

IGBT Modules

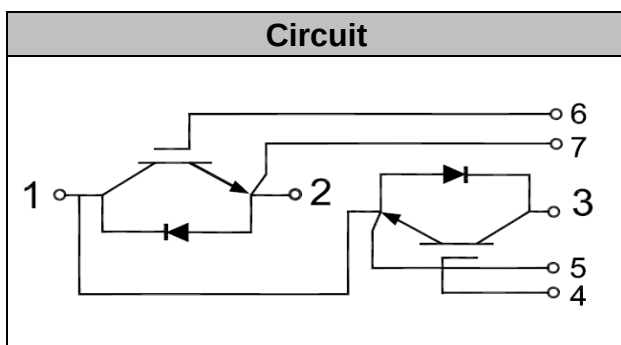
V_{CES} 1200V
I_c 50A



Applications

- High frequency drivers
- Solar inverters
- UPS (Uninterruptible Power Supplies)
- Electric welding machine

Circuit



Features

- High speed IGBT in NPT technology
- Low switching losses
- High short circuit capability(10us)
- Including ultra fast & soft recovery anti-parallel FWD
- Low inductance

Absolute Maximum Ratings (T_C = 25°C unless otherwise specified)

Symbol	Description		Values	Units
V _{CES}	Collector - Emitter Voltage		1200	V
V _{GES}	Gate-Emitter Voltage		±20	V
I _c	DC Collector Current	T _C =25°C	80	A
		T _C =80°C	50	A
I _{CM(1)}	Peak Collector Current Repetitive	T _J = 125°C	100	A
I _F	Diode Continuous Forward Current	T _J = 125°C	50	A
P _D	Maximum Power Dissipation (IGBT)	T _C = 25°C, T _{Jmax} =150°C	400	W
T _J	Maximum Junction Temperature		150	°C
T _{JOP}	Operating Temperature		-40 ~ +150	°C
T _{stg}	Storage Temperature		-40 ~ +125	°C
Viso	Isolation Voltage (All Terminals Shorted)	f=50Hz, 1min	3000	V
Weight	Weight Of Module		150	g
Mounting Torque	Power Terminals Screw:M5		2.5~5	N*m
	Mounting Screw:M6		3~5	N*m

Notes :

(1) Repetitive Rating: Pulse width limited by max. junction temperature



Electrical Characteristics of IGBT ($T_J = 25^\circ\text{C}$ unless otherwise specified)

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
OFF Characteristics						
V _{(BR)CES}	Collector-Emitter Breakdown Voltage	V _{GE} = 0V, I _c = 1mA	1200			V
I _{CES}	Collector Leakage Current	V _{CE} =V _{CES} , V _{GE} =0V,			200	uA
		V _{CE} =V _{CES} , V _{GE} =0V, T _J =125°C			1	mA
I _{GES}	Gate Leakage Current	V _{CE} =0V, V _{GE} =±20V	-400		400	nA
ON Characteristics						
V _{GE(th)}	Gate - Emitter Threshold Voltage	V _{CE} =V _{GE} , I _c =4mA	5	5.8	6.6	V
V _{CE(sat)}	Collector – Emitter Saturation Voltage	I _c =50A, V _{GE} =15V		3.1		V
		I _c =50A, V _{GE} =15V, T _J =125°C		3.8		V
Dynamic Characteristics						
C _{ies}	Input Capacitance	V _{CE} = 25V, V _{GE} = 0V , f=1MHz		4.3		nF
C _{oes}	Output Capacitance			0.55		nF
C _{res}	Reverse Transfer Capacitance			0.26		nF
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{CC} = 600V, I _c = 50A , R _G = 10Ω, V _{GE} =±15V , Inductive Load, T _J = 25°C		33		ns
t _r	Rise Time			43		ns
t _{d(off)}	Turn-off Delay Time			181		ns
T _f	Fall Time			60		ns
E _{on}	Turn-on Switching Loss			3.90		mJ
E _{off}	Turn-off Switching Loss			1.23		mJ
t _{d(on)}	Turn-on Delay Time	V _{CC} = 600V, I _c = 50A , R _G = 10Ω, V _{GE} =±15V , Inductive Load, T _J = 125°C		38		ns
t _r	Rise Time			47		ns
t _{d(off)}	Turn-off Delay Time			220		ns
T _f	Fall Time			65		ns
E _{on}	Turn-on Switching Loss			5.65		mJ
E _{off}	Turn-off Switching Loss			1.98		mJ
R _{g-int}	Internal Gate Resistance			2.5		Ω
I _{SC}	SC data	T _P ≤10us, V _{GE} =15V, V _{CC} =600, V _{CEM} ≤1200V,		420		A



