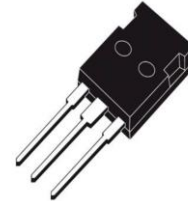


IGBT

Features

- 1200V,50A
- $V_{CE(sat)(typ.)}=2.4V@V_{GE}=15V,I_C=50A$
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms



TO-247-3L Plus

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 ($T_C=100^\circ C$)	50	A
I_{CM}	Pulsed Collector Current (Note 1)	150	A
I_F	Diode Continuous Forward Current ($T_C=100^\circ C$)	50	A
I_{FM}	Diode Maximum Forward Current (Note 1)	150	A
t_{sc}	Short Circuit Withstand Time	10	us
	$V_{GE}=15V, V_{CC}\leq 960V, T_j\leq 150^\circ C$;		
P_D	Maximum Power Dissipation ($T_C=25^\circ C$)	320	W
	Maximum Power Dissipation ($T_C=100^\circ C$)	130	W
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
$R_{th\ j-c}$	Thermal Resistance, Junction to case for IGBT	0.38	$^\circ C/W$
$R_{th\ j-c}$	Thermal Resistance, Junction to case for Diode	0.5	$^\circ C/W$
$R_{th\ j-a}$	Thermal Resistance, Junction to Ambient	25	$^\circ C/W$

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	$V_{GE}=0\text{V}, I_C=250\mu\text{A}$	1200	-	-	V
I_{CES}	Collector-Emitter Leakage Current	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}$	-	-	250	μA
I_{GES}	Gate Leakage Current, Forward	$V_{GE}=30\text{V}, V_{CE}=0\text{V}$	-	-	100	nA
	Gate Leakage Current, Reverse	$V_{GE}=-30\text{V}, V_{CE}=0\text{V}$	-	-	-100	nA
$V_{GE(th)}$	Gate Threshold Voltage	$V_{GE}=V_{CE}, I_C=250\mu\text{A}$	4.0	-	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15\text{V}, I_C=50\text{A}$	-	-	-	-
		$T_C=25^\circ\text{C}$	-	2.4	2.9	V
		$T_C=125^\circ\text{C}$	-	2.8	-	V
Q_g	Total Gate Charge	$V_{CC}=960\text{V}$ $V_{GE}=15\text{V}$ $I_C=50\text{A}$	-	170	-	nC
Q_{ge}	Gate-Emitter Charge		-	40	-	nC
Q_{gc}	Gate-Collector Charge		-	80	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600\text{V}$ $V_{GE}=15\text{V}$ $I_C=50\text{A}$ $R_G=10\Omega$ Inductive Load $T_C=25^\circ\text{C}$	-	40	-	ns
t_r	Turn-on Rise Time		-	75	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	270	-	ns
t_f	Turn-off Fall Time		-	35	-	ns
E_{on}	Turn-on Switching Loss		-	3	-	mJ
E_{off}	Turn-off Switching Loss		-	2.5	-	mJ
E_{ts}	Total Switching Loss		-	5.5	-	mJ
C_{ies}	Input Capacitance	$V_{CE}=30\text{V}$ $V_{GE}=0\text{V}$ $f=1\text{MHz}$	-	3720	-	pF
C_{oes}	Output Capacitance		-	160	-	pF
C_{res}	Reverse Transfer Capacitance		-	90	-	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	$I_F=50\text{A}$	-	2.3	3.2	V
t_{rr}	Diode Reverse Recovery Time	$V_{CE}=600\text{V}$ $I_F=50\text{A}$	-	250	-	ns
I_{rr}	Diode peak Reverse Recovery Current		-	10	-	A
Q_{rr}	Diode Reverse Recovery Charge	$dI_F/dt=200\text{A}/\mu\text{s}$	-	1350	-	nC

Notes:

