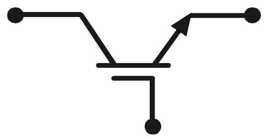
V_{CE} = 6500 V
I_C = 25 A

IGBT-Die

5SMX 12M6500

PRELIMINARY



Die size: 13.6 x 13.6 mm

Doc. No. 5SYA1627-01 Sep 05

- **Low loss, rugged SPT technology**
- **Smooth switching for good EMC**
- **Large bondable emitter area**
- **Passivation: SIPOS and 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		6500	V
DC collector current	I_C			25	A
Peak collector current	I_{CM}	Limited by T_{vjmax}		50	A
Gate-emitter voltage	V_{GES}		-20	20	V
IGBT short circuit SOA	t_{psc}	$V_{CC} = 4400$ V, $V_{CEM} \leq 6500$ V $V_{GE} \leq 15$ V, $T_{vj} \leq 125$ °C		10	µs
Junction temperature	T_{vj}		-40	125	°C

[1)] Maximum rated values indicate limits beyond which damage to the device may occur per IEC 60747 - 9

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		6500			V
Collector-emitter saturation voltage	$V_{CE\ sat}$	I_C = 25 A, V_{GE} = 15 V	T_{vj} = 25 °C		4.2		V
			T_{vj} = 125 °C		5.4		V
Collector cut-off current	I_{CES}	V_{CE} = 6500 V, V_{GE} = 0 V	T_{vj} = 25 °C		10		µA
			T_{vj} = 125 °C			4000	µA
Gate leakage current	I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V, T_{vj} = 125 °C		-200		200	nA
Gate-emitter threshold voltage	$V_{GE(TO)}$	I_C = 10 mA, V_{CE} = V_{GE}, T_{vj} = 25 °C		6		8	V
Gate charge	Q_{ge}	I_C = 25 A, V_{CE} = 3600 V, V_{GE} = -15 ..15 V			400		nC
Input capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz, T_{vj} = 25 °C			6.28		nF
Output capacitance	C_{oes}				0.38		
Reverse transfer capacitance	C_{res}				0.06		
Internal gate resistance	R_{Gint}				5		Ω
Turn-on delay time	$t_{d(on)}$	V_{CC} = 3600 V, I_C = 25 A, R_G = 82 Ω, V_{GE} = ±15 V, L_σ = 6800 nH, inductive load	T_{vj} = 25 °C		690		ns
			T_{vj} = 125 °C		550		
Rise time	t_r		T_{vj} = 25 °C		340		ns
			T_{vj} = 125 °C		270		
Turn-off delay time	$t_{d(off)}$	V_{CC} = 3600 V, I_C = 25 A, R_G = 56 Ω, V_{GE} = ±15 V, L_σ = 6800 nH, inductive load	T_{vj} = 25 °C		1430		ns
			T_{vj} = 125 °C		1450		
Fall time	t_f		T_{vj} = 25 °C		540		ns
			T_{vj} = 125 °C		690		
Turn-on switching energy	E_{on}	V_{CC} = 3600 V, I_C = 25 A, V_{GE} = ±15 V, R_G = 82 Ω, L_σ = 6800 nH, inductive load, FWD: ½ 5SLX12M6500	T_{vj} = 25 °C		180		mJ
			T_{vj} = 125 °C		200		
Turn-off switching energy	E_{off}	V_{CC} = 3600 V, I_C = 25 A, V_{GE} = ±15 V, R_G = 56 Ω, L_σ = 6800 nH, inductive load	T_{vj} = 25 °C		85		mJ
			T_{vj} = 125 °C		130		
Short circuit current	I_{SC}	t_{psc} ≤ 10 µs, V_{GE} = 15 V, T_{vj} = 125 °C, V_{CC} = 4400 V, V_{CEM} ≤ 6500 V			110		A

