

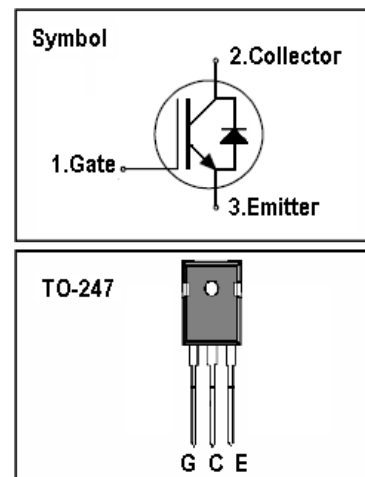
IGBT

Features

- 1200V,30A, $V_{CE(sat)(typ.)}=2.1V@V_{GE}=15V$
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA

General Description

H&M IGBTs offer lower losses and higher energy efficiency for application such as Motor driver, UPS, General inverter and other soft switching applications.



Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{CES}	Collector-Emitter Voltage	1200	V
V_{GES}	Gate-Emitter Voltage	± 30	V
I_C	Continuous Collector Current ($T_C=25^{\circ}C$)	55	A
	Continuous Collector Current ($T_C=100^{\circ}C$)	28	A
I_{CM}	Pulsed Collector Current (Note 1)	240	A
I_F	Diode Continuous Forward Current ($T_C=100^{\circ}C$)	25	A
I_{FM}	Diode Maximum Forward Current (Note 1)	240	A
P_D	Maximum Power Dissipation ($T_C=25^{\circ}C$)	300	W
	Maximum Power Dissipation ($T_C=100^{\circ}C$)	120	W
TSC	Short circuit withstand time	10	us
T_J	Operating Junction Temperature Range	-55 to +150	$^{\circ}C$
T_{STG}	Storage Temperature Range	-55 to +150	$^{\circ}C$

Thermal Characteristics

Symbol	Parameter	Max.	Units
R_{thj-c}	Thermal Resistance, Junction to case for IGBT	0.42	$^{\circ}C / W$
R_{thj-cd}	Thermal Resistance, Junction to case for Diode	0.83	$^{\circ}C / W$
R_{thj-a}	Thermal Resistance, Junction to Ambient	40	$^{\circ}C / W$

Electrical Characteristics (T_C=25°C unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV _{CES}	Collector-Emitter Breakdown Voltage	V _{GE} = 0V, I _C = 250uA	1200	-	-	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	4.0	5.0	6.0	V
V _{CE(sat)}	Collector-Emitter Saturation Voltage	V _{GE} =15V, I _C = 30A	-	2.1	2.3	V
Q _g	Total Gate Charge	V _{CC} =960V V _{GE} =15V I _C =30A	-	178		nC
Q _{ge}	Gate-Emitter Charge		-	36		nC
Q _{gc}	Gate-Collector Charge		-	84		nC
t _{d(on)}	Turn-on Delay Time	V _{CC} =600V V _{GE} =0V/15V I _C =30A R _G =28Ω Inductive Load T _C =25 °C	-	54	-	ns
t _r	Turn-on Rise Time		-	72	-	ns
t _{d(off)}	Turn-off Delay Time		-	671	-	ns
t _f	Turn-off Fall Time		-	44	-	ns
E _{on}	Turn-on Switching Loss		-	2.9	-	mJ
E _{off}	Turn-off Switching Loss		-	2.2	-	mJ
E _{ts}	Total Switching Loss		-	5.1	-	mJ
C _{ies}	Input Capacitance	V _{CE} =30V V _{GE} =0V f = 100kHz	-	645	-	pF
C _{oes}	Output Capacitance		-	206	-	pF
C _{res}	Reverse Transfer Capacitance		-	115	-	pF
R _{Gint}	Integrated gate resistor			2.1		Ω

