

IGBT Modules

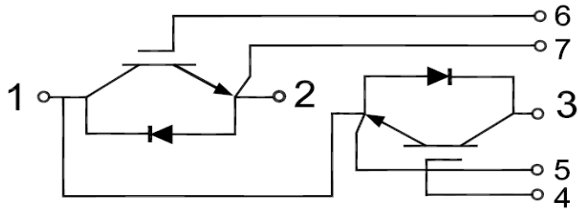


V_{CES} 1200V
I_C 100A

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	150	A
		T _C =80°C	100	A
I _{CM(1)}	Peak Collector Current Repetitive	T _J = 125°C	200	A
I _F	Diode Continuous Forward Current	T _J = 125°C	100	A
P _D	Maximum Power Dissipation (IGBT)	T _C = 25°C, T _{Jmax} =150°C	675	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		155	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 =100A, V _{GE} =15V		3.0		V
		I _C =100A, V _{GE} =15V, T _J =125°C		3.8		V
Dynamic Characteristics						
C _{ies}	Input Capacitance	V _{CE} = 25V, V _{GE} = 0V , f=1MHz		6.7		nF
C _{oes}	Output Capacitance			1.1		nF
C _{res}	Reverse Transfer Capacitance			0.55		nF
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{CC} = 600V, I _C = 100A , R _G = 10Ω, V _{GE} =±15V , Inductive Load, T _J = 25°C		102		ns
t _r	Rise Time			79		ns
t _{d(off)}	Turn-off Delay Time			284		ns
T _f	Fall Time			24		ns
E _{on}	Turn-on Switching Loss			11.2		mJ
E _{off}	Turn-off Switching Loss			2.6		mJ
t _{d(on)}	Turn-on Delay Time	V _{CC} = 600V, I _C = 100A , R _G = 10Ω, V _{GE} =±15V , Inductive Load, T _J = 125°C		110		ns
t _r	Rise Time			85		ns
t _{d(off)}	Turn-off Delay Time			325		ns
T _f	Fall Time			28		ns
E _{on}	Turn-on Switching Loss			15.6		mJ
E _{off}	Turn-off Switching Loss			3.8		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,		700		A



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

Symbol	Item	Conditions	Values			Units
			Min.	Typ.	Max.	
V_{FM}	Forward Voltage	$I_F = 100\text{A}$, $V_{GE} = 0\text{V}$		1.9		V
Q_{rr}	Reverse Recovery Charge	$I_F = 100\text{A}$, $di/dt = 1200\text{A}/\mu\text{s}$, $V_{rr} = 600\text{V}$, $V_{GE} = -15\text{V}$	$T_J = 25^\circ\text{C}$	5.6		μC
			$T_J = 125^\circ\text{C}$	12.1		
I_{rr}	Peak Reverse Recovery Current		$T_J = 25^\circ\text{C}$	78		A
			$T_J = 125^\circ\text{C}$	95		
E_{rec}	Reverse Recovery Energy		$T_J = 25^\circ\text{C}$	3.2		mJ
			$T_J = 125^\circ\text{C}$	6.7		

Thermal Resistance Characteristics

Symbol	Description	Values			Units
		Min.	Typ.	Max.	
$R_{\theta JC}$	Junction-To-Case (IGBT Part, Per Leg)		0.185		$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Junction-To-Case (Diode Part, Per Leg)		0.3		$^\circ\text{C}/\text{W}$
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)		0.05		$^\circ\text{C}/\text{W}$

