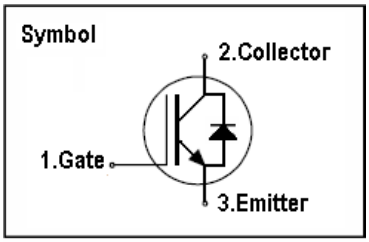
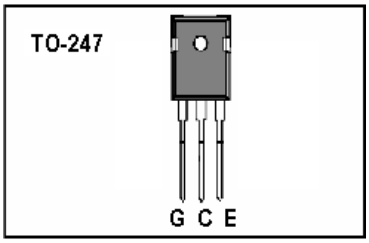
SL25N60FL

600V, 25A, Trench NPT IGBT





Features

- 600V,25A
- $V_{CE(sat)(typ.)}$=1.9V@V_{GE}=15V,I_C=25A
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA using NPT technology

Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	600	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current (T_C=25 ℃)	45	A
	Continuous Collector Current (T_C=100℃)	25	A
I_{CM}	Pulsed Collector Current (Note 1)	80	A
I_F	Diode Continuous Forward Current (T_C=100 ℃)	20	A
I_{FM}	Diode Maximum Forward Current (Note 1)	40	A
t_{sc}	Short Circuit Withstand Time	10	us
P_D	Maximum Power Dissipation (T_C=25 ℃)	200	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	0.63	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	1.5	℃/ W
$R_{th\ j\text{-}a}$	Thermal Resistance, Junction to Ambient	40	℃/ W

Electrical Characteristics (T_C=25℃ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	V_{GE}= 0V, I_C= 250uA	600	-	-	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	3.5	-	5.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C= 25A	-	1.9		V
Qg	Total Gate Charge	V_{CC}=480V V_{GE}=15V I_C=25A	-	90		nC
Qge	Gate-Emitter Charge		-	36		nC
Qgc	Gate-Collector Charge		-	26		nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=300V V_{GE}=15V I_C=25A R_G=28Ω Inductive Load T_C=25 ℃	-	47	-	ns
t_r	Turn-on Rise Time		-	51	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	97	-	ns
t_f	Turn-off Fall Time		-	260	-	ns
Eon	Turn-on Switching Loss		-	0.47	-	mJ
Eoff	Turn-off Switching Loss		-	0.41	-	mJ
Ets	Total Switching Loss		-	0.88	-	mJ
Cies	Input Capacitance	V_{CE}=25V V_{GE}=0V f = 100kHz	-	1250	-	pF
Coes	Output Capacitance		-	150	-	pF
Cres	Reverse Transfer Capacitance		-	45	-	pF
R_{Gint}	Integrated gate resistor			39		Ω

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	I_F=20A	-	1.5	2.0	V
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 300V I_F= 20A dI_F/dt = 200A/us	-	65		ns
I_{rr}	Diode peak Reverse Recovery Current		-	6		A
Q_{rr}	Diode Reverse Recovery Charge		-	200		nC

