MG50HF12LEC1

RoHS COMPLIANT

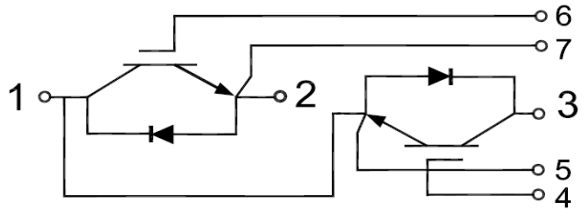
IGBT Modules

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℃ 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℃	80	A
		T_C=80℃	50	A
$I_{CM(1)}$	Peak Collector Current Repetitive	T_J = 125℃	100	A
I_F	Diode Continuous Forward Current	T_J = 125℃	50	A
P_D	Maximum Power Dissipation (IGBT)	T_C = 25℃,T_{Jmax}=150℃	400	W
T_J	Maximum Junction Temperature		150	℃
T_{JOP}	Operating Temperature		-40 ~ +150	℃
T_{stg}	Storage Temperature		-40 ~ +125	℃
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℃ 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℃		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℃		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℃ unless otherwise specified）

Symbol	Item	Conditions		Values			Units
				Min.	Typ.	Max.	
V_{FM}	Forward Voltage	I_F = 50A, V_{GE} = 0V	T_J = 25℃		2.1		V
			T_J = 125℃		2.3		
Q_{rr}	Reverse Recovery Charge	I_F = 50A, di/dt =950A/μs, V_{rr} = 600V, V_{GE} = -15V	T_J = 25℃		2.54		μC
			T_J = 125℃		4.96		
I_{rr}	Peak Reverse Recovery Current		T_J = 25℃		39		A
			T_J = 125℃		48		
Erec	Reverse Recovery Energy		T_J = 25℃		0.72		mJ
			T_J = 125℃		1.51		

Thermal Resistance Characteristics

Symbol	Description	Values			Units
		Min.	Typ.	Max.	
$R_{\theta JC}$	Junction-To-Case (IGBT Part, Per Leg)			0.31	℃/W
$R_{\theta JC}$	Junction-To-Case (Diode Part, Per Leg)			0.78	℃/W
$R_{\theta CS}$	Case-To-Sink (Conductive Grease Applied)			0.05	℃/W