Performance Curves

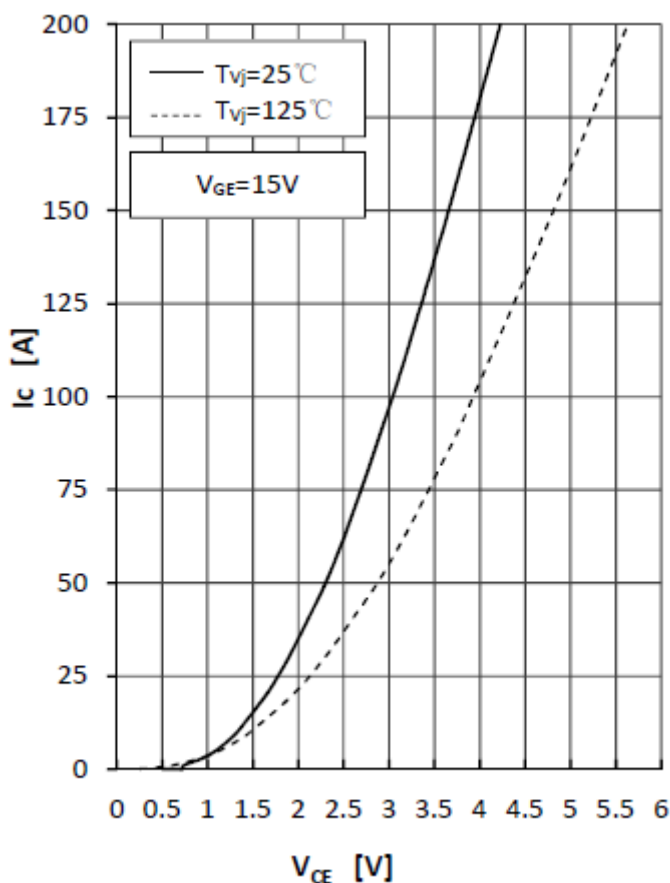


Fig1.IGBT Output Characteristics

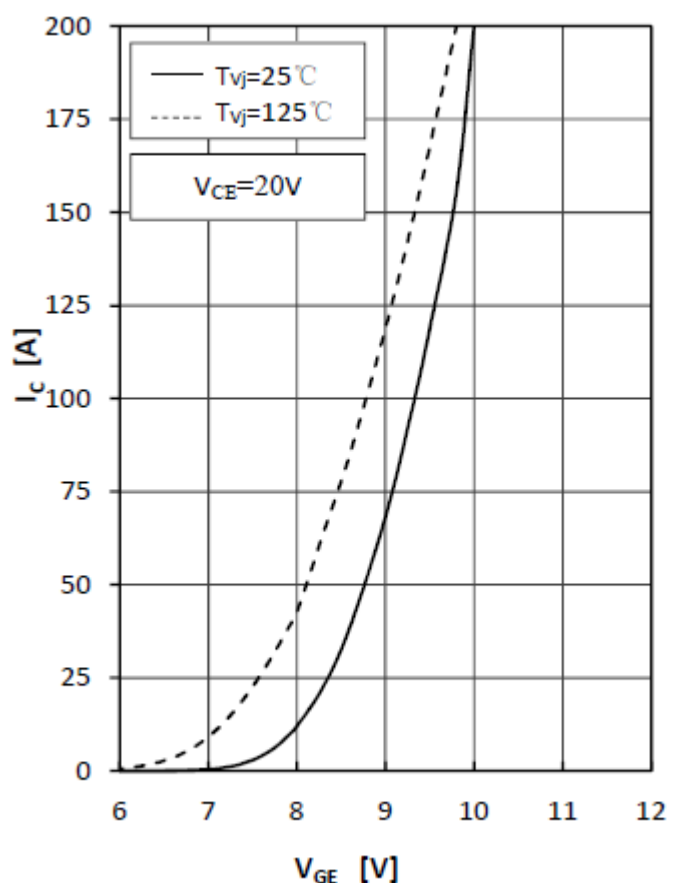


