

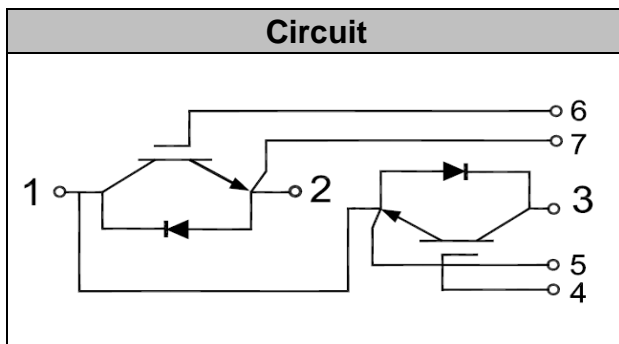
IGBT Modules



V_{CES} 1200V
I_c 50A

Applications

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



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	μA
		$V_{CE}=V_{CES}, V_{GE}=0V,$ $T_J=125^\circ\text{C}$			1	mA
I_{GES}	Gate Leakage Current	$V_{CE}=0V, V_{GE}=\pm 20V$	-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
		$I_C=50A, V_{GE}=15V,$ $T_J=125^\circ\text{C}$		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	$V_{CC} = 600V, I_C = 50A,$ $R_G = 10\Omega, V_{GE} = \pm 15V,$ Inductive Load, $T_J = 25^\circ\text{C}$		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	$V_{CC} = 600V, I_C = 50A,$ $R_G = 10\Omega, V_{GE} = \pm 15V,$ Inductive Load, $T_J = 125^\circ\text{C}$		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	$T_P \leq 10\mu s, V_{GE} = 15V,$ $V_{CC} = 600V, V_{CEM} \leq 1200V,$		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	I _F = 50A, di/dt = 950A/μs, V _{rr} = 600V, V _{GE} = -15V	T _J = 25°C	2.54		μC
			T _J = 125°C	4.96		
I _{rr}	Peak Reverse Recovery Current	I _F = 50A, di/dt = 950A/μs, V _{rr} = 600V, V _{GE} = -15V	T _J = 25°C	39		A
			T _J = 125°C	48		
E _{rec}	Reverse Recovery Energy	I _F = 50A, di/dt = 950A/μs, V _{rr} = 600V, V _{GE} = -15V	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

