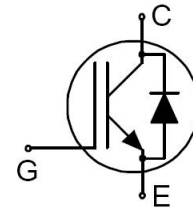


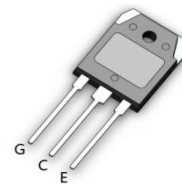
### 1350V , 25A , Trench-FS IGBT

#### Features

- ◆ Advanced Trench+FS (Field Stop) IGBT technology
- ◆ Low Collector-Emitter Saturation voltage, typical data is 1.9V @ 25A.
- ◆ Easy parallel switching capability due to positive Temperature coefficient in Vce.
- ◆ Fast switching
- ◆ High input impedance
- ◆ Pb- Free product



Schematic Diagram



TO3PN

#### Applications

- ◆ Power switch circuit of induction cooker.

Absolute Max Ratings(T <sub>J</sub> = 25°C unless otherwise noted)			
Symbol	Parameter	Units	Maximum
V <sub>CES</sub>	Collector-to-Emitter Voltage	V	1350
V <sub>GES</sub>	Gate to Emitter Voltage	V	± 30
I <sub>C</sub> @ TC = 25°C	Collector current @T <sub>c</sub> = 25 °C	A	50
I <sub>C</sub> @ TC = 100°C	Collector Current @T <sub>c</sub> = 100 °C	A	25
I <sub>CM</sub>	Pulsed Drain Current <sup>②</sup>	A	75
P <sub>D</sub>	Power Dissipation @T <sub>c</sub> = 25 °C	W	310
	Power Dissipation @T <sub>c</sub> = 100 °C	W	155
T <sub>J</sub>	Operating Junction Temperature Range	°C	-50 to + 175
T <sub>STG</sub>	Storage Temperature Range	°C	-50 to + 175
T <sub>L</sub>	Maximum Temperature of Soldering	°C	260
R <sub>θJC</sub>	Maximum Junction-to-Case <sup>①</sup>	°C/W	0.48
R <sub>θJA</sub>	Maximum Junction-to-Ambient <sup>②</sup>	°C/W	40

① These 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<sub>J(MAX)</sub>=175° C.

② The R<sub>θJA</sub> is the sum of the thermal impedance from junction to case R<sub>θJC</sub> and case to ambient.

Electrical characteristics(T <sub>J</sub> = 25°C unless otherwise noted)						
Symbol	Parameter	Test conditions	Units	Min.	Typ.	Max.
V <sub>(BR)CES</sub>	Collector - Emitter breakdown voltage	V <sub>GE</sub> = 0V, I <sub>D</sub> = 0.5mA	V	1350	—	—
V <sub>CE(sat)</sub>	Collector-Emitter Saturation voltage	V <sub>GE</sub> =15V, I <sub>C</sub> =25A, T <sub>C</sub> =25°C	V	—	1.9	2.1
		V <sub>GE</sub> =15V, I <sub>C</sub> =25A, T <sub>C</sub> =125°C	V	—	2.05	—
V <sub>GE(th)</sub>	Gate threshold voltage	V <sub>GE</sub> = V <sub>CE</sub> , I <sub>D</sub> = 0.4mA	V	4.0	5.2	6.5
V <sub>F</sub>	Diode Forward voltage	I <sub>C</sub> =25A	V	—	1.7	2.0
I <sub>GES</sub>	Gate to Emitter Forward Leakage	V <sub>ge</sub> =+30V	nA	—	—	200
I <sub>GESR</sub>	Gate to Emitter reverse Leakage	V <sub>ge</sub> =-30V		-200	—	—
I <sub>CES</sub>	Zero gate voltage collector current	V <sub>CE</sub> =1350V	uA	—	—	100

