

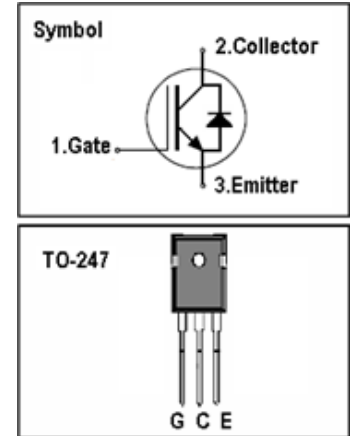
IGBT

Features

- 1200V,40A
- $V_{CE(sat)(typ.)}=1.8V@V_{GE}=15V,I_C=40A$
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms
- Square RBSOA

General Description

JIAEN FS-IGBTs offer lower losses and higher energy efficiency for application such as IH (induction heating),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 ($T_C=25^\circ C$)	80	A
	Continuous Collector Current ($T_C=100^\circ C$)	40	A
I_{CM}	Pulsed Collector Current (Note 1)	120	A
I_F	Diode Continuous Forward Current ($T_C=100^\circ C$)	40	A
I_{FM}	Diode Maximum Forward Current (Note 1)	120	A
t_{sc}	Short Circuit Withstand Time	10	us
P_D	Maximum Power Dissipation ($T_C=25^\circ C$)	420	W
	Maximum Power Dissipation ($T_C=100^\circ C$)	210	W
T_J	Operating Junction Temperature Range	-55 to +175	$^\circ C$
T_{STG}	Storage Temperature Range	-55 to +150	$^\circ C$

Thermal Characteristics

Symbol	Parameter	Max.	Units
$R_{th\ j-c}$	Thermal Resistance, Junction to case for IGBT	0.36	$^\circ C/W$
$R_{th\ j-c}$	Thermal Resistance, Junction to case for Diode	0.8	$^\circ C/W$
$R_{th\ j-a}$	Thermal Resistance, Junction to Ambient	40	$^\circ C/W$

Electrical Characteristics ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV_{CES}	Collector-Emitter Breakdown Voltage	$V_{GE}=0V, I_C=250\mu A$	1200	-	-	V
I_{CES}	Collector-Emitter Leakage Current	$V_{CE}=1200V, V_{GE}=0V$	-	-	100	μA
I_{GES}	Gate Leakage Current, Forward	$V_{GE}=\pm 30V, V_{CE}=0V$	-	-	± 100	nA
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE}=V_{CE}, I_C=250\mu A$	4.5	-	6.5	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=40A$	-	1.8		V
Q_g	Total Gate Charge	$V_{CC}=960V$ $V_{GE}=15V$ $I_C=40A$	-	172		nC
Q_{ge}	Gate-Emitter Charge		-	51.6		nC
Q_{gc}	Gate-Collector Charge		-	105.7		nC
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V$ $V_{GE}=15V$ $I_C=40A$ $R_G=15\Omega$ Inductive Load $T_C=25^\circ\text{C}$	-	54	-	ns
t_r	Turn-on Rise Time		-	76	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	278	-	ns
t_f	Turn-off Fall Time		-	94	-	ns
E_{on}	Turn-on Switching Loss		-	2.9	-	mJ
E_{off}	Turn-off Switching Loss		-	1.7	-	mJ
E_{ts}	Total Switching Loss	-	4.6	-	mJ	
C_{ies}	Input Capacitance	$V_{CE}=25V$	-	3603	-	pF
C_{oes}	Output Capacitance	$V_{GE}=0V$	-	194	-	pF
C_{res}	Reverse Transfer Capacitance	$f=1\text{MHz}$	-	37	-	pF

Electrical Characteristics of Diode ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
V_F	Diode Forward Voltage	$I_F=40A$	-	1.9	3.2	V
t_{rr}	Diode Reverse Recovery Time	$V_{CE}=600V$	-	276		ns
I_{rr}	Diode peak Reverse Recovery Current	$I_F=40A$	-	22		A
Q_{rr}	Diode Reverse Recovery Charge	$dI_F/dt=600A/\mu s$	-	2456		nC

