Packing	Qty.
RSG120N120HWP	T0-247plus-3	RSG120N120HWP	Tube	30 PCS

Absolute Maximun Ratings Tc= 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	1010	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℃ 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
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	-	1.82	2.2	V	I_C=120 A, T_j=25° C
	Gate Threshold Voltage	-	2.52	--	V	V_{GE}=15 V, T_j=175° C
$V_{GE(th)}$	Collector-Emitter Breakdown Voltage	5.0	5.6	6.2	V	I_C=2.3mA,V_{CE}=V_{GE}
Gfs	Transconductance		95		S	I_C=120A,V_{CE}=20V
Dynamic Characteristics						
Cies	Input Capacitance	-	17070	--	PF	V_{CE}=25V, V_{GE}=0V, f=100KHz
Coes	Output Capacitance	-	400	--		
Cres	Reverse Transfer Capacitance	-	125	--		
Qg	Total Gate Charge		1063		uC	IC = 120A, VGE = 15 V, VCE =960 V
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	-	28		ns	V_{CE}=600V, I_C=120A, V_{GE}=+/-15V, R_g=3.3Ω, Inductive Load
t_r	Rise Time	-	196	--		
$t_{d(OFF)}$	Turn-Off Delay Time	-	150	--		
t_f	Fall Time	-	70			
E_{on}	Turn-On Switching Loss	-	17.5	--	mJ	
E_{off}	Turn-Off Switching Loss	-	4.1	--		

Diode Maximum Ratings (TJ= 25℃ unless otherwise specified)

Symbol	Parameter	Value	Unit	Test Conditions
VRRM	Repetitive Peak Reverse Voltage	1200	V	TC = 25℃
IF	Forward Current	120	A	TC = 100℃
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		2.06 1.9 1.85	2.5	IF =120A,V_{GE}=0V TJ = 25℃ IF =120A,V_{GE}=0V TJ = 150℃ IF =120A,V_{GE}=0V TJ = 175℃	V
IRM	Peak reverse recovery current		26 62		VR = 600V, IF =120A,V_{GE}=-15V diF/dt=500A/us TJ = 25℃ VR = 600V, IF =120A,V_{GE}=-15V diF/dt=500A/us TJ = 175℃	A
Qrr	Reverse Recovery Charge		6.2 23		VR = 600V, IF =120A,V_{GE}=-15V diF/dt=500A/us TJ = 25℃ VR = 600V, IF =120A,V_{GE}=-15V diF/dt=500A/us TJ = 175℃	uC
trr	Reverse Recovery time		480 870		VR = 600V, IF =120A,V_{GE}=-15V diF/dt=500A/us TJ = 25℃ VR = 600V, IF =120A,V_{GE}=-15V diF/dt=500A/us TJ = 175℃	ns
Erec	Reverse recovered energy		2.4 8.7		VR = 600V, IF =120A,V_{GE}=-15V diF/dt=500A/us TJ = 25℃ VR = 600V, IF =120A,V_{GE}=-15V diF/dt=500A/us TJ = 175℃	mJ
R_{thJC}	Diode Thermal Resistance, Junction		0.22			K/ W
Tvj op	Temperature under switching conditions	-40		175		°C

Typical Feature Curve

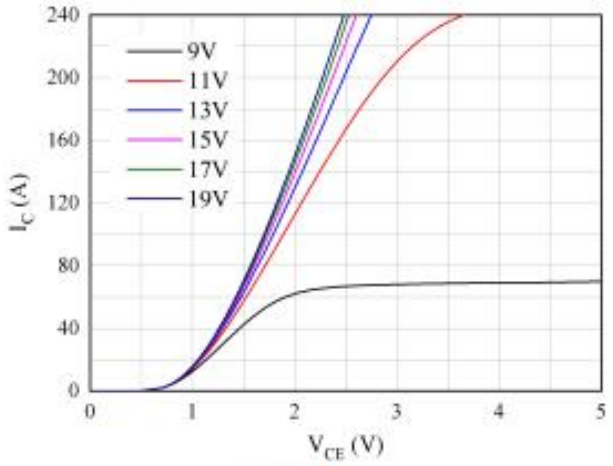


图 1. 典型输出特性 (T_{vj}=25℃)
Figure 1. Typical output characteristics (T_{vj}=25℃)