Performance Curves

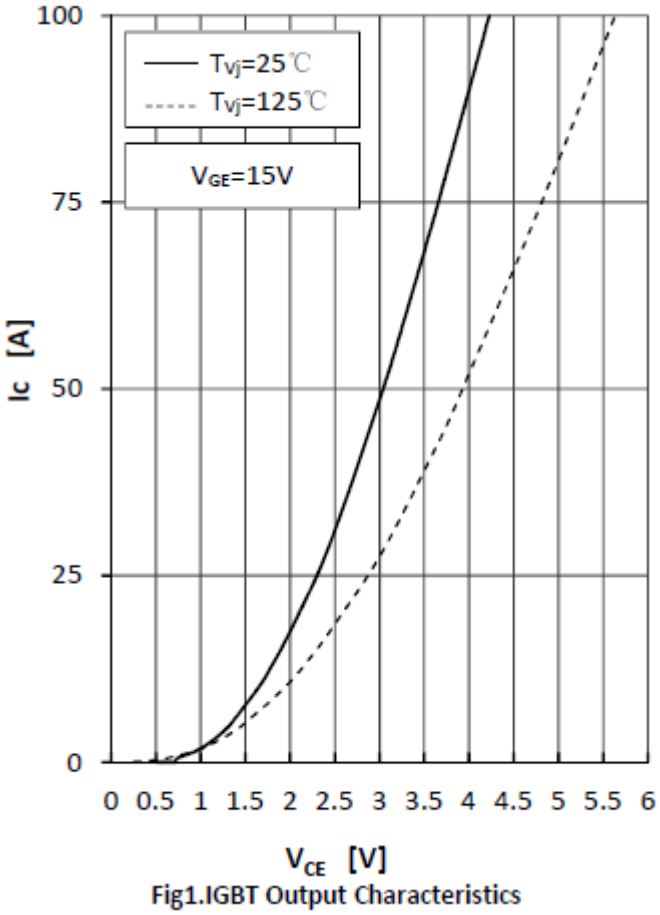


Fig1.IGBT Output Characteristics

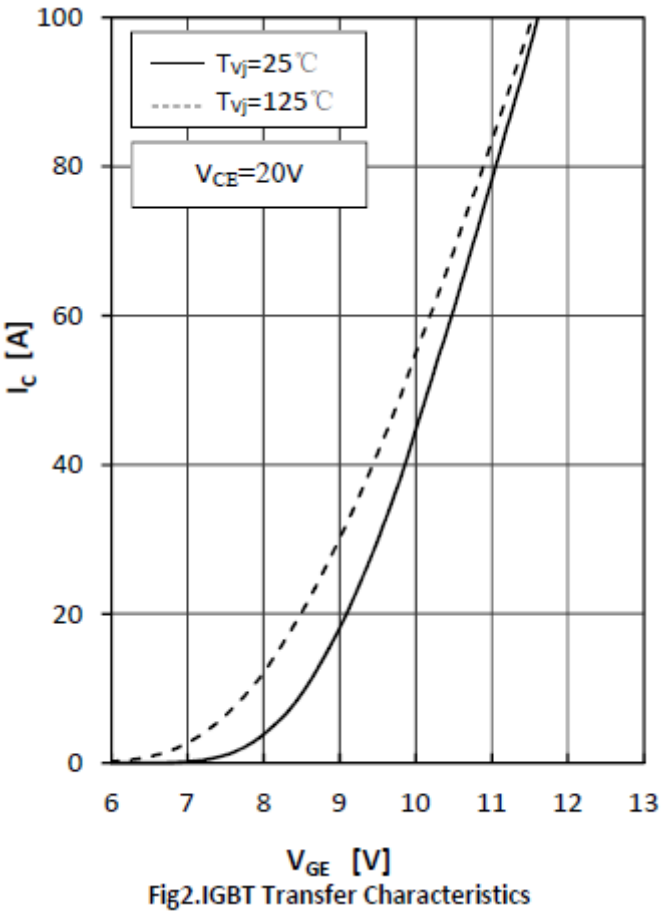


Fig2.IGBT Transfer Characteristics