Notes:

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

Typical Performance Characteristics

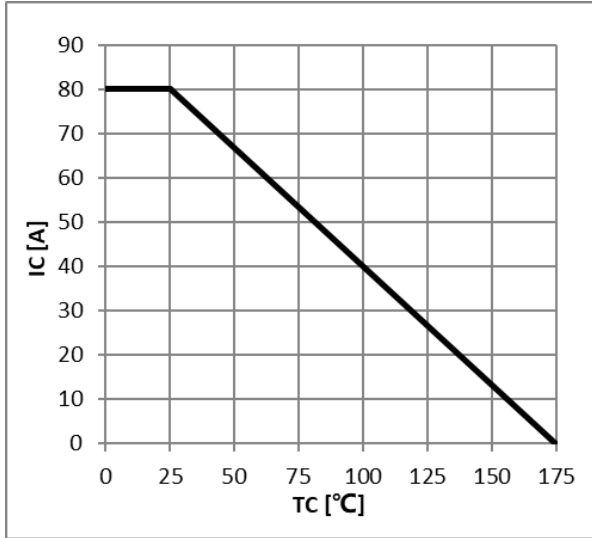


Figure 1: Maximum DC Collector Current VS. case temperature

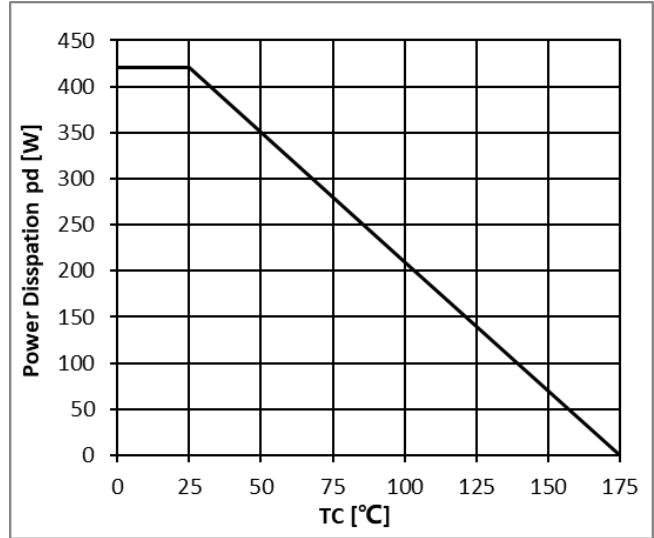


Figure 2: Power Dissipation VS. Case Temperature

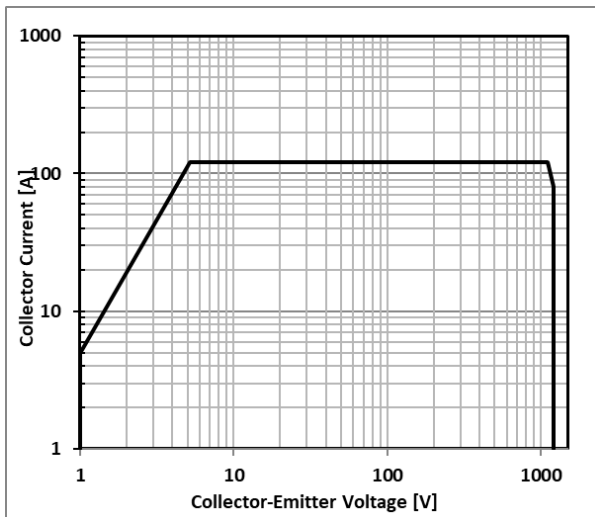


Figure 3: Reverse Bias SOA, $T_J=125^{\circ}\text{C}$, $V_{GE}=15\text{V}$