Fig2.IGBT Transfer Characteristics

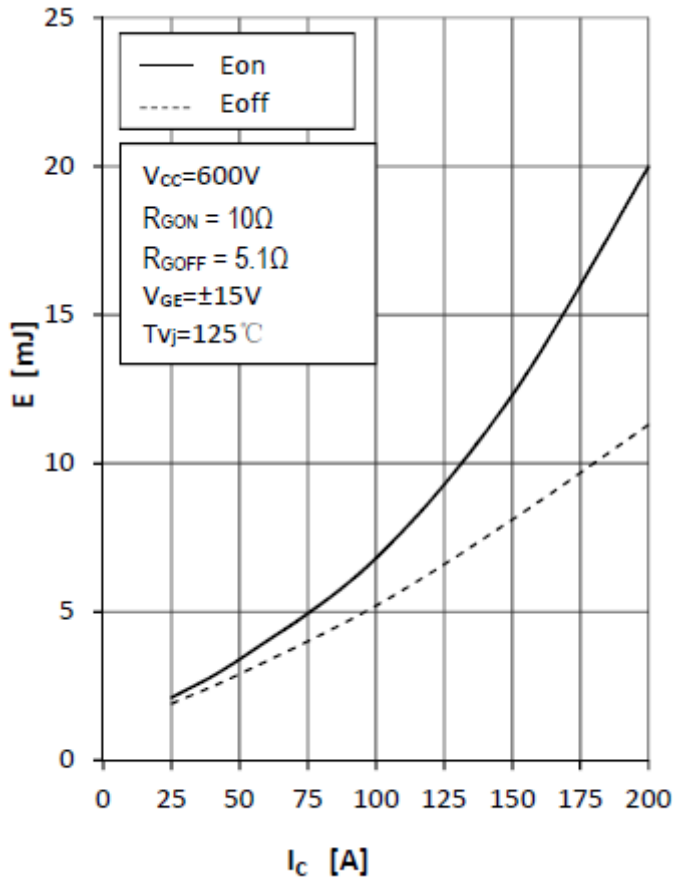


Fig3.IGBT Switching Loss vs.Ic

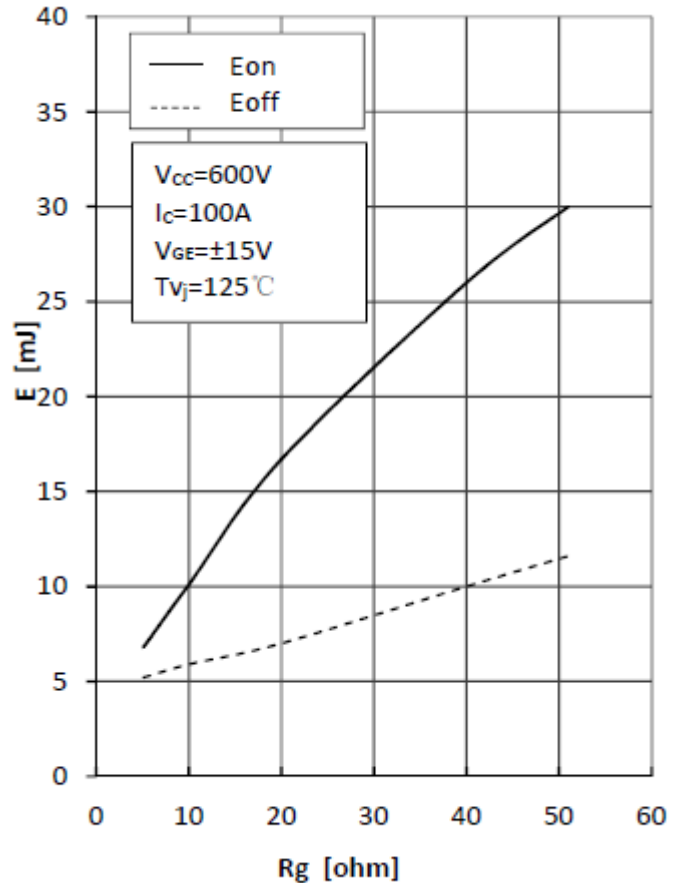


