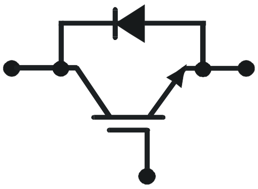
V_{CE} = 2500 V
I_C = 1200 A

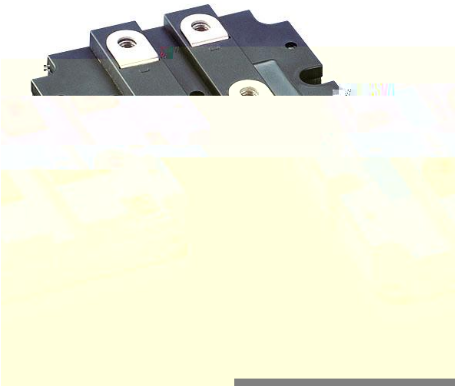
ABB HiPak™



IGBT Module
5SNA 1200E250100

Doc. No. 5SYA 1557-02 July 04

- **Low-loss, rugged SPT chip-set**
- **Smooth switching SPT chip-set for good EMC**
- **Industry standard package**
- **High power density**
- **AlSiC base-plate for high power cycling capability**
- **AlN substrate for low thermal resistance**



Maximum rated values [1]

Parameter	Symbol	Conditions	min	max	Unit
Collector-emitter voltage	V_{CES}	V_{GE} = 0 V		2500	V
DC collector current	I_C	T_c = 80 °C		1200	A
Peak collector current	I_{CM}	t_p = 1 ms, T_c = 80 °C		2400	A
Gate-emitter voltage	V_{GES}		-20	20	V
Total power dissipation	P_{tot}	T_c = 25 °C, per switch (IGBT)		11000	W
DC forward current	I_F			1200	A
Peak forward current	I_{FRM}			2400	A
Surge current	I_{FSM}	V_R = 0 V, T_{vj} = 125 °C, t_p = 10 ms, half-sinewave		11000	A
IGBT short circuit SOA	t_{psc}	V_{CC} = 1900 V, $V_{CEM\,CHIP} \leq 2500$ V $V_{GE} \leq 15$ V, $T_{vj} \leq 125$ °C		10	µs
Isolation voltage	V_{isol}	1 min, f = 50 Hz		5000	V
Junction temperature	T_{vj}			150	°C
Junction operating temperature	$T_{vj(op)}$		-40	125	°C
Case temperature	T_c		-40	125	°C
Storage temperature	T_{stg}		-40	125	°C
Mounting torques [2]	M_1	Base-heatsink, M6 screws	4	6	Nm
	M_2	Main terminals, M8 screws	8	10	
	M_3	Auxiliary terminals, M4 screws	2	3	

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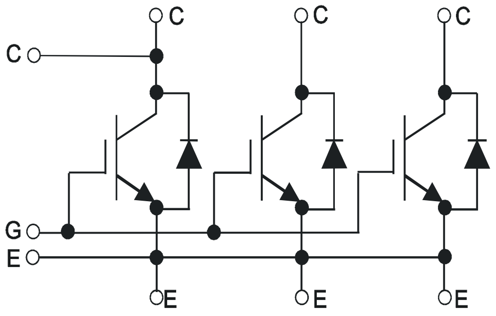
[1] Maximum rated values indicate limits beyond which damage to the device may occur per IEC 60747
[2] For detailed mounting instructions refer to ABB Document No. 5SYA2039

Diode characteristic values [5)]

