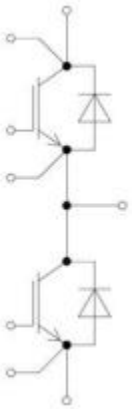
1 Features



V_{CES} = 1200 V

$I_{C\ nom}$ = 450 A

IGBT

Half bridge IGBT modules

Typical Applications

- Switching mode power supply
- AC and DC servo drive amplifier
- UPS Systems

Electrical Features

- Low VCEsat
- Low Switching Losses
- Fast switching and short tail current

Mechanical Features

- 4kV Insulation
- High Creepage and Clearance Distances
- High Power Density

Product Name	Package	Version	Date
SPM450V120Y62HS	62mm	V1.1	2025.10.28

2 IGBT (Inverter)

2.1 Maximum Rated Values

Parameter	Test Conditions	Symbol	Value	Unit
Collector-emitter voltage	T_{vj} =25℃	V_{CES}	1200	V
Continuous DC collector current	T_F =75℃,T_{vj} =150℃	$I_{C\ nom}$	450	A
Repetitive peak collector current	t_p =1ms , T_{vj} =25℃	I_{CRM}	900	A
Gate-emitter peak voltage	T_{vj} =25℃	V_{GES}	±20	V
Total power dissipation	T_C =100℃,T_{vj} =150℃	P_{tot}	595	W

2.2 Characteristic Values

Parameter	Test Conditions		Symbol	Value			Unit
				min	typ	max	
Collector-emitter saturation voltage	I_C =450 A,V_{GE} =15V,	T_{vj} =25℃ T_{vj} =125℃ T_{vj} =150℃	$V_{CE\ sat}$	-	1.67 1.93 2.01	1.9 - -	V
Gate threshold voltage	I_C =17.1mA,V_{CE} =V_{GE},T_{vj} =25℃		V_{GEth}	5.0	6.1	6.5	V
Gate charge	V_{GE}=-15V...15V		Q_G	-	6.08	-	uC
Internal gate resistor	T_{vj} =25℃		R_{Gint}	-	0.7	-	Ω
Input capacitance	f=1000KHz, V_{CE}		C_{ies}	-	61	-	nF

Output capacitance	=25V, V_{GE} =0V, T_{vj} =25℃		C_{oes}	-	TBD	-	nF
Reverse transfer capacitance			C_{res}	-	1.04	-	nF
Collector-emitter cut-off current	V_{CE} =1200V,V_{GE} =0V,T_{vj} =25℃		I_{CES}	-	-	1	mA
Gate-emitter leakage current	V_{CE} =0V,V_{GE} =20V,T_{vj} =25℃		I_{GES}	-	-	300	nA
Turn-on delay time, inductive load	I_C =450 A, V_{CE} =600 V, V_{GE}=-15 V/+15 V, $R_{G(on)}$ =2 Ω, $R_{G(off)}$ =2 Ω	T_{vj} =25℃ T_{vj} =125℃ T_{vj} =150℃	td(on)	-	210 220 220	-	ns
Rise time, inductive load			tr	-	60 80 90	-	ns
Turn-off delay time, inductive load			td(off)	-	520 570 570	-	ns
Fall time, inductive load			tf	-	210 320 370	-	ns
Turn-on energy loss per pulse			Eon	-	26.4 45.7 53.5	-	mJ
Turn-off energy loss per pulse			Eoff	-	41.	-	mJ

					7 54. 7 60. 3		
SC data	V_{GE} = ≤15V,V_{CC}=600 V, tp≤8us, T_{vj}=150℃	V_{CEmax} = V_{CES} -L_{sCE} ·di/dt ,	I_{SC}	-	318 4	-	A
Thermal resistance, junction to case	per IGBT		R_{thJC}	-	-	0.0 84	K/W

3 Diode (Inverter)

3.1 Maximum Rated Values

Parameter	Test Conditions	Symbol	Value	Unit
Repetitive peak reverse voltage	T_{vj}=25℃	V_{RRM}	1200	V
Continuous DC forward current		I_F	450	A
Repetitive peak forward current	tp=1ms, T_{vj}=25℃	I_{FRM}	900	A
I^2t-Value	tp=10 ms, T_{vj}=125℃	I^2t	TBD	A^2s

3.2 Characteristic Values

Parameter	Test Conditions		Symbol	Value			Unit
				Min	Typ	Max	
Forward voltage	I_F=450 A,V_{GE}=0V,	T_{vj}=25℃	V_F	-	1.73	2.4	V
		T_{vj}=125℃			1.69	-	
		T_{vj}=150℃			1.67	-	
Peak reverse recovery current	I_F=450 A, V_R=600 V, V_{GE}=-15 V,	T_{vj}=25℃	I_{RM}	-	318	-	A
		T_{vj}=125℃			409		
		T_{vj}=150℃			436		
Recovered charge			Qr	-	9.0	-	uC
					17.		

