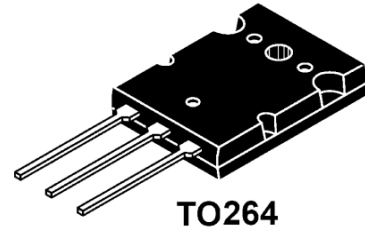


IGBT

Features

- 1200V,50A
- $V_{CE(sat)(typ.)}=2.5V@V_{GE}=15V,I_C=50A$
- High speed switching
- Higher system efficiency
- Soft current turn-off waveforms



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 ($T_C=25^\circ C$)	100	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
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	$V_{GE}=0V, I_C=250\mu A$	1200	-	-	V
I_{CES}	Collector-Emitter Leakage Current	$V_{CE}=1200V, V_{GE}=0V$	-	-	250	μA
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	$V_{GE}=V_{CE}, I_C=250\mu A$	4.0	-	6.0	V
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$V_{GE}=15V, I_C=50A$	-			
		$T_C=25^\circ\text{C}$		2.5	2.9	V
		$T_C=125^\circ\text{C}$		3.2		V
Q_g	Total Gate Charge	$V_{CC}=960V$ $V_{GE}=15V$ $I_C=50A$	-	340		nC
Q_{ge}	Gate-Emitter Charge		-	102		nC
Q_{gc}	Gate-Collector Charge		-	170		nC
$t_{d(on)}$	Turn-on Delay Time	$V_{CC}=600V$ $V_{GE}=15V$ $I_C=50A$ $R_G=15\Omega$ Inductive Load $T_C=25^\circ\text{C}$	-	51	-	ns
t_r	Turn-on Rise Time		-	103	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	584	-	ns
t_f	Turn-off Fall Time		-	47	-	ns
E_{on}	Turn-on Switching Loss		-	4.9	-	mJ
E_{off}	Turn-off Switching Loss		-	1.8	-	mJ
E_{ts}	Total Switching Loss	-	6.7	-	mJ	
C_{ies}	Input Capacitance	$V_{CE}=25V$ $V_{GE}=0V$ $f=1\text{MHz}$	-	2735	-	pF
C_{oes}	Output Capacitance		-	314	-	pF
C_{res}	Reverse Transfer Capacitance		-	177	-	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	$I_F=50A$	-	2.1	3.2	V
t_{rr}	Diode Reverse Recovery Time	$V_{CE}=600V$ $I_F=50A$ $dI_F/dt=500A/\mu s$	-	548		ns
I_{rr}	Diode peak Reverse Recovery Current		-	23		A
Q_{rr}	Diode Reverse Recovery Charge		-	3785		nC

Notes:

