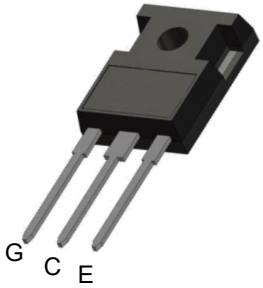
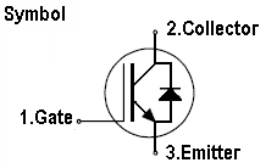
IGBT in TO-247

Features

- 1400V,25A,VCE(sat)(typ.)=2.15 V@VGE=15V
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA using NPT technology





Mechanical Data

- **Case:** TO-247 (plastic package).
  Lead free; RoHS compliant
- **Molding Compound Flammability Rating:**
  UL 94 V-0
- **Terminals:** High temperature soldering guaranteed:
  260 °C/10 sec. at terminals

Benefits

- High Efficiency for Motor Control
- Rugged Performance
- Excellent Current Sharing in Parallel Operation

Applications

CREATEK's IGBTs offer lower losses and higher energy for application such as motor drive ,UPS, inverter and other soft switching applications.

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	1400	V
V_{GES}	Gate-Emitter Voltage	30	V
I_C	Continuous Collector Current (T_C=25 ℃)	50	A
	Continuous Collector Current (T_C=100℃)	25	A
I_{CM}	Pulsed Collector Current (Note 1)	100	A
I_F	Diode Continuous Forward Current (T_C=100 ℃)	25	A
I_{FM}	Diode Maximum Forward Current (Note 1)	100	A
t_{sc}	Short Circuit Withstand Time	10	us
$t_{sc\ (Max)}$	Maximum Short Circuit Withstand Time	>23	us
Isc	Short Circuit Current	140	A
P_D	Maximum Power Dissipation (T_C=25 ℃)	220	W
	Maximum Power Dissipation (T_C=100℃)	100	W
T_J	Operating Junction Temperature Range	-55 to +150	℃
T_{STG}	Storage Temperature Range	-55 to +150	℃

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for IGBT	0.45	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	0.85	℃/W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	40	℃/W

Electrical Characteristics (TC=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}= 0V, I_C= 250uA	1200	-	1400	V
I_{CES}	Collector-Emitter Leakage Current	V_{CE}= 1200V, V_{GE}= 0V	-	-	250	uA
I_{GES}	Gate Leakage Current, Forward	V_{GE}=30V, V_{CE}= 0V	-	-	100	nA
	Gate Leakage Current, Reverse	V_{GE}= -30V, V_{CE}= 0V	-	-	-100	nA
$V_{GE(th)}$	Gate Threshold Voltage	V_{GE}= V_{CE}, I_C= 250uA	4.5	5.0	5.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C= 25A	-	2.15	2.5	V
Q_g	Total Gate Charge	V_{CC}=960V V_{GE}=15V I_C=25A	-	165		nC
Q_{ge}	Gate-Emitter Charge		-	90		nC
Q_{gc}	Gate-Collector Charge		-	105		nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=600V V_{GE}=15V I_C=25A R_G=10Ω Inductive Load T_C=25℃	-	22	-	ns
t_r	Turn-on Rise Time		-	33	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	300	-	ns
t_f	Turn-off Fall Time		-	230	-	ns
Eon	Turn-on Switching Loss		-	1.15	-	mJ
Eoff	Turn-off Switching Loss		-	1.9	-	mJ
Ets	Total Switching Loss		-	3.05	-	mJ
C_{ies}	Input Capacitance	V_{CE}=25V V_{GE}=0V f = 1MHz	-	1080	-	pF
C_{oes}	Output Capacitance		-	175	-	pF
C_{res}	Reverse Transfer Capacitance		-	120	-	pF
R_{Gint}	Integrated gate resistor	f=1M;Vpp=1V		8.0		Ω

Electrical Characteristics of Diode (TC=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=25A	-	2.1	2.3	V
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 600V I_F= 25A dIF/dt = 500A/us	-	110		ns
I_{rr}	Diode peak Reverse Recovery Current		-	15.0		A
Q_{rr}	Diode Reverse Recovery Charge		-	1050		nC

