技术信息 / Technical Information

IGBT-模块
IGBT-modules

FZ1600R12KL4C

1200V IGBT Modul mit low loss IGBT der 2.ten Generation und softer Emitter Controlled Diode
1200V IGBT Module with low loss IGBT of 2nd generation and soft Emitter Controlled Diode

IGBT, 逆变器 / IGBT,Inverter

最大额定值 / Maximum Rated Values

集电极 - 发射极电压 Collector-emitter voltage	T_{vj} = 25°C T_{vj} = 125°C	V_{CES}		1200 1200	V
连续集电极直流电流 Continuous DC collector current	T_C = 80°C, $T_{vj\,max}$ = 150°C T_C = 25°C, $T_{vj\,max}$ = 150°C	$I_{C\,nom}$ I_C		1600 2450	A A
集电极重复峰值电流 Repetitive peak collector current	t_P = 1 ms	I_{CRM}		3200	A
总功率损耗 Total power dissipation	T_C = 25°C, $T_{vj\,max}$ = 150	P_{tot}		10,0	kW
栅极 - 发射极峰值电压 Gate-emitter peak voltage		V_{GES}		+/-20	V

特征值 / Characteristic Values

			min.	typ.	max.	
集电极 - 发射极饱和电压 Collector-emitter saturation voltage	I_C = 1600 A, V_{GE} = 15 V I_C = 1600 A, V_{GE} = 15 V	T_{vj} = 25°C T_{vj} = 125°C	$V_{CE\,sat}$		2,10 2,40	2,60 2,90	V V
栅极阈值电压 Gate threshold voltage	I_C = 64,0 mA, V_{CE} = V_{GE}, T_{vj} = 25°C		V_{GEth}	4,5	5,5	6,5	V
栅极电荷 Gate charge	V_{GE} = -15 V ... +15 V		Q_G		17,0		µC
内部栅极电阻 Internal gate resistor	T_{vj} = 25°C		R_{Gint}		0,8		Ω
输入电容 Input capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{ies}		110		nF
反向传输电容 Reverse transfer capacitance	f = 1 MHz, T_{vj} = 25°C, V_{CE} = 25 V, V_{GE} = 0 V		C_{res}		7,00		nF
集电极-发射极截止电流 Collector-emitter cut-off current	V_{CE} = 1200 V, V_{GE} = 0 V, T_{vj} = 25°C		I_{CES}			5,0	mA
栅极-发射极漏电流 Gate-emitter leakage current	V_{CE} = 0 V, V_{GE} = 20 V, T_{vj} = 25°C		I_{GES}			400	nA
开通延迟时间(电感负载) Turn-on delay time, inductive load	I_C = 1600 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Gon} = 0,91 Ω	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,on}$		0,28 0,30		µs µs
上升时间(电感负载) Rise time, inductive load	I_C = 1600 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Gon} = 0,91 Ω	T_{vj} = 25°C T_{vj} = 125°C	t_r		0,19 0,19		µs µs
关断延迟时间(电感负载) Turn-off delay time, inductive load	I_C = 1600 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Goff} = 0,91 Ω	T_{vj} = 25°C T_{vj} = 125°C	$t_{d\,off}$		1,05 1,15		µs µs
下降时间(电感负载) Fall time, inductive load	I_C = 1600 A, V_{CE} = 600 V V_{GE} = ±15 V R_{Goff} = 0,91 Ω	T_{vj} = 25°C T_{vj} = 125°C	t_f		0,14 0,15		µs µs
开通损耗能量 (每脉冲) Turn-on energy loss per pulse	I_C = 1600 A, V_{CE} = 600 V, L_S = 70 nH V_{GE} = ±15 V R_{Gon} = 0,91 Ω	T_{vj} = 25°C T_{vj} = 125°C	E_{on}		210		mJ mJ
关断损耗能量 (每脉冲) Turn-off energy loss per pulse	I_C = 1600 A, V_{CE} = 600 V, L_S = 70 nH V_{GE} = ±15 V R_{Goff} = 0,91 Ω	T_{vj} = 25°C T_{vj} = 125°C	E_{off}		260		mJ mJ
短路数据 SC data	V_{GE} ≤ 15 V, V_{CC} = 900 V V_{CEmax} = V_{CES} -L_{sCE} ·di/dt	t_P ≤ 10 µs, T_{vj} = 125°C	I_{SC}		12000		A
结 - 外壳热阻 Thermal resistance, junction to case	每个 IGBT / per IGBT		R_{thJC}			12,5	K/kW
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个 IGBT / per IGBT λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)		R_{thCH}		9,60		K/kW
在开关状态下温度 Temperature under switching conditions			$T_{vj\,op}$	-40		125	°C

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二极管,逆变器 / Diode, Inverter

最大额定值 / Maximum Rated Values

反向重复峰值电压 Repetitive peak reverse voltage	T_{vj} = 25°C T_{vj} = 125°C	V_{RRM}	1200 1200	V
连续正向直流电流 Continuous DC forward current		I_F	1600	A
正向重复峰值电流 Repetitive peak forward current	t_P = 1 ms	I_{FRM}	3200	A
I2t-值 I²t - value	V_R = 0 V, t_P = 10 ms, T_{vj} = 125°C	I²t	590	kA²s
最小开通时间 Minimum turn-on time		$t_{on\ min}$	10,0	µs

特征值 / Characteristic Values

			min.	typ.	max.	
正向电压 Forward voltage	I_F = 1600 A, V_{GE} = 0 V I_F = 1600 A, V_{GE} = 0 V	V_F		1,80 1,70	2,30 2,20	V V
反向恢复峰值电流 Peak reverse recovery current	I_F = 1600 A, - di_F/dt = 9000 A/µs (T_{vj}=125°C) T_{vj} = 25°C V_R = 600 V T_{vj} = 125°C V_{GE} = -15 V	I_{RM}		900 1450		A A
恢复电荷 Recovered charge	I_F = 1600 A, - di_F/dt = 9000 A/µs (T_{vj}=125°C) T_{vj} = 25°C V_R = 600 V T_{vj} = 125°C V_{GE} = -15 V	Q_r		150 340		µC µC
反向恢复损耗（每脉冲） Reverse recovery energy	I_F = 1600 A, - di_F/dt = 9000 A/µs (T_{vj}=125°C) T_{vj} = 25°C V_R = 600 V T_{vj} = 125°C V_{GE} = -15 V	E_{rec}		60,0 115		mJ mJ
结 - 外壳热阻 Thermal resistance, junction to case	每个二极管 / per diode	R_{thJC}			21,0	K/kW
外壳 - 散热器热阻 Thermal resistance, case to heatsink	每个二极管 / per diode λ_{Paste} = 1 W/(m·K) / λ_{grease} = 1 W/(m·K)	R_{thCH}		16,0		K/kW
在开关状态下温度 Temperature under switching conditions		$T_{vj\ op}$	-40		125	°C