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

Typical Performance Characteristics

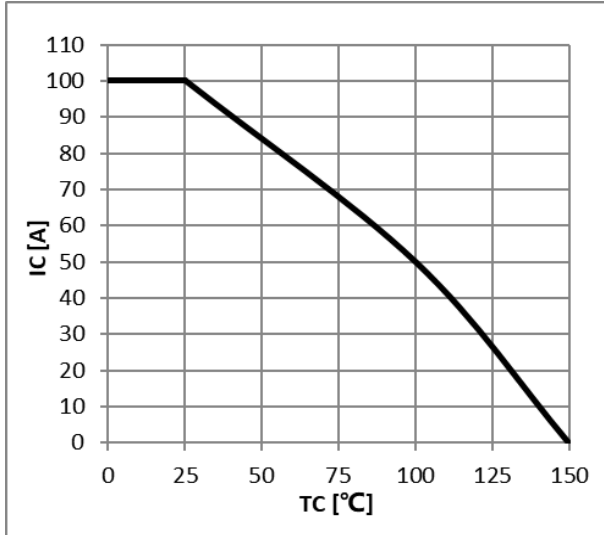


Figure 1: Maximum DC Collector Current VS. case temperature

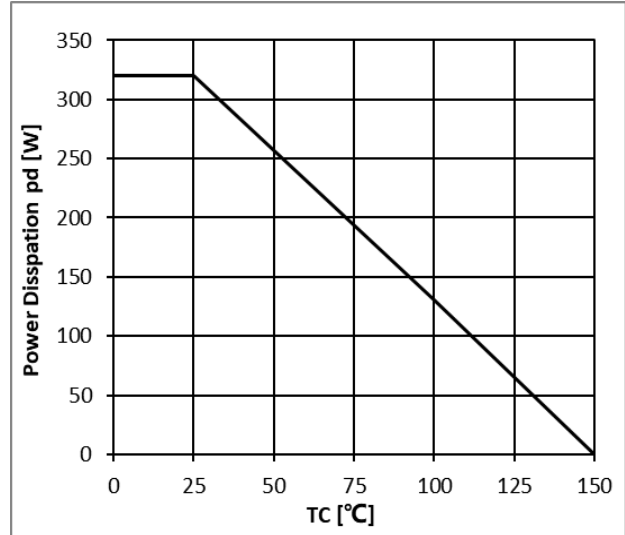


Figure 2: Power Dissipation VS. Case Temperature

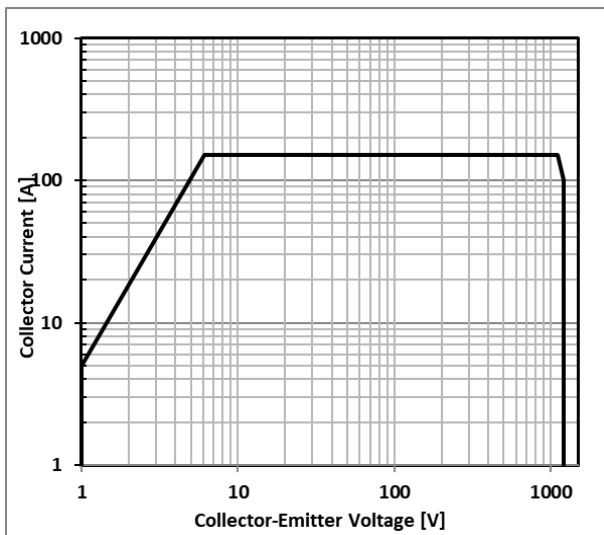


Figure 3: Reverse Bias SOA, $T_J=125^{\circ}\text{C}$, $V_{GE}=15\text{V}$

