

# 5SLD 1000N330300

## HiPak DIODE Module

$$V_{RRM} = 3300 \text{ V}$$

$$I_F = 2 \times 1000 \text{ A}$$

Ultra low-loss, rugged SPT+ diode  
 Smooth switching SPT+ diode for good EMC  
 AlSiC base-plate for high power cycling capability  
 AlN substrate for low thermal resistance  
 2 diodes in 1 package  
 Improved high reliability package



### Maximum rated values <sup>1)</sup>

Parameter	Symbol	Conditions	min	max	Unit
Repetitive peak reverse voltage	$V_{RRM}$	$T_{vj} \geq 25 \text{ }^\circ\text{C}$		3300	V
DC forward current	$I_F$			1000	A
Peak forward current	$I_{FRM}$	$t_p = 1 \text{ ms}$ , per Diode		2000	A
Total power dissipation	$P_{tot}$	$T_C = 25 \text{ }^\circ\text{C}$ , $T_{vj} = 150 \text{ }^\circ\text{C}$ , per Diode		4900	W
Surge current	$I_{FSM}$	$V_R = 0 \text{ V}$ , $T_{vj} = 150 \text{ }^\circ\text{C}$ , $t_p = 10 \text{ ms}$ , half-sinewave, per Diode		9000	A
Isolation voltage	$V_{isol}$	1 min, $f = 50 \text{ Hz}$		6000	V
Junction temperature	$T_{vj}$			175	$^\circ\text{C}$
Junction operating temperature	$T_{vj(op)}$		-50	150	$^\circ\text{C}$
Case temperature	$T_C$		-50	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-50	125	$^\circ\text{C}$
Mounting torques <sup>2)</sup>	$M_s$	Base-heatsink, M6 screws	4	6	Nm
	$M_{t1}$	Main terminals, M8 screws	8	10	

<sup>1)</sup> Maximum rated values indicate limits beyond which damage to the device may occur per IEC 60747

<sup>2)</sup> For detailed mounting instructions refer to ABB Document No. 5SYA 2039

### Diode characteristic values <sup>3)</sup>

Parameter	Symbol	Conditions	min	typ	max	Unit
Forward voltage <sup>4)</sup>	V <sub>F</sub>	I <sub>F</sub> = 1000 A	T <sub>vj</sub> = 25 °C	2.05	2.5	V
			T <sub>vj</sub> = 125 °C	2.25	2.6	V
			T <sub>vj</sub> = 150 °C	2.20		V
Continuous reverse current	I <sub>R</sub>	V <sub>R</sub> = 3300 V	T <sub>vj</sub> = 25 °C		0.5	mA
			T <sub>vj</sub> = 125 °C	6	12	mA
			T <sub>vj</sub> = 150 °C	30		mA
Reverse recovery current	I <sub>rr</sub>		T <sub>vj</sub> = 25 °C	1010		A
			T <sub>vj</sub> = 125 °C	1180		A
			T <sub>vj</sub> = 150 °C	1230		A
Recovered charge	Q <sub>rr</sub>	V <sub>CC</sub> = 1800 V, I <sub>F</sub> = 1000 A, di/dt = 4 kA/μs L <sub>σ</sub> = 100 nH, inductive load switch: 5SNA 1000N330300 Per Diode	T <sub>vj</sub> = 25 °C	630		μC
			T <sub>vj</sub> = 125 °C	1020		μC
			T <sub>vj</sub> = 150 °C	1180		μC
Reverse recovery time	t <sub>rr</sub>		T <sub>vj</sub> = 25 °C	1125		ns
			T <sub>vj</sub> = 125 °C	1440		ns
			T <sub>vj</sub> = 150 °C	1630		ns
Reverse recovery energy	E <sub>rec</sub>		T <sub>vj</sub> = 25 °C	700		mJ
			T <sub>vj</sub> = 125 °C	1210		mJ
			T <sub>vj</sub> = 150 °C	1420		mJ

<sup>3)</sup> Characteristic values according to IEC 60747 - 2

<sup>4)</sup> Forward voltage is given at chip level

### Package properties <sup>5)</sup>

Parameter	Symbol	Conditions	min	typ	max	Unit
Diode thermal resistance junction to case	R <sub>th(j-c)DIODE</sub>	Per Diode			0.025	K/W
Diode thermal resistance <sup>2)</sup> case to heatsink	R <sub>th(c-s)DIODE</sub>	Per Diode, λ grease = 1W/m x K		0.024		K/W
Comparative tracking index	CTI		600			
Module stray inductance	L <sub>σ AC</sub>	Per Diode		24		nH
Resistance, terminal-chip	R <sub>AA'+CC'</sub>	Per Diode	T <sub>C</sub> = 25