Notes：

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

Typical Performance Characteristics

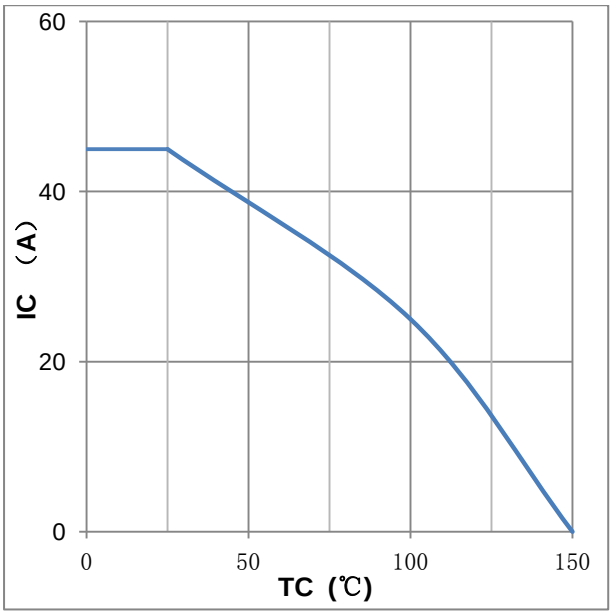


Figure1:maximum DC collector current VS. case temprature

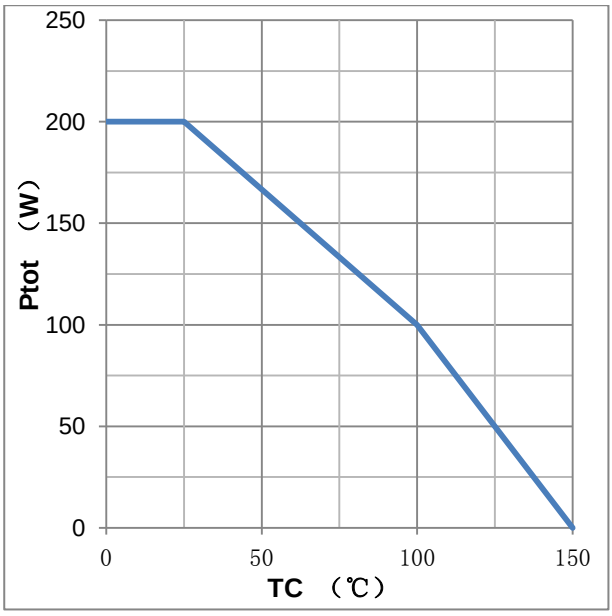


Figure2:power dissipation VS. case temprature

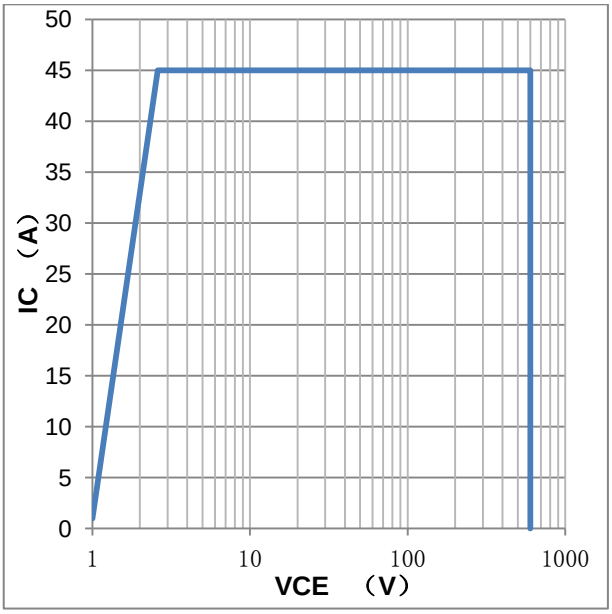


