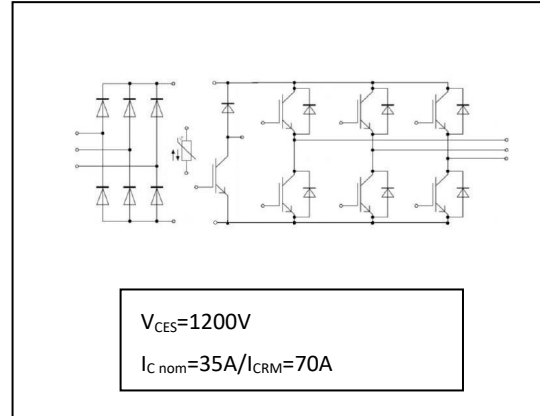


1200V 35A IGBT PIM Module

受控文件

1200V 35A IGBT PIM 模块



Features:

- 1200V Trench+ Field Stop technology
- Freewheeling diodes with fast and soft reverse recovery
- $V_{CE(sat)}$ with positive temperature coefficient
- Low switching losses
- Short circuit ruggedness

Typical Applications:

- Motor drives
- Servo drives

产品特性:

- 1200V 沟槽栅+场截止技术
- 快速的软恢复特性续流二极管
- 导通压降具有正温度系数
- 低开关损耗
- 良好的短路稳定性

典型应用:

- 电机驱动
- 伺服驱动

IGBT, Inverter / IGBT, 逆变器

受控文件

Maximum Rated Values / 最大额定值

Item	Symbol	Conditions	Value	Units
集电极-发射极电压 Collector-emitter voltage	V_{CES}	$T_{vj}=25^{\circ}\text{C}$	1200	V
连续集电极直流电流 Continuous DC collector current	I_C	$T_C=80^{\circ}\text{C}$	35	A
集电极重复峰值电流 Peak repetitive collector current	I_{CRM}	$t_p=1\text{ms}$	70	A
栅极-发射极峰值电压 Maximum gate-emitter voltage	V_{GES}		± 20	V
总功率损耗 Total power dissipation	P_{tot}	$T_C=25^{\circ}\text{C}, T_{vj}=175^{\circ}\text{C}$	208	W