					0 22.3		
Reverse recovery energy			E_{rec}	-	20.9 39.6 47.1	-	mJ
Thermal resistance, junction to case	per diode		R_{thJC}	-	-	0.14	K/W

4 Module

Parameter	Test Conditions	Symbol	Value			Unit
			min	typ	max	
Isolation test voltage	RMS, f = 50 Hz, t = 1 min	V_{ISOL}		4000		V
Material of module baseplate				Cu/Ni		
Internal isolation				Al_2O_3		
Creepage distance	terminal to terminal terminal to heatsink	d_{Creep}		23 27		mm
Clearance	terminal to terminal terminal to heatsink	d_{Clear}		11 21		mm
Comperative tracking index		CTI		> 200		
Stray inductance module		L_{sCE}	-	20	-	nH
Temperature under switching conditions		$T_{vj,op}$	-40	-	150	℃
Storage temperature		T_{stg}	-40	-	125	℃
Mounting torque for modul mounting		M	3	-	6	Nm
Terminal connection torque		M	2.5	-	5	Nm
Weight		G	-	340	-	g

5 Characteristics diagrams

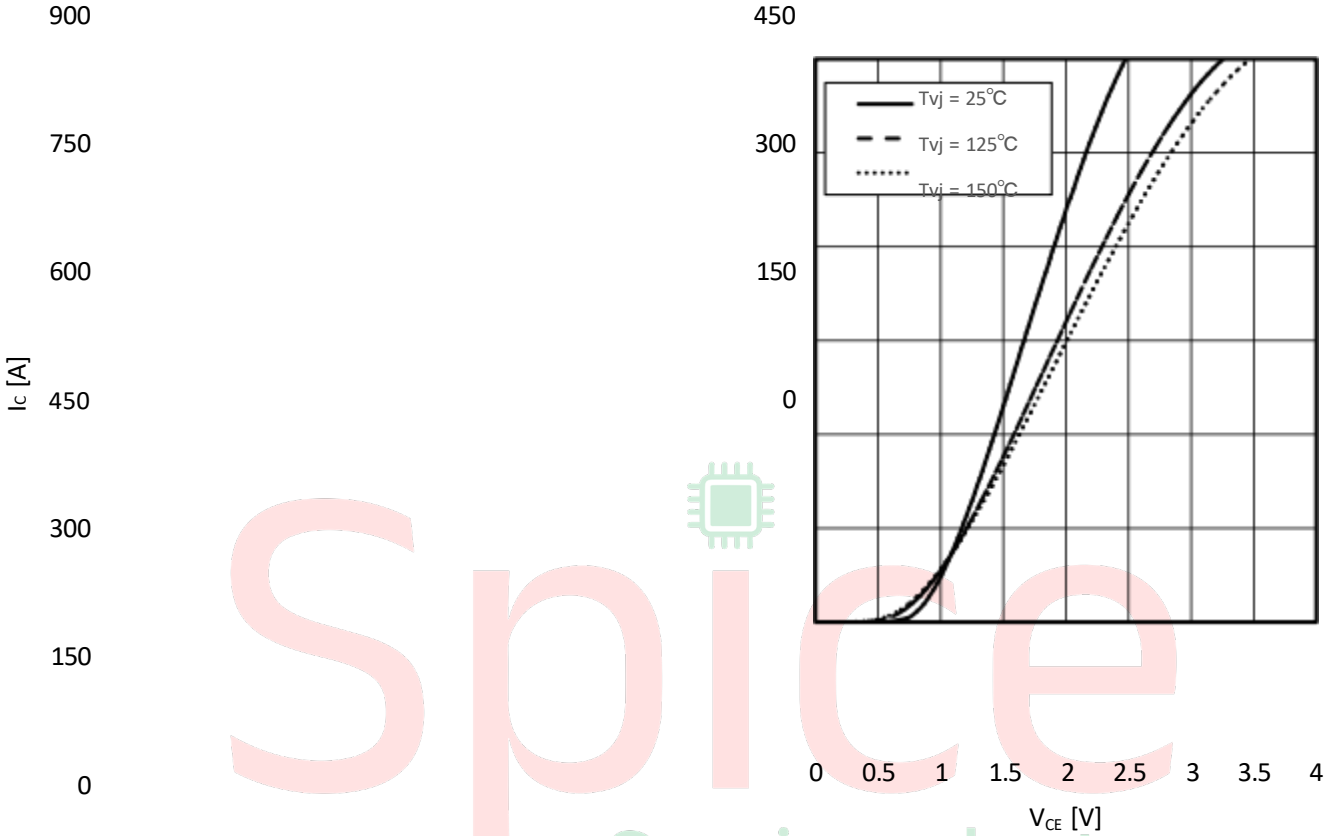
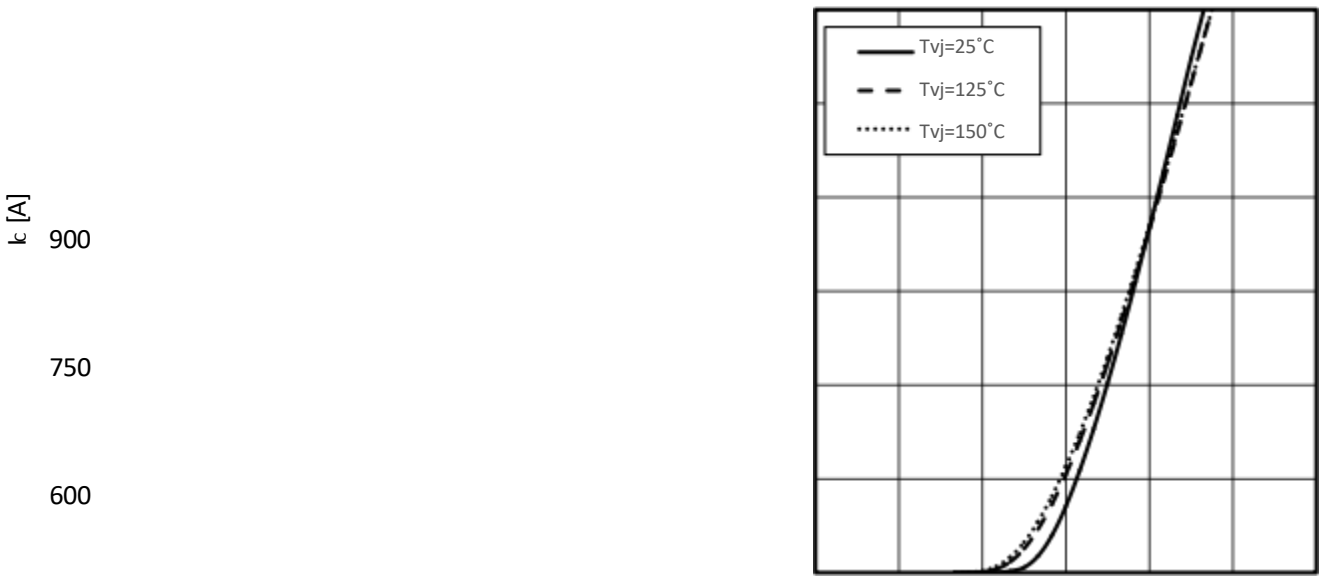


Figure 1 : Output characteristic (IGBT)

