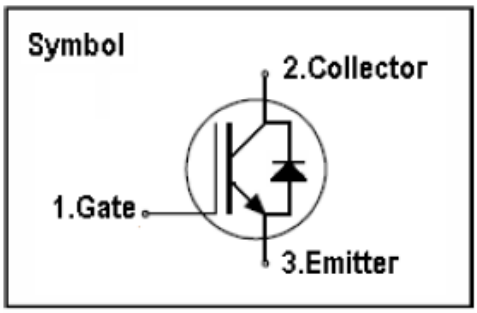
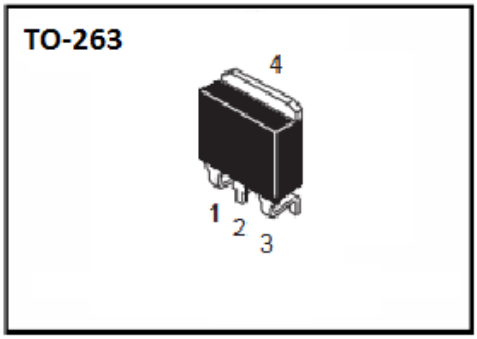
IGBT

Features

- 600V 15A
- $V_{CE(sat)(typ.)}$=2.1V@V_{GE}=15V,I_C=15A
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms





General Description

KEDA NPT IGBTs offer lower losses and higher energy efficiency for motor control and others soft switching applications.

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 ℃)	30	A
	Continuous Collector Current (T_C=100℃)	15	A
I_{CM}	Pulsed Collector Current (Note 1)	45	A
I_F	Diode Continuous Forward Current (T_C=100 ℃)	15	A
I_{FM}	Diode Maximum Forward Current (Note 1)	45	A
P_D	Maximum Power Dissipation (T_C=25 ℃)	114	W
	Maximum Power Dissipation (T_C=100℃)	50	W
T_J	Operating Junction Temperature Range	-35 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	1.1	℃/ W
$R_{th\ j\text{-}c}$	Thermal Resistance, Junction to case for Diode	1.6	℃/ 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}= 600V, V_{GE}= 0V	-	-	100	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	4.0	-	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	V_{GE}=15V, I_C= 15A	-	2.1	2.5	V
Qg	Total Gate Charge	V_{CC}=480V V_{GE}=15V I_C=15A	-	55		nC
Qge	Gate-Emitter Charge		-	23		nC
Qgc	Gate-Collector Charge		-	16		nC
$t_{d(on)}$	Turn-on Delay Time	V_{CC}=400V V_{GE}=15V I_C=15A R_G=20Ω Inductive Load 500uH T_C=25 ℃	-	25	-	ns
t_r	Turn-on Rise Time		-	24	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	128	-	ns
t_f	Turn-off Fall Time		-	45	-	ns
Eon	Turn-on Switching Loss		-	0.38	-	mJ
Eoff	Turn-off Switching Loss		-	0.23	-	mJ
Ets	Total Switching Loss		-	0.61	-	mJ
C_{ies}	Input Capacitance	V_{CE}=25V V_{GE}=0V f = 100kHz	-	605	-	pF
C_{oes}	Output Capacitance		-	87	-	pF
C_{res}	Reverse Transfer Capacitance		-	28	-	pF

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=15A	-	1.35	2.3	V
t_{rr}	Diode Reverse Recovery Time	V_{CE} = 300V I_F= 15A dI_F/dt = 500A/us	-	85		ns
I_{rr}	Diode peak Reverse Recovery Current		-	16		A
Q_{rr}	Diode Reverse Recovery Charge		-	648		nC