Characteristic Values / 特征值

Item	Symbol	Conditions	Min.	Typ.	Max.	Units
集电极-发射极饱和电压 Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=35\text{A}, V_{GE}=15\text{V}$	$T_{vj}=25^{\circ}\text{C}$	1.85	2.25	V
			$T_{vj}=125^{\circ}\text{C}$	2.15		V
			$T_{vj}=150^{\circ}\text{C}$	2.25		V
栅极阈值电压 Gate threshold voltage	$V_{GE(th)}$	$I_C=1.2\text{mA}, V_{CE}=V_{GE}, T_{vj}=25^{\circ}\text{C}$	5.2	5.8	6.4	V
栅极电荷 Gate charge	Q_G	$V_{GE}=-15\text{V}\dots+15\text{V}$		0.23		μC
输入电容 Input capacitance	C_{ies}	$f=1\text{MHz}, T_{vj}=25^{\circ}\text{C}, V_{CE}=25\text{V}, V_{GE}=0\text{V}$		2.1		nF
反向传输电容 Reverse transfer capacitance	C_{res}	$f=1\text{MHz}, T_{vj}=25^{\circ}\text{C}, V_{CE}=25\text{V}, V_{GE}=0\text{V}$		0.08		nF
集电极-发射极截止电流 Collector-emitter cut-off current	I_{CES}	$V_{CE}=1200\text{V}, V_{GE}=0\text{V}, T_{vj}=25^{\circ}\text{C}$			1.00	mA
栅极-发射极漏电流 Gate-emitter leakage current	I_{GES}	$V_{CE}=0\text{V}, V_{GE}=20\text{V}, T_{vj}=25^{\circ}\text{C}$			500	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	$t_{d(on)}$		$T_{vj}=25^{\circ}\text{C}$	120		ns
			$T_{vj}=125^{\circ}\text{C}$	130		ns
			$T_{vj}=150^{\circ}\text{C}$	135		ns
上升时间(电感负载) Rise time, inductive load	t_r		$T_{vj}=25^{\circ}\text{C}$	28		ns
			$T_{vj}=125^{\circ}\text{C}$	32		ns
			$T_{vj}=150^{\circ}\text{C}$	35		ns
关断延迟时间(电感负载) Turn-off delay time, inductive load	$t_{d(off)}$	$I_C=35\text{A}, V_{CE}=600\text{V}$ $V_{GE}=-15\text{V}\dots+15\text{V}$ $R_{Gon}=13\Omega$	$T_{vj}=25^{\circ}\text{C}$	380		ns
			$T_{vj}=125^{\circ}\text{C}$	470		ns
			$T_{vj}=150^{\circ}\text{C}$	490		ns
下降时间(电感负载) Fall time, inductive load	t_f	$R_{Goff}=13\Omega$ Inductive Load	$T_{vj}=25^{\circ}\text{C}$	86		ns
			$T_{vj}=125^{\circ}\text{C}$	150		ns
			$T_{vj}=150^{\circ}\text{C}$	160		ns
开通损耗能量(每脉冲) Turn-on energy loss per pulse	E_{on}		$T_{vj}=25^{\circ}\text{C}$	3.60		mJ
			$T_{vj}=125^{\circ}\text{C}$	4.75		mJ
			$T_{vj}=150^{\circ}\text{C}$	5.10		mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	E_{off}		$T_{vj}=25^{\circ}\text{C}$	2.05		mJ
			$T_{vj}=125^{\circ}\text{C}$	3.00		mJ
			$T_{vj}=150^{\circ}\text{C}$	4.20		mJ
短路数据 SC data	I_{SC}	$V_{GE}=-15\text{V}\dots+15, V_{CC}=900\text{V}$ $V_{CEmax}=V_{CES}-L_{SCE}\cdot di/dt, t_p=10\mu\text{s}, T_{vj}=150^{\circ}\text{C}$		180		A
结-外壳热阻 Thermal resistance, junction to case	R_{thJC}	Per IGBT / 每个 IGBT			0.66	K/W
工作温度 Temperature under switching conditions	T_{vjop}		-40		150	$^{\circ}\text{C}$

Diode, Inverter / 二极管, 逆变器

受控文件

Maximum Rated Values / 最大额定值

Item	Symbol	Conditions	Value	Units
反向重复峰值电压 Peak repetitive reverse voltage	V_{RRM}	$T_{vj}=25^{\circ}\text{C}$	1200	V
连续正向直流电流 Continuous DC forward current	I_F		35	A
正向重复峰值电流 Peak repetitive forward current	I_{FRM}	$t_p=1\text{ms}$	70	A

Characteristic Values / 特征值

Item	Symbol	Conditions	Min.	Typ.	Max.	Units
正向电压 Forward voltage	V_F	$I_F=35\text{A}$	$T_{vj}=25^{\circ}\text{C}$	1.90	2.30	V
			$T_{vj}=125^{\circ}\text{C}$	1.95		
			$T_{vj}=150^{\circ}\text{C}$	1.95		
反向恢复峰值电流 Peak reverse recovery current	I_{rm}	$I_F=35\text{A}$	$T_{vj}=25^{\circ}\text{C}$	32		A
			$T_{vj}=125^{\circ}\text{C}$	35		
			$T_{vj}=150^{\circ}\text{C}$	37		
反向恢复电荷 Reverse recovery charge	Q_{rr}	$-di_f/dt_{off}=1200\text{A}/\mu\text{s}$ $V_R = 600\text{V}$ $V_{GE}=-15\text{V}$	$T_{vj}=25^{\circ}\text{C}$	3.2		μC
			$T_{vj}=125^{\circ}\text{C}$	6.0		
			$T_{vj}=150^{\circ}\text{C}$	6.5		
反向恢复损耗 (每脉冲) Reverse recovery energy (per pulse)	E_{rec}		$T_{vj}=25^{\circ}\text{C}$	1.0		mJ
			$T_{vj}=125^{\circ}\text{C}$	2.1		
			$T_{vj}=150^{\circ}\text{C}$	2.3		
结-外壳热阻 Thermal resistance, junction to case	R_{thJC}	Per diode / 每个二极管			1.00	K/W
工作温度 Temperature under switching conditions	T_{vjop}		-40		150	$^{\circ}\text{C}$

