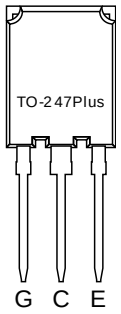
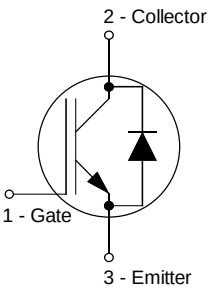
KJG75N120PL

1200V 75A Trench and Field Stop IGBT

Product Information

Features	Package Marking and Ordering Information	
◆ Advanced Field Stop technology	◆ Product Name:	KJG75N120PL
◆ Low switching power loss	◆ Marking:	KJG75N120PL
◆ Low switching surge and noise	◆ Package:	TO-247 Plus-3L
◆ Low EMI	◆ Quantity:	300 pcs
◆ T_{VJ} 175℃		
Applications		
◆ Industrial UPS		
◆ Welding machine		
◆ Solar converters		
◆ Energy storage		
◆ EV Charger		

Maximum Rated Values (T_{vj}=25℃, 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≤10 μs, D<0.010)		±30	
DC Collector Current, T_C=25℃ (Limited by T_{VJ} max)	I_C	150	A
DC Collector Current, T_C=100℃ (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℃ (T_p limited by T_{VJ} max)	I_F	150	
Diode Forward Current, T_C=100℃ (T_p limited by T_{VJ} max)		75	
Turn-Off Safe Operating Area V_{CE}≤1200 V, T_{vj}≤175℃, t_p=1 μs	-	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	℃
Storage Temperature	T_{stg}	-55 to 150	

Thermal Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Thermal Resistance, Junction-Ambient	$R_{\theta JA}$	-	-	50	℃/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℃, 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℃ T_{VJ}=175℃	 - -	 1.95 2.80	 2.40 -	V
Diode Forward Voltage	V_F	V_{GE}=0 V, I_F=75 A T_{VJ}=25℃ T_{VJ}=175℃	 - -	 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℃, 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}		-	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℃, 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}		-	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℃, 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℃, 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

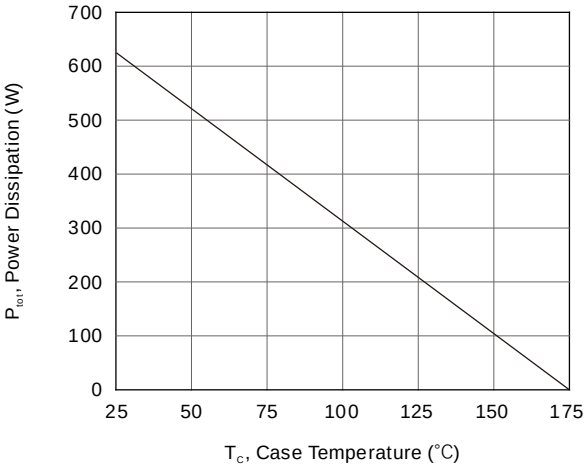


Figure 1. Power dissipation vs. case temperature (T_{VJ}≤175℃)

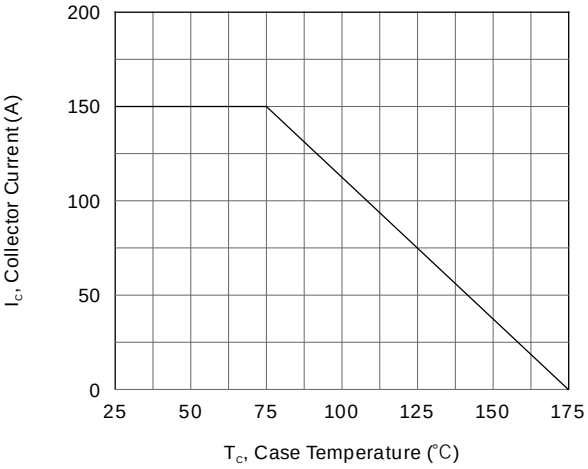


Figure 2. Collector current vs. case temperature (V_{GE}≤15V, T_{VJ}≤175℃)

