

5SMY 12J1730

IGBT-Die

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

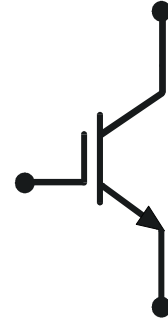
$I_C = 75 \text{ A}$

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}	$V_{GE} = 0 \text{ V}$, $T_{vj} \geq 25 \text{ }^{\circ}\text{C}$		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}	$V_{CC} = 1300 \text{ V}$, $V_{CEM \text{ CHIP}} \leq 1700 \text{ V}$ $V_{GE} \leq 15 \text{ V}$, $T_{vj} \leq 175 \text{ }^{\circ}\text{C}$		10	μs
Junction temperature	$T_{vj(op)}$		-40	175	$^{\circ}\text{C}$

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 ³⁾	V _{(BR)CES}	V _{GE} = 0 V, I _C = 1 mA, T _{vj} = 25 °C		1700			V
Collector-emitter saturation voltage	V _{CE sat}	I _C = 150 A, V _{GE} = 15 V	T _{vj} = 25 °C		2.25	2.6	V
			T _{vj} = 125 °C		2.55		V
			T _{vj} = 175 °C		2.75		V
Collector cut-off current	I _{CES}	V _{CE} = 1700 V, V _{GE} = 0 V	T _{vj} = 25 °C			0.2	mA
			T _{vj} = 125 °C		0.4		mA
			T _{vj} = 175 °C		7.5		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		4.5		6.5	V
Gate charge	Q _{GE}	I _C = 150 A, V _{CE} = 900 V, V _{GE} = 15 V .. 15 V			0.53		µC
Input capacitance	C _{ies}	V _{CE} = 25 V, V _{GE} = 0 V, f = 1 MHz, T _{vj} = 25 °C			4.6		nF
Output capacitance	C _{oes}				0.26		nF
Reverse transfer capacitance	C _{res}				0.18		nF
Internal gate resistance	R _{Gint}				7.8		Ω
Turn-on delay time	t _{d(on)}	V _{CC} = 900 V, I _C = 75 A, R _G = 5.4 Ω, V _{GE} = ± 15 V, L _σ = 120 nH, inductive load Aux: 5SLZ 12F1700	T _{vj} = 25 °C		180		ns
			T _{vj} = 125 °C		190		ns
			T _{vj} = 175 °C		190		ns
Rise time	t _r		T _{vj} = 25 °C		66		ns
			T _{vj} = 125 °C		68		ns
			T _{vj} = 175 °C		73		ns
Turn-off delay time	t _{d(off)}	T _{vj} = 25 °C		220		ns	
		T _{vj} = 125 °C		245		ns	
		T _{vj} = 175 °C		260		ns	
Fall time	t _f	T _{vj} = 25 °C		185		ns	
		T _{vj} = 125 °C		195		ns	
		T _{vj} = 175 °C		205		ns	
Turn-on switching energy	E _{on}	V _{CC} = 900 V, I _C = 150 A, V _{GE} = ± 15 V, R _G = 5.4 Ω, L _σ = 120 nH, inductive load Aux: 5SLZ 12F1700	T _{vj} = 25 °C		22		mJ
		T _{vj} = 125 °C		29		mJ	
		T _{vj} = 175 °C		37		mJ	
Turn-off switching energy	E _{off}	V _{CC} = 900 V, I _C = 150 A, V _{GE} = ± 15 V, R _G = 5.4 Ω, L _σ = 120 nH, inductive load	T _{vj} = 25 °C		11		mJ
		T _{vj} = 125 °C		19		mJ	
		T _{vj} = 175 °C		23		mJ	
Short circuit current	I _{SC}	t _{pSC} ≤ 10 µs, V _{GE} = 15 V, V _{CC} = 1300 V, V _{CEM CHIP} ≤ 1700 V	T _{vj} = 175 °C		240		A