IGBT, Brake Chopper / IGBT, 刹车

受控文件

Maximum Rated Values / 最大额定值

Item	Symbol	Conditions	Value	Units
集电极-发射极电压 Collector-emitter voltage	V_{CEs}	$T_{vj}=25^{\circ}C, I_C=1mA, V_{GE}=0V$	1200	V
连续集电极直流电流 Continuous DC collector current	I_C	$T_C=100^{\circ}C, T_{vj}=175^{\circ}C$	25	A
集电极重复峰值电流 Peak repetitive collector current	I_{CRM}	$t_p=1ms$	50	A
栅极-发射极峰值电压 Maximum gate-emitter voltage	V_{GES}		± 20	V
总功率损耗 Total power dissipation	P_{tot}	$T_C=25^{\circ}C, T_{vj}=175^{\circ}C$	166	W

Characteristic Values / 特征值

Item	Symbol	Conditions	Min.	Typ.	Max.	Units
集电极-发射极饱和电压 Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C=25A, V_{GE}=15V$		$T_{vj}=25^{\circ}C$ 1.90 $T_{vj}=125^{\circ}C$ 2.20 $T_{vj}=150^{\circ}C$ 2.30	2.25	V
栅极阈值电压 Gate threshold voltage	$V_{GE(th)}$	$I_C=1.2mA, V_{CE}=V_{GE}, T_{vj}=25^{\circ}C$	5.6	6.2	7.0	V
栅极电荷 Gate charge	Q_G	$V_{GE}=-15V...+15V$		0.24		μC
输入电容 Input capacitance	C_{ies}	$f=1MHz, V_{CE}=25V, V_{GE}=0V, T_{vj}=25^{\circ}C$		1.60		nF
反向传输电容 Reverse transfer capacitance	C_{res}	$f=1MHz, V_{CE}=25V, V_{GE}=0V, T_{vj}=25^{\circ}C$		0.07		nF
集电极-发射极截止电流 Collector-emitter cut-off current	I_{CES}	$V_{CE}=1200V, V_{GE}=0V, T_{vj}=25^{\circ}C$			1.00	mA
栅极-发射极漏电流 Gate-emitter leakage current	I_{GES}	$V_{CE}=0V, V_{GE}=20V, T_{vj}=25^{\circ}C$			500	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	$t_{d(on)}$			$T_{vj}=25^{\circ}C$ 175 $T_{vj}=125^{\circ}C$ 185 $T_{vj}=150^{\circ}C$ 195		ns
上升时间(电感负载) Rise time, inductive load	t_r			$T_{vj}=25^{\circ}C$ 38 $T_{vj}=125^{\circ}C$ 43 $T_{vj}=150^{\circ}C$ 45		ns
关断延迟时间(电感负载) Turn-off delay time, inductive load	$t_{d(off)}$	$I_C=25A, V_{CE}=600V$ $V_{GE}=-15V...+15V$ $R_{Gon}=18\Omega$		$T_{vj}=25^{\circ}C$ 420 $T_{vj}=125^{\circ}C$ 510 $T_{vj}=150^{\circ}C$ 530		ns
下降时间(电感负载) Fall time, inductive load	t_f	$R_{Goff}=18\Omega$ Inductive Load		$T_{vj}=25^{\circ}C$ 65 $T_{vj}=125^{\circ}C$ 120 $T_{vj}=150^{\circ}C$ 125		ns
开通损耗能量(每脉冲) Turn-on energy loss per pulse	E_{on}			$T_{vj}=25^{\circ}C$ 1.95 $T_{vj}=125^{\circ}C$ 2.60 $T_{vj}=150^{\circ}C$ 2.8		mJ
关断损耗能量(每脉冲) Turn-off energy loss per pulse	E_{off}			$T_{vj}=25^{\circ}C$ 1.20 $T_{vj}=125^{\circ}C$ 2.00 $T_{vj}=150^{\circ}C$ 2.20		mJ
短路数据 SC data	I_{SC}	$V_{GE}=-15V...+15, V_{CC}=900V$ $V_{CEmax}=V_{CES}-L_{sCE} \cdot di/dt, t_p=10\mu s, T_{vj}=150^{\circ}C$		140		A
结-外壳热阻 Thermal resistance, junction to case	R_{thJC}	Per IGBT / 每个 IGBT			0.90	K/W
工作温度 Temperature under switching conditions	T_{vjop}		-40		150	$^{\circ}C$