Electrical Characteristics of FWD (T_c = 25°C unless otherwise specified)

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
V _{FM}	Forward Voltage	I _F = 50A, V _{GE} = 0V	T _J = 25°C	2.1		V
			T _J = 125°C	2.3		
Q _{rr}	Reverse Recovery Charge		T _J = 25°C	2.54		μC
			T _J = 125°C	4.96		
I _{rr}	Peak Reverse Recovery Current		T _J = 25°C	39		A
			T _J = 125°C	48		
E _{rec}	Reverse Recovery Energy		T _J = 25°C	0.72		mJ
			T _J = 125°C	1.51		

Thermal Resistance Characteristics

Symbol	Description	Values			Units
		Min.	Typ.	Max.	
R _{θJC}	Junction-To-Case (IGBT Part, Per Leg)			0.31	°C/W
R _{θJC}	Junction-To-Case (Diode Part, Per Leg)			0.78	°C/W
R _{θCS}	Case-To-Sink (Conductive Grease Applied)			0.05	°C/W

Performance Curves

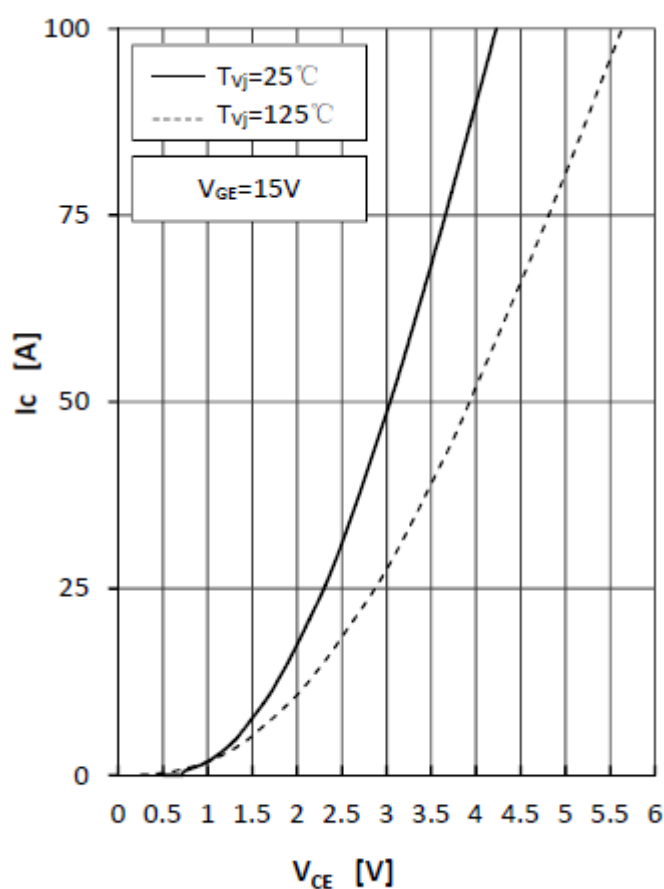


Fig1.IGBT Output Characteristics

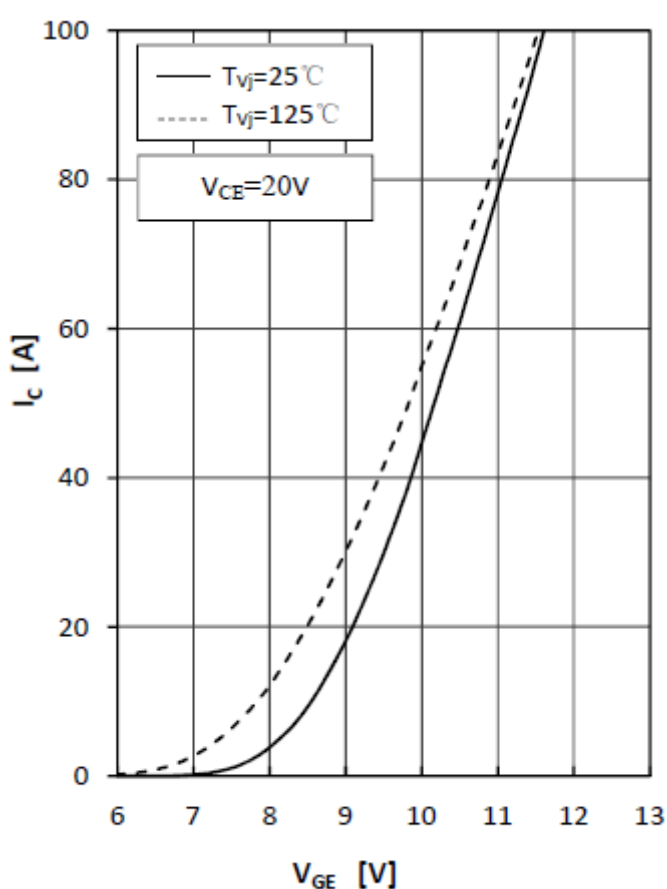
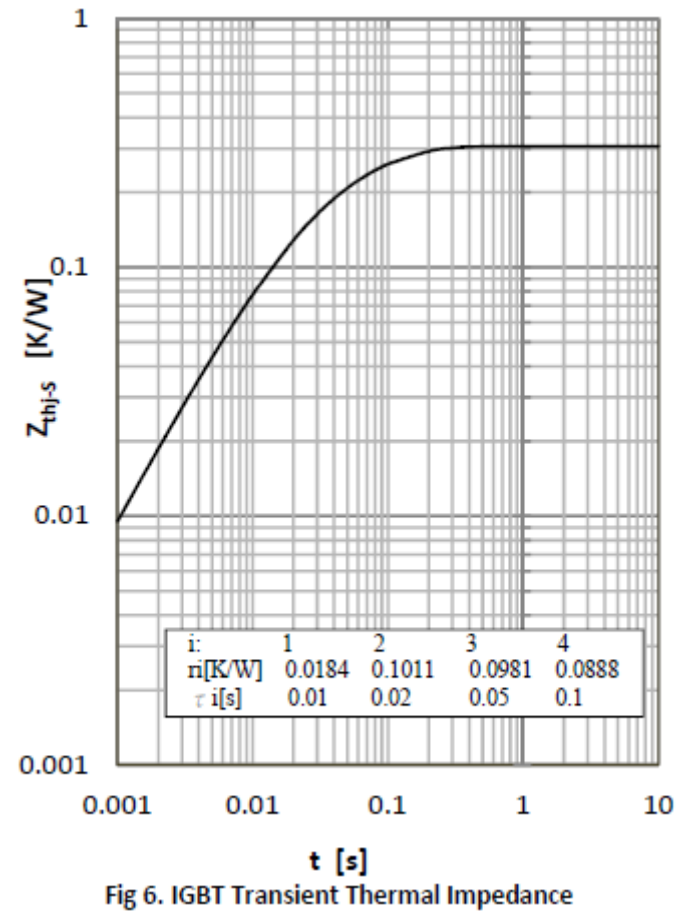
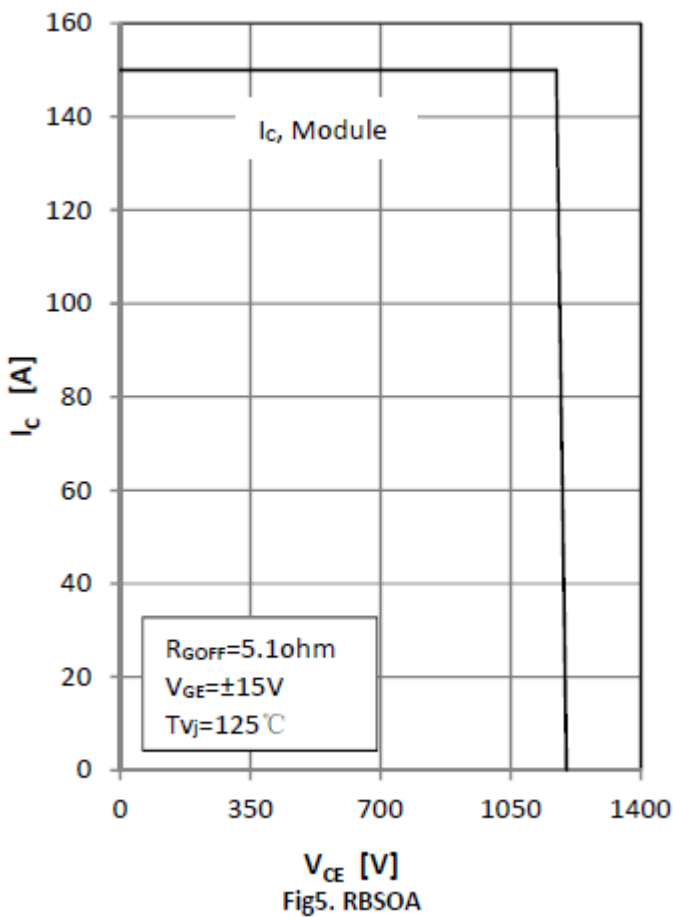
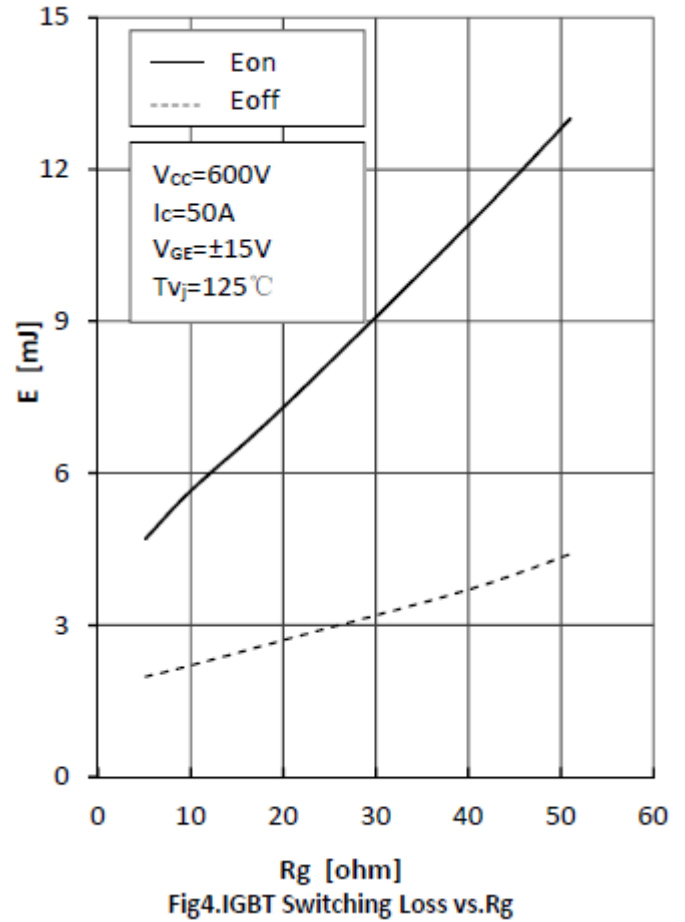
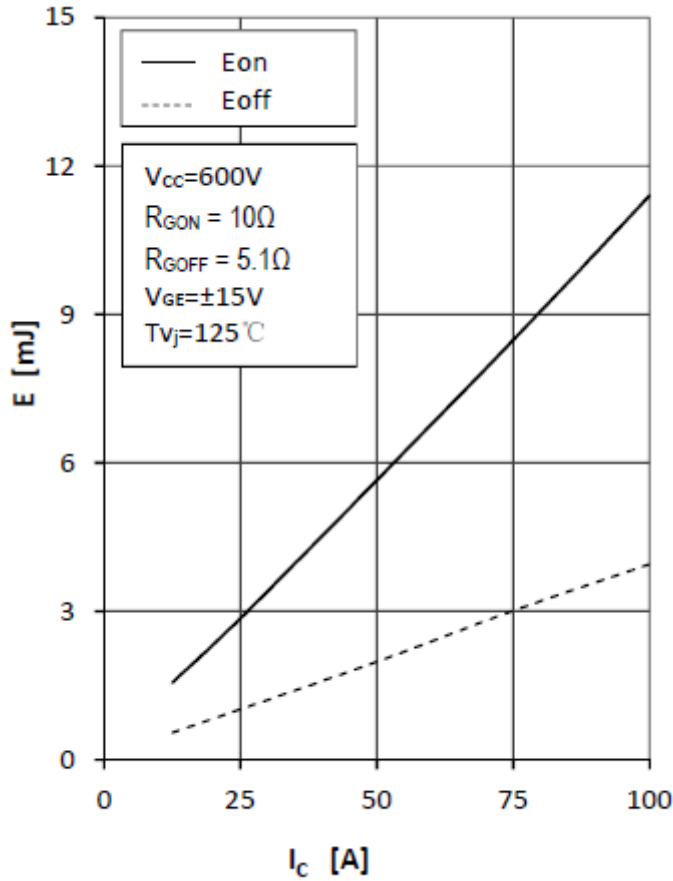