²⁾ Characteristic values according to IEC 60747 - 9

³⁾ Please refer to Application Note 5SYA 2059: Applying IGBT and diode dies

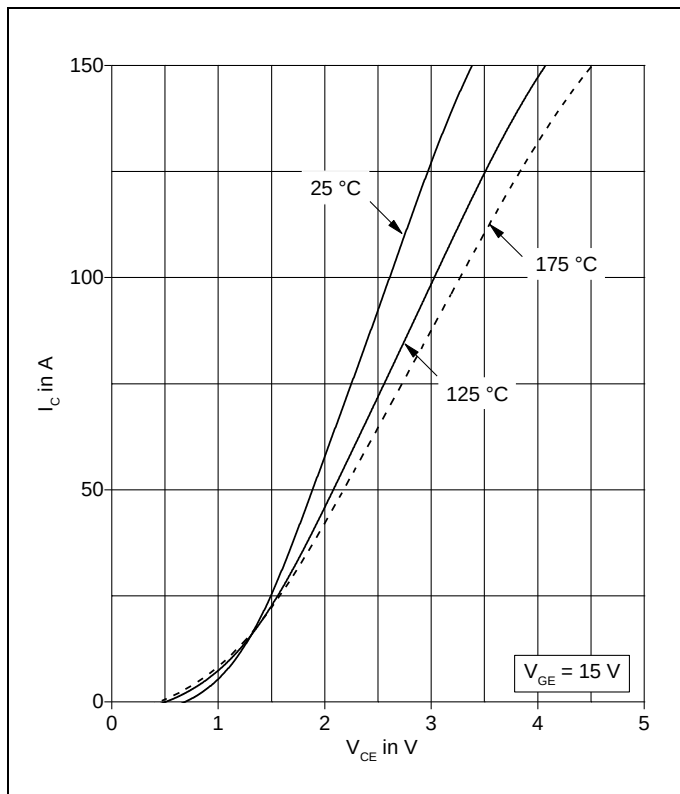


Fig. 1 Typical on-state characteristics

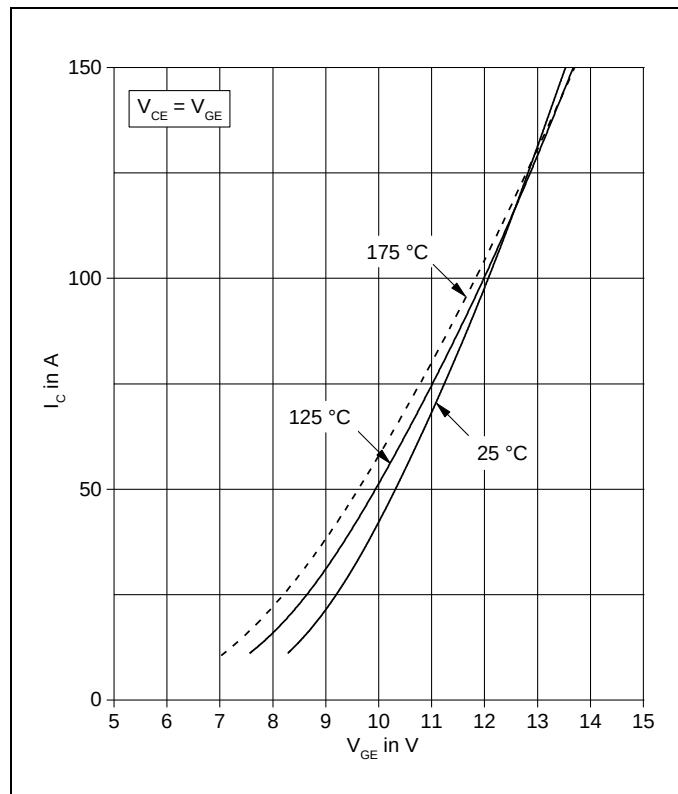


Fig. 2 Typical transfer characteristics