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature

Typical Characteristics

Fig 1. maximum DC collector current VS. case temprature

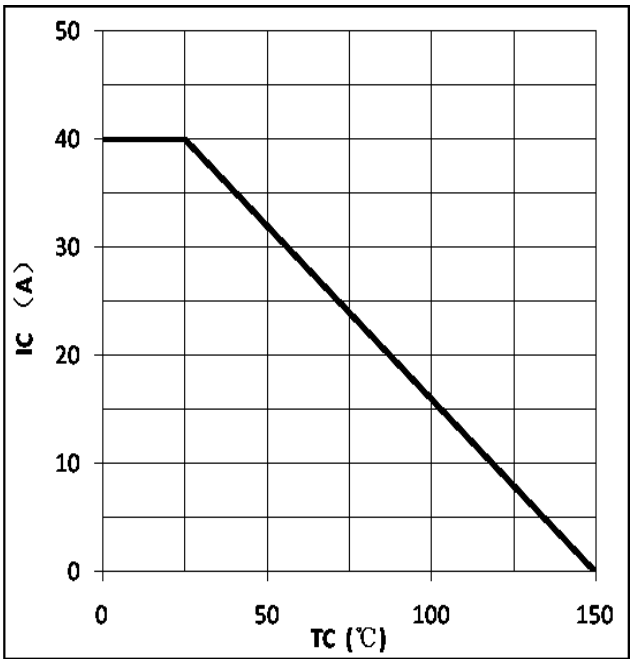


Fig 2. power dissipation VS. case temprature

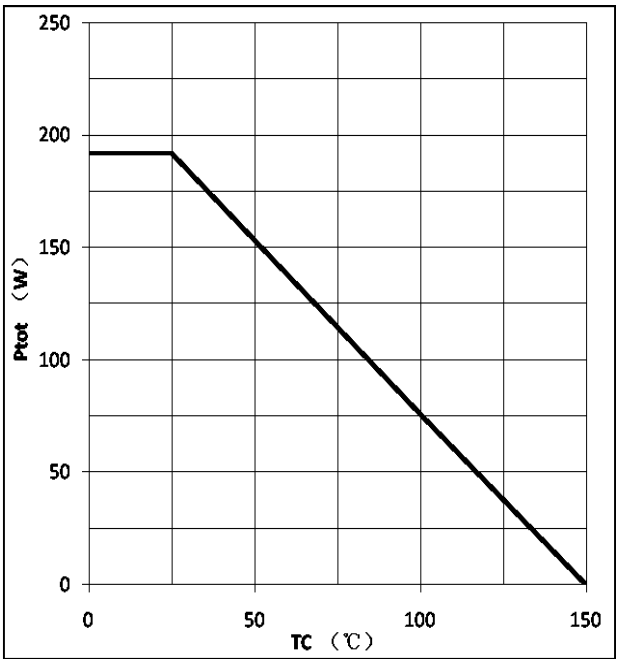


Fig 3. IGBT Forward SOA,TC=25℃,TJ≤150℃

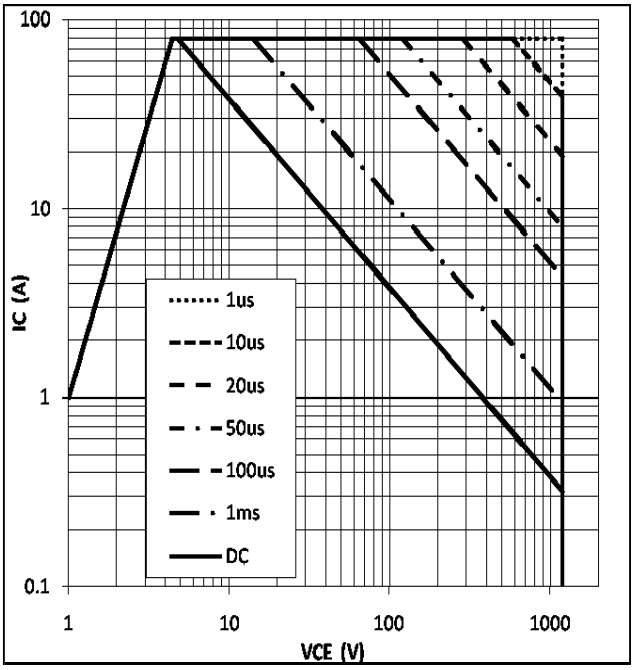
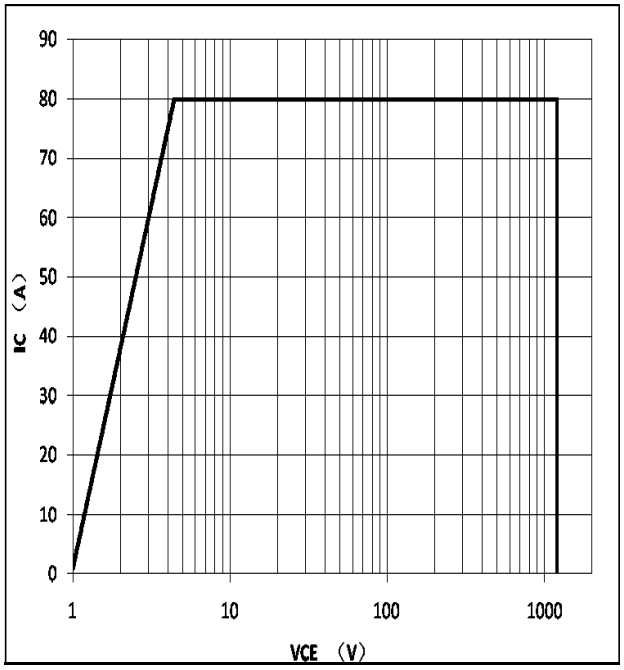


