

5SMY 12J1721

IGBT-Die

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

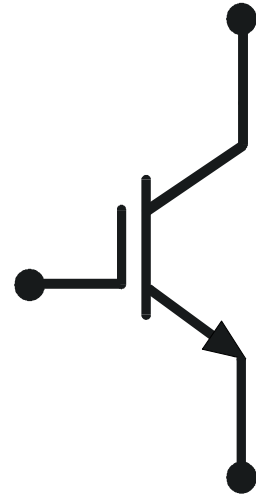
$I_C = 75 \text{ A}$

Ultra low loss thin IGBT die

Highly rugged SPT+ design

Large bondable emitter area

Passivation: Silicon Nitride plus Polyimide



Maximum rated values ¹⁾

Parameter	Symbol	Conditions	min	max	Unit
Collector-emitter voltage	V_{CES}	$V_{GE} = 0 \text{ V}$, $T_{vj} \geq 25 \text{ °C}$		1700	V
DC collector current	I_C			75	A
Peak collector current	I_{CM}			150	A
Gate-emitter voltage	V_{GES}		- 20	20	V
IGBT short circuit SOA	t_{psc}	$V_{CC} = 1300 \text{ V}$, $V_{CEM \text{ CHIP}} \leq 1700 \text{ V}$ $V_{GE} \leq 15 \text{ V}$, $T_{vj} \leq 150 \text{ °C}$		10	μs
Junction temperature	T_{vj}			175	°C
	$T_{vj(op)}$		-40	150	

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

IGBT characteristic values ²⁾

Parameter	Symbol	Conditions		min	typ	max	Unit
Collector (-emitter) breakdown voltage	V _{(BR)CES}	V _{GE} = 0 V, I _C = 1 mA, T _{vj} = 25 °C adequate environment		1700			V
Collector-emitter saturation voltage	V _{CE sat}	I _C = 75 A, V _{GE} = 15 V	T _{vj} = 25 °C		2.5	2.75	V
			T _{vj} = 125 °C		3.0		V
			T _{vj} = 150 °C		3.1		V
Collector cut-off current	I _{CES}	V _{CE} = 1700 V, V _{GE} = 0 V	T _{vj} = 25 °C			0.1	mA
			T _{vj} = 125 °C		0.26		mA
			T _{vj} = 150 °C		1.30		mA
Gate leakage current	I _{GES}	V _{CE} = 0 V, V _{GE} = ± 20 V, T _{vj} = 125 °C		- 500		500	nA
Gate-emitter threshold voltage	V _{GE(TO)}	I _C = 6 mA, V _{CE} = V _{GE} , T _{vj} = 25 °C		5.4		7.4	V
Gate charge	Q _{ge}	I _C = 75 A, V _{CE} = 900 V, V _{GE} = 15 V .. 15 V			0.61		μC
Input capacitance	C _{ies}	V _{CE} = 25 V, V _{GE} = 0 V, f = 1 MHz, T _{vj} = 25 °C			5.1		nF
Output capacitance	C _{oes}				0.27		nF
Reverse transfer capacitance	C _{res}				0.18		nF
Turn-on delay time	t _{d(on)}	V _{CC} = 900 V, I _C = 75 A, R _G = 15 Ω, V _{GE} = ± 15 V, L _σ = 400 nH, inductive load	T _{vj} = 25 °C		235		ns
			T _{vj} = 125 °C		250		ns
			T _{vj} = 150 °C		254		ns
Rise time	t _r		T _{vj} = 25 °C		110		ns
			T _{vj} = 125 °C		120		ns
			T _{vj} = 150 °C		125		ns
Turn-off delay time	t _{d(off)}	V _{CC} = 900 V, I _C = 75 A, R _G = 15 Ω, V _{GE} = ± 15 V, L _σ = 400 nH, inductive load	T _{vj} = 25 °C		390		ns
			T _{vj} = 125 °C		475		ns
			T _{vj} = 150 °C		500		ns
Fall time	t _f		T _{vj} = 25 °C		145		ns
			T _{vj} = 125 °C		155		ns
			T _{vj} = 150 °C		160		ns
Turn-on switching energy	E _{on}	V _{CC} = 900 V, I _C = 75 A, V _{GE} = ± 15 V, R _G = 15 Ω, L _σ = 400 nH, inductive load	T _{vj} = 25 °C		20		mJ
			T _{vj} = 125 °C		26		mJ
			T _{vj} = 150 °C		29		mJ
Turn-off switching energy	E _{off}	V _{CC} = 900 V, I _C = 75 A, V _{GE} = ± 15 V, R _G = 15 Ω, L _σ = 400 nH, inductive load	T _{vj} = 25 °C		14		mJ
			T _{vj} = 125 °C		22		mJ
			T _{vj} = 150 °C		24		mJ
Short circuit current	I _{SC}	t _{pSC} ≤ 10 μs, V _{GE} = 15 V, T _{vj} = 150 °C, V _{CC} = 1300 V, V _{CEM CHIP} ≤ 1700 V	T _{vj} = 150 °C		250		A

