Silicon FS Trench IGBT

CRG30T65R85SDZ, CRG30T65R95SDZ

General Description：

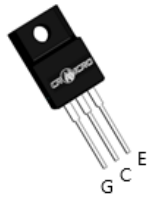
Using micro trench design and advanced Field Stop (FS) technology, offering superior conduction and switching performances.

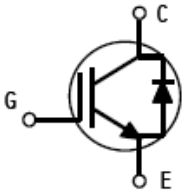
RoHS Compliant.

V_{CES}	650	V
I_C	30	A
$V_{CE(sat)}$	1.5	V

TO-220

TO-220F





Features：

- FS Trench Technology, Positive temperature coefficient
- Low saturation voltage：

$V_{CE(sat)}$,TYP=1.5V @I_C=30A,V_{GE}=15V；

- Low switching loss：

Applications

- UPS
- Solar converts
- Charger
- Motor Control

Package Parameters

Type	Package	Marking	Packing
CRG30T65R85SDZ	TO-220	G30T65R85SDZ	Tube
CRG30T65R95SDZ	TO-220F	G30T65R95SDZ	Tube

Absolute Maximum Ratings（T_C= 25℃ unless otherwise specified）:

Symbol	Parameter	Rating		Units
		TO-220	TO-220F	
V_{CES}	Collector-Emitter Voltage	650	650	V
V_{GES}	Gate- Emitter Voltage	±20	±20	V
	Gate- Emitter Voltage （tp≤10us,D<0.01）	±30	±30	
I_C [a1]	Collector Current @T_C = 25 ℃	60	60	A
	Collector Current @T_C = 100 ℃	30	30	
I_{CM}	Pulsed Collector Current @T_C=25℃	120	120	A
I_F [a2]	Diode Continuous Forward Current @T_C = 25 ℃	60	60	A
	Diode Continuous Forward Current @T_C = 100 ℃	30	30	
I_{FM}	Diode Maximum Forward Current	120	120	A
Tsc	Short Circuit Withstand Time @V_{GE}=15V,V_{CE}=400V	6	6	μs
P_D	Power Dissipation @ T_C = 25 ℃	172	47	W
	Power Dissipation @T_C = 100 ℃	86	23.5	
T_j [a3]	Operating Junction temperature range	-40～175	-40～175	℃
T_{stg}	Storage Temperature Range	−55～150	−55～150	℃
T_L	Maximum Temperature for Soldering	270	270	℃

Thermal Characteristics

Symbol	Parameter	Typ.	Max.		Units
			TO-220	TO-220F	
$R_{\theta JC}$	Thermal Resistance, Junction to case for IGBT	--	0.87	3.2	℃/W
$R_{\theta JC}$	Thermal Resistance, Junction to case for Diode	--	1.87	4.6	℃/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	--	62.5		℃/W

Electrical Characteristics of the IGBT（T_C= 25℃ unless otherwise specified）:

Symbol	Parameter	Test Conditions	SPEC			Units
			Min.	Typ.	Max.	
OFF Characteristics						
$V_{(BR)CES}$	Collector-Emitter Breakdown Voltage	V_{GE}=0V,I_{CE}=250uA	650	--	--	V
I_{CES}	Collector-Emitter Leakage Current	V_{GE}=0V,V_{CE}=650V	--	--	1	mA
$I_{GES(F)}$	Gate to Emitter Forward Leakage	V_{GE}=+20V	--	--	+250	nA
$I_{GES(R)}$	Gate to Source Reverse Leakage	V_{GE} =-20V	--	--	-250	nA
ON Characteristics						
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C=30A，V_{GE}=15V，T_C=25℃	--	1.5	1.9	V
		I_C=30A，V_{GE}=15V，T_C=150℃	--	1.87	--	V
$V_{GE(th)}$	Gate Threshold Voltage	I_C=250uA，V_{CE}=V_{GE}	4	--	7	V