$I_C = f(V_{CE})$, V_{GE} = 15V



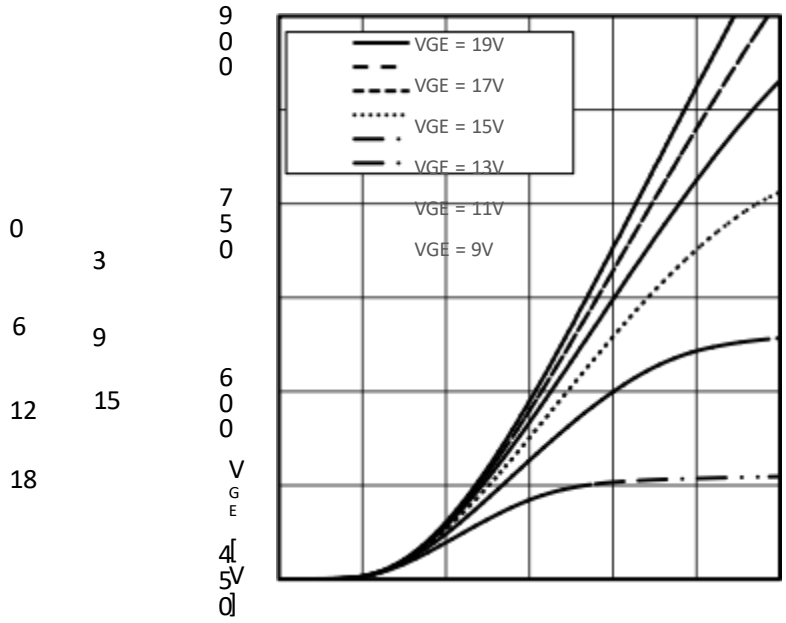


Figure 3 : Transfer characteristic

$I_C = f(V_{GE})$, V_{CE} = 20V

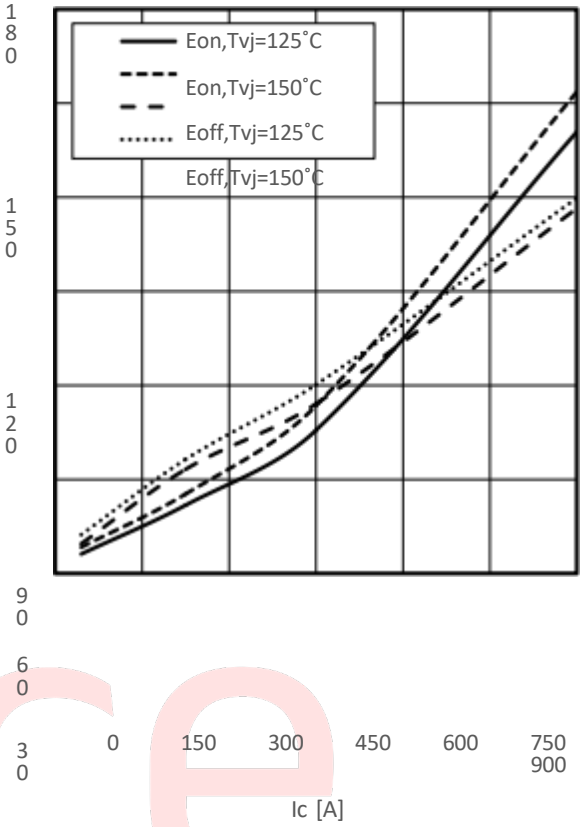
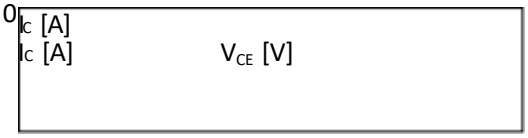


Figure 4 : Switching losses (IGBT) $E_{on} = f(I_C)$, $E_{off} = f(I_C)$, R_{Goff} = 2 Ω, R_{Gon} =2 Ω, V_{CE} =600 V, V_{GE} = ± 15 V



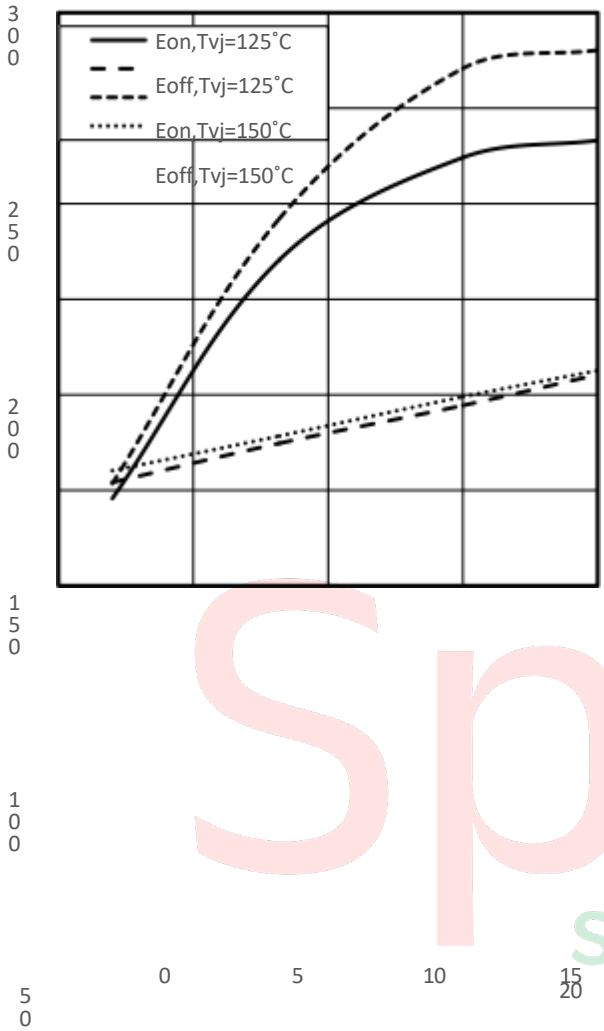


Figure 5 : Switching losses (IGBT)

