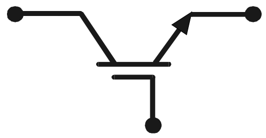
V_{CE} = 1700 V
I_C = 100 A

IGBT-Die

5SMX 12M1701



Die size: 13.6 x 13.6 mm

Doc. No. 5SYA1620-01 July 03

- **Low loss thin IGBT die**
- **Highly rugged SPT design**
- **Large front bondable area**
- **Frontside passivation: 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			100	A
Peak collector current	I_{CM}	Limited by T_{vjmax}		200	A
Gate-emitter voltage	V_{GES}		-20	20	V
IGBT short circuit SOA	t_{psc}	$V_{CC} = 1300$ V, $V_{CEM} \leq 1700$ V $V_{GE} \leq 15$ V, $T_{vj} \leq 125$ °C		10	µs
Junction temperature	T_{vj}		-40	150	°C

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

IGBT characteristic values

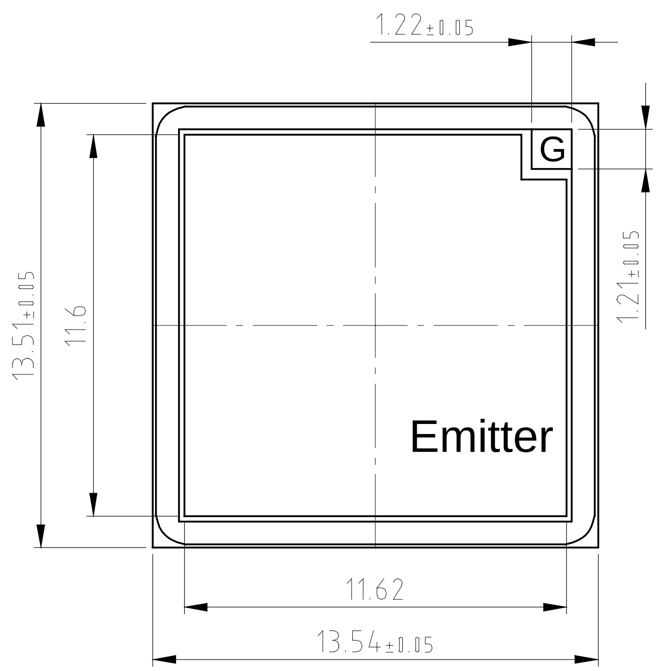
Parameter	Symbol	Conditions		min	typ	max	Unit
Collector (-emitter) breakdown voltage	$V_{(BR)CES}$	V_{GE} = 0 V, I_C = 1 mA, T_{vj} = 25 °C		1700			V
Collector-emitter saturation voltage	$V_{CE\ sat}$	I_C = 100 A, V_{GE} = 15 V	T_{vj} = 25 °C	2.1	2.3	2.7	V
			T_{vj} = 125 °C		2.6		V
Collector cut-off current	I_{CES}	V_{CE} = 1700 V, V_{GE} = 0 V	T_{vj} = 25 °C			100	µA
			T_{vj} = 125 °C		800		µA
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 = 4 mA, V_{CE} = V_{GE}, T_{vj} = 25 °C		4.5		6.5	V
Gate charge	Q_{ge}	I_C = 100 A, V_{CE} = 900 V, V_{GE} = -15 ..15 V			880		nC
Input capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz, T_{vj} = 25 °C			9.5		nF
Output capacitance	C_{oes}				0.64		
Reverse transfer capacitance	C_{res}				0.40		
Internal gate resistance	R_{Gint}				4		Ω
Turn-on delay time	$t_{d(on)}$	V_{CC} = 900 V, I_C = 100 A, R_G = 10 Ω, V_{GE} = ±15 V, L_σ = 160 nH, inductive load	T_{vj} = 25 °C		160		ns
			T_{vj} = 125 °C		170		
Rise time	t_r		T_{vj} = 25 °C		100		ns
			T_{vj} = 125 °C		110		
Turn-off delay time	$t_{d(off)}$	V_{CC} = 900 V, I_C = 100 A, R_G = 10 Ω, V_{GE} = ±15 V, L_σ = 160 nH, inductive load	T_{vj} = 25 °C		400		ns
			T_{vj} = 125 °C		480		
Fall time	t_f		T_{vj} = 25 °C		90		ns
			T_{vj} = 125 °C		110		
Turn-on switching energy	E_{on}	V_{CC} = 900 V, I_C = 100 A, V_{GE} = ±15 V, R_G = 10 Ω, L_σ = 160 nH, inductive load, FWD: 5SLX12H1700	T_{vj} = 25 °C		22		mJ
			T_{vj} = 125 °C		32		
Turn-off switching energy	E_{off}	V_{CC} = 900 V, I_C = 100 A, V_{GE} = ±15 V, R_G = 10 Ω, L_σ = 160 nH, inductive load	T_{vj} = 25 °C		17		mJ
			T_{vj} = 125 °C		27		
Short circuit current	I_{SC}	t_{psc} ≤ 10 µs, V_{GE} = 15 V, T_{vj} = 125 °C, V_{CC} = 1300 V, V_{CEM} ≤ 1700 V			470		A

