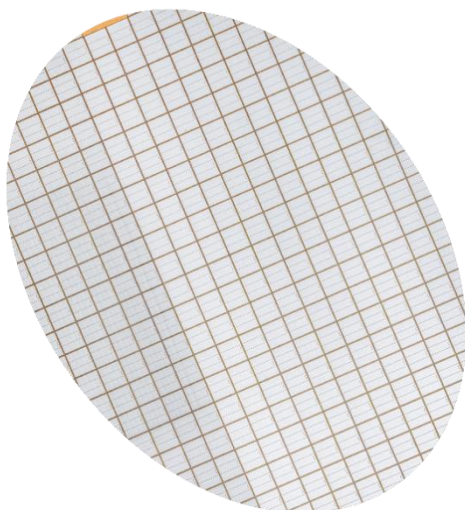


DATASHEET SIS0300C120i23

I23 micro pattern IGBT, 15.7 mm x 12.1 mm



$V_{CE} = 1200\text{ V}$

$I_C = 300\text{ A}$

- i23 ultra-low-loss micro pattern Trench IGBT chip-set
- Soft switching for a broad application range due to best turn-off controllability
- positive temperature coefficient
- easy paralleling

Maximum ratings¹

PARAMETER	SYMBOL	CONDITIONS	MIN	MAX	UNIT
Collector-emitter voltage	V_{CES}	$V_{GE} = 0\text{ V}$, $T_{vj} \geq 25\text{ °C}$		1200	V
DC collector current	I_C			300	A
Peak collector current	I_{CM}	t_p limited by $T_{vj\text{ max}}$		600	A
Gate-emitter voltage	V_{GES}		-20	20	V
Junction temperature	T_{vj}		-40	175	°C
Junction operating temperature	$T_{vj(op)}$		-40	175	°C
Short circuit ²	t_{sc}	$V_{GE} = 15\text{V}$, $V_{CC} = 800\text{V}$, $T_{vj} = 175\text{°C}$ ³		8	μs



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

² Not subject to production test, capability depending on module design

³ Short circuit performance at high temperature requires suitable die assembly process



IGBT⁴

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNIT
Collector(-emitter) breakdown voltage	V _{(BR)CES}	V _{GE} = 0 V, I _C = 0.25 mA, T _{vj} = 25 °C		1200			V
Collector-emitter saturation voltage ⁵	V _{CEsat}	I _C = 300 A, V _{GE} = 15 V	T _{vj} = 25 °C		1.55		V
			T _{vj} = 125 °C		1.75		V
			T _{vj} = 175 °C		1.85		V
Collector cut-off current	I _{CES}	V _{CE} = 1200 V, V _{GE} = 0 V	T _{vj} = 25 °C			1.0	μA
Gate leakage current	I _{GES}	V _{CE} = 0 V, V _{GE} = ±20 V		-0.1		0.1	μA
Gate-emitter threshold voltage	V _{GE(th)}	I _C = 15 mA, V _{CE} = V _{GE} , T _{vj} = 25°C			6.3		V
Gate charge	Q _G	I _C = 300 A, V _{CE} = 600 V, V _{GE} = -15 V .. 15 V			2.55		μC
Input capacitance	C _{ies}	V _{CE} = 25 V, V _{GE} = 0 V, f = 100 kHz, T _{vj} = 25 °C			38.76		nF
Output capacitance	C _{oes}				821		pF
Reverse transfer capacitance	C _{res}				361		pF
Internal gate resistor	R _{Gint}	Per switch			1.65		Ω
Turn-on delay time	t _{d(on)}	V _{CC} = 600 V, I _C = 300 A, R _G = 1.5 Ω, V _{GE} = ± 15 V	T _{vj} = 25 °C		218		ns
			T _{vj} = 125 °C		249		ns
			T _{vj} = 175 °C		258		ns
Rise time	t _r		T _{vj} = 25 °C		70		ns
			T _{vj} = 125 °C		81		ns
			T _{vj} = 175 °C		87		ns
Turn-off delay time	t _{d(off)}	V _{CC} = 600 V, I _C = 300 A, R _G =1.5 Ω, V _{GE} = ± 15 V	T _{vj} = 25 °C		262		ns
			T _{vj} = 125 °C		345		ns
			T _{vj} = 175 °C		379		ns
Fall time	t _f		T _{vj} = 25 °C		294		ns
			T _{vj} = 125 °C		383		ns
			T _{vj} = 175 °C		435		ns
Turn-on switching energy	E _{on}	V _{CC} = 600 V, I _C = 300 A, R _G = 1.5 Ω, V _{GE} = ± 15 V Diode: SID0250C120d20	T _{vj} = 25 °C		28		mJ
			T _{vj} = 125 °C		37		mJ
			T _{vj} = 175 °C		42		mJ
Turn-off switching energy	E _{off}	V _{CC} = 600 V, I _C = 300 A, R _G = 1.5 Ω, V _{GE} = ± 15 V	T _{vj} = 25 °C		30		mJ
			T _{vj} = 125 °C		41		mJ
			T _{vj} = 175 °C		46		mJ
Short circuit current	I _{SC}	t _{PCS} ≤ 8 μs, V _{GE} = 15 V, T _{vj} = 175 °C, V _{CC} = 800 V, V _{CEM Chip} ≤ 1200 V			1000		A

