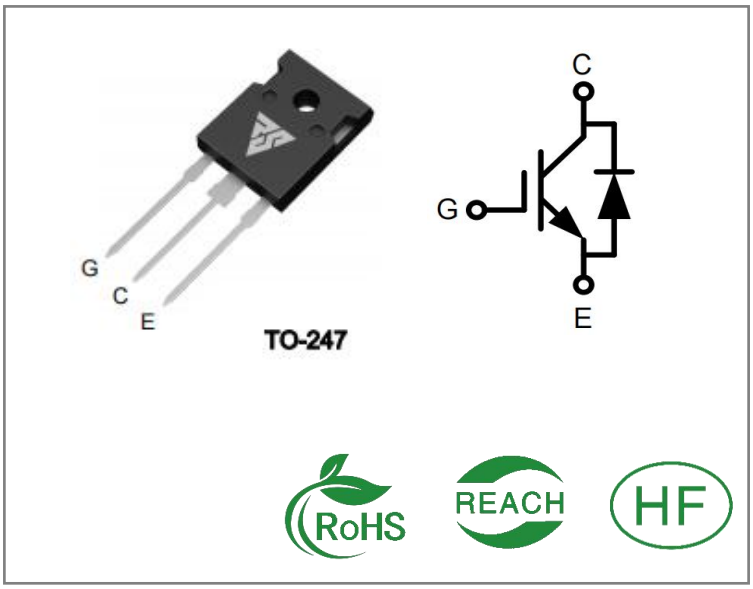
IF	V_{ce}(sat)	VCES
50A	1.58V	650V



Applications:

- EV Charging
- Uninterruptible Power Supply (UPS)
- Inverters

Features:

- 650V 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.
RSG50N65HW	T0-247-3	RSG50N65HW	Tube	30 PCS

Absolute Maximun Ratings Tc= 2 5℃ unless otherwise specified

Symbol	Parameter	RSG50N65HW	Units
VCES	Collector-Emitter Voltage	650	V
VGES	Gate- Emitter Voltage	±20	V
IC	Continuous DC collector current TC = 100 °C	50	A
ICrm	Repetitive peak collector current tp=1 ms	100	A
Ptot	Total Power Dissipation @ TC = 25°C	275	W
Tstg	Operating Junction and Storage Temperature Range	-40 to150	°C
TL	Maximum Temperature for Soldering	260	°C

Thermal Characteristic

Symbol	Parameter	RSG50N65HW	Units
R_{thJC}	Thermal Resistance, Junction to case for IGBT	0.38	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	650	-	--	V	V_{GE}=0V,I_{CE}=1mA
ICES	Collector-Emitter Leakage Current	-	-	1	mA	V_{GE} =0V, V_{CE}=650V
IGES	Gate to Emitter Leakage current	-	-	200	nA	V_{GE}=+20V, V_{CE}=0V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	-	1.58	2.1	V	I_C=50A V_{GE}=15 V, T_j=25° C
	Gate Threshold Voltage	-	1.95	--	V	I_C=50A V_{GE}=15 V, T_j=150° C
$V_{GE(th)}$	Collector-Emitter Breakdown Voltage	4.2	5.0	5.8	V	I_C=0.5mA,V_{CE}=V_{GE}
Gfs	Transconductance		77		S	I_C=50A,V_{CE}=20V
Dynamic Characteristics						
Cies	Input Capacitance	-	5460	--	PF	V_{CE}=25V, V_{GE}=0V, f=1MHz
Coes	Output Capacitance	-	200	--		
Cres	Reverse Transfer Capacitance	-	100	--		
Qg	Total Gate Charge		5.4		uC	IC = 50 A, VGE = 15 V, VCE =520 V
Switching Characteristics						
$t_{d(ON)}$	Turn-on Delay Time	-	33	--	ns	V_{CE}=400V, I_C=50A, V_{GE}=+/-15V, R_g=8Ω, Inductive Load
t_r	Rise Time	-	75			
$t_{d(OFF)}$	Turn-Off Delay Time	-	21	--		
t_f	Fall Time	-	41	--		
E_{on}	Turn-On Switching Loss	-	2.36	--	mJ	
E_{off}	Turn-Off Switching Loss	-	0.6	--		