Pulse width tp≤300μs,δ≤2%						
Dynamic Characteristics						
C_{ies}	Input Capacitance	V_{CE}=30V,V_{GE}=0V f=1MHz	--	2340	--	pF
C_{oes}	Output Capacitance		--	80	--	
C_{res}	Reverse Transfer Capacitance		--	12	--	
Switching Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{CE}=400V, I_C=30A, R_g=10Ω, V_{GE}=15V, Inductive Load, T_J=25°C	--	37	--	ns
t_r	Rise Time		--	37	--	
$t_{d(off)}$	Turn-Off Delay Time		--	70	--	
t_f	Fall Time		--	69	--	
E_{on} [a4]	Turn-On Switching Loss		--	0.68	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.35	--	
E_{ts}	Total Switching Loss		--	1.03	--	
$t_{d(on)}$	Turn-on Delay Time	V_{CE}=400V, I_C=30A, R_g=10Ω, V_{GE}=15V, Inductive Load, T_J=150°C	--	37	--	ns
t_r	Rise Time		--	42	--	
$t_{d(off)}$	Turn-Off Delay Time		--	72	--	
t_f	Fall Time		--	98	--	
E_{on} [a4]	Turn-On Switching Loss		--	0.74	--	mJ
E_{off}	Turn-Off Switching Loss		--	0.44	--	
E_{ts}	Total Switching Loss		--	1.18	--	
Qg	Total Gate Charge	V_{CE}=520V, I_C=30A, V_{GE}=15V	--	79	--	nC
Qge	Gate to Emitter Charge		--	21	--	
Qgc	Gate to Collector Charge		--	34	--	
Electrical Characteristics of the DIODE（T_C= 25°C unless otherwise specified）:						
V_F	Diode Forward Voltage	I_F=30A,T_C=25°C	--	1.95	2.8	V
		I_F=30A,T_C=150°C	--	1.7	--	V
T_{rr}	Reverse Recovery Time	I_F=30A di/dt=200A/μS T_C=25°C	--	32	--	ns
I_{rrm}	Reverse Recovery Current		--	3.85	--	A
Q_{rr}	Reverse Recovery Charge		--	62	--	nC

Notes:

a1: The collector DC current is limited by the maximum junction temperature, limited by the bond wire current capacity at 25℃

a2: FRD DC forward current is limited by the maximum junction temperature, limited by the bond wire current capacity at 25℃

a3: Repetitive rating; pulse width limited by maximum junction temperature Tvjop = 175℃, the maximum duty cycle is less than 20% (lasting for 60s at most)