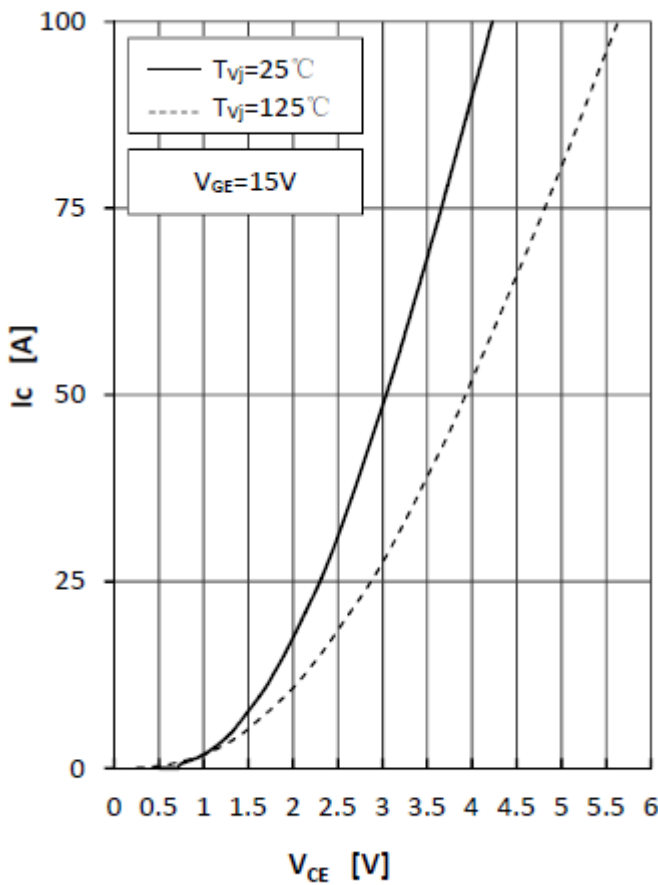


Fig1.IGBT Output Characteristics

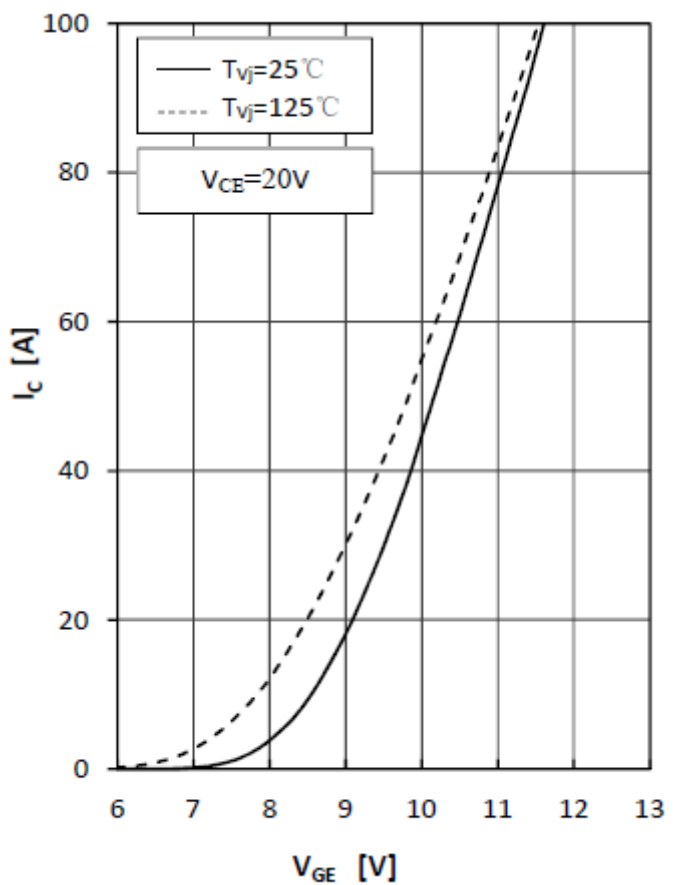


Fig2.IGBT Transfer Characteristics

