V_{CE} = 1200 V

I_C = 57 A

IGBT-Die

5SMY 12H1280

Die size: 9.1 x 9.1 mm

Doc. No. 5SYA 1320-01 Nov 10

- **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		1200	V
DC collector current	I_C			57	A
Peak collector current	I_{CM}	Limited by T_{vjmax}		114	A
Gate-emitter voltage	V_{GES}		-20	20	V
IGBT short circuit SOA	t_{psc}	V_{CC} = 900 V, $V_{CEM} \leq 1200$ 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 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		1200			V
Collector-emitter saturation voltage	$V_{CE\ sat}$	I_C = 57 A, V_{GE} = 15 V	T_{vj} = 25 °C		1.9		V
			T_{vj} = 125 °C		2.1		V
Collector cut-off current	I_{CES}	V_{CE} = 1200 V, V_{GE} = 0 V	T_{vj} = 25 °C			100	µA
			T_{vj} = 125 °C		50		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 = 2 mA, V_{CE} = V_{GE}, T_{vj} = 25 °C		5		7	V
Gate charge	Q_{ge}	I_C = 57 A, V_{CE} = 600 V, V_{GE} = -15 ..15 V			611		nC
Input capacitance	C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz, T_{vj} = 25 °C			4.29		nF
Output capacitance	C_{oes}				0.30		
Reverse transfer capacitance	C_{res}				0.20		
Internal gate resistance	R_{Gint}				10		Ω
Turn-on delay time	$t_{d(on)}$	V_{CC} = 600 V, I_C = 57 A, R_G = 18 Ω, V_{GE} = ±15 V, L_σ = 60 nH, inductive load	T_{vj} = 25 °C		320		ns
			T_{vj} = 125 °C		345		
Rise time	t_r		T_{vj} = 25 °C		70		ns
			T_{vj} = 125 °C		70		
Turn-off delay time	$t_{d(off)}$	V_{CC} = 600 V, I_C = 57 A, R_G = 18 Ω, V_{GE} = ±15 V, L_σ = 60 nH, inductive load	T_{vj} = 25 °C		485		ns
			T_{vj} = 125 °C		560		
Fall time	t_f		T_{vj} = 25 °C		55		ns
			T_{vj} = 125 °C		70		
Turn-on switching energy	E_{on}	V_{CC} = 600 V, I_C = 57 A, V_{GE} = ±15 V, R_G = 18 Ω, L_σ = 60 nH, inductive load, FWD: 5SLY 12E1200	T_{vj} = 25 °C		7.7		mJ
			T_{vj} = 125 °C		10.1		
Turn-off switching energy	E_{off}	V_{CC} = 600 V, I_C = 57 A, V_{GE} = ±15 V, R_G = 18 Ω, L_σ = 60 nH, inductive load	T_{vj} = 25 °C		3.5		mJ
			T_{vj} = 125 °C		5.8		
Short circuit current	I_{SC}	t_{psc} ≤ 10 µs, V_{GE} = 15 V, T_{vj} = 125 °C, V_{CC} = 900 V, V_{CEM} ≤ 1200 V			270		A

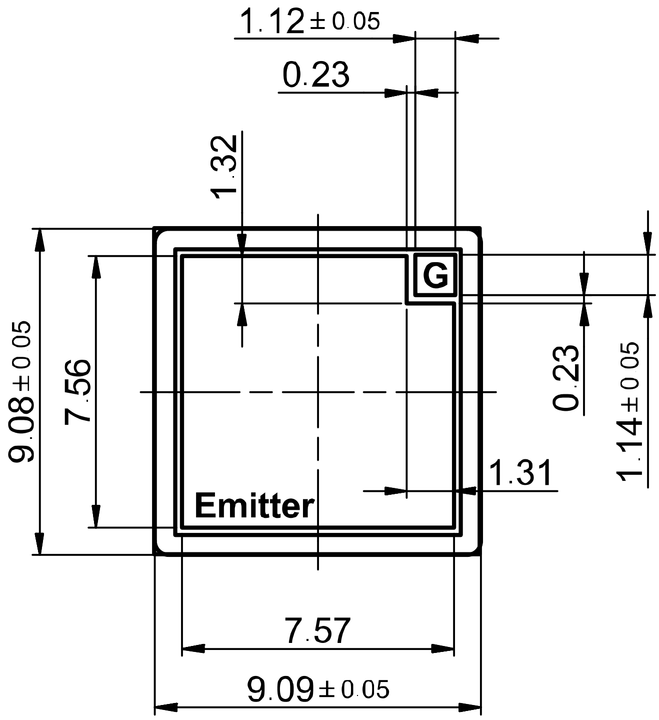
[2)] Characteristic values according to IEC 60747 - 9