⁴ Characteristic values according to IEC 60747-9

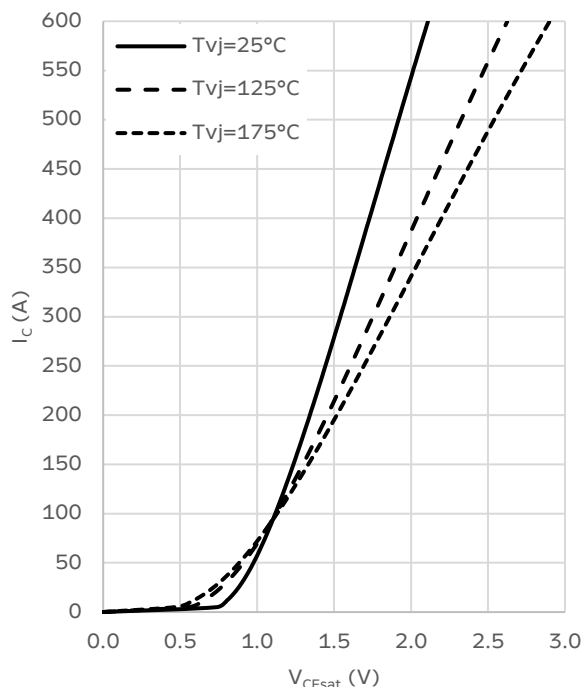


Characteristics

IGBT on-state characteristics (typical)

$I_C = f(V_{CE})$

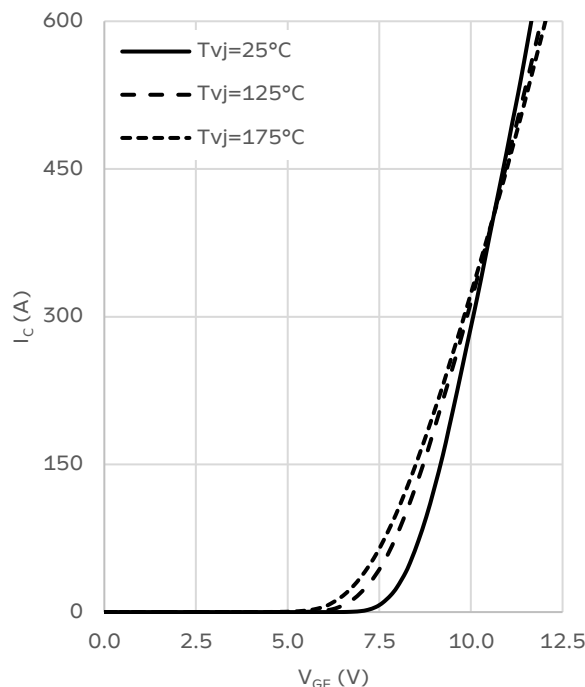
$V_{GE} = 15\text{ V}$



IGBT transfer characteristics (typical)