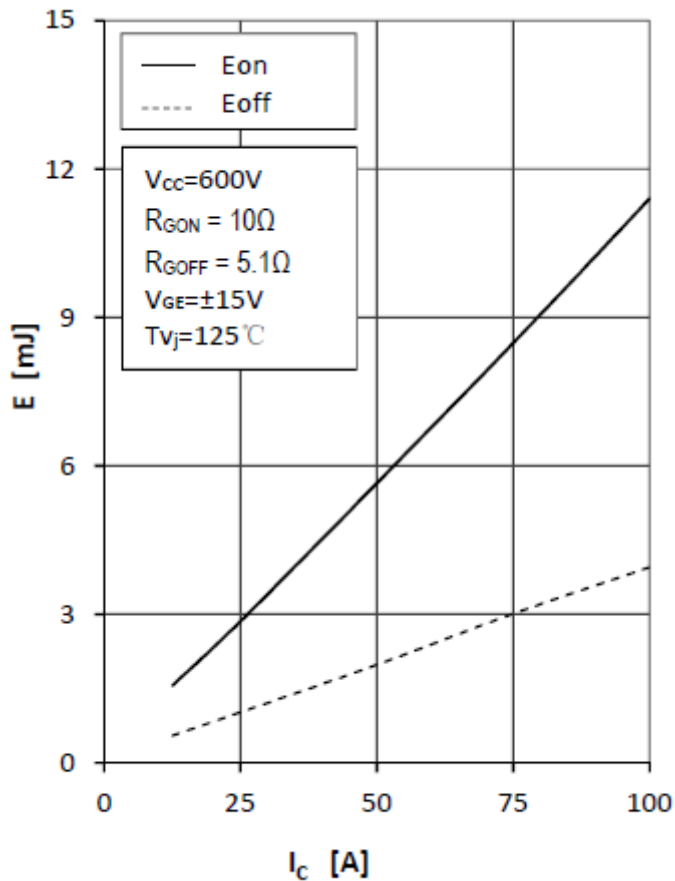


Fig3.IGBT Switching Loss vs.Ic

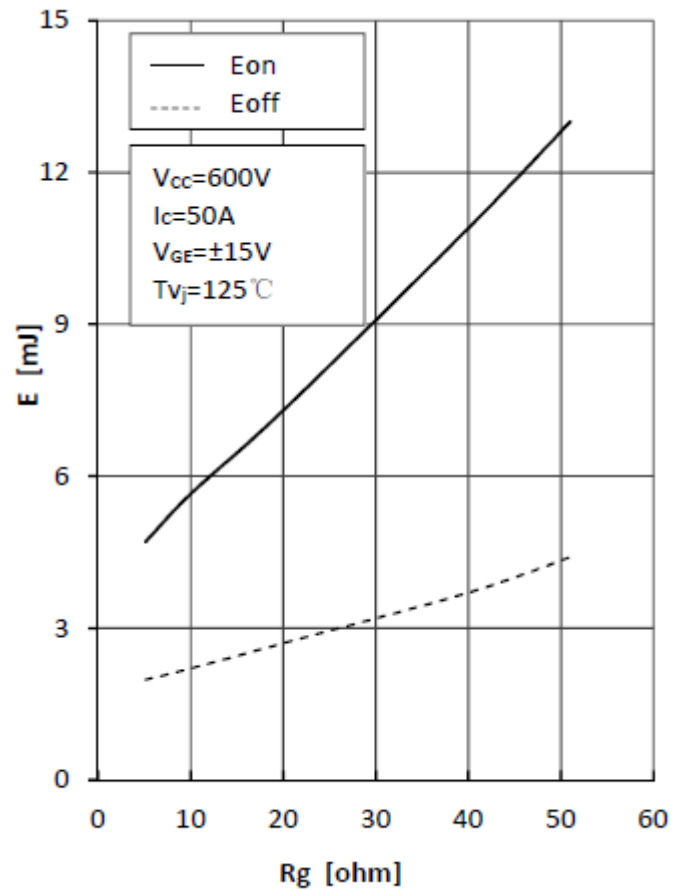


Fig4.IGBT Switching Loss vs.Rg

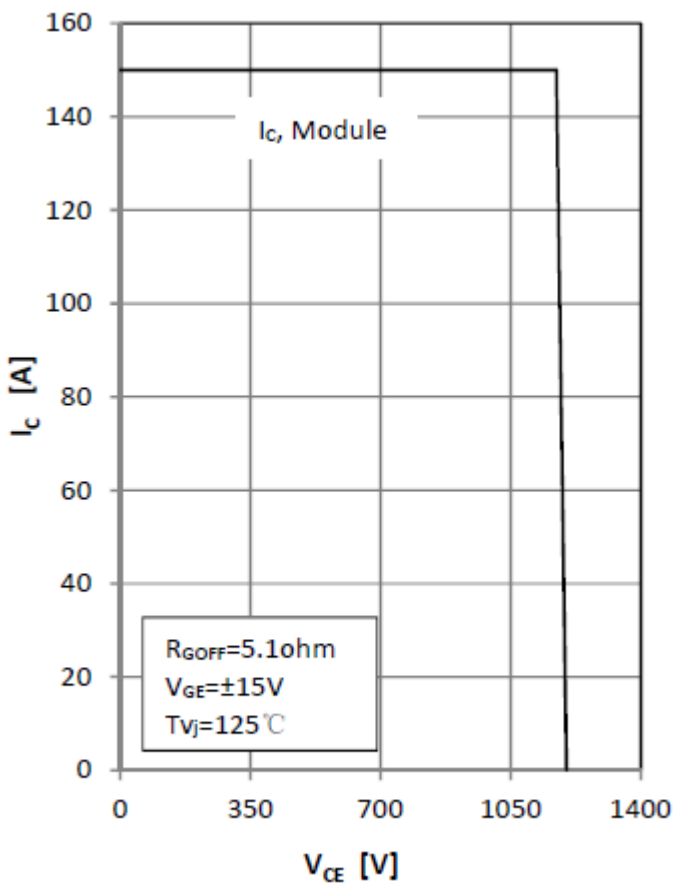