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V _F	Diode Forward Voltage	I _F =30A	-	2.0	2.2	V
t _{rr}	Diode Reverse Recovery Time	V _{CE} = 600V I _F = 30A dI _F /dt = 500A/us	-	197	-	ns
I _{rr}	Diode peak Reverse Recovery Current		-	20	-	A
Q _{rr}	Diode Reverse Recovery Charge		-	1923	-	nC

Notes:

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

Typical Performance Characteristics

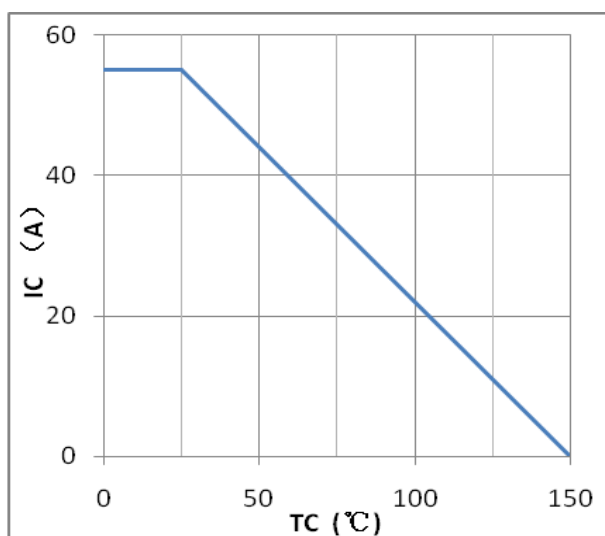