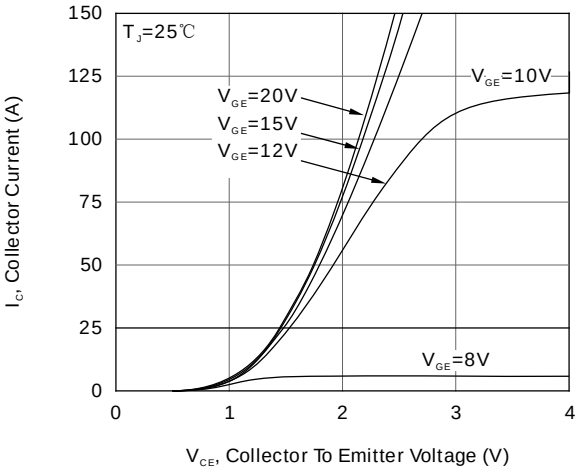


Figure 3. Typical output characteristic (T_{VJ}=25℃)

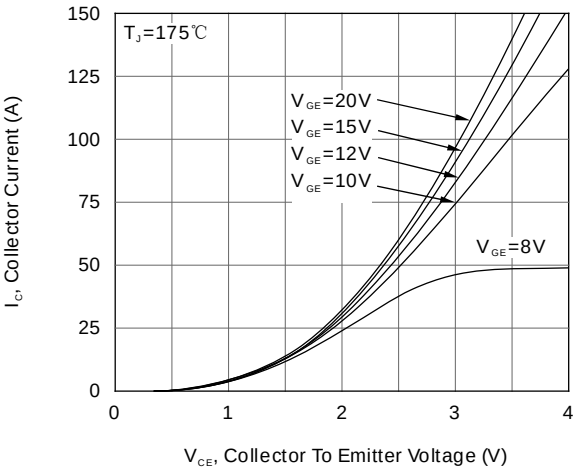


Figure 4. Typical output characteristic (T_{VJ}=175℃)

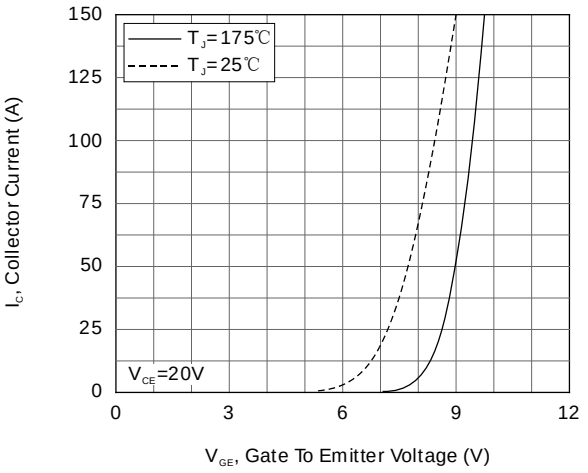


Figure 5. Typical transfer characteristic (V_{CE}=20V)

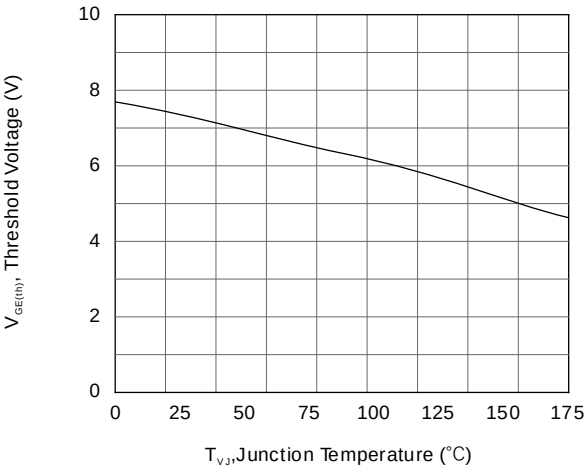


Figure 6. Gate threshold voltage (I_C=75mA, V_{CE}=20V)

Typical Electrical and Thermal Characteristics (cont.)