Fig2.IGBT Transfer Characteristics



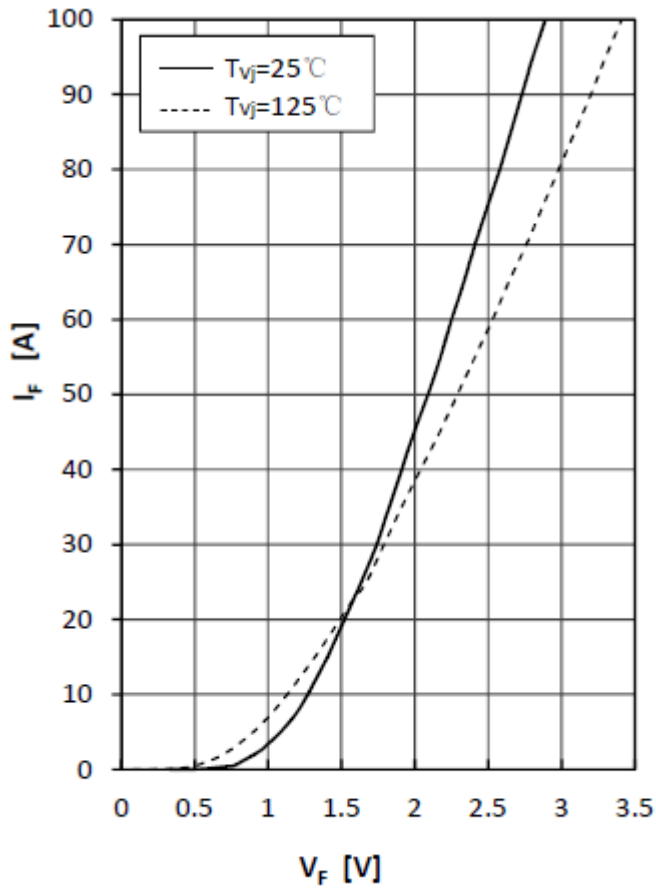


Fig7. Diode Forward Characteristics

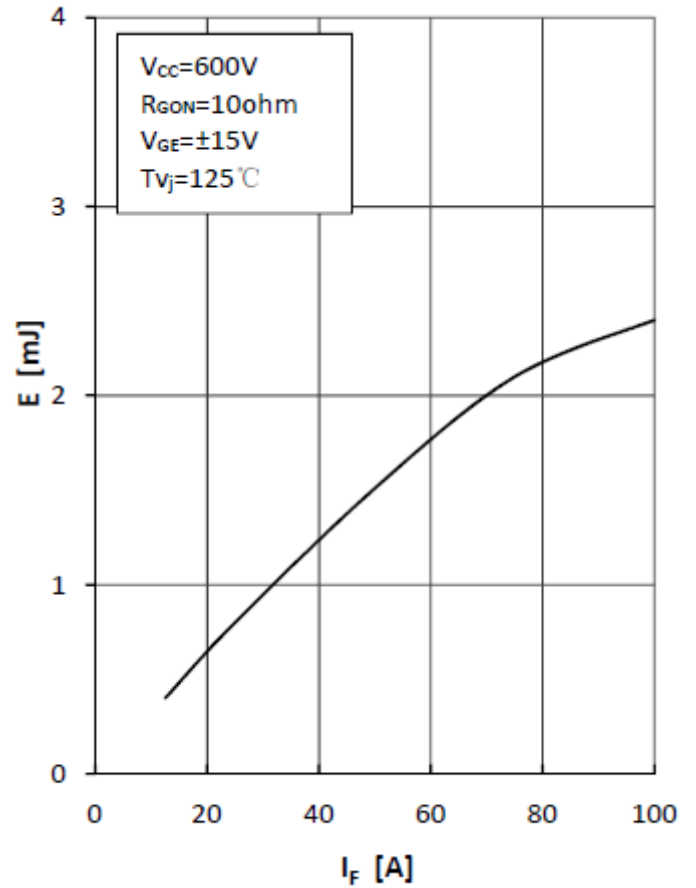


