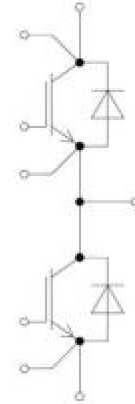
1 Features



IGBT

Half bridge IGBT modules

V_{CES} = 1200 V
$I_{C\ nom}$ = 600 A

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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

- 2.5kV Insulation
- High Creepage and Clearance Distances
- High Power Density

Product Name	Package	Version	Date
SPM600V120Y62HS	62mm	V1.0	2025.12.10

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_C=100℃,T_{vj}=150℃	$I_{C\ nom}$	600	A
Repetitive peak collector current	t_p=1ms， T_{vj}=25℃	I_{CRM}	1200	A
Gate-emitter peak voltage	T_{vj}=25℃	V_{GES}	±20	V
Total power dissipation	T_C=25℃,T_{vj}=175℃	P_{tot}	1875	W

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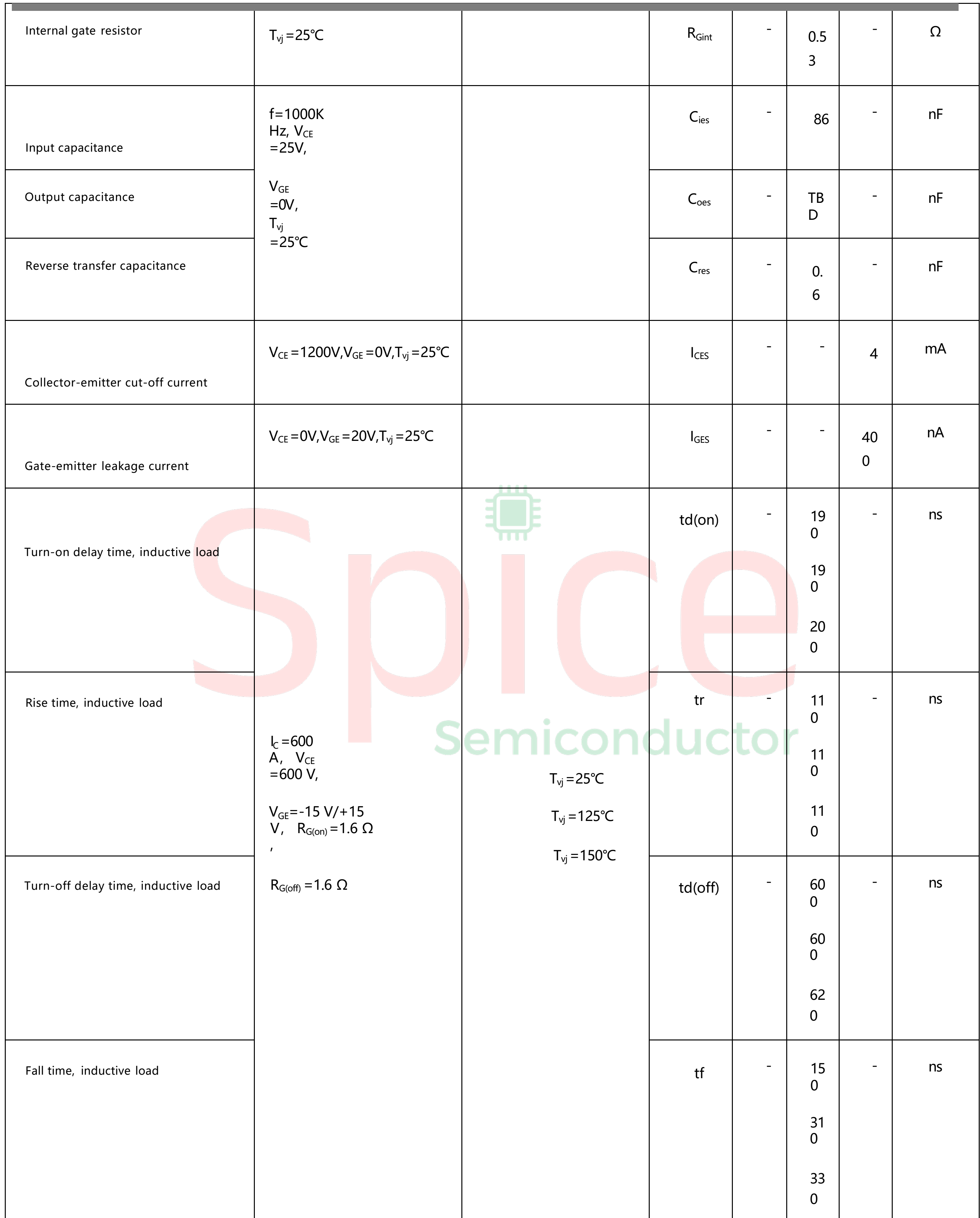
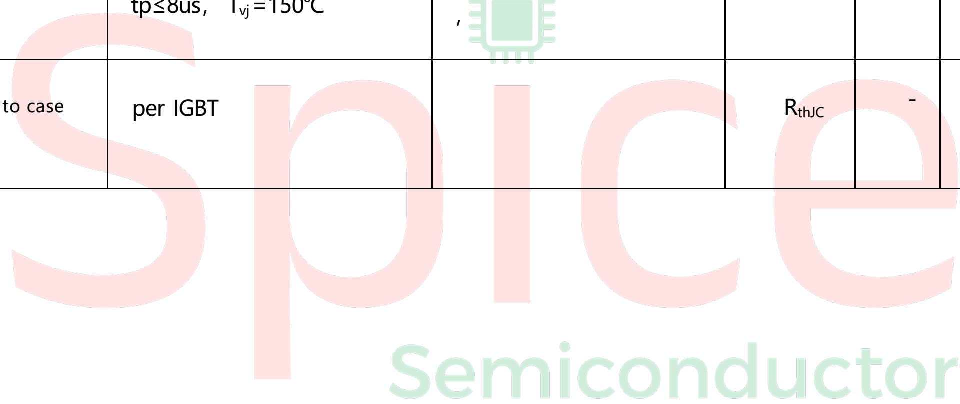
2.2 Characteristic Values