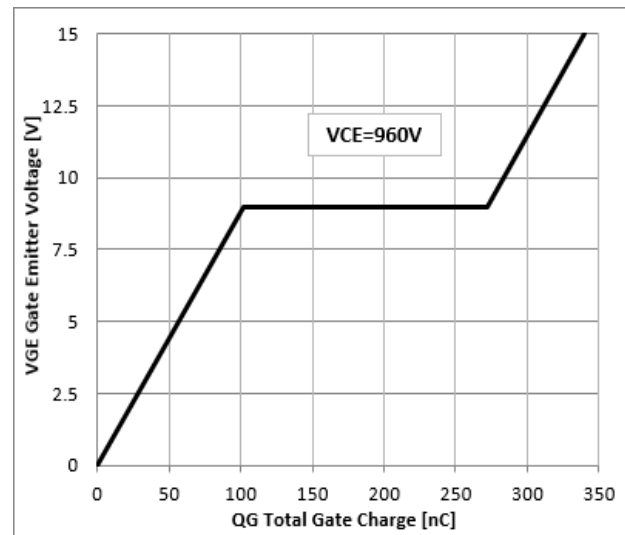


Figure 4: Typical Gate charge VS. V_{GE} , $I_C=50\text{A}$

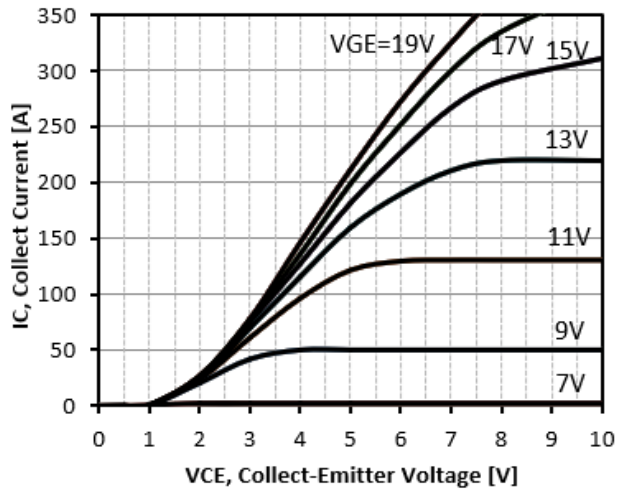


Figure 5: Typical IGBT Output characteristics,
TC=25°C;tp=300us

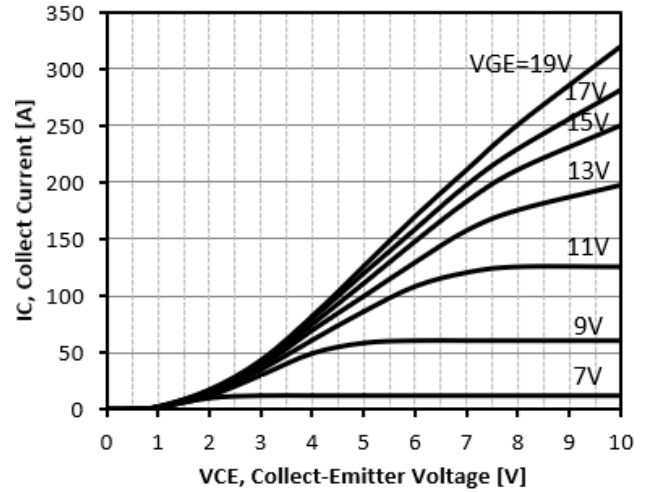


Figure 6: Typical IGBT Output characteristics,
C=150°C;tp=300us

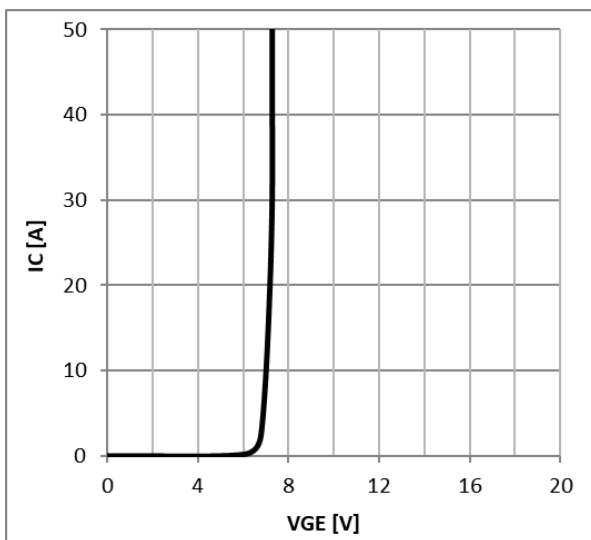


Figure 7: Typical Gate Threshold Voltage

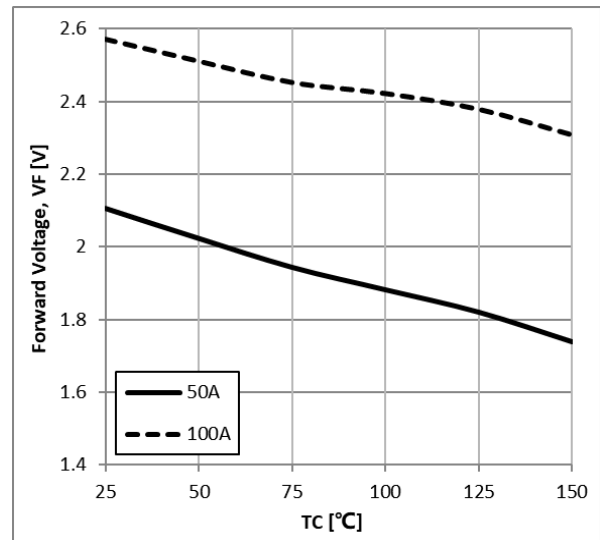