Fig8. Diode Switching Loss(Erec) vs. I_F

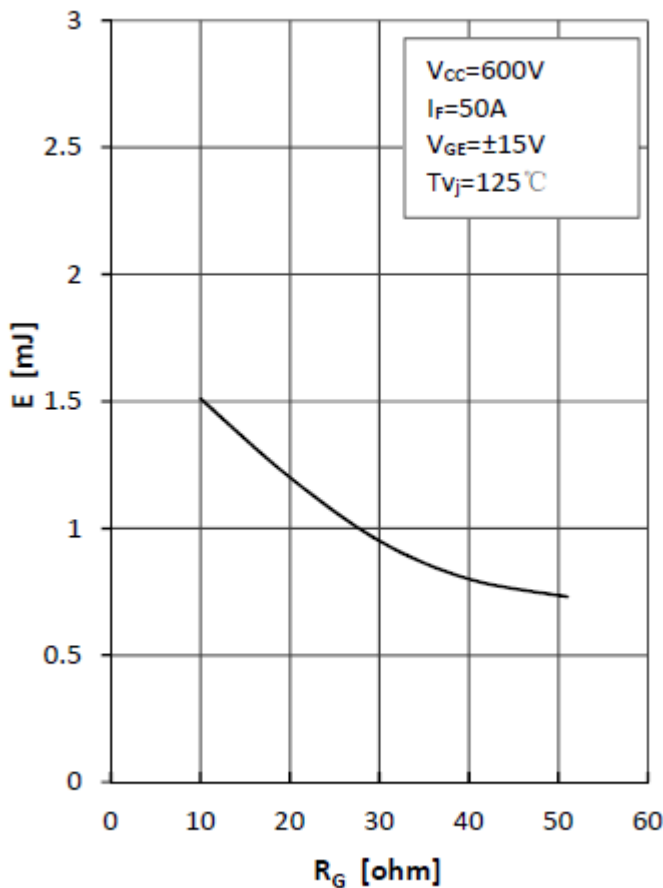


Fig9. Diode Switching Loss(Erec) vs. R_G

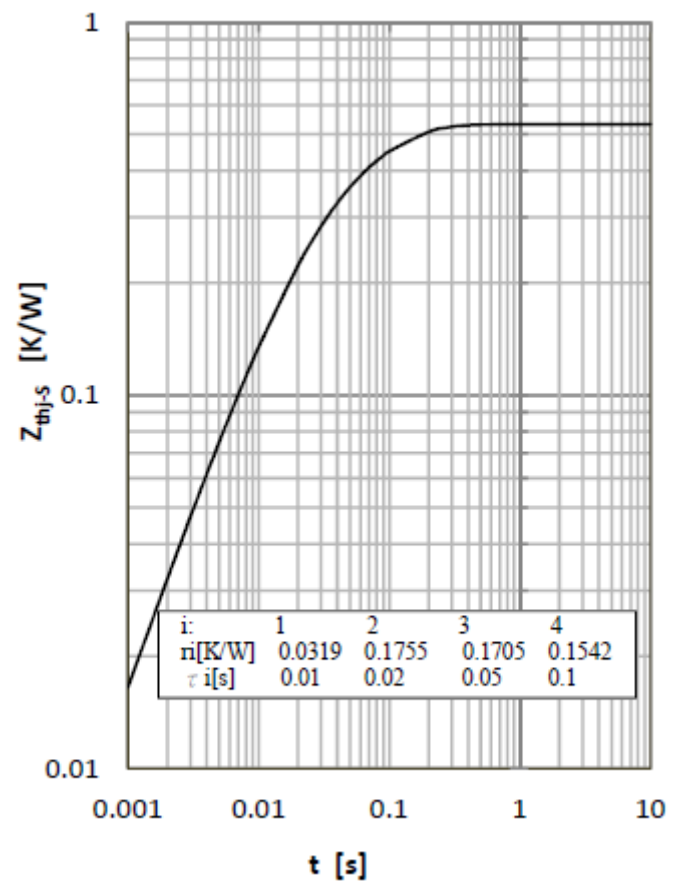