Figure3:reverse bias SOA,TJ=150℃,VGE=15V

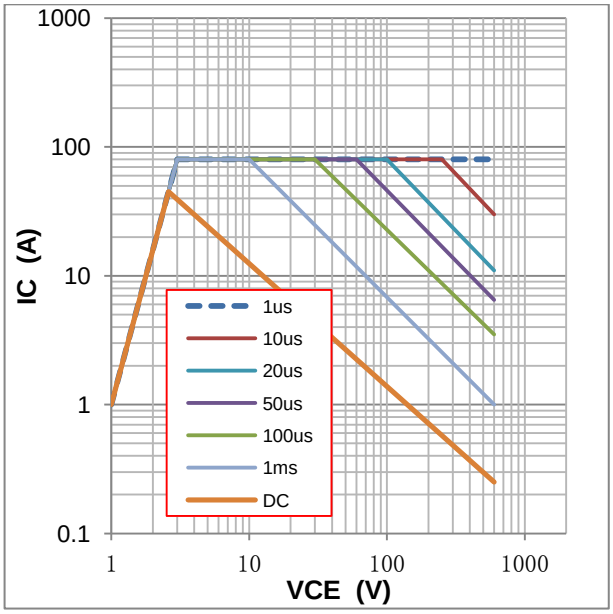


Figure4:forward SOA,TC=25℃,TJ≤150℃

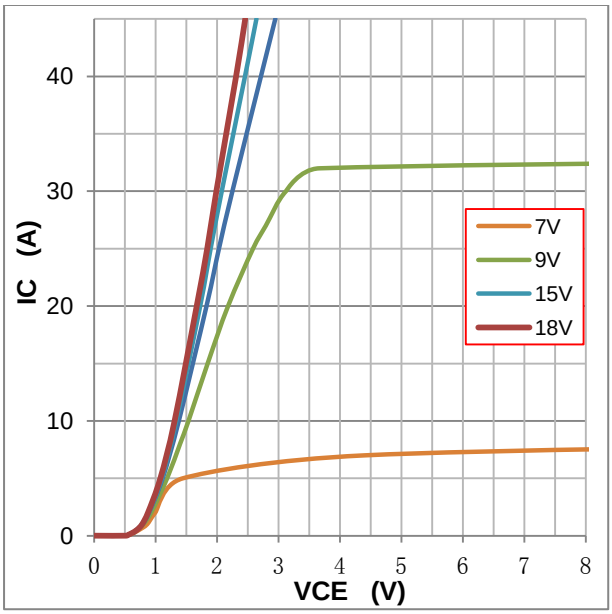


Figure5:typical IGBT output characteristics, TJ=25℃;tp=300us

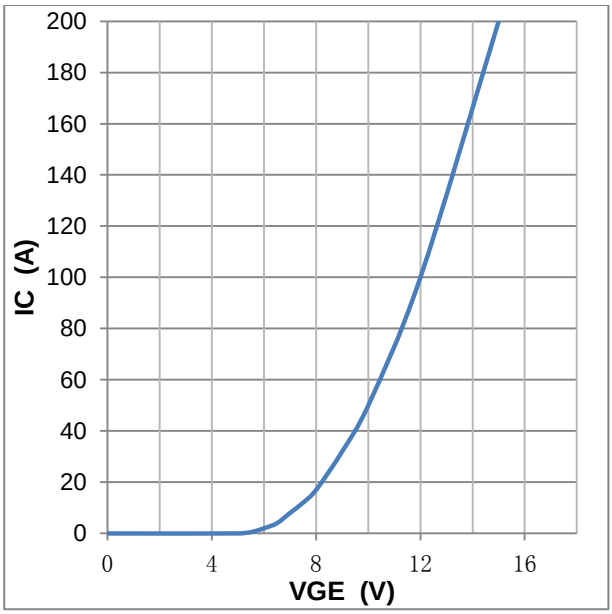


Figure6:typical trans characteristics,VCE=20V,tp=20us

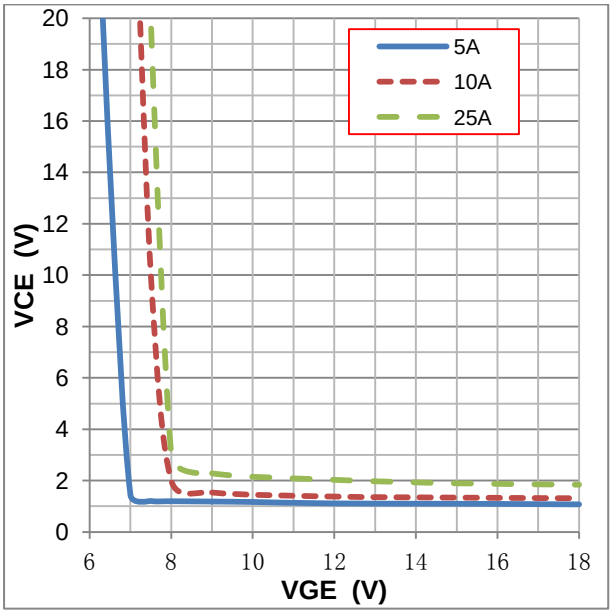


