

Trenchstop Insulated Gate Bipolar Transistor

Description:

The KGP 50N65FTD is use advanced field stop(FS) technology.
 The 650V FS IGBT offers superior conduction and switching performances.



Features:

- 650V Breakdown VoltageLow saturation voltage:VCE(sat),
- typ=1.6V@IC=50A and TC=25°C
- FS Trench Technology, Positive temperature coefficient

Mechanical Data

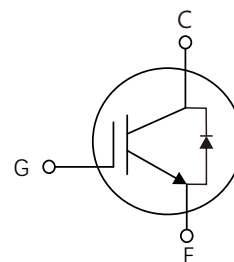
- Case:TO-247 Package

Application

- Solar Converters
- Welding Converters
- UPS



Block Diagram



Product Summary		
V _{CEs} (V)	V _{CEsA} (V)Typ	I _c (A)
650	1.6 @15V,50A	50

Table1 Absolute Maximum Ratings (Tc=25°C, unless otherwise specified)

Parameters	Symbol	Value	Unit
Collector-Emmitter Voltage	V _{CEs}	650	V
Gate-Emmitter Voltage	V _{GES}	±20	V
Collector Current-continuous	I _c	Tc=25°C 100	A
		Tc=100°C 50	
Collector Current – pulse (Note 1)	I _{CM}	150	A
Power Dissipation	P _D	Tc=25°C 440	W
		Tc=100°C 220	
Operating Junction Temperature	T _J	-55 ~ +175	°C
Storage Temperature Range	T _{STG}	-55 ~ +175	

Table 2. Thermal Characteristics

Parameters	Symbol	Value	Unit
IGBT Thermal resistance Junction to Ambient	$R_{\theta JA}$	40	$^{\circ}\text{C}/\text{W}$
IGBT Thermal resistance Junction to Case	$R_{\theta JC}$	0.343	$^{\circ}\text{C}/\text{W}$
Diode Thermal resistance Junction to Case	$R_{\theta JC}$	0.47	$^{\circ}\text{C}/\text{W}$

Table 3. Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise specified)

Parameters		Symbol	Test Conditions		Min	Typ	Max	Unit
Off Characteristics								
Collector-Emmitter Voltage		BV _{CES}	V _{GE} =0V,I _C =250μA		650			V
Zero Gate Voltage Collector Current		I _{CES}	V _{CE} =650V,V _{GE} =0V				10	μA
Gate-body Leakage Current	Forward	I _{GES}	V _{GS} =20V,V _{DS} =0V				250	nA
	Reverse		V _{GS} = -20V,V _{DS} =0V				-250	nA
On Characteristics								
Gate Threshold Voltage		V _{GE(TH)}	V _{CE} =V _{GE} ,I _C =1mA		4.0	5.0	6.0	V
Collector-Emmitter saturation Voltage		V _{CESAT}	V _{GE} =15V,I _C =50A	T _J =25°C		1.6	2.2	V
Dynamic Characteristics								
Input Capacitance		C _{IES}	V _{CE} =30V,V _{GE} =0V,f=1.0MHz			3570		pF
Output Capacitance		CO _{ES}				199		pF
Reverse Transfer Capacitance		CR _{ES}				137		pF
Switching Characteristics								
Turn-On Delay Time		td(on)	V _{CE} =400V,I _C =50A, V _{GE} =15V,R _G =10Ω,			73		ns
Turn-On Rise Time		tr				158		ns
Turn-Off Delay Time		td(off)				335		ns
Turn-Off Fall Time		tf				141		ns
Total Gate Charge		Q _G	V _{CE} =400V,I _C =50A, V _{GE} =15V			125		nC
Gate to emitter charge		Q _{GE}				29		nC
Gate to collector charge		Q _{GC}				50		nC
Diode Characteristics								
Diode Continuous Forward Current		I _F	T _C =100°C		50			
Diode Continuous Forward Current		I _{FM}	T _C =100°C		100			
Diode Forward Voltage		V _F	I _F =50A			1.9	2.4	V
Reverse Recovery Time		T _{rr}	I _F =50A,T _J =25°C di/dt=200A/μS			55		ns
Reverse Recovery Charge		Q _{rr}				198		nC