Figure1:maximum DC collector current
VS. case temperature

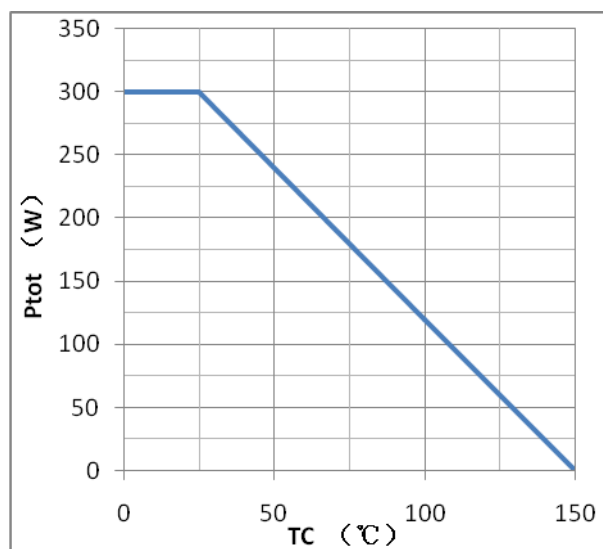


Figure2:power dissipation VS. case temperature

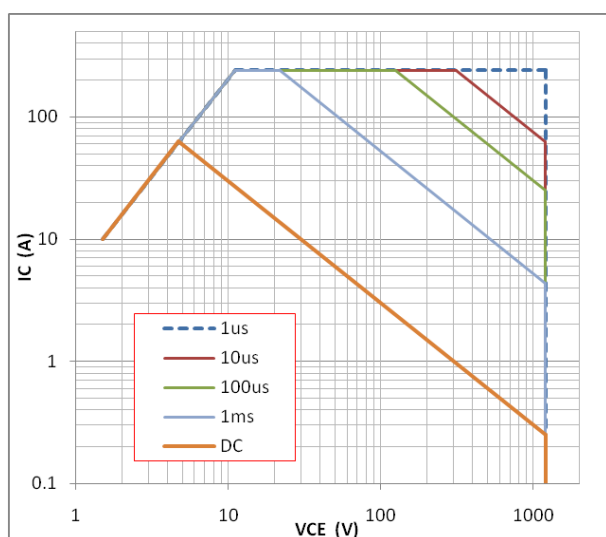


Figure3:forward SOA,TC=25°C,TJ≤150°C

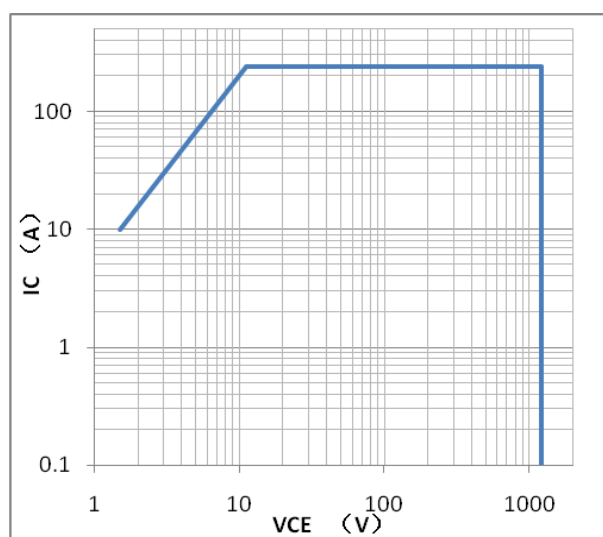


Figure4:reverse bias SOA,TJ=150°C,VGE=15V

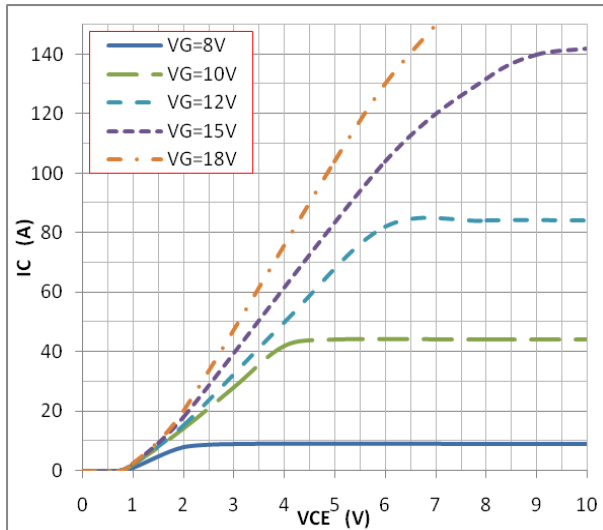


Figure5:typical IGBT output characteristics,
 $T_J=25^{\circ}\text{C}$; $t_p=300\mu\text{s}$