Parameter	Test Conditions		Symbol	Value			Unit
				min	typ	max	
Collector-emitter saturation voltage	I_C=600 A,V_{GE}=15V,	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃	$V_{CE\ sat}$	-	1.45 1.60 1.65	1.90 - -	V
Gate threshold voltage	I_C=22.8mA,V_{CE}=V_{GE},T_{vj}=25℃		V_{GEth}	5.0	5.8	6.5	V
Gate charge	V_{GE}=-15V...15V		Q_G	-	6.9	-	uC



Parameter	Conditions		Symbol	Min	Typ	Max	Unit
Internal gate resistor	T_{vj}=25℃		R_{Gint}	-	0.53	-	Ω
Input capacitance	f=1000KHz, V_{CE}=25V, V_{GE}=0V, T_{vj}=25℃		C_{ies}	-	86	-	nF
Output capacitance			C_{oes}	-	TBD	-	nF
Reverse transfer capacitance			C_{res}	-	0.6	-	nF
Collector-emitter cut-off current	V_{CE}=1200V,V_{GE}=0V,T_{vj}=25℃		I_{CES}	-	-	4	mA
Gate-emitter leakage current	V_{CE}=0V,V_{GE}=20V,T_{vj}=25℃		I_{GES}	-	-	400	nA
Turn-on delay time, inductive load	I_C=600A, V_{CE}=600 V, V_{GE}=-15 V/+15 V, $R_{G(on)}$=1.6 Ω, $R_{G(off)}$=1.6 Ω	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃	td(on)	-	190 190 200	-	ns
Rise time, inductive load			tr	-	110 110 110	-	ns
Turn-off delay time, inductive load			td(off)	-	600 600 620	-	ns
Fall time, inductive load			tf	-	150 310 330	-	ns

Turn-on energy loss per pulse			Eon	-	51.9 52.6 57.2	-	mJ
Turn-off energy loss per pulse			Eoff	-	69.3 81.7 88.0	-	mJ
data	V_{GE} = ≤15V,V_{CC} =600 V, tp≤8us, T_{vj} =150℃	V_{CEmax} = V_{CES} -L_{sCE} ·di/dt ,	I_{SC}	-	3100	-	A
Thermal resistance, junction to case	per IGBT		R_{thJC}	-	-	0.08	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	600	A
Repetitive peak forward current	tp =1ms， T_{vj}=25℃	I_{FRM}	1200	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=600 A,V_{GE}=0V,	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃	V_F	-	2.00 1.65 1.60	2.40 - -	V
Peak reverse recovery current	I_F=600 A, V_R=600 V, V_{GE}=-15 V,	T_{vj}=25℃ T_{vj}=125℃ T_{vj}=150℃	I_{RM}	-	290 480 520	-	A
Recovered charge			Qr	-	38.4 96.5 118.	-	uC