E_{on} = f (R_G), E_{off} = f (R_G)

I_C = 450 A, V_{CE} = 600 V, V_{GE} = ± 15 V

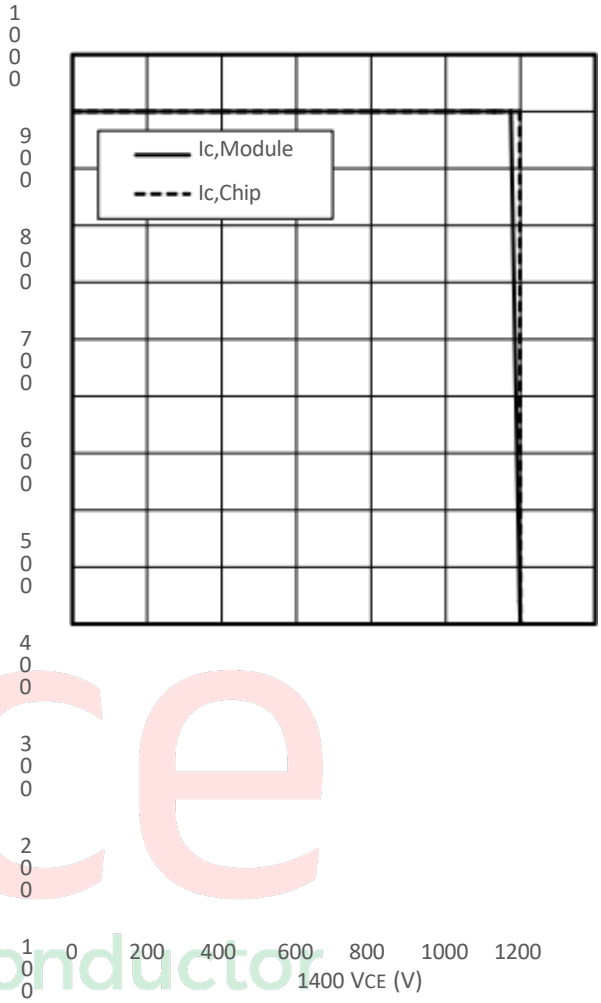


Figure 7 : RBSOA (IGBT) I_C = f (V_{CE}) , V_{GE} = ±15 V, R_{Goff} = 2 Ω, T_{vj} =