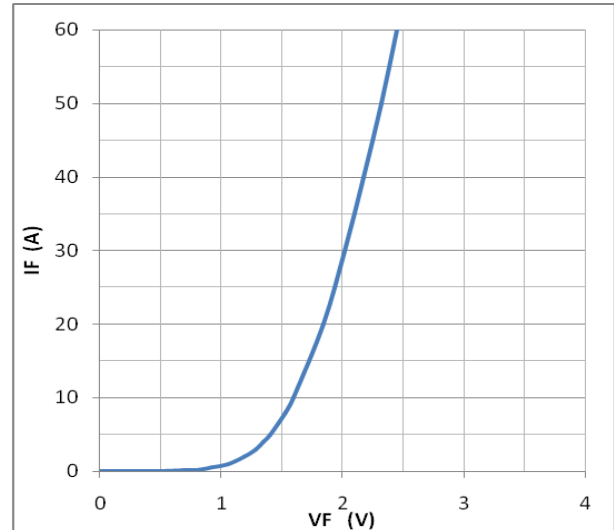


Figure6:typical trans characteristics, $V_{CE}=20\text{V}$, $t_p=20\mu\text{s}$

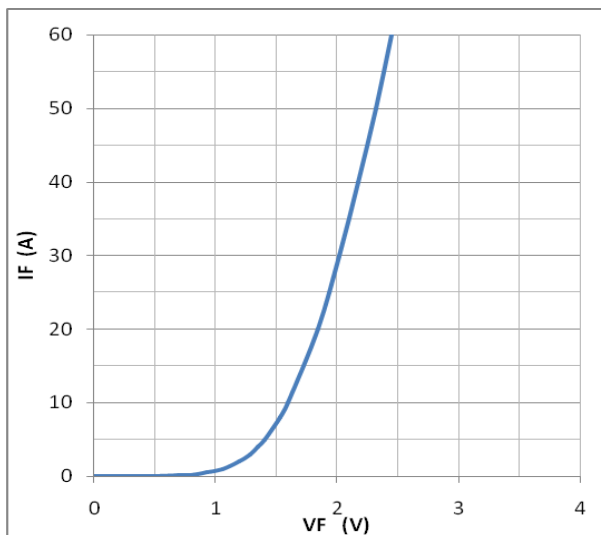


Figure7:typical diode forward characteristic, $t_p=300\mu\text{s}$

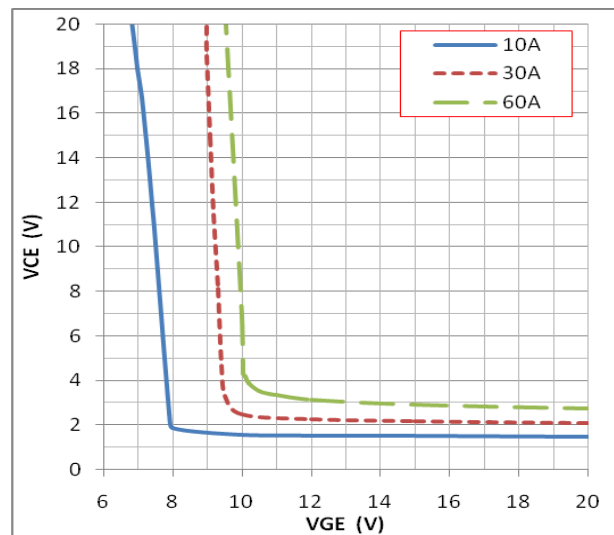


Figure8:typical V_{CE} VS. V_{GE} , $T_J=25^{\circ}\text{C}$

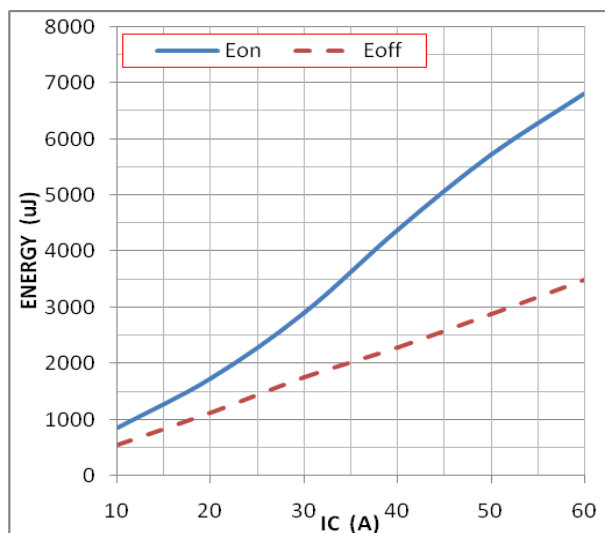


Figure 9: typical energy loss VS. IC, TC=25°C, L=500uH,