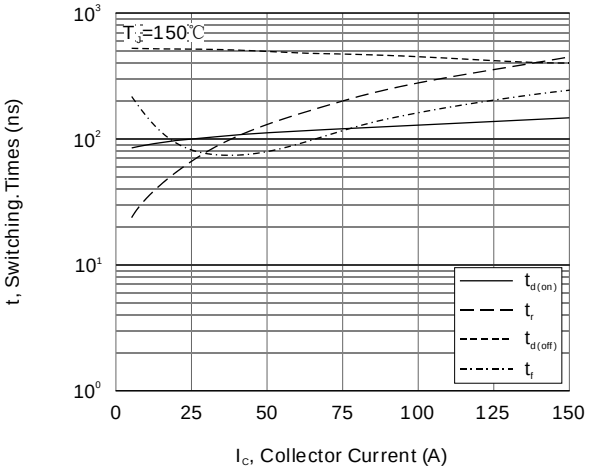


Figure 7. Typical switching times vs. collector current
(T_{VJ}=150℃, V_{CE}=600V, V_{GE}=15V, R_G=10Ω)

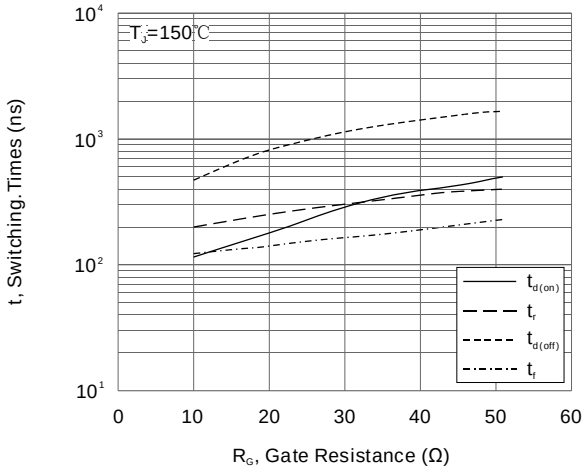


Figure 8. Typical switching times vs. gate resistor
(T_{VJ}=150℃, V_{CE}=600V, V_{GE}=15V, I_C=75A)

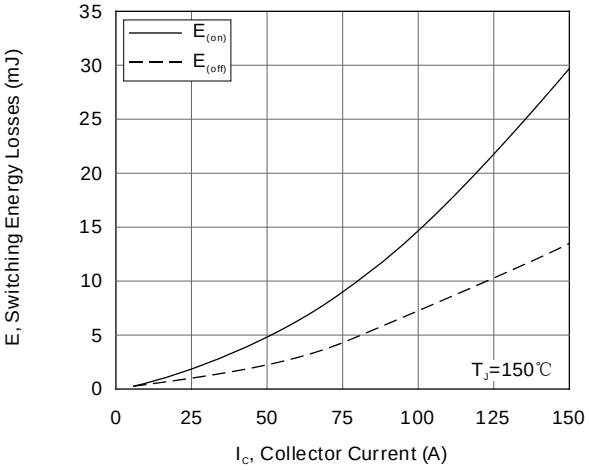


Figure 9. Typical switching losses vs. Collector current
(T_{VJ}=150℃, V_{CE}=600V, V_{GE}=15V, R_G=10Ω)

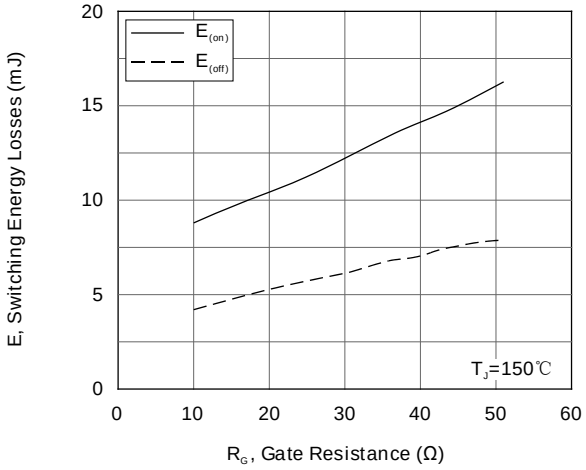


Figure 10. Typical capacitance vs. collector-emitter voltage
(T_{VJ}=150℃, V_{CE}=600V, V_{GE}=15V, R_G=10Ω)