Diode, Brake Chopper / 二极管, 刹车

受控文件

Maximum Rated Values / 最大额定值

Item	Symbol	Conditions	Value	Units
反向重复峰值电压 Peak repetitive reverse voltage	V_{RRM}	$T_{vj}=25^{\circ}\text{C}$	1200	V
连续正向直流电流 Continuous DC forward current	I_F		15	A
正向重复峰值电流 Peak repetitive forward current	I_{FRM}	$t_p=1\text{ms}$	30	A

Characteristic Values / 特征值

Item	Symbol	Conditions	Min.	Typ.	Max.	Units
正向电压 Forward voltage	V_F	$I_F=15\text{A}$	$T_{vj}=25^{\circ}\text{C}$	2.00	2.40	V
			$T_{vj}=125^{\circ}\text{C}$	2.10		
			$T_{vj}=150^{\circ}\text{C}$	2.10		
反向恢复峰值电流 Peak reverse recovery current	I_{rr}	$I_F=15\text{A}$	$T_{vj}=25^{\circ}\text{C}$	12.0		A
			$T_{vj}=125^{\circ}\text{C}$	14.0		A
			$T_{vj}=150^{\circ}\text{C}$	15.0		A
反向恢复电荷 Reverse recovery charge	Q_r	$-di_r/dt_{off}=550\text{A}/\mu\text{s}$ $V_R = 600\text{V}$ $V_{GE}=-15\text{V}$	$T_{vj}=25^{\circ}\text{C}$	1.10		μC
			$T_{vj}=125^{\circ}\text{C}$	1.90		μC
			$T_{vj}=150^{\circ}\text{C}$	2.00		μC
反向恢复损耗 (每脉冲) Reverse recovery energy (per pulse)	E_{rec}		$T_{vj}=25^{\circ}\text{C}$	0.30		mJ
			$T_{vj}=125^{\circ}\text{C}$	0.60		mJ
			$T_{vj}=150^{\circ}\text{C}$	0.65		mJ
结-外壳热阻 Thermal resistance, junction to case	R_{thJC}	Per diode / 每个二极管			1.5	K/W
工作温度 Temperature under switching conditions	T_{vjop}		-40		150	$^{\circ}\text{C}$

Diode, Rectifier / 二极管, 整流

受控文件

Maximum Rated Values / 最大额定值

Item	Symbol	Conditions	Value	Units
反向重复峰值电压 Peak repetitive reverse voltage	V_{RRM}	$T_{vj}=25^{\circ}C$	1600	V
最大正向均方根电流(每芯片) Maximum RMS forward current per chip	I_{FRMSM}	$T_H = 100^{\circ}C$	50	A
最大整流器输出均方根电流 Maximum RMS current at rectifier output	I_{RMSM}	$T_H = 100^{\circ}C$	60	A
正向浪涌电流 Surge forward current	I_{FSM}	$t_p=10ms, T_{vj}=25^{\circ}C, \sin 180^{\circ}$	320	A
I ² t-值 I ² t-value	I^2t	$t_p=10ms, T_{vj}=25^{\circ}C, \sin 180^{\circ}$	510	A ² S

Characteristic Values / 特征值

Item	Symbol	Conditions	Min.	Typ.	Max.	Units
正向电压 Forward voltage	V_F	$T_{vj}=150^{\circ}C, I_F=100A$		1.12		V
反向电流 Reverse current	I_R	$T_{vj}=125^{\circ}C, V_R=1600V$			2.0	mA
结-外壳热阻 Thermal resistance, junction to case	R_{thJC}	Per diode / 每个二极管			0.75	K/W
工作温度 Temperature under switching conditions	T_{vjop}		-40		150	$^{\circ}C$

NTC-Thermistor / 负温度系数热敏电阻

Characteristic Values / 特征值

Item	Symbol	Conditions	Value	Units
额定电阻值 Rated resistance	R_{25}	$T_c=25^{\circ}C$	5.00	k Ω
B-值 B-value	$B_{25/50}$	$R_2=R_{25} \exp[B_{25/50}(1/T_2-1/(298.15K))]$	3375	K

