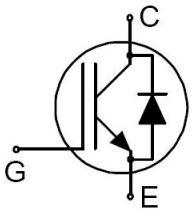
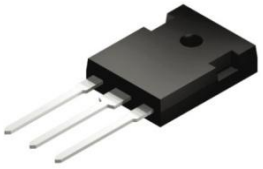
1200V , 25A , Trench-FS IGBT

Features

- Advanced Trench+FS (Field Stop) IGBT technology
- Low Collector-Emitter Saturation voltage, typical data is 1.85V @ 25A.
- Easy parallel switching capability due to positive Temperature coefficient in Vce.
- Fast switching
- High input impedance
- Pb- Free product



Schematic Diagram



TO-247

Applications

- Industry Inverter
- Power switch circuit of induction cooker.

Absolute Max Ratings(TJ = 25°C unless otherwise noted)			
Symbol	**Parameter**	**Units**	**Maximum**
V_{CES}	Collector-to-Emitter Voltage	V	1200
V_{GES}	Gate to Emitter Voltage	V	± 30
I_C @ TC = 25°C	Collector current @T_c = 25 °C	A	50
I_C @ TC = 100°C	Collector Current @T_c = 100 °C	A	25
I_{CM}	Pulsed Drain Current②	A	75
I_F @ TC = 25°C	Diode continuous forward current	A	50
I_F @ TC = 100°C	Diode continuous forward current	A	25
I_{FM}	Diode maximum forward current	A	75
P_D	Power Dissipation @T_c = 25 °C	W	310
	Power Dissipation @T_c = 100 °C	W	155
T_J	Operating Junction Temperature Range	°C	-50 to + 175
T_{STG}	Storage Temperature Range	°C	-50 to + 175
T_L	Maximum Temperature of Solding	°C	260
$R_{\theta JC}$	Maximum Junction-to-Case①	°C/W	0.48
$R_{\theta JA}$	Maximum Junction-to-Ambient②	°C/W	40

①These curves are based on the junction-to-case thermal impedance which is measured with the

device mounted to a large heat sink, assuming maximum junction temperature of $T_{J(MAX)}$=175° C.

②The $R_{\theta JA}$ is the sum of the thermal impedance from junction to case $R_{\theta JC}$ and case to ambient.

Electrical characteristics(TJ = 25°C unless otherwise noted)						
Symbol	**Parameter**	**Test conditions**	**Units**	**Min.**	**Typ.**	**Max.**
$V_{(BR)CES}$	Collector - Emitter breakdown voltage	V_{GE} = 0V, I_D = 0.5mA	V	1200	—	—
$V_{CE(sat)}$	Collector-Emitter Saturation voltage	V_{GE}=15V, I_C=25A,T_C=25°C	V	—	1.85	2.1
		V_{GE}=15V, I_C=25A,T_C=125°C	V	—	2.05	—
$V_{GE(th)}$	Gate threshold voltage	V_{GE}= V_{CE}, I_D = 0.4mA	V	4.0	5.6	6.5
V_F	Diode Forward voltage	Ic=25A	V	—	2.1	2.6
I_{GES}	Gate to Emitter Forward Leakage	Vge=+30V	nA	—	—	200
I_{GESR}	Gate to Emitter reverse Leakage	Vge=-30V		-200	—	—
I_{CES}	Zero gate voltage collector current	V_{CE} =1200V	uA	—	—	100

Dynamic characteristics(TJ = 25°C unless otherwise noted)						
Symbol	**Parameter**	**Test conditions**	**Units**	**Min.**	**Typ.**	**Max.**
C_{iss}	Input capacitance	V_{GE} = 0V V_{CE}= 25V f = 1MHz	pF	—	2280	—
C_{oss}	Output capacitance			—	63	—
C_{rss}	Reverse transfer capacitance			—	45	—
Q_g	Total gate charge	I_C =20A, V_{CE}=600V, V_{GE} =15V	nC	—	192	—
Q_{ge}	Gate-to-Emitter charge			—	16	—
Q_{gc}	Gate-to-Collector("Miller") charge			—	78	—
$T_{d(off)}$	Turn-Off DelayTime	T_J=25°,Vcc=600V, Ic=25A,Rg=10ohm, V_{GE} =15V	ns	—	190	—
t_f	Turn-Off Fall Time			—	100	—
E_{off}	Turn-off switch loss		mJ	—	0.9	—
t_{rr}	Diode Reverse Recovery Time	I_F = 25 A, V_{GE} = 0 V, di/dt = -20 A/μs	ns	—	230	—
Q_{rr}	Diode Reverse Recovery Charge		nC	—	3050	—
SCSOA	Short Circuit Safe Operation Area	V_{cc}=600V, R_G=25 Ω ,V_G=15V to 0V	uS	10		—