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

Symbol	Parameter	Value	Unit	Test Conditions
VRRM	Repetitive Peak Reverse Voltage	650	V	TC = 25℃
IF	Forward Current	50	A	TC = 100℃
IFRM	Repetitive Peak Forward Surge Current	100	A	tp=1 ms

Characteristics Values (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Min.	Typ.	Max.	Test Conditions	Unit
VF	Forward Voltage		1.63 1.42 1.37	2.1	IF =50A,V_{GE}=0V TJ = 25℃ IF =50A,V_{GE}=0V TJ = 125℃ IF =50A,V_{GE}=0V TJ = 150℃	V
IRM	Peak reverse recovery current		21 29 32		VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 25℃ VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 125℃ VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 150℃	A
Qrr	Reverse Recovery Charge		1.47 3.25 3.95		VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 25℃ VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 125℃ VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 150℃	uC
trr	Reverse Recovery time		132 198 217		VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 25℃ VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 125℃ VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 150℃	ns
Erec	Reverse recovered energy		0.37 0.65 0.77		VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 25℃ VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 125℃ VR = 400V, IF =50A,V_{GE}=-15V diF/dt=411A/us TJ = 150℃	mJ
R_{thJC}	Diode Thermal Resistance, Junction		0.45			K/ W
Tvj op	Temperature under switching conditions	-40		175		°C

Typical Feature Curve

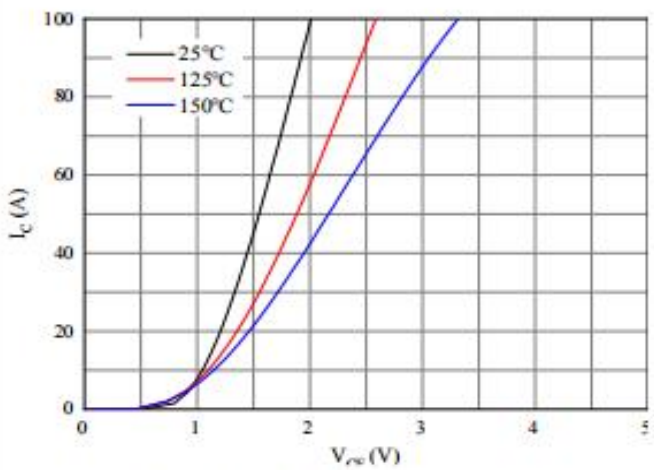


图 1. 典型输出特性 (V_{GE}=15V)
Figure 1. Typical output characteristics (V_{GE}=15V)

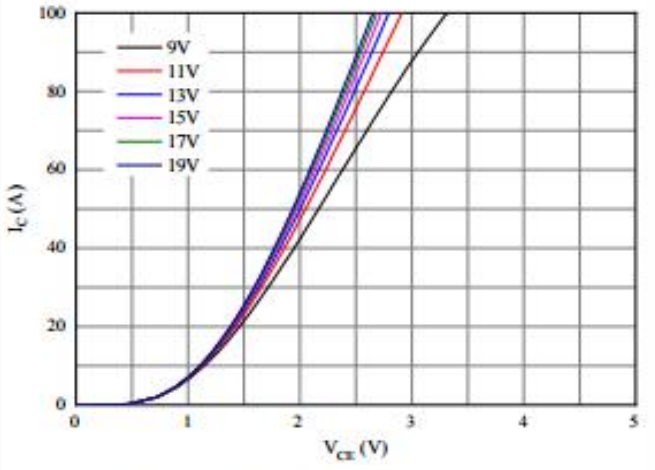


图 2. 典型输出特性 (T_{vj}=150℃)
Figure 2. Typical output characteristics (T_{vj}=150℃)