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

Typical Performance Characteristics

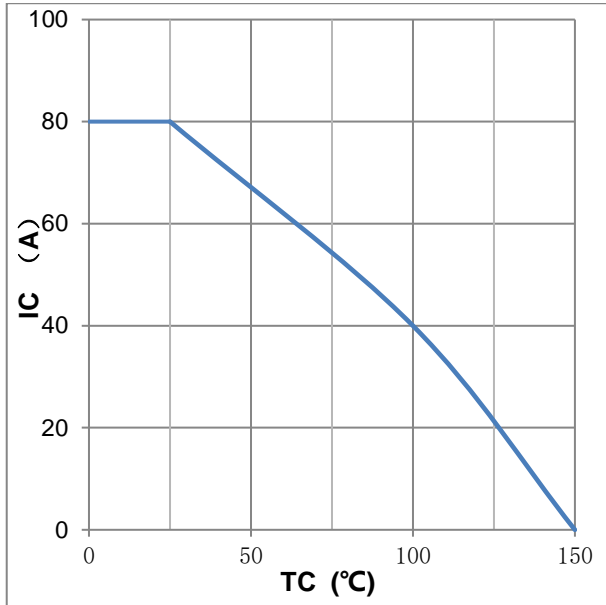


Figure1:maximum DC collector current
VS. case temperature

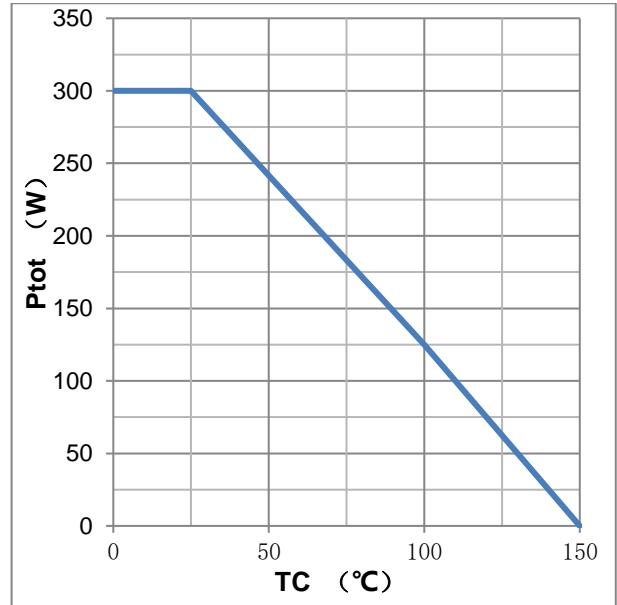


Figure2:power dissipation VS. case temprature

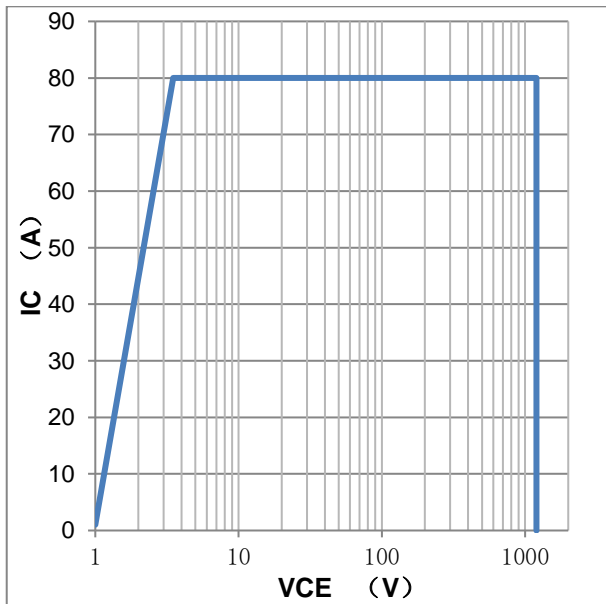


Figure3:reverse bias SOA,TJ=150°C,VGE=15V

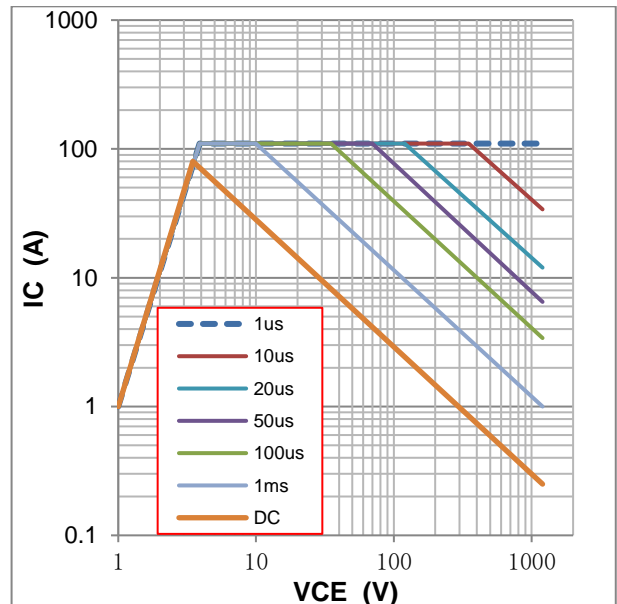


Figure4:forward SOA,TC=25°C,TJ≤150°C

Typical Performance Characteristics

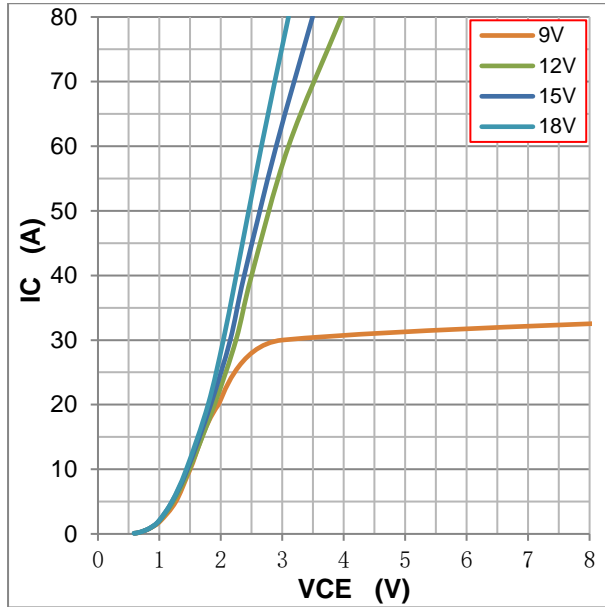


Figure5: typical IGBT output characteristics,
 $T_J=25^{\circ}\text{C}; t_p=300\mu\text{s}$