Fig 4. IGBT Reverse SOA,TJ=150℃,VGE=15V



Typical Characteristics

Fig 5. Typical output characteristic （Tj=25℃）
tp=300us

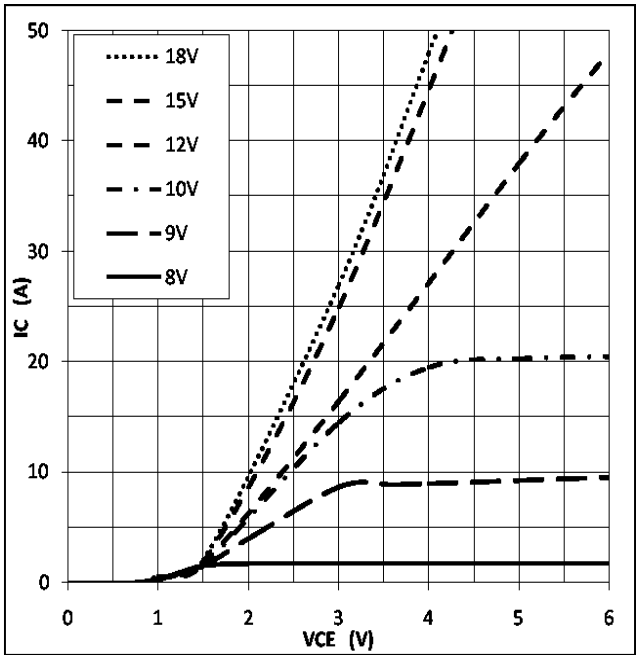


Fig 6. Typical trans characteristics,VCE=20V,tp=20us

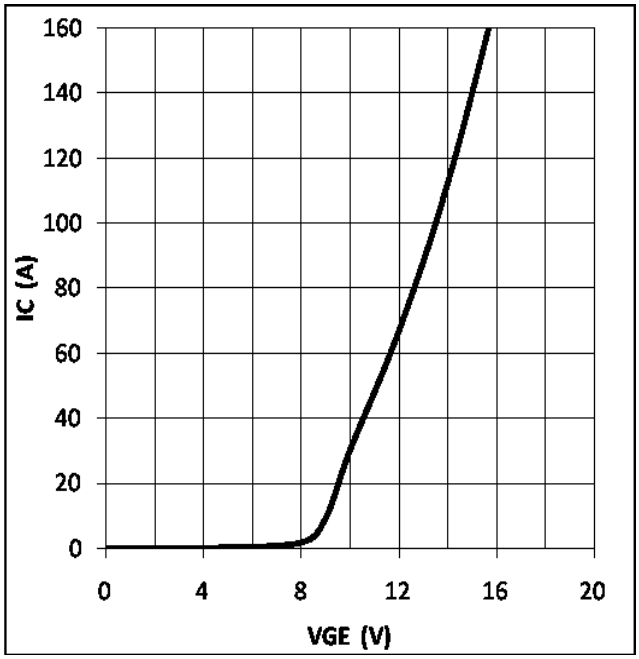


Fig 7. Typical diode forward characteristic,tp=300us

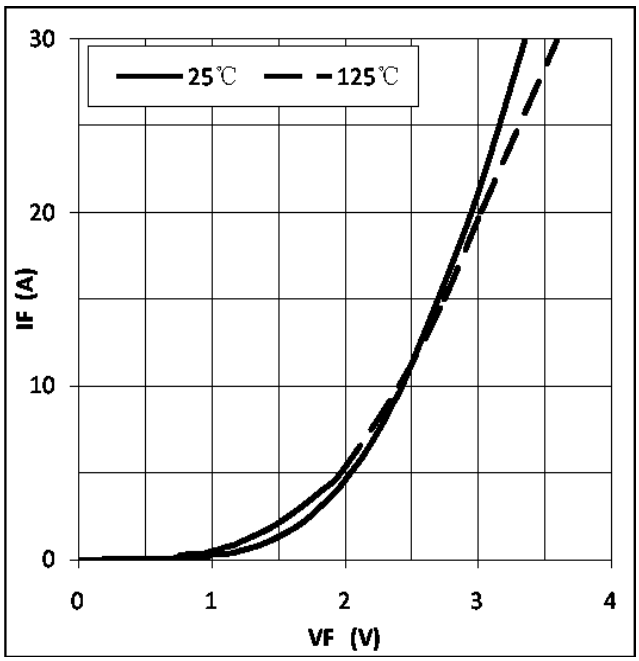
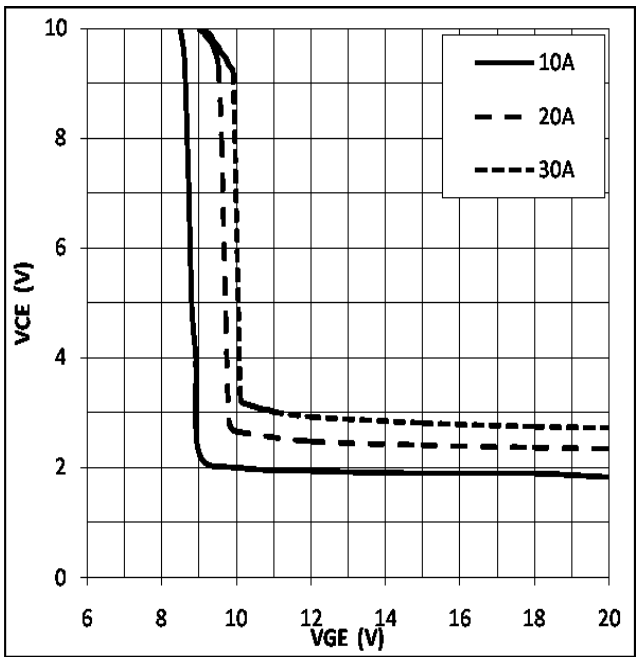