Notes：

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

Typical Performance Characteristics

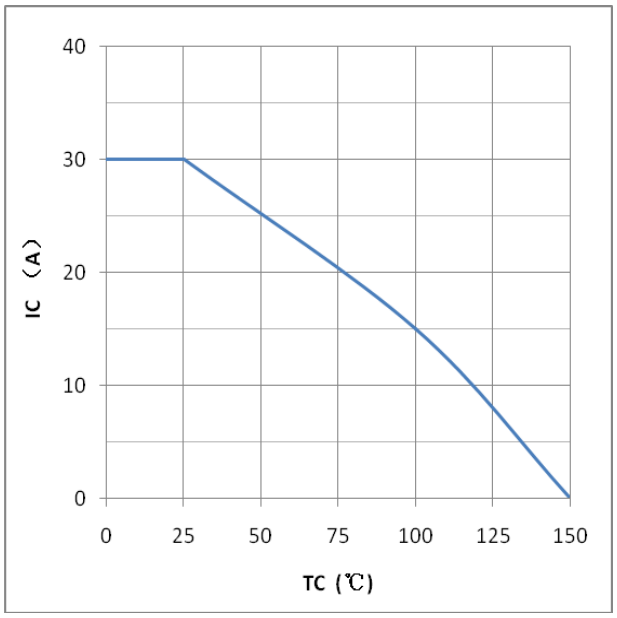


Figure1:maximum DC collector current VS. case temprature

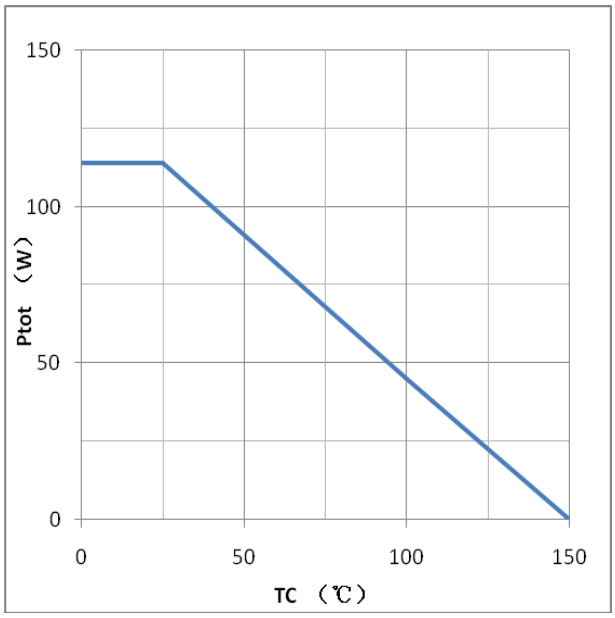


Figure2:power dissipation VS. case temprature

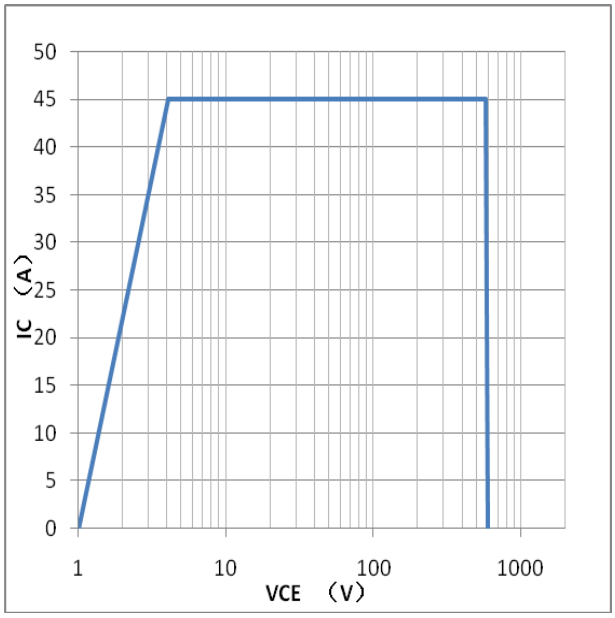


Figure3:reverse bias SOA,TJ=150℃,VGE=15V