VCE=600V, VGE=15V, Rg=28Ω

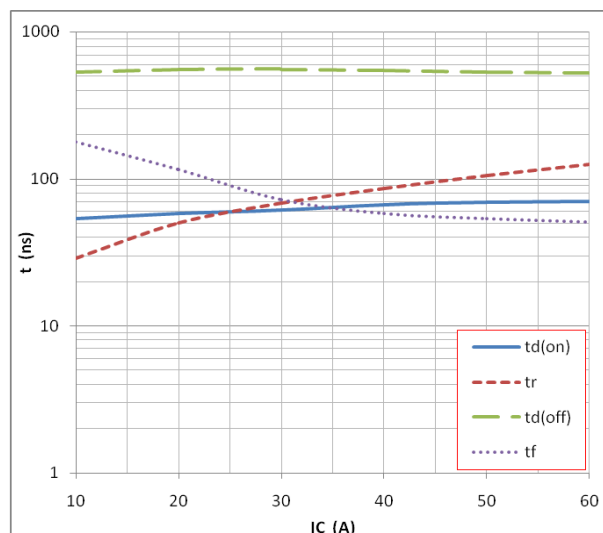


Figure 10: typical switching time VS. IC, TC=25°C,

L=500uH, VCE=600V, VGE=15V, Rg=28Ω

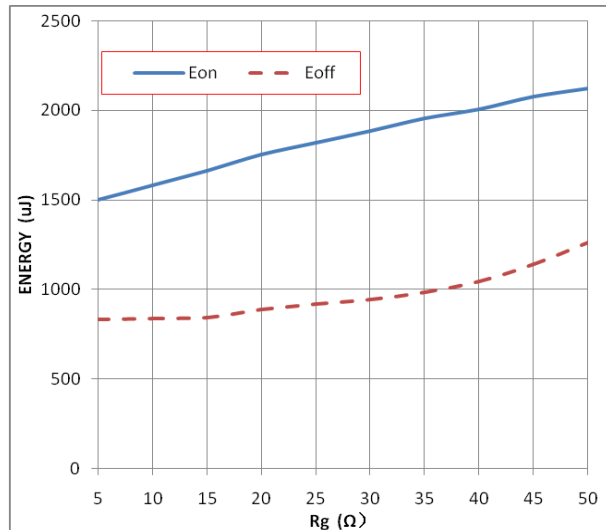


Figure 11: typical energy loss VS. Rg, TC=25°C,

L=500uH, VCE=600V, VGE=15V, IC=30A

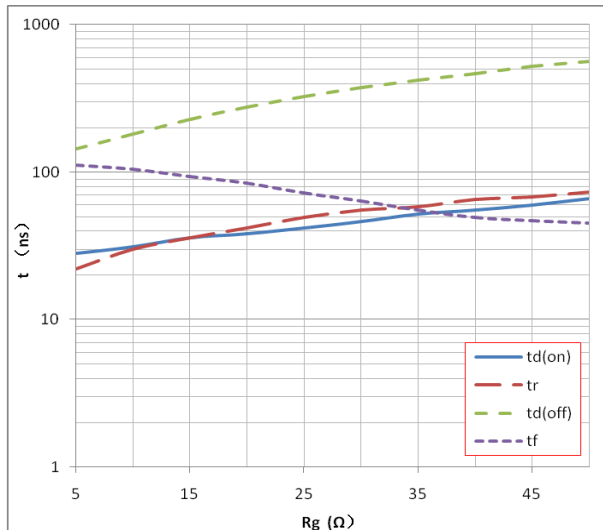


Figure 12: typical switching time VS. Rg, TC=25°C,

L=500uH, VCE=600V, VGE=15V, IC=30A

