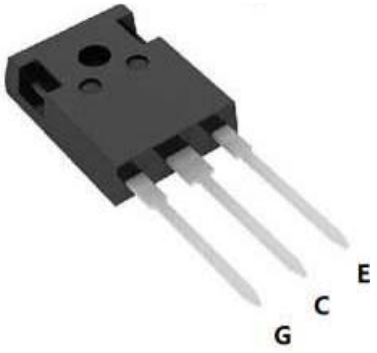
DGW40N120CTH0

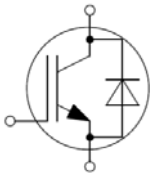
RoHS COMPLIANT



IGBT Modules

V_{CE}	1200	V
I_C	40	A
$V_{CE(SAT)}$ I_C=40A	1.90	V

Circuit



Applications

- High frequency switching application
- Resonant converters
- Uninterruptible power supply
- Welding converters

Features

- High breakdown voltage to 1200V for improved reliability
- Maximum junction temperature 175℃
- Positive temperature coefficient
- Including fast & soft recovery anti-parallel FWD

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-Emitter Breakdown Voltage	V_{CE}	1200	V
DC Collector Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_C	80 40	A
Diode Forward Current, limited by T_{jmax} T_C= 25°C T_C= 100°C	I_F	80 40	A
Continuous Gate-Emitter Voltage	V_{GE}	±20	V
Transient Gate-Emitter Voltage	V_{GE}	±30	V
Turn off Safe Operating Area V_{CE}≤1200V, T_j≤ 150°C		160	A
Pulsed Collector Current, V_{GE}=15V, tp limited by T_{jmax}	I_{CM}	160	A
Diode Pulsed Current, tp limited by T_{jmax}	I_{Fpuls}	160	A
Power Dissipation , Tj=175°C， Tc=25°C	P_{tot}	500	W

Operating Junction Temperature	T_j	-40...+175	°C
Storage Temperature	T_s	-55...+150	°C
Soldering Temperature, wave soldering 1.6mm (0.063in.) from case for 10s		260	°C

Electrical Characteristics of the IGBT（T_j= 25℃unless otherwise specified）:

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	V_{GE}=0V, I_C=250μA	1200		-	V
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=1.5mA	4.5	5.0	5.5	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=40A T_j=25°C, T_j=125°C T_j=150°C		1.90 2.25 2.35	2.10	V
Zero Gate Voltage Collector Current	I_{CES}	V_{CE}=1200V, V_{GE}=0V T_j= 25°C, T_j=150°C			0.25 4	mA
Gate-Emitter Leakage Current	I_{GES}	V_{CE}= 0V, V_{GE}= ± 20V			100	nA

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic						
Input Capacitance	C_{ies}	V_{CE}= 25V, V_{GE}= 0V, f = 1MHz	-	2.12	-	nF
Reverse Transfer Capacitance	C_{res}		-	0.08	-	
Gate Charge	Q_G	V_{CC}=960V,I_C=40A, V_{GE}=15V	-	0.215	-	uC

Electrical Characteristics of the Diode（T_j= 25℃unless otherwise specified）:

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Static						
Diode Forward Voltage	V_F	I_F= 40A T_j= 25°C, T_j= 125°C T_j= 150°C		2.00 1.90 1.85		V

Switching Characteristic, Inductive Load

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}= 600V, I_C=40A, V_{GE}= -15V~15V, R_g=12Ω	-	10	-	ns
Rise Time	t_r		-	24	-	ns
Turn-on Energy	E_{on}		-	2.2	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	160	-	ns
Fall Time	t_f		-	135	-	ns
Turn-off Energy	E_{off}		-	1.50	-	mJ
Dynamic , at T_j= 125℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}= 600V, I_C=40A, V_{GE}= -15V~15V, R_g=12Ω	-	12	-	ns
Rise Time	t_r		-	30	-	ns
Turn-on Energy	E_{on}		-	3.0	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	180	-	ns
Fall Time	t_f		-	180	-	ns
Turn-off Energy	E_{off}		-	2.0	-	mJ
Dynamic , at T_j= 150℃						
Turn-on Delay Time	$t_{d(on)}$	V_{CC}= 600V, I_C=40A, V_{GE}= -15v~15V, R_g=12Ω	-	13	-	ns
Rise Time	t_r		-	34	-	ns
Turn-on Energy	E_{on}		-	3.2	-	mJ
Turn-off Delay Time	$t_{d(off)}$		-	190	-	ns
Fall Time	t_f		-	200	-	ns
Turn-off Energy	E_{off}		-	2.2	-	mJ