Dynamic characteristics(T <sub>J</sub> = 25°C unless otherwise noted)						
Symbol	Parameter	Test conditions	Units	Min.	Typ.	Max.
C <sub>iss</sub>	Input capacitance	V <sub>GE</sub> = 0V V <sub>CE</sub> = 25V f = 1MHz	pF	—	2280	—
C <sub>oss</sub>	Output capacitance			—	63	—
C <sub>rss</sub>	Reverse transfer capacitance			—	45	—
Q <sub>g</sub>	Total gate charge	I <sub>C</sub> =20A, V <sub>CE</sub> =600V, V <sub>GE</sub> =15V	nC	—	192	—
Q <sub>ge</sub>	Gate-to-Emitter charge			—	16	—
Q <sub>gc</sub>	Gate-to-Collector("Miller") charge			—	78	—
T <sub>d(off)</sub>	Turn-Off DelayTime	T <sub>J</sub> =25°, V <sub>CC</sub> =600V, I <sub>C</sub> =25A, R <sub>g</sub> =10ohm, V <sub>GE</sub> =15V	ns	—	190	—
t <sub>f</sub>	Turn-Off Fall Time			—	100	—
E <sub>off</sub>	Turn-off switch loss			mJ	—	0.9
t <sub>rr</sub>	Diode Reverse Recovery Time	I <sub>F</sub> = 25 A, V <sub>GE</sub> = 0 V, di/dt = -20 A/μs	ns	—	230	—
Q <sub>rr</sub>	Diode Reverse Recovery Charge			nC	—	3050