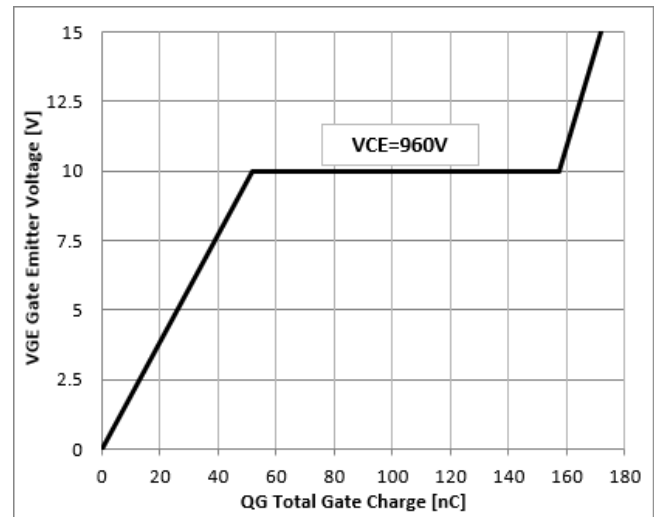


Figure 4: Typical Gate charge VS. V_{GE} , $I_C=40\text{A}$

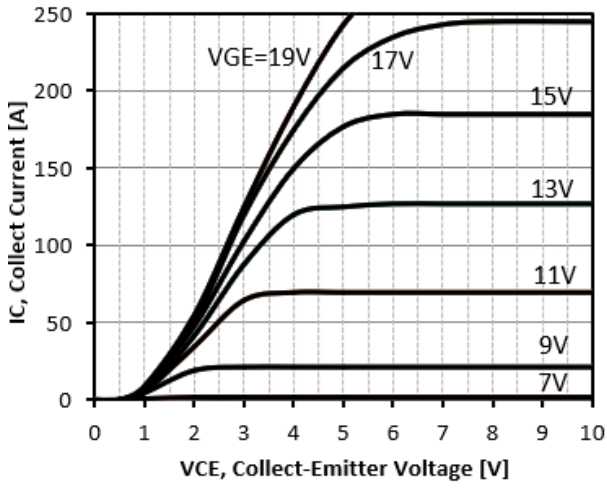


Figure 5: Typical IGBT Output characteristics,
TC=25°C;tp=300us

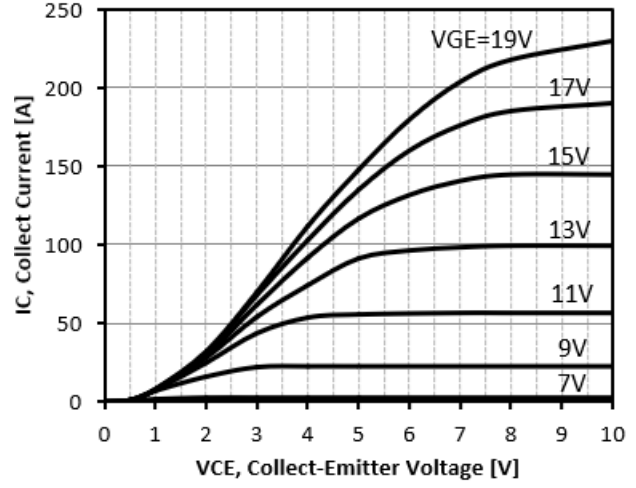


Figure 6: Typical IGBT Output characteristics,
C=150°C;tp=300us

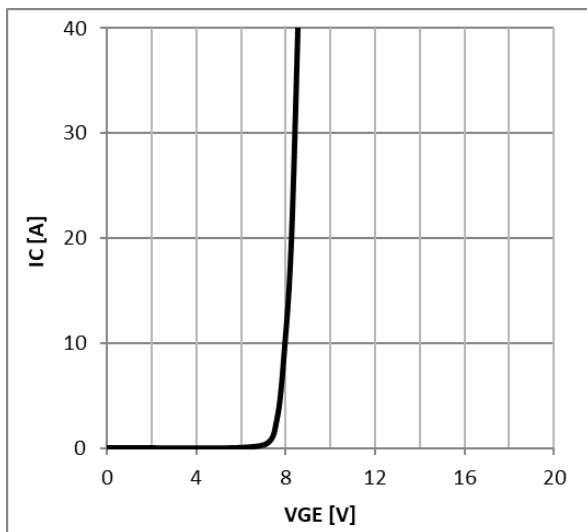