Figure7: typical VCE VS. VGE,TJ=25℃

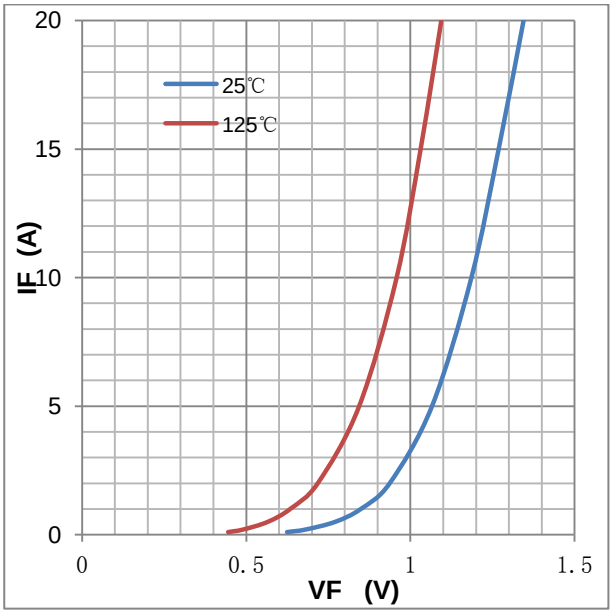


Figure8:typical diode forward characteristic,tp=300us

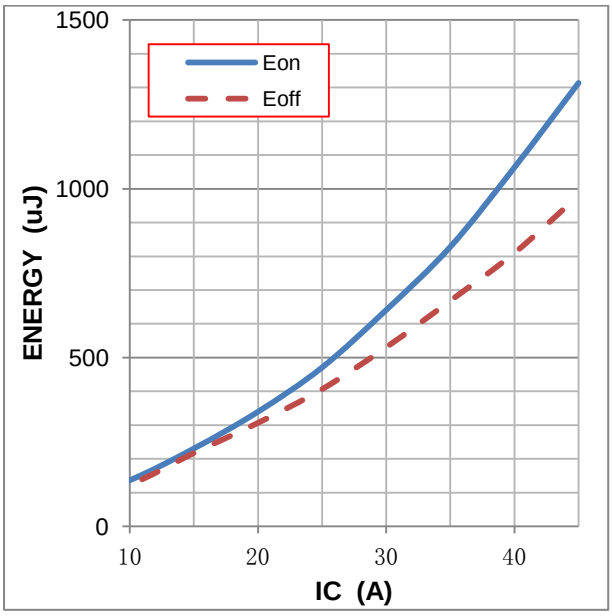


Figure9: typical energy loss VS. IC, TC=25℃,

L=500uH, VCE=300V,VGE=15V,Rg=28Ω,

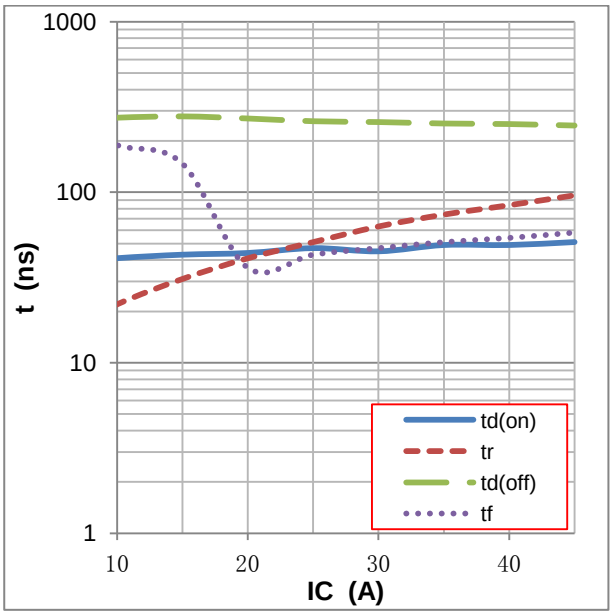


Figure10: typical switching time VS. IC, TC=25℃,