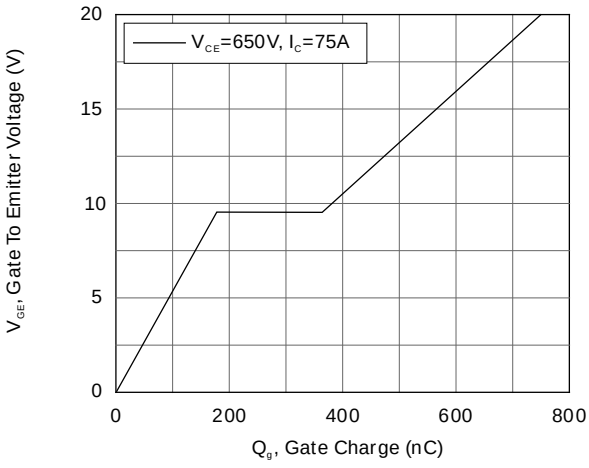


Figure 11. Typical gate charge
(T_{VJ}=25℃, V_{CE}=600V, I_C=75A)

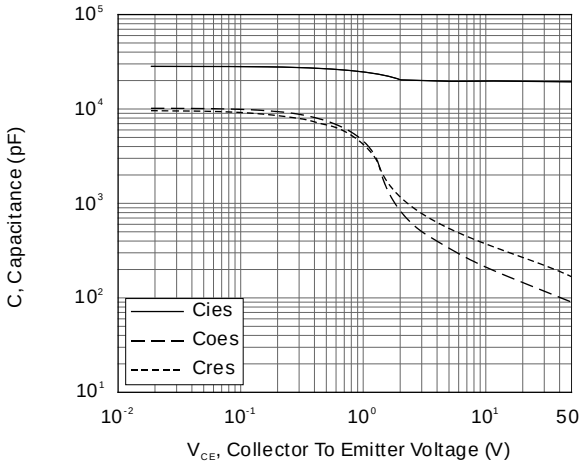


Figure 12. Typical capacitance vs. collector-emitter voltage (V_{GE}=0V, f=1MHz)

Typical Electrical and Thermal Characteristics (cont.)

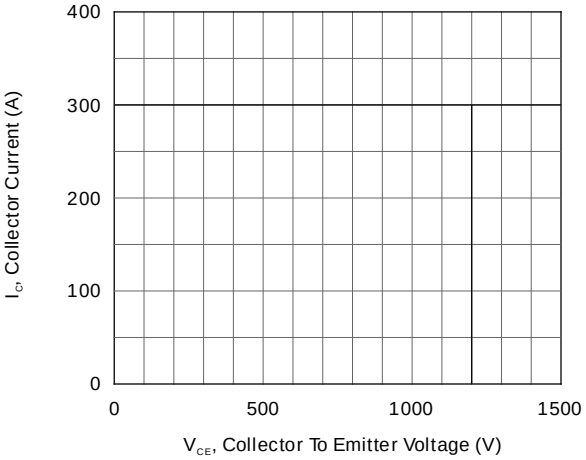


Figure 13. Reverse biased safe operating area
(T_{VJ}=175℃, V_{GE}=15/0V, R_G=20Ω)