Figure 7: Typical Gate Threshold Voltage

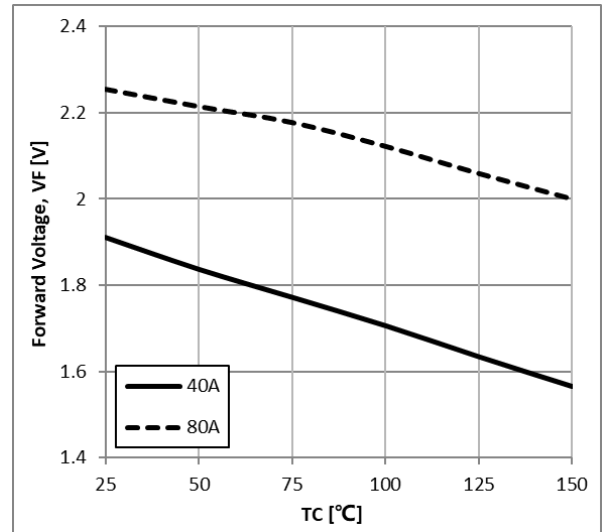


Figure 8: Typical Forward Voltage vs IF

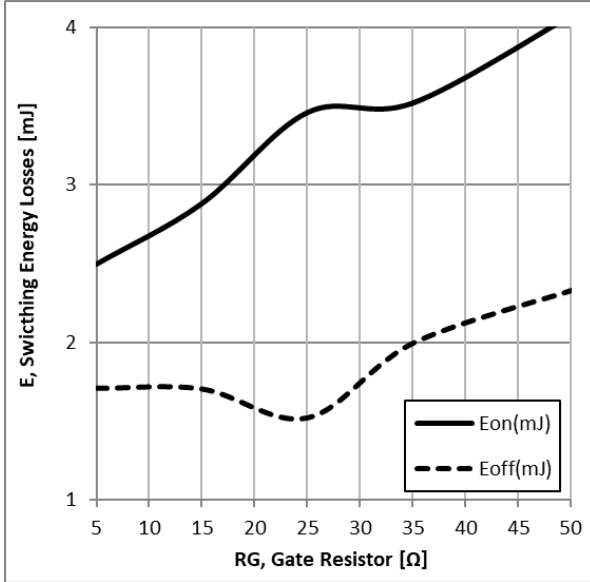


Figure 9: Typical Energy Loss VS. RG, TC=25°C,
L=200uH, VCE=600V, VGE=15V, IC=40A

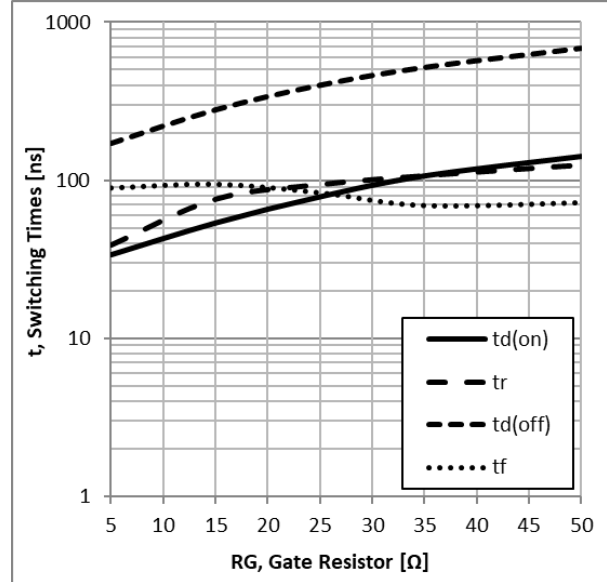


Figure 10: Typical Switching Time VS. RG, TC=25°C,
L=200uH, VCE=600V, VGE=15V, IC=40A