Electrical Characteristics of the DIODE

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Dynamic , at T_j= 25℃						
Reverse Recovery Current	I_{rr}	I_F=40A, V_R=600V, di/dt= -520A/μs,	-	14	-	A
Diode reverse recovery time	trr			235		ns
Reverse Recovery Charge	Q_{rr}		-	1.50	-	uC
Reverse Recovery Energy	Erec		-	0.48		mJ
Dynamic , at Tj= 125℃						
Reverse Recovery Current	I_{rr}	I_F=40A,V_R=600V di/dt= -520A/μs,	-	16	-	A
Diode reverse recovery time	trr			386		ns
Reverse Recovery Charge	Q_{rr}		-	4.20	-	uC
Reverse Recovery Energy	Erec		-	1.10		mJ
Dynamic , at Tj= 150℃						
Reverse Recovery Current	I_{rr}	I_F=40A,V_R=600V di/dt= -520A/μs,	-	18	-	A
Diode reverse recovery time	trr			422		ns
Reverse Recovery Charge	Q_{rr}		-	4.80	-	uC
Reverse Recovery Energy	Erec		-	1.38		mJ

Thermal Resistance

Parameter	Symbol	Max. Value	Unit
IGBT Thermal Resistance, Junction - Case	R_{θ}(j-c)	0.30	K/W
Diode Thermal Resistance, Junction - Case	R_{θ}(j-c)	0.65	K/W
Thermal Resistance, Junction - Ambient	R_{θ}(j-a)	40	K/W