Module / 模块

受控文件

Item	Symbol	Conditions	Value	Units
绝缘测试电压 Isolation test voltage	V_{ISOL}	RMS, f=50Hz, t=1min	2.5	kV
模块基板材料 Material of module baseplate			Cu	
内部绝缘 Internal isolation		基本绝缘 (class 1, IEC 61140) Basic insulation (class 1, IEC 61140)	Al_2O_3	
爬电距离 Creepage distance			10	mm
电气间隙 Clearance			7.5	mm
相对电痕指数 Comperative tracking index	CTI		> 200	

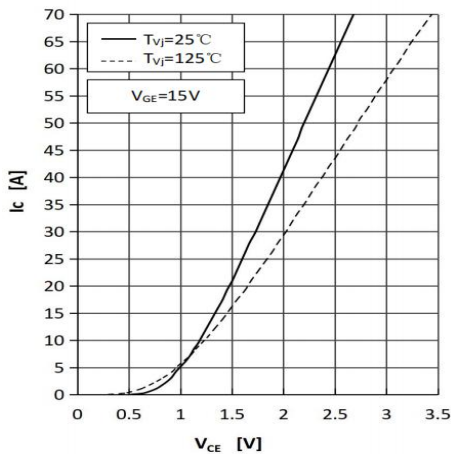
Item	Symbol	Conditions	Min.	Typ.	Max.	Units
杂散电感, 模块 Stray inductance module	L_{SCE}			35		nH
模块引脚电阻, 端子-芯片 Module Lead Resistance, Terminals-Chip	$R_{CC'+EE'}$ $R_{AA'+CC'}$	$T_C=25^{\circ}C$,每个开关/perswitch $T_C=25^{\circ}C$,每个开关/perswitch		4.0		$m\Omega$
储存温度 Storage temperature	T_{stg}		-40		125	$^{\circ}C$
模块安装的扭距 Mounting torque for module mounting	M		3.00		6.00	Nm
重量 Weight	G			180		g

受控文件

输出特性 IGBT, 逆变器 (典型)

Output characteristic IGBT, Inverter (typical)

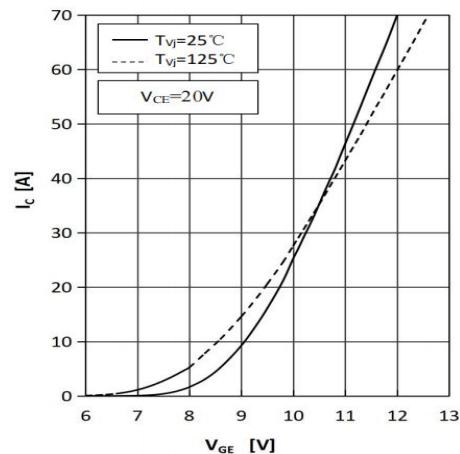
$I_c = f(V_{CE})$



转移特性 IGBT, 逆变器 (典型)

Transfer characteristic IGBT, Inverter (typical)

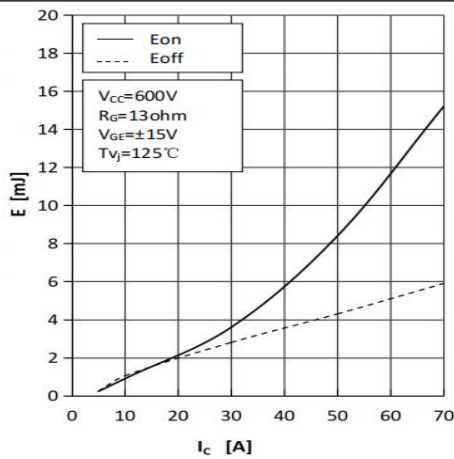
$I_c = f(V_{GE})$



开关损耗 IGBT, 逆变器 (典型)

Switching losses IGBT, Inverter (typical)

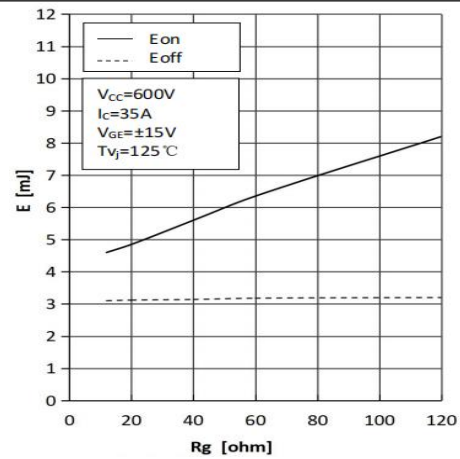
$E = f(I_c)$



开关损耗 IGBT, 逆变器 (典型)