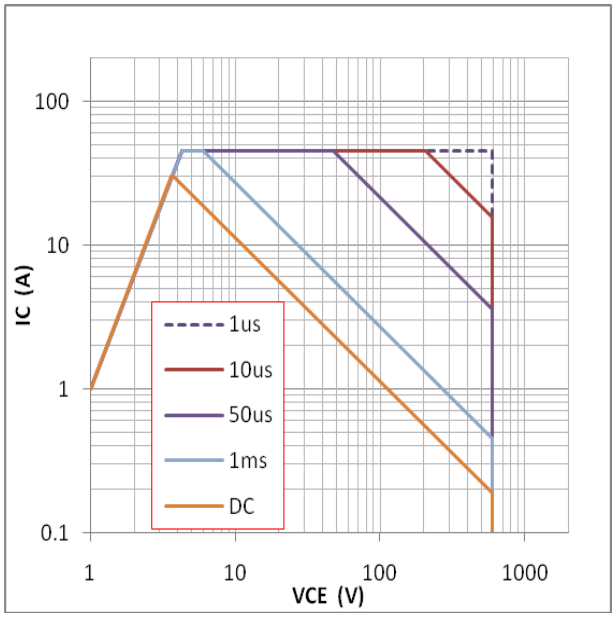


Figure4:forward SOA,TC=25℃,TJ≤150℃

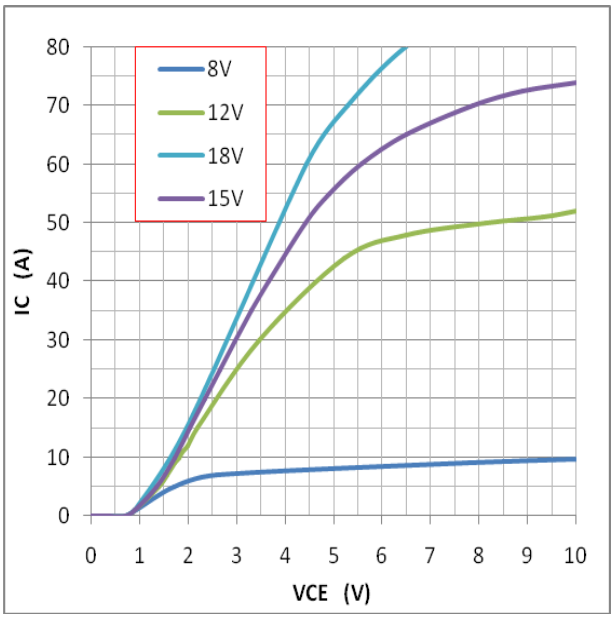


Figure5: typical IGBT output characteristics, TJ=25℃;tp=300us

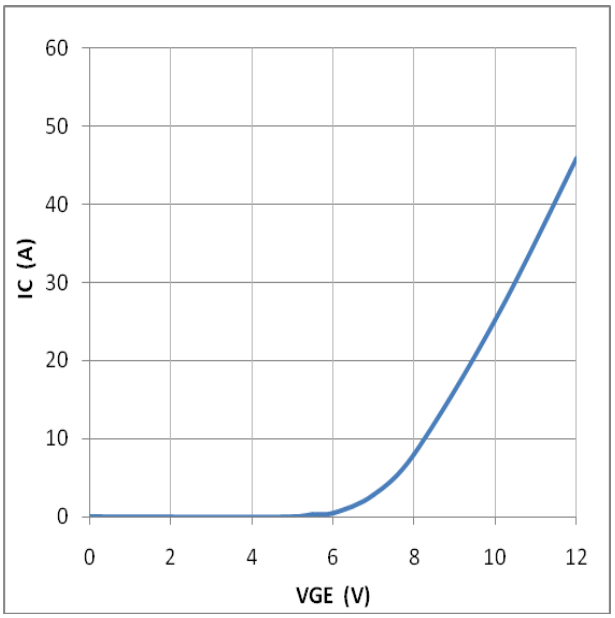


Figure6:typical trans characteristics,VCE=20V,tp=20us

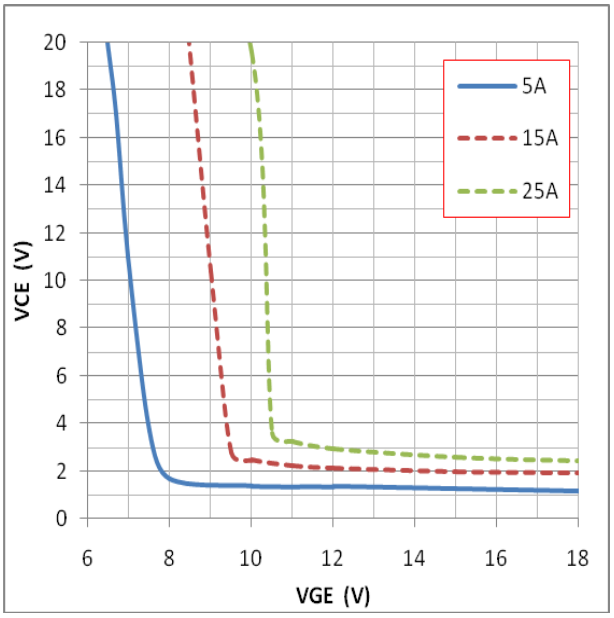