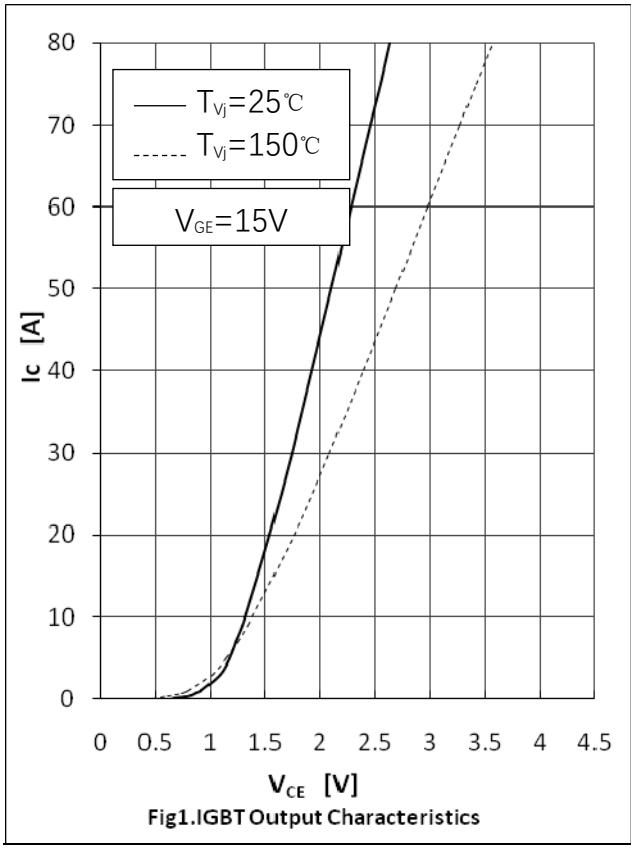


Fig1.IGBT Output Characteristics

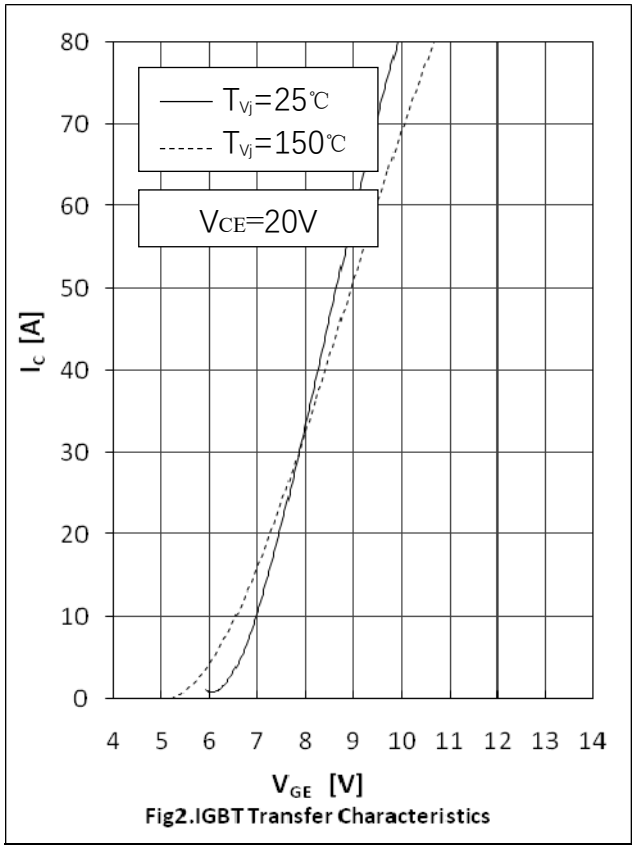


Fig2.IGBT Transfer Characteristics

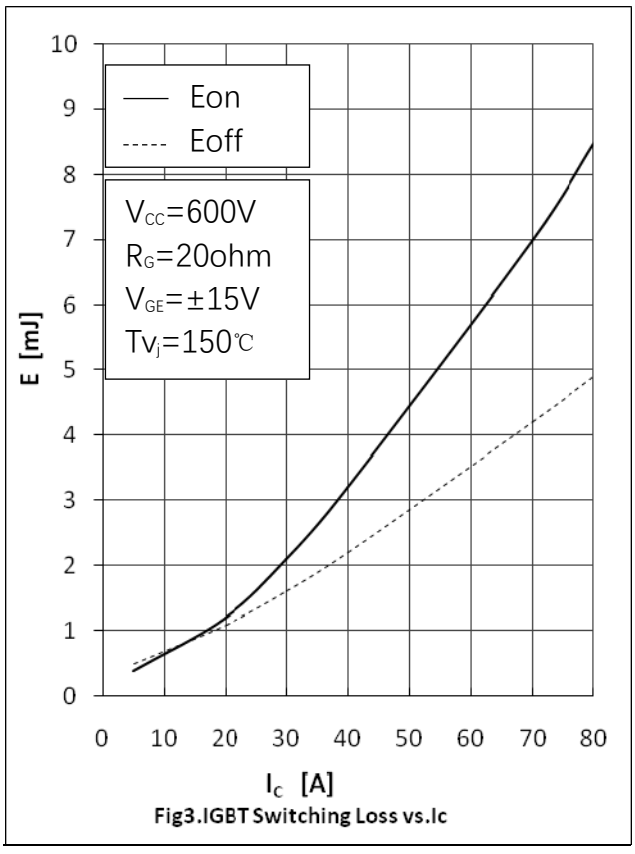


