

# DATASHEET 规格书

## SIS0200C170i20

I20 fine pattern IGBT, 15.8mm x 12.1mm

精细沟槽栅 i20 IGBT 芯片, 15.8mm x 12.1mm



$V_{CE} = 1700\text{ V}$

$I_C = 200\text{ A}$

- i20 ultra-low loss fine pattern Trench IGBT chipset  
i20 超低损耗精细沟槽栅型 IGBT 芯片组
- positive temperature coefficient  
正温度系数
- easy paralleling  
易并联

### Maximum ratings<sup>1</sup> 最大额定值

PARAMETER 参数	SYMBOL 符号	CONDITIONS 工作条件	MIN 最小值	MAX 最大值	UNIT 单位
Collector-emitter voltage 集电极-发射极电压	$V_{CES}$	$V_{GE} = 0\text{ V}, T_{vj} \geq 25\text{ °C}$		1700	V
DC collector current 集电极直流电流	$I_C$			200	A
Peak collector current 集电极峰值电流	$I_{CM}$	$t_p$ limited by $T_{vj\text{ max}}$ 脉冲宽度依据 $T_{vj\text{ max}}$ 设定		400	A
Gate-emitter voltage 栅极-发射极驱动电压	$V_{GES}$		-20	20	V
Junction temperature 结温	$T_{vj}$		-40	175	°C
Junction operating temperature 运行结温	$T_{vj(OP)}$		-40	175	°C
Short circuit <sup>2</sup> 短路	$t_{sc}$	$V_{GE} = 15\text{ V}, V_{CC} = 1200\text{ V}, T_{vj} = 175\text{ °C}^3$		10	µs



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<sup>1</sup> Maximum rated values indicate limits beyond which damage to the device may occur per IEC 60747

<sup>1</sup> 根据标准 IEC 60747 要求, 最大额定值表示超过该限值可能会对器件造成损坏

<sup>2</sup> Not subject to production test, capability depending on module design

<sup>2</sup> 不从属于生产测试, 性能取决于模块设计

<sup>3</sup> Short circuit performance at high temperature requires suitable die assembly process

<sup>3</sup> 高温下的短路性能测试, 需要合适的芯片封装工艺。

## IGBT<sup>4</sup>

PARAMETER 参数	SYMBOL 符号	CONDITIONS 条件	MIN 最小	TYP 典型	MAX 最大	UNIT 单位
Collector(-emitter) breakdown voltage 集电极-发射极击穿电压	$V_{(BR)CES}$	$V_{GE} = 0\text{ V}, I_C = 0.25\text{ mA}, T_{vj} = 25^\circ\text{C}$	1700			V
Collector-emitter saturation voltage <sup>5</sup> 集电极-发射极饱和电压	$V_{CESat}$	$I_C = 200\text{ A}, V_{GE} = 15\text{ V}$	$T_{vj} = 25^\circ\text{C}$	1.65		V
			$T_{vj} = 125^\circ\text{C}$	1.85		V
			$T_{vj} = 175^\circ\text{C}$	2.05		V
Collector cut-off current 集电极截止电流	$I_{CES}$	$V_{CE} = 1700\text{ V}, V_{GE} = 0\text{ V}$			1.0	$\mu\text{A}$
Gate leakage current 栅极漏电流	$I_{GES}$	$V_{CE} = 0\text{ V}, V_{GE} = \pm 20\text{ V}$	-0.5		0.5	$\mu\text{A}$
Gate-emitter threshold voltage 栅极-发射极阈值电压	$V_{GE(th)}$	$I_C = 12\text{ mA}, V_{CE} = V_{GE}, T_{vj} = 25^\circ\text{C}$	5	6.15	7.5	V
Gate charge 栅极电荷	$Q_G$	$I_C = 200\text{ A}, V_{CE} = 900\text{ V}, V_{GE} = -15\text{ V} \dots 15\text{ V}$		1.5		$\mu\text{C}$
Input capacitance 输入电容	$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 100\text{ kHz}, T_{vj} = 25^\circ\text{C}$		15.3		nF
Output capacitance 输出电容	$C_{oes}$			0.89		nF
Reverse transfer capacitance 反向传输电容	$C_{res}$			0.47		nF
Internal gate resistor 栅极内阻	$R_{Gint}$		Per switch		4.2	
Turn-on delay time 开通延迟	$t_{d(on)}$	$V_{CC} = 900\text{ V}, I_C = 200\text{ A}, R_G = 4.5\ \Omega, V_{GE} = \pm 15\text{ V}$	$T_{vj} = 25^\circ\text{C}$	105		ns
			$T_{vj} = 125^\circ\text{C}$	130		ns
			$T_{vj} = 175^\circ\text{C}$	150		ns
Rise time 上升时间	$t_r$		$T_{vj} = 25^\circ\text{C}$	52		ns
			$T_{vj} = 125^\circ\text{C}$	58		ns
			$T_{vj} = 175^\circ\text{C}$	62		ns
Turn-off delay time 关断延迟	$t_{d(off)}$	$V_{CC} = 900\text{ V}, I_C = 200\text{ A}, R_G = 4.5\ \Omega, V_{GE} = \pm 15\text{ V}$	$T_{vj} = 25^\circ\text{C}$	590		ns
			$T_{vj} = 125^\circ\text{C}$	720		ns
			$T_{vj} = 175^\circ\text{C}$	775		ns
Fall time 下降时间	$t_f$		$T_{vj} = 25^\circ\text{C}$	360		ns
			$T_{vj} = 125^\circ\text{C}$	570		ns
			$T_{vj} = 175^\circ\text{C}$	660		ns
Turn-on switching energy 开通损耗	$E_{on}$	$V_{CC} = 900\text{ V}, I_C = 200\text{ A}, R_G = 4.5\ \Omega, V_{GE} = \pm 15\text{ V}$ Diode: SID0200C170d20	$T_{vj} = 25^\circ\text{C}$	54		mJ
			$T_{vj} = 125^\circ\text{C}$	74		mJ
			$T_{vj} = 175^\circ\text{C}$	87		mJ
Turn-off switching energy 关断损耗	$E_{off}$	$V_{CC} = 900\text{ V}, I_C = 200\text{ A}, R_G = 4.5\ \Omega, V_{GE} = \pm 15\text{ V}$	$T_{vj} = 25^\circ\text{C}$	44		mJ
			$T_{vj} = 125^\circ\text{C}$	64		mJ
			$T_{vj} = 175^\circ\text{C}$	72		mJ
Short circuit current 短路电流	$I_{SC}$	$t_{PCS} \leq 10\ \mu\text{s}, V_{GE} = 15\text{ V}, T_{vj} = 175^\circ\text{C}, V_{CC} = 1200\text{ V}, V_{CEM\ Chip} \leq 1700\text{ V}$		790		A

<sup>4</sup> Characteristic values according to IEC 60747-9

<sup>4</sup> IGBT 特征数值均参考标准 IEC 60747-9



## Mechanical properties<sup>6</sup> 机械特性

PARAMETER 参数		UNIT 单位
Die size 芯片面积	15.78 x 12.1	mm <sup>2</sup>
Gate pad size 栅极焊盘尺寸	1.32 x 0.82	mm <sup>2</sup>
Thickness 厚度	185	μm
Wafer diameter 晶圆直径	200	mm
Maximum chips per wafer 每片晶圆的最大芯片数	126	pcs
Frontside passivation 正面钝化层	Polyimide	
Frontside metal (pads) 正面金属 (衬垫)	Al Cu, 5000nm	
Backside metal 背面金属	Al Ni Ag System, 1100nm	