Figure7: typical VCE VS. VGE,TJ=25℃

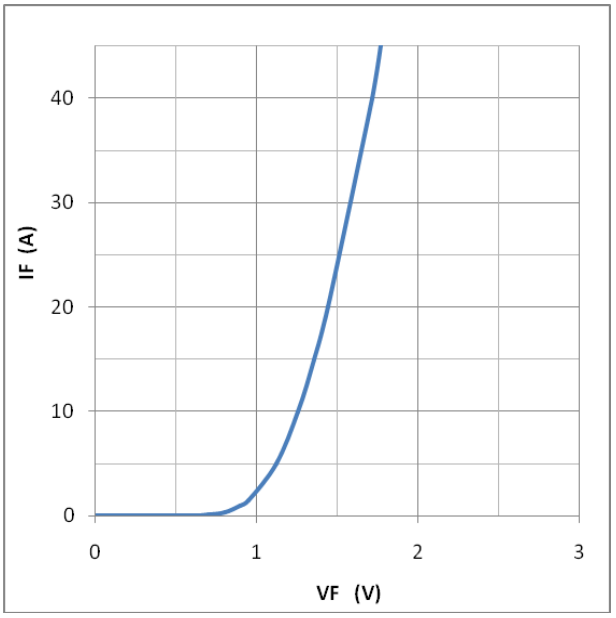


Figure8:typical diode forward characteristic, TJ=25℃,tp=300us

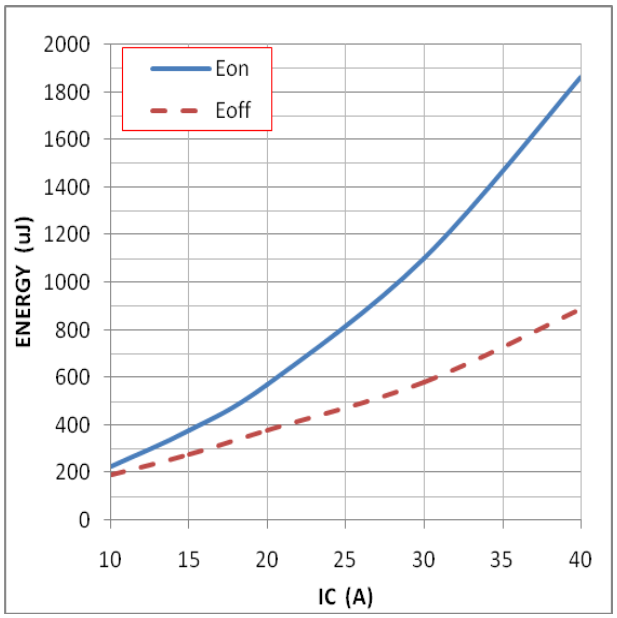


Figure9: typical energy loss VS. IC, TC=25℃,

L=500uH, VCE=400V,VGE=15V,Rg=20Ω

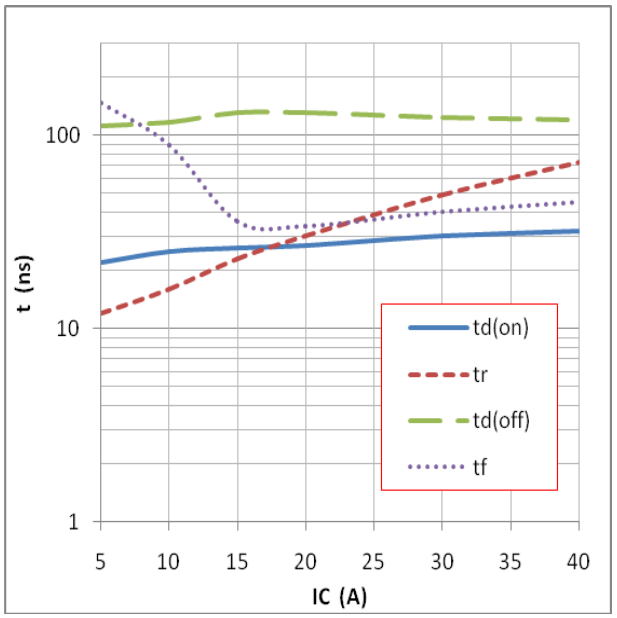


Figure10: typical switching time VS. IC, TC=25℃,

