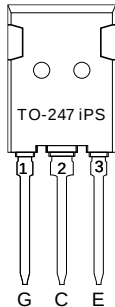
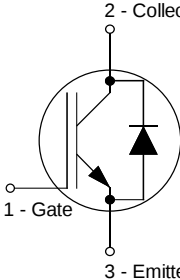


1200V 75A Trench and Field Stop IGBT

Product Information

Features ◆ Advanced Field Stop technology ◆ Low switching power loss ◆ Low switching surge and noise ◆ Low EMI ◆ T_{VJ} 175°C Applications ◆ Industrial UPS ◆ Welding machine ◆ Solar converters ◆ Energy storage ◆ EV Charger	Package Marking and Ordering Information	
	◆ Product Name:	KJG75N120PS
	◆ Marking:	KJG75N120PS
	◆ Package:	TO-247 iPS-3L
	◆ Quantity:	300 pcs
	 TO-247 iPS 1 2 3 G C E  2 - Collector 1 - Gate 3 - Emitter	

Maximum Rated Values ($T_{vj}=25^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CES}	1200	V
Gate-Emitter Voltage	V_{GE}	± 20	V
Transient Gate-Emitter Voltage ($t_p \leq 10 \mu\text{s}$, $D < 0.010$)		± 30	
DC Collector Current, $T_C = 25^{\circ}\text{C}$ (Limited by T_{vj} max)	I_C	150	A
DC Collector Current, $T_C = 100^{\circ}\text{C}$ (Limited by T_{vj} max)		75	
Pulsed collector current (T_p limited by T_{vj} max) ^[1]	I_{Cpuls}	300	
Diode Forward Current, $T_C = 25^{\circ}\text{C}$ (T_p limited by T_{vj} max)	I_F	150	
Diode Forward Current, $T_C = 100^{\circ}\text{C}$ (T_p limited by T_{vj} max)		75	
Turn-Off Safe Operating Area $V_{CE} \leq 1200 \text{ V}$, $T_{vj} \leq 175^{\circ}\text{C}$, $t_p = 1 \mu\text{s}$	-	300	
IGBT Max. Power Dissipation	P_{D_IGBT}	625	W
FWD Max. Power Dissipation	P_{D_FRD}	350	
Operating Junction Temperature	T_{vj}	-40 to 175	$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-55 to 150	

Thermal Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-Ambient	$R_{\theta JA}$	-	-	50	$^{\circ}\text{C/W}$
IGBT Thermal Resistance, Junction-Case	$R_{\theta JC}$	-	-	0.24	
Diode Thermal Resistance, Junction-Case	$R_{\theta JCD}$	-	-	0.43	