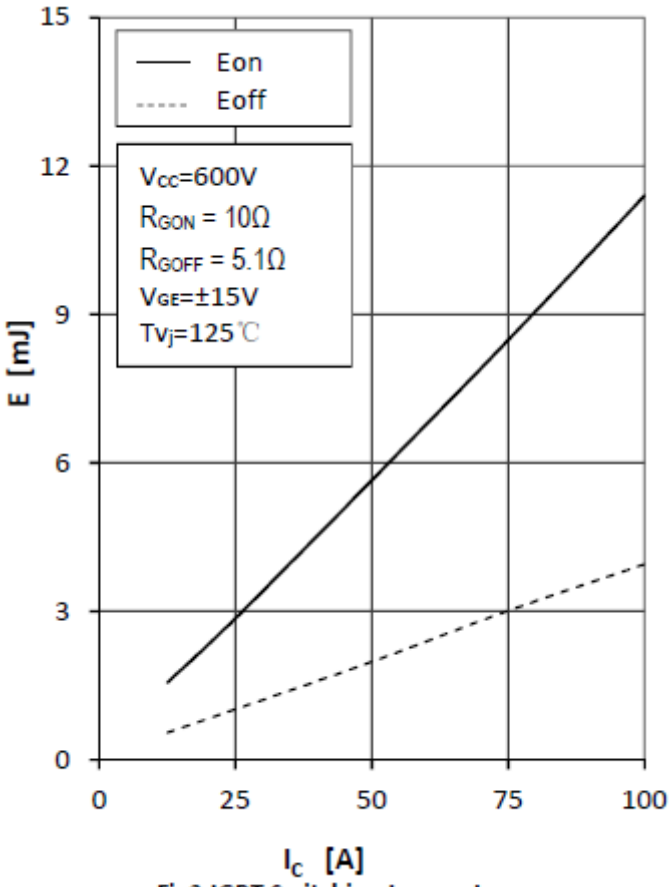


Fig3.IGBT Switching Loss vs.Ic

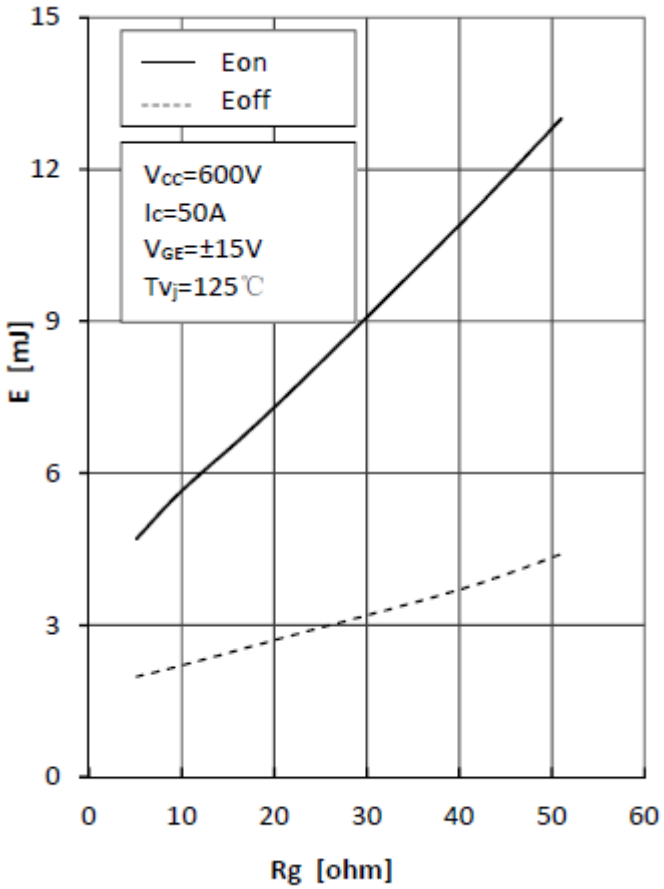


Fig4.IGBT Switching Loss vs.Rg

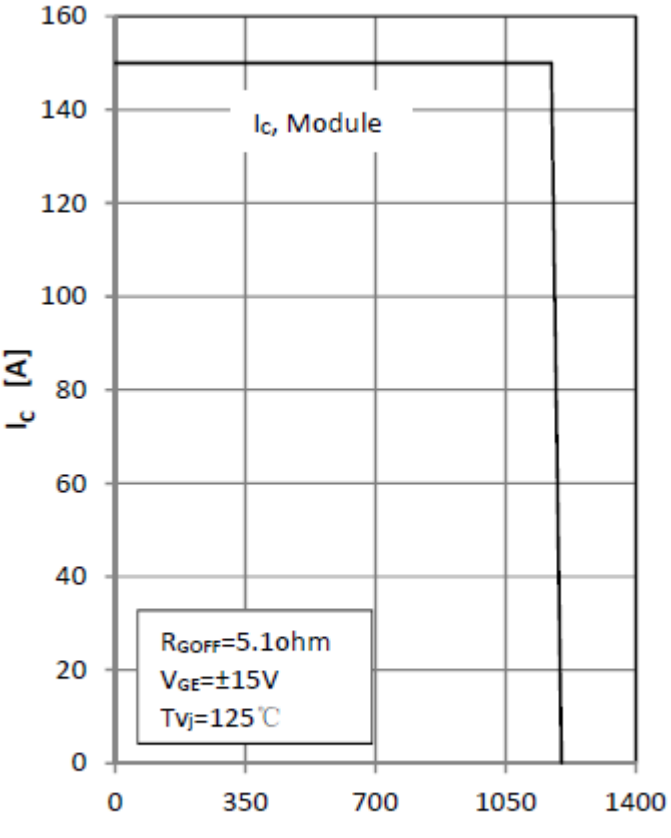