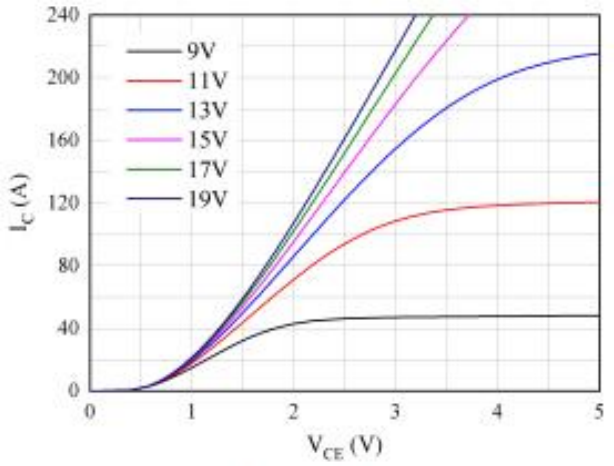


图 2. 典型输出特性 (T_{vj}=175℃)
Figure 2. Typical output characteristics (T_{vj}=175℃)

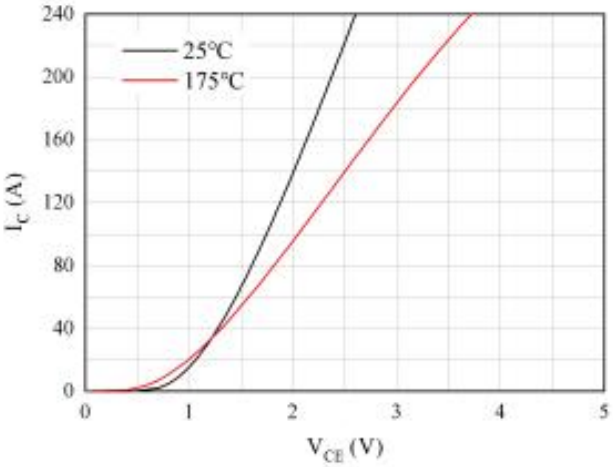


图 3. 典型输出特性 (V_{GE}=15V)
Figure 3. Typical output characteristics (V_{GE}=15V)

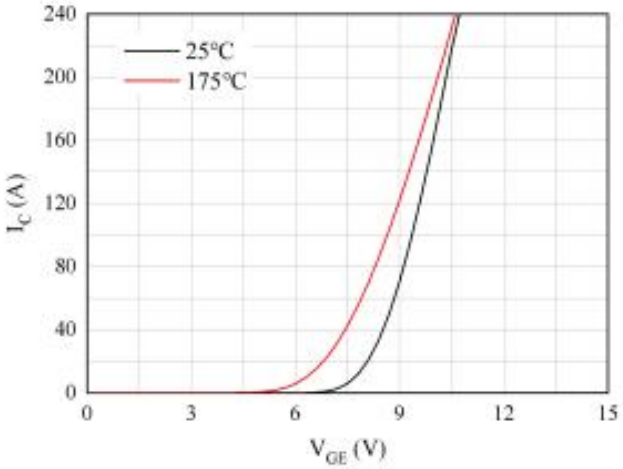


图 4. 典型传输特性(V_{CE}=20V)
Figure 4. Typical transfer characteristic(V_{CE}=20V)