Figure 8: Typical Forward Voltage vs IF

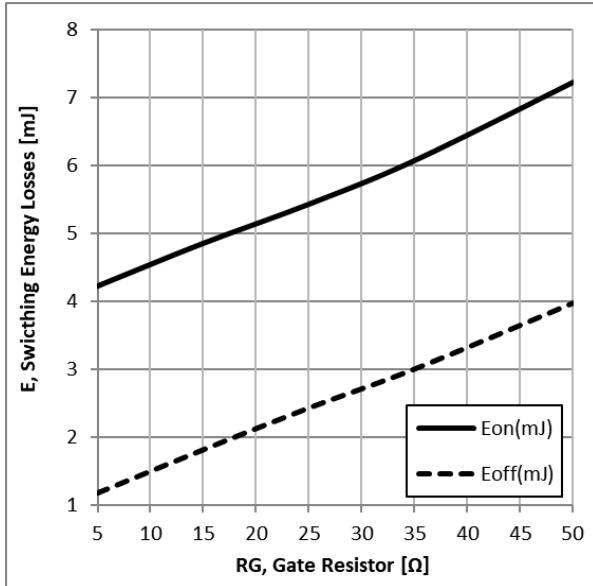


Figure 9: Typical Energy Loss VS. RG, TC=25°C,
L=200uH, VCE=600V, VGE=15V, IC=50A

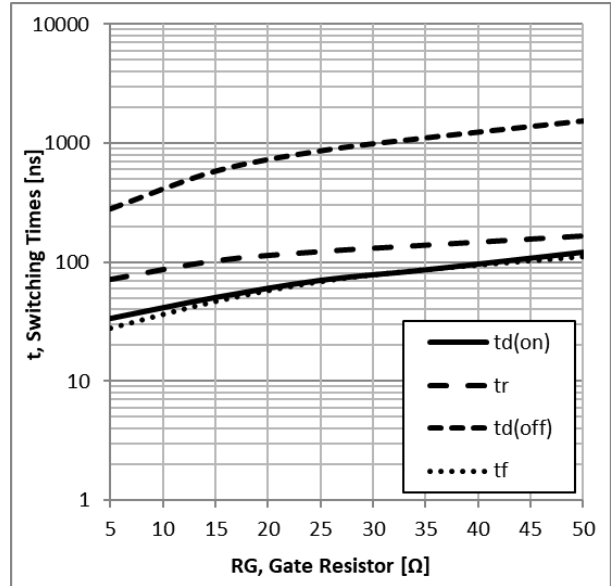


Figure 10: Typical Switching Time VS. RG, TC=25°C,
L=200uH, VCE=600V, VGE=15V, IC=50A

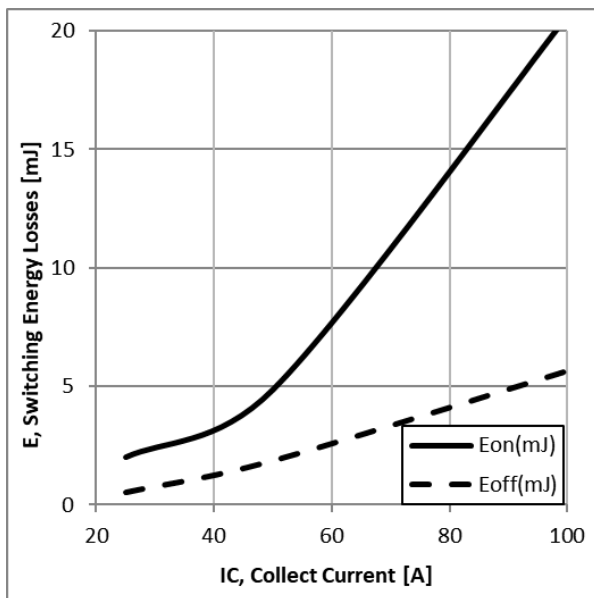


Figure 11: Typical Energy Loss VS. IC, TC=25°C,
L=200uH, VCE=600V, VGE=15V, RG=15Ω