Electrical Characteristics (T_{VJ}=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Static Characteristics						
Collector-Emitter Breakdown Voltage	V _{(BR)CES}	V _{GE} =0 V, I _C =0.50 mA	1200	-	-	V
C-E Leakage Current	I _{CES}	V _{CE} =1200 V, V _{GE} =0 V	-	-	200	μA
G-E Leakage Current	I _{GES}	V _{CE} =0 V, V _{GE} =±30 V	-	-	±200	nA
G-E Threshold Voltage	V _{GE(th)}	V _{CE} =V _{GE} , I _C =2.6 mA	5.0	5.8	6.6	V
Collector-Emitter Saturation Voltage	V _{CE(sat)}	V _{GE} =15V, I _C =75 A T _{VJ} =25°C T _{VJ} =175°C	- -	1.95 2.80	2.40 -	V
Diode Forward Voltage	V _F	V _{GE} =0 V, I _F =75 A T _{VJ} =25°C T _{VJ} =175°C	- -	2.2 1.8	3.0 -	
Dynamic Characteristics						
Input Capacitance	C _{ies}	V _{CE} =25 V, V _{GE} =0 V, f=1 MHz	-	19.5	-	pF
Output Capacitance	C _{oes}		-	240	-	
Reverse Transfer Capacitance	C _{res}		-	130	-	
Gate Charge	Q _G	V _{CC} =960 V, I _C =75 A, V _{GE} =15 V	-	590	-	nC
IGBT Switching Characteristics						
Turn-on Delay Time	t _{d(on)}	T _{VJ} =25°C, V _{CC} =600 V, I _C =75 A, V _{GE} =15 V, R _G =0.6 Ω, Inductive load	-	42	-	ns
Rise Time	t _r		-	146	-	
Turn-off Delay Time	t _{d(off)}		-	122	-	
Fall Time	t _f		-	105	-	
Turn-on Energy	E _{on}	T _{VJ} =25°C, V _{CC} =600 V, I _C =75 A, V _{GE} =15 V, R _G =0.6 Ω, Inductive load	-	4.0	-	mJ
Turn-off Energy	E _{off}		-	2.4	-	
Total Switching Energy	E _{ts}		-	6.4	-	
Turn-on Delay Time	t _{d(on)}	T _{VJ} =175°C, V _{CC} =600 V, I _C =75 A, V _{GE} =15 V, R _G =0.6 Ω, Inductive load	-	41	-	ns
Rise Time	t _r		-	138	-	
Turn-off Delay Time	t _{d(off)}		-	142	-	
Fall Time	t _f		-	132	-	
Turn-on Energy	E _{on}	T _J =175°C, V _{CC} =600 V, I _F =75 A, di _F /dt=680 A/μs	-	3.6	-	mJ
Turn-off Energy	E _{off}		-	3.4	-	
Total Switching Energy	E _{ts}		-	7.0	-	
Diode Characteristics						
Diode Reverse Recovery Time	t _{rr}	T _J =25°C, V _{CC} =600 V, I _F =75 A, di _F /dt=680 A/μs	-	210	-	ns
Diode Reverse Recovery Charge	Q _{rr}		-	2.9	-	μC
Diode Peak Reverse Recovery Current	I _{rrm}		-	26	-	A
Diode Reverse Recovery Time	t _{rr}	T _J =175°C, V _{CC} =600 V, I _F =75 A, di _F /dt=680 A/μs	-	330	-	ns
Diode Reverse Recovery Charge	Q _{rr}		-	10.5	-	μC
Diode Peak Reverse Recovery Current	I _{rrm}		-	64	-	A

Typical Electrical and Thermal Characteristics

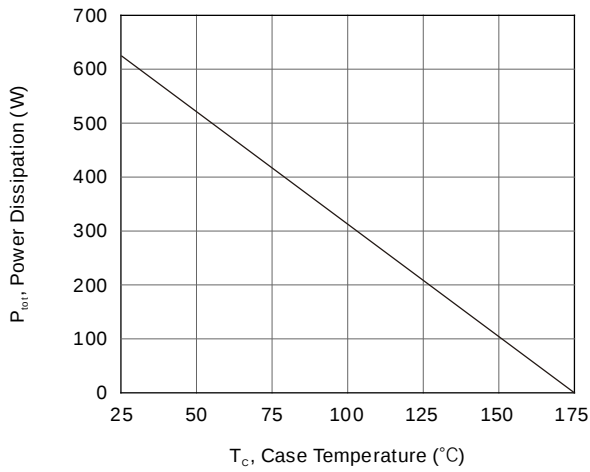


Figure 1. Power dissipation vs. case temperature ($T_{vj} \leq 175^\circ\text{C}$)

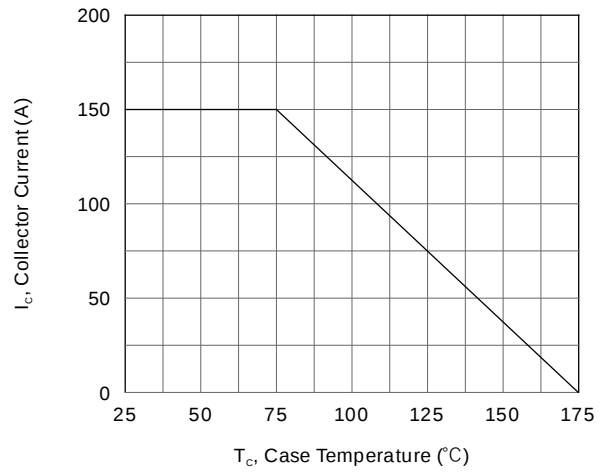


Figure 2. Collector current vs. case temperature ($V_{GE} \leq 15\text{V}$, $T_{vj} \leq 175^\circ\text{C}$)