Fig3.IGBT Switching Loss vs.Ic

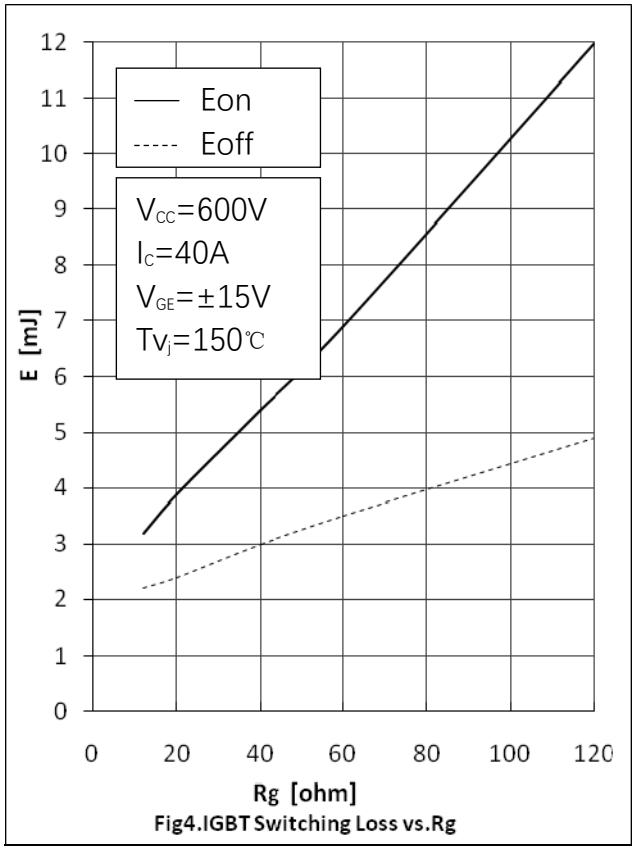


Fig4.IGBT Switching Loss vs.Rg

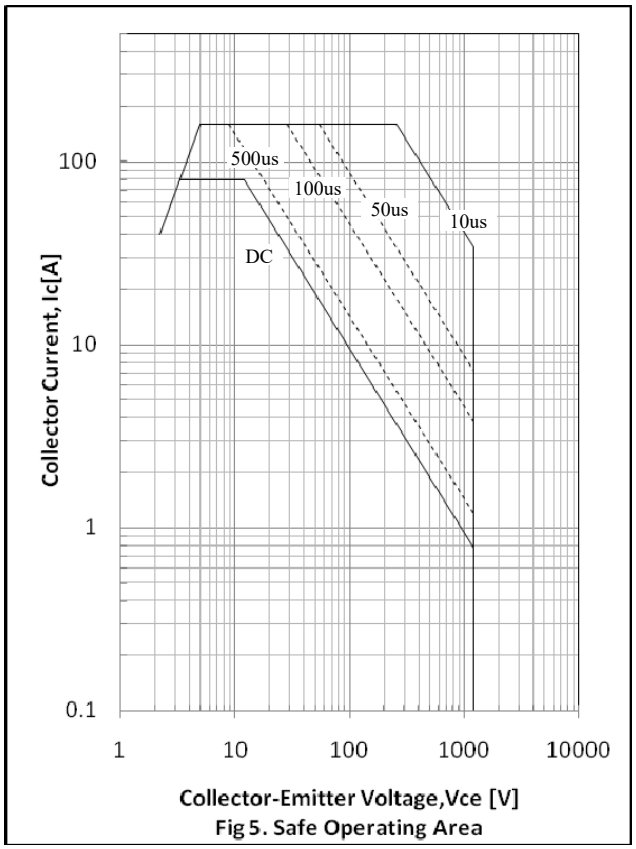


Fig 5. Safe Operating Area