Fig5. RBSOA

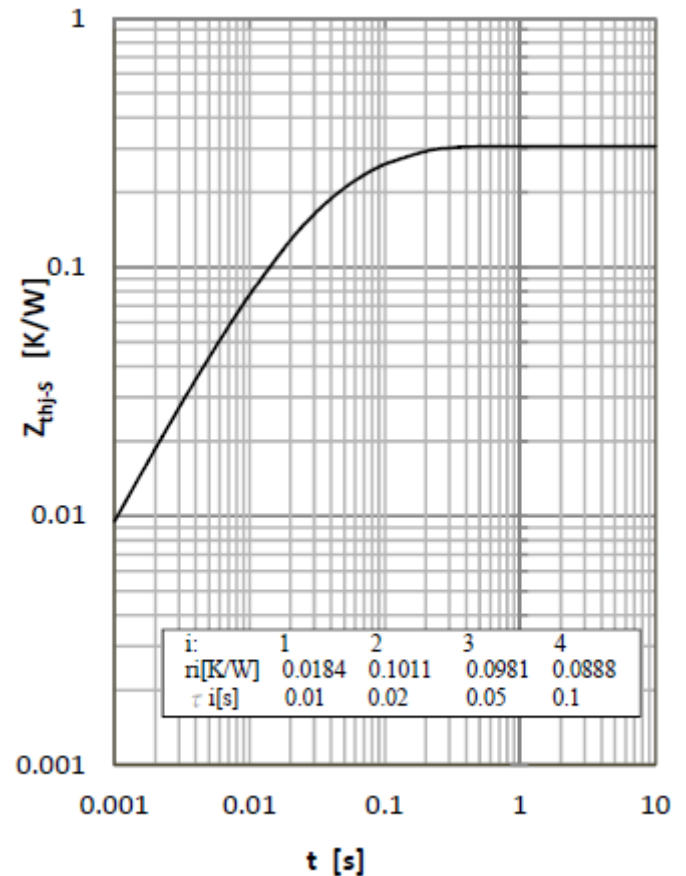


Fig 6. IGBT Transient Thermal Impedance

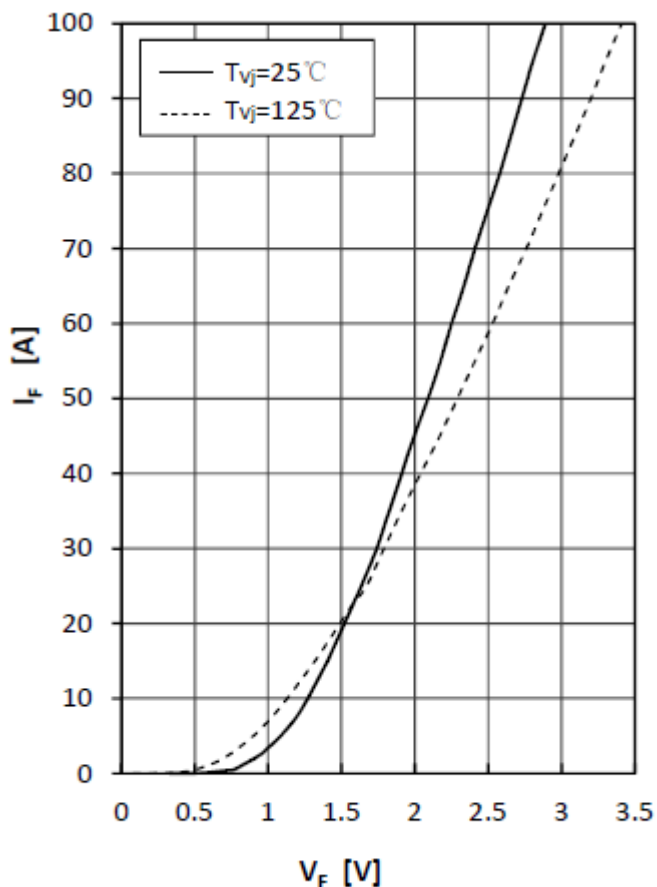


Fig7. Diode Forward Characteristics