a4: Turn-on losses include diode losses

Typical Performance Characteristics：

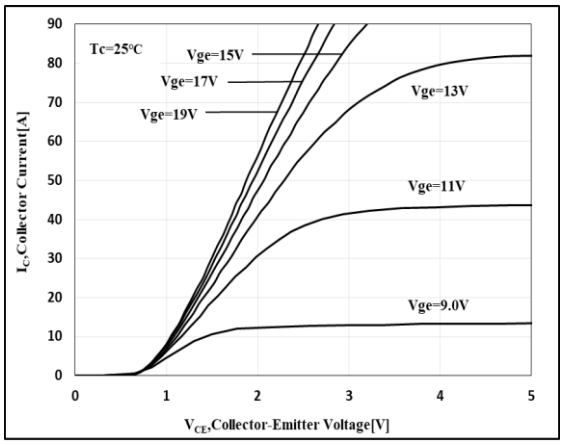


Figure 1.Output Characteristics

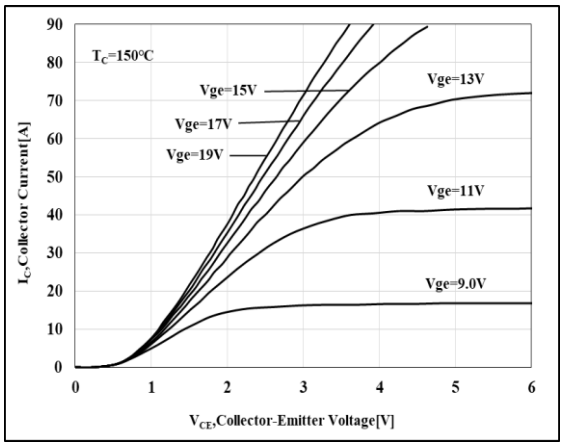


Figure 2.Output Characteristics

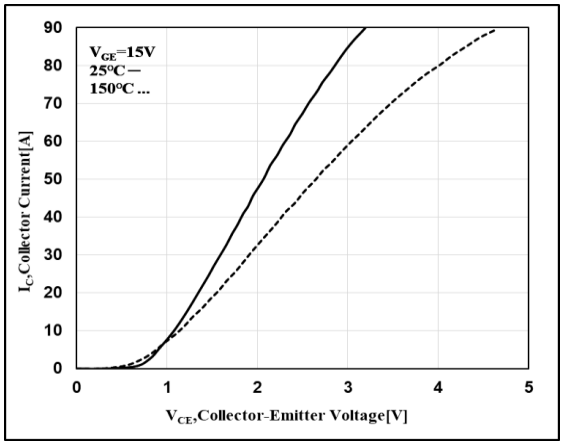


Figure 3.Saturation Voltage Characteristics

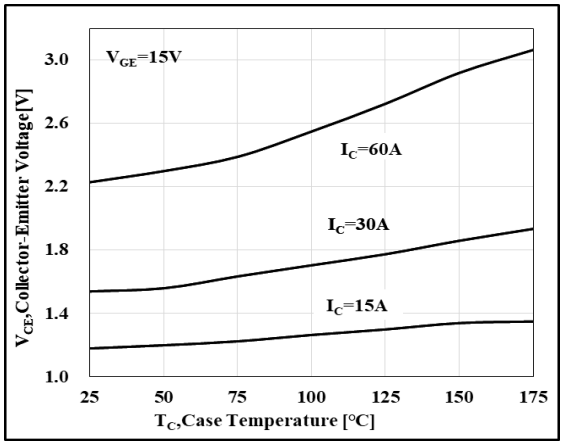


Figure 4.Saturation Voltage –T_c Characteristics

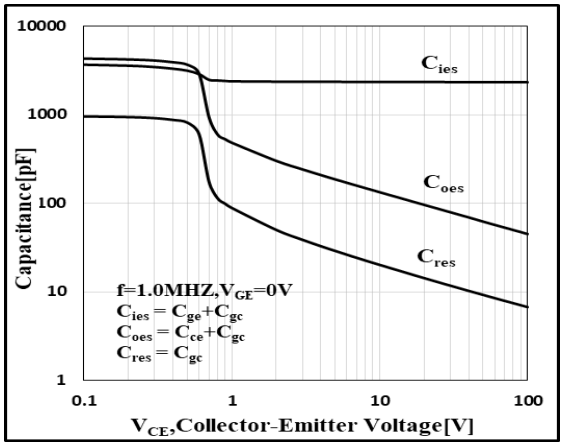