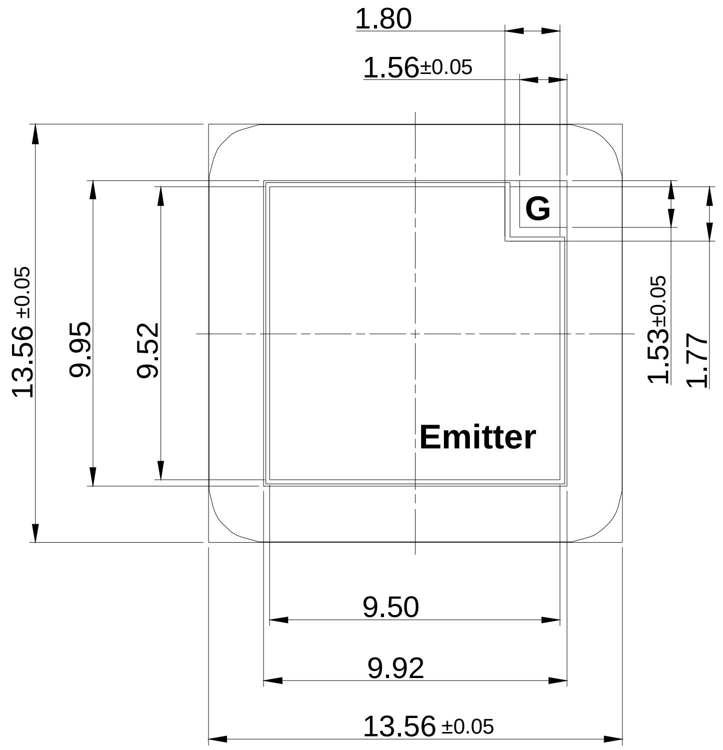
[2)] Characteristic values according to IEC 60747 - 9

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)	9.52 x 9.5	mm
	gate pad	L x W	1.56 x 1.53	mm
	thickness		670 ± 20	µm
Metallization [3]	front (E)	AlSi1	4	µm
	back (C)	AlSi1 + TiNiAg	1.8 + 1.2	µm

[3] For assembly instructions refer to : IGBT and Diode chips from ABB Switzerland Ltd, Semiconductors, Doc. No. 5SYA 2033.

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.

This product has been designed and qualified for Industrial Level.

