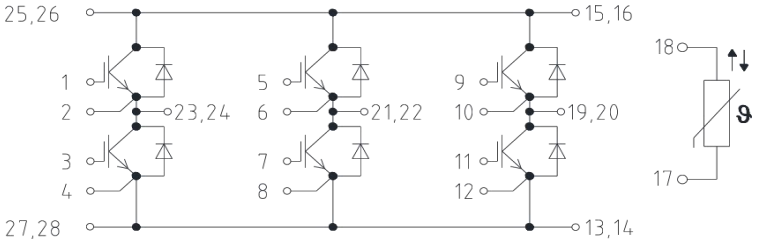
EconoPIM2 SixPack IGBT Module

V_{CES}=1200V, I_C=75A, $V_{CE(sat)}$=1.9V

Features

- IGBT Inverter Short Circuit Rated 10μs
- $V_{CE(Sat)}$ With Positive Temperature Coefficient
- 100% RBSOA Tested
- HI-REL Power Terminals



Applications

- Inverters
- Servo Drives
- UPS Systems

IGBT, Inverter

Maximum Ratings

Parameter	Symbol	Condition	Value	Unit
Collector-emitter voltage	V_{CES}		1200	V
Gate-emitter peak voltage	V_{GES}		±20	V
Continuous DC collector current	$I_{C\ nom}$	T_C=80℃	75	A
		T_C=25℃	150	A
Repetitive peak collector current	I_{CRM}	T_{vj}=150℃	150	A
Short circuit withstand time	t_{sc}	T_{vj}=125℃	>10	us
Maximum power dissipation(IGBT)	P_D	T_C=25℃, T_{vj}=150℃	450	W

Characteristics Values

Parameter	Symbol	Conditions		Value			Unit
				Min.	Typ.	Max.	
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C=50A, V_{GE}=15V	T_{vj}=25℃		1.9	2.1	V
			T_{vj}=125℃		2.2		V
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C=1mA, V_{CE}=V_{GE}	T_{vj}=25℃	4.5	5.4	6.5	V
Gate charge	Q_G	I_C=75A, V_{CE}=600V, V_{GE}=-15V...+15V			0.63		μC
Input capacitance	C_{ies}	f=1MHz, V_{CE}=25V, V_{GE}=0V	T_{vj}=25℃		10.4		nF
Output capacitance	C_{oes}	f=1MHz, V_{CE}=25V, V_{GE}=0V	T_{vj}=25℃		0.56		nF
Collector-emitter cut-off current	I_{CES}	V_{CE}=V_{CES}, V_{GE}=0V	T_{vj}=25℃			500	uA
			T_{vj}=125℃			1	mA

Gate-emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=V_{GES}	T_{vj}=25℃			300	nA
			T_{vj}=125℃			600	nA
Turn-on delay time	$t_{d\ on}$	I_C=75A, V_{CE}=600V, V_{GE}=-15V/+15V,R_G=15Ω, Inductive Load	T_{vj}=25℃		190		ns
			T_{vj}=125℃		175		ns
Rise time	t_r		T_{vj}=25℃		100		ns
			T_{vj}=125℃		110		ns
Turn-off delay time	$t_{d\ off}$		T_{vj}=25℃		270		ns
			T_{vj}=125℃		280		ns
Fall time	t_f		T_{vj}=25℃		160		ns
			T_{vj}=125℃		240		ns
Turn-on switching loss	E_{on}		T_{vj}=25℃		5.2		mJ
			T_{vj}=125℃		6.9		mJ
Turn-off switching loss	E_{off}		T_{vj}=25℃		3.6		mJ
			T_{vj}=125℃		5.5		mJ
Total switching loss	E_{ts}		T_{vj}=25℃		8.8		mJ
			T_{vj}=125℃		12.4		mJ
Reverse bias safe operating area	RBSOA	I_C=150A, V_{CC}=960V, V_p=1200V, R_g=15Ω, V_{GE}=+15V to 0V,	T_{vj}=150℃	Trapezoid			
Short circuit safe operating area	SCSOA	V_{GE}=15V, V_{CE}=600V	T_{vj}=150℃	10			us

Diode, Inverter

Maximum Ratings

Parameter	Symbol	Conditions		Value	Unit
Repetitive peak reverse voltage	V_{RRM}	T_{vj}=25℃		1200	V
Continuous forward current	I_F			75	A
Repetitive peak forward current	I_{FRM}	t_P= 1ms		100	A
I^2t-value	I^2t	t_P=10ms, V_R=0V	T_{vj}=125℃	1200	A^2s