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

Typical Characteristics Diagrams

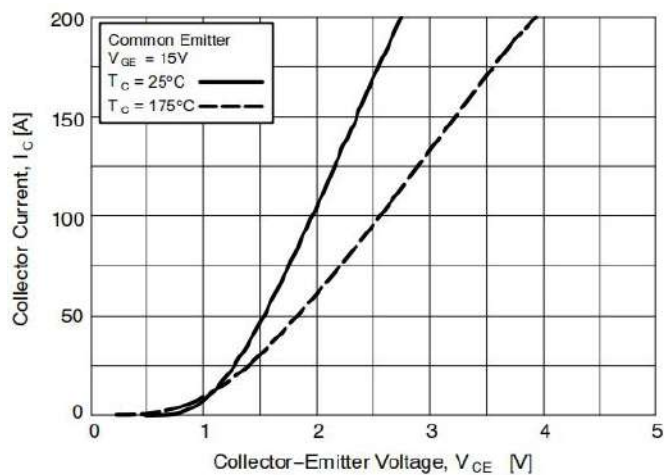


Figure 1. Typical Saturation Voltage

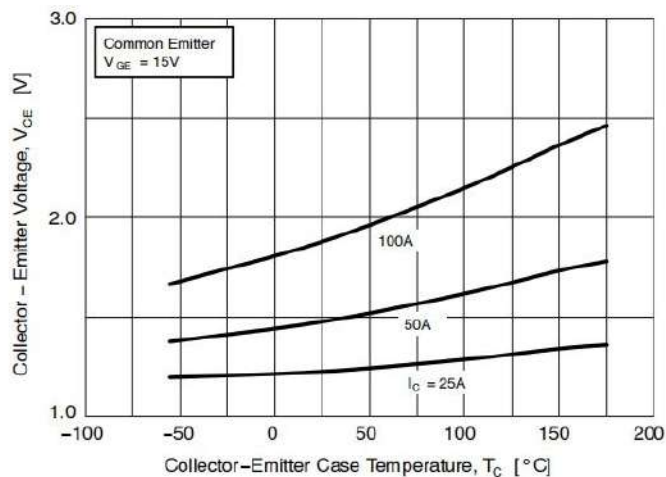


Figure 2. Saturation Voltage vs. Case Temperature

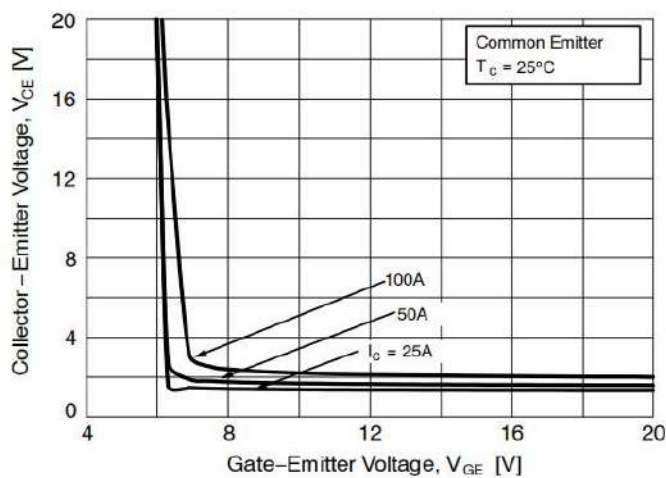


Figure 3. Saturation Voltage vs. V_{GE}