L=500uH, VCE=400V,VGE=15V,Rg=20Ω

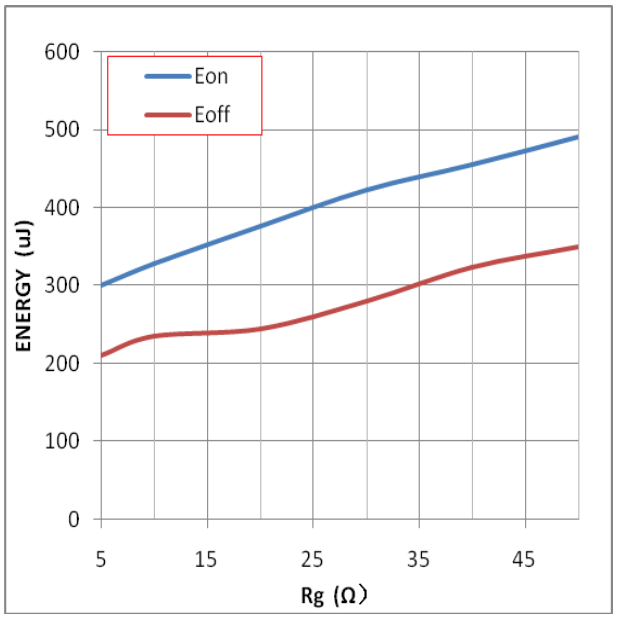


Figure11: typical energy loss VS. Rg,TC=25℃,

L=500uH, VCE=400V, VGE=15V,IC=15A

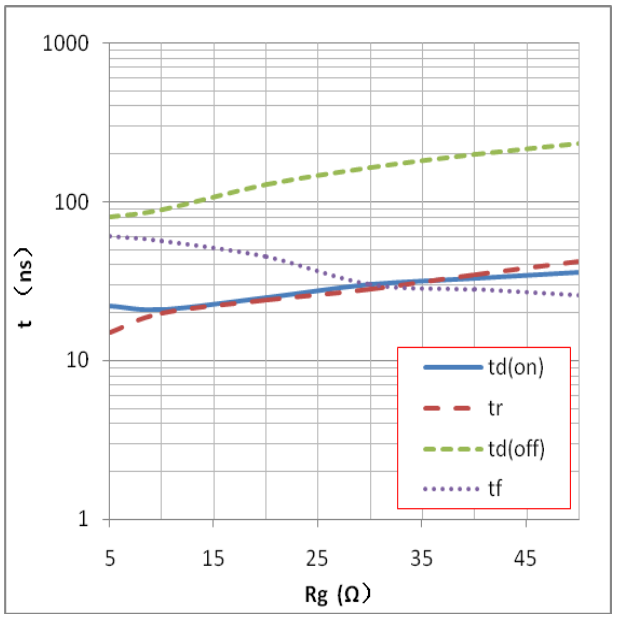


Figure12: typical switching time VS. Rg,TC=25℃,

L=500uH,VCE=400V,VGE=15V,IC=15A

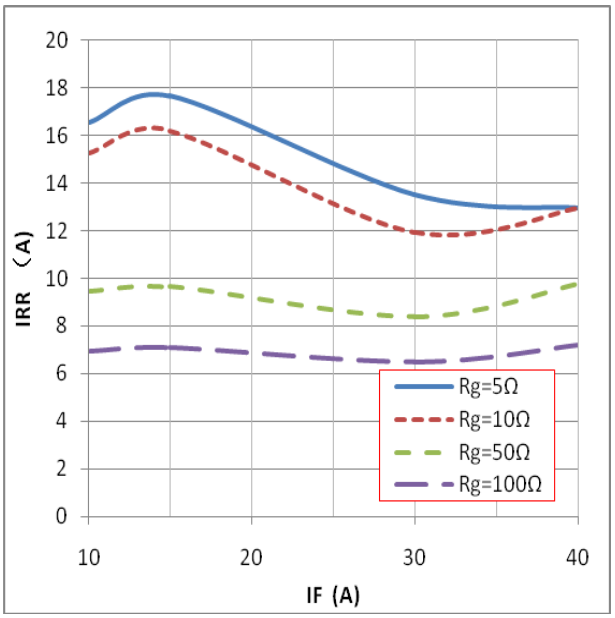


Figure13: typical diode IRR VS. IF, TC=25℃