Fig4.IGBT Switching Loss vs.Rg

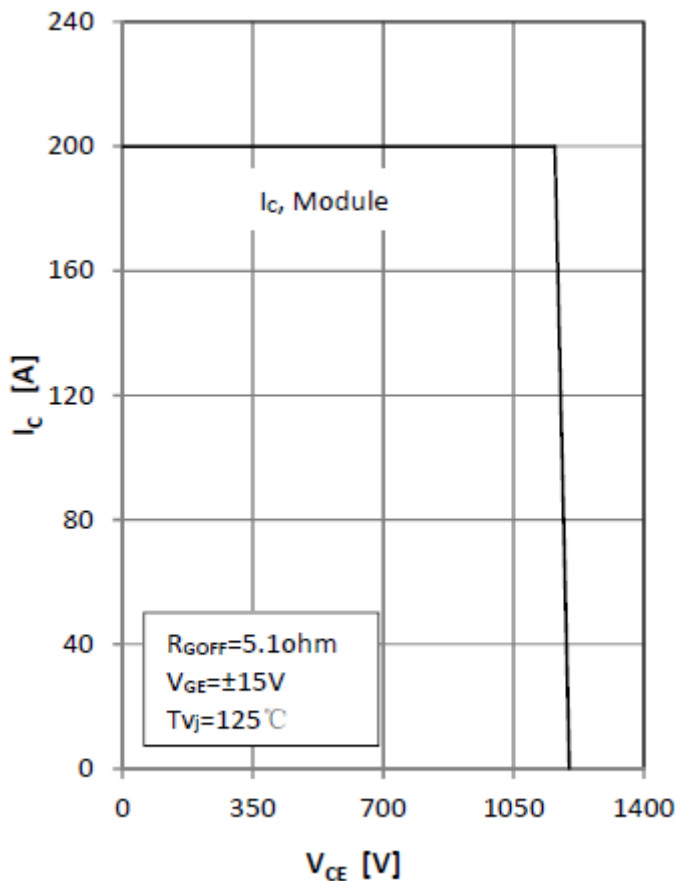


Fig5. RBSOA

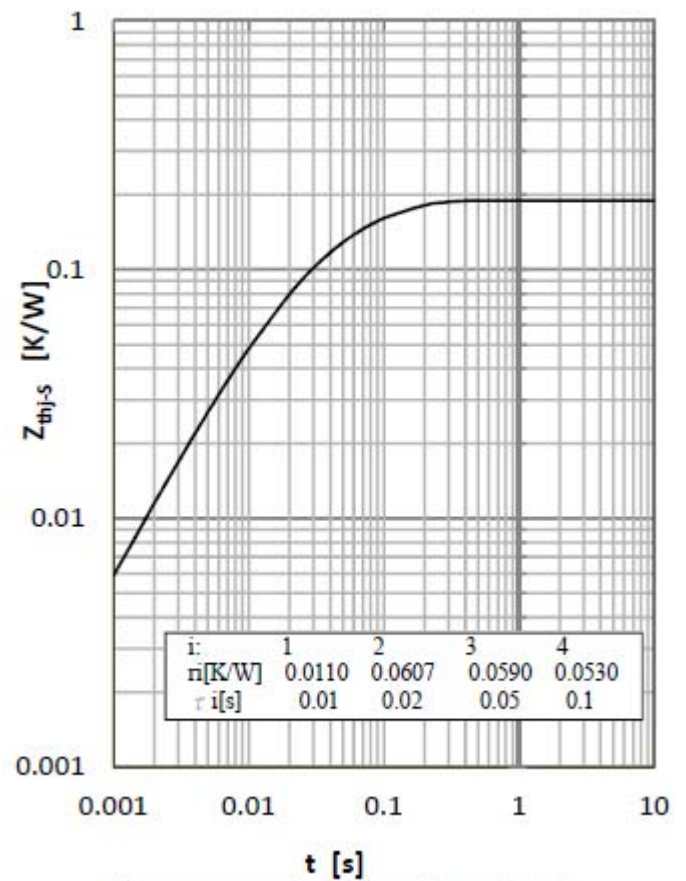


Fig 6. IGBT Transient Thermal Impedance