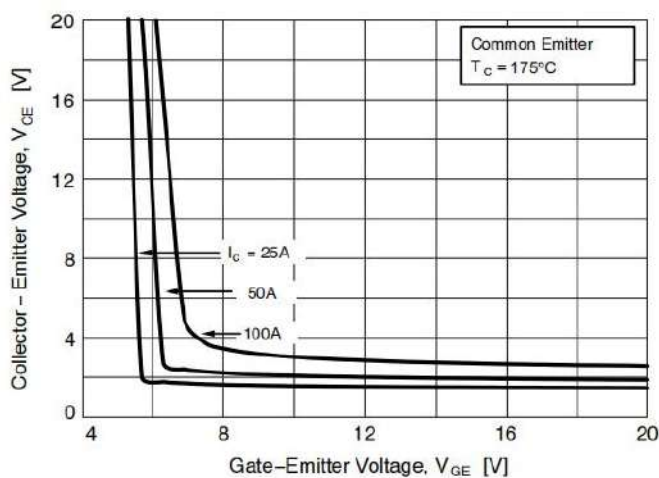


Figure 4. Saturation Voltage vs. V_{GE}

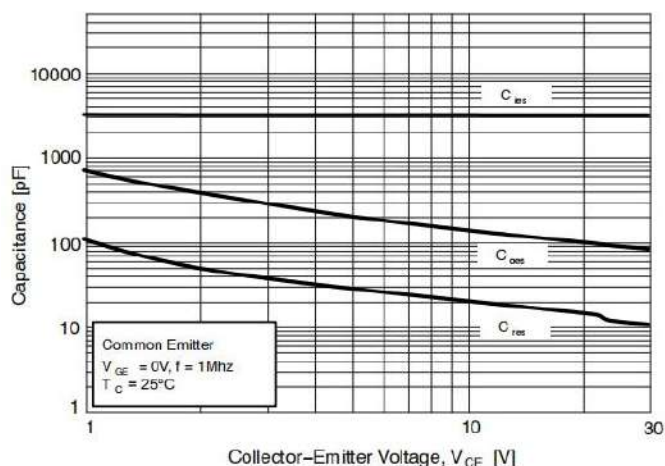


Figure 5. Capacitance Characteristics

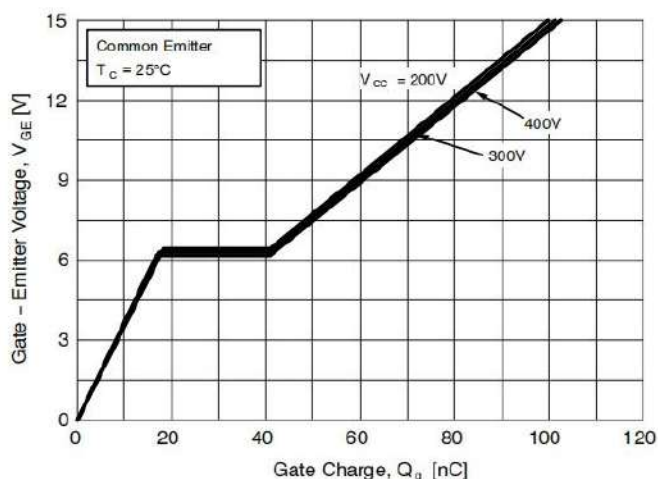


Figure 6. Gate Charge

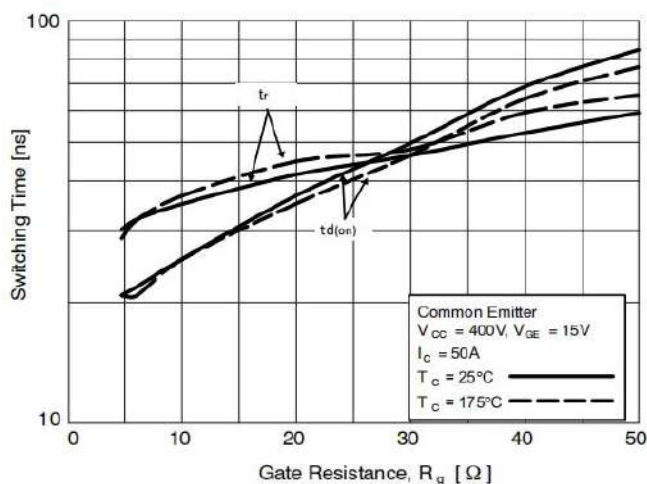


Figure 7. Turn-On Characteristics vs. Gate Resistance