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					0		
Reverse recovery energy			E_{rec}	-	10.7 27.0 32.8	-	mJ
Thermal resistance, junction to case	per diode		R_{thJC}	-	-	0.10	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}	2500			V
Material of module baseplate			Cu/Ni			
nternal 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

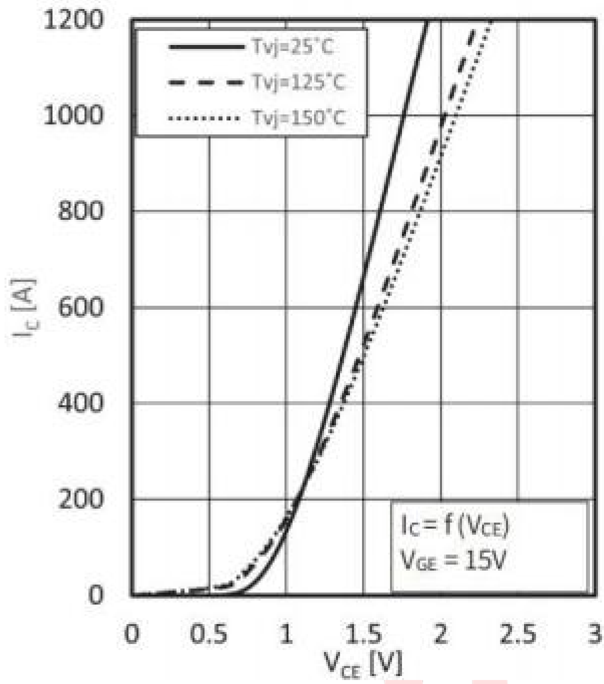

Figure 1： Output characteristic (IGBT)

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

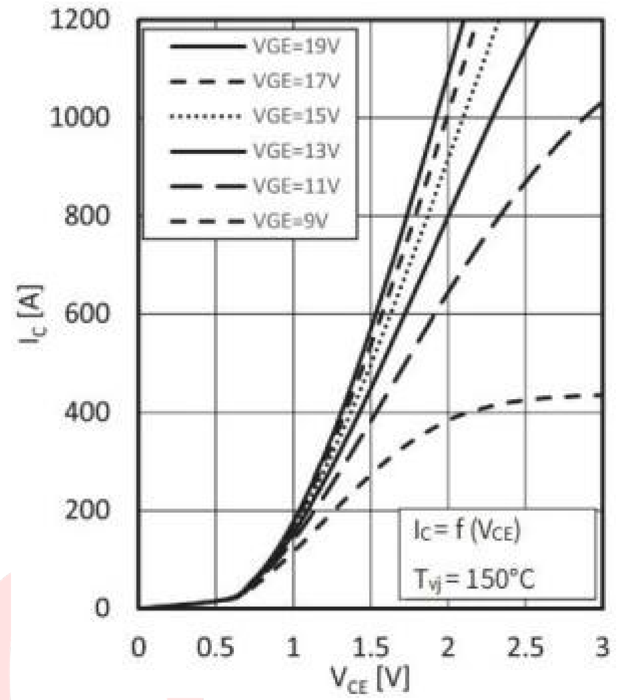

Figure 2： Output characteristic (IGBT)