Fig 8. Typical VCE VS. VGE,TJ=25℃



Typical Characteristics

Fig 9. typical VCE VS. VGE,TJ=125℃

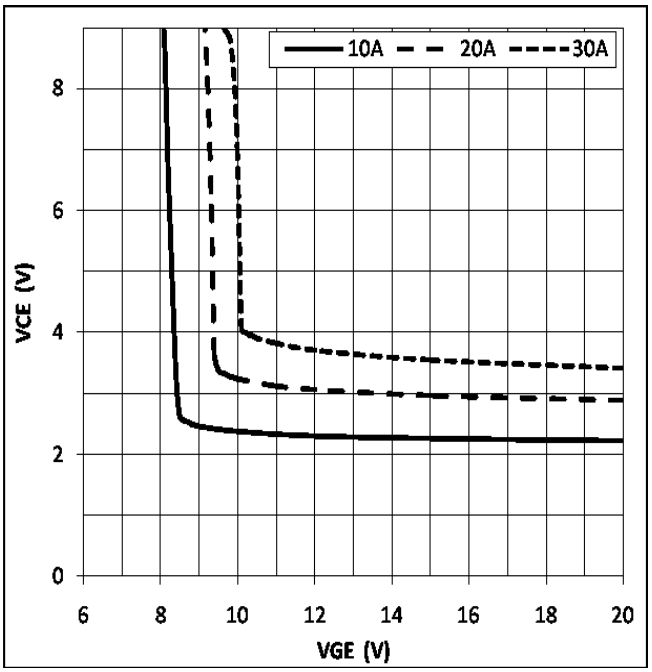


Fig 10. typical energy loss VS. IC TC=25℃,L=500uH, VCE=600V,VGE=15V,Rg=28Ω

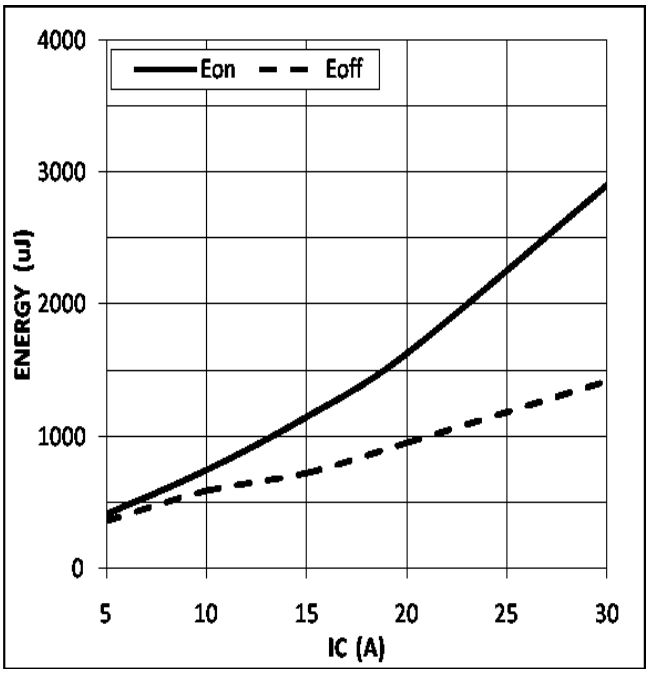


Fig 11. typical switching time VS. IC, TC=25℃, L=500uH, VCE=600V,VGE=15V,Rg=28Ω

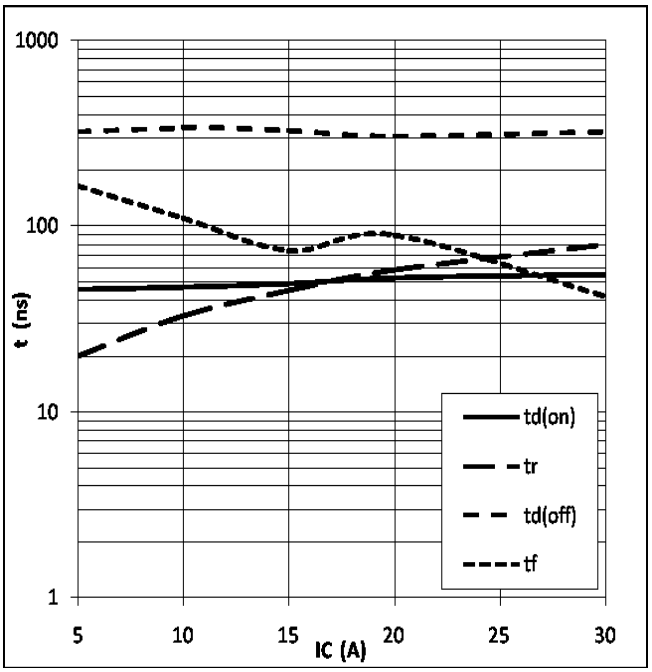
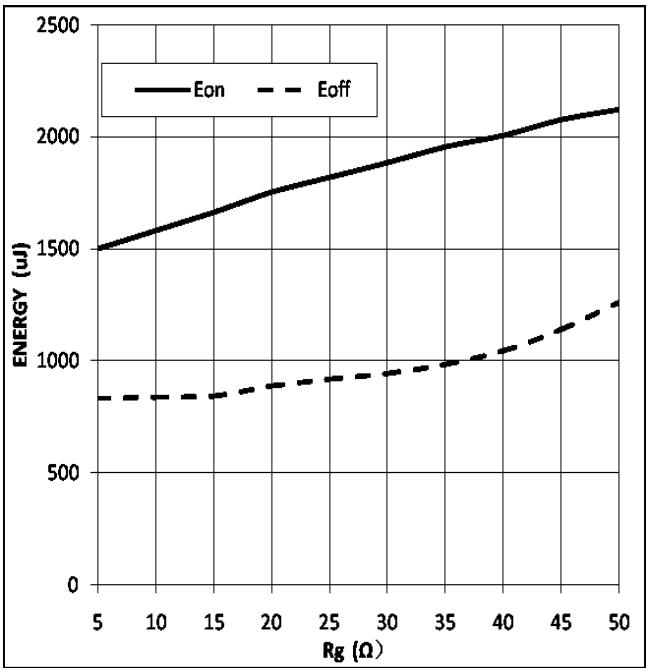