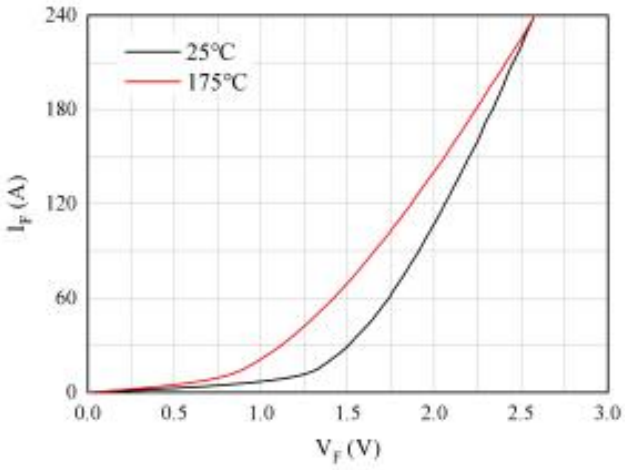


图 5. 正向偏压特性 二极管
Figure 5. Forward characteristic of Diode

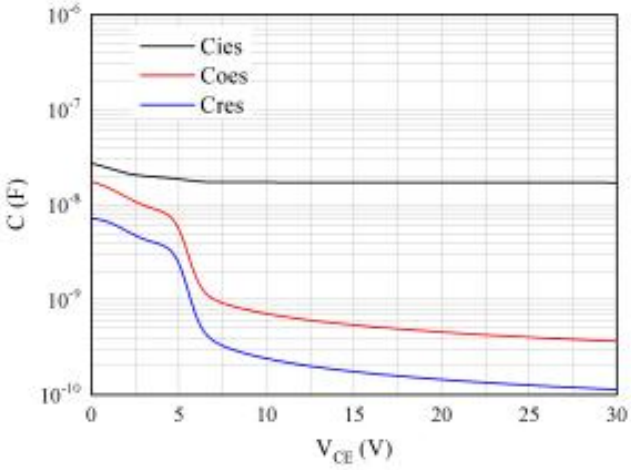


图 6. 电容特性
Figure 6. Capacitance characteristic

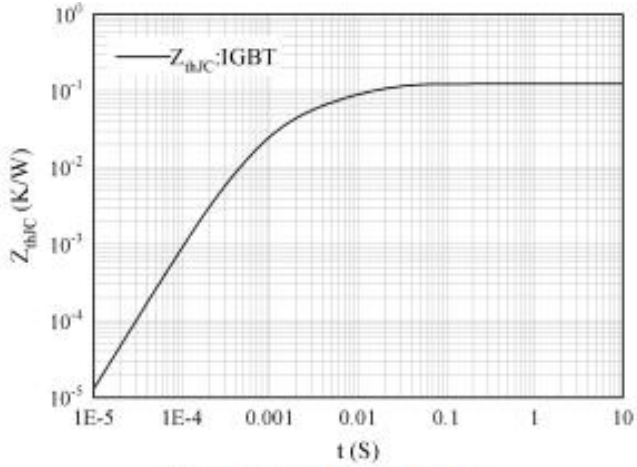


图 7. 瞬态热阻抗 IGBT
Figure 7. Transient thermal impedance IGBT, $Z_{thJC}=f(t)$

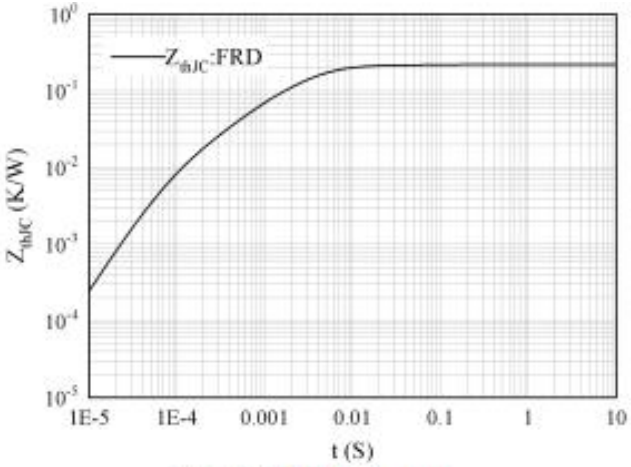