²⁾ Characteristic values according to IEC 60747 - 9

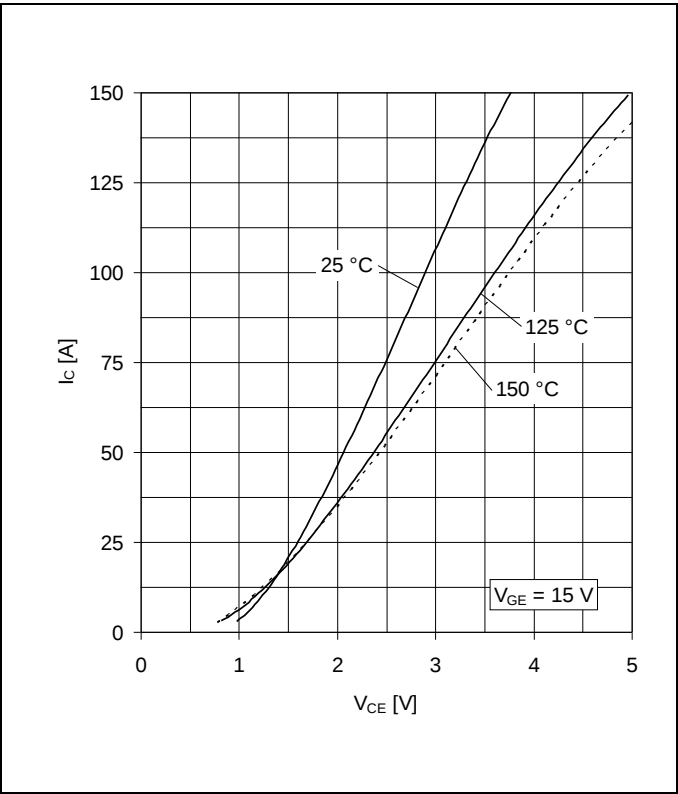


Fig. 1 Typical on-state characteristics, chip level

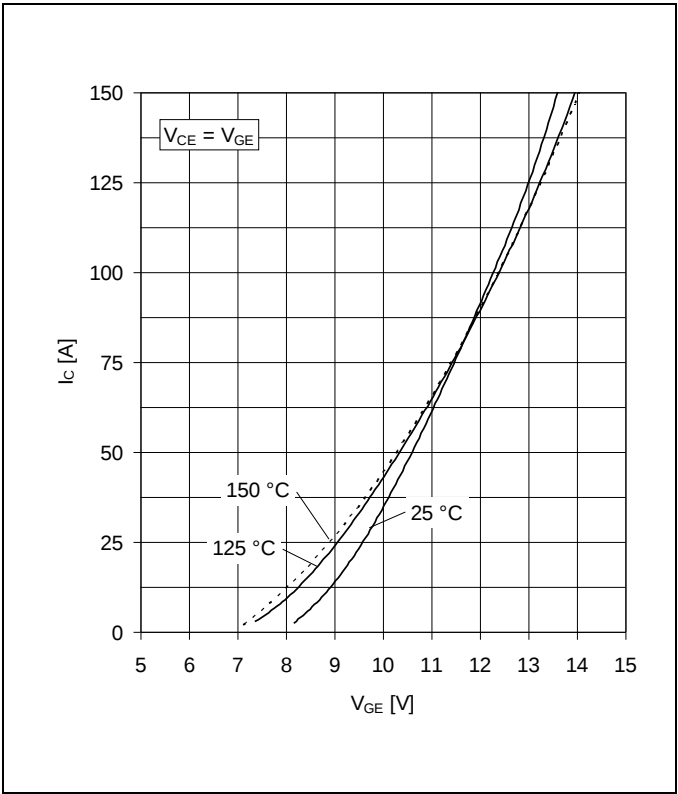


Fig. 2 Typical transfer characteristics, chip level