VCC=300V, VGE=15V

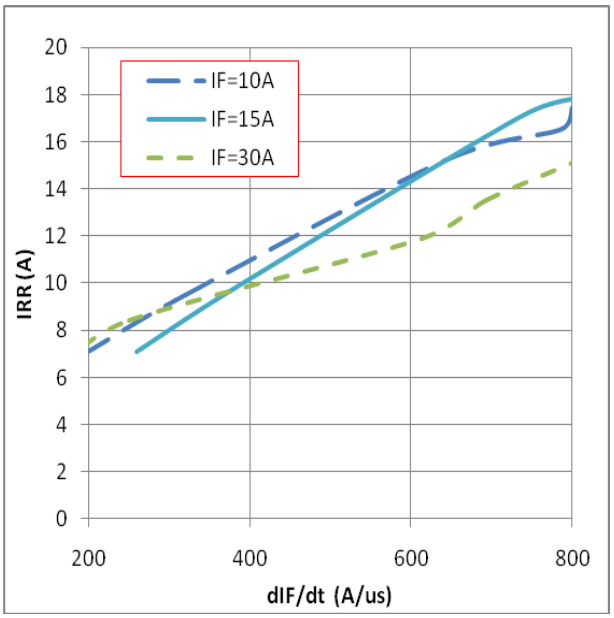


Figure14:typical diode IRR VS. dIF/dt

VCC=300V,VGE=15V

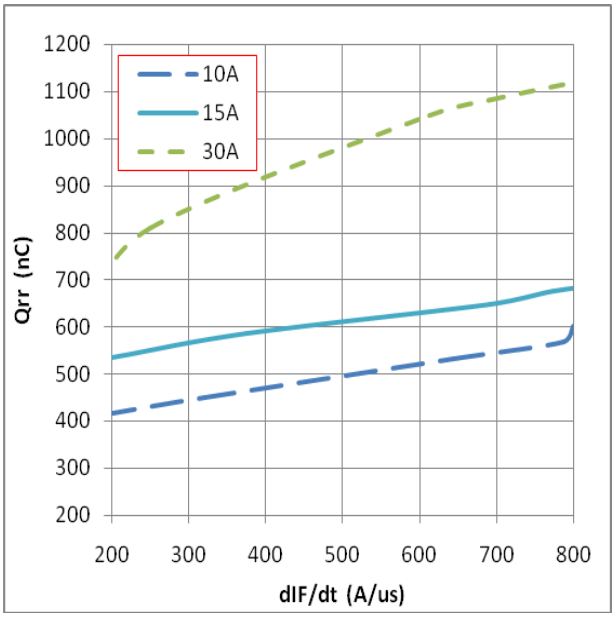


Figure15:typical diode QRR VS. dIF/dt

VCC=300V,VGE=15V

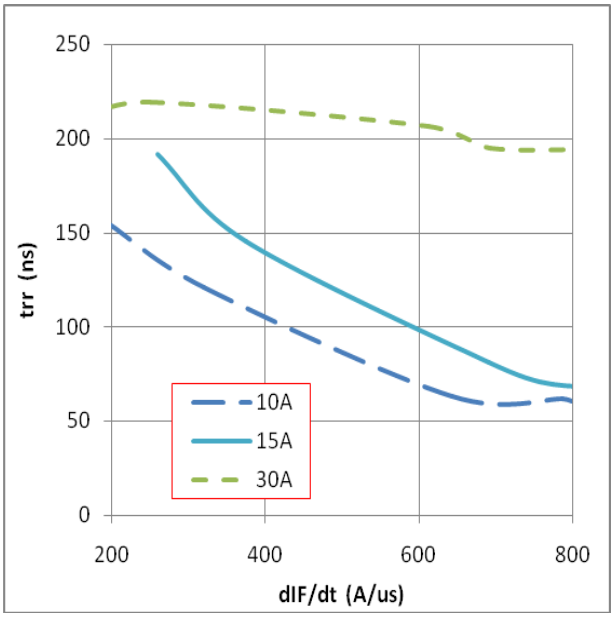


Figure16:typical diode TRR VS. dIF/dt,

VCC=300V,VGE=15V

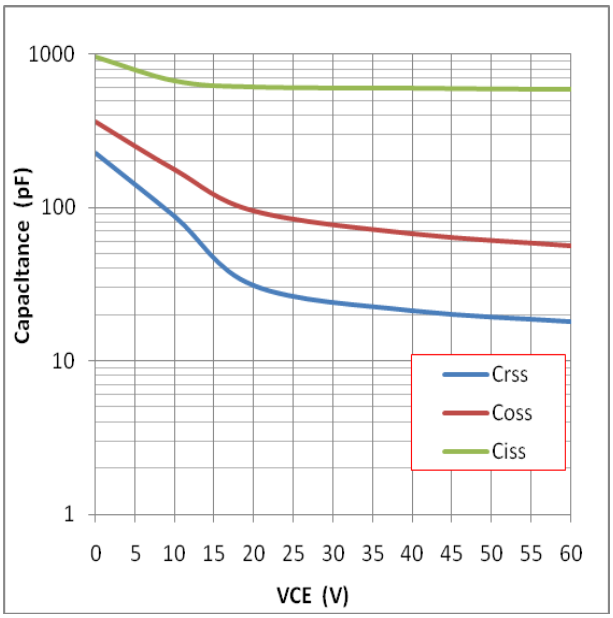