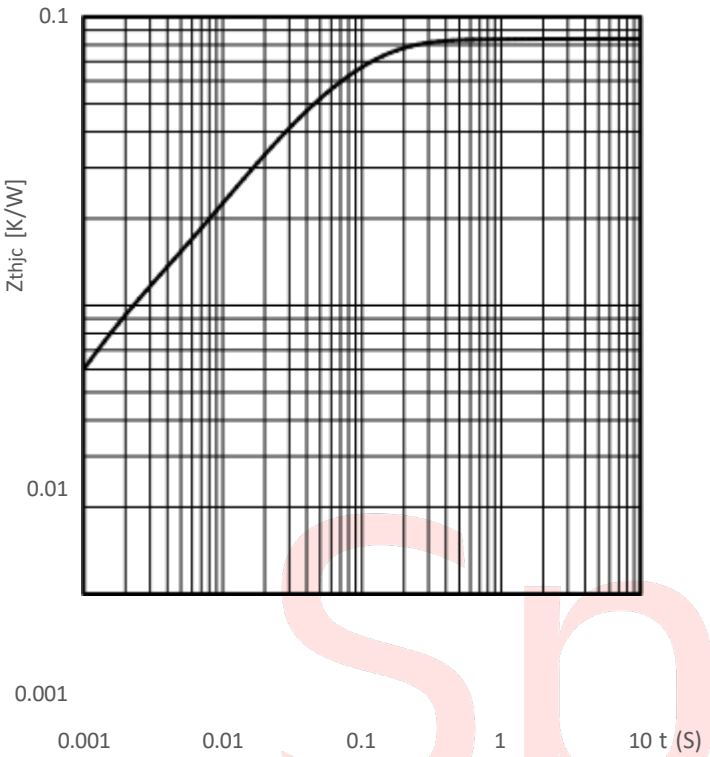


Figure 6 : Transient thermal impedance IGBT, Inverter

$Z_{thJC} = f(t)$

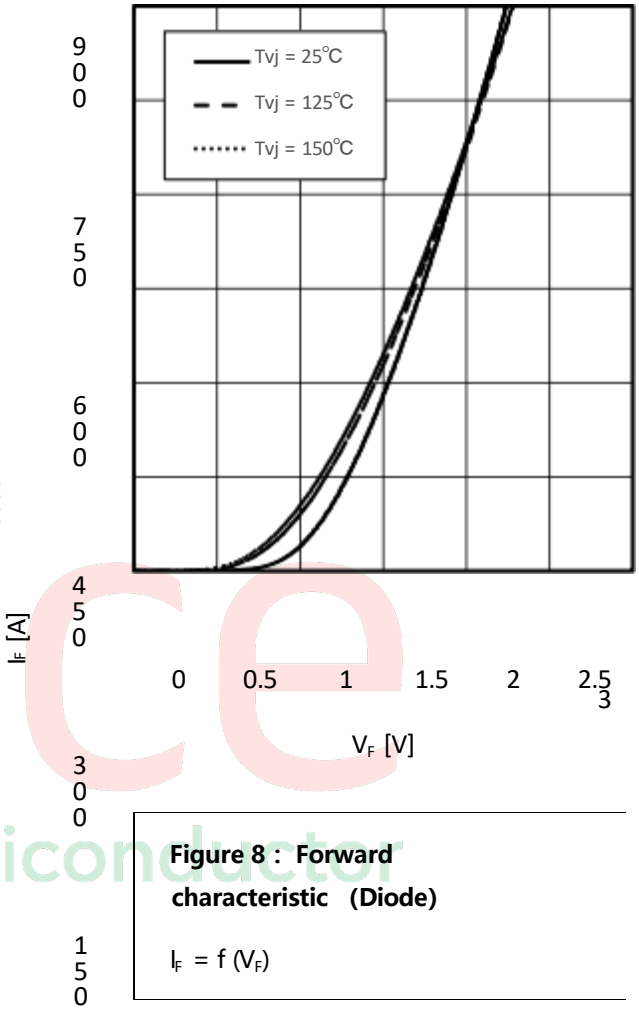


Figure 8 : Forward characteristic (Diode)

$I_F = f(V_F)$

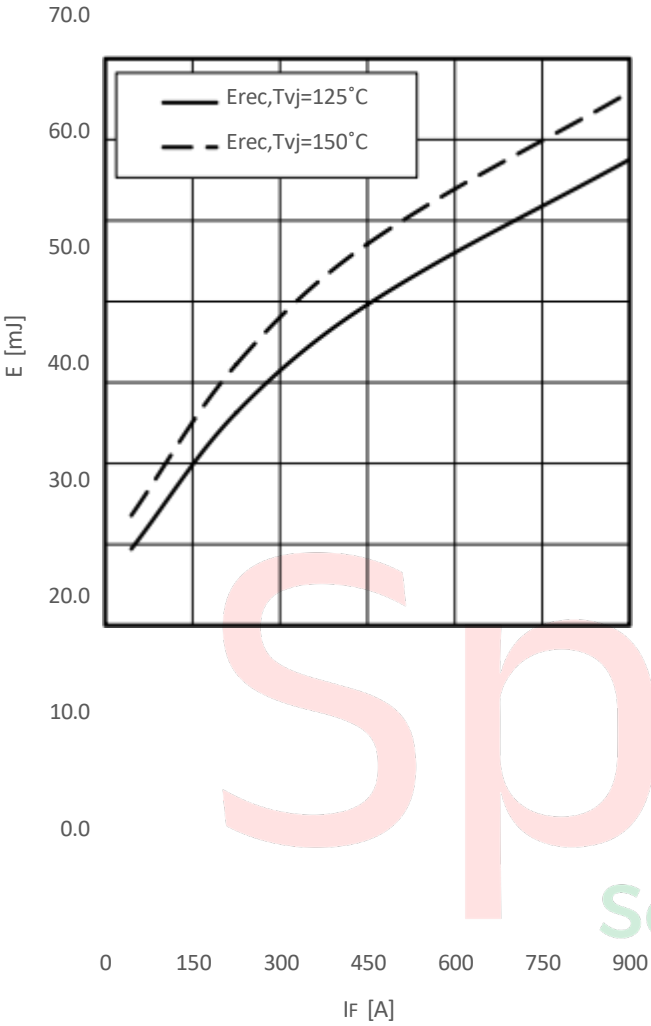


Figure 9 : Switching losses (Diode)