L=500uH, VCE=300V,VGE=15V,Rg=28Ω,

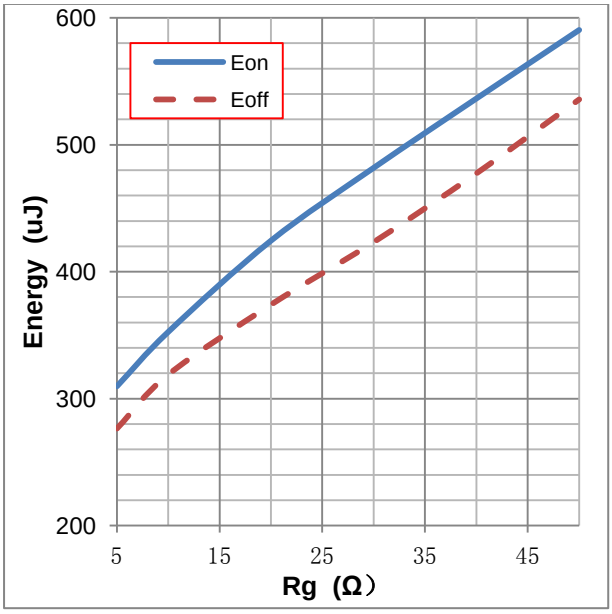


Figure11: typical energy loss VS. Rg,TC=25℃,

L=500uH, VCE=300V, VGE=15V,IC=25A

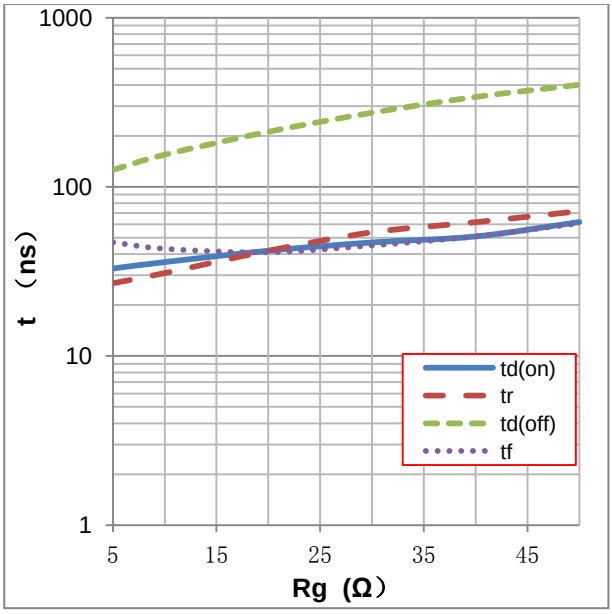


Figure12: typical switching time VS. Rg,TC=25℃,

L=500uH,VCE=300V,VGE=15V,IC=25A

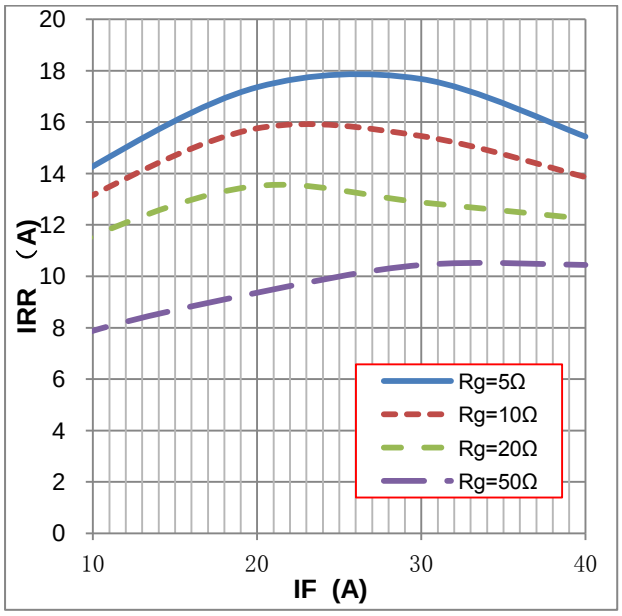