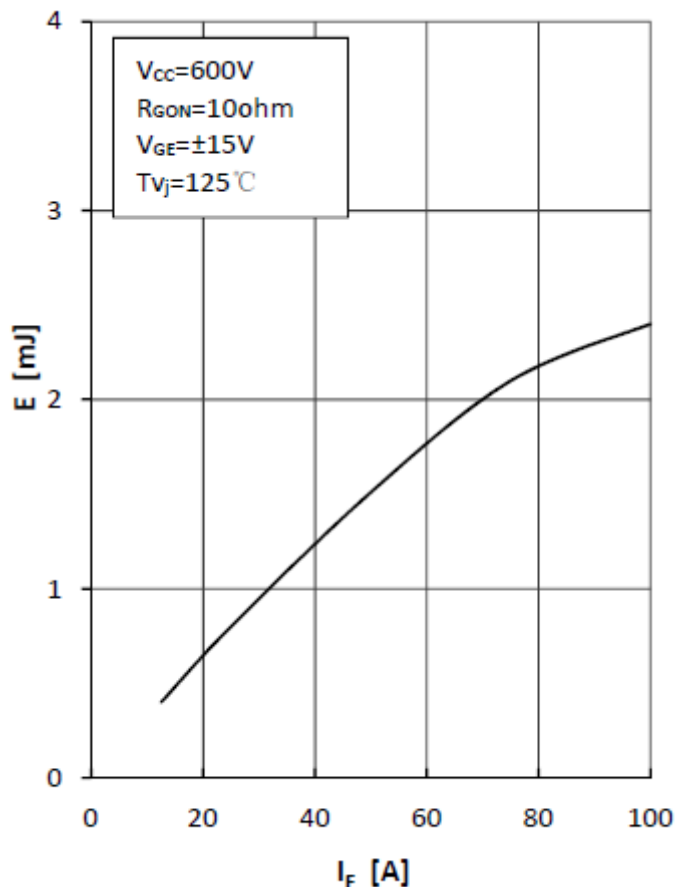


Fig8. Diode Switching Loss(Erec) vs. I_F

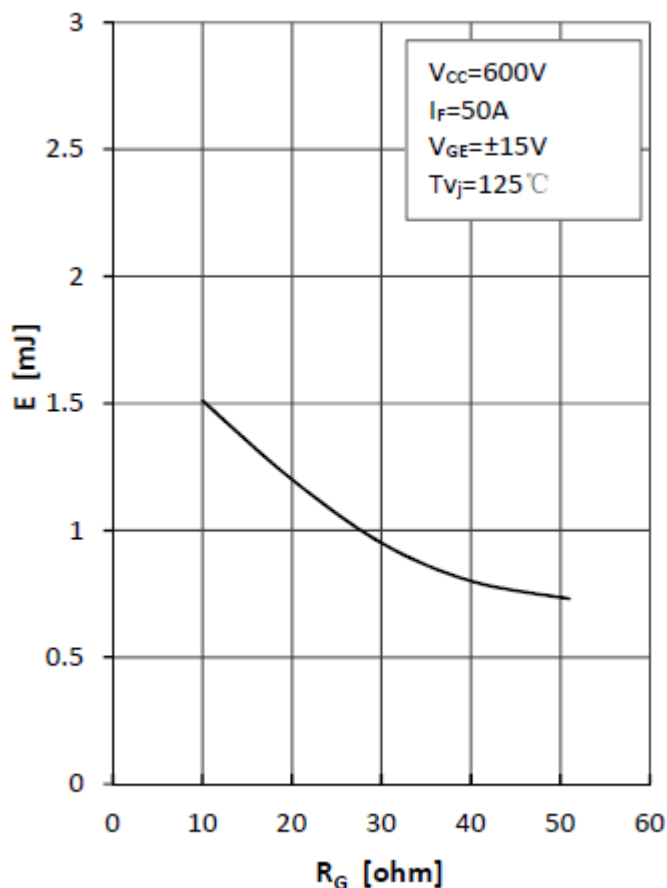


Fig9. Diode Switching Loss(Erec) vs. R_G