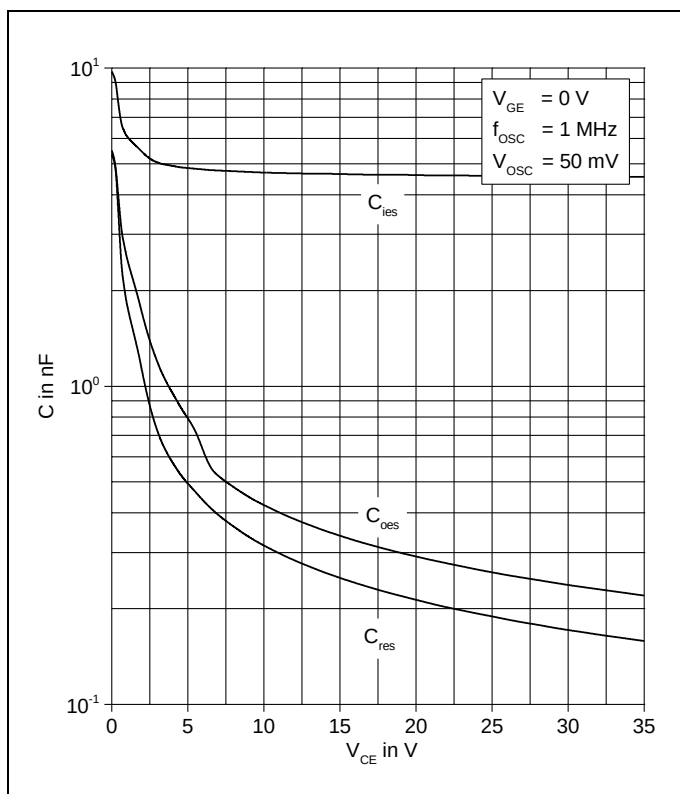


Fig. 3 Typical capacitances vs collector-emitter voltage

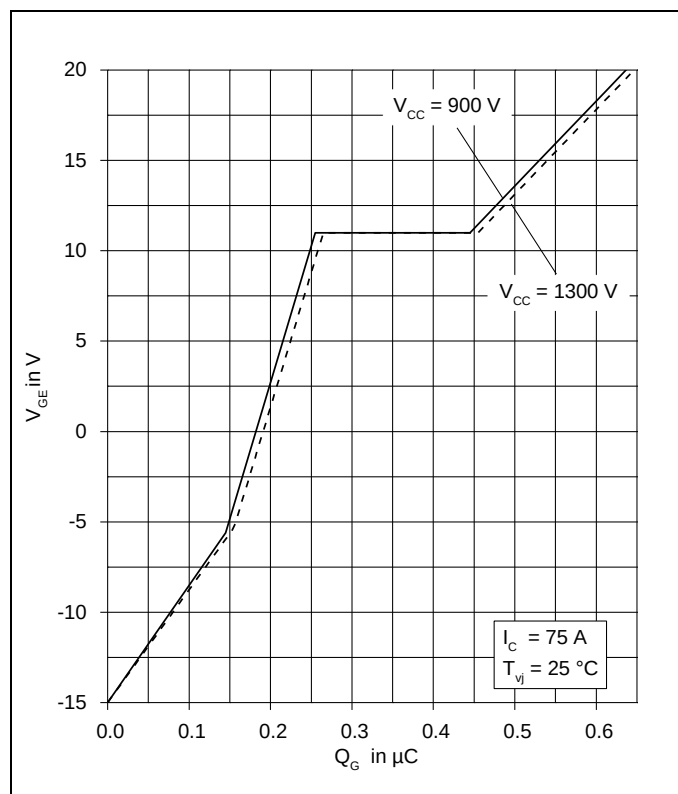


Fig. 4 Typical gate charge characteristics

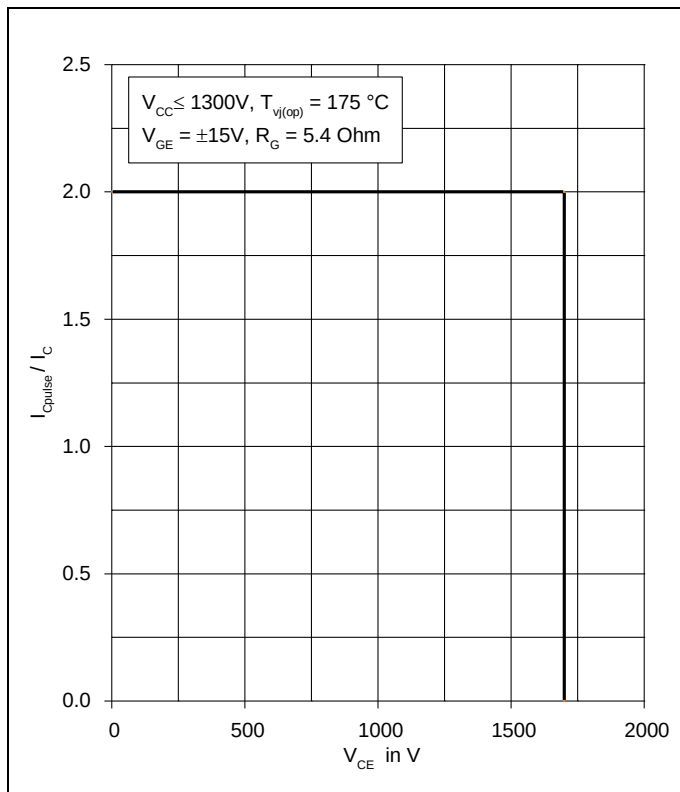


Fig. 5 Turn-off safe operating area (RBSOA)