图 8. 瞬态热阻抗 FRD
Figure 8. Transient thermal impedance FRD, $Z_{thJC}=f(t)$

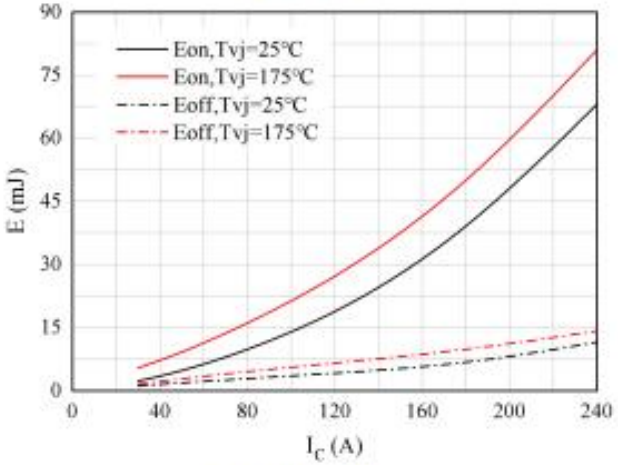


图 9. 开关损耗
Figure 9. Switching losses of IGBT
V_{GE}=±15V, Rgon=3.3Ω, Rgoff=3.3Ω, V_{CE}=600V

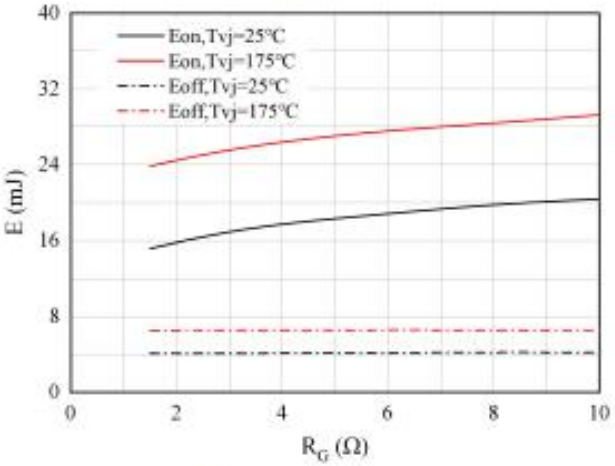


图 10. 开关损耗
Figure 10. Switching losses of IGBT
V_{GE}=±15V, I_C=120A, V_{CE}=600V