Mechanical properties

Parameter				Unit
Dimensions	Overall die	L x W	9.1 x 9.1	mm
	exposed front metal	L x W (except gate pad)	7.57 x 7.56	mm
	gate pad	L x W	1.12 x 1.14	mm
	thickness		140 ± 20	µm
Metallization [3]	front (E)	AlSi1	4	µm
	back (C)	Al / Ti / Ni / Ag	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.

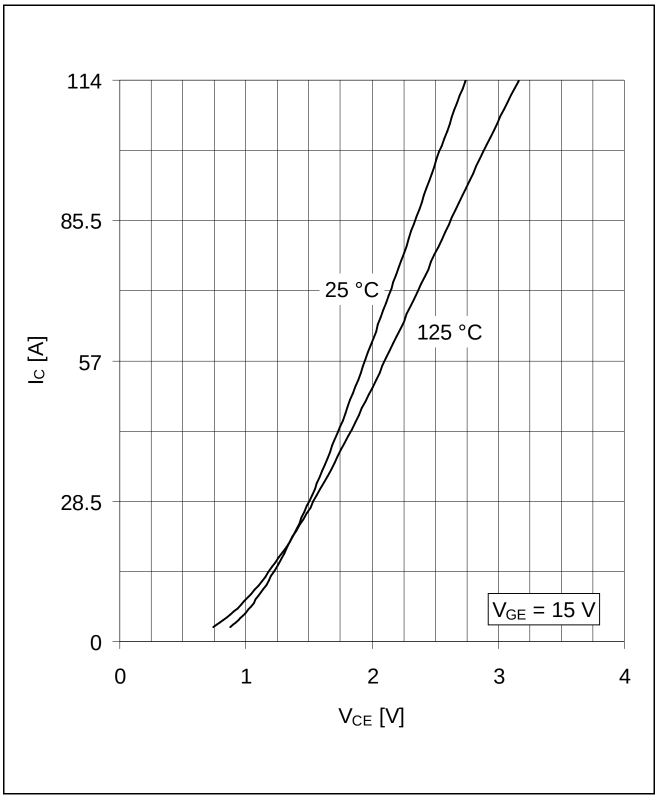


Fig. 1 Typical on-state characteristics

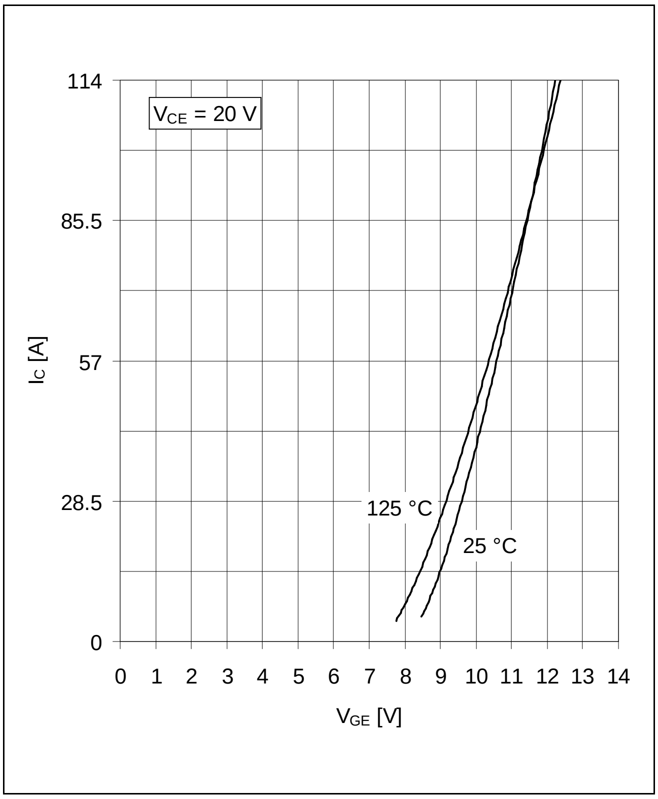


Fig. 2 Typical transfer characteristics

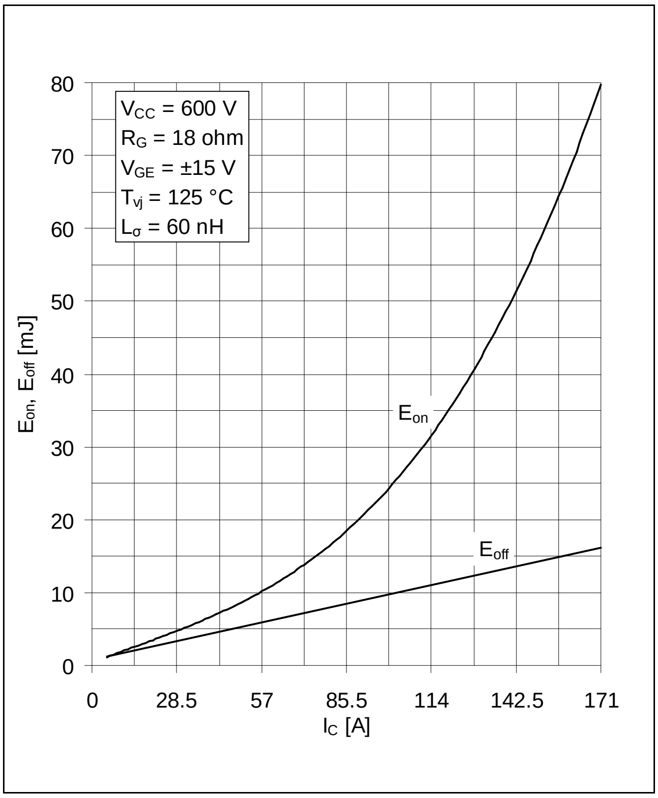


Fig. 3 Typical switching characteristics vs collector current

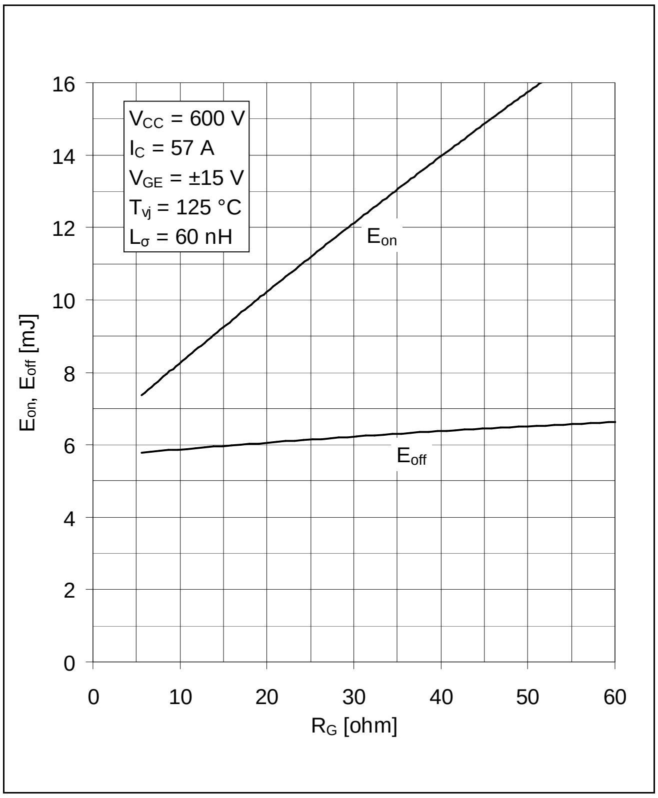