Characteristics Values

Parameter	Symbol	Conditions		Value			Unit
				Min.	Typ.	Max.	
Forward voltage	V_F	I_F=75A, V_{GE}=0V	T_{vj}=25℃		2.0	2.2	V
			T_{vj}=125℃		2.2		V
Reverse recovery time	t_{rr}	I_F=75A, V_R=600V, V_{GE}=-15V, di/dt=750A/μs	T_{vj}=25℃		190		ns
			T_{vj}=125℃		200		ns
Peak reverse recovery current	I_{rr}		T_{vj}=25℃		46		A
			T_{vj}=125℃		75		A
Recovered charge	Q_{rr}		T_{vj}=25℃		4.5		μC
			T_{vj}=125℃		9.1		μC
Reverse recovery energy	E_{rec}		T_{vj}=25℃		1.2		mJ
			T_{vj}=125℃		3.2		mJ

NTC-Thermistor

Characteristics Values

Symbol	Condition	Typ.	Max.	Unit
R_{25}	T_C=25℃	5		kΩ
△R/R	T_C=100℃， R_{100}=481Ω		±5	%
P_{25}	T_C=25℃	50		mW
$B_{25/50}$	$R_2=R_{25}\exp[B_{25/50}(1/T_2-1/(298.15K))]$	3380		K
$B_{25/80}$	$R_2=R_{25}\exp[B_{25/80}(1/T_2-1/(298.15K))]$	3440		K

Module

Characteristics Values

Parameter	Symbol	Conditions	Value	Unit
Isolation test voltage	V_{ISOL}	f=50Hz, t=1min	2.5	kV
Operating junction temperature of IGBT	T_{vj}	Inverter& Brake& Rectifier	-40~+175	℃
Operating junction temperature of diode	T_{vj}	Inverter& Brake& Rectifier	-40~+155	℃
Storage temperature	T_{stg}		-40~+125	℃

Thermal Characteristics

Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Inverter	$R_{\theta JC}$	Junction-To-Case (IGBT Part, Per Leg)			0.33	℃/W
	$R_{\theta JC}$	Junction-To-Case (Diode Part, Per Leg)			0.39	℃/W
Module	$R_{\theta JC}$	Case-To-Sink (conductive grease applied)			0.1	℃/W
	M	Mounting torque for module mounting:M6		4	6	N·m
	G	Weight			180	g