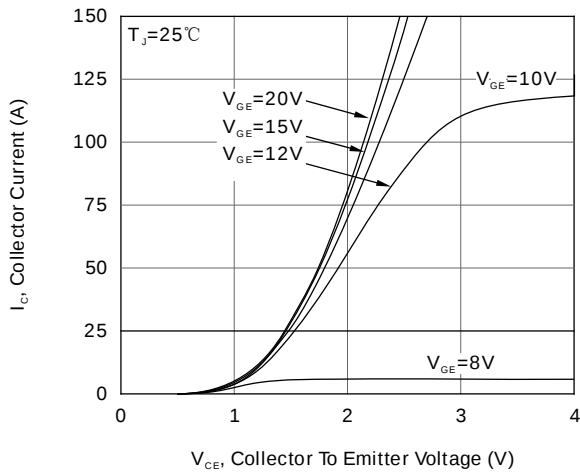


Figure 3. Typical output characteristic ($T_{vj} = 25^\circ\text{C}$)

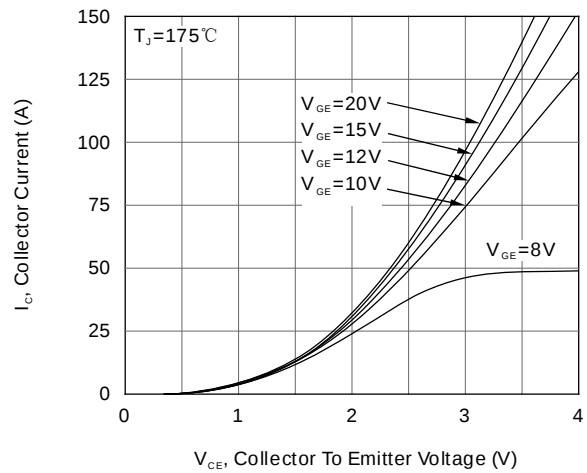


Figure 4. Typical output characteristic ($T_{vj} = 175^\circ\text{C}$)

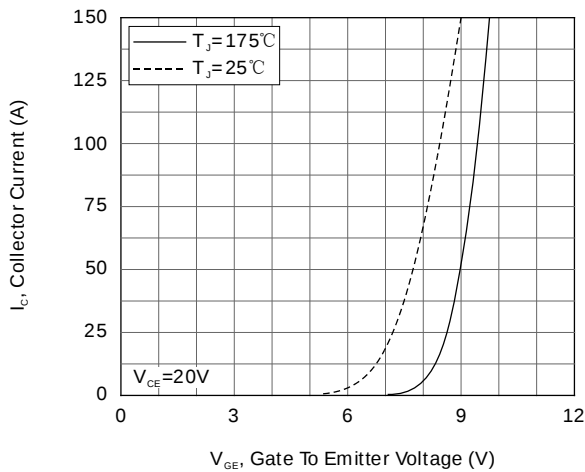


Figure 5. Typical transfer characteristic ($V_{CE} = 20\text{V}$)

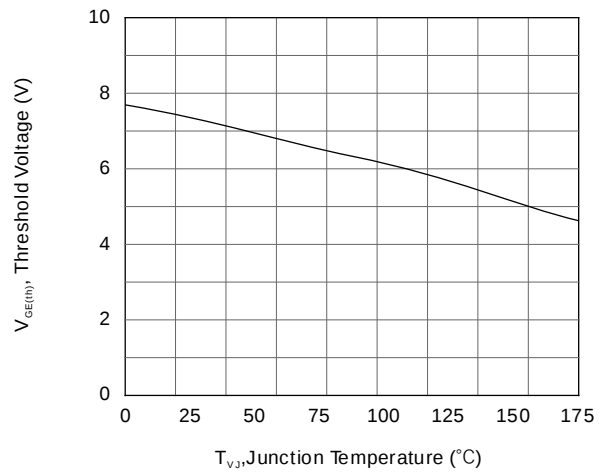


Figure 6. Gate threshold voltage ($I_c = 75\text{mA}$, $V_{CE} = 20\text{V}$)

Typical Electrical and Thermal Characteristics (cont.)