Switching losses IGBT, Inverter (typical)

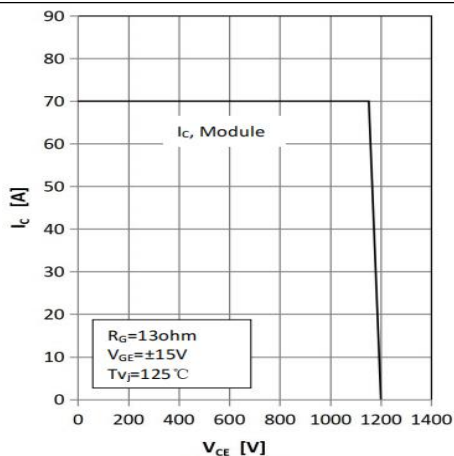
$E = f(R_g)$



反偏安全工作区 IGBT, 逆变器 (RBSOA)

Reverse bias safe operating area IGBT, Inverter (RBSOA)

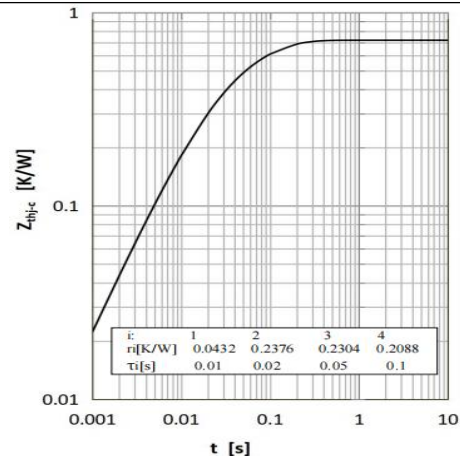
$I_c = f(V_{CE})$



瞬态热阻抗 IGBT, 逆变器

Transient thermal impedance IGBT, Inverter

$Z_{thjc} = f(t)$

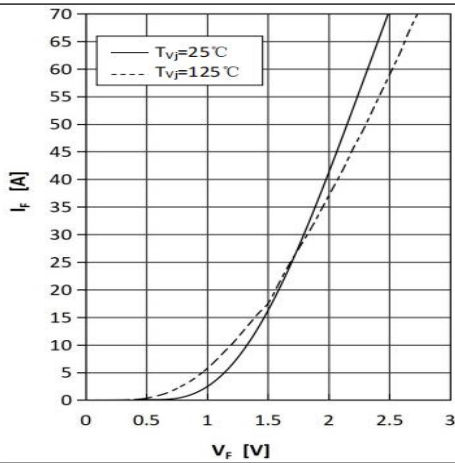


受控文件

输出特性 FRD, 逆变器 (典型)

Output characteristic FRD, Inverter (typical)

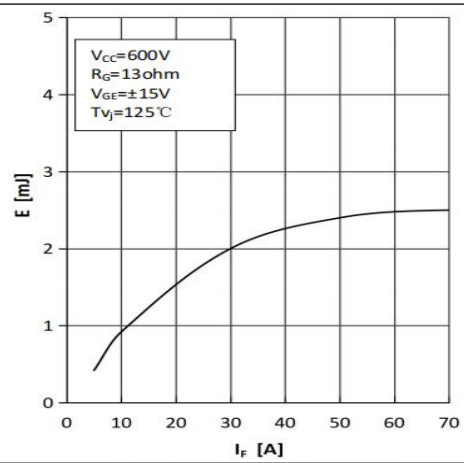
$$I_f = f(V_f)$$



开关损耗 FRD, 逆变器 (典型)

Switching losses FRD, Inverter (typical)