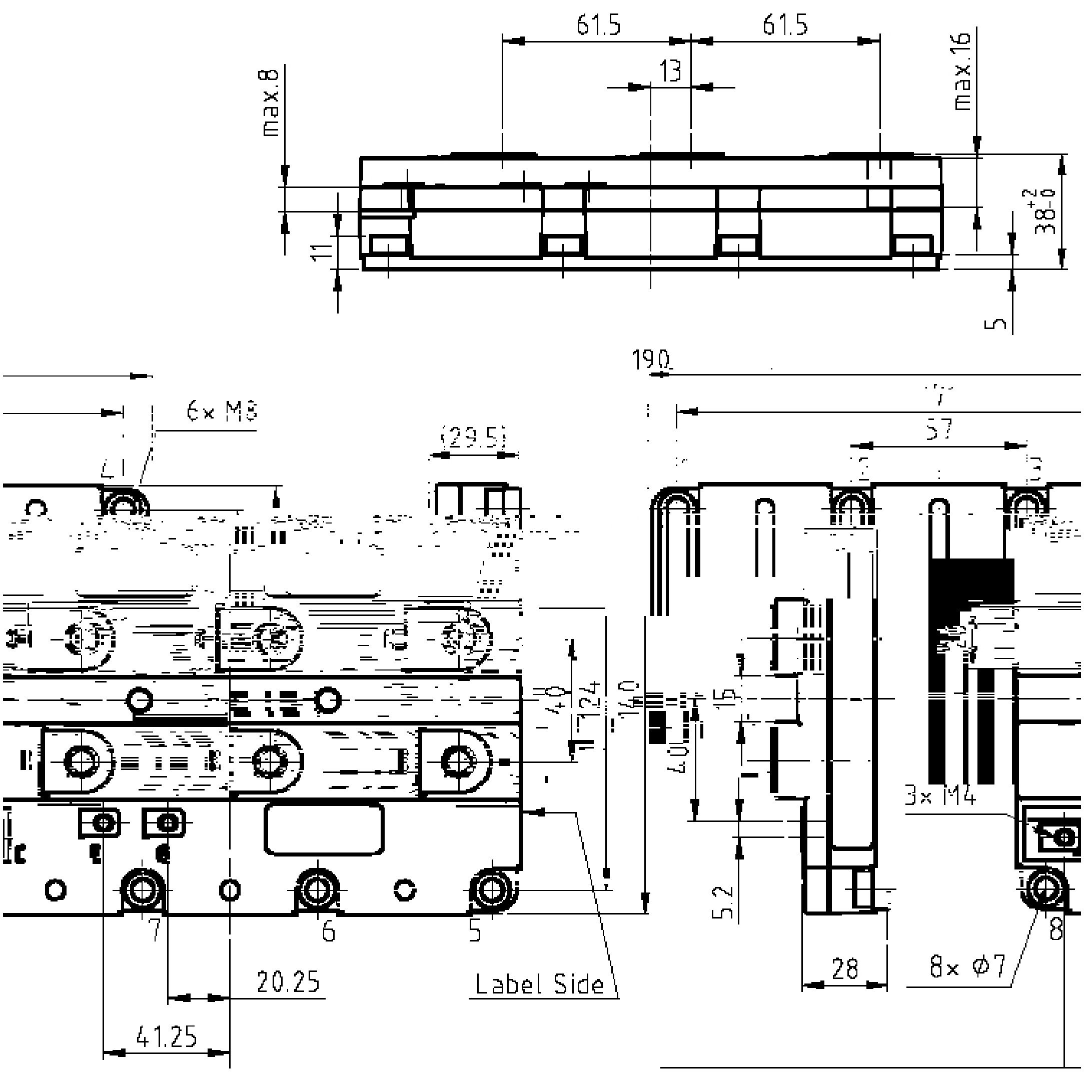
Parameter	Symbol	Conditions		min	typ	max	Unit
Forward voltage [6)]	V_F	I_F = 1200 A	T_{vj} = 25 °C	1.5	1.75	2.0	V
			T_{vj} = 125 °C	1.4	1.8	2.0	
Reverse recovery current	I_{rr}		T_{vj} = 25 °C		965		A
			T_{vj} = 125 °C		1180		

[redacted]

Electrical configuration



Outline drawing [2]



Note: all dimensions are shown in mm

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[2] 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. IX.

This product has been designed and qualified for Industrial Level.