$I_C = f(V_{CE})$, $T_{vj} = 150℃$

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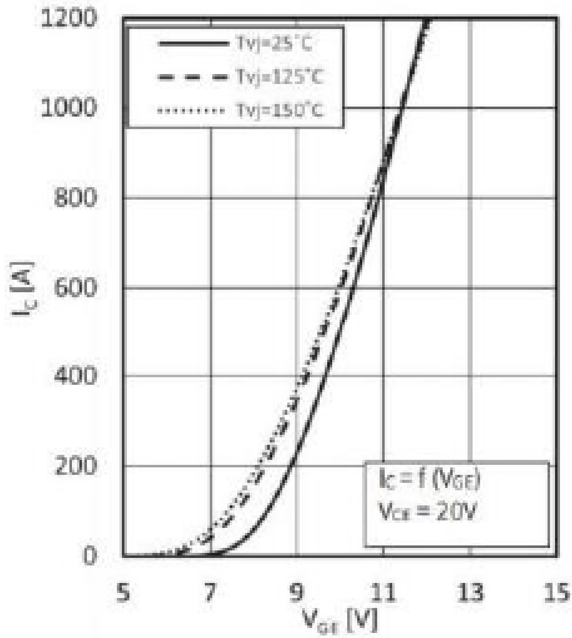

Figure 3 : Transfer characteristic

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

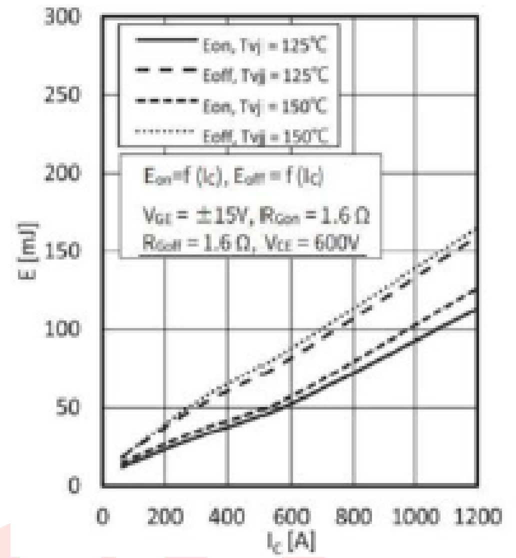

Figure 4 : Switching losses (IGBT)

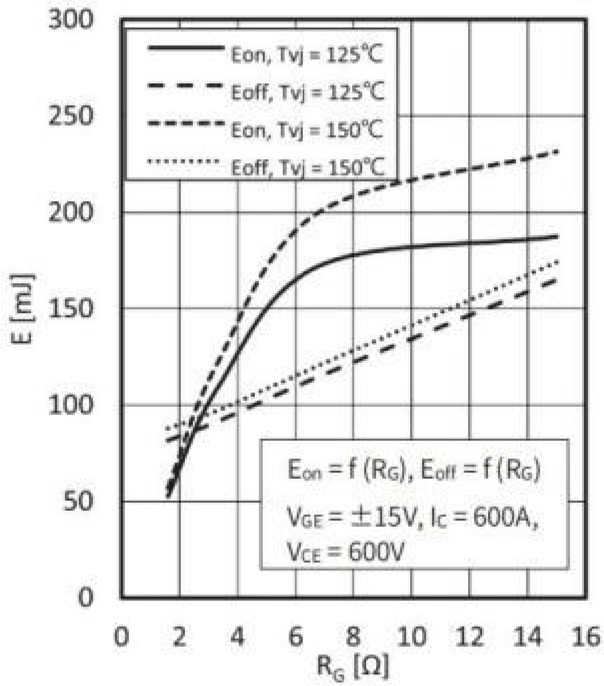

Figure 5 : Switching losses (IGBT)

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

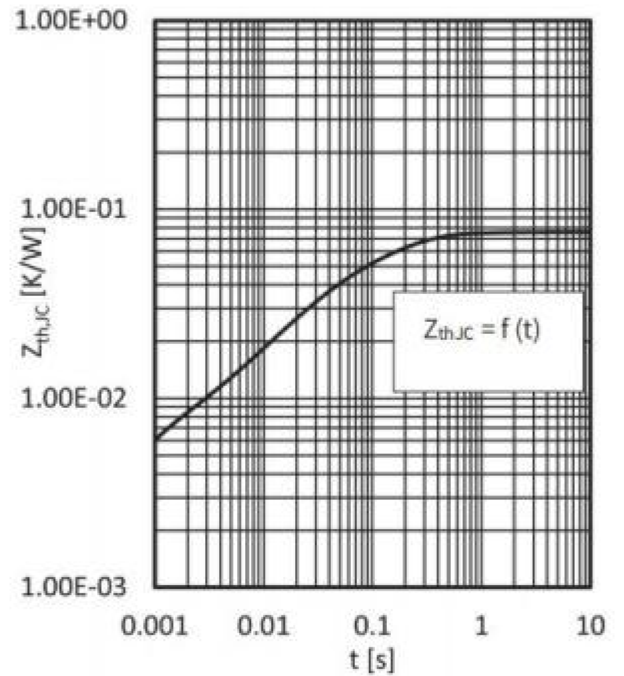

Figure 6 : Transient thermal impedance IGBT, Inverter

Z_{thJC} = f (t)