Figure 5.Capacitance Characteristics

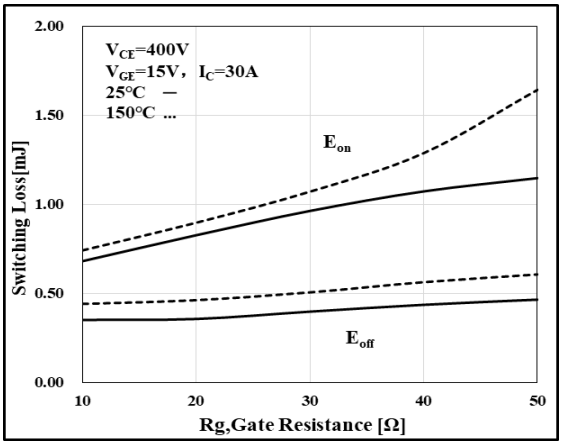


Figure 6.Switching Loss-R_G Characteristics

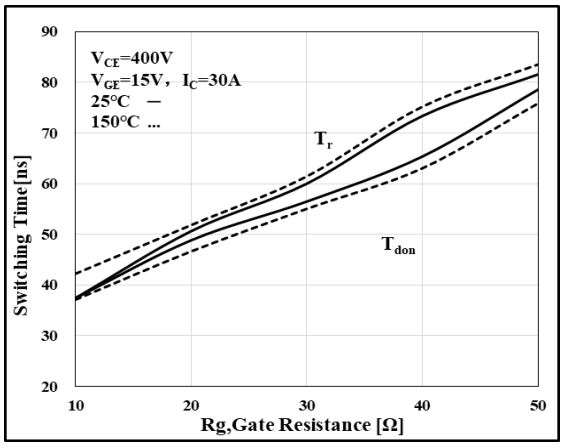


Figure 7.Switching Time-R_G Characteristics

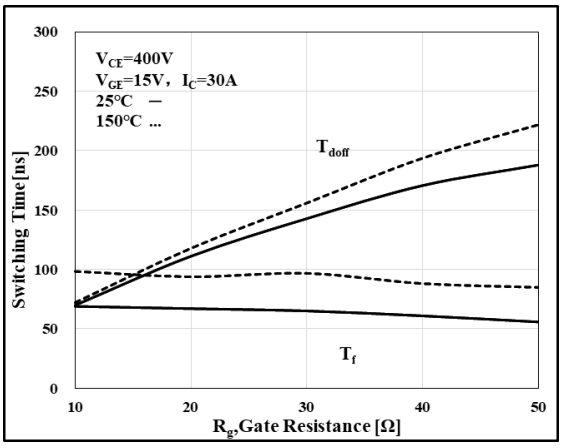


Figure 8.Switching Time-R_G Characteristics

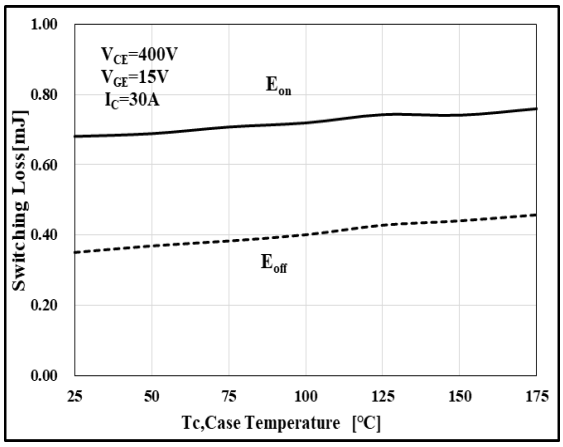


Figure 9.Switching Loss-T_c Characteristics

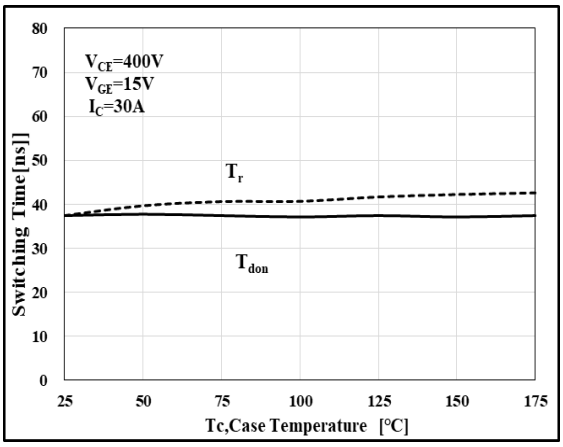