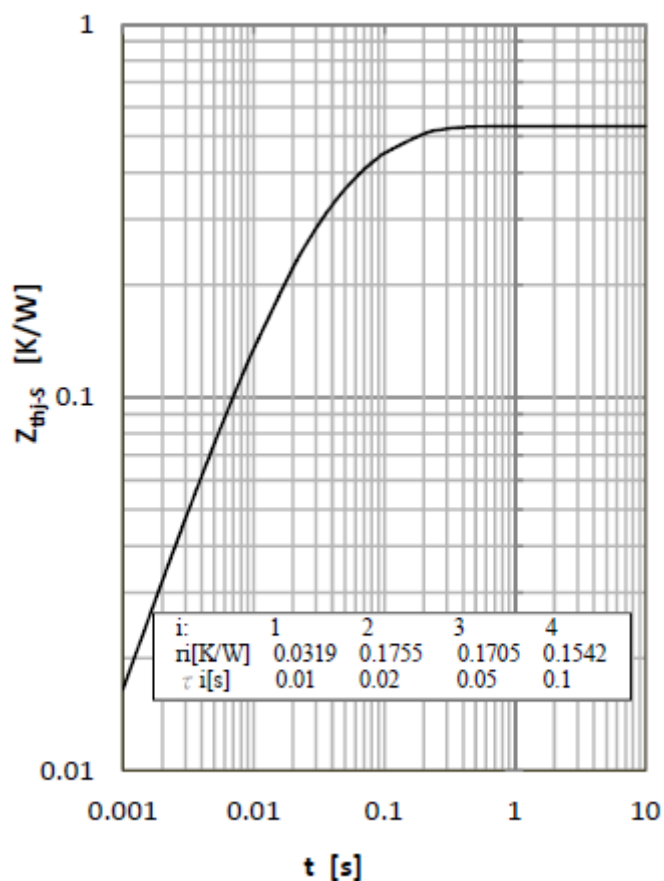
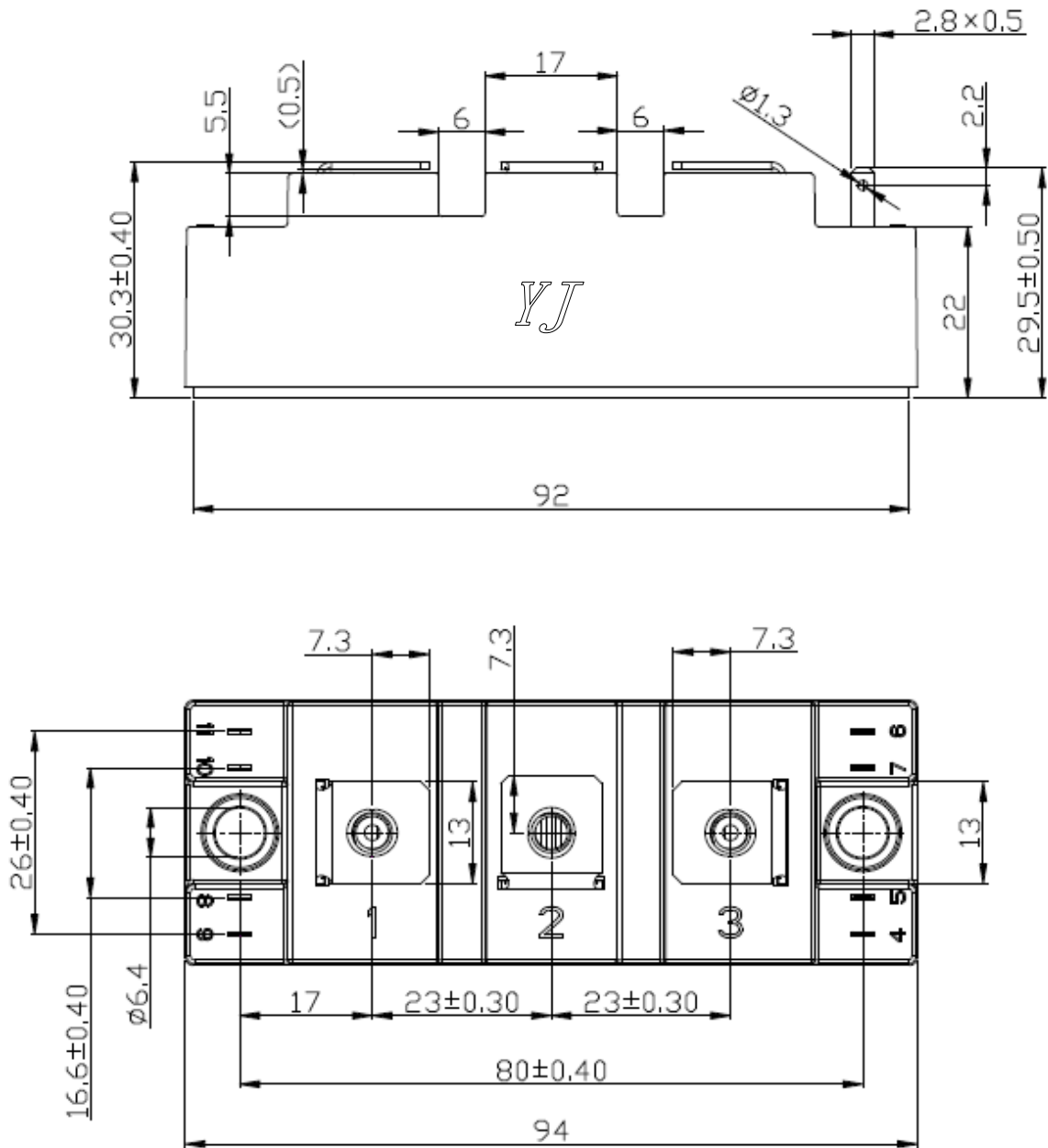


Fig10. Diode Transient Thermal Impedance

Package Outline Information

CASE: C1



Dimensions in mm