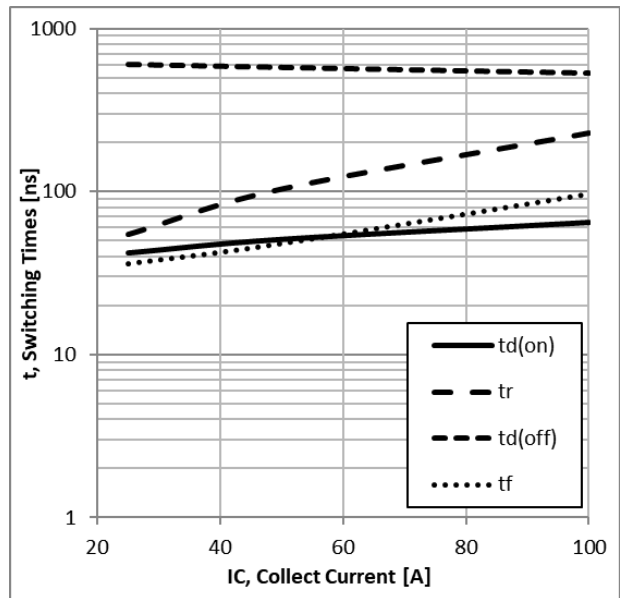


Figure 12: Typical Switching Time VS. IC, TC=25°C,
L=200uH, VCE=600V, VGE=15V, RG=15Ω