Mechanical properties

Parameter				Unit
Dimensions	Overall die	L x W	13.6 x 13.6	mm
	exposed front metal	L x W (except gate pad)	11.6 x 11.6	mm
	gate pad	L x W	1.2 x 1.2	mm
	thickness		210 ± 15	µm
Metallization [1)]	front	AlSi1	4	µm
	back	Al / Ti / Ni / Ag	1.2	µm

1) For assembly instructions refer to : IGBT and Diode chips from ABB Switzerland Ltd, Semiconductors, Doc. No. 5SYA2033-01 April 02.

Outline drawing



Note: all dimensions are shown in mm

This is an electrostatic sensitive device, please observe the international standard IEC 60747-1, Chap. IX.

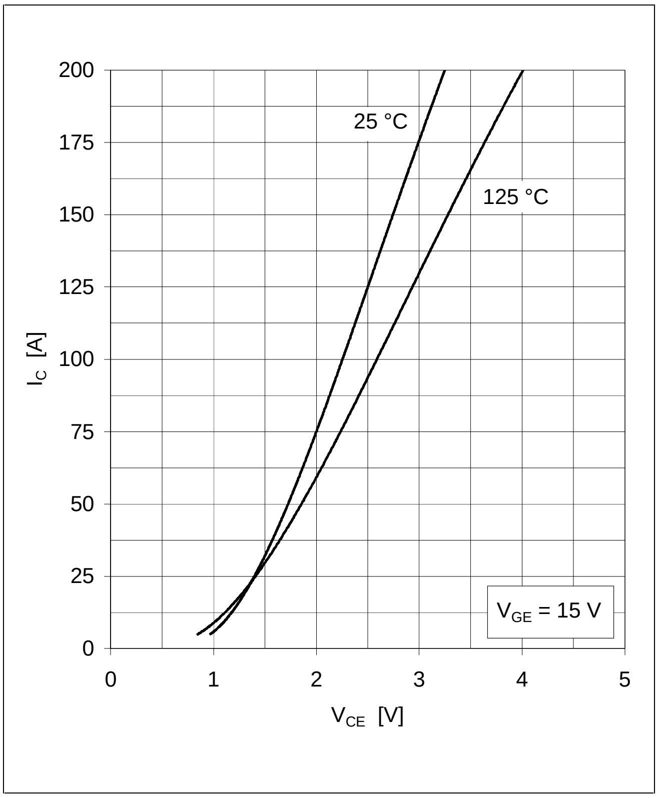


Fig. 1 Typical onstate characteristics

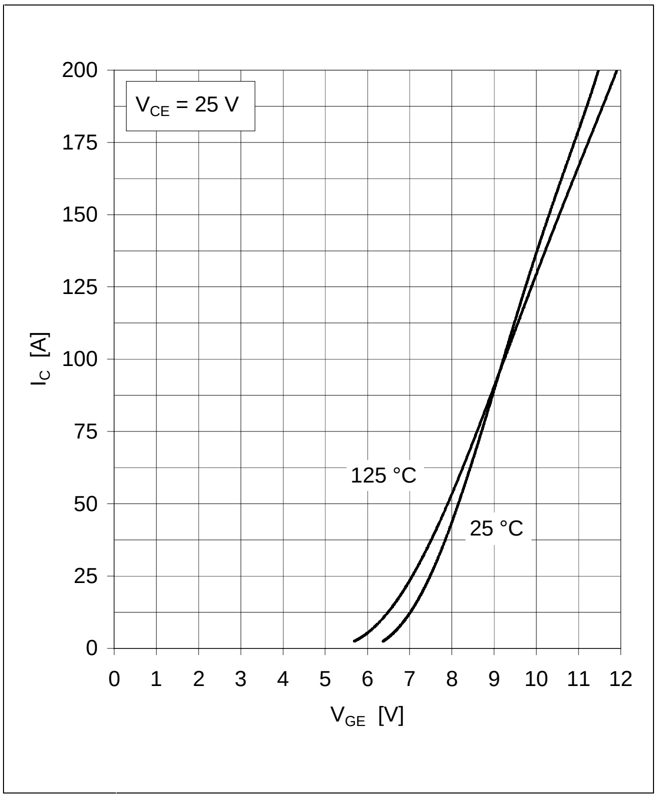


Fig. 2 Typical transfer characteristics

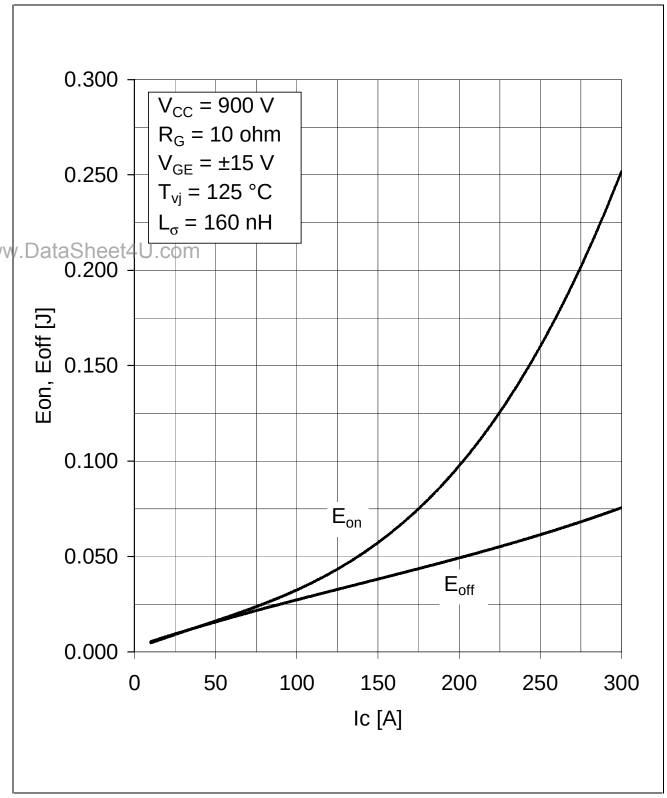