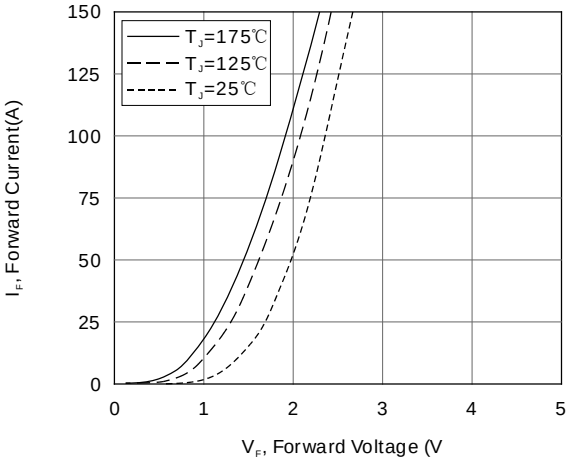


Figure 14. Typical diode forward current vs. forward voltage

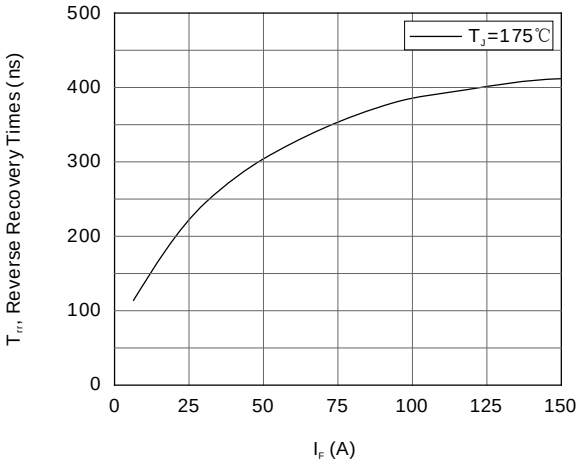


Figure 15. Typical reverse recovery characteristics vs. forward current of diode
(T_{VJ}=175℃, V_{CE}=600V, V_{GE}=15V, R_G=10Ω)

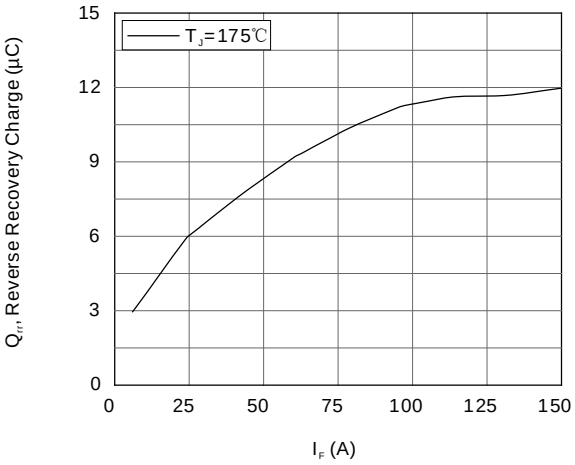


Figure 16. Typical reverse recovery characteristics vs. forward current of diode
(T_{VJ}=175℃, V_{CE}=600V, V_{GE}=15V, R_G=10Ω)

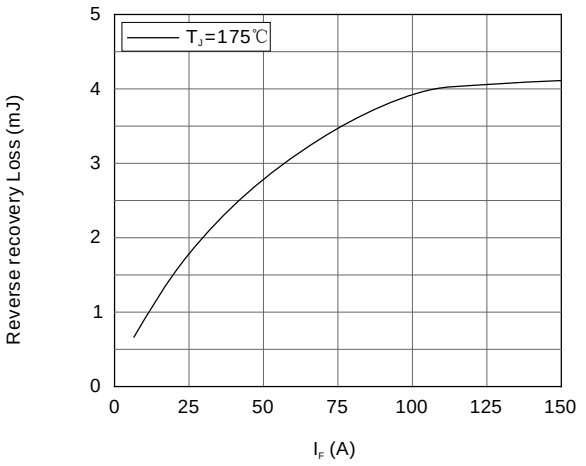


Figure 17. Typical reverse recovery loss vs. forward current of diode
(T_{VJ}=175℃, V_{CE}=600V, V_{GE}=15V, R_G=10Ω)