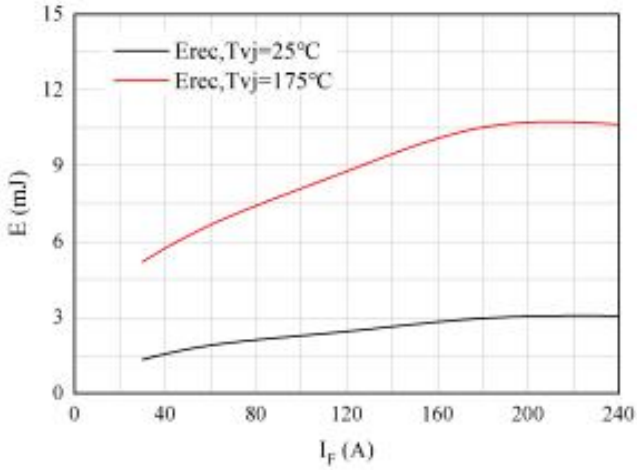


图 11. 开关损耗 二极管
Figure 11. Switching losses of Diode
Rgon=3.3Ω, V_{CE}=600V

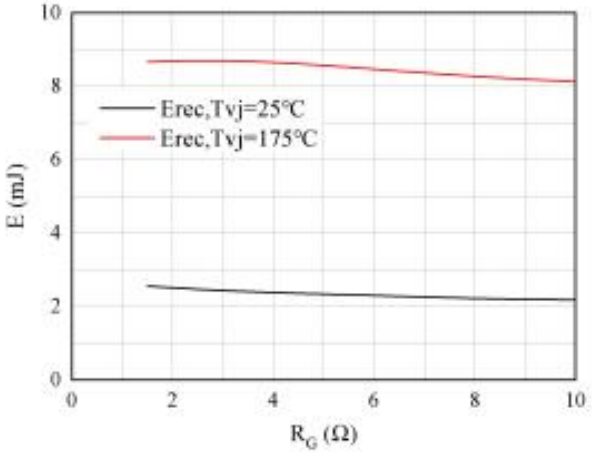
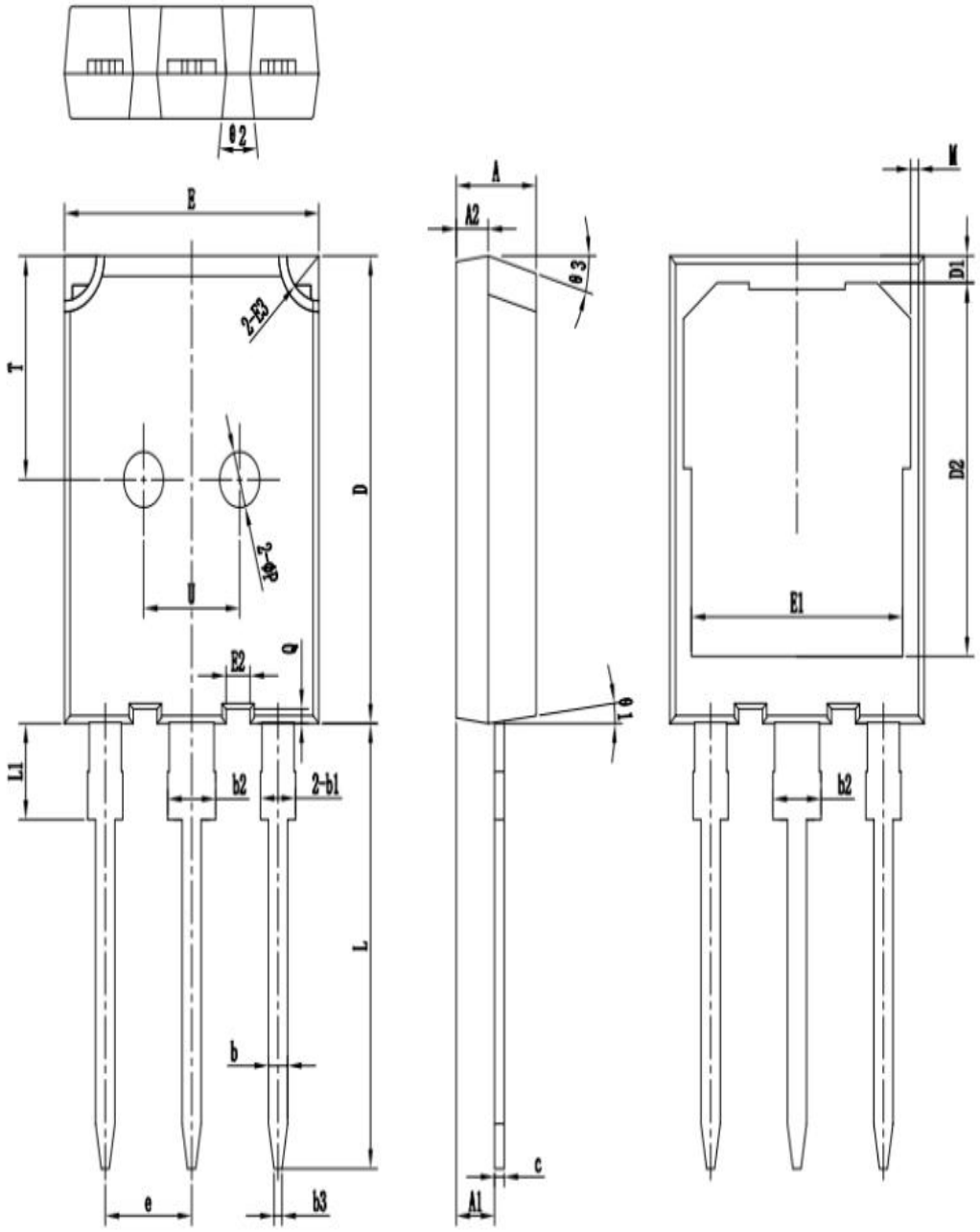


图 12. 开关损耗 二极管
Figure 12. Switching losses of Diode
I_F=120A, V_{CE}=600V

Package outline drawing(TO-247PLUS-3 Unit: mm)



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
φP	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
θ1	5°	7°	9°
θ2	13°	16°	19°
θ3	13°	15°	17°

*为关键管控尺寸

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