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

Typical Characteristics

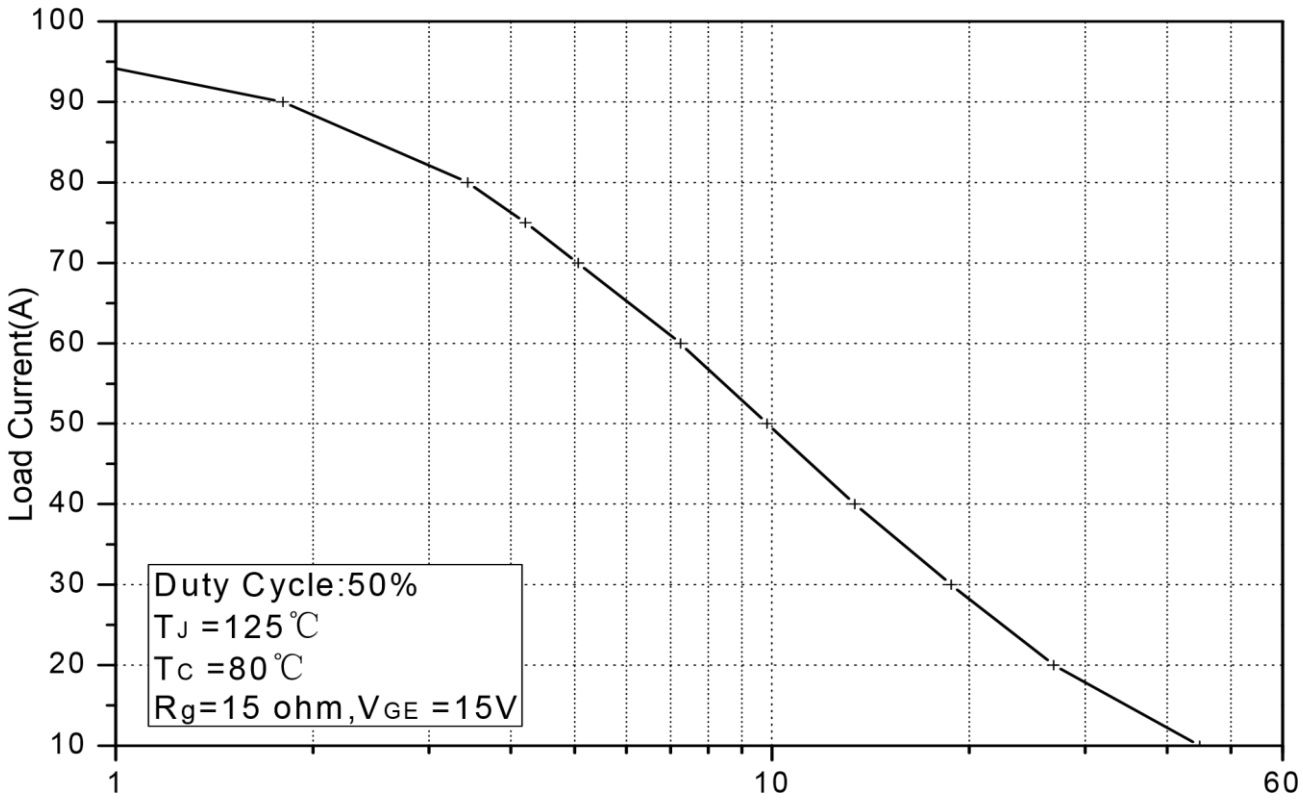


Fig.1 Typical Load Current vs. Frequency
(IGBT Inverter)

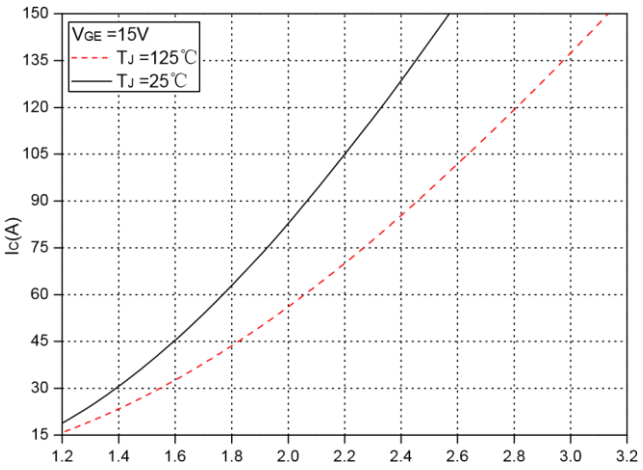


Fig.2 Typical Saturation Voltage Characteristics
T_{vj}=25℃, (IGBT Inverter)

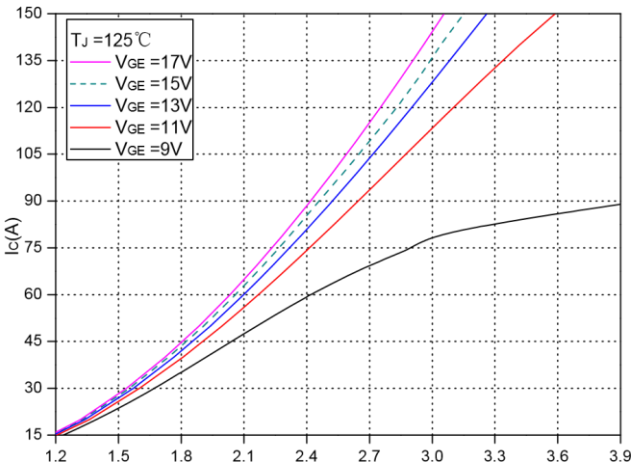


Fig.3 Typical Collector Current vs. Gate Resistance
V_{GE}=±15V，R_{Gon}=R_{Goff}=22Ω，V_{CE}=600V
(IGBT Inverter)

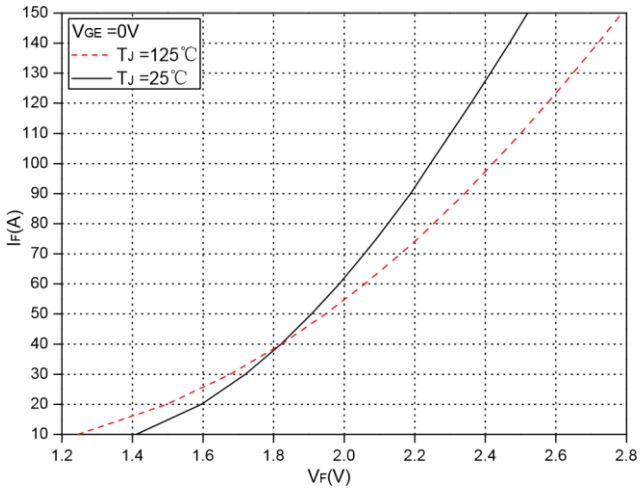


Fig.4 Forward Characteristics of FWD
(Diode Inverter)