Figure17:typical capacitance VS. VCE,VGE=0V,f=100kHz

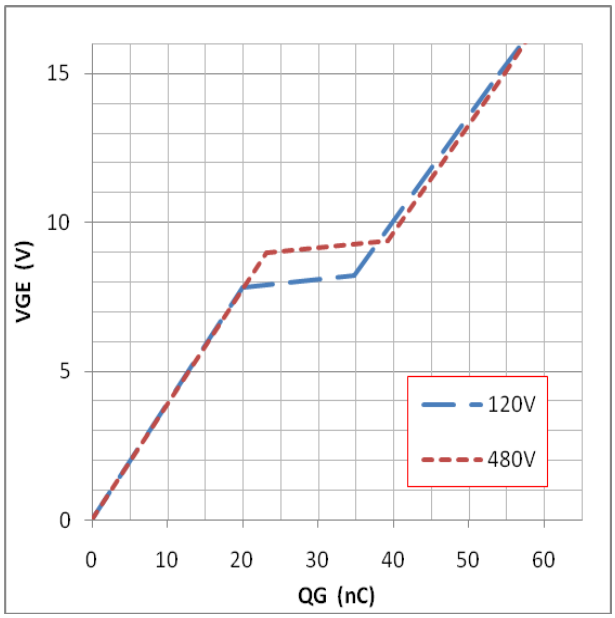


Figure18:typical gate charge VS. VGE,IC=15A

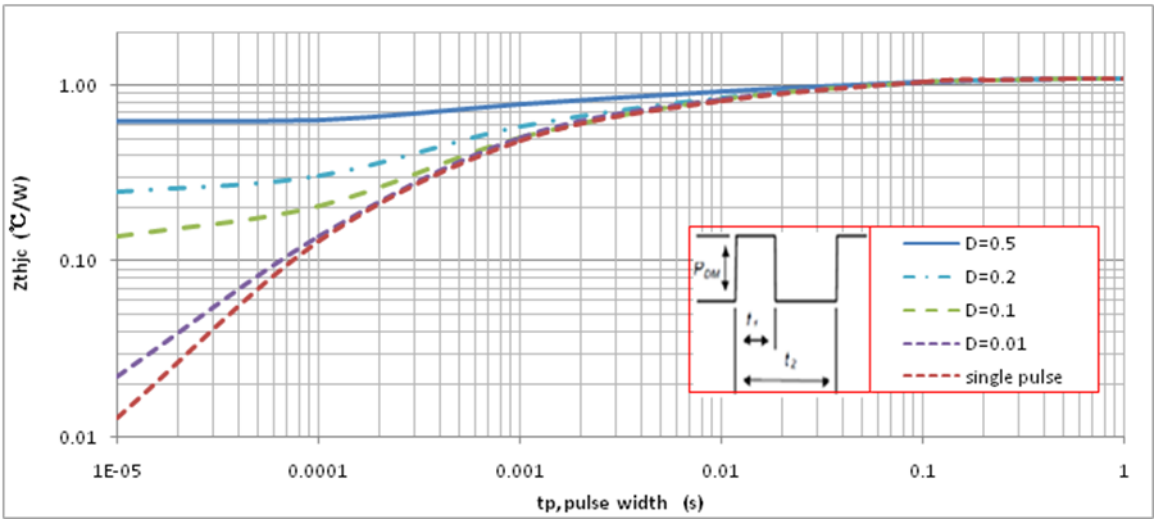


Figure19:normalized transient thermal impedance, junction-to-case

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

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