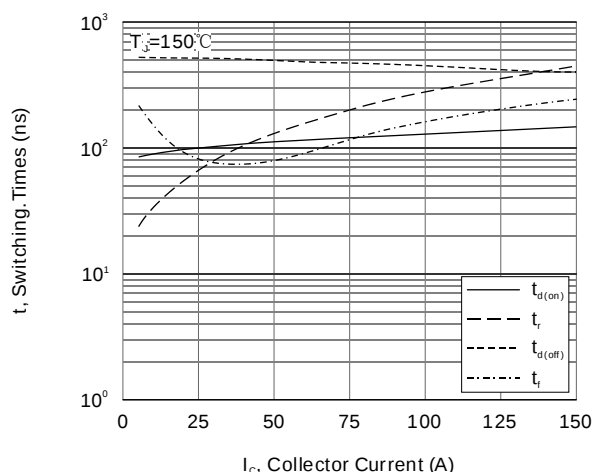


Figure 7. Typical switching times vs. collector current

(T_{VJ}=150°C, V_{CE}=600V, V_{GE}=15V, R_G=10Ω)

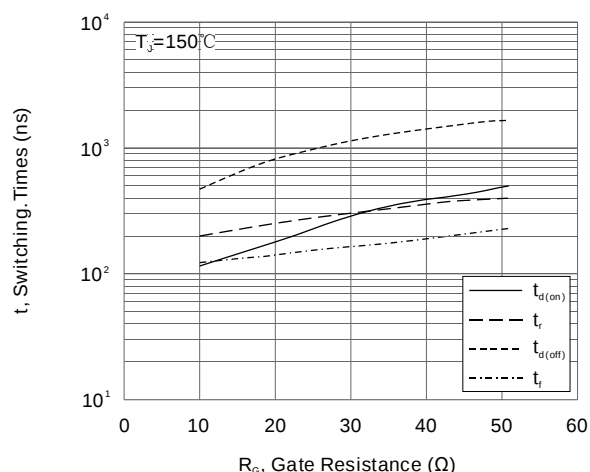


Figure 8. Typical switching times vs. gate resistor

(T_{VJ}=150°C, V_{CE}=600V, V_{GE}=15V, I_C=75A)

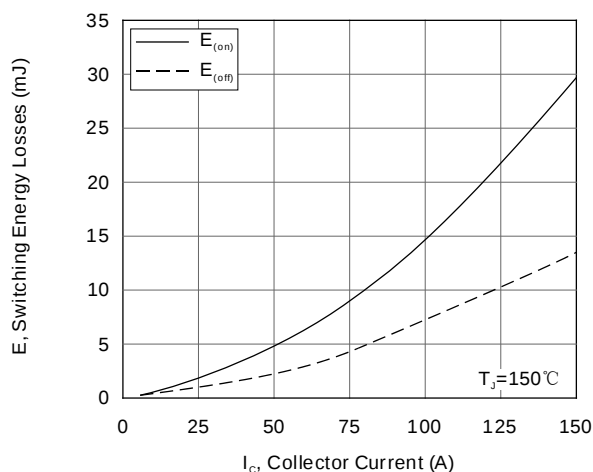


Figure 9. Typical switching losses vs. Collector current

(T_{VJ}=150°C, V_{CE}=600V, V_{GE}=15V, R_G=10Ω)

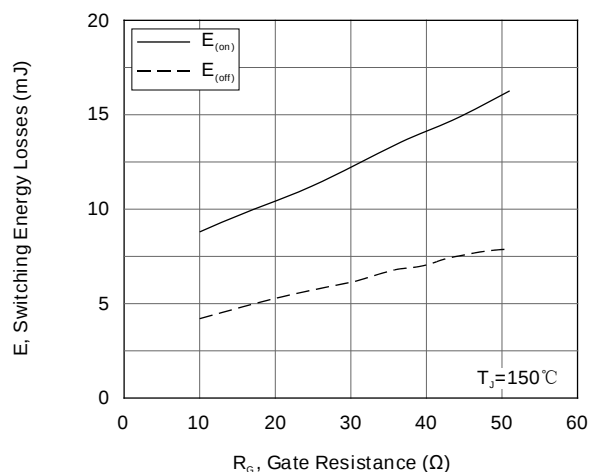


Figure 10. Typical switching losses vs. collector-emitter voltage

(T_{VJ}=150°C, V_{CE}=600V, V_{GE}=15V, R_G=10Ω)