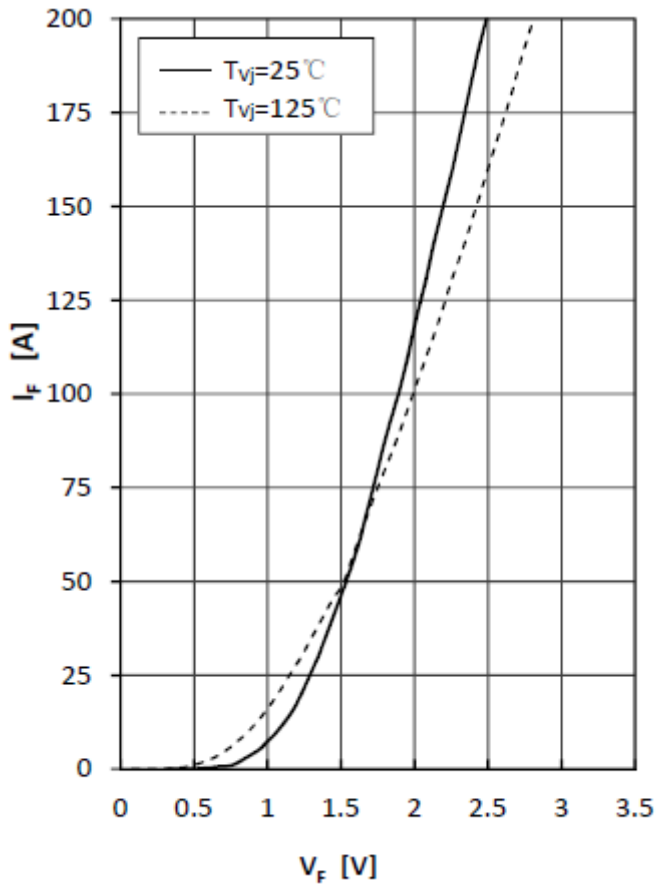


Fig7. Diode Forward Characteristics

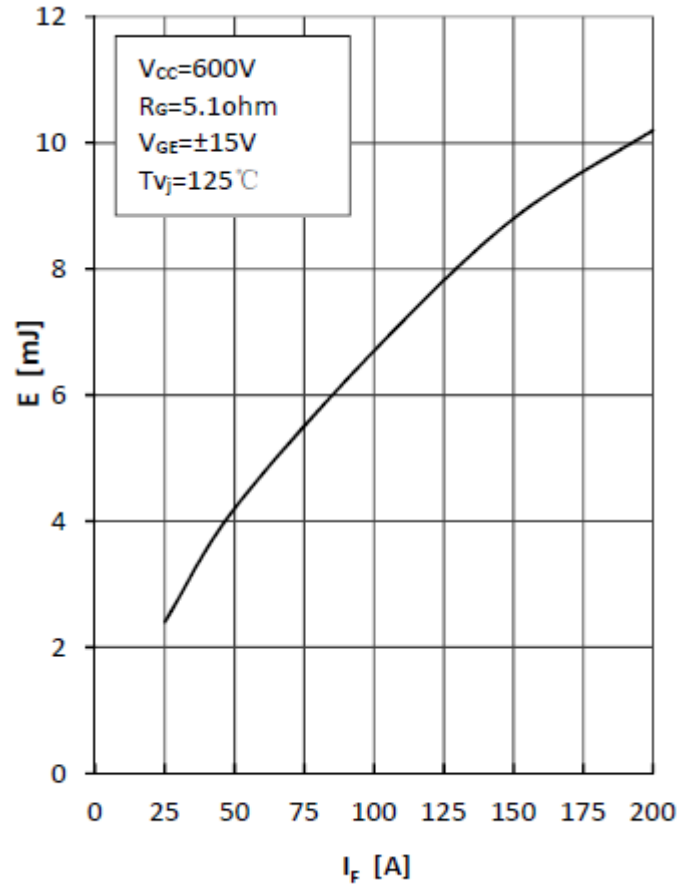