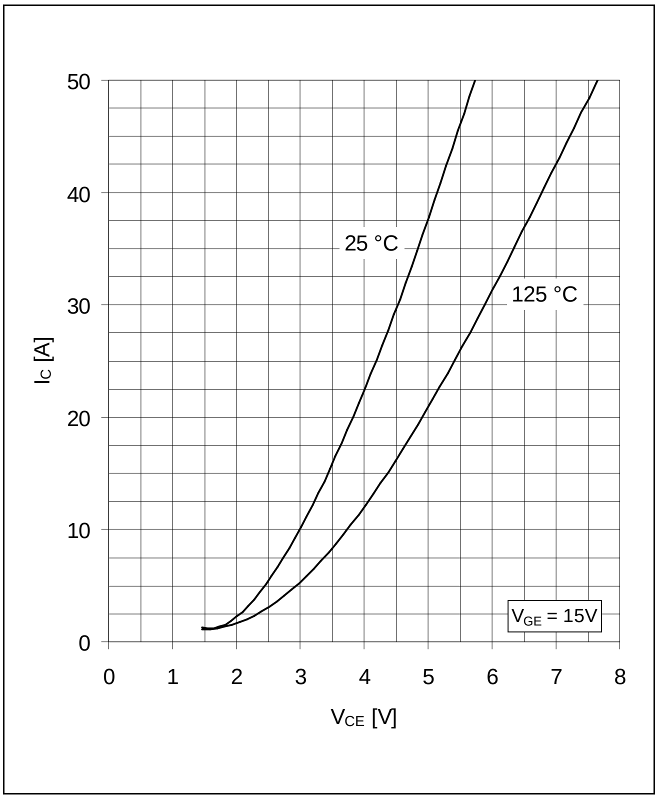


Fig. 1 Typical on-state characteristics

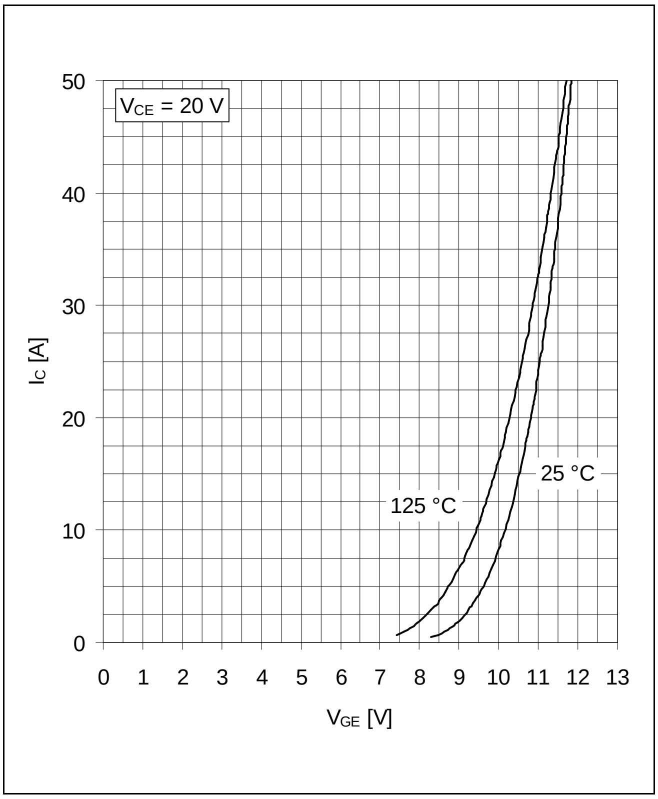


Fig. 2 Typical transfer characteristics

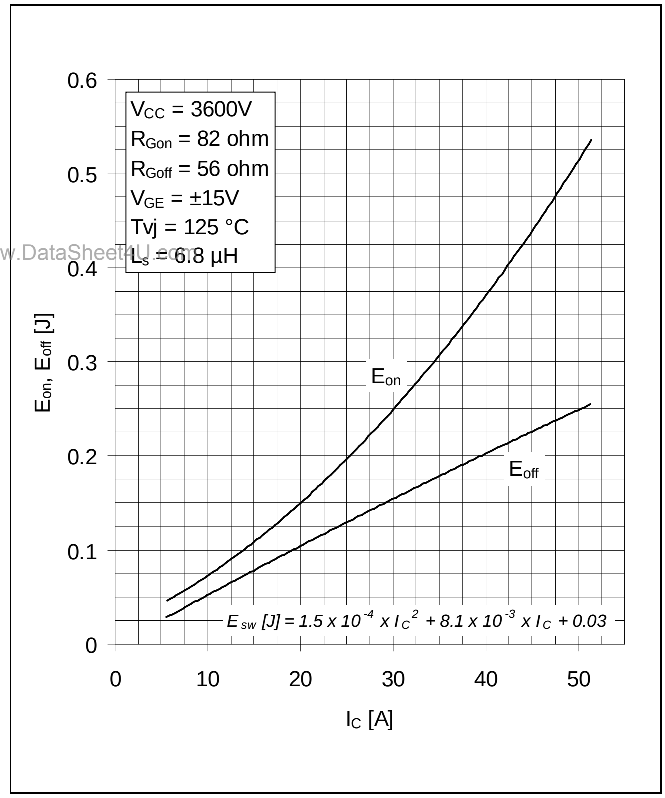


Fig. 3 Typical switching characteristics vs collector current

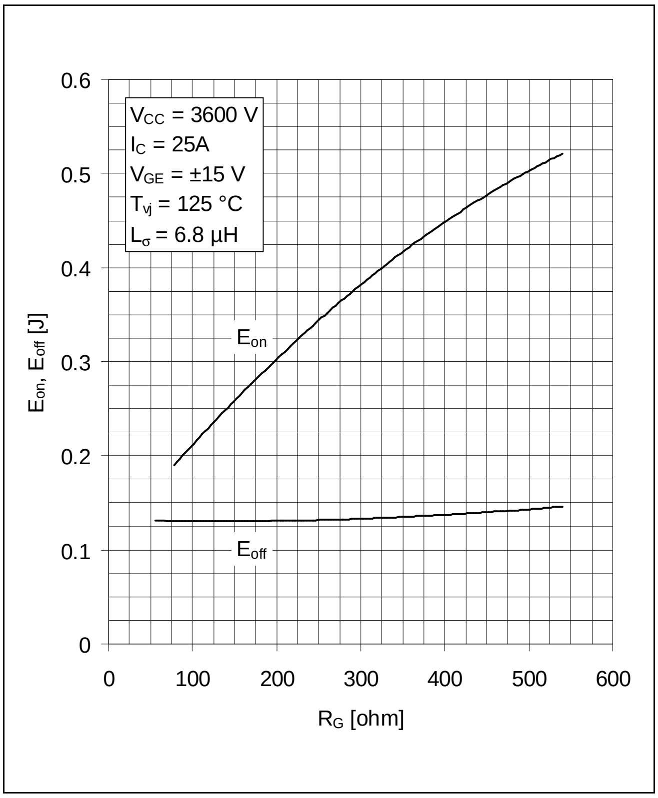


Fig. 4 Typical switching characteristics vs gate resistor