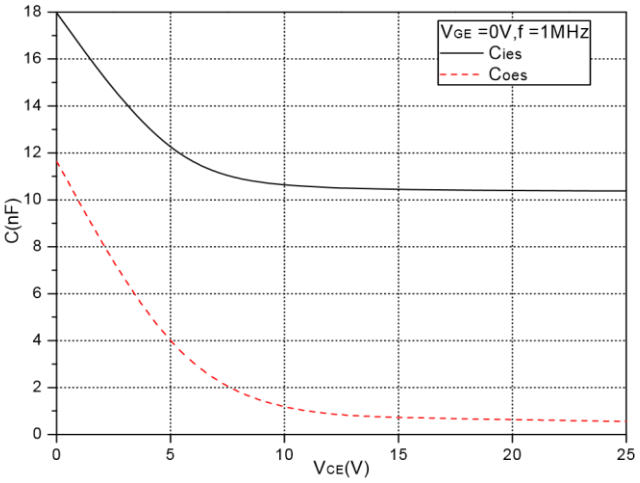


Fig.5 Capacitance Characteristics
(IGBT Inverter)

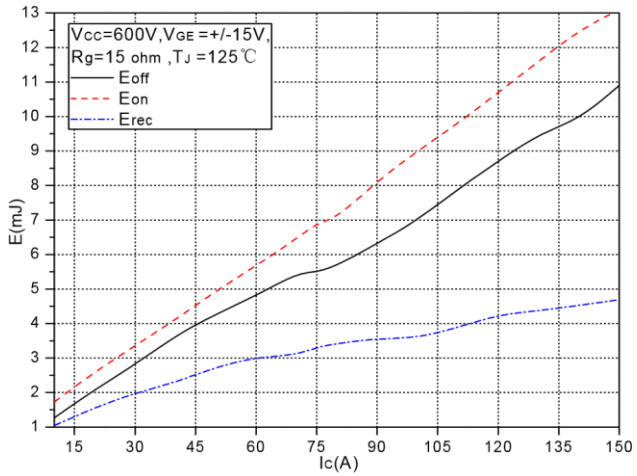


Fig.6 Typical Switching Loss vs. Collector Current
(IGBT & Diode Inverter)

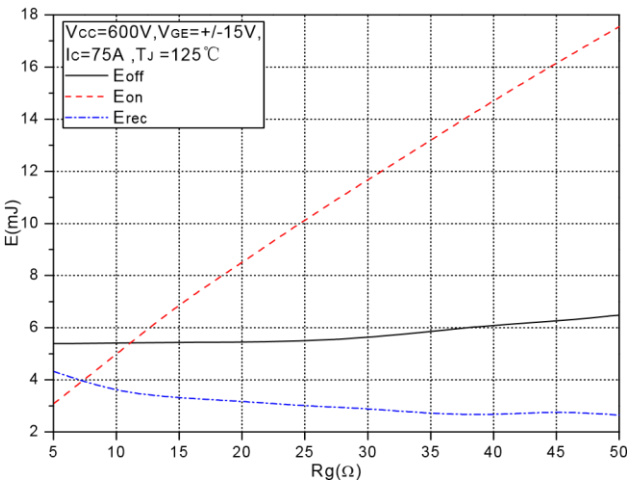


Fig.7 Typical Switching Loss vs. Gate Resistance
(IGBT & Diode Inverter)

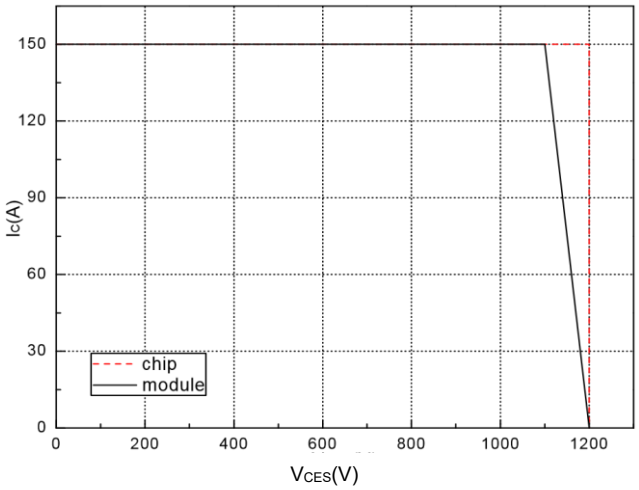


Fig.8 Reverse Bias Safe Operation Area (RBSOA)
(IGBT Inverter)