Fig. 4 Typical switching characteristics vs gate resistor

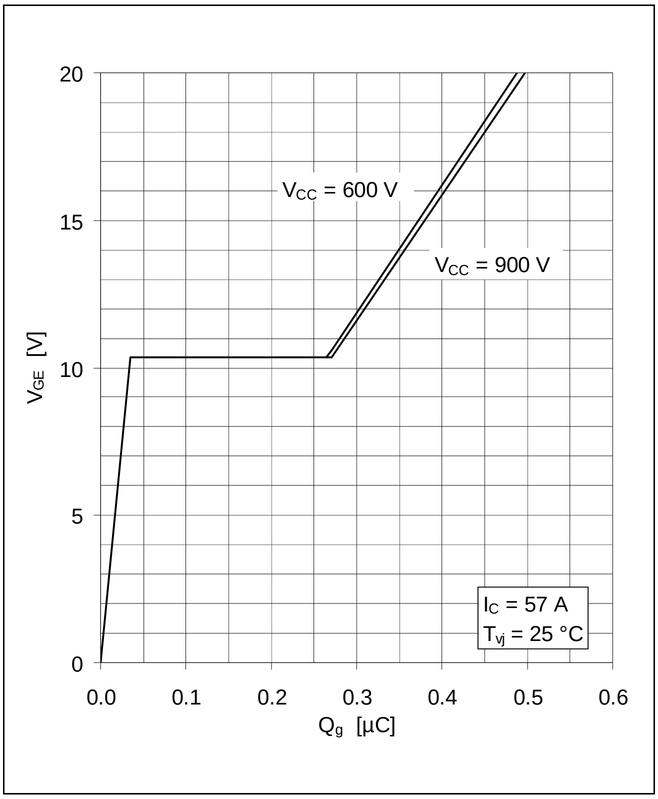


Fig. 5 Typical gate charge characteristics

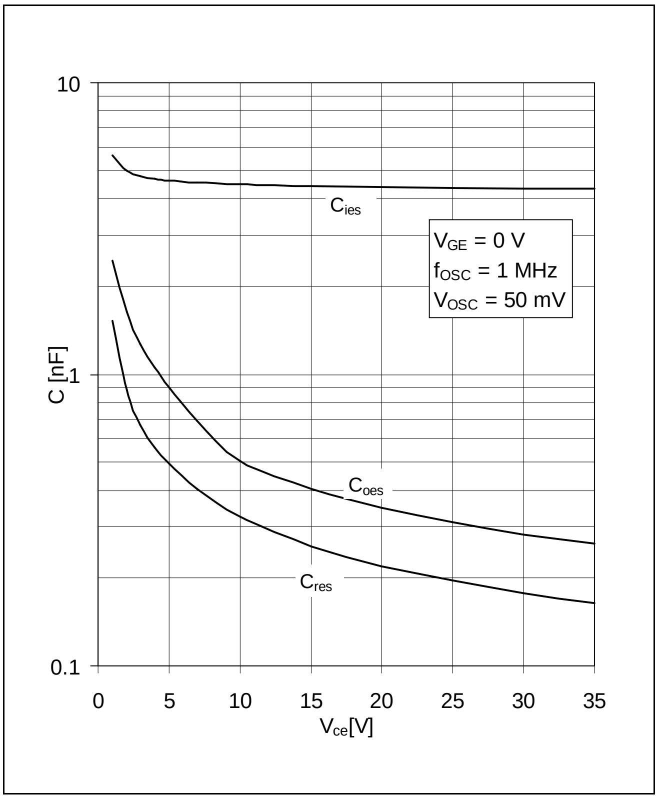


Fig. 6 Typical capacitances vs collector-emitter voltage

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