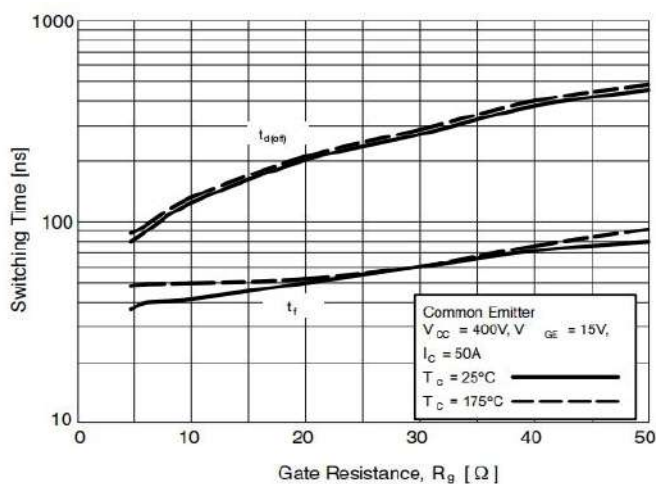


Figure 8. Turn-Off Characteristics vs. Gate Resistance

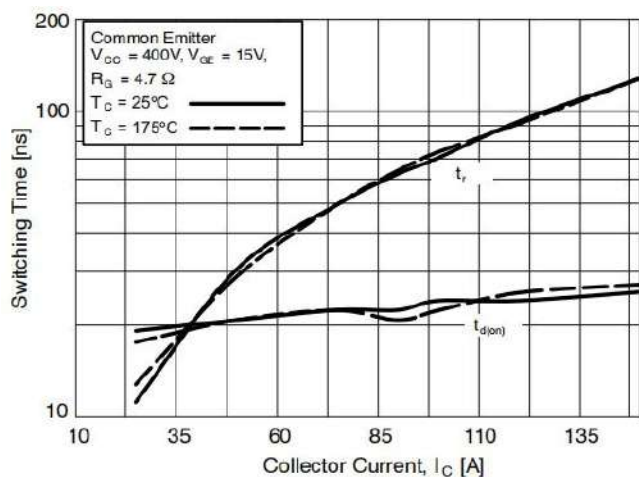


Figure 9. Turn-On Characteristics vs. Collector Current

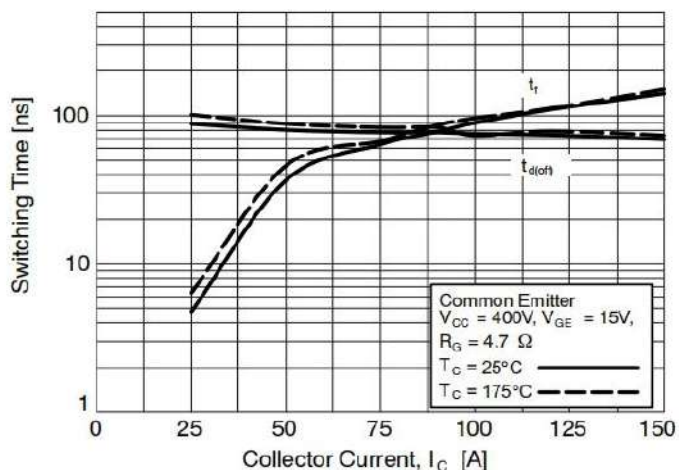


Figure 10. Turn-Off Characteristics vs. Collector Current

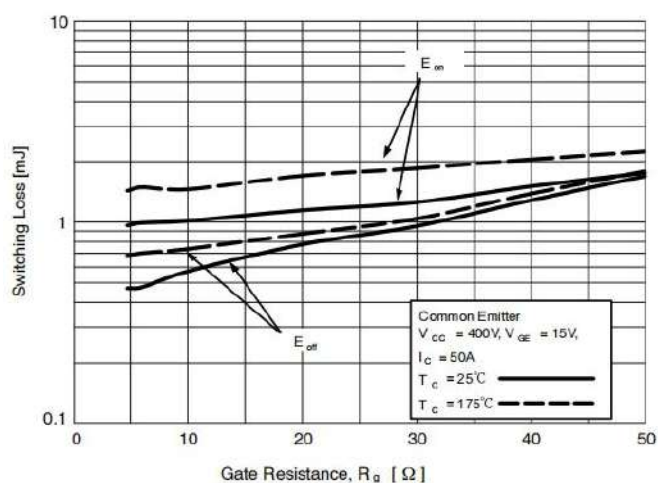