Fig. 3 Typical switching characteristics vs collector current

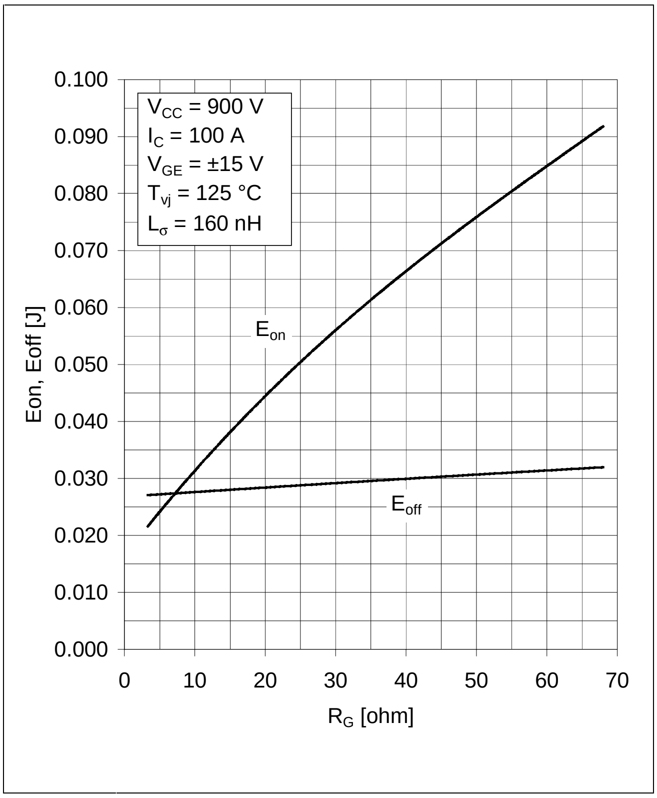


Fig. 4 Typical switching characteristics vs gate resistor

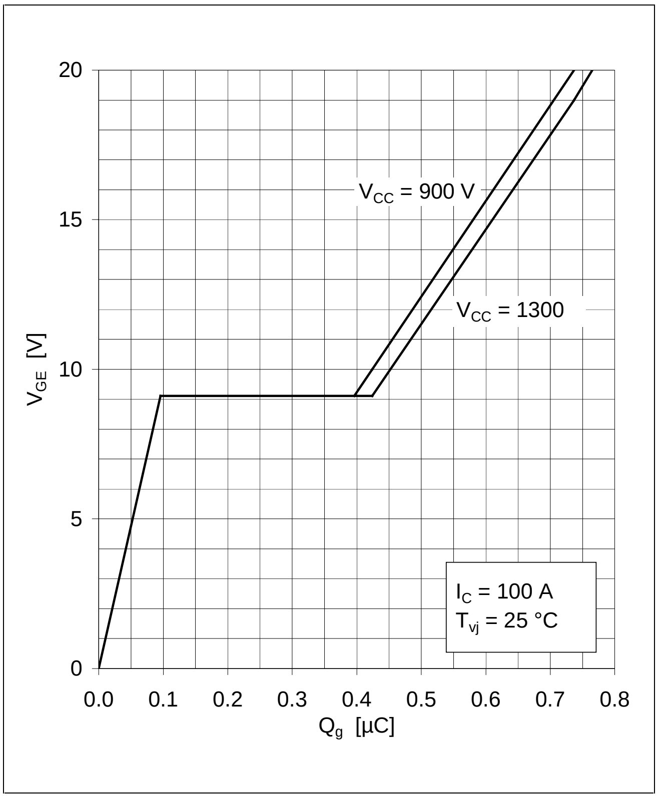


Fig. 5 Typical gate charge characteristics

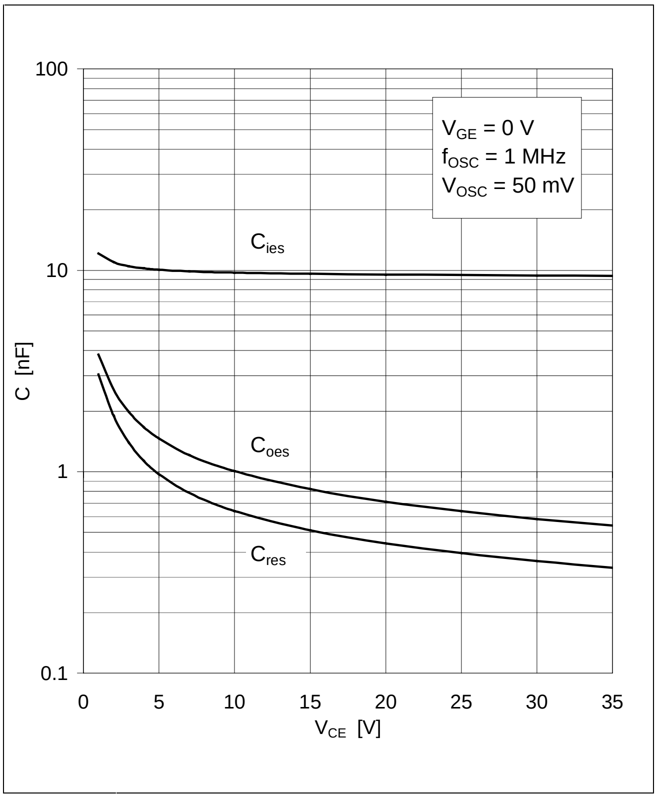


Fig. 6 Typical capacitances vs collector-emitter voltage

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