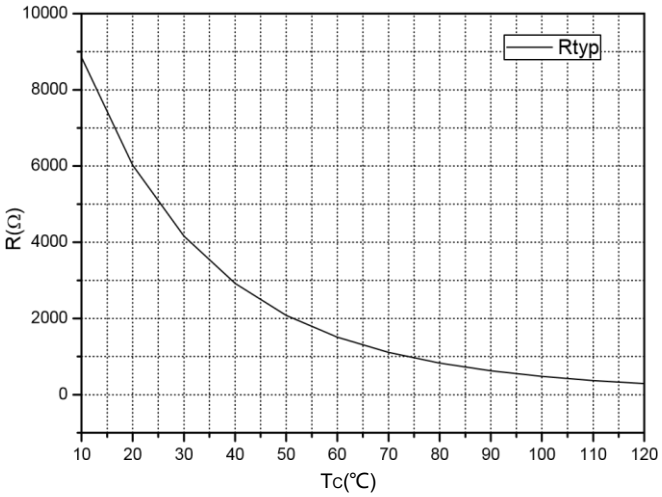


Fig.9 NTC Temperature characteristics

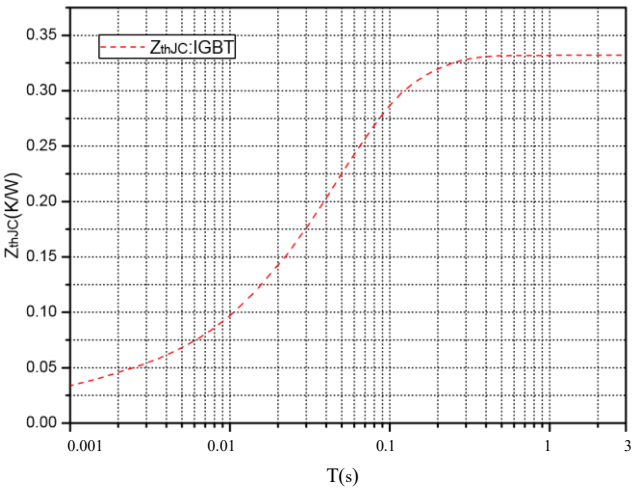


Fig.10 Transient thermal impedance (IGBT Inverter)