Mechanical properties ³⁾

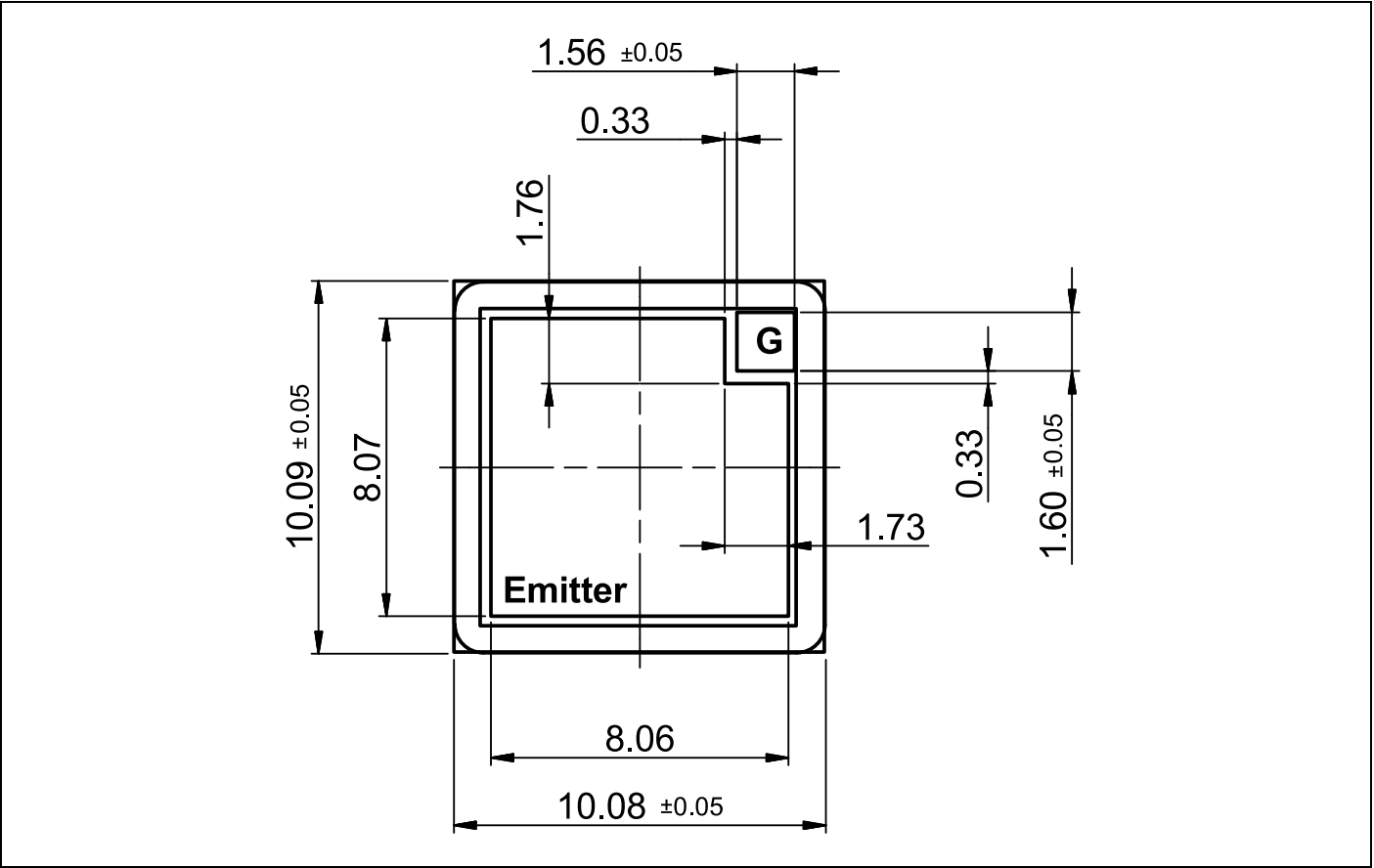
Parameter	Symbol	Conditions	min	Unit
Dimensions	Overall die	L x W	10.09 x 10.08	mm
	exposed front metal	L x W (except gate pad)	8.07 x 8.06	mm
	gate pad	L x W	1.76 x 1.56	mm
	thickness		190 ± 15	µm
Metallization ³⁾	front (E)	AlSi1	4	µm
	back (C)	Al / Ti / Ni / Ag	1.6	µm

³⁾ Please refer to Application Note 5SYA 2059: Applying IGBT and diode dies

Form of delivery

Description	Part number
Unsawn 6" wafer die (on blue tape)	5SMY 76J1730
Sawn 6" wafer die (on blue tape)	5SMY 86J1730

Outline drawing



Note: all dimensions are shown in millimeters

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

Related documents:

5SYA 2045 Thermal runaway during blocking
5SYA 2059 Applying IGBT & Diode Dies
5SZK 9114 Handling, packing and storage conditions for sawn wafer dies and bare die

ABB Switzerland Ltd.
Semiconductors
Fabrikstrasse 3
CH-5600 Lenzburg
Switzerland

Phone: +41 58 586 1419
Fax: +41 58 586 1306
E-Mail: abbsem@ch.abb.com

www.abb.com/semiconductors

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