Figure 10.Switching Time-T_c Characteristics

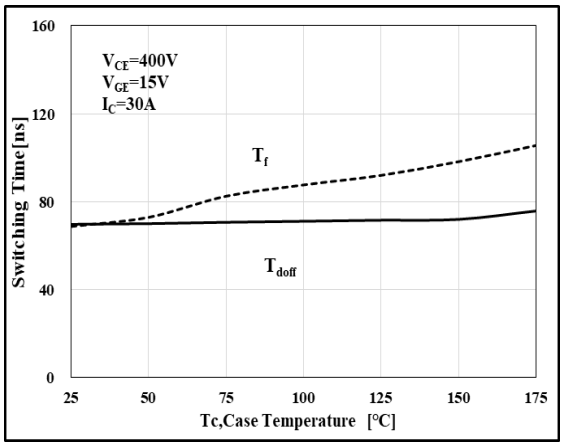


Figure 11.Switching Time-T_c Characteristics

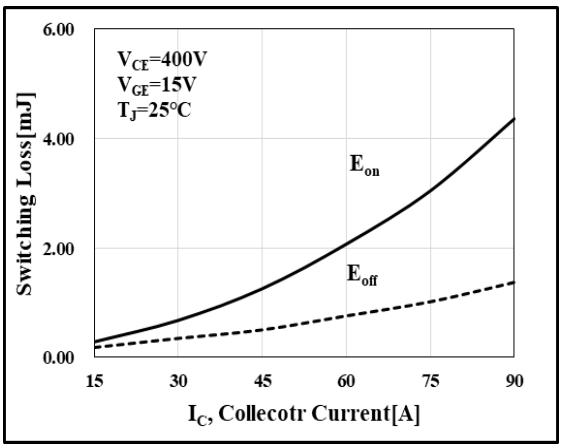


Figure 12.Switching Loss-I_C Characteristics

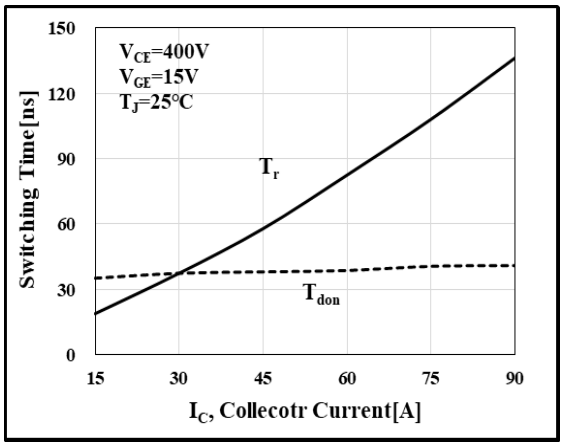


Figure 13.Switching Time-I_C Characteristics

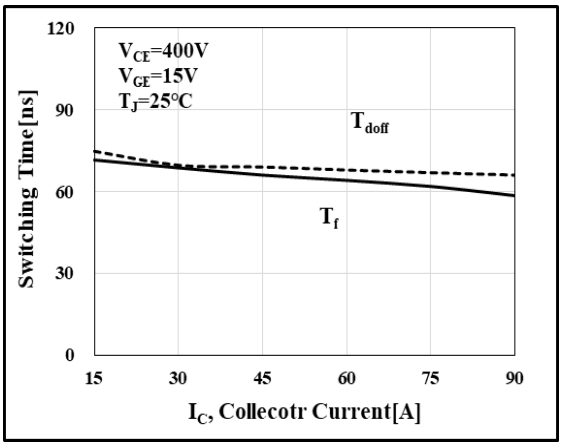


Figure 14.Switching Time-I_C Characteristics

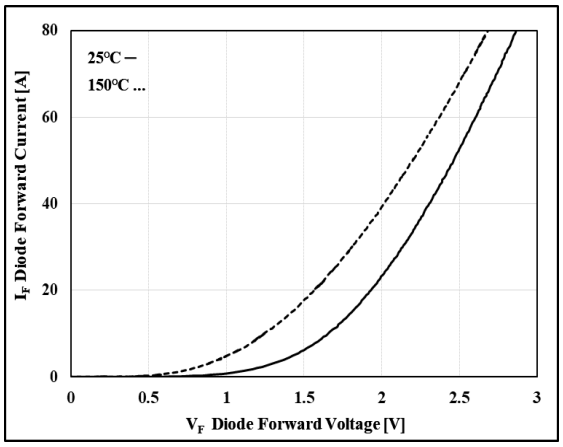


Figure 15.Diode Forward Characteristics