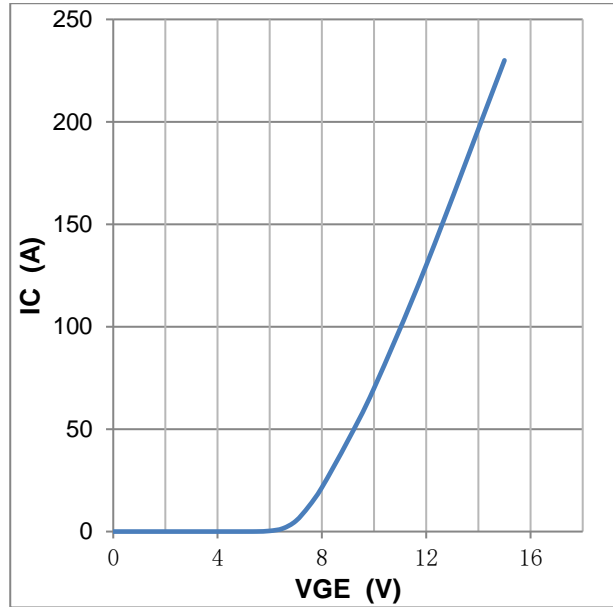


Figure6: typical trans characteristics, $V_{CE}=20\text{V}, t_p=20\mu\text{s}$

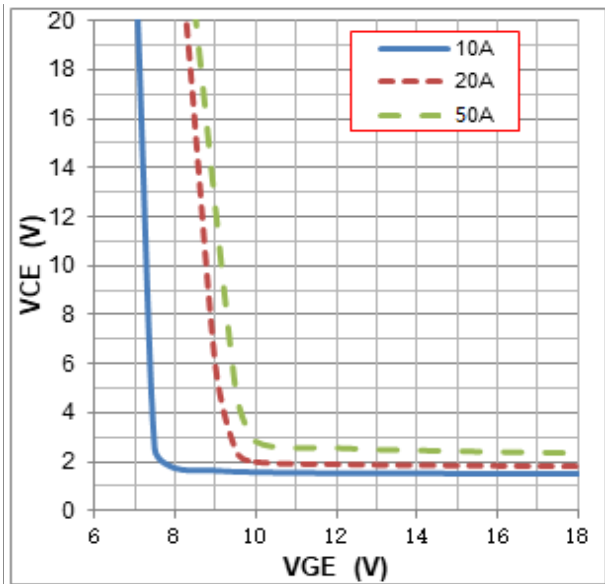


Figure7: typical VCE VS. VGE, $T_J=25^{\circ}\text{C}$

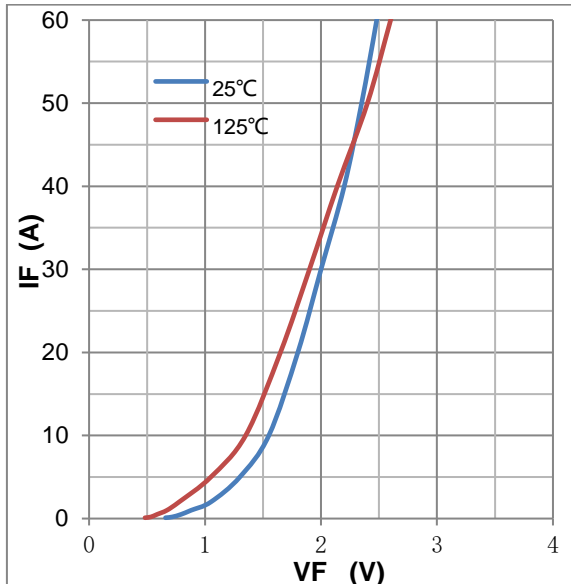


Figure8: typical diode forward characteristic, $t_p=300\mu\text{s}$

Typical Performance Characteristics

