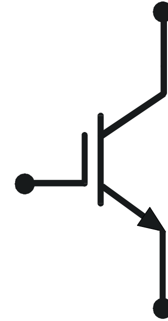
Data Sheet, Doc. No. 5SYA 1752-00 01-2018

5SMY 12J1732

IGBT-Die

V_{CE} = 1700 V
I_C = 75 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 V, $T_{vj} \geq 25$ °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 V, $V_{CEM\ CHIP} \leq 1700$ V $V_{GE} \leq 15$ V, $T_{vj} \leq 175$ °C		10	µs
	$T_{vj(op)}$		-40	175	

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

ABB

IGBT characteristic values [2)]

Parameter	Symbol	Conditions		min	typ	max	Unit
Collector (-emitter) breakdown voltage	$V_{(BR)CES}$	V_{GE} = 0 V, IC = 1 mA, T_{vj} = 25 °C adequate environment		1700			V
Collector-emitter saturation voltage	$V_{CE\ sat}$	IC = 75 A, VGE = 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 = 75 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	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	$t_{d(off)}$	V_{CC} = 900 V, I_C = 75 A, R_G = 5.4 Ω, V_{GE} = ±15 V, $L_σ$ = 120 nH, inductive load	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		196		ns
			T_{vj} = 175 °C		205		ns
Turn-on switching energy	E_{on}	V_{CC} = 900 V, I_C = 75 A, V_{GE} = ±15 V, R_G = 5.4 Ω, $L_σ$ = 120 nH, inductive load	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 = 75 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	ISC	t_{psc} ≤ 10 µs, V_{GE} = 15 V, T_{vj} = 175 °C, V_{CC} = 1300 V, $V_{CEM\ CHIP}$ ≤ 1700 V	T_{vj} =175 °C		240		A