Fig5. RBSOA

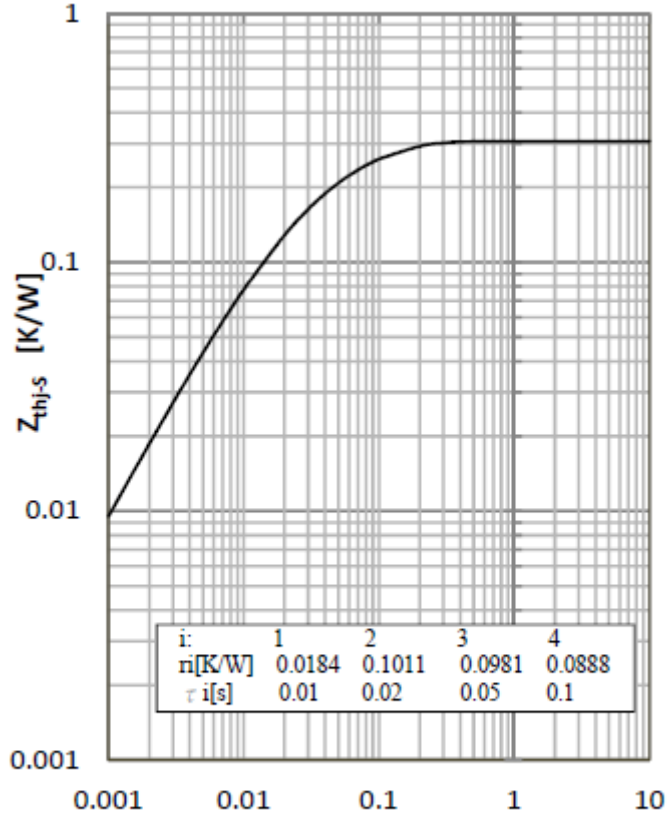


Fig 6. IGBT Transient Thermal Impedance

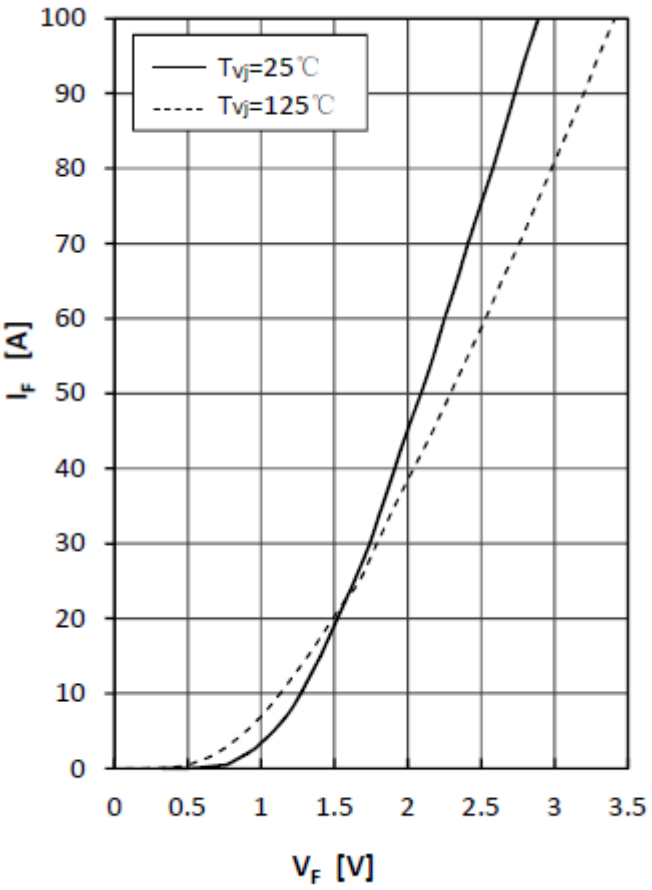


Fig7.Diode Foward Characteristics