Figure13: typical diode IRR VS. IF, TC=25℃

VCC=300V, VGE=15V

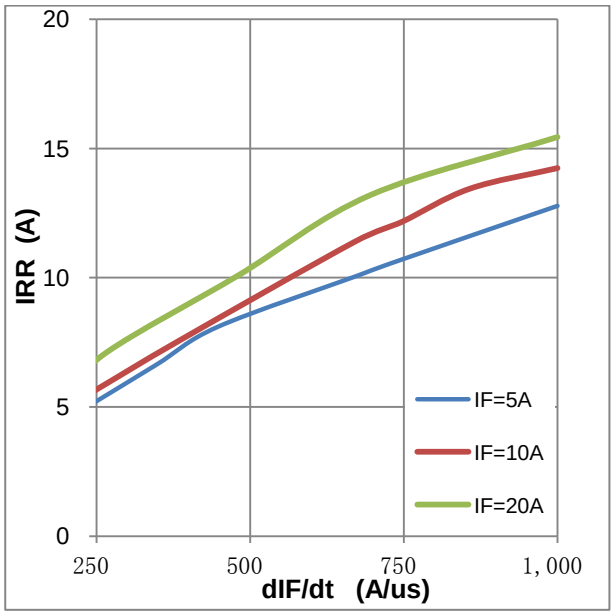


Figure14:typical diode IRR VS. dIF/dt

VCC=300V,VGE=15V

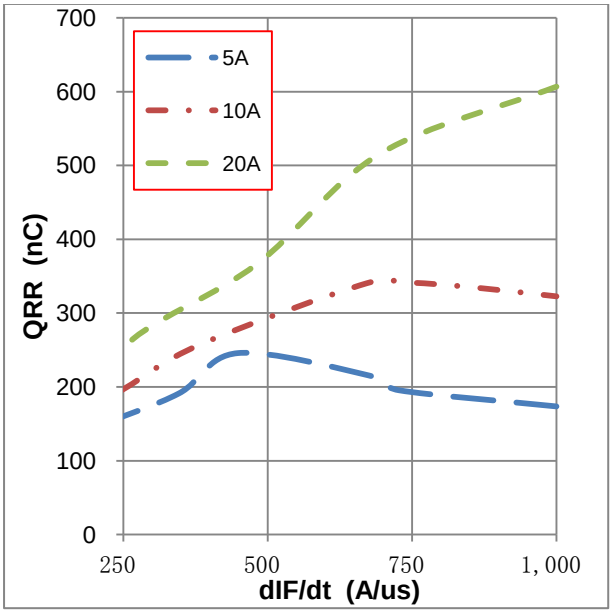


Figure15:typical diode QRR VS. dIF/dt

VCC=300V,VGE=15V

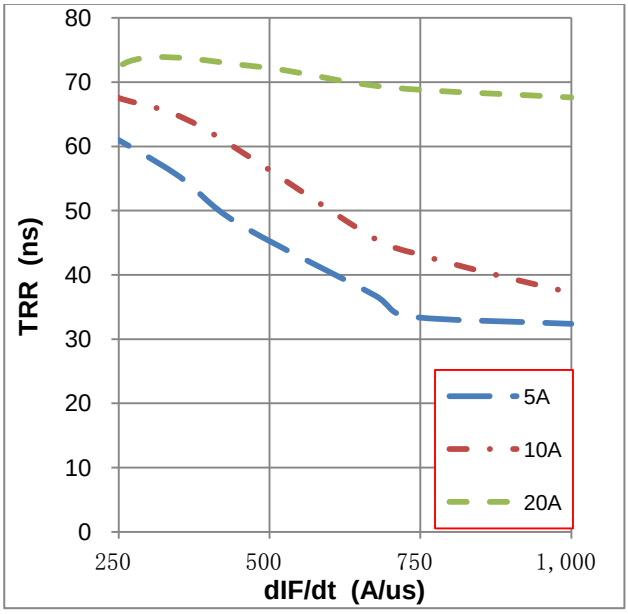


Figure16:typical diode TRR VS. dIF/dt,