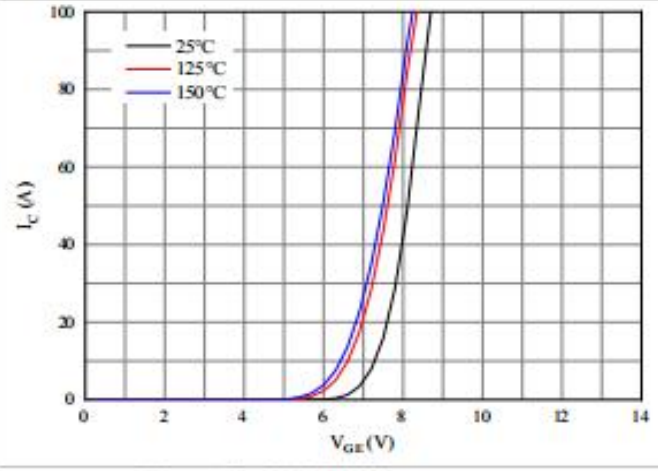


图 3. 典型传输特性(V_{CE}=20V)
Figure 3. Typical transfer characteristic(V_{CE}=20V)

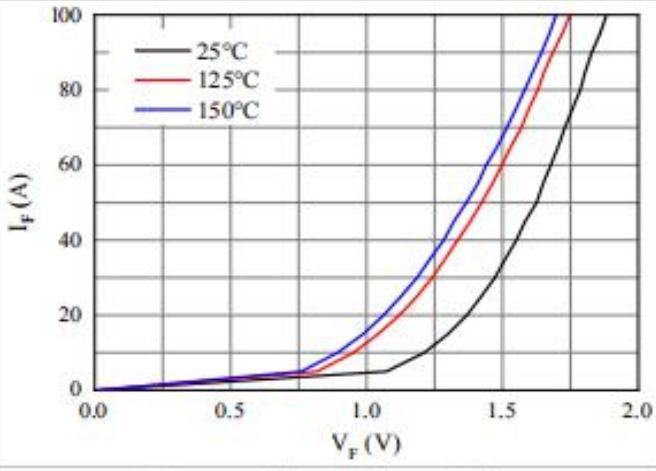


图 4. 正向偏压特性 二极管
Figure 4. Forward characteristic of Diode

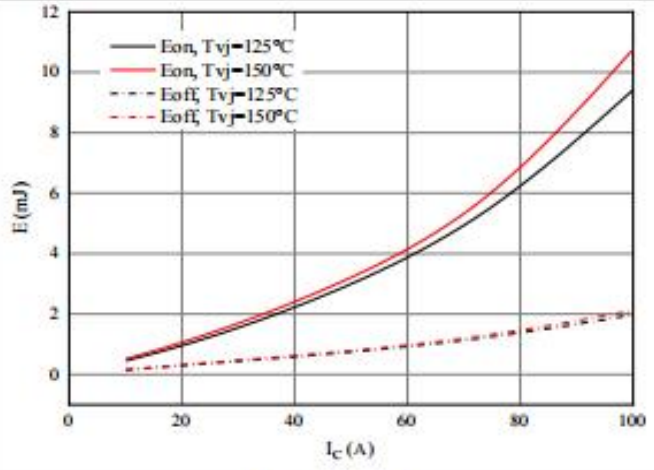


图 5. 开关损耗
Figure 5. Switching losses of IGBT
VGE=±15V, RGon=8Ω, Rgoff=8Ω, VCE=400V