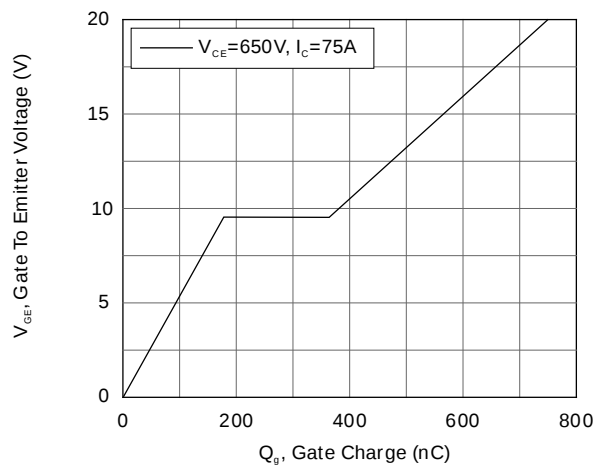


Figure 11. Typical gate charge

(T_{VJ}=25°C, V_{CE}=600V, I_C=75A)

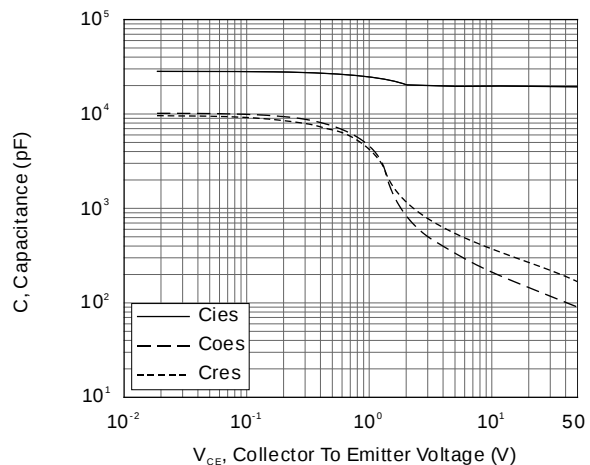


Figure 12. Typical capacitance vs. collector-emitter voltage (V_{GE}=0V, f=1MHz)

Typical Electrical and Thermal Characteristics (cont.)

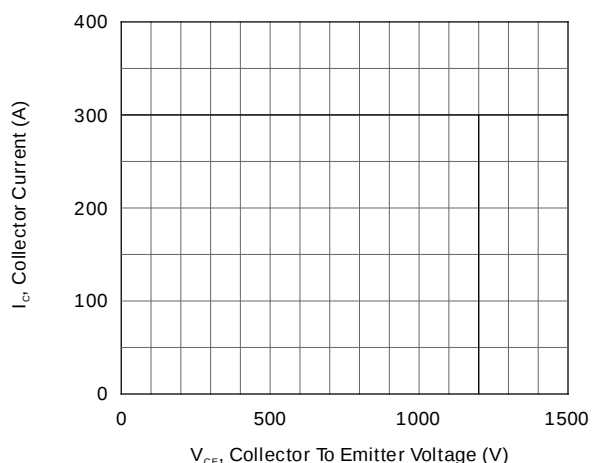


Figure 13. Reverse biased safe operating area
($T_{VJ}=175^{\circ}\text{C}$, $V_{GE}=15/0\text{V}$, $R_G=20\Omega$)