Typical electrical and thermal characteristics：

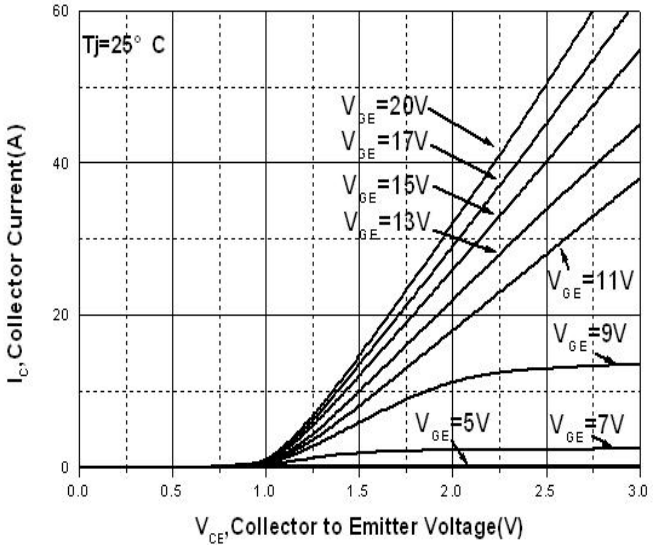


Figure 1: Typical Output Characteristics

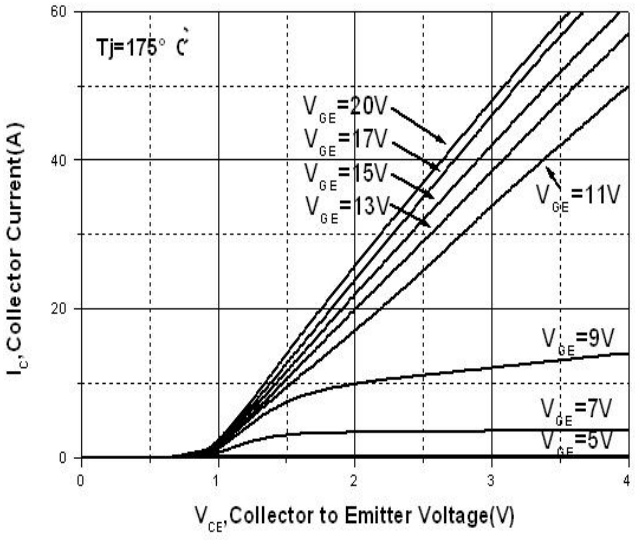


Figure 2: Typical Output Characteristics

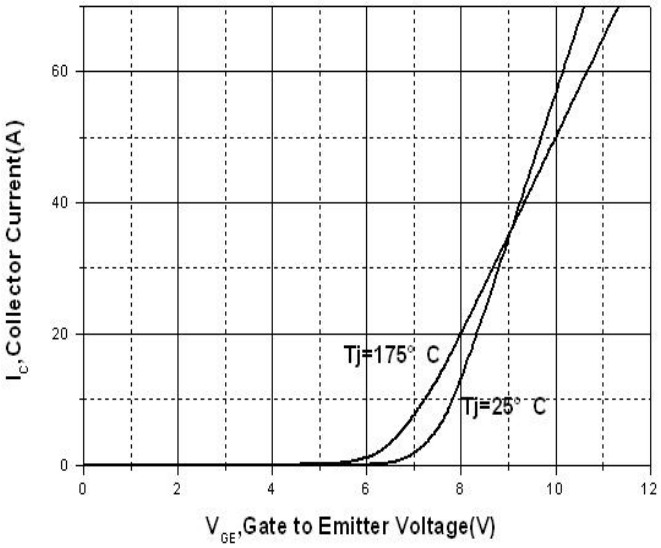


Figure 3: Typical Transfer Characteristics

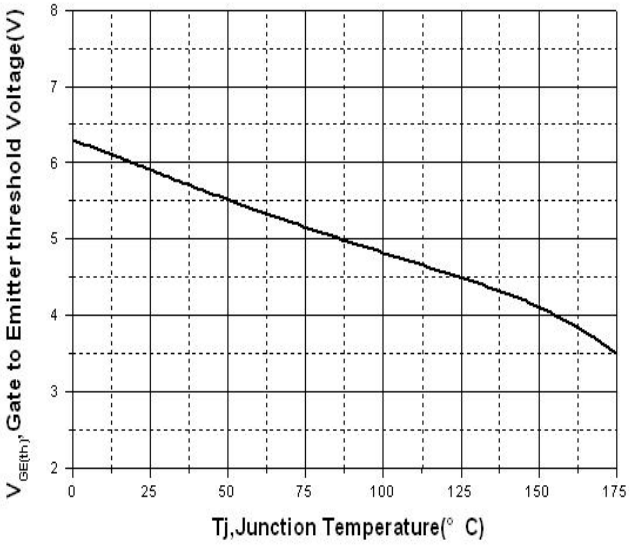