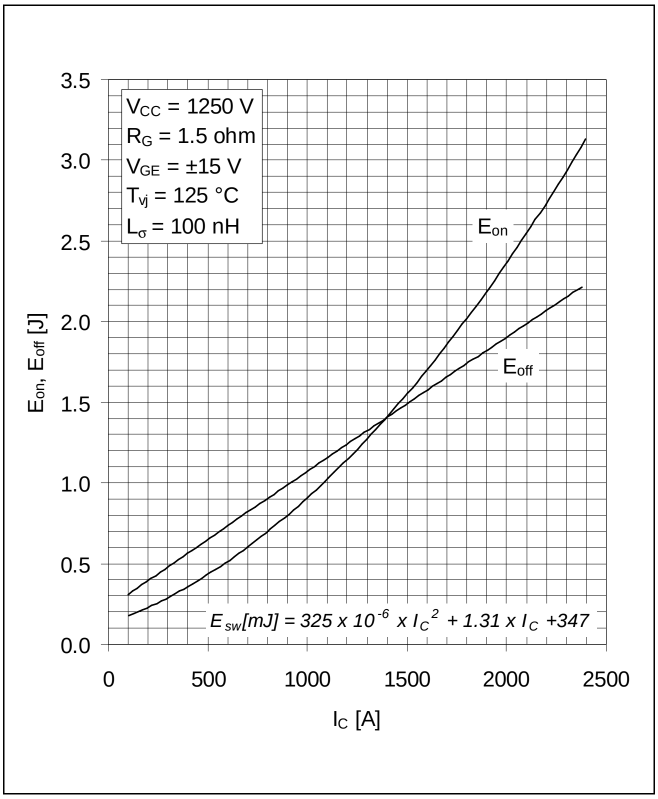


Fig. 5 Typical switching energies per pulse vs collector current

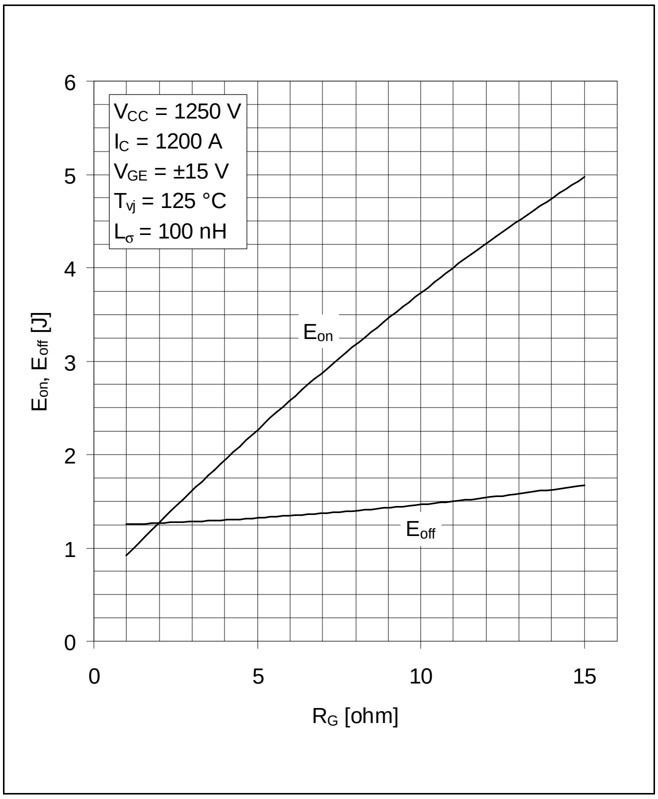
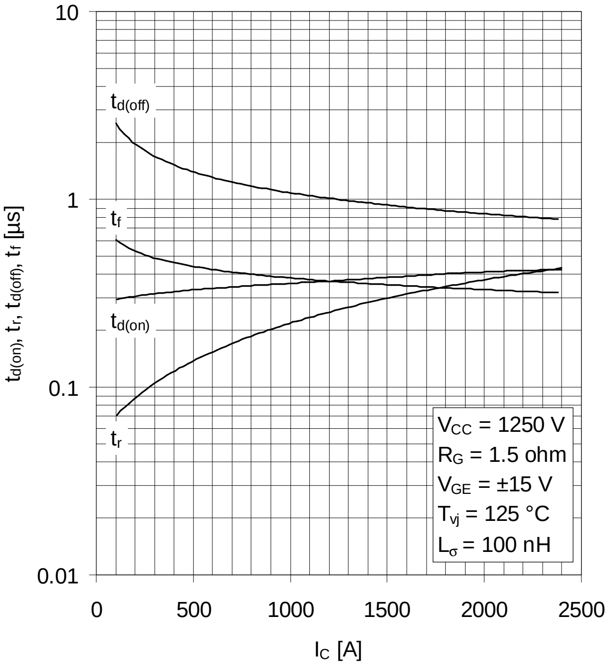
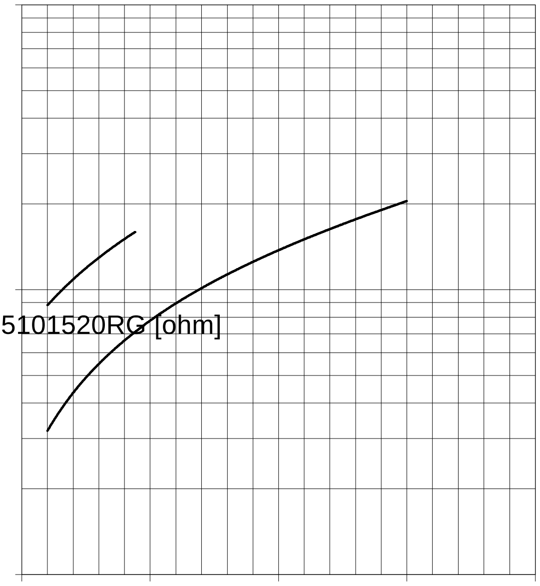