[2)] Characteristic values according to IEC 60747 - 9

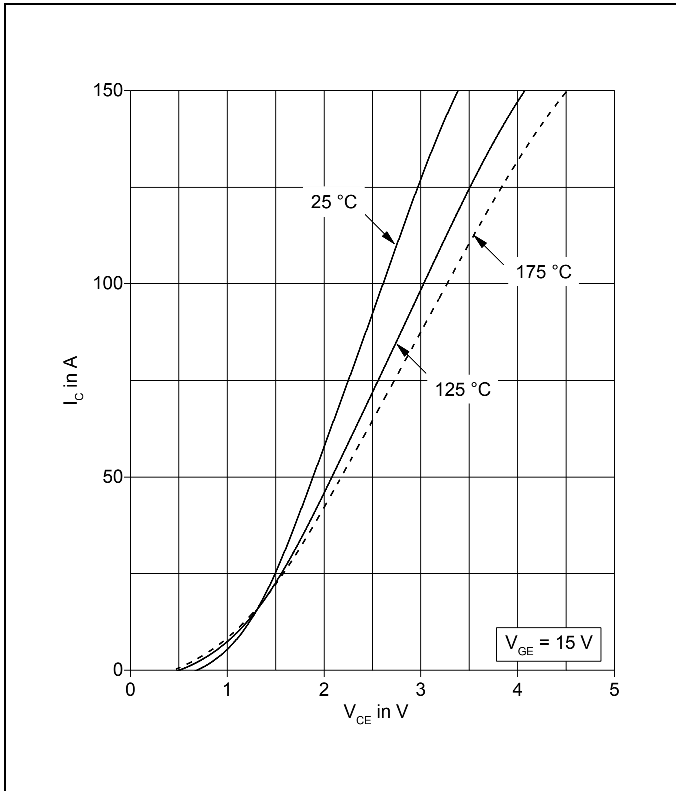


Fig. 1 Typical on-state characteristics, chip level

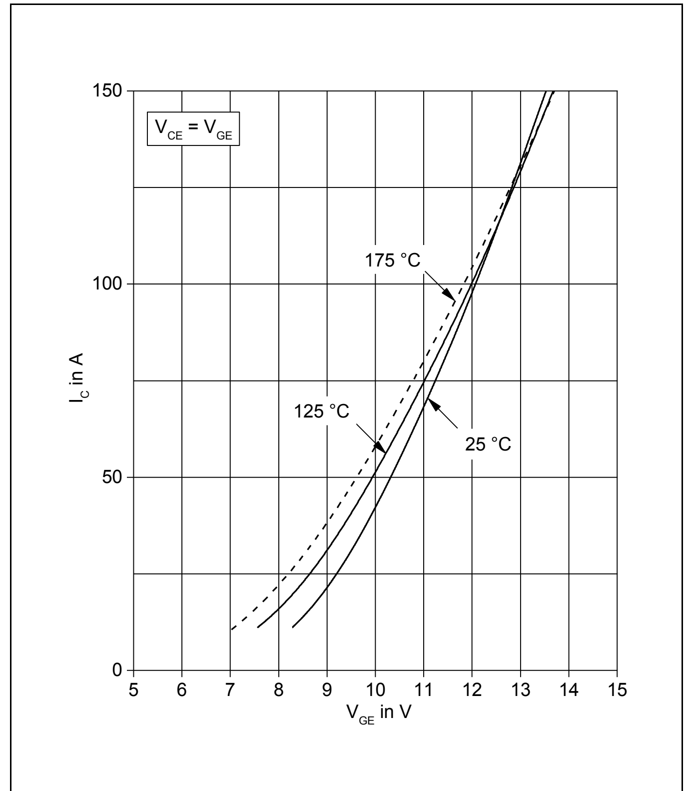


Fig. 2 Typical transfer characteristics, chip level

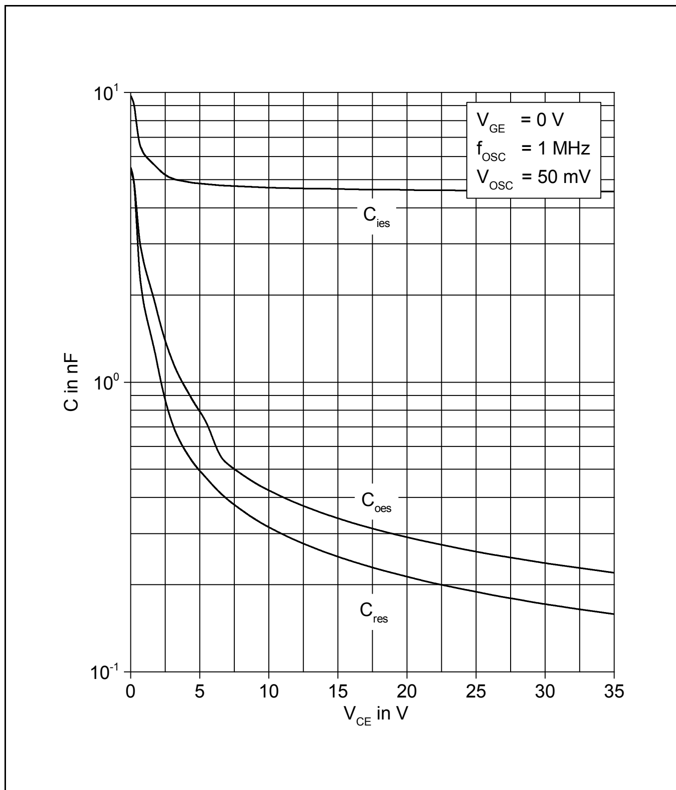


Fig. 3 Typical capacitances vs collector-emitter voltage

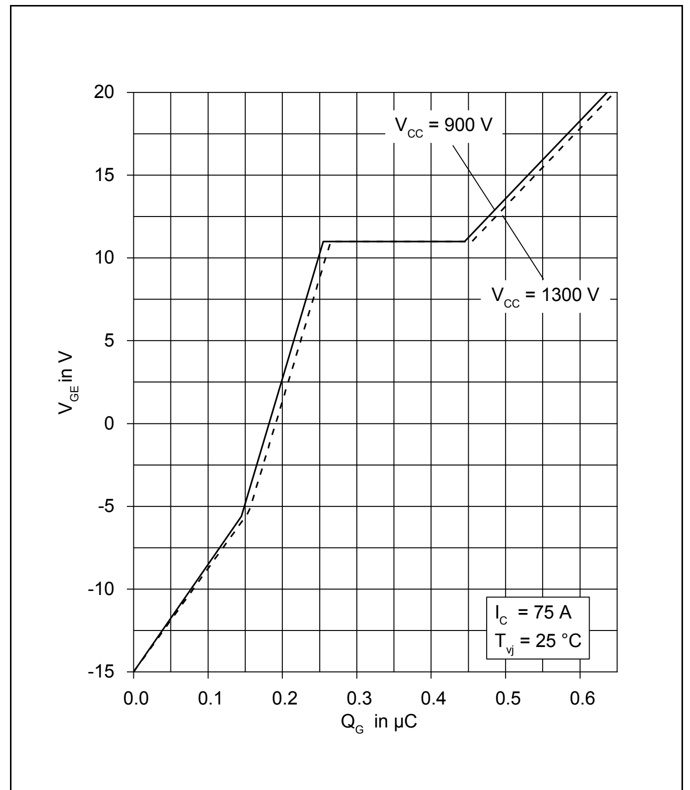


Fig. 4 Typical gate charge characteristics

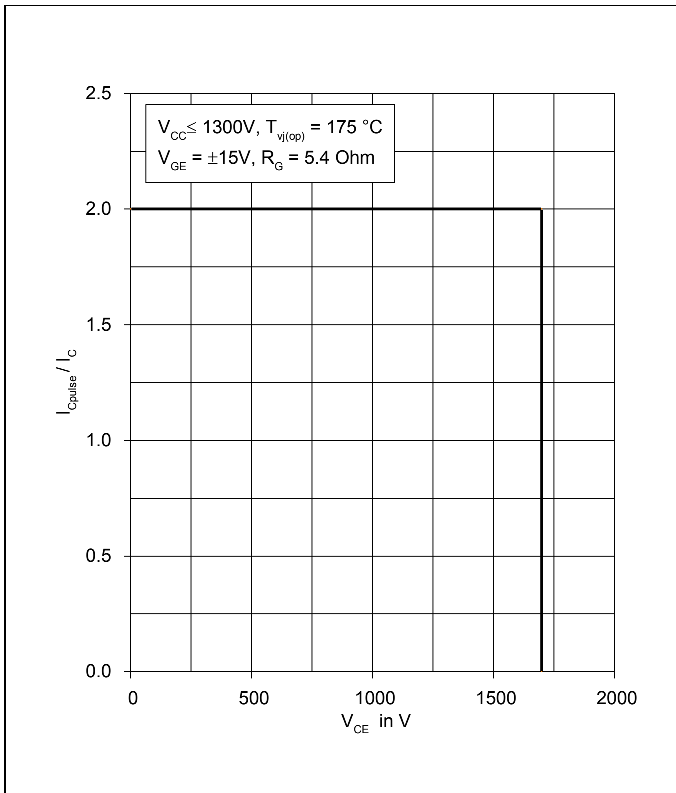


Fig. 5 Safe operation area (RBSOA)

Mechanical properties [3)]

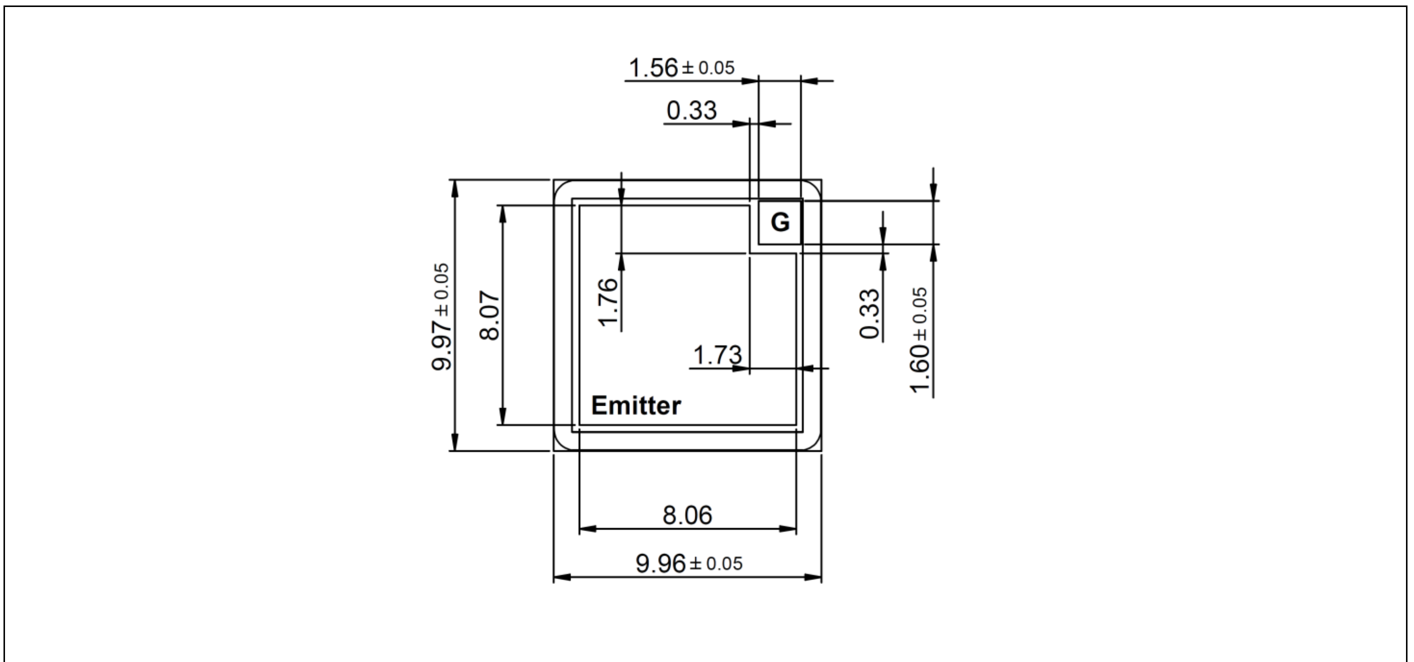
Parameter	Symbol	Conditions	min	Unit
Dimensions	Overall die	L x W	9.96 x 9.97	mm
	exposed front metal	L x W (except gate pad)	8.06 x 8.07	mm
	gate pad	L x W	1.73 x 1.76	mm
	thickness		195 ± 15	µm
Metallization [3)]	front (E)	AlSi1	4	µm
	back (C)	Al / Ti / Ni / Ag	1.6	µm

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

Form of delivery

Description	Part number
Unsawn 6" wafer die	5SMY 76J1732
Sawn 6" wafer die (on blue tape)	5SMY 86J1732

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.VIII.
This product has been designed and qualified for Industrial Level.

Related documents:

5SYA 2042 Failure rates of HiPak modules due to cosmic rays
5SYA 2045 Thermal runaway during blocking
5SYA 2053 Applying IGBT

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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