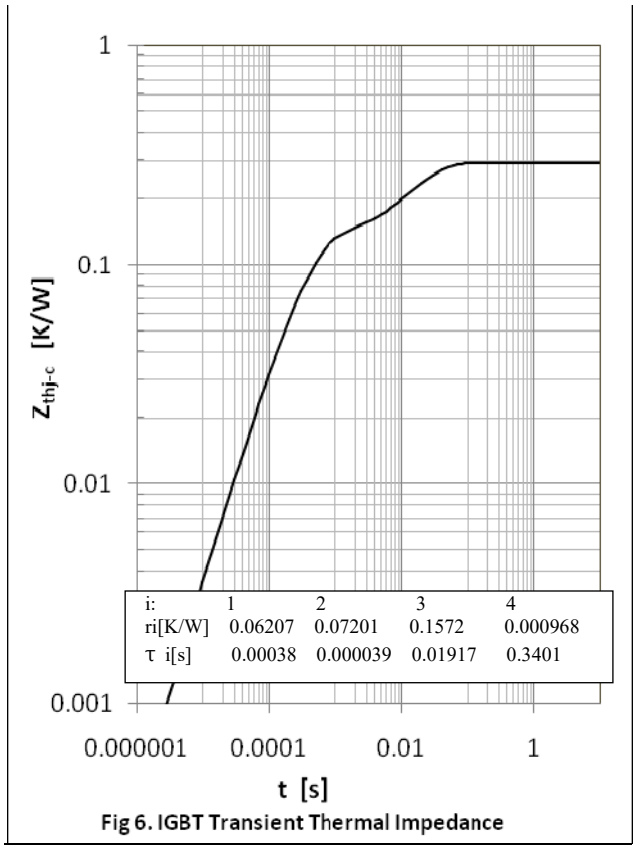


Fig 6. IGBT Transient Thermal Impedance

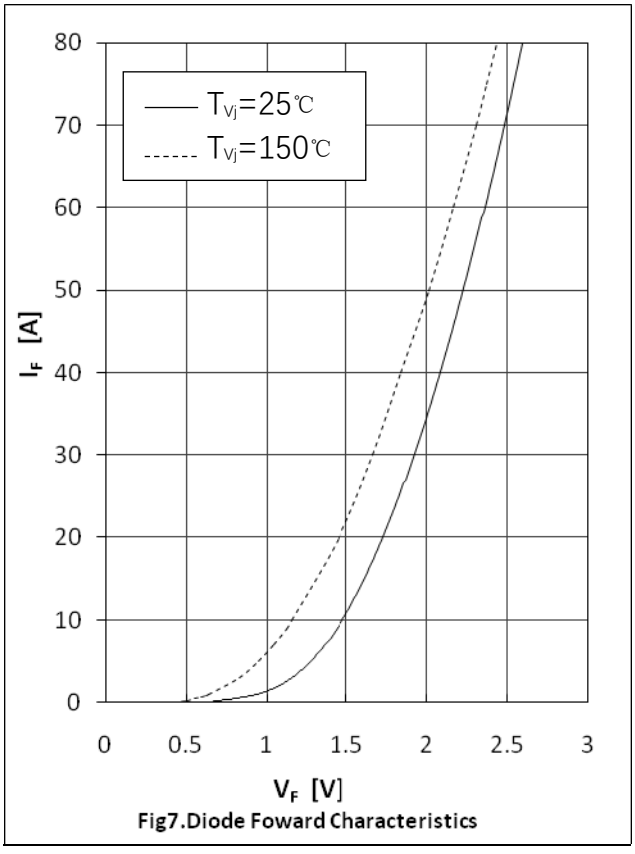


Fig7.Diode Foward Characteristics

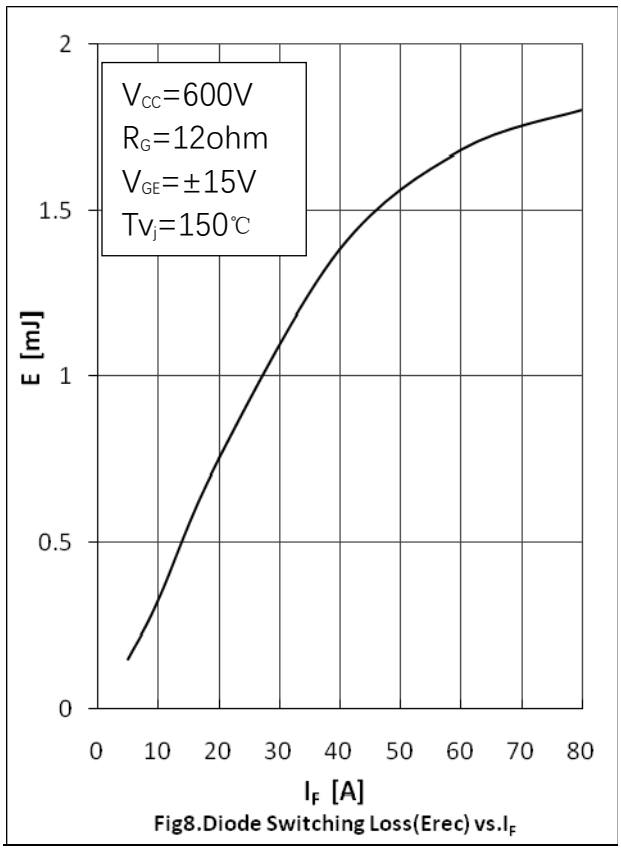