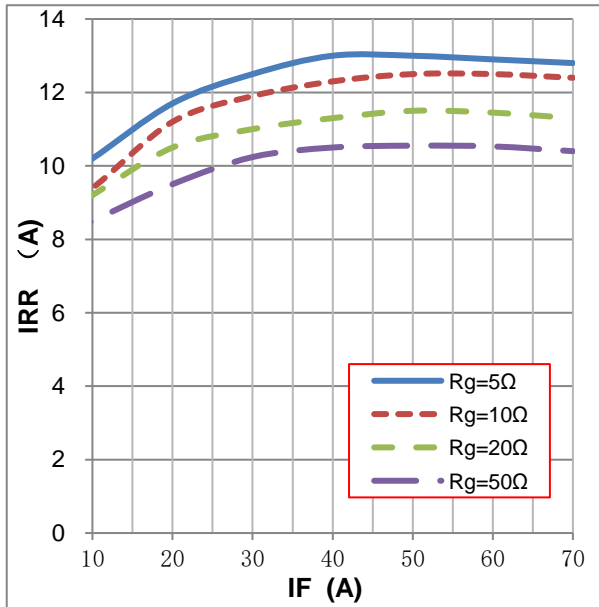


Figure9: typical diode IRR VS. IF, TC=25°C

VCC=600V, VGE=15V

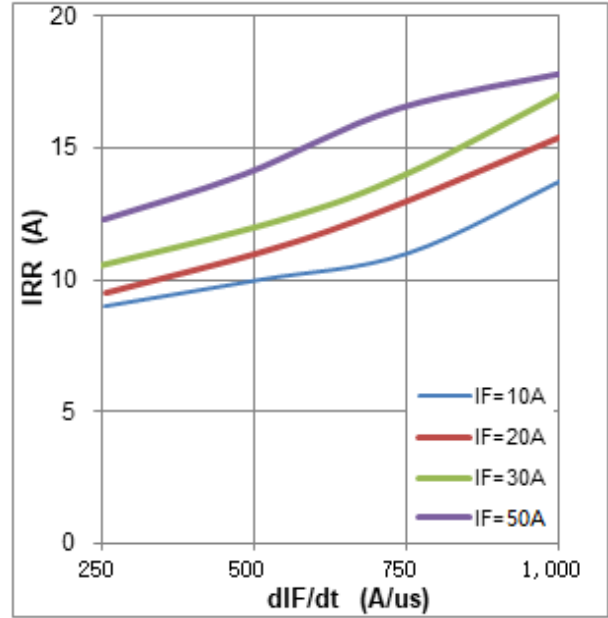


Figure10: typical diode IRR VS. dIF/dt

VCC=600V, VGE=15V

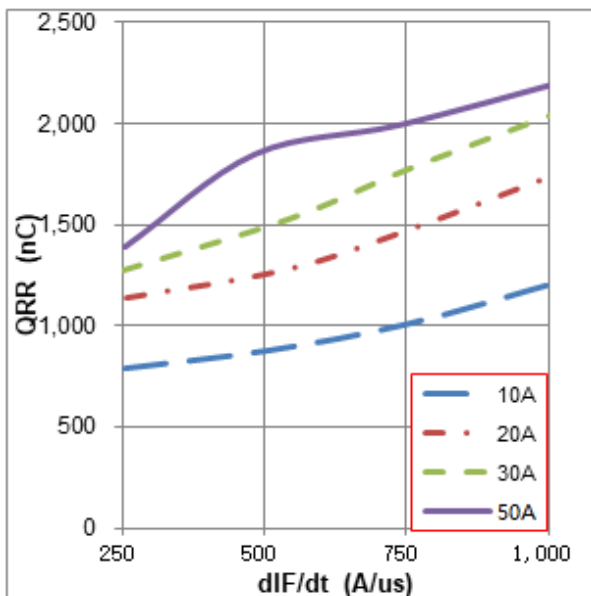


Figure11: typical diode QRR VS. dIF/dt

VCC=600V, VGE=15V

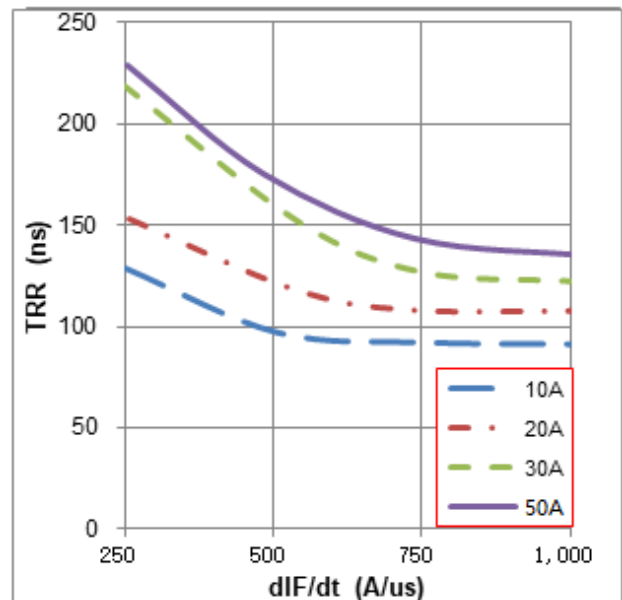


Figure12: typical diode TRR VS. dIF/dt,