Fig 12. typical energy loss VS. Rg,TC=25℃, L=500uH,VCE=600V,VGE=15V,IC=20A



Typical Characteristics

Fig 13. typical switching time VS. Rg,TC=25℃,
L=500uH,VCE=600V,VGE=15V,IC=20A

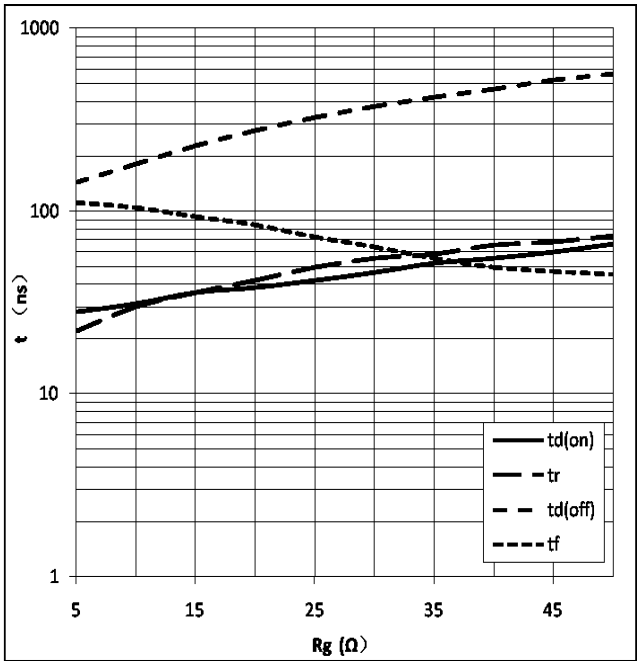


Fig 14. typical diode Irrm VS. IF, TC=25℃
VCC=600V,VGE=15V

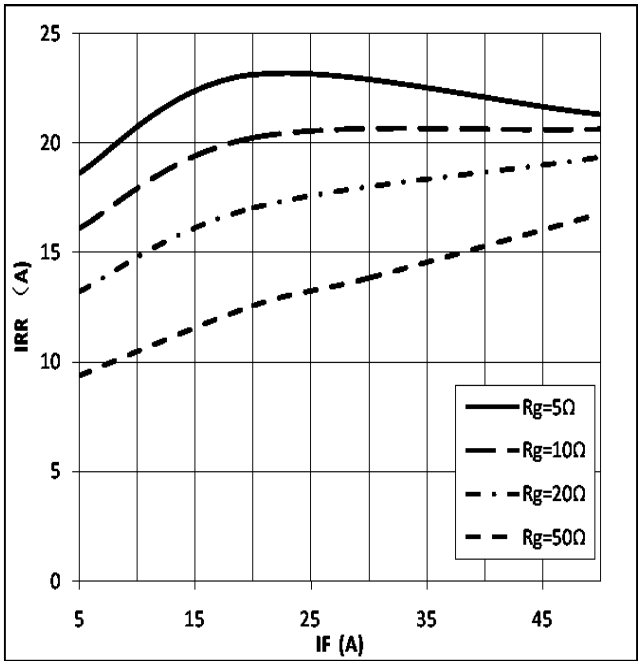


Fig 15. typical diode Irrm VS. dIF/dt
VCC=600V,VGE=15V,IF=20A

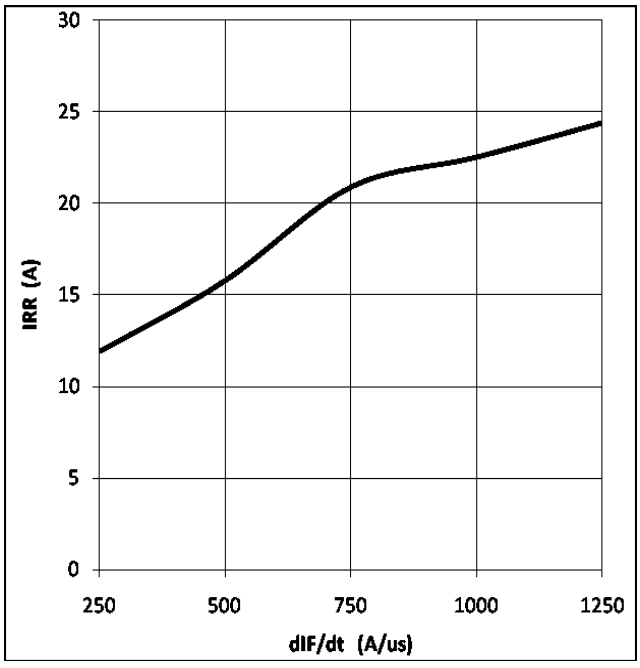
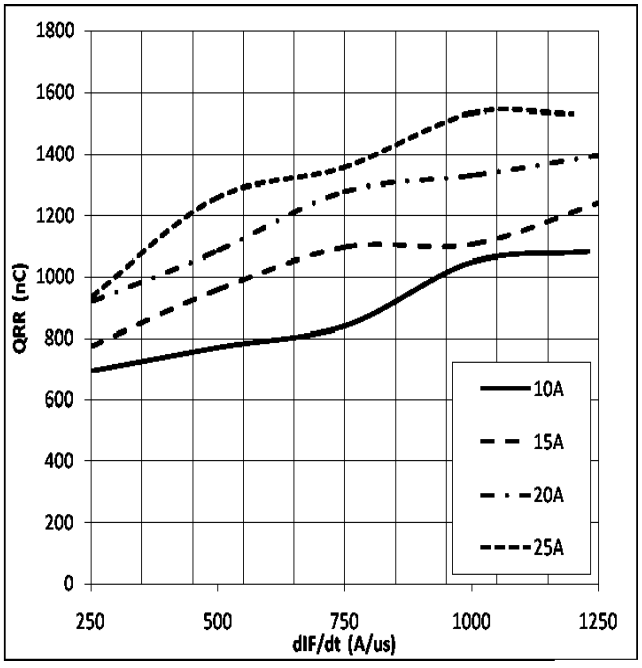