VCC=300V,VGE=15V

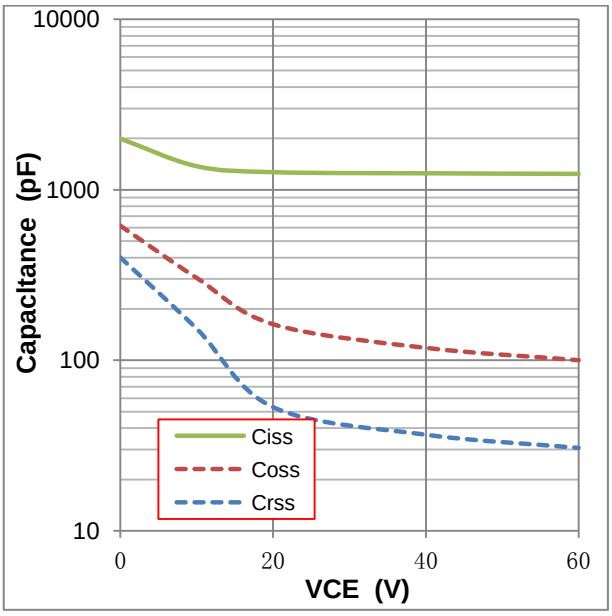


Figure17:typical capacitance VS. VCE,VGE=0V,f=100kHz

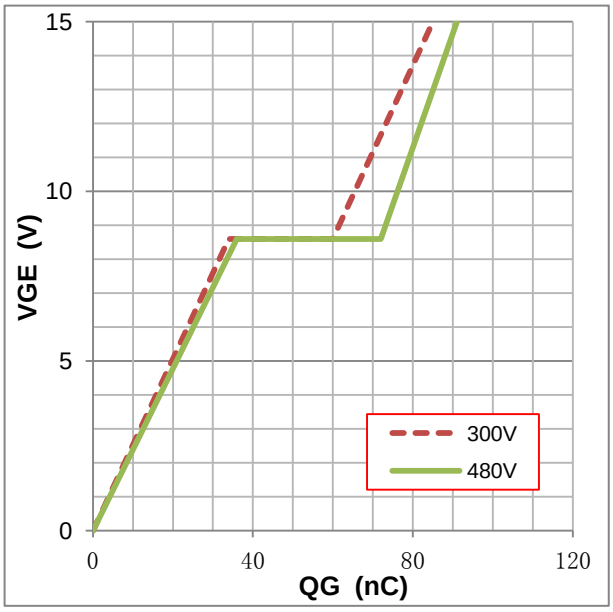


Figure18:typical gate charge VS. VGE,IC=25A

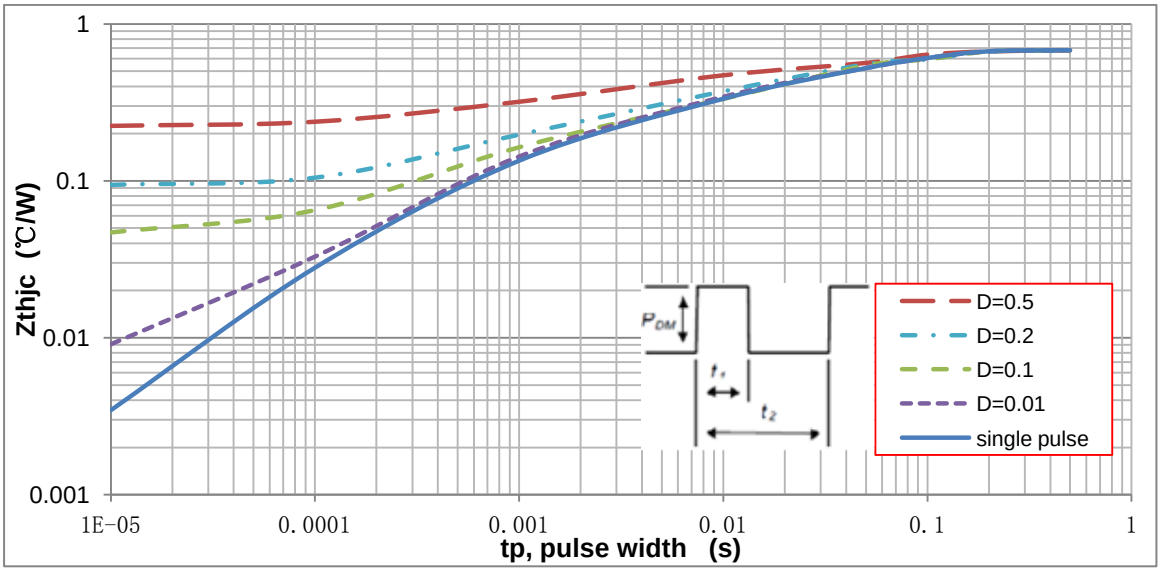
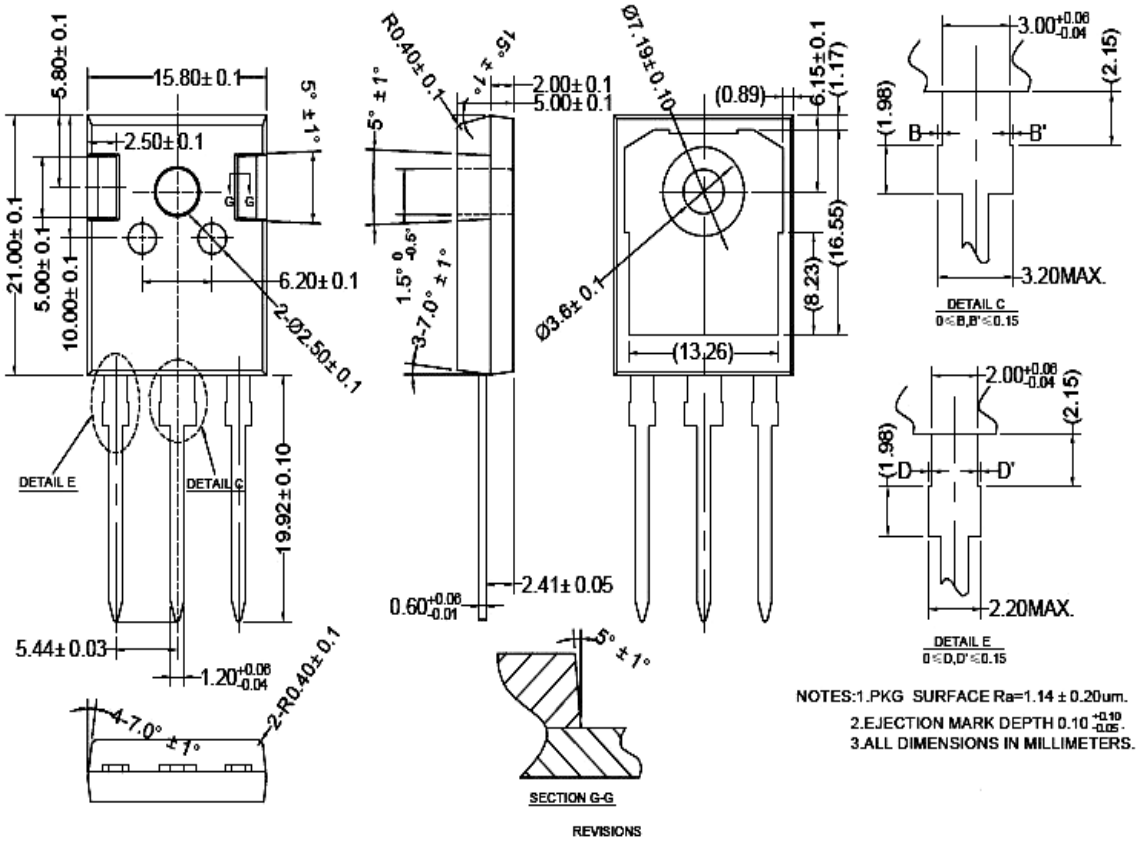


Figure19:normalized transient thermal impedance, junction-to-case

Note1.Duty factor D=t1/t2; Note2:peak TJ=PDM×Zthjc+TC

TO247 PACKAGE OUTLINE



公差标注	公差值	表面粗糙度
0	±0.2	Ra3.2~6.3
0.0	±0.1	Ra1.6~3.2
0.00	±0.01	Ra0.8~1.6
0.000	±0.005	Ra0.4~0.8
0.0000	±0.002	Ra0.2~0.4

0≤D,D'≤0.15

NOTES:1.PKG SURFACE Ra=1.14 ± 0.20um.
2.EJECTION MARK DEPTH 0.10 +0.10 -0.05.
3.ALL DIMENSIONS IN MILLIMETERS.