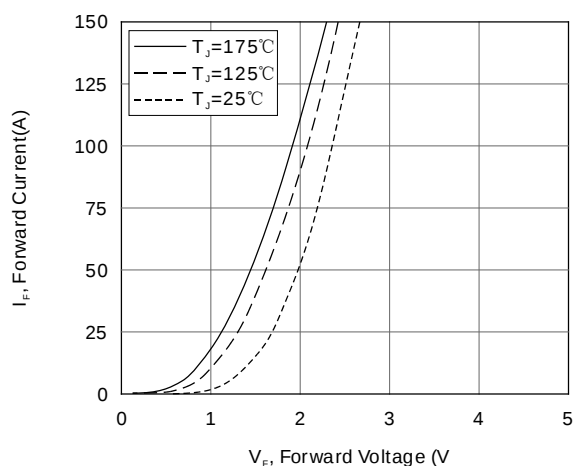


Figure 14. Typical diode forward current vs. forward voltage

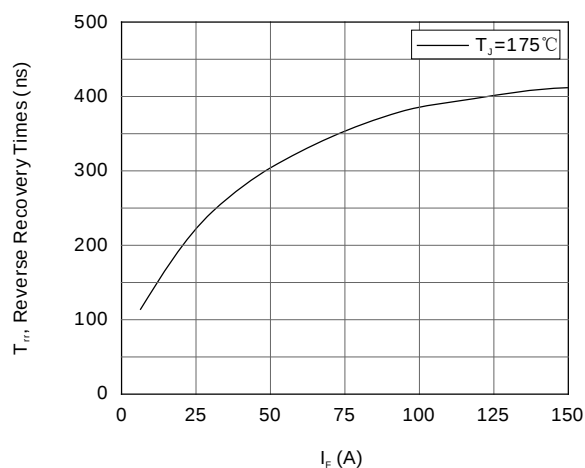


Figure 15. Typical reverse recovery characteristics vs. forward current of diode
($T_{VJ}=175^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $R_G=10\Omega$)

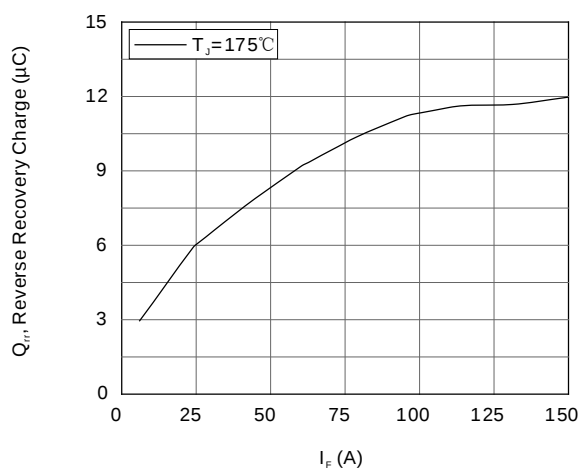


Figure 16. Typical reverse recovery characteristics vs. forward current of diode
($T_{VJ}=175^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $R_G=10\Omega$)

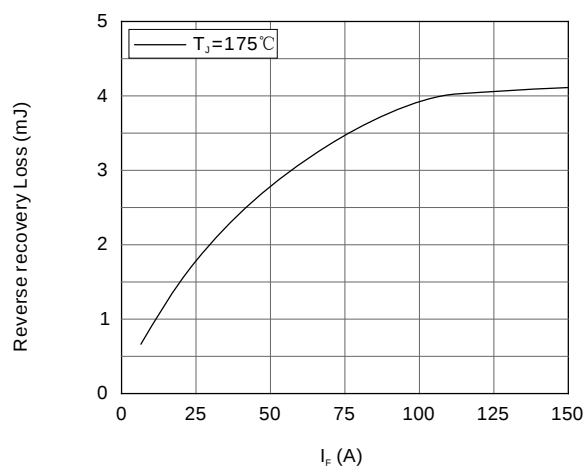


Figure 17. Typical reverse recovery loss vs. forward current of diode
($T_{VJ}=175^{\circ}\text{C}$, $V_{CE}=600\text{V}$, $V_{GE}=15\text{V}$, $R_G=10\Omega$)