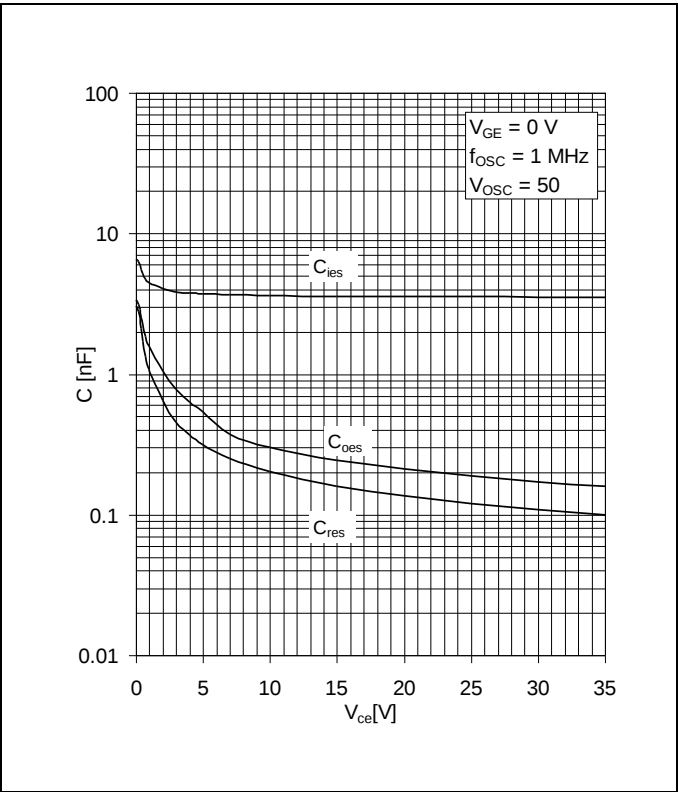


Fig. 3 Typical capacitances vs collector-emitter voltage

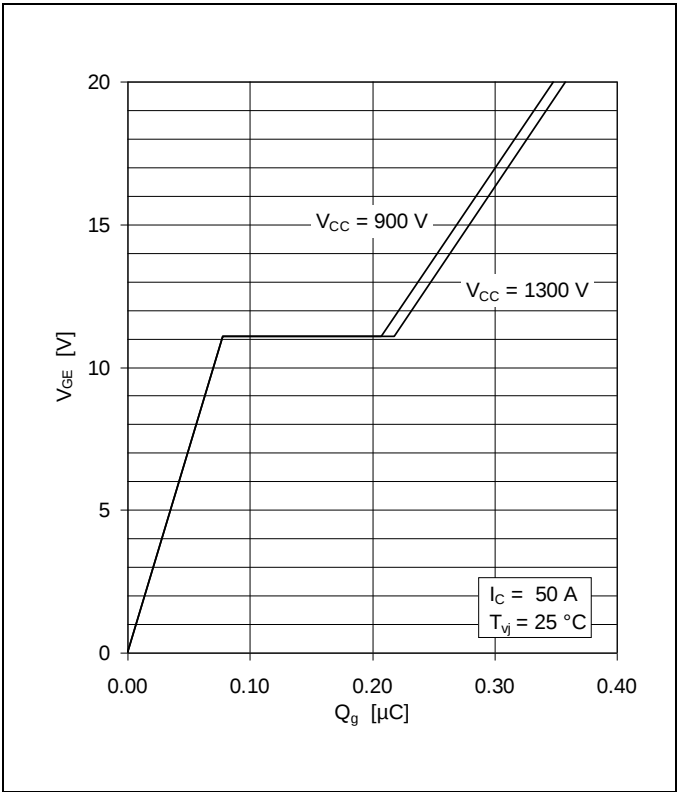


Fig. 4 Typical gate charge characteristics

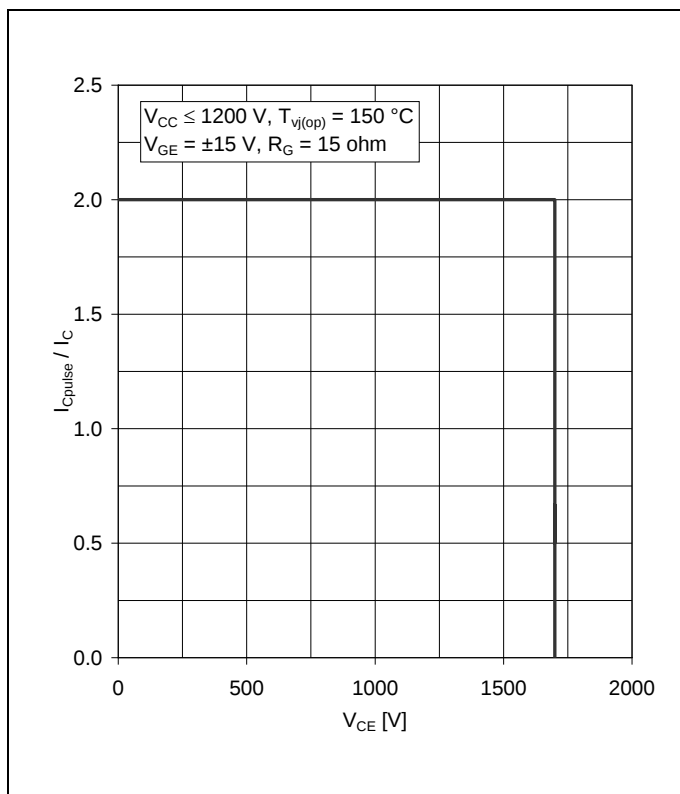


Fig. 5 Safe operating area (RBSOA)