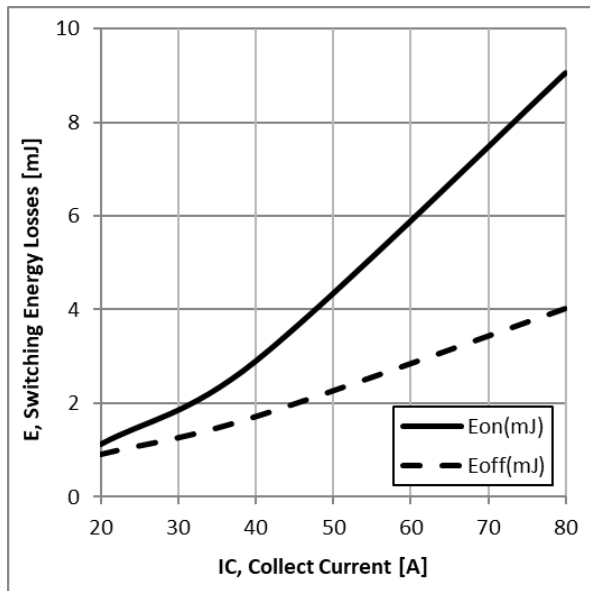


Figure 11: Typical Energy Loss VS. IC, TC=25°C,
L=200uH, VCE=600V, VGE=15V, RG=15Ω

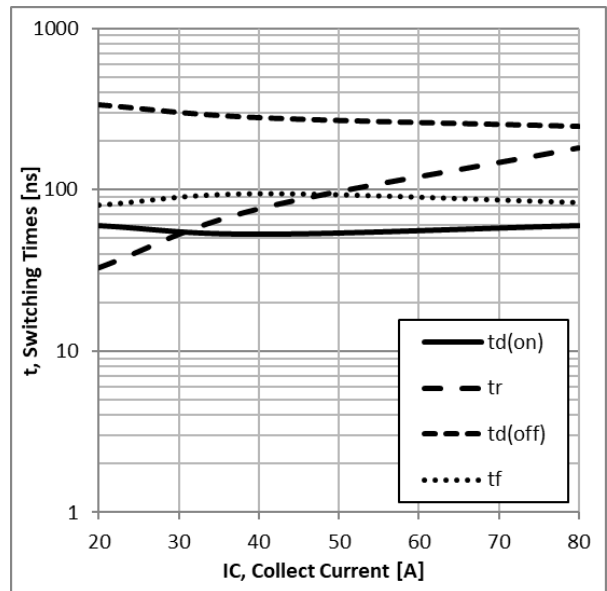


Figure 12: Typical Switching Time VS. IC, TC=25°C,
L=200uH, VCE=600V, VGE=15V, RG=15Ω