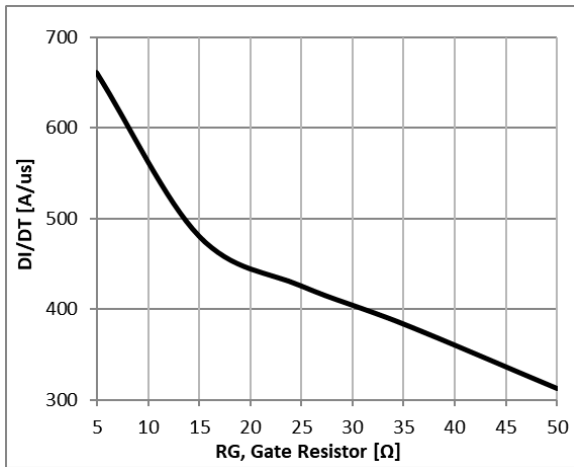


Figure 13: Typical Diode DI/DT VS. RG, TC=25°C
VCC=600V, VGE=15V, IF=50A

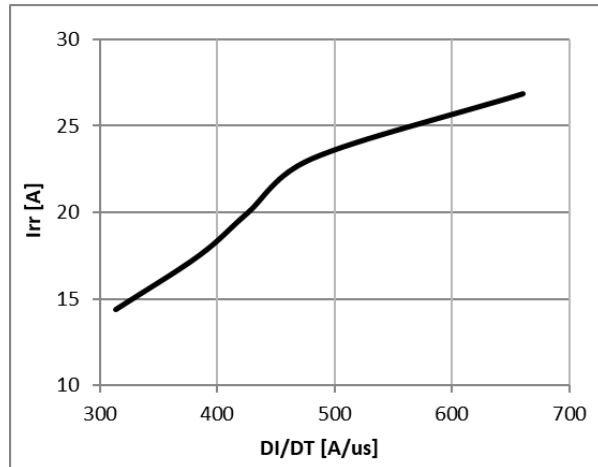


Figure 14: Typical Diode IRR VS. DI/DT, TC=25°C
VCC=600V, VGE=15V, IF=50A

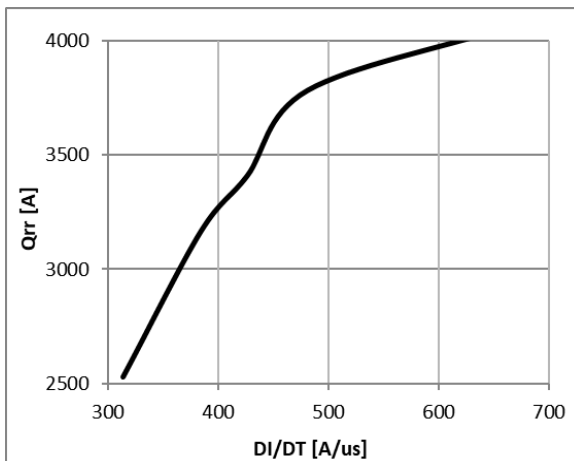


Figure 15: Typical Diode Qrr VS. DI/DT, TC=25°C
VCC=600V, VGE=15V, IF=50A

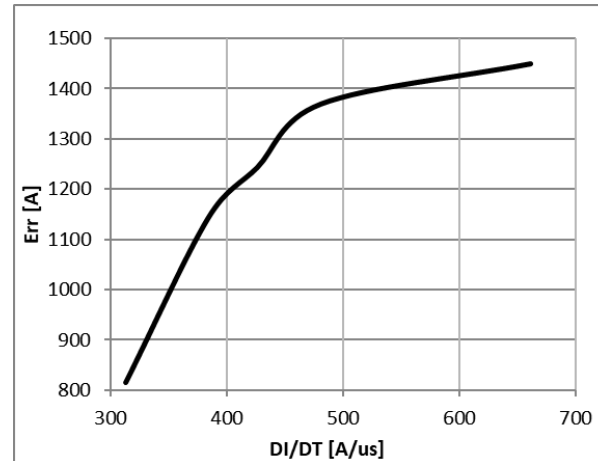


Figure 16: Typical Diode Err VS. DI/DT, TC=25°C
VCC=600V, VGE=15V, IF=50A

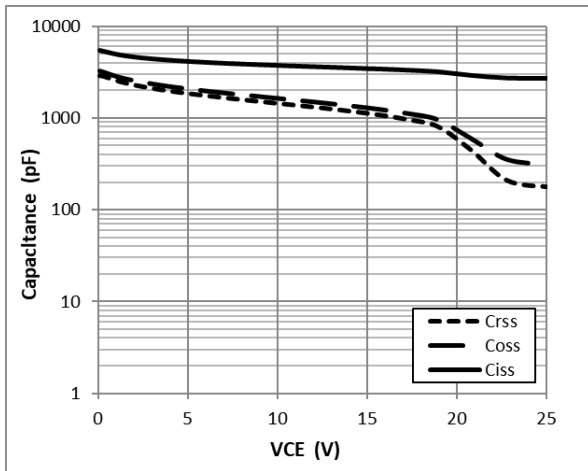


Figure 17: Typical Capacitance VS. VCE,
VGE=0V, f=1MHz