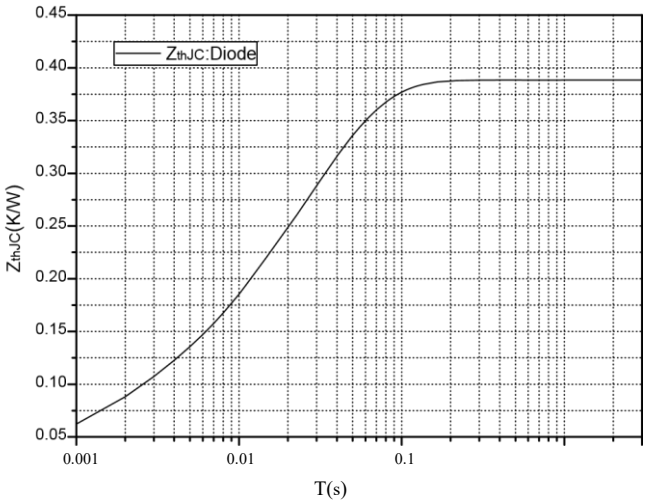
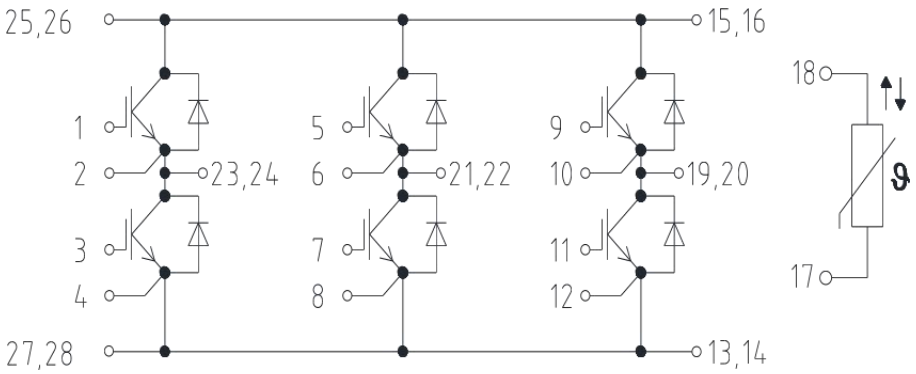
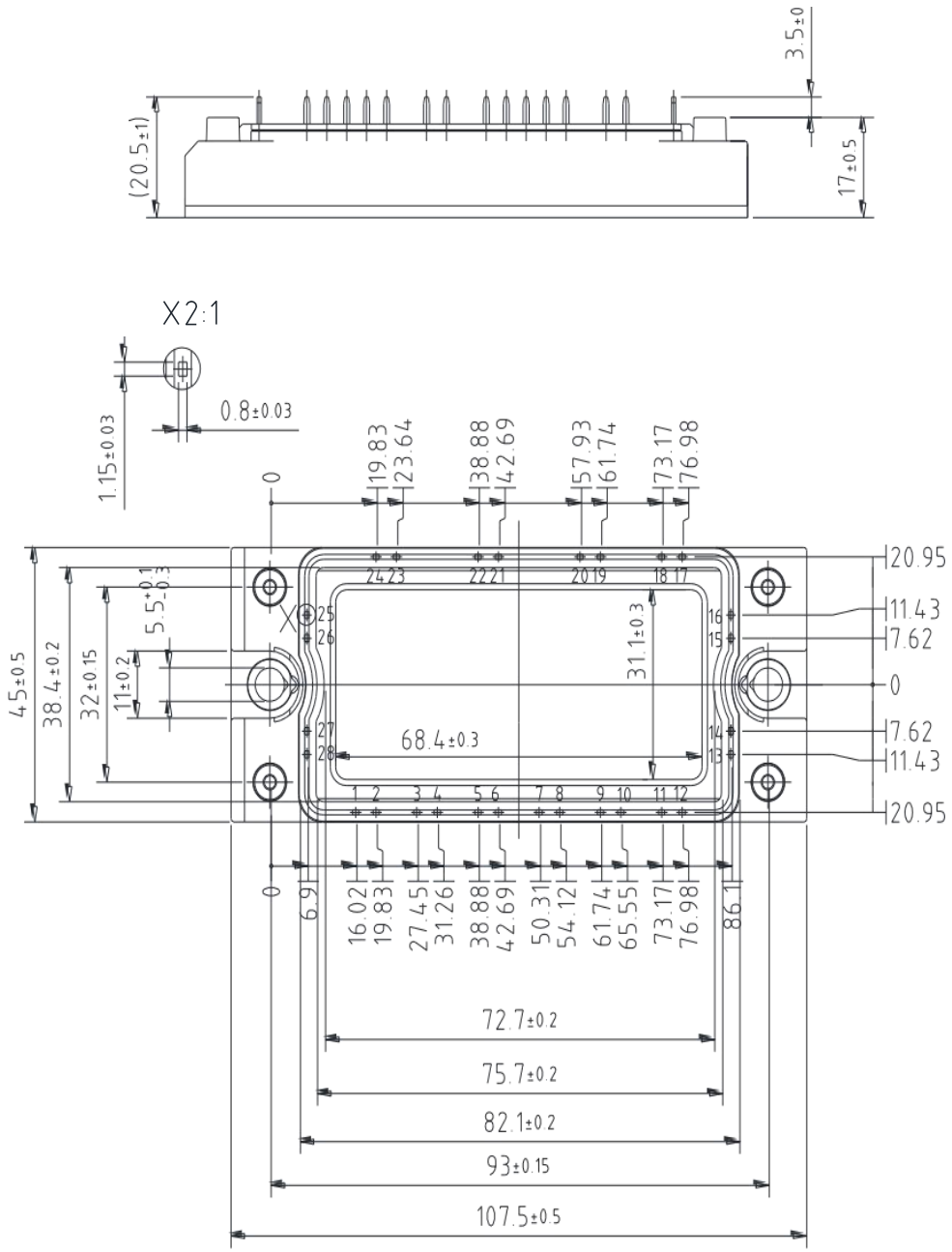


Fig.11 Transient thermal impedance (Diode Inverter)

Circuit Diagram



Package Outlines (Unit:mm)



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