Fig8. Diode Switching Loss(Erec) vs.If

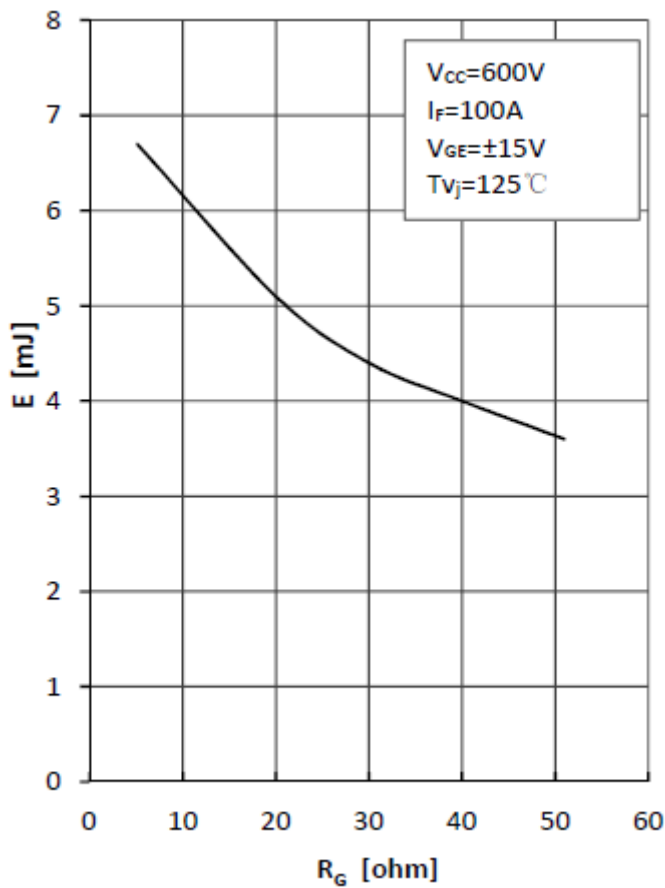


Fig9. Diode Switching Loss(Erec) vs.Rg

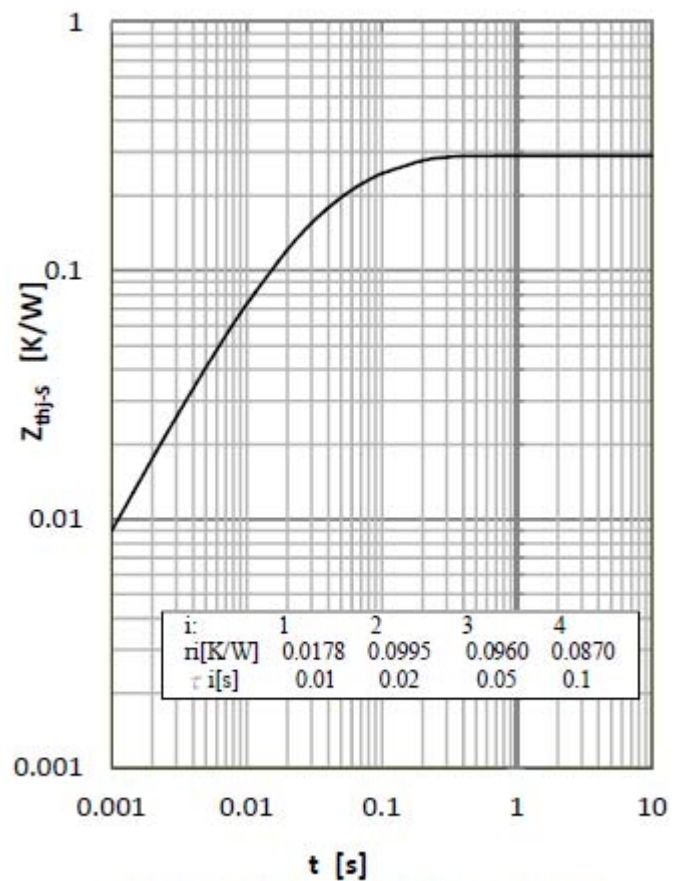