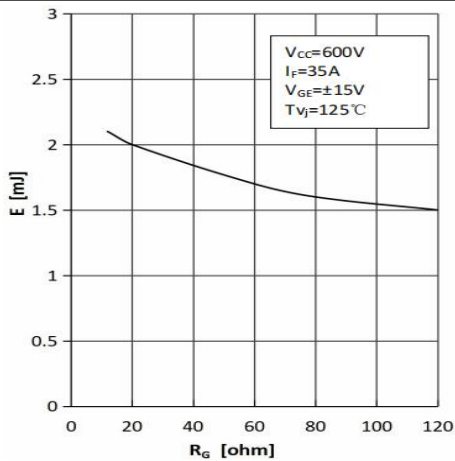
$$E = f(I_f)$$



开关损耗 FRD, 逆变器 (典型)

Switching losses FRD, Inverter (typical)

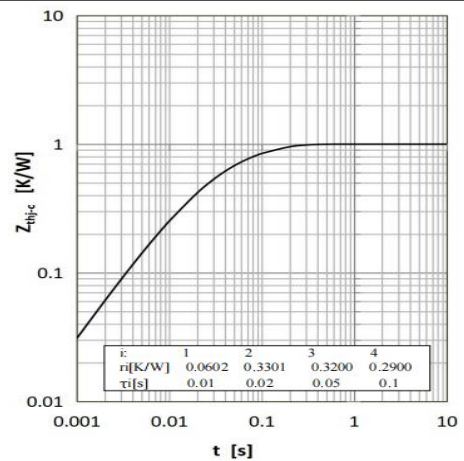
$$E = f(R_g)$$



瞬态热阻抗 FRD, 逆变器

Transient thermal impedance FRD, Inverter

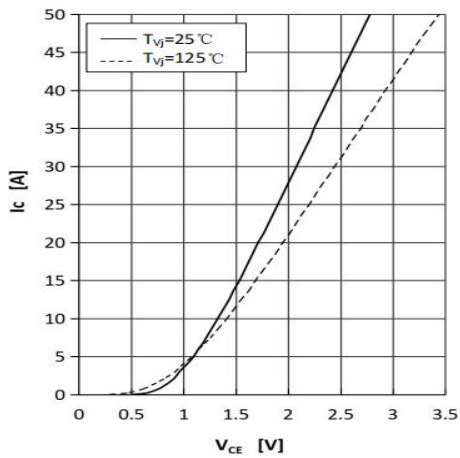
$$Z_{thjc} = f(t)$$



输出特性 IGBT, 刹车 (典型)

Output characteristic IGBT, Brake Chopper (typical)

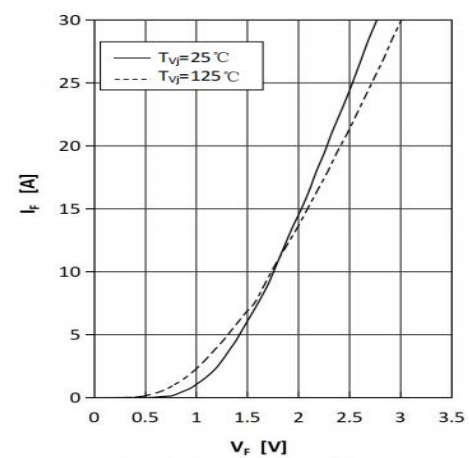
$$I_c = f(V_{ce})$$

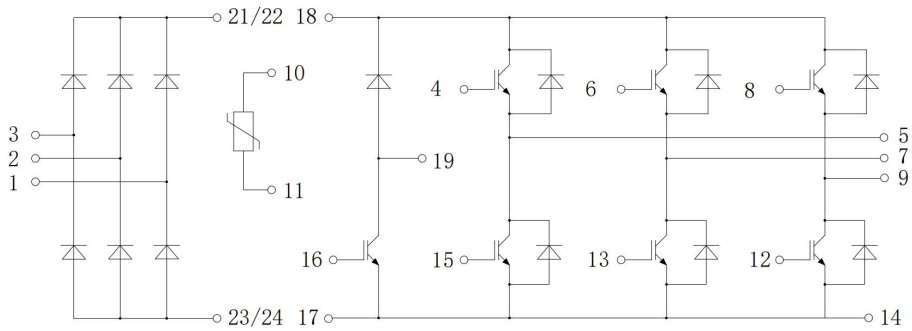


正向偏压特性 FRD, 刹车 (典型)

Forward characteristic of FRD, Brake Chopper (typical)

$$I_f = f(V_f)$$





Package outlines / 封装尺寸