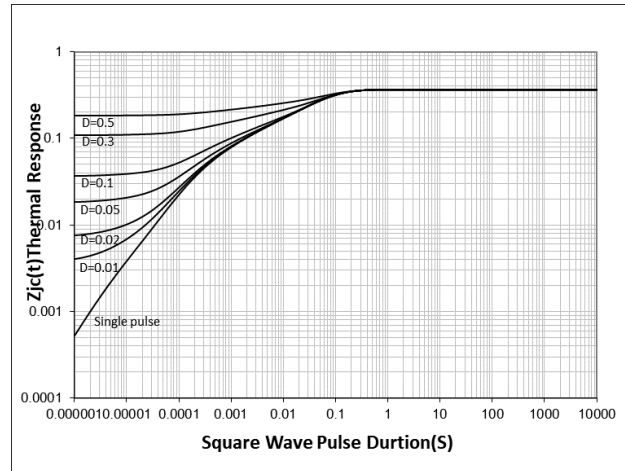
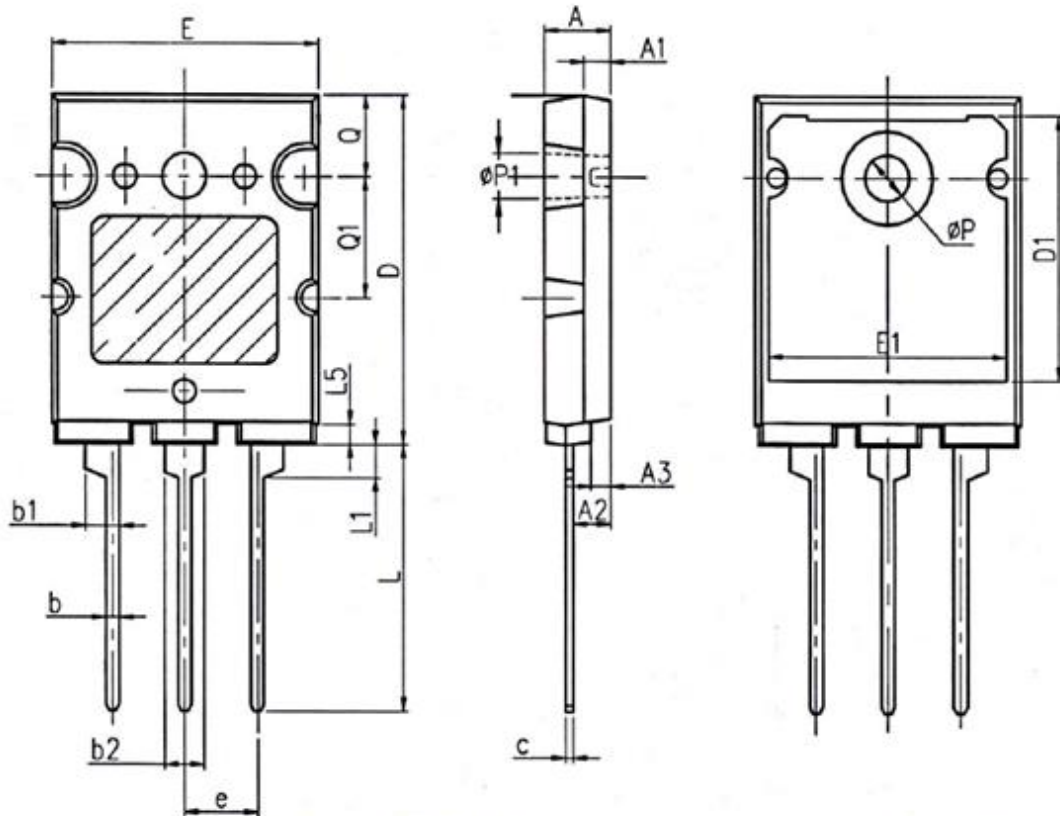


Figure 18: Normalized transient thermal impedance
junction-to-case

封装外形


SYMBOL	DIM			SYMBOL	DIM		
	MIN	NOM	MAX		MIN	NOM	MAX
A	4.80	5.00	5.20	E	19.50	20.00	20.50
A1	2.00 REF			E1	16.00	-	-
A2	2.50	2.80	3.10	e	5.45 TYP		
A3	1.50 REF			L	19.50	20.00	20.50
b	0.90	1.00	1.25	L1	2.30	2.50	2.70
b1	2.30	2.50	2.75	L5	1.35 REF		
b2	2.80	3.00	3.20	ΦP	3.00	3.20	3.40
c	0.50	0.60	0.85	$\Phi P1$	3.20	3.40	3.60
D	25.70	26.00	26.30	Q	5.80	6.00	6.20
D1	19.00	-	-	Q1	8.80	9.00	9.20

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