## Typical electrical and thermal characteristics:

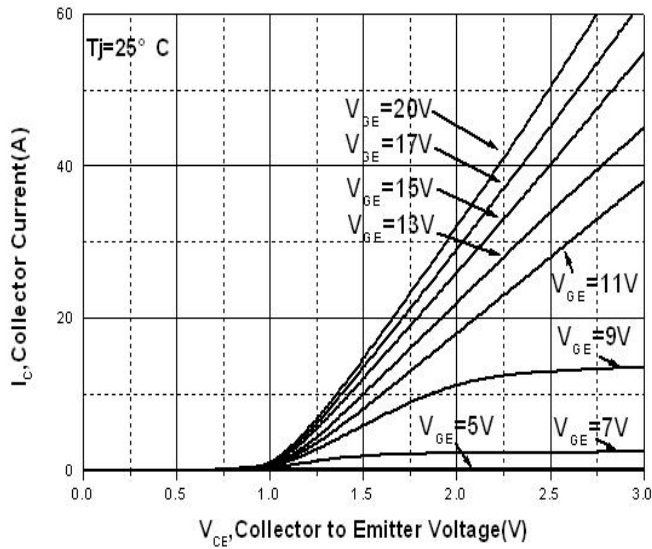


Figure 1: Typical Output Characteristics

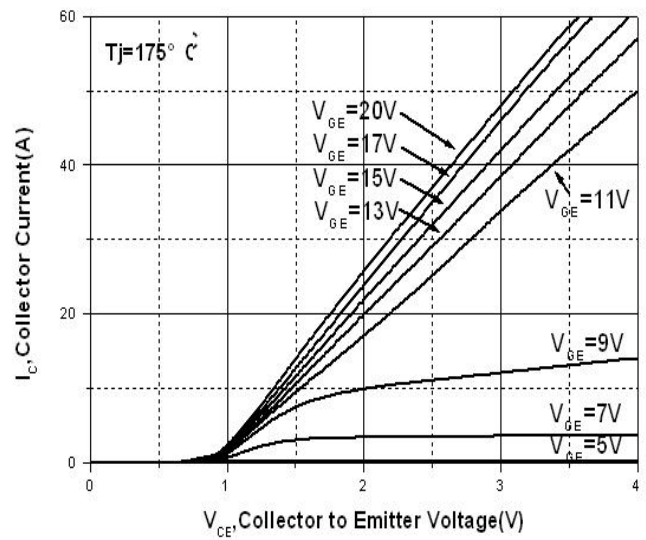


Figure 2: Typical Output Characteristics

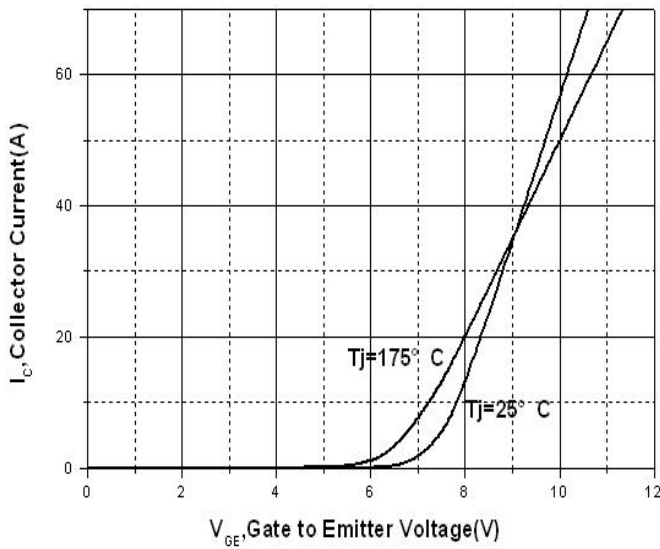


Figure 3: Typical Transfer Characteristics

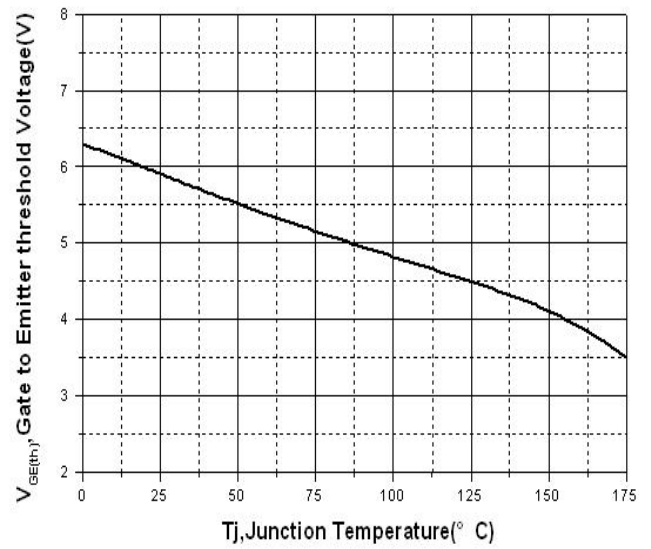