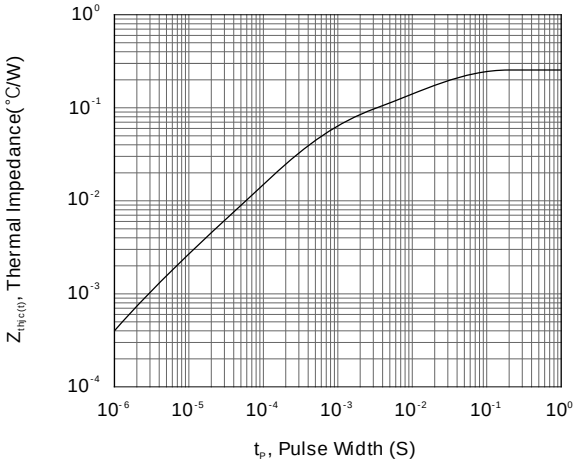
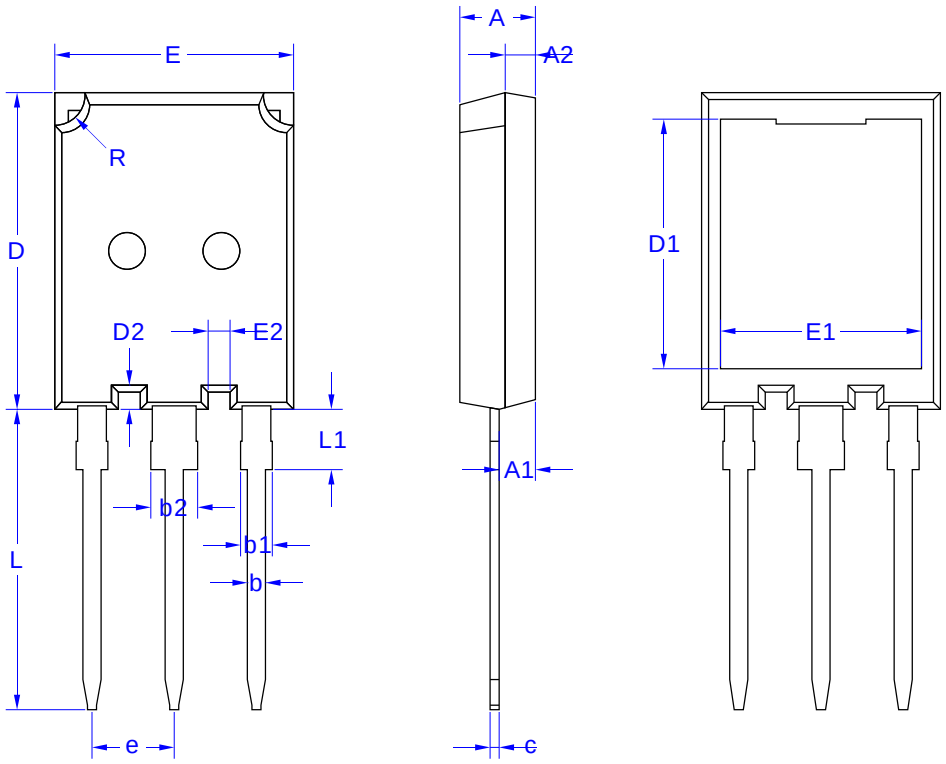


Figure 18. IGBT transient thermal impedance
(D=tp/T)

Package Mechanical Data

TO-247 Plus-3L Package



Symbol	Dimensions in Millimeters		
	MIN.	NOM.	MAX.
A	4.80	5.00	5.20
A1	2.21	2.40	2.61
A2	1.85		2.15
b	1.07	1.20	1.33
b1	1.90		2.16
b2	2.90		3.20
c	0.52	0.60	0.68
D	20.70	21.00	21.30

Symbol	Dimensions in Millimeters		
	NOM.	NOM.	MAX.
D1	16.25	16.55	16.85
D2	0.53	0.68	0.83
E	15.50	15.80	16.10
E1	13.10	13.30	13.50
E2	1.30	1.45	1.60
e		5.44	
L	19.62	19.92	20.22
L1			4.30