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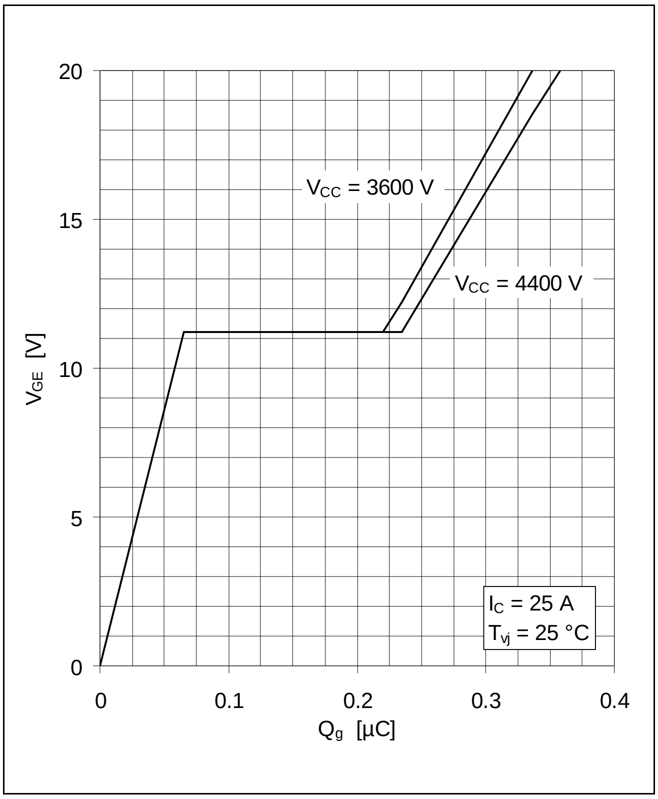

Fig. 5 Typical gate charge characteristics

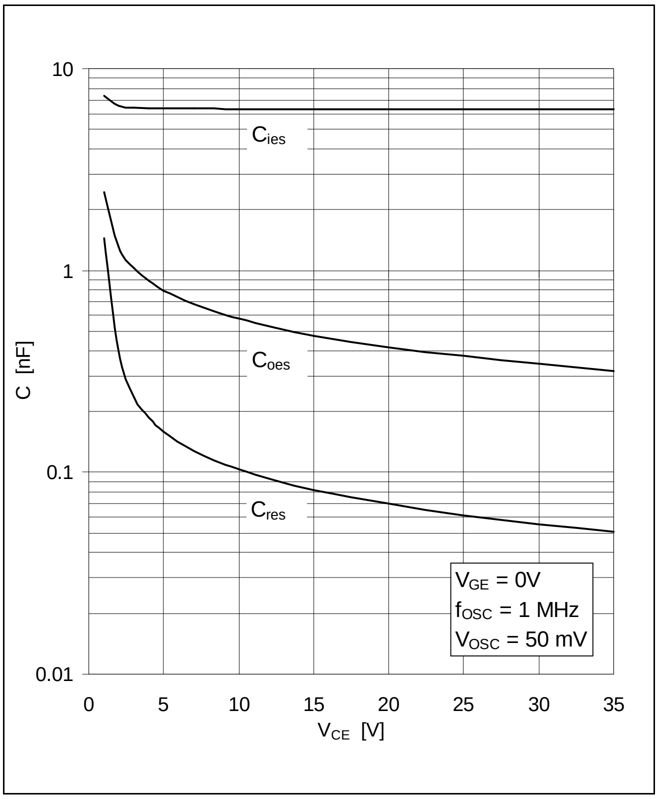

Fig. 6 Typical capacitances vs collector-emitter voltage

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

Telephone +41 (0)58 586 1419
Fax +41 (0)58 586 1306
Email abbsem@ch.abb.com
Internet www.abb.com/semiconductors