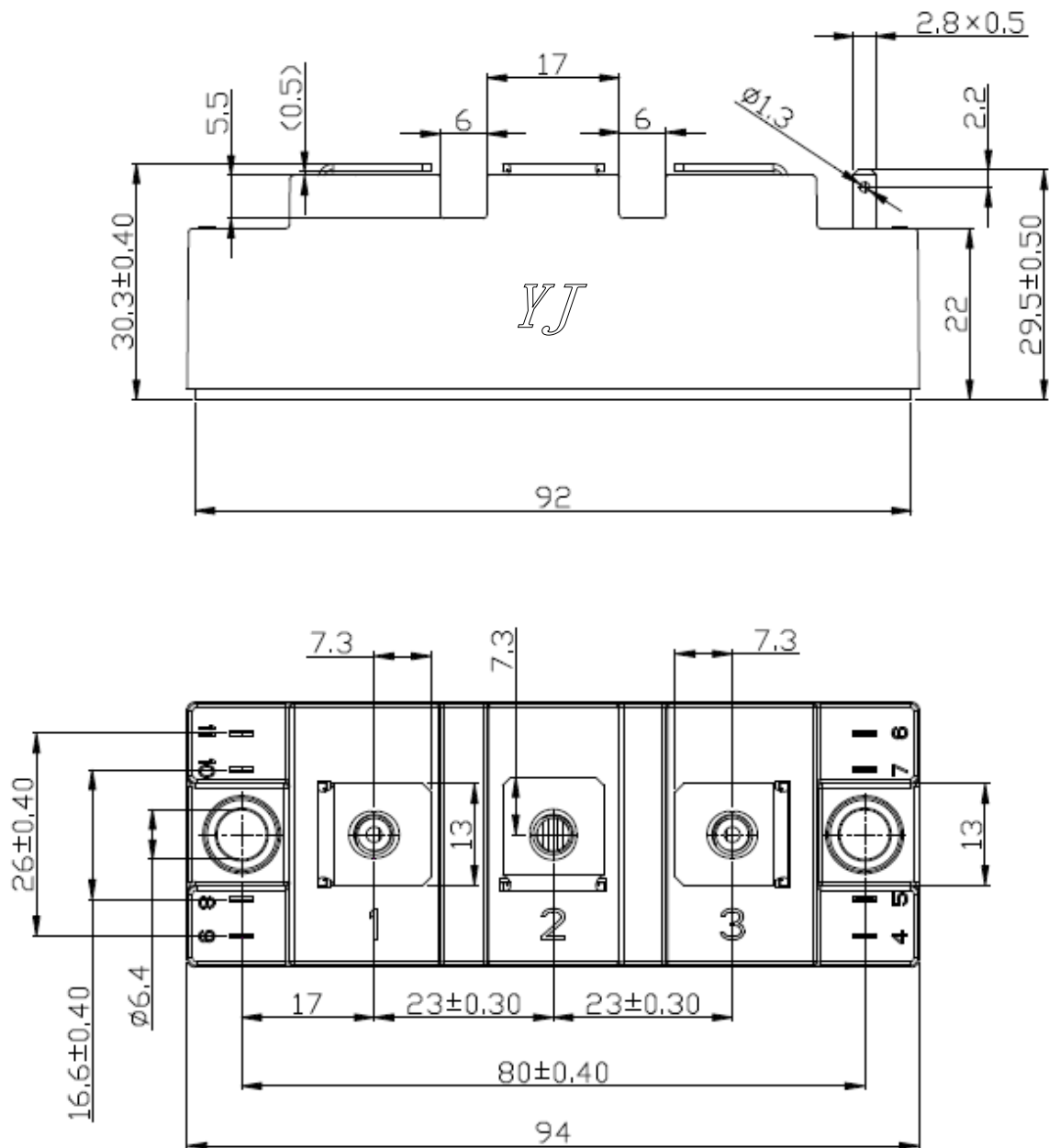


Fig10. Diode Transient Thermal Impedance

Package Outline Information

CASE: C1



Dimensions in mm