Figure 4: Gate to Emitter threshold Voltage as a function of Tj

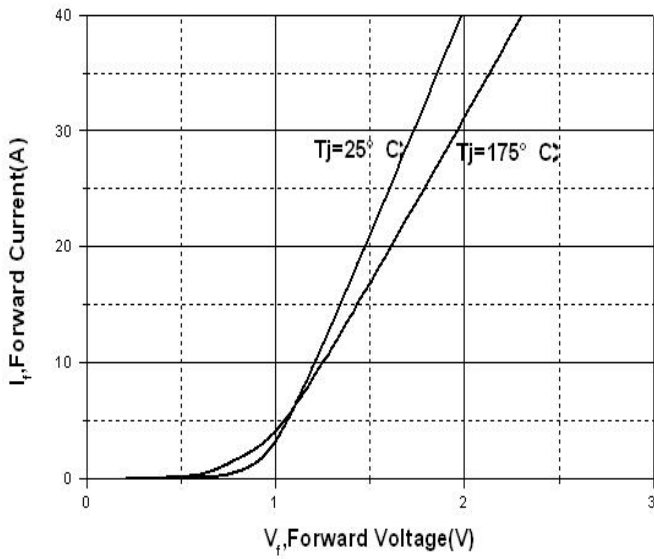


Figure 5: Typical Diode Forward Characteristics

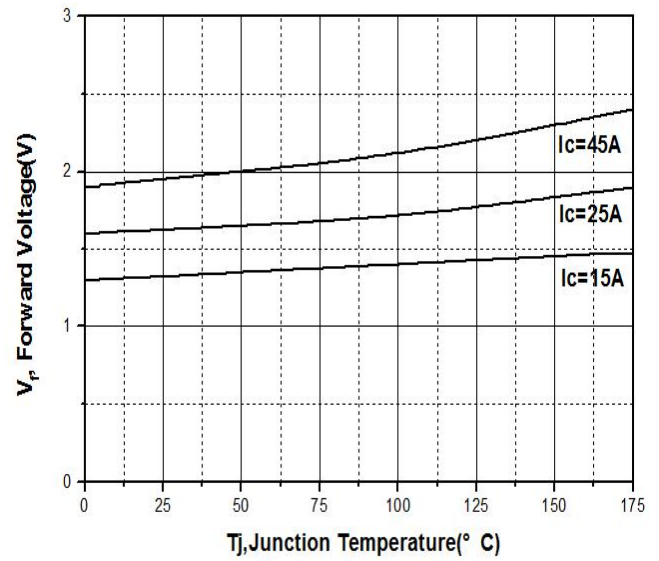


Figure 6: Forward Voltage as a function of  $T_J$

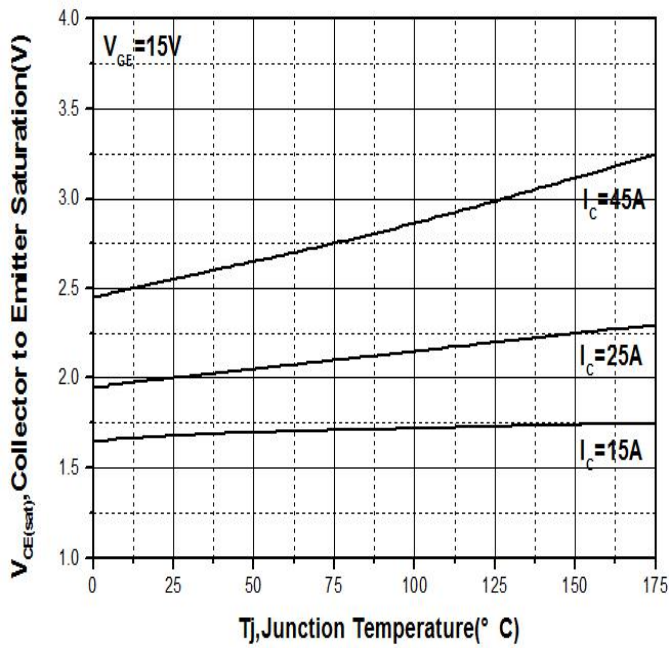


Figure 7: Typical  $V_{CE(sat)}$  as a Function of  $T_J$