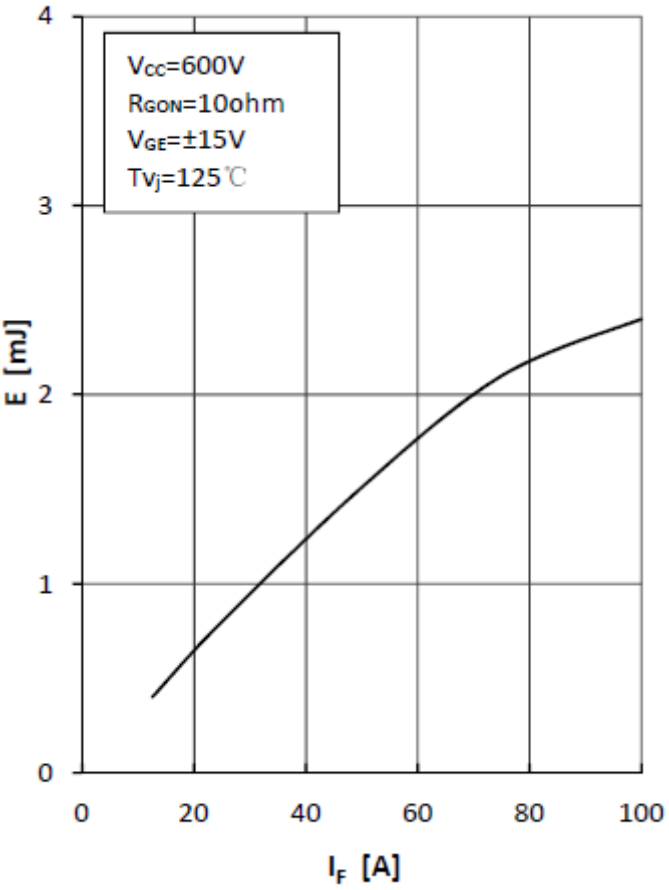


Fig8.Diode Switching Loss(Erec) vs.I_F

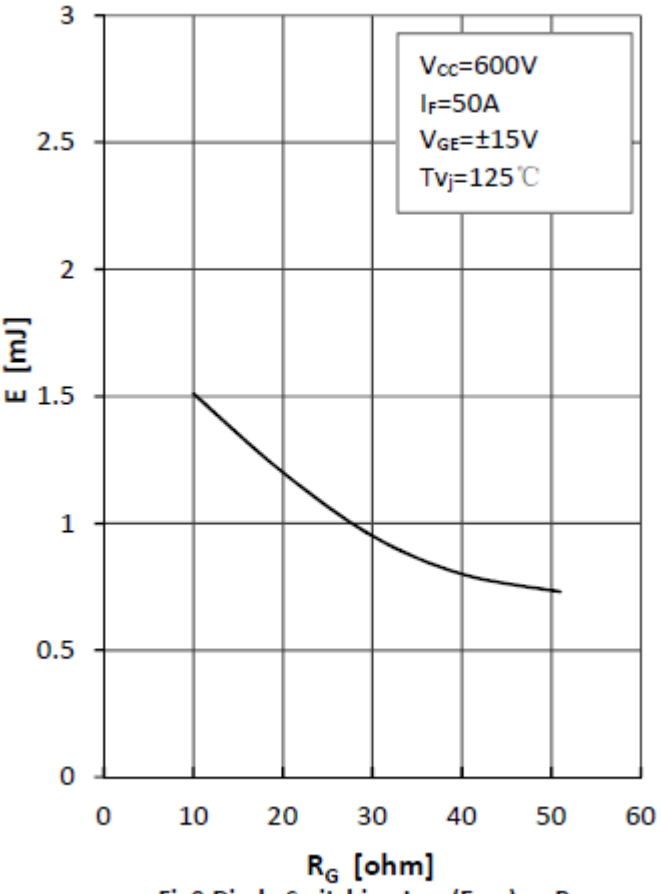


Fig9.Diode Switching Loss(Erec) vs.Rg