VCC=600V, VGE=15V

Typical Performance Characteristics

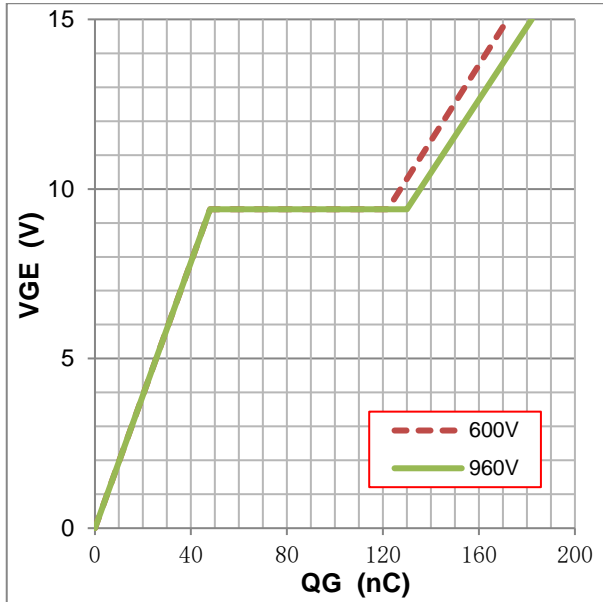


Figure13:typical gate charge VS. VGE,IC=50A

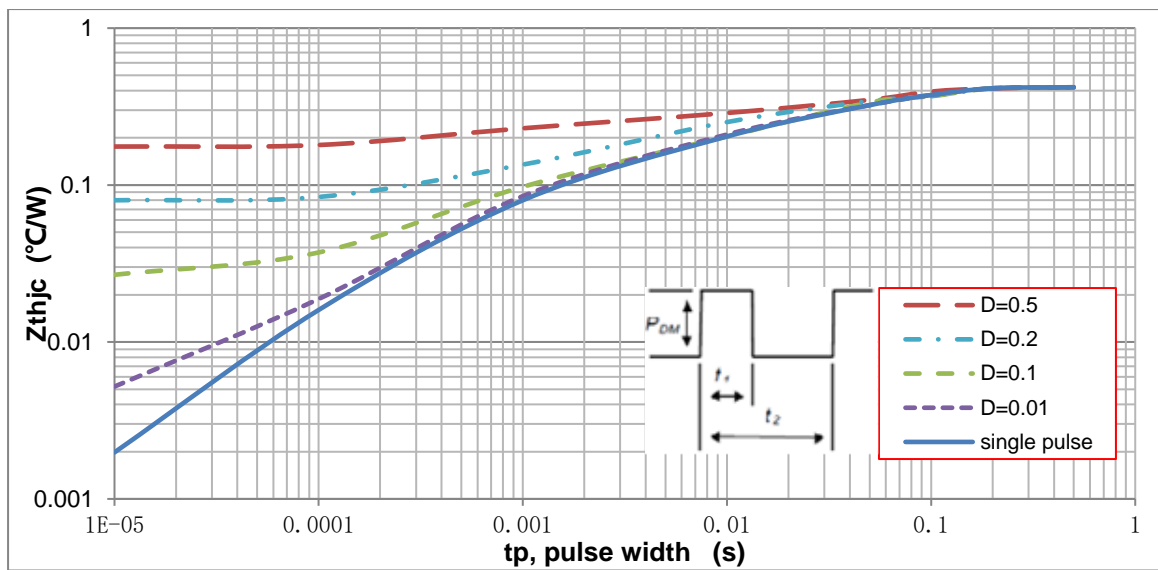
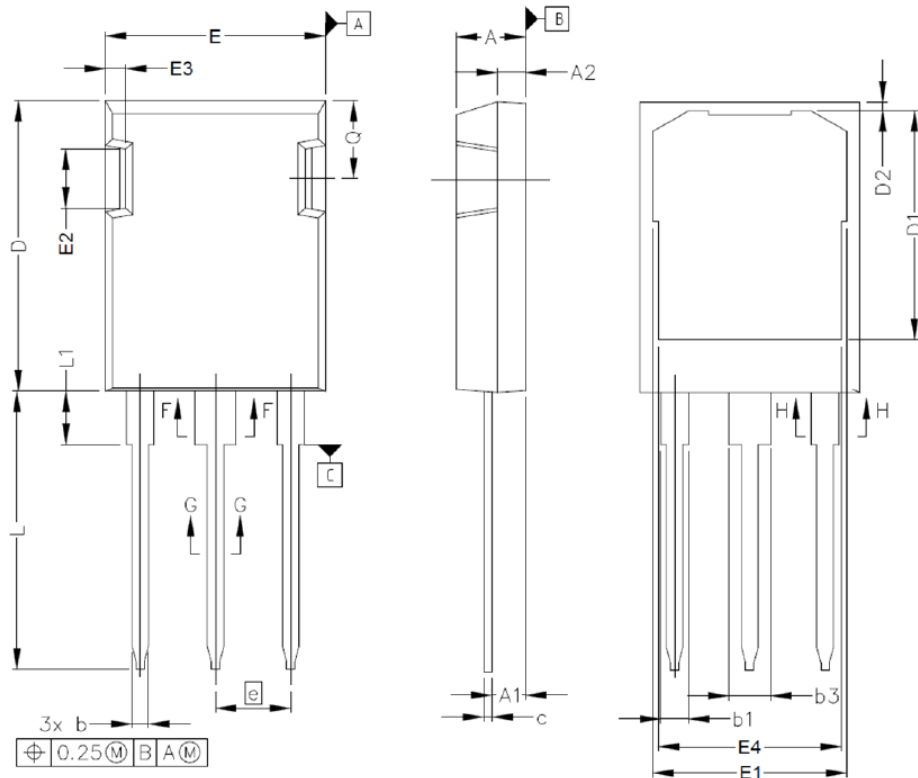


Figure14: normalized transient thermal impedance, junction-to-case

Note1. Duty factor $D=t_1/t_2$; Note2: peak $T_J=P_{DM} \times Z_{thjc} + T_C$

封装外形



SYMBOL	MIN	MAX
A	4.83	5.21
A1	2.29	2.54
A2	1.91	2.16
b'	1.07	1.28
b	1.07	1.33
b1	1.91	2.41
b2	1.91	2.16
b3	2.87	3.38
b4	2.87	3.13
c'	0.55	0.65
c	0.55	0.68
D	20.80	21.10
D1	16.25	17.65
D2	0.50	0.80

SYMBOL	MIN	MAX
E	15.75	16.13
E1	13.10	14.15
E2	3.68	5.10
E3	1.00	1.90
E4	12.38	13.43
e	5.44 BSC	
N	3	
L	19.81	20.32
L1	3.70	4.00
Q	5.49	6.00

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