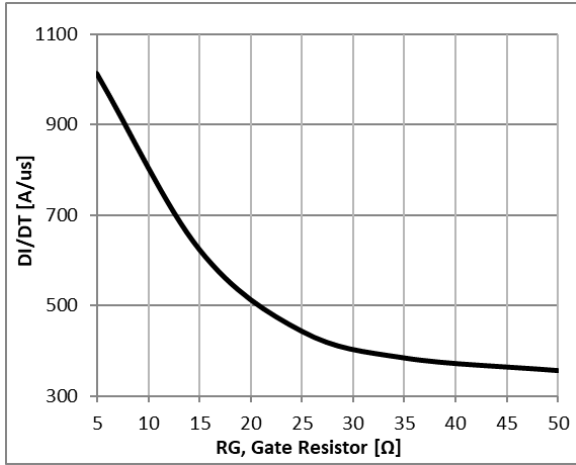


Figure 13: Typical Diode DI/DT VS. RG, TC=25°C
VCC=600V, VGE=15V, IF=40A

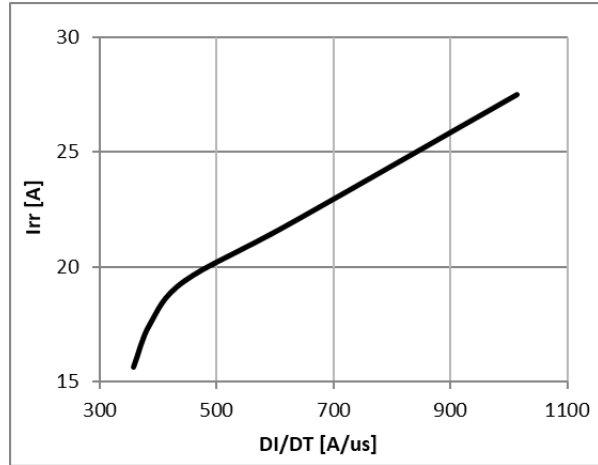


Figure 14: Typical Diode IRR VS. DI/DT, TC=25°C
VCC=600V, VGE=15V, IF=40A

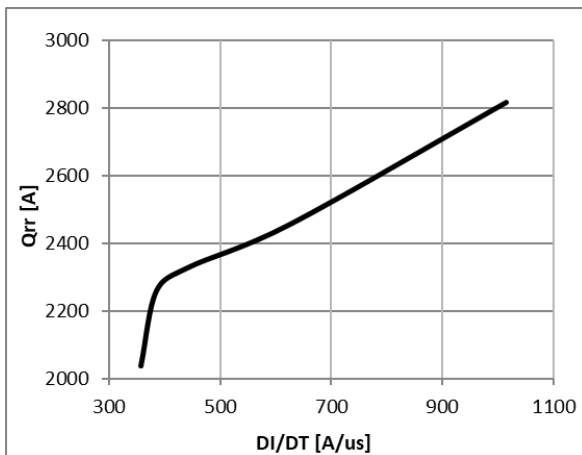


Figure 15: Typical Diode Qrr VS. DI/DT, TC=25°C
VCC=600V, VGE=15V, IF=40A

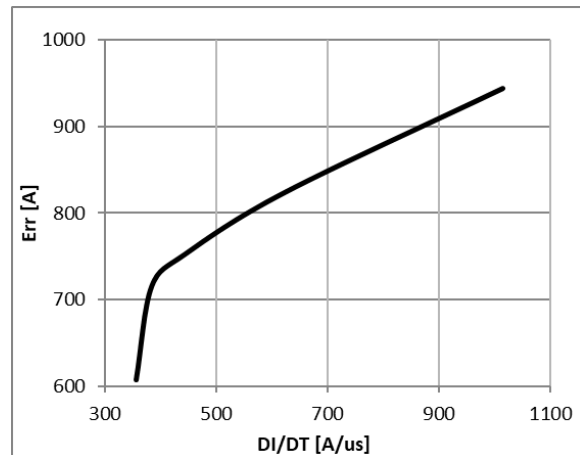


Figure 16: Typical Diode Err VS. DI/DT, TC=25°C
VCC=600V, VGE=15V, IF=40A

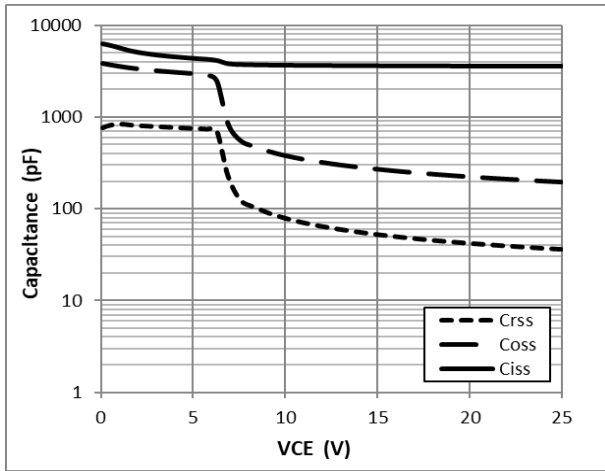