Fig. 6 Typical switching energies per pulse vs gate resistor





0.111005101520RG [ohm]

td(on)td(off)trtfVCC = 1250 VIC = 1200 AVGE = .6115 VTvj = 125 .60CLs = 10

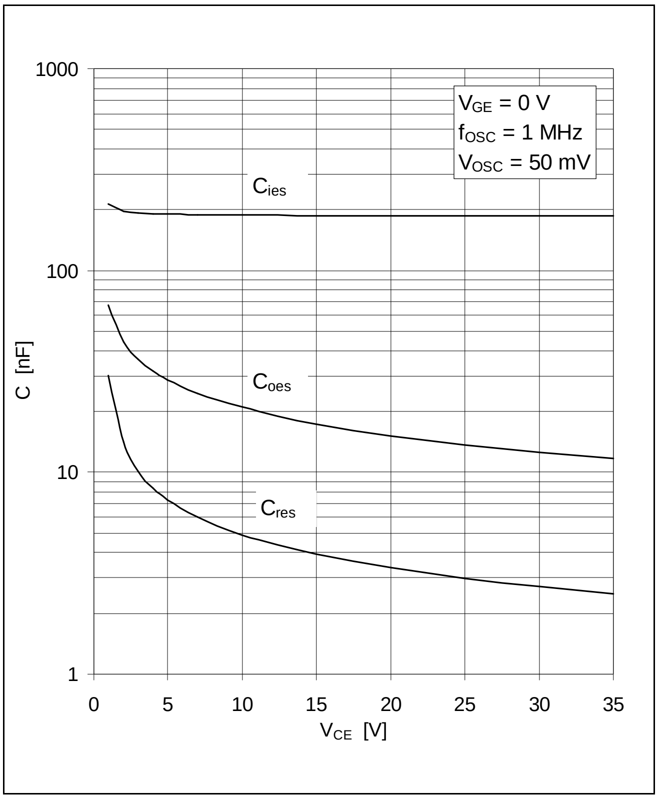


Fig. 9 Typical capacitances vs collector-emitter voltage

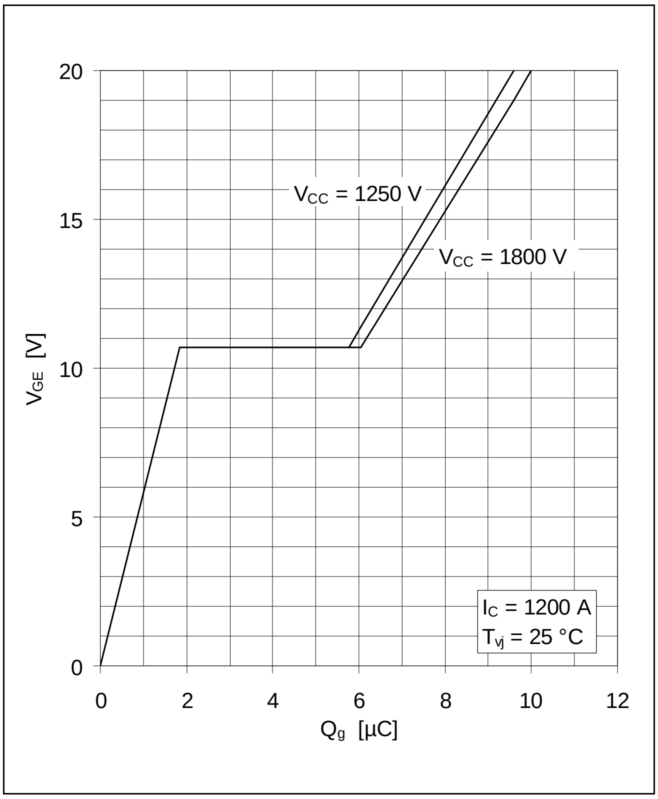


Fig. 10 Typical gate charge characteristics

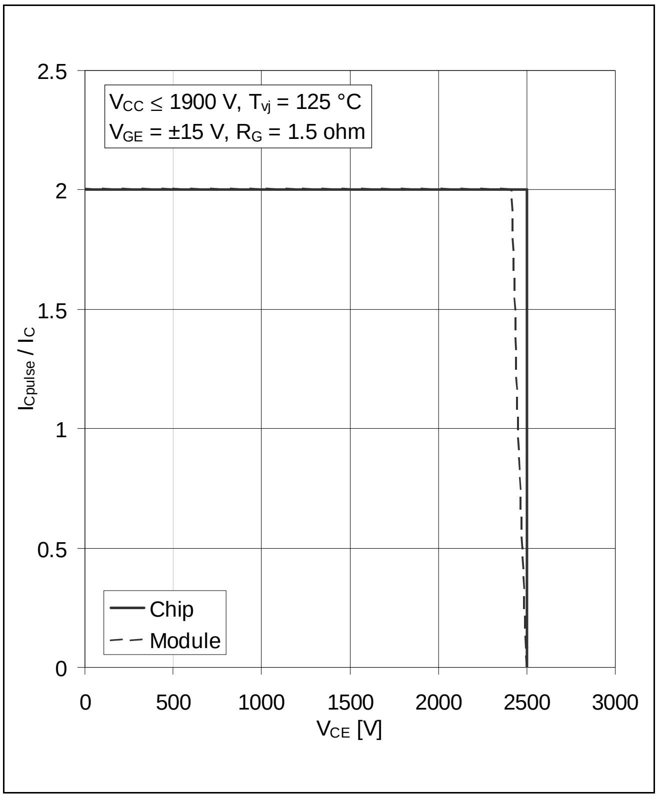
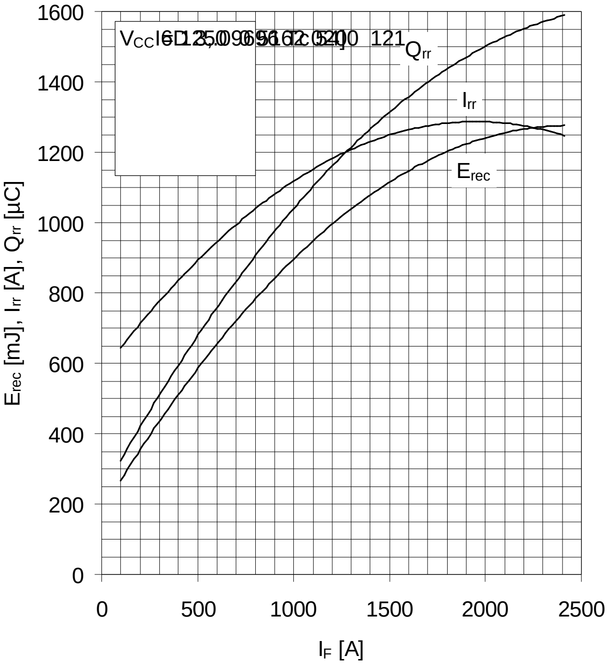


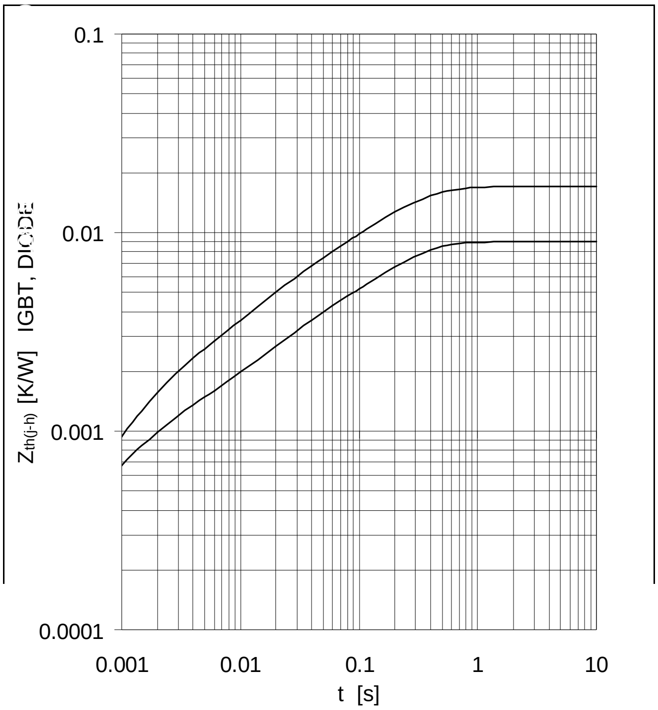
Fig. 11 Turn-off safe operating area (RBSOA)



3000
1900 V
C

R
1200160020002400280005001000150020002500 3000V

400800



Analytical function for transient thermal impedance:

$$Z_{th\,(j-c)}(t) = \sum_{i=1}^{n} R_i \left(1 - e^{-t/\tau_i}\right)$$

	i	1	2	3	4	5
IGBT	R_i(K/kW)	6.287	1.685	0.685	0.337	
	τ_i(ms)	194.7	20.4	1.98	0.52	
DIODE	R_i(K/kW)	11.54	2.92	1.28	1.27	
	τ_i(ms)	203.4	29.3	6.96	1.5	

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