Mechanical properties ³⁾

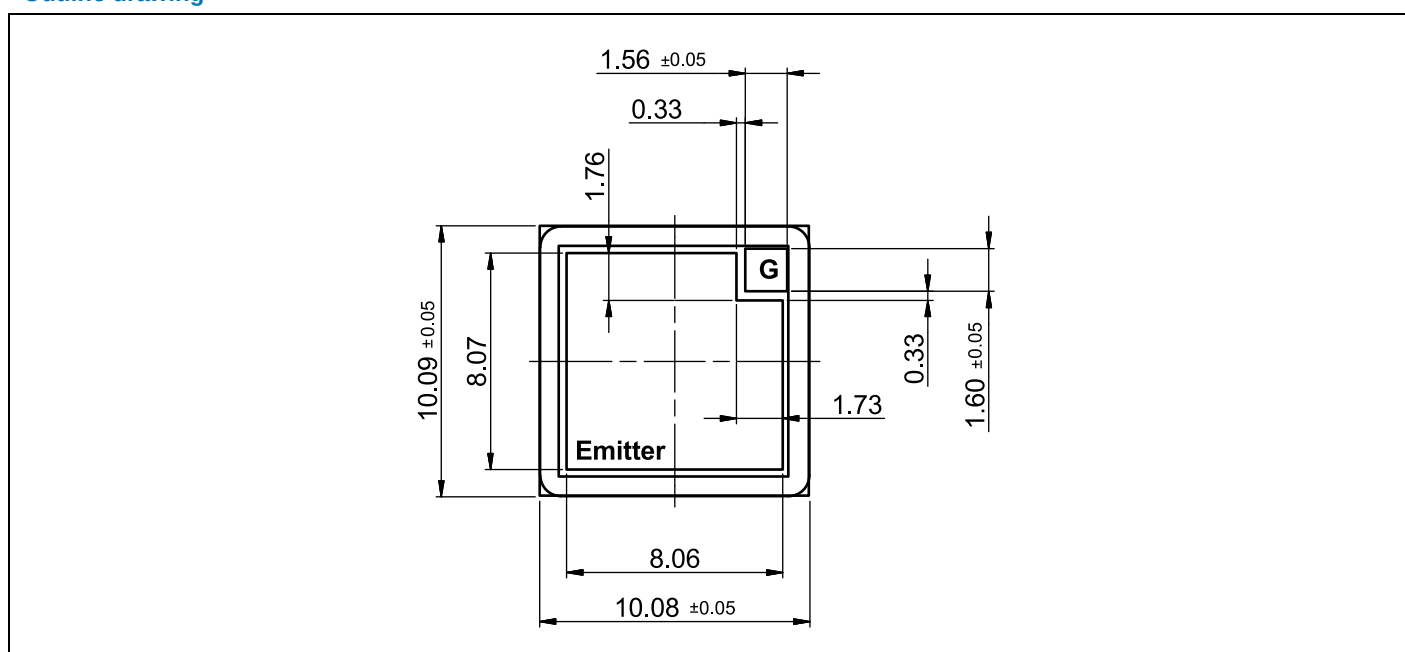
Parameter	Symbol	Conditions	min	Unit
Dimensions	Overall die	L x W	10.08 x 10.09	mm
	exposed front metal	L x W (except gate pad)	8.06 x 8.07	mm
	gate pad	L x W	1.73 x 1.76	mm
	thickness		209 ± 15	µm
Metallization ³⁾	front (E)	AlSi1	4	µm
	back (C)	Al / Ti / Ni / Ag	1.6	µm

³⁾ Package and mechanical properties according to IEC 60747 - 15

Form of delivery

Description	Part number
Picked wafer die (waffle pack)	5SMY 12J1721
Sawn 6" wafer die (on blue tape)	5SMY 86J1721

Outline drawing ⁴⁾



Note: all dimensions are shown in millimeters

⁴⁾ For detailed mounting instructions refer to ABB Document No. 5SYA2039

This is an electrostatic sensitive device, please observe the international standard IEC 60747-1, chap. IX.
This product has been designed and qualified for Industrial Level.

Related documents:

5SYA 2045 Thermal runaway during blocking
5SYA 2059 Applying IGBT and Diode dies
5SYA 2093-00 Thermal design of IGBT Modules

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