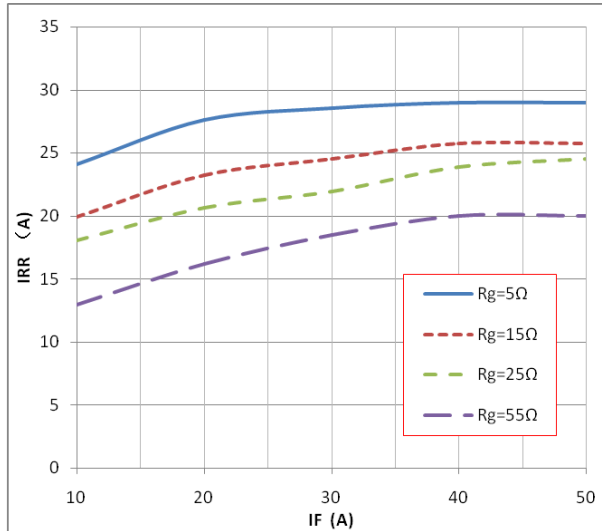


Figure13: typical diode IRR VS. IF, TC=25°C

VCC=600V,VGE=15V

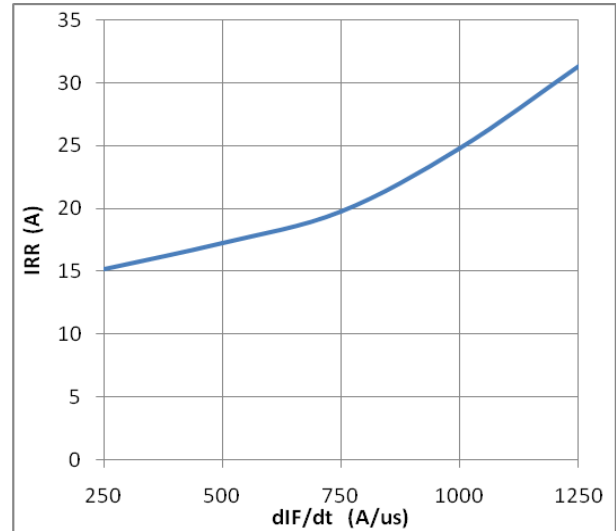


Figure14:typical diode IRR VS. dIF/dt

VCC=600V,VGE=15V,IF=30A

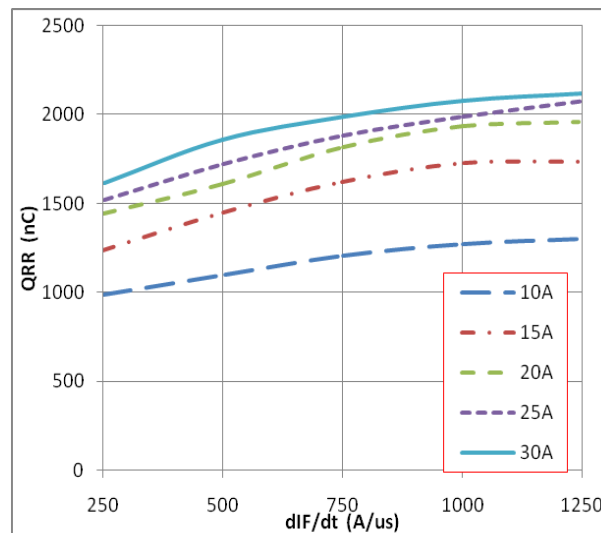


Figure15:typical diode QRR VS. dIF/dt,VCC=600V,VGE=15V

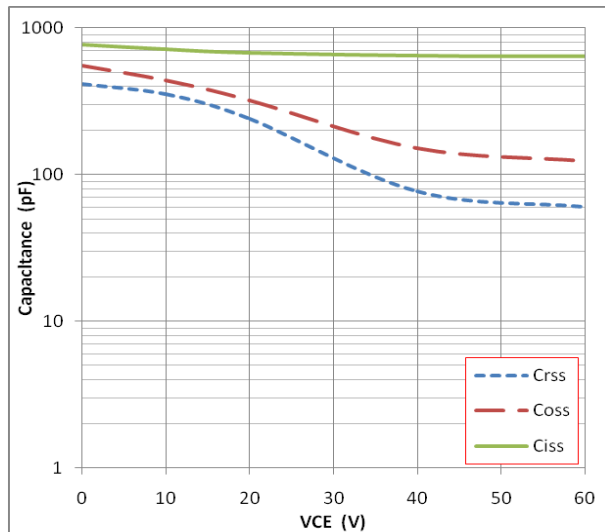


Figure16:typical capacitance VS. VCE,VGE=0V,f=100kHz

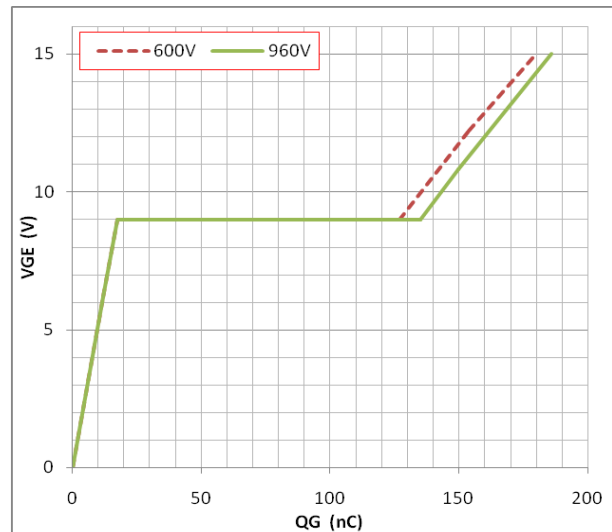