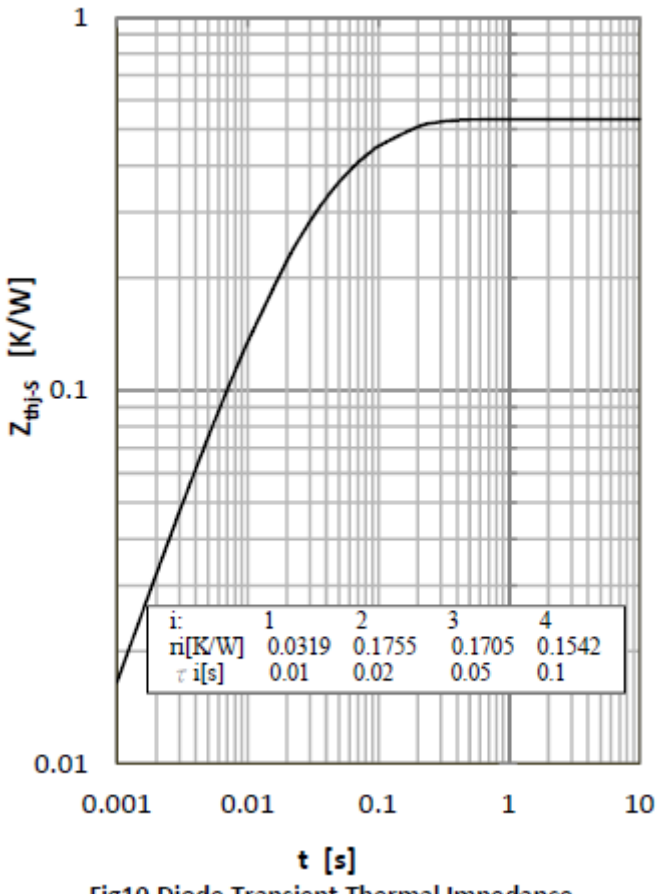
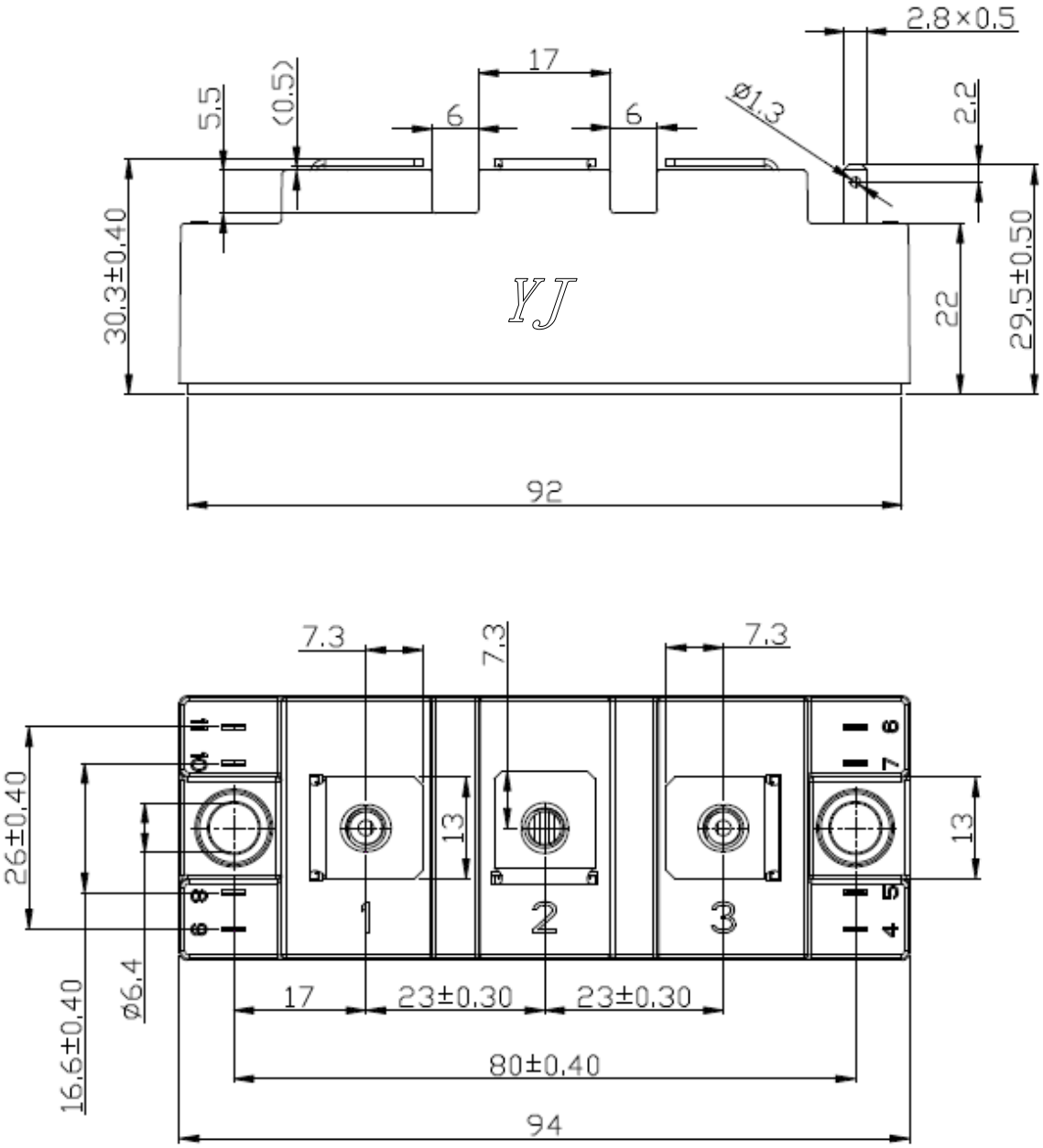


Fig10.Diode Transient Thermal Impedance

Package Outline Information

CASE: C1



Dimensions in mm