Figure 4: Gate to Emitter threshold Voltage as a function of Tj

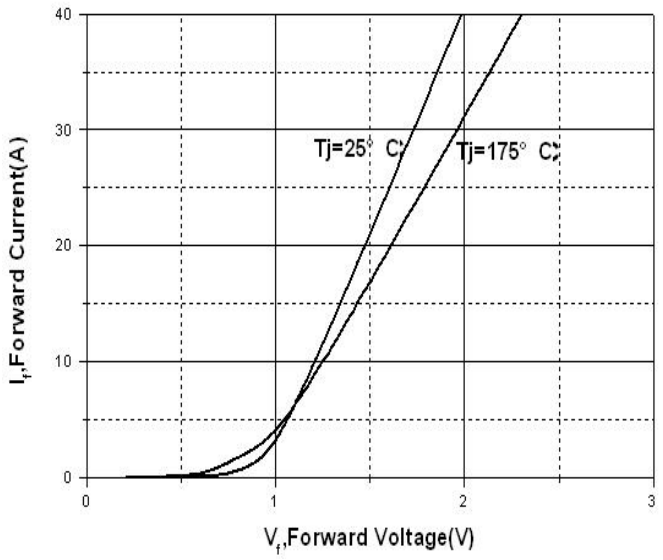


Figure 5: Typical Diode Forward Characteristics

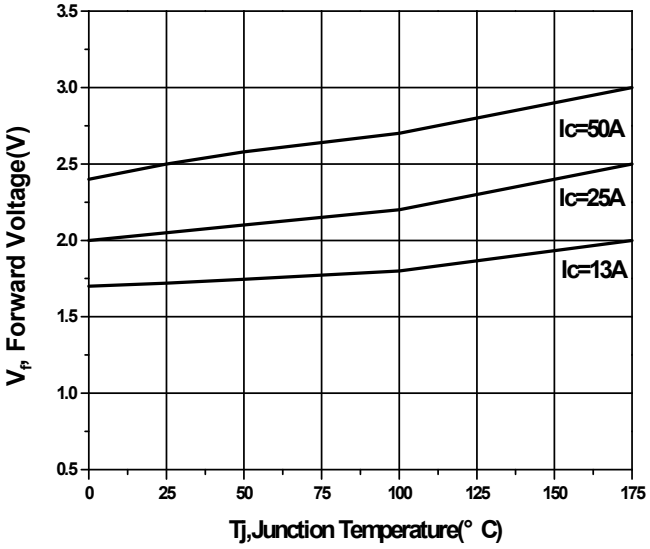


Figure 6: Forward Voltage as a function of Tj

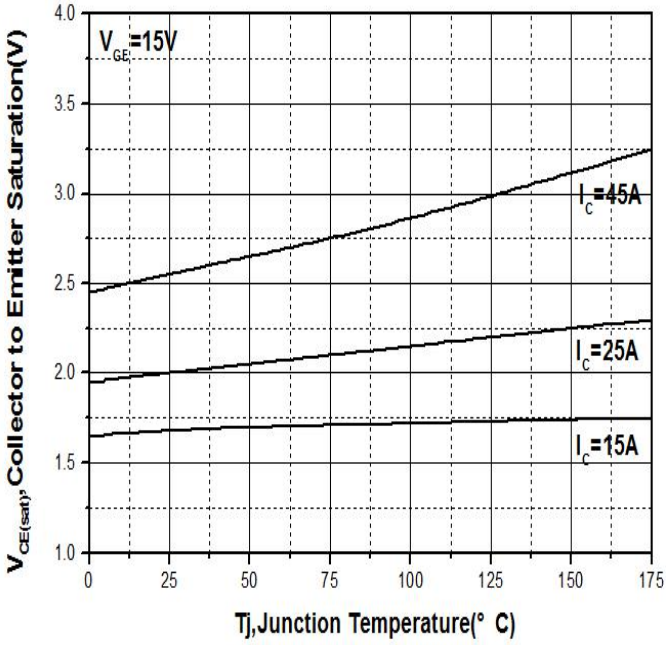


Figure 7: Typical $V_{CE(sat)}$ as a Function of Tj