Figure17:typical gate charge VS. VGE,IC=30A

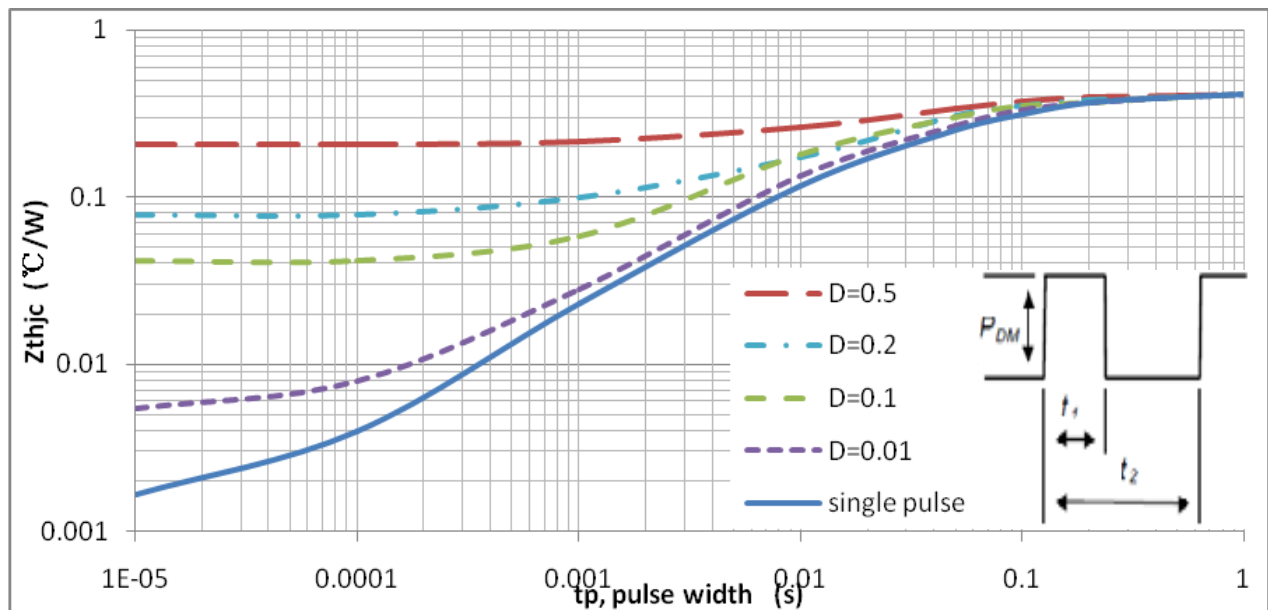


Figure18:normalised transient thermal impedance,junction-to-case

Note1.Duty factor $D=t_1/t_2$;

Note2:peak $T_J=P_{DM} \times Z_{thjc}+T_C$

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

 $0 \leq D, D' \leq 0.15$

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

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