Fig8.Diode Switching Loss(Erec) vs.I_F

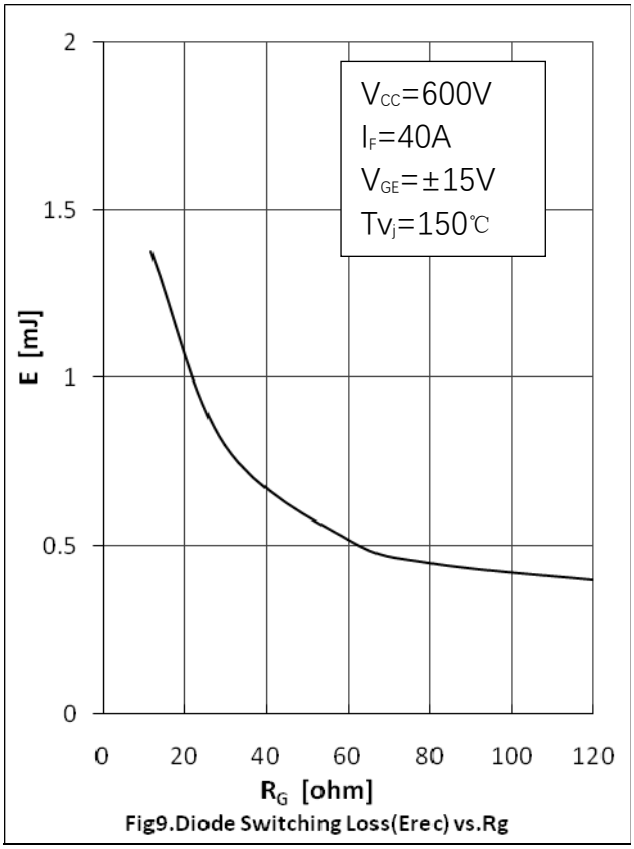


Fig9.Diode Switching Loss(Erec) vs.Rg

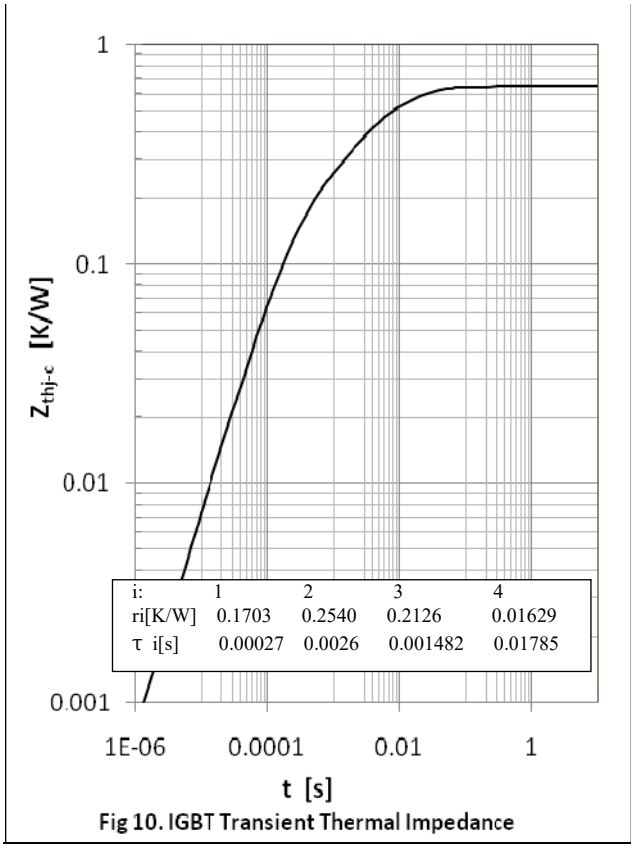
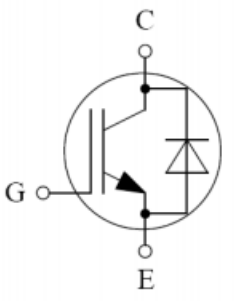