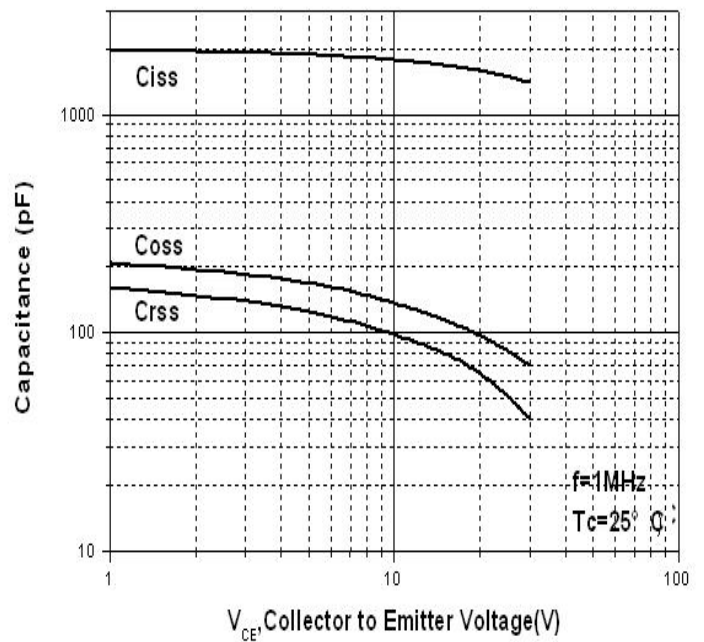


Figure 8: Capacitance Characteristics

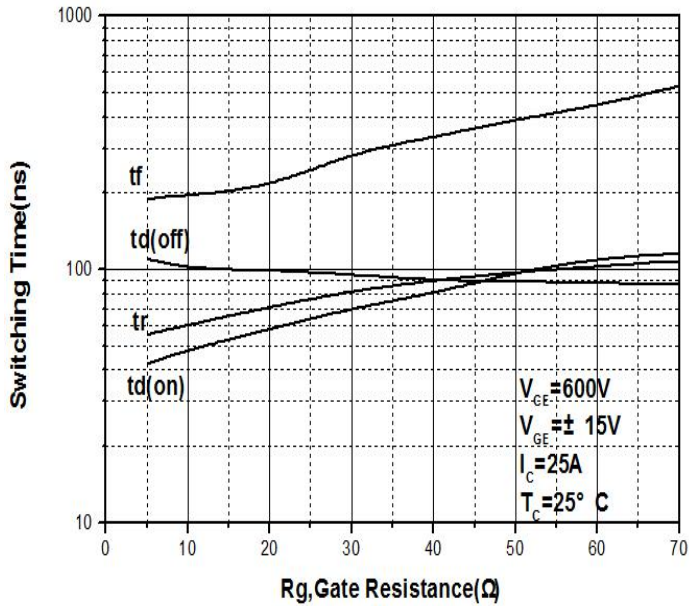


Figure 9: Switching Time Vs Rg

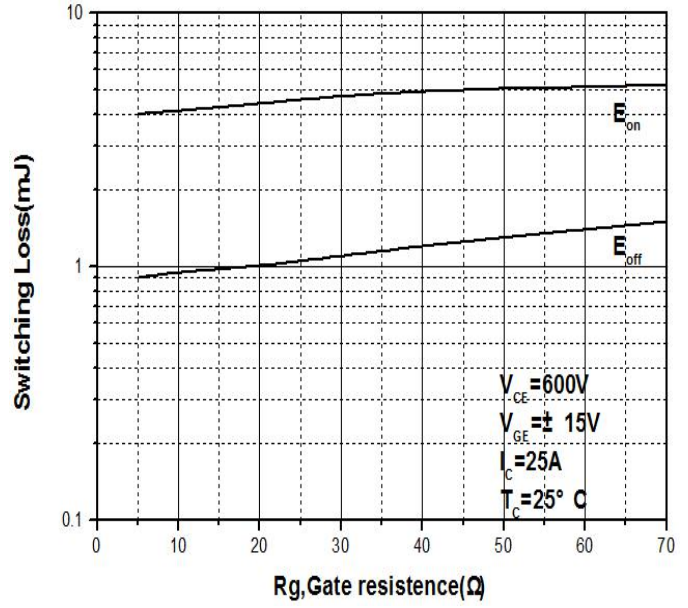


Figure 10: Switching Loss Vs Rg

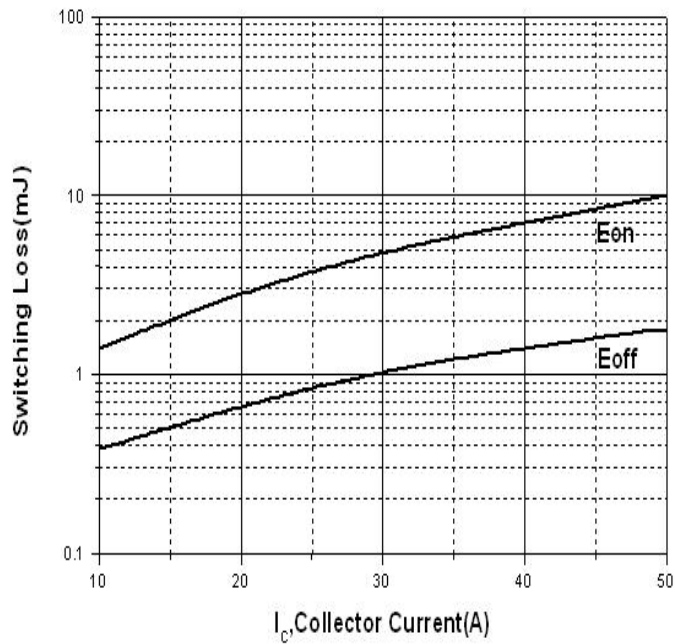


Figure 11: Switching Loss Vs  $I_C$

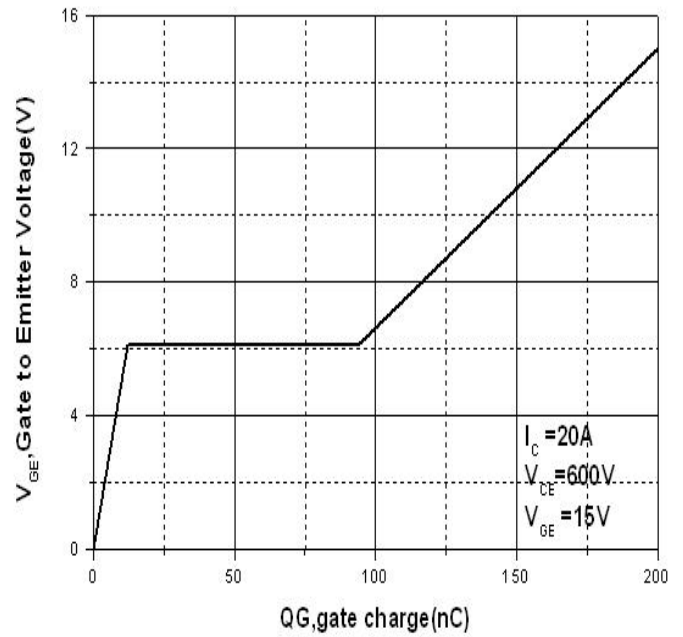