Fig 16. typical diode QRR VS. dIF/dt
VCC=600V,VGE=15V



Typical Characteristics

Fig 17. Typical capacitance VS. VCE,VGE=0V, f=100kHz

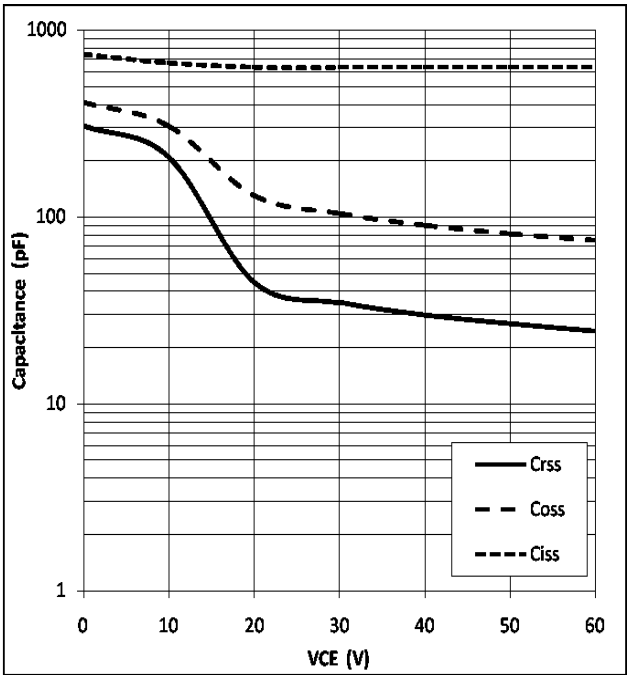