Figure 11 . Switching Loss vs. Gate Resistance

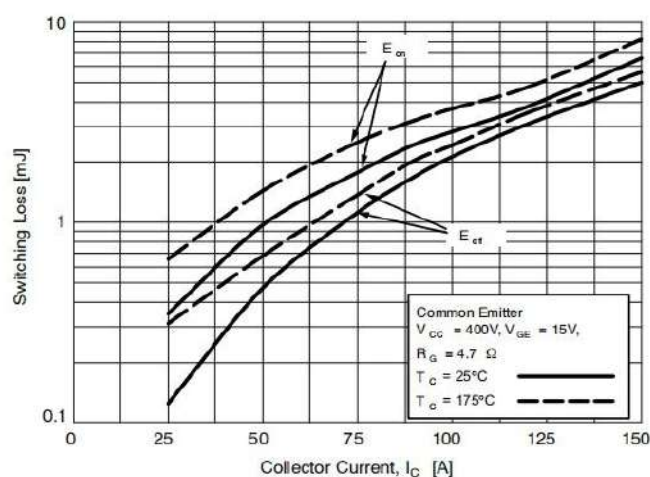


Figure 12 . Switching Loss vs. Collector Current

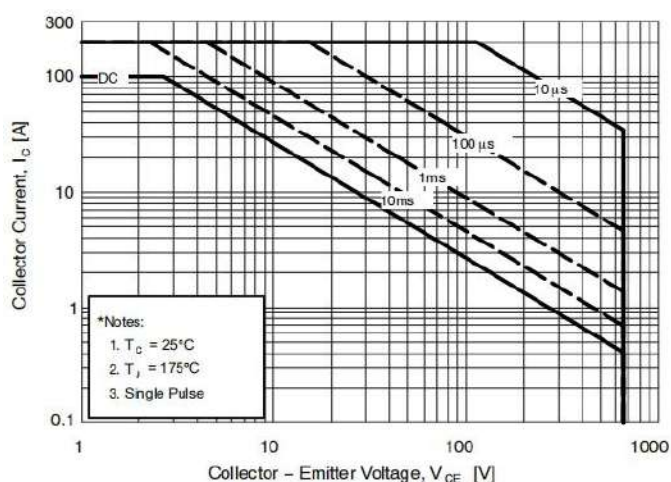


Figure 13 . SOA Characteristics

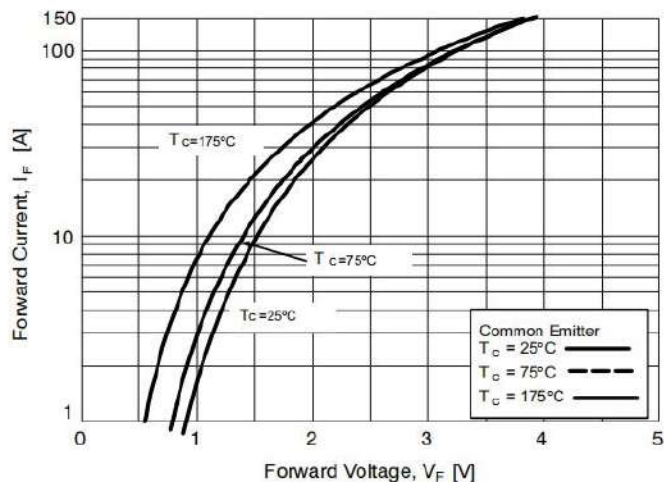


Figure 14 . Forward Characteristics

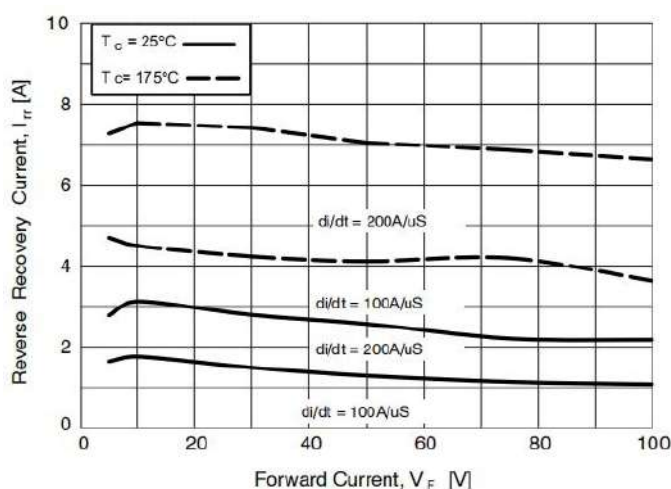