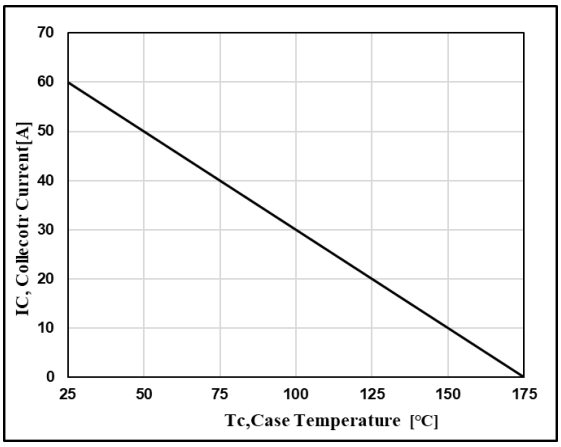


Figure 16.Collector Current-T_C Characteristics

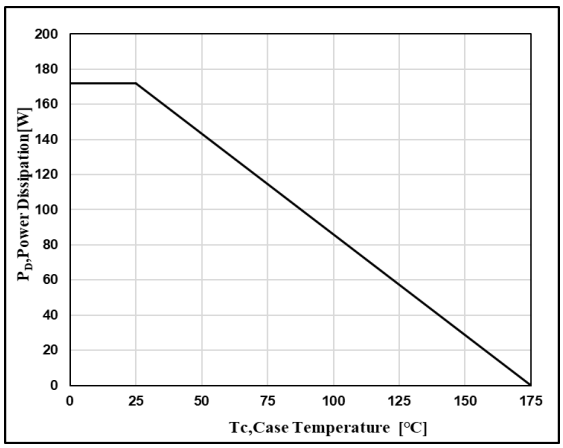


Figure 17.Power dissipation (TO-220)

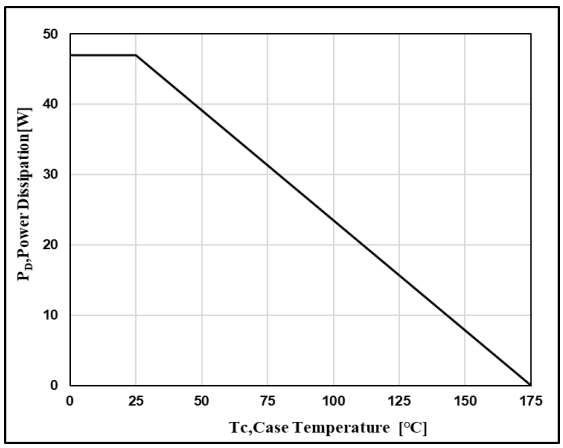


Figure 18.Power dissipation (TO-220F)

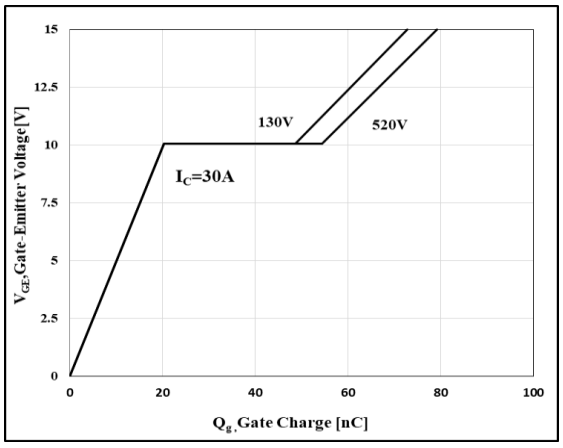


Figure 19.Gate Charge Characteristics

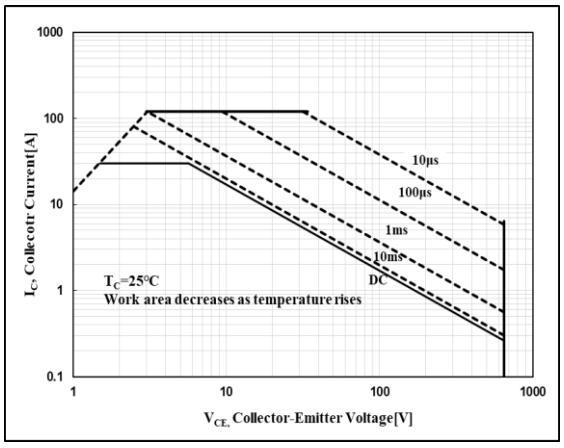


Figure 20.Forward Bias Safe Operating Area (TO-220)