Figure 12: Gate Charge Characteristics

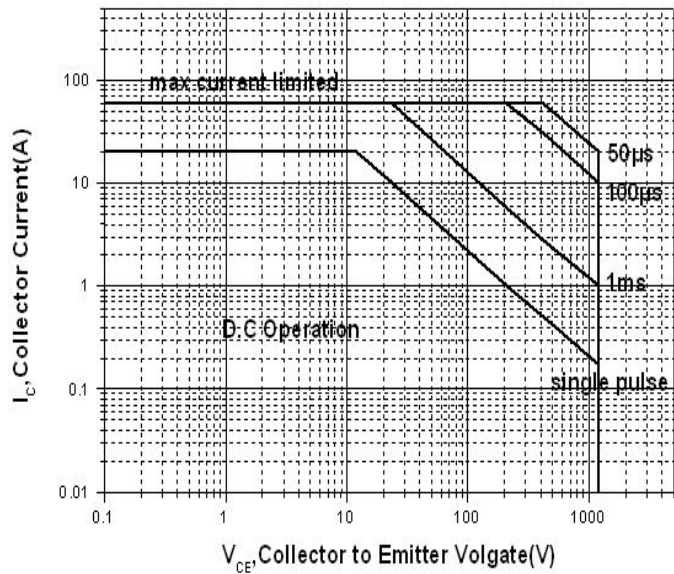


Figure 13: Maximum Forward Biased Safe Operating Area

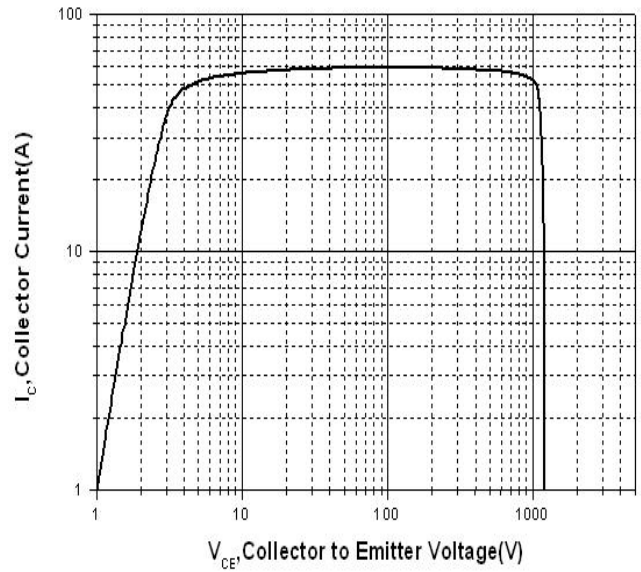


Figure 14: Turn Off Safe Operating Area

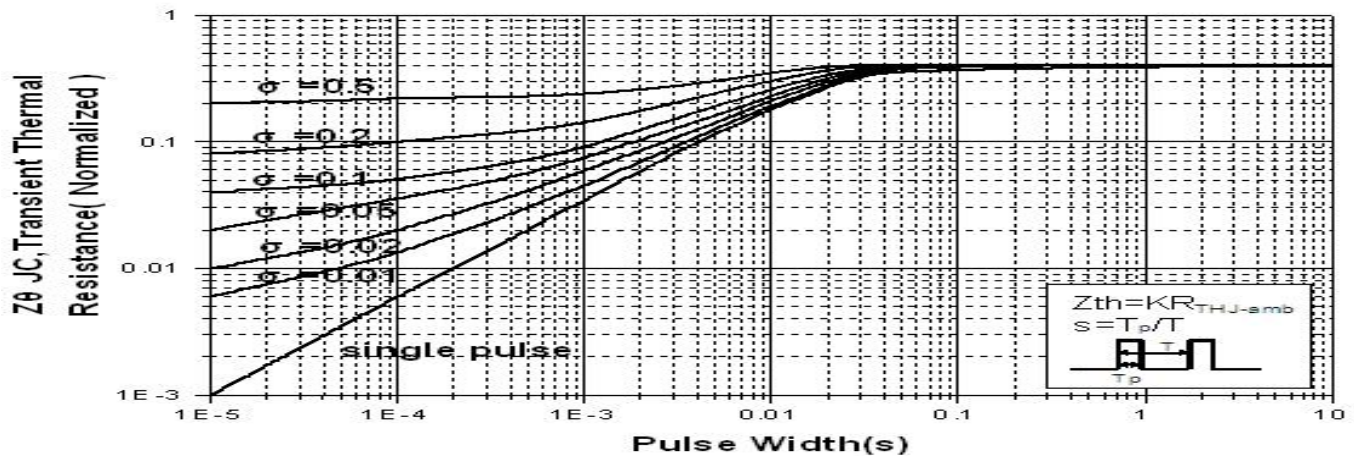
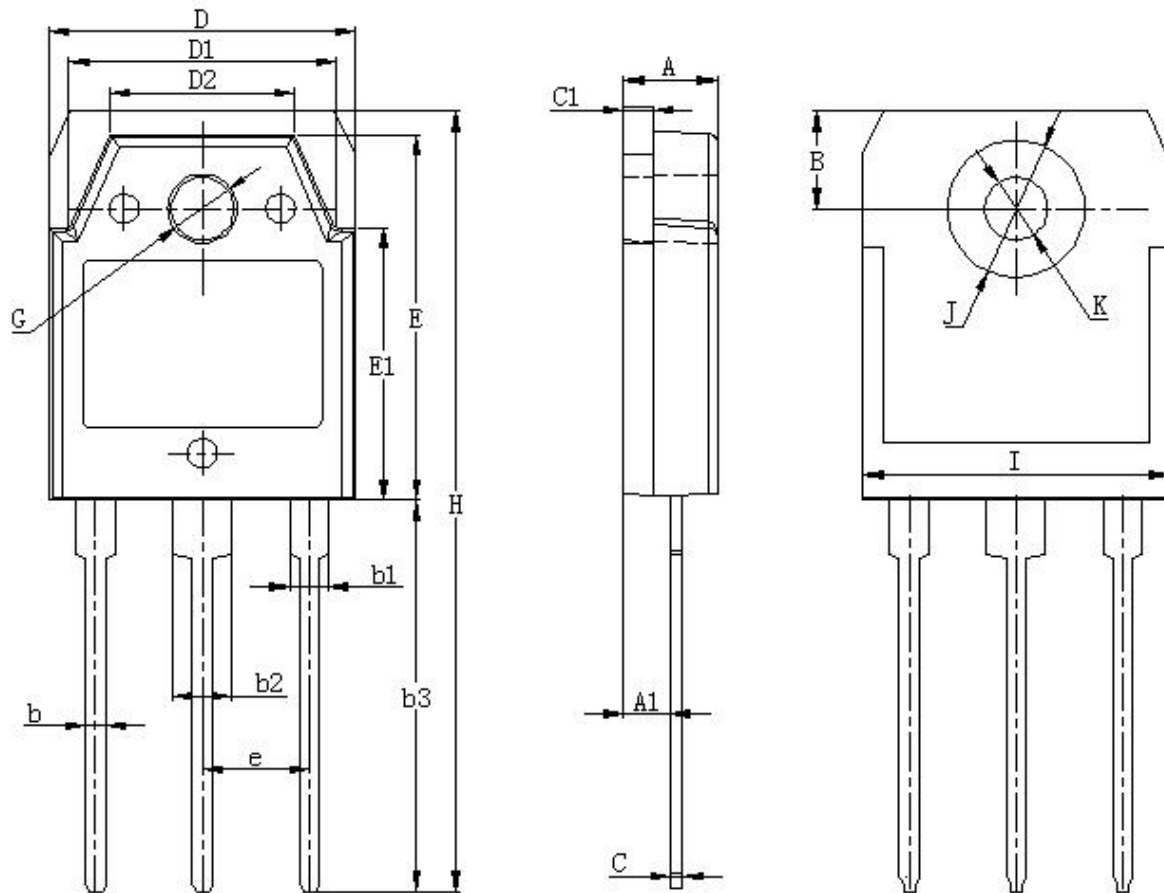


Figure 15: Normalized Maximum Transient Thermal Impedance

## Mechanical Data: TO3PN



Dim	Millimeters		Dim	Millimeters	
	MIN	MAX		MIN	MAX
A	4.6	5.0	D1	13.4	13.8
A1	2.2	0.2	D2	9.42	9.82
B	4.8	5.2	E	18.5	18.9
b	0.8	1.2	E1	13.7	14.1
b1	2.0	2.2	e	(5.45)	
b2	3.0	3.2	G	3.3	3.7
b3	19.7	20.3	H	39.5	40.5
C	0.55	0.65	I	15.54	15.94
C1	1.45	1.55	J	6.8	7.2
D	15.4	15.8	K	3	3.4

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