Figure 15 . Reverse Recovery Current

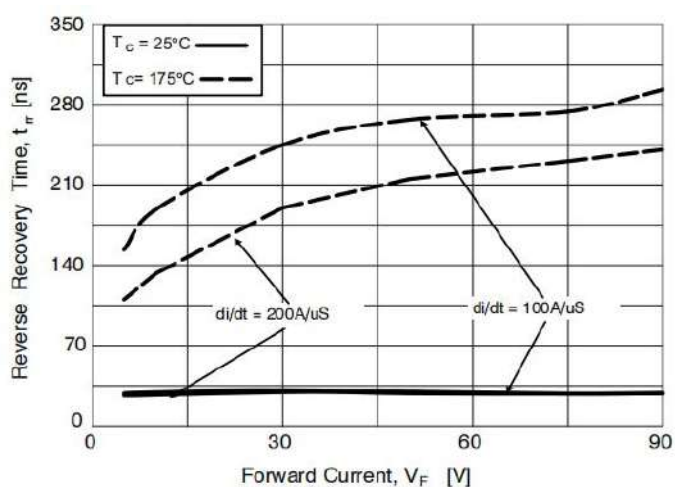


Figure 16 . Reverse Recovery Time

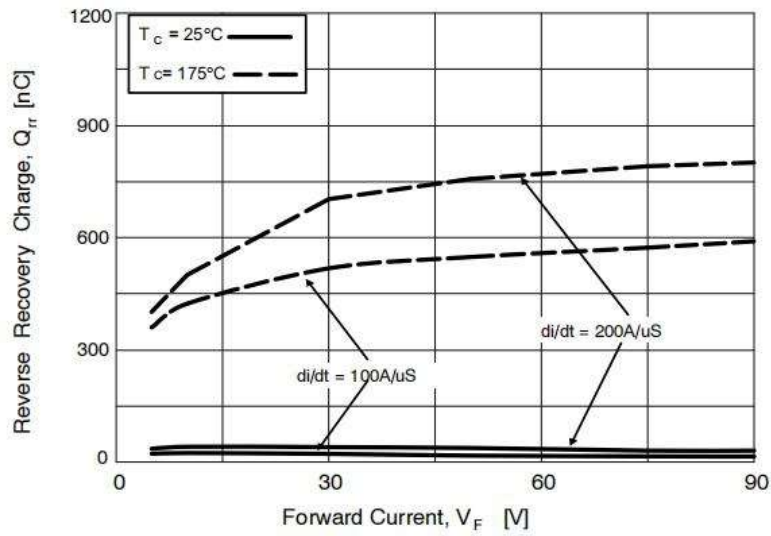


Figure 17 . Stored Charge

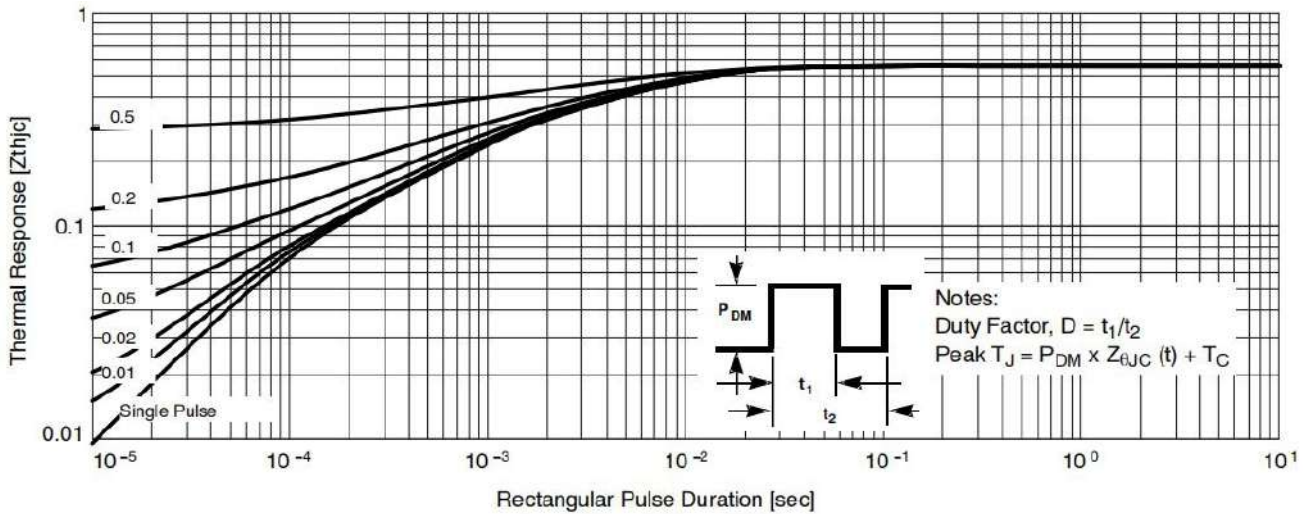


Figure 18 . Transient Thermal Impedance of IGBT

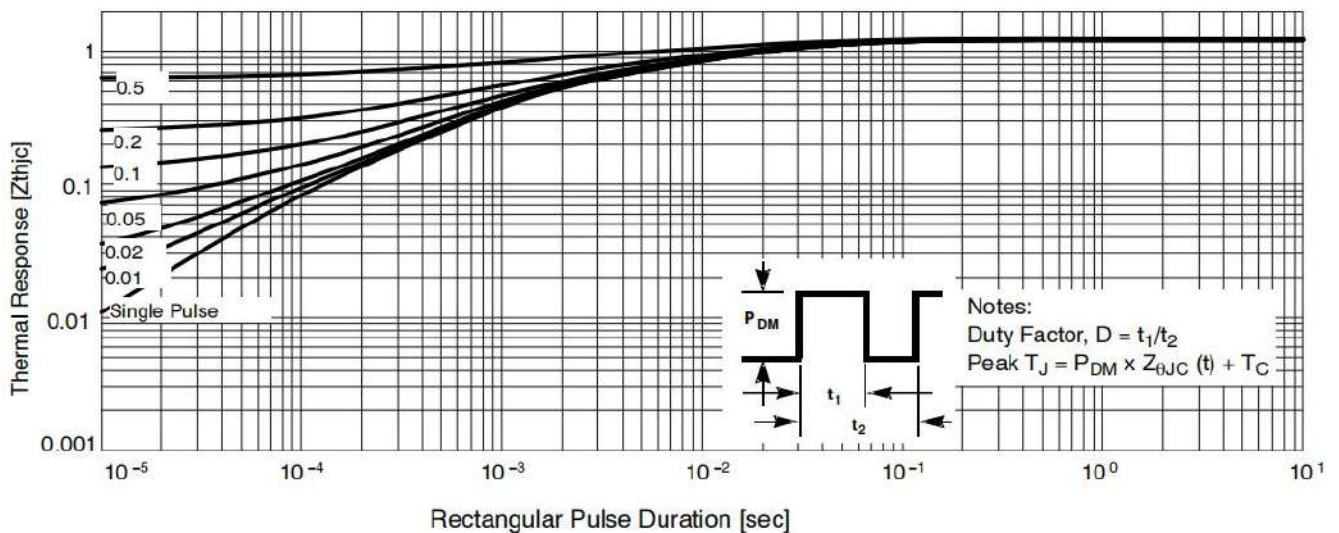