Fig 18. Typical gate charge VS. VGE,IC=20A

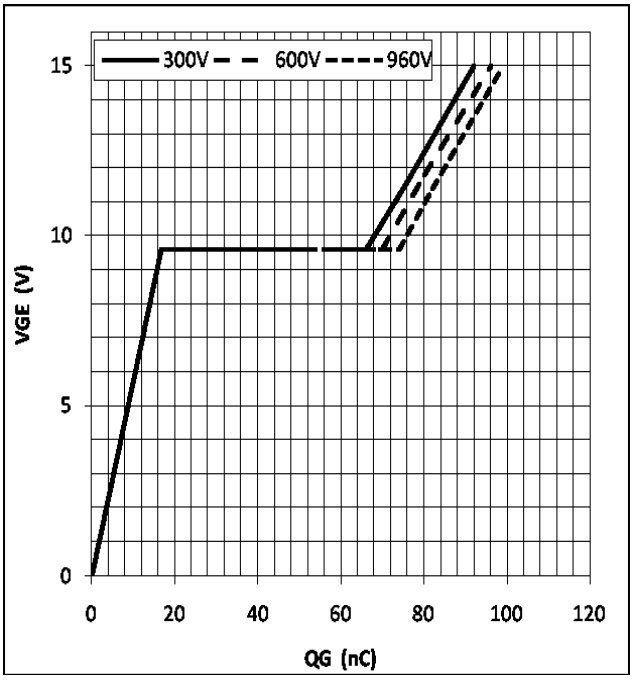
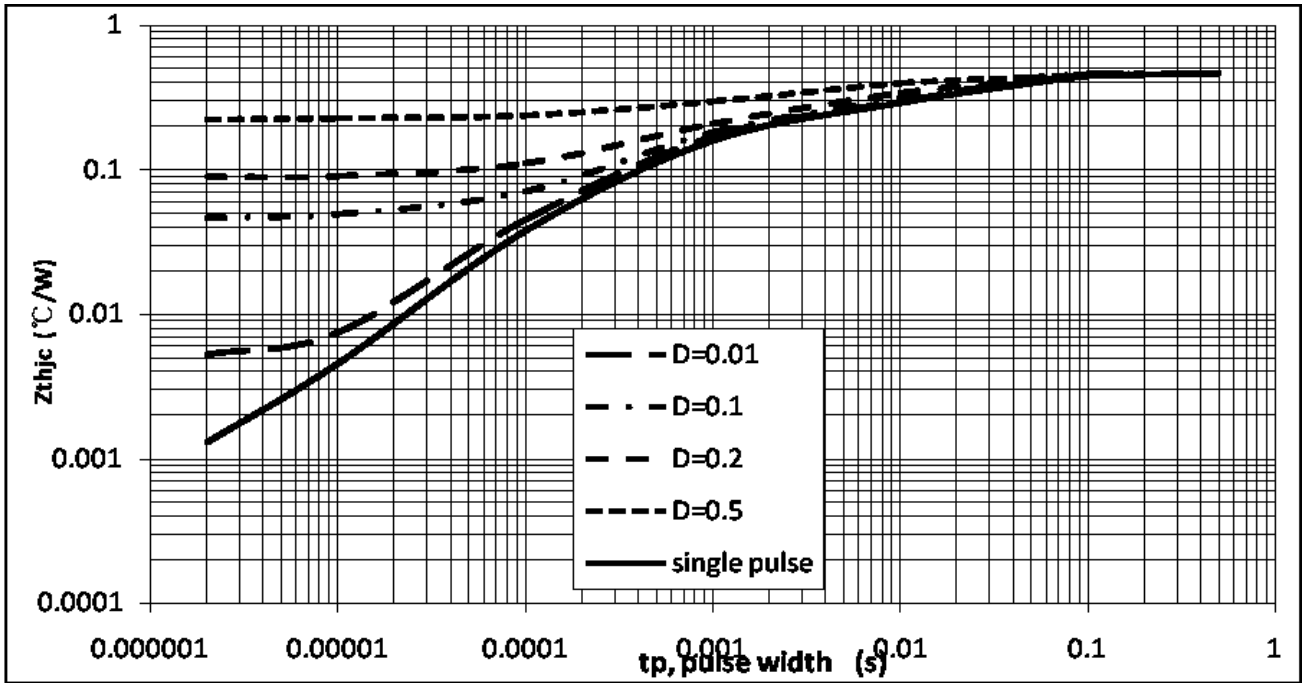
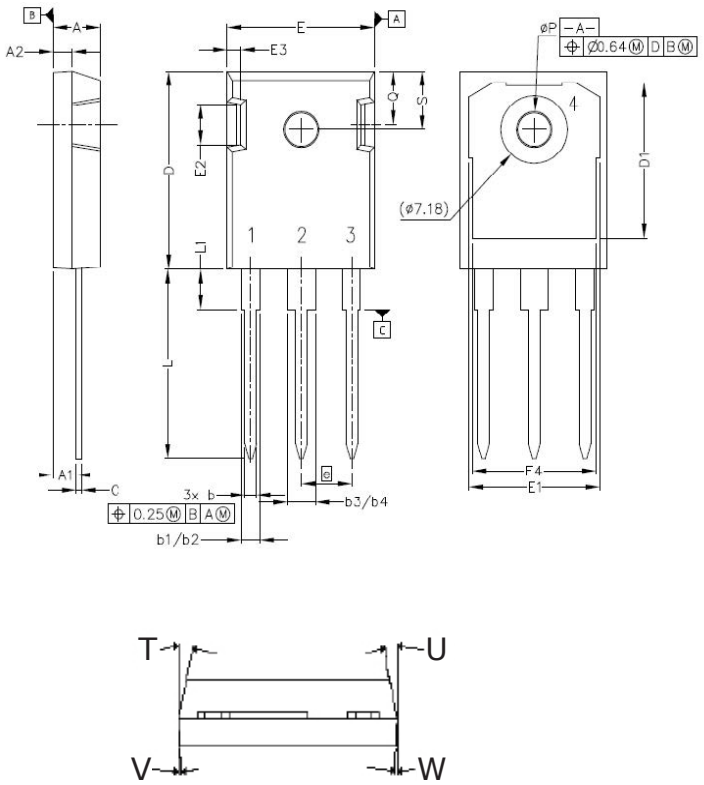