Figure 17: Typical Capacitance VS. VCE,
VGE=0V,f=1MHz

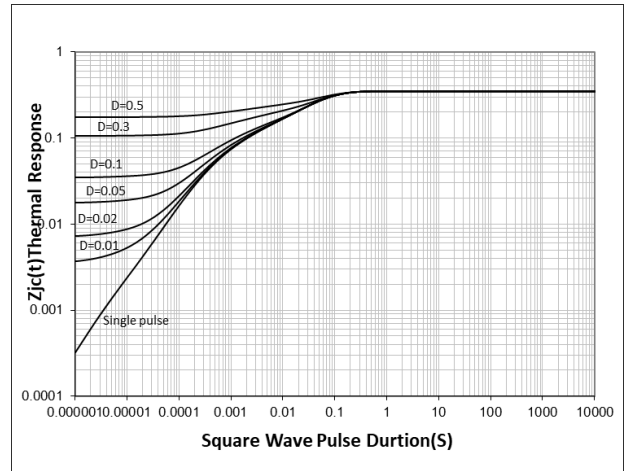
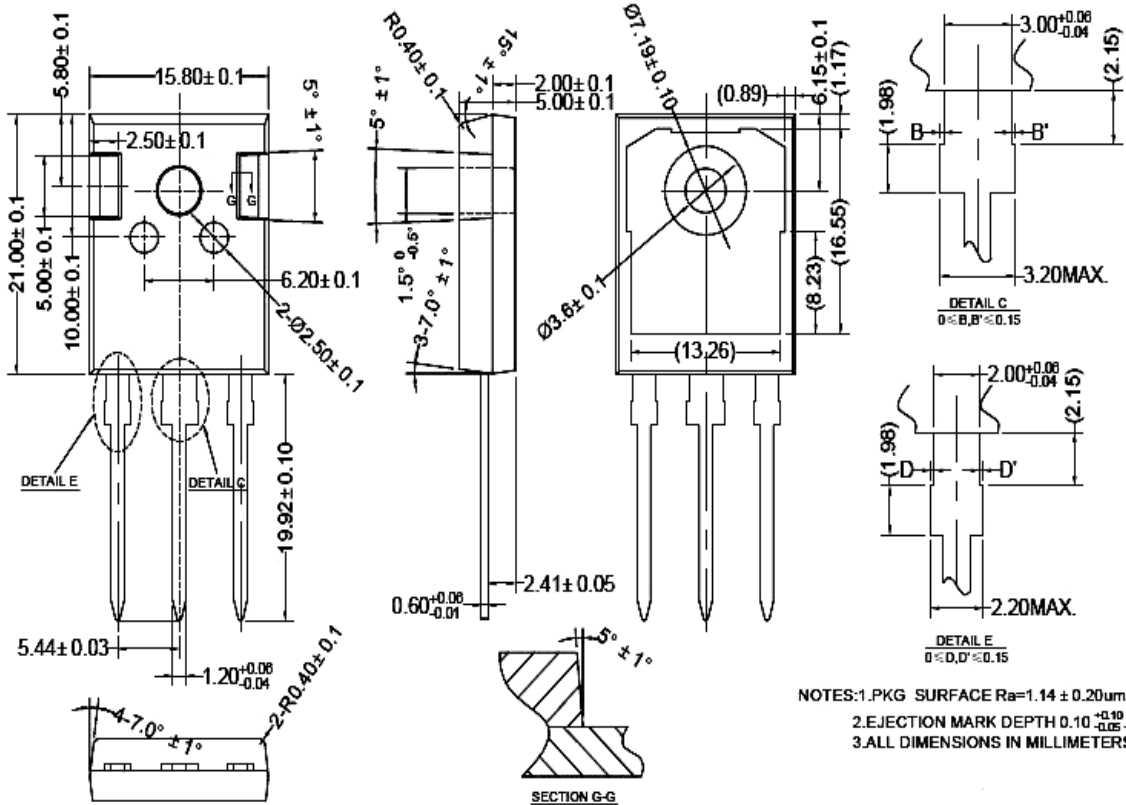


Figure 18: Normalized transient thermal impedance
junction-to-case

TO247 PACKAGE OUTLINE



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

SECTION G-G
REVISIONS

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

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3.ALL DIMENSIONS IN MILLIMETERS.

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