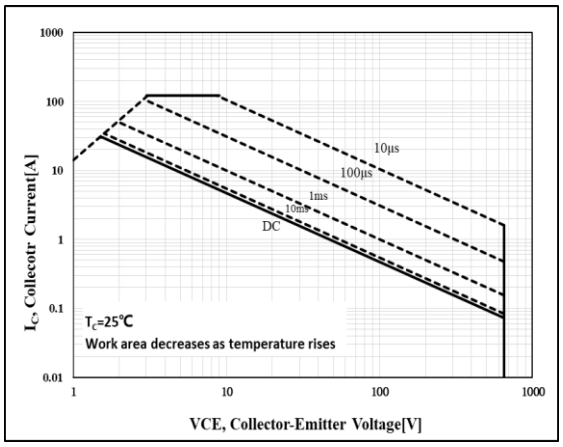


Figure 21.Forward Bias Safe Operating Area (TO-220F)

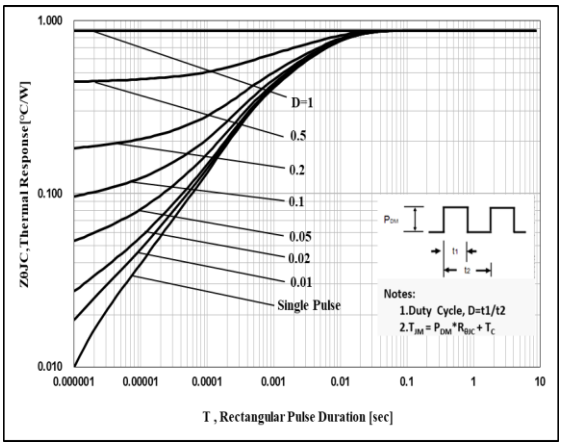


Figure 22.IGBT Transient Thermal Impedance (TO-220)

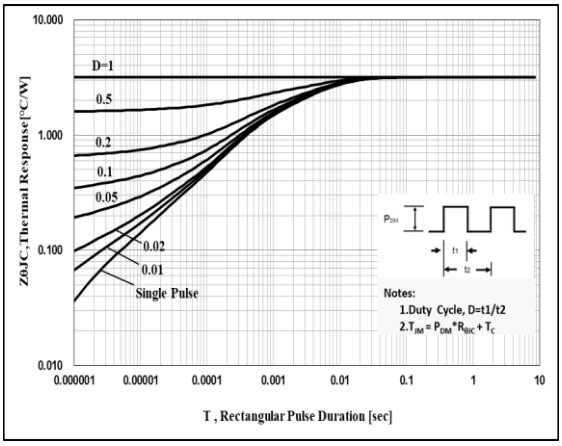
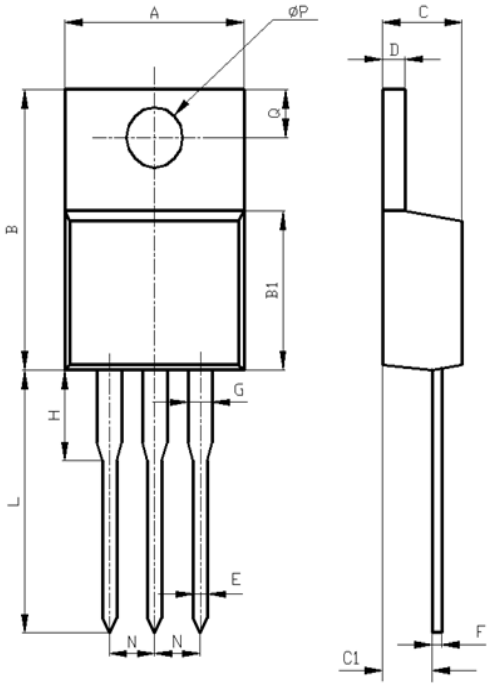


Figure 23.IGBT Transient Thermal Impedance (TO-220F)