$I_C = f(V_{GE})$

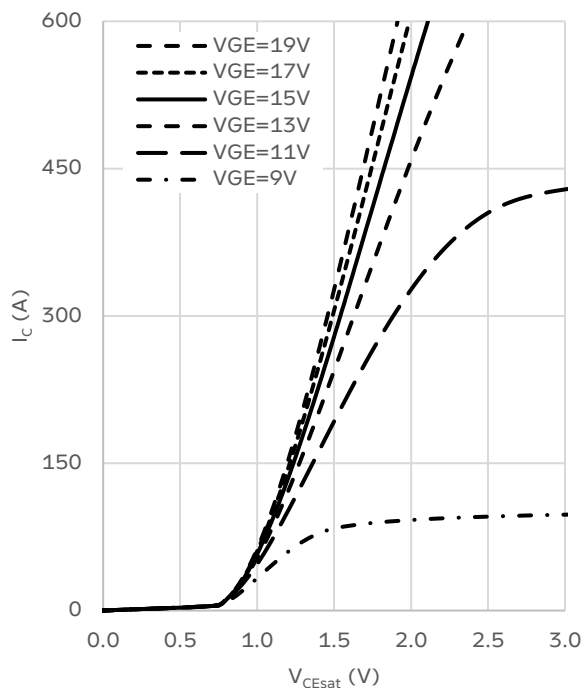
$V_{CE} = 20\text{ V}$



IGBT output characteristics (typical)

$I_C = f(V_{CE})$

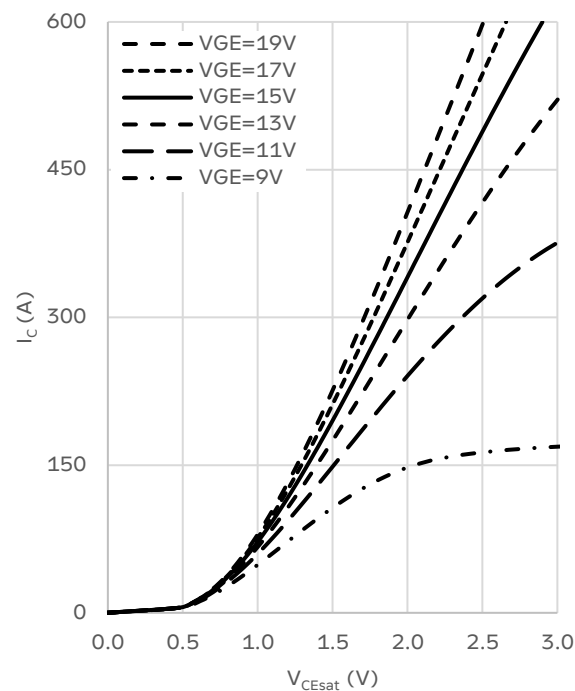
$T_{vj} = 25^\circ\text{C}$



IGBT output characteristics (typical)

$I_C = f(V_{CE})$

$T_{vj} = 175^\circ\text{C}$

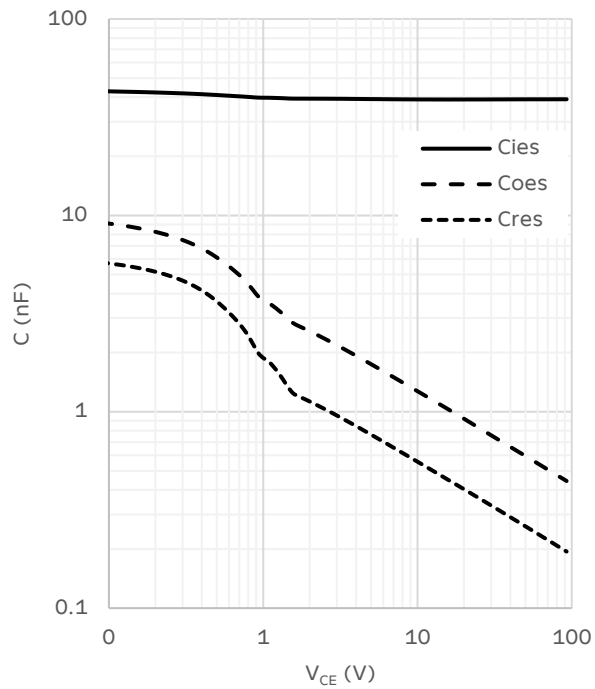




IGBT Capacitance characteristics (typical)