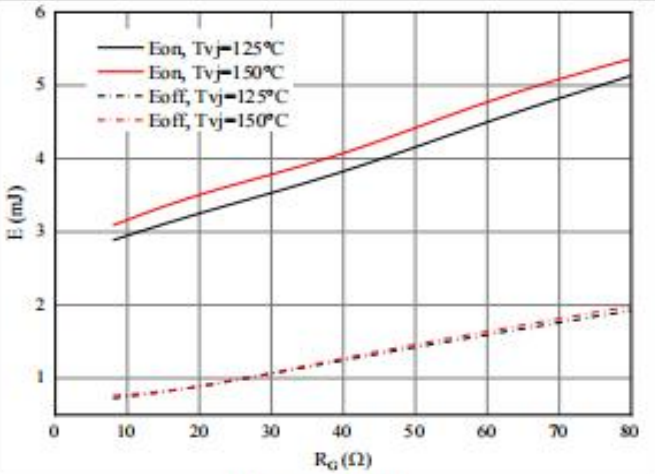


图 6. 开关损耗
Figure 6. Switching losses of IGBT
VGE=±15V, IC=50A, VCE=400V

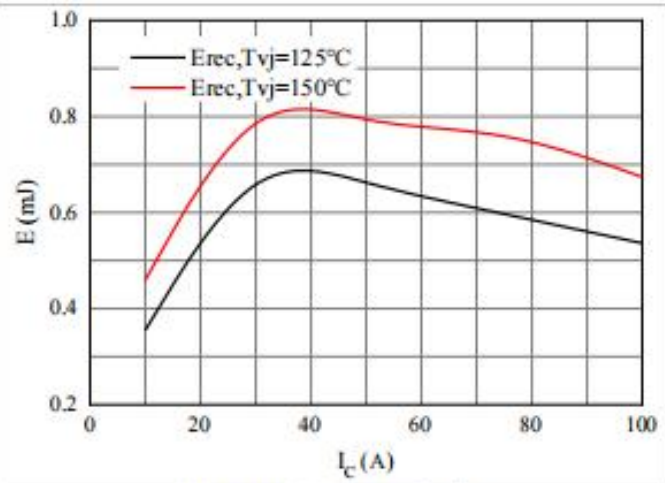


图 7. 开关损耗 二极管

Figure 7. Switching losses of Diode

Rgon=8Ω, VCE=400V

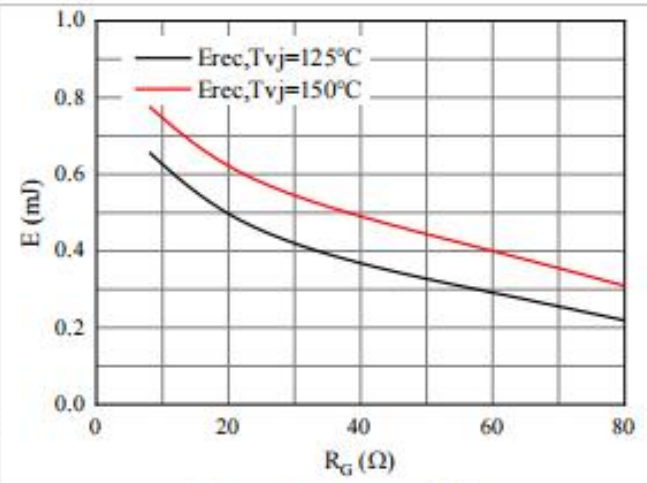


图 8. 开关损耗 二极管

Figure 8. Switching losses of Diode

IF=50A, VCE=400V

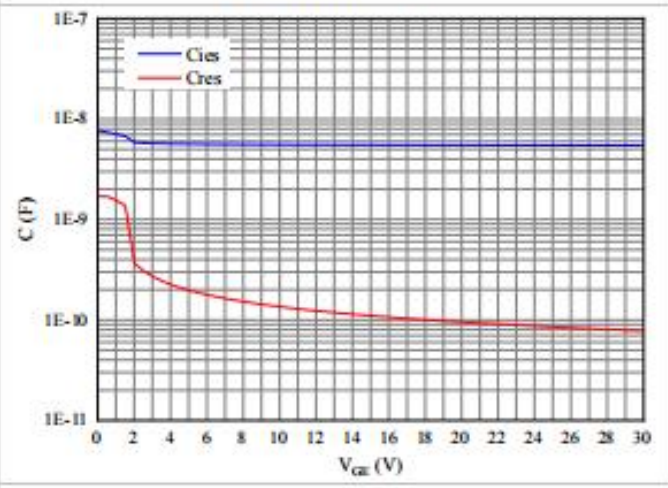
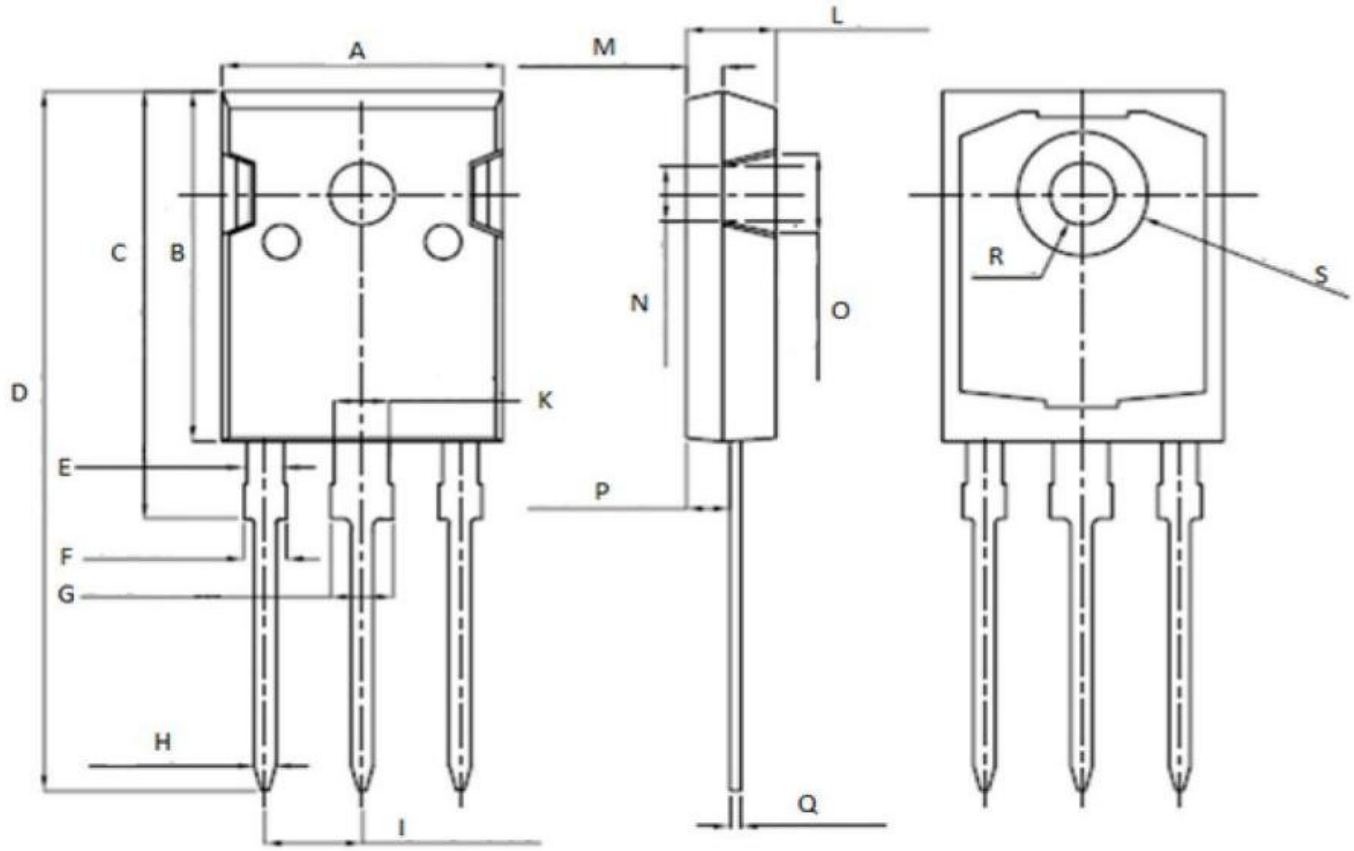


图 9. 电容特性

Figure 9. Capacitance characteristic

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



Unit: mm		
Symbol	Min.	Max.
A	15.95	16.25
B	20.85	21.25
C	20.95	21.35
D	40.5	40.9
E	1.9	2.1
F	2.1	2.25
G	3.1	3.25
H	1.1	1.3
I	5.40	5.50

Unit: mm		
Symbol	Min.	Max.
K	2.90	3.10
L	4.90	5.30
M	1.90	2.10
N	4.50	4.70
O	5.40	5.60
P	2.29	2.49
Q	0.51	0.71
R	ϕ3.5	ϕ3.7
S	ϕ7.1	ϕ7.3

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