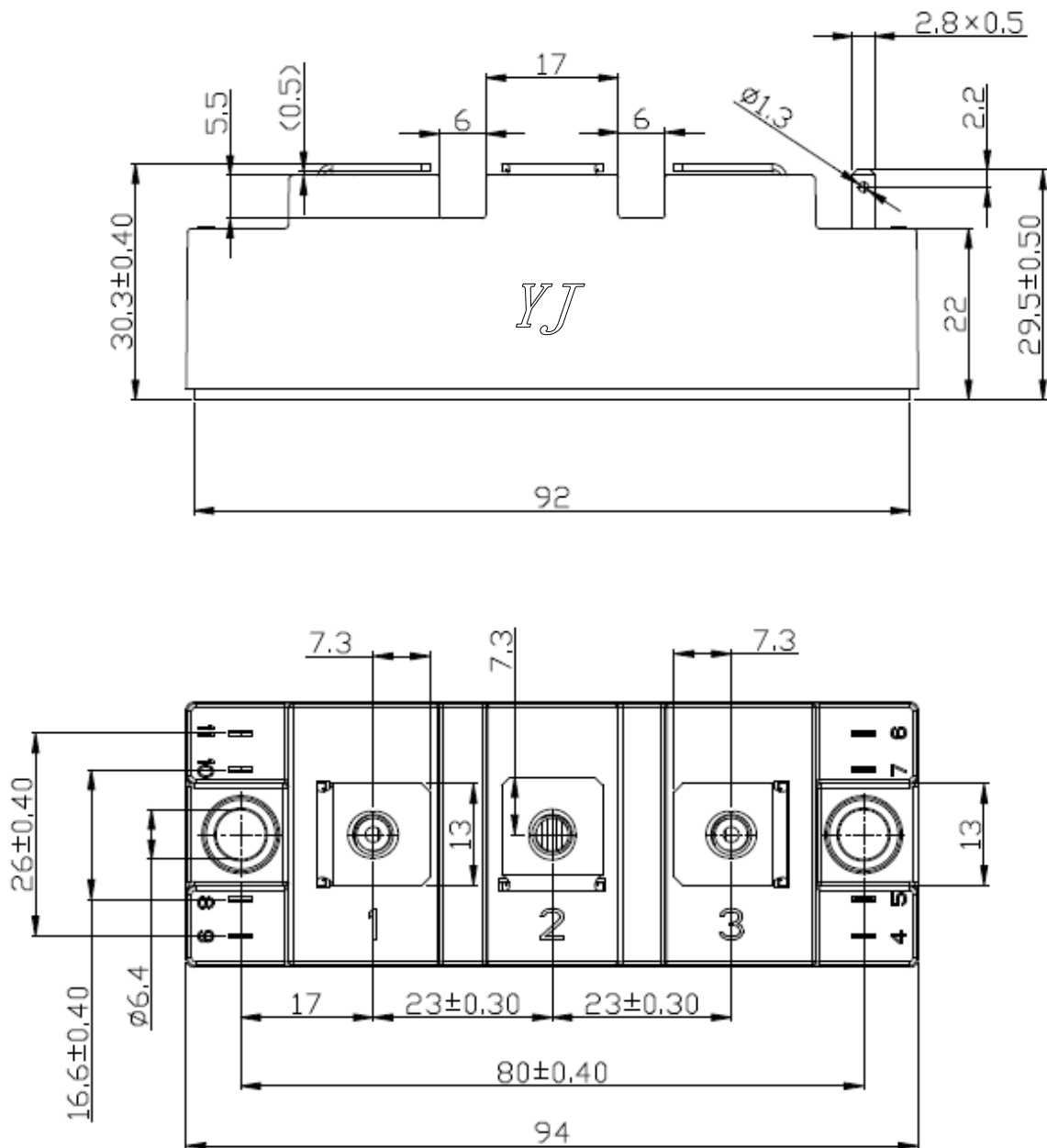


Fig10. Diode Transient Thermal Impedance

Package Outline Information

CASE: C1



Dimensions in mm