E_{rec} = f (I_F) , R_{Gon} = 2 Ω, V_{CE} =600 V

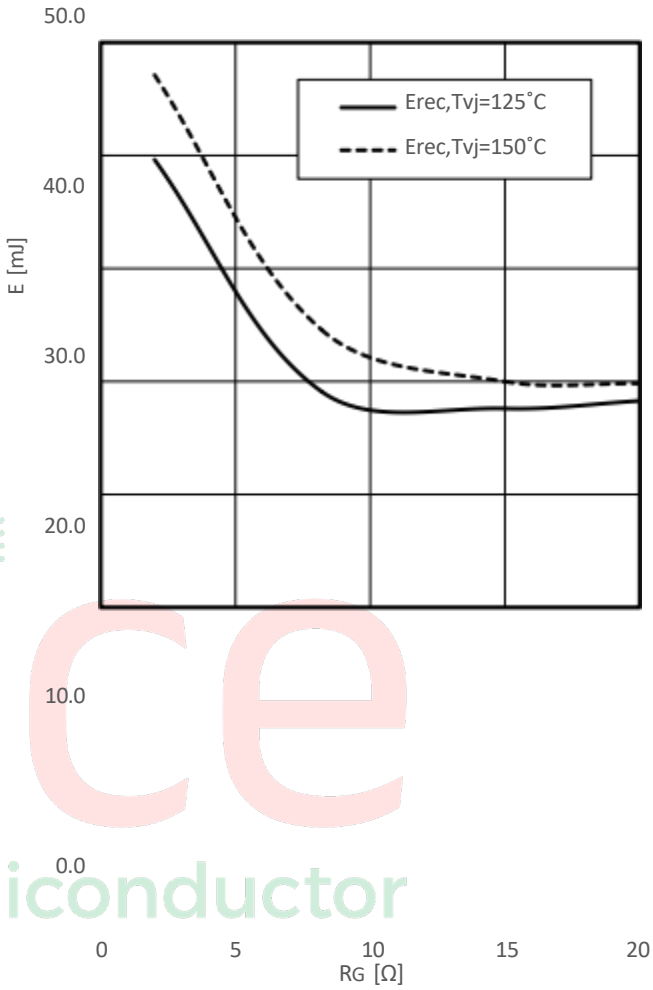


Figure 10: Switching losses (Diode)

E_{rec} = f (R_G) , I_F = 450 A, V_{CE} = 600 V

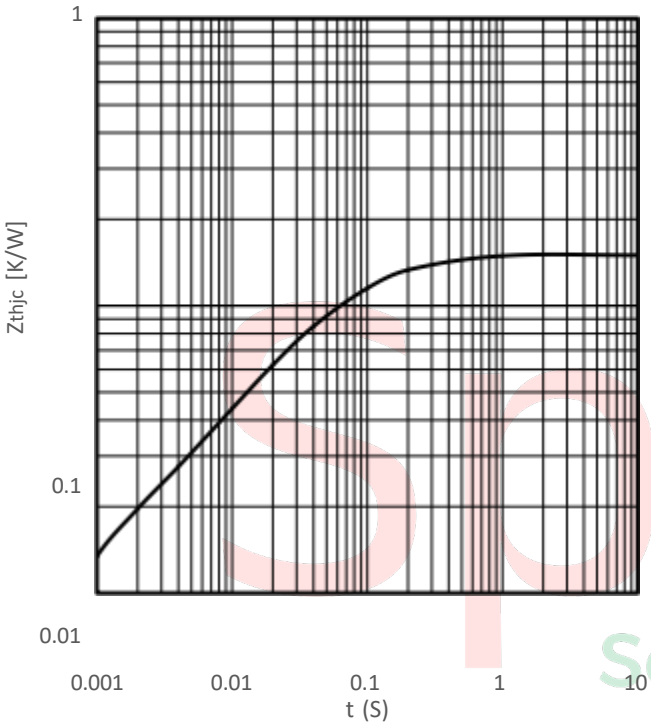
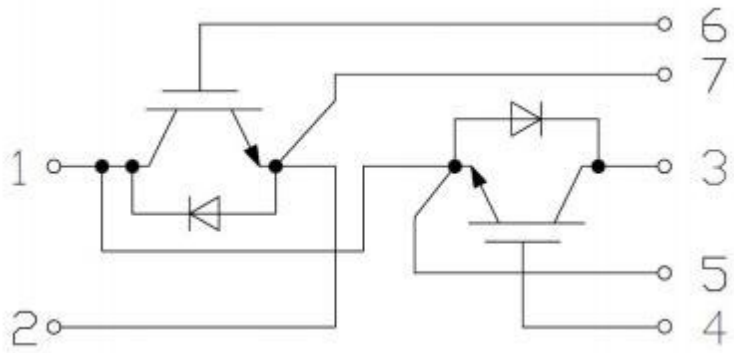


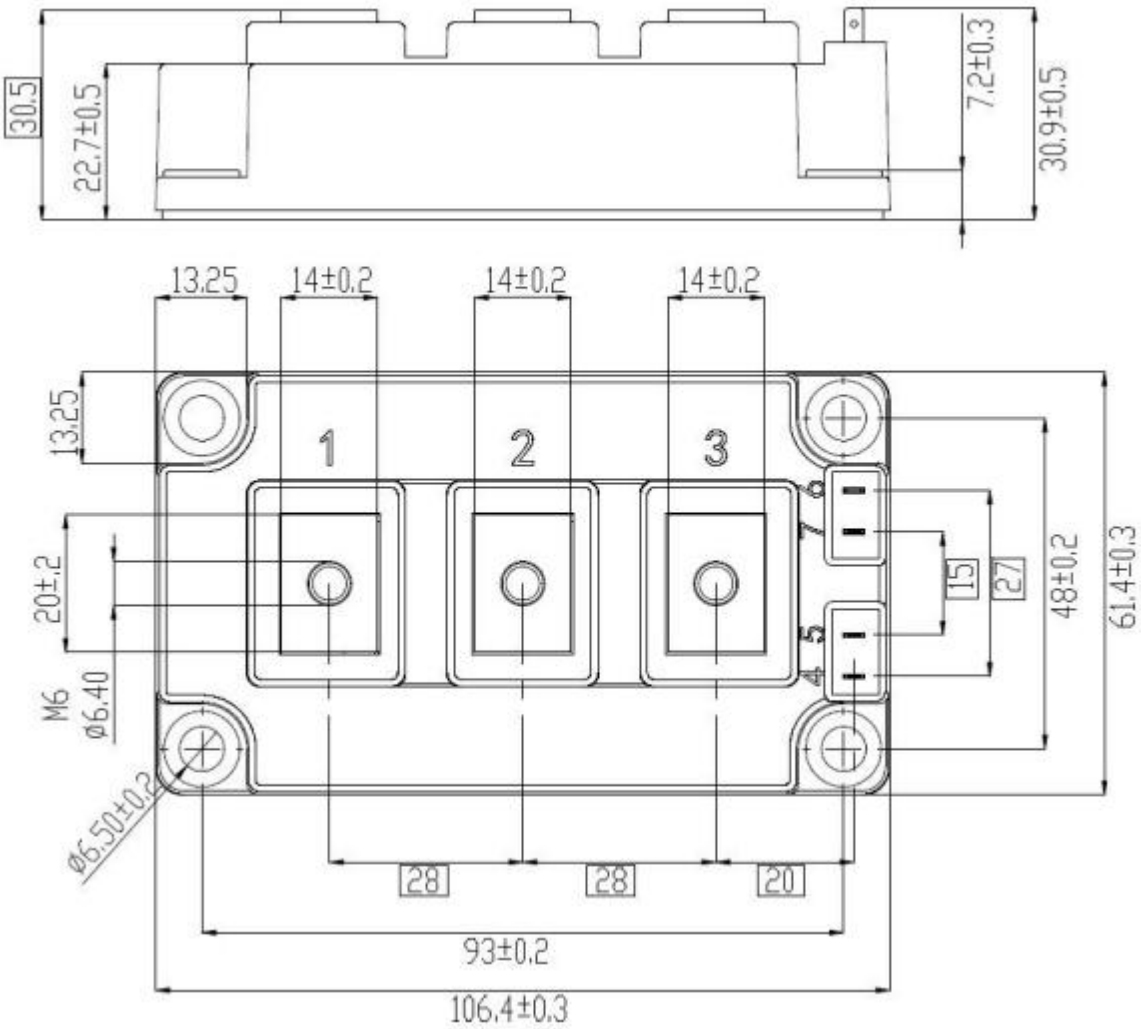
Figure 11: Transient thermal impedance Diode, Inverter

$Z_{thJC} = f(t)$

6 Circuit schematic



7 Package outlines: mm



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