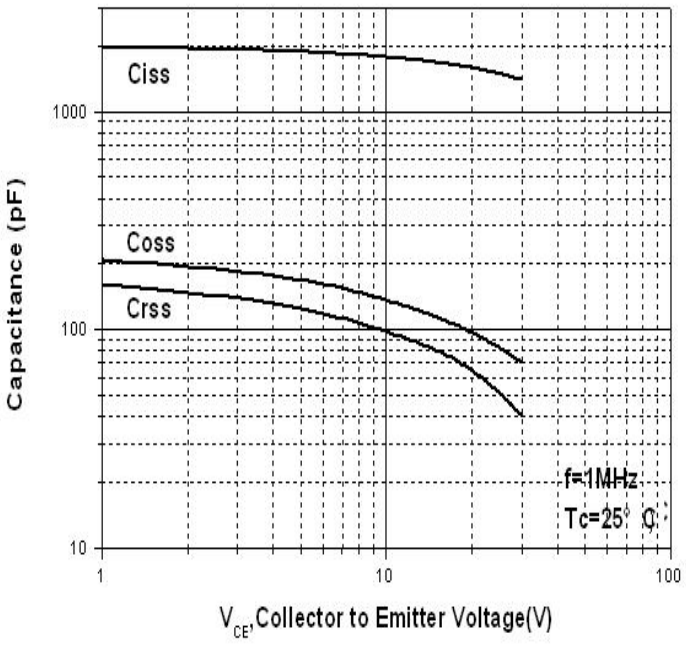


Figure 8: Capacitance Characteristics

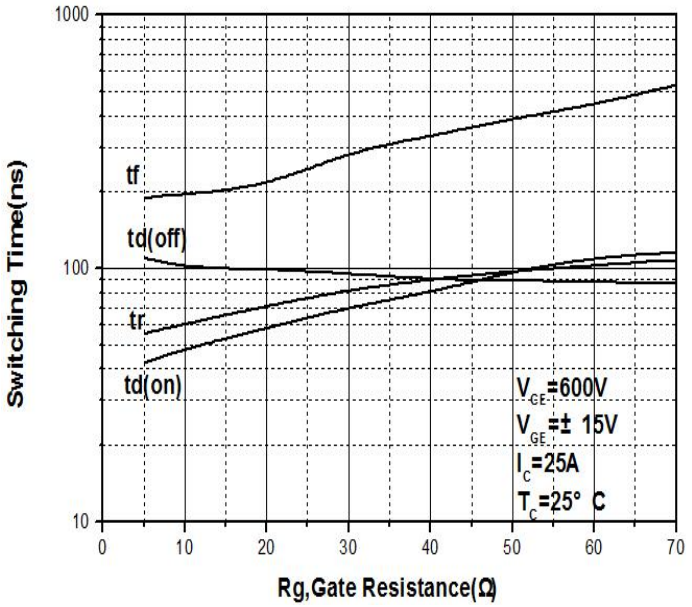


Figure 9: Switching Time Vs Rg

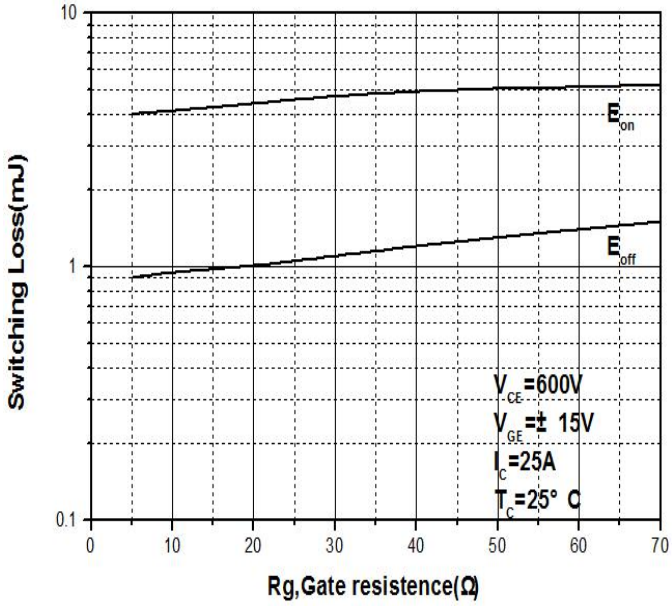


Figure 10: Switching Loss Vs Rg

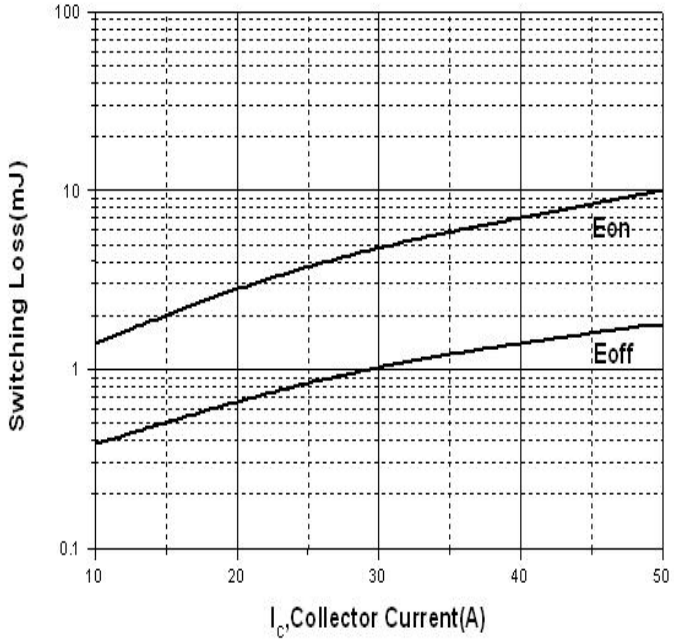


Figure 11: Switching Loss Vs I_C