Fig 19. Normalized transient trermal impedance,junction-to-case
Note1.Duty factor D=t1/t2; Note2:peak TJ=PDM×Zthjc+TC



Package Dimensions



POS	Inches		Millimeters	
	Min	Max	Min	Max
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.042	.052	1.07	1.33
b1	.075	.095	1.91	2.41
b2	.075	.085	1.91	2.16
b3	.113	.133	2.87	3.38
b4	.113	.123	2.87	3.13
c	.022	.027	0.55	0.68
D	.819	.831	20.80	21.10
D1	.640	.695	16.25	17.65
D2	.037	.049	0.95	1.25
E	.620	.635	15.75	16.13
E1	.516	.557	13.10	14.15
E2	.145	.201	3.68	5.10
E3	.039	.075	1.00	1.90
E4	.487	.529	12.38	13.43
e	.214 BSC		5.44 BSC	
N	3		3	
L	.780	.800	19.81	20.32
L1	.161	.173	4.10	4.40
ØP	.138	.144	3.51	3.65
Q	.216	.236	5.49	6.00
S	.238	.248	6.04	6.30
T	9°	11°	9°	11°
U	9°	11°	9°	11°
V	2°	8°	2°	8°
W	2°	8°	2°	8°

Ordering information

Order code	Package	Packaging option	Base quantity	Packaging specification
CXG25N120H	TO-247	Tube/BOX	2250pcs / BOX	EIA STD RS-481

Revision history

Date	Revision	Changes
28-May-2020	1.0	Initial release

CAUTION / WARNING

Information in this document is believed to be accurate and reliable. However, RDSEMI does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Users should independently evaluate the suitability of and test each product selected for their own applications, and RDSEMI assumes no liability what's ever relating to the choice, selection or use of the RDSEMI products and services described herein.

RDSEMI reserves the right to change or update, without notice, any information contained in this publication; to change, without notice, the design, construction, processing, or specification of any product; and to discontinue or limit production or distribution of any product.

Information in this document supersedes and replaces all information previously supplied.

Products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an RDSEMI product can reasonably be expected to result in personal injury, death or severe property or environmental damage. RDSEMI accepts no liability for inclusion and/or use of RDSEMI products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from national authorities.

Resale of RDSEMI products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by RDSEMI for the RDSEMI product or service described herein and shall not create or extend in any manner whatsoever, any liability of RDSEMI.

RDSEMI expressly disclaims all implied warranties regarding the information contained herein, including, but not limited to, any implied warranties of merchantability or fitness for a particular purpose. RDSEMI only obligations are those in the RDSEMI Standard Terms and Conditions of Sale and in no case will RDSEMI be liable for any incidental, indirect, or consequential damages arising from the sale, resale, use, or misuse of its products.

Specifications are subject to change without notice