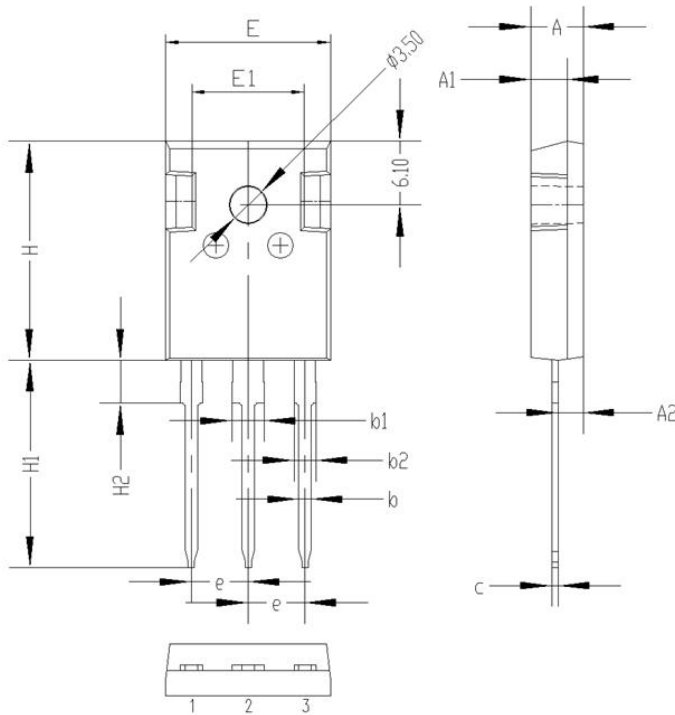


Figure 19 . Transient Thermal Impedance of Diode

Dimensions

TO-247 PACKAGE



Symbol	Dimensions(millimeters)	
	Min.	Max.
A	4.80	5.20
A1	3.30	3.70
A2	2.10	2.50
b	1.00	1.40
b1	2.90	3.30
b2	1.90	2.30
c	0.40	0.80
e	5.25	5.65
E	15.6	16.0
E1	10.6	11.6
H	20.8	21.2
H1	19.4	20.4
H2	3.90	4.30
G	5.90	6.30
ΦP	3.30	3.70