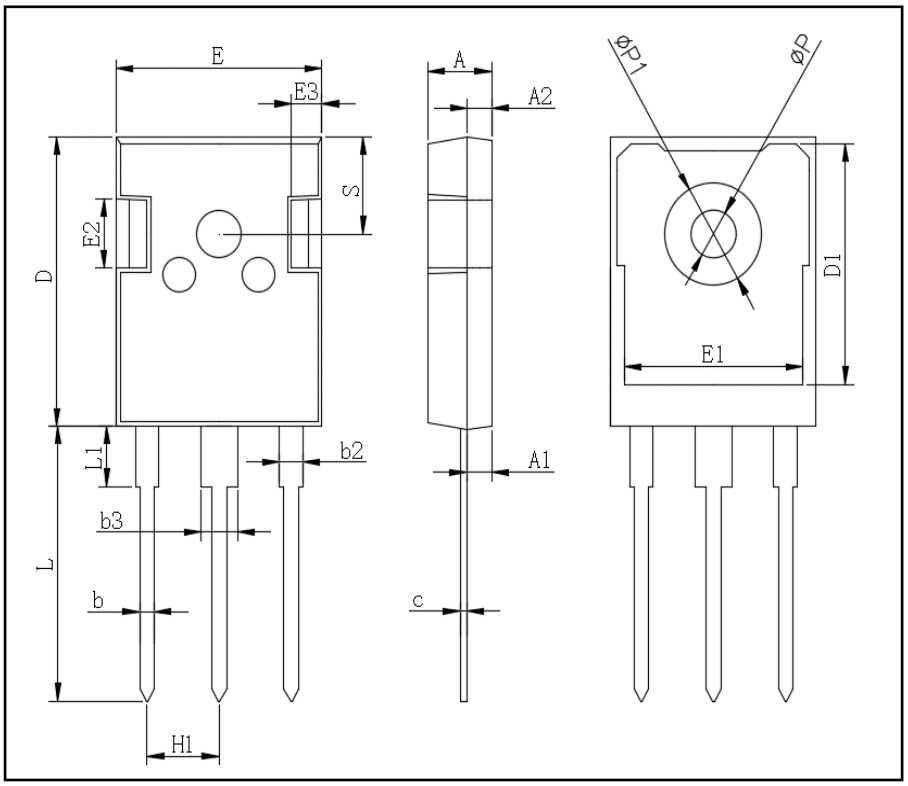
Fig 10. IGBT Transient Thermal Impedance

- Circuit Diagram



- **Package Outline Information**

CASE: TO 247



TO-247AB		
Dim	Min	Max
A	4.80	5.20
A1	2.21	2.61
A2	1.85	2.15
b	1.0	1.4
b2	1.91	2.21
C	0.5	0.7
D	20.70	21.30
D1	16.25	16.85
E	15.50	16.10
E1	13.0	13.6
E2	4.80	5.20
E3	2.30	2.70
L	19.62	20.22
L1	-	4.30
ΦP	3.40	3.80
ΦP1	-	7.30
S	6.15TYP	
H1	5.44TYP	
b3	2.80	3.20