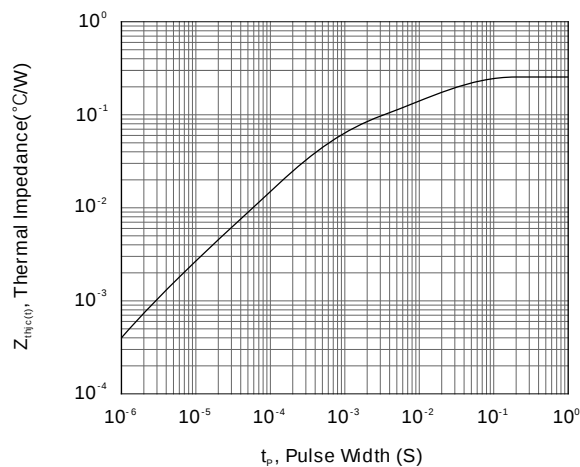
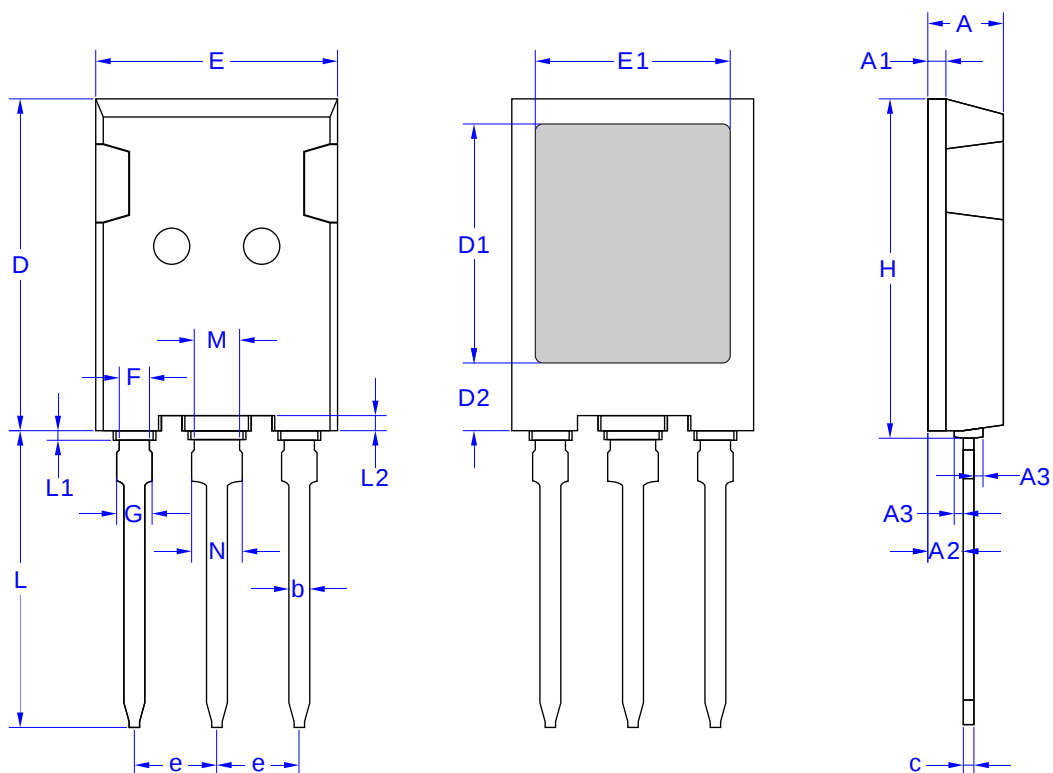


Figure 18. IGBT transient thermal impedance
($D=tp/T$)

Package Mechanical Data

TO-247 iPS-3L Package



Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	1.10	1.20	1.30
A2	2.20	2.35	2.50
A3	0.45	0.60	0.75
b	1.16	1.36	1.56
c	0.51	0.70	0.89
D	21.80	22.00	22.20
D1	12.60	12.90	13.20
D2	3.55	3.75	3.95
E	15.70	16.00	16.30

Symbol	Dimensions in Millimeters		
	MIN	NOM	MAX
E1	15.55	15.85	16.15
e	5.25	5.45	5.65
F	1.80	2.00	2.20
G	2.15	2.35	2.55
H	4.80	5.00	5.20
L	19.40	19.70	20.00
L1	0.44	0.64	0.84
L2	0.80	1.00	1.20
M	2.80	3.00	3.20
N	3.15	3.35	3.55