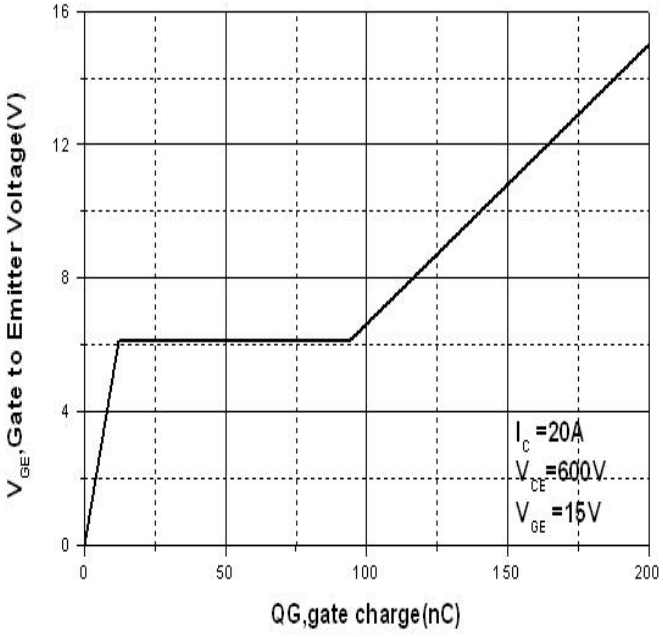


Figure 12: Gate Charge Characteristics

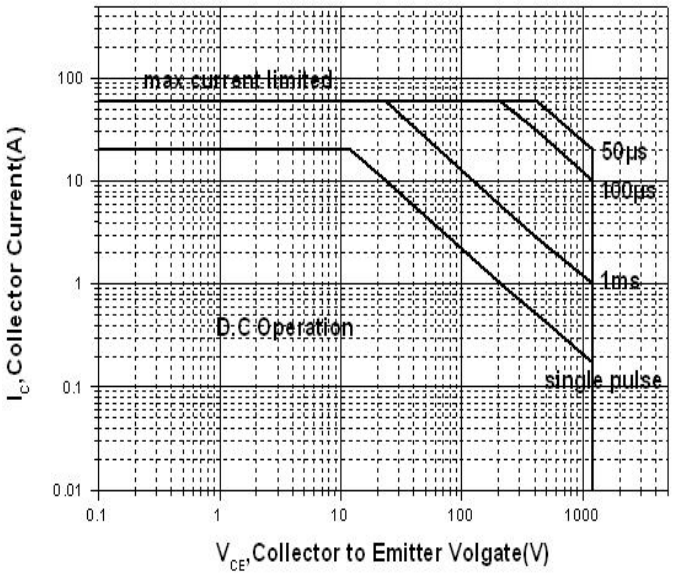


Figure 13: Maximum Forward Biased Safe Operating Area

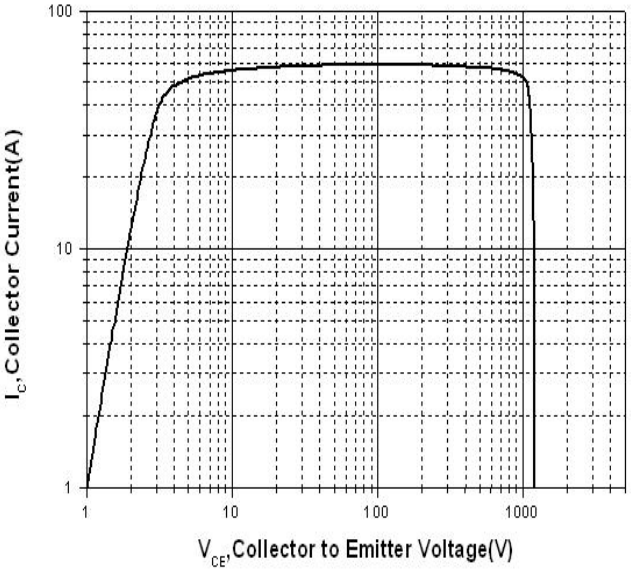


Figure 14: Turn Off Safe Operating Area

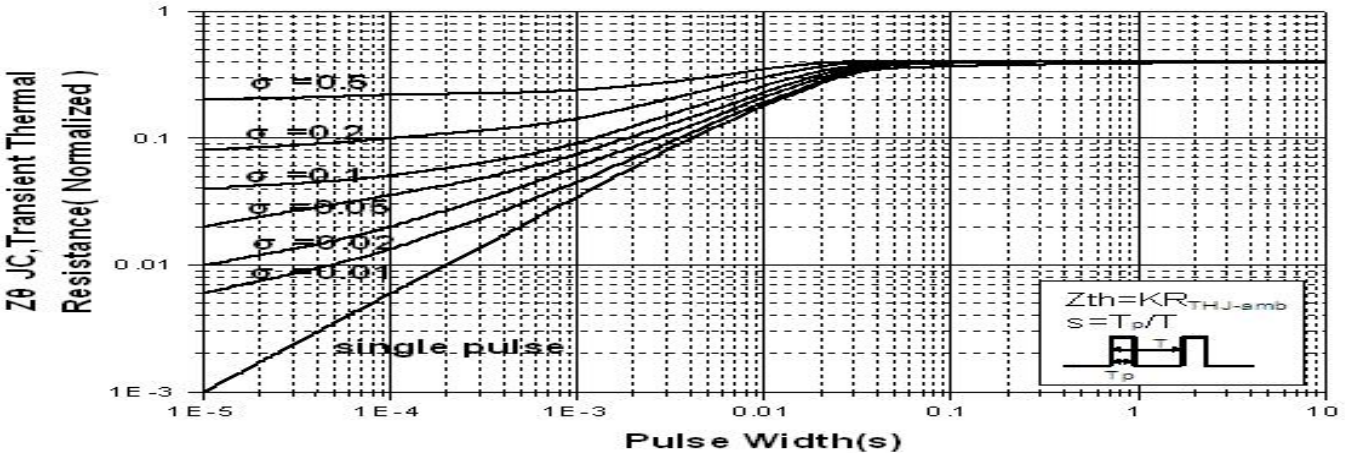
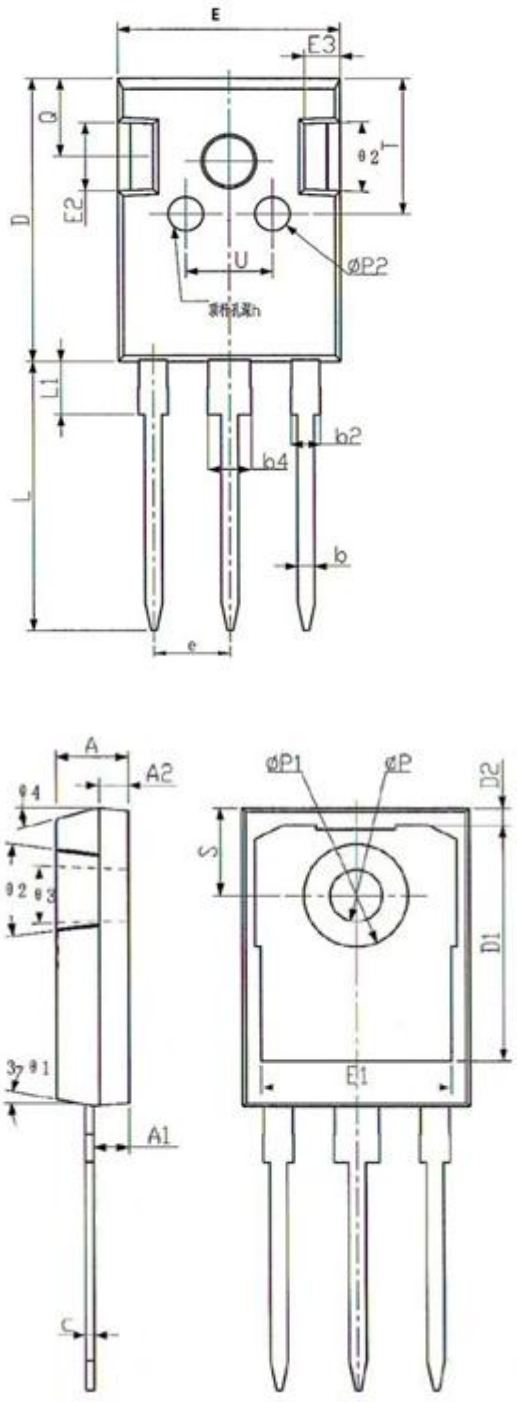


Figure 15: Normalized Maximum Transient Thermal Impedance

Mechanical Data：TO-247



Dimensions			
	unit:mm		
Symbol	Min	Typ	Max
A	4.90	5.00	5.10
A1	2.31	2.41	2.51
A2	1.90	2.00	2.10
b	1.16	1.21	1.26
b2	1.96	2.01	2.06
b4	2.96	3.01	3.06
c	0.59	0.61	0.66
D	20.90	21.00	21.10
D1	16.25	16.55	16.85
D2	1.05	1.20	1.35
E	15.70	15.80	15.90
E1	13.10	13.30	13.50
E2	4.90	5.00	5.10
E3	2.40	2.50	2.60
e	5.44BSC		
h	0.05	–	0.20
L	19.80	19.92	20.01
L1	–	–	4.30
ΦP	3.50	3.60	3.70
ΦP1	–	–	7.30
ΦP2	2.40	2.50	2.60
Q	5.60	5.80	6.00
S	6.15BSC		
T	9.80	–	10.20
U	6.00	–	6.40
θ1	6°	7°	8°
θ2	4°	5°	6°
θ3	1°		1.5°
θ4	14°	15°	16°

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