$C = f(V_{CE})$, $T_{vj} = 25\text{ °C}$

$f = 100\text{ kHz}$, $V_{GE} = 0\text{ V}$

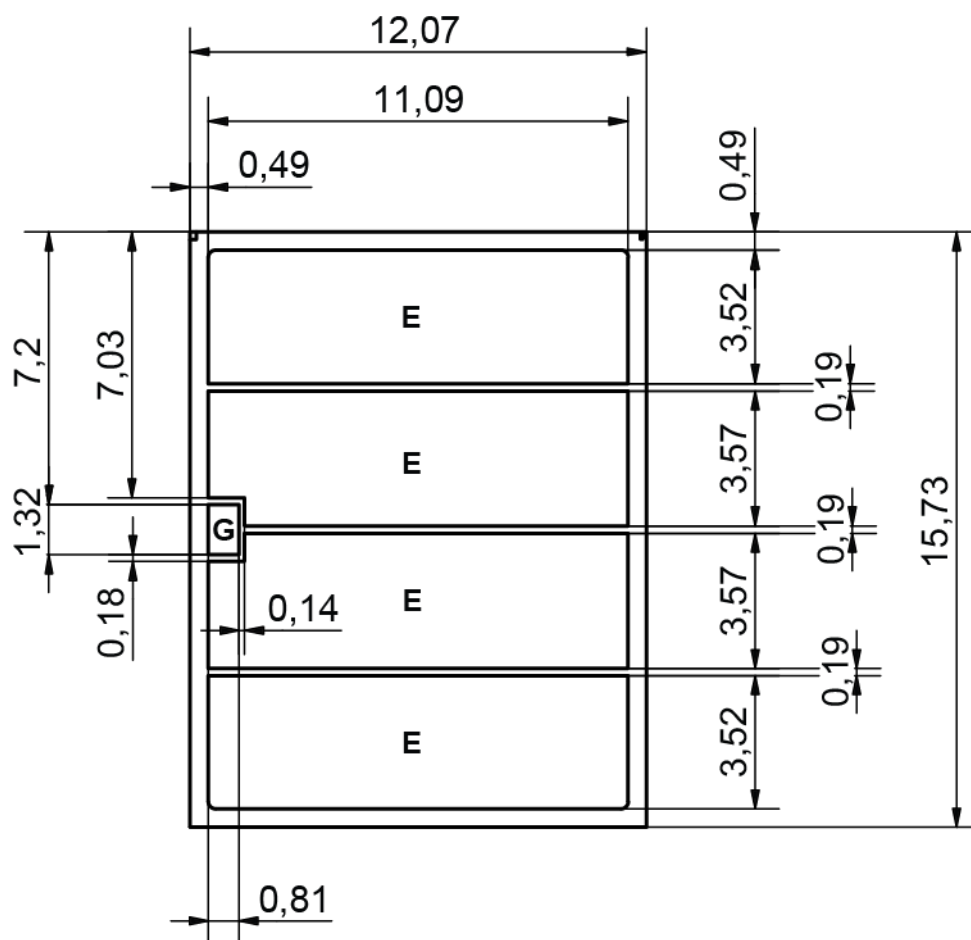




Mechanical properties⁶

PARAMETER		UNIT 単位
Die size	$(15.73 \pm 0.01) \times (12.07 \pm 0.01)$	mm ²
Gate pad size	1.3 x 0.8	mm ²
Thickness	135 ± 5	μm
Wafer diameter	300	mm
Maximum chips per wafer	315	pcs
Frontside passivation	Polyimide	
Frontside metal (pads)	Al Cu, 5000nm	
Backside metal	Al Ni Ag System, 1100nm	

Chip drawing



This is an electrostatic sensitive device.

Ordering Information

Part Number	SIS0300C120i23
Package	Bare Die
Packaging Method	Wafer