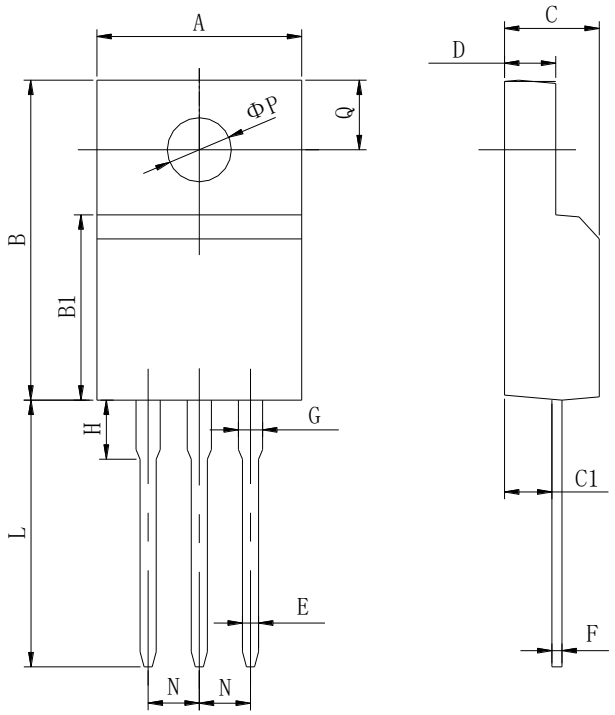
Package Information: CRG30T65R85SDZ (TO-220)



Items	Values (mm)	
	MIN	MAX
A	9.60	10.6
B	15.0	16.0
B1	8.90	9.50
C	4.30	4.80
C1	2.30	3.10
D	1.20	1.40
E	0.70	0.90
F	0.30	0.60
G	1.17	1.37
H	2.70	3.80
L	12.6	14.8
N	2.34	2.74
Q	2.40	3.00
ΦP	3.50	3.90

TO-220 Package

Package Information: CRG30T65R95SDZ (TO-220F)



Items	Values(mm)	
	MIN	MAX
A	9.60	10.4
B	15.4	16.2
B1	8.90	9.50
C	4.30	4.90
C1	2.10	3.00
D	2.40	3.00
E	0.60	1.00
F	0.30	0.60
G	1.12	1.42
H	3.40	3.80
L	12.0	14.0
N	2.34	2.74
Q	3.15	3.55
ΦP	2.90	3.30

TO-220F Package

The name and content of poisonous and harmful material in products

Part's Name Limit	Hazardous Substance									
	Pb	Hg	Cd	Cr(VI)	PBB	PBDE	DIBP	DEHP	DBP	BBP
	≤0.1%	≤0.1%	≤0.01 %	≤0.1%	≤0.1%	≤0.1%	≤0.1%	≤0.1%	≤0.1%	≤0.1%
Lead Frame	○	○	○	○	○	○	○	○	○	○
Molding	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
Wire Bonding	○	○	○	○	○	○	○	○	○	○
Solder	×	○	○	○	○	○	○	○	○	○
Note	○：Means the hazardous material is under the criterion of 2011/65/EU. ×：Means the hazardous material exceeds the criterion of 2011/65/EU. The plumbum element of solder exist in products presently, but within the allowed range of Eurogroup's RoHS.									

Warnings

1. Exceeding the maximum ratings of the device in performance may cause damage to the device, even the permanent failure, which may affect the dependability of the machine. It is suggested to be used under 80 percent of the maximum ratings of the device.
2. When installing the heat sink, please pay attention to the torsional moment and the smoothness of the heat sink.
3. IGBTs is the device which is sensitive to the static electricity, it is necessary to protect the device from being damaged by the static electricity when using it.
4. This publication is made by Huajing Microelectronics and subject to regular change without notice.

WUXI CHINA RESOURCES HUAJING MICROELECTRONICS CO., LTD.

Add： No.14 Liangxi RD. Wuxi, Jiangsu, China Mail：214061 https://www.crmicro.com
Tel: 0510-85807228 Fax: 0510-85800864

Marketing Part： Post：214061 Tel / Fax：0510-85807228-3663/5508
0510-85800360（Fax）

Application and Service：Post：214061 Tel / Fax：0510-85807228-3399 / 2227

Modify ：

Version	Modify record
2024V01	Initial release