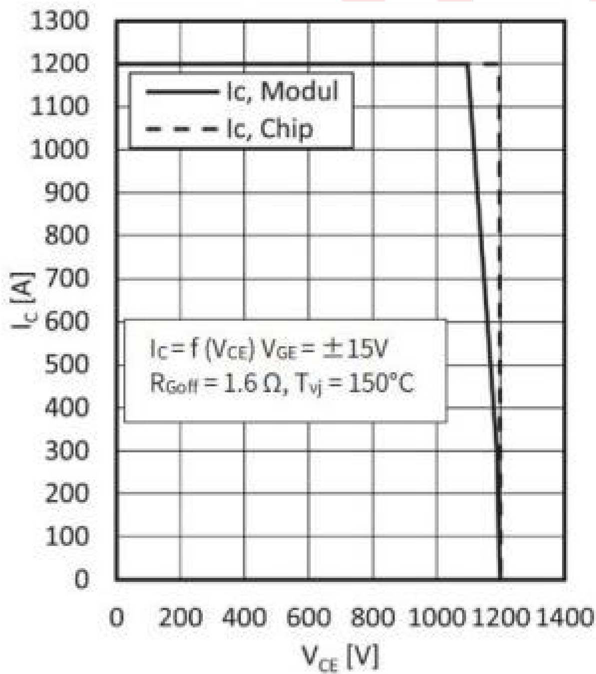

Figure 7 : RBSOA (IGBT)

I_C = f (V_{CE}), V_{GE} = ±15 V, R_{Goff} = 1.6 Ω, T_{vj} = 150 ℃

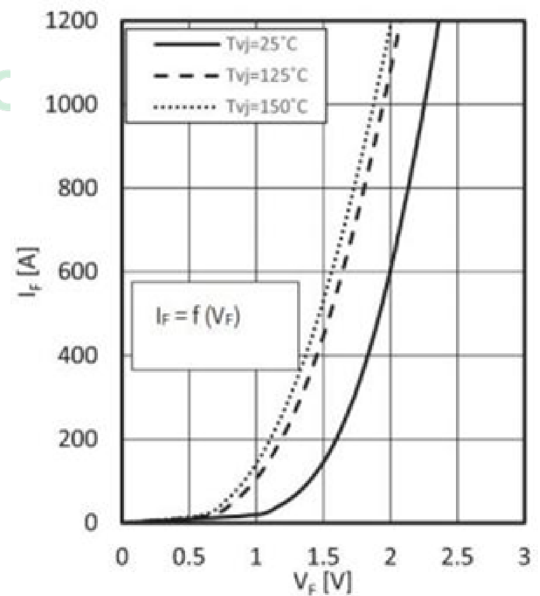

Figure 8 : Forward characteristic (Diode)

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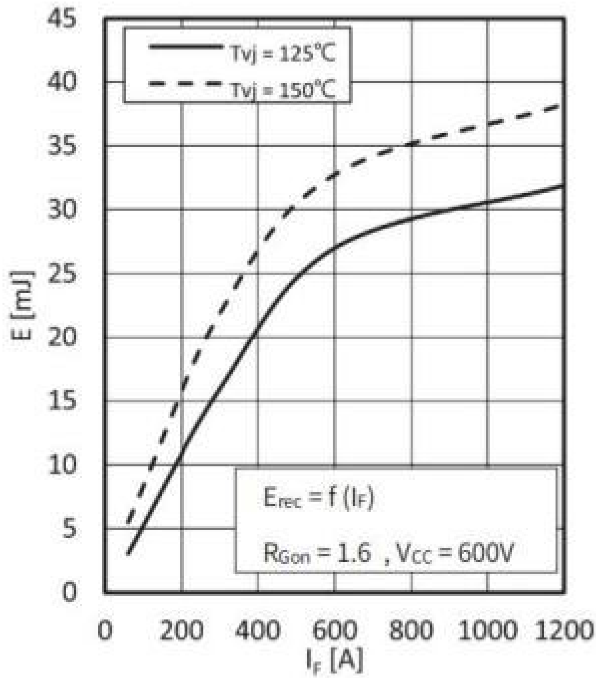


Figure 9 : Switching losses (Diode)

E_{rec} = f (I_F) R_{Gon} = 1 6 Ω V_{CE} =600 V

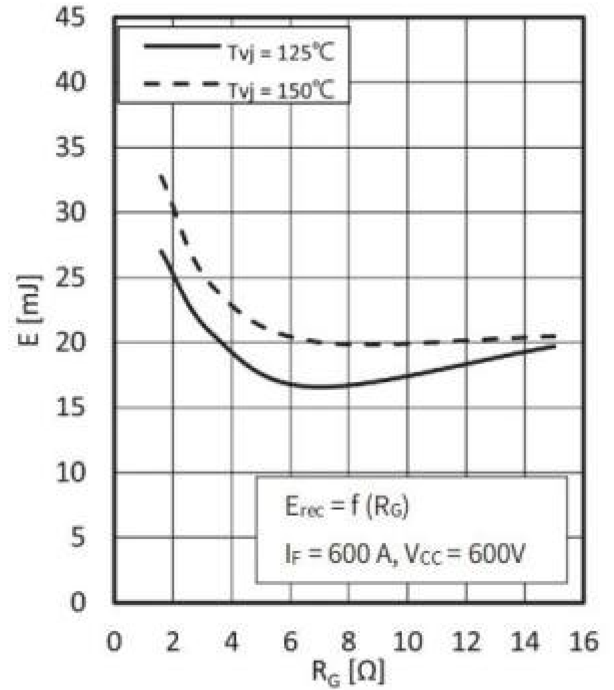
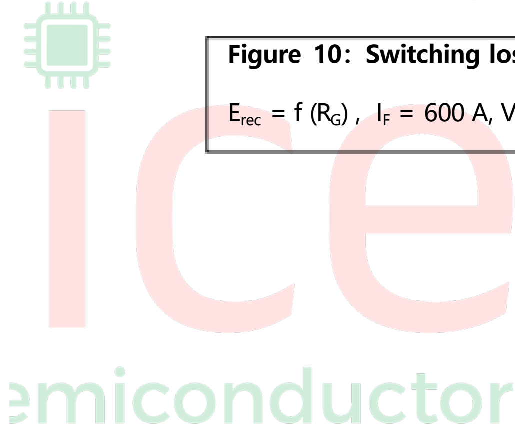


Figure 10: Switching losses (Diode)

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



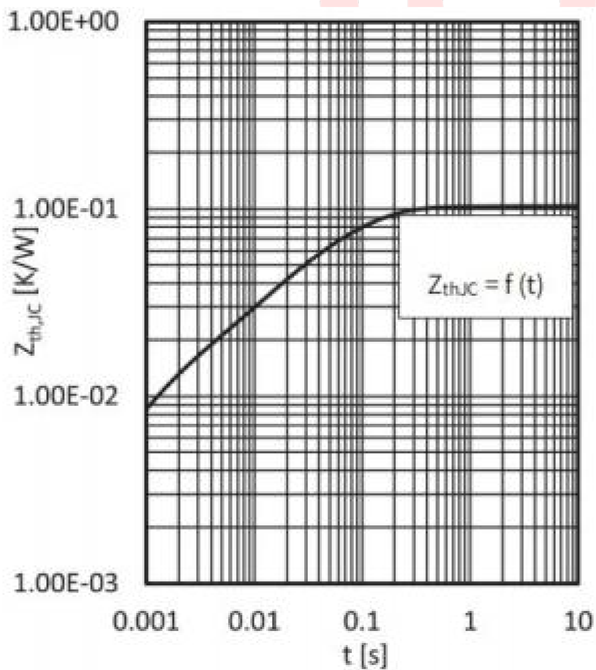


Figure 11: Transient thermal impedance Diode, Inverter

Z_{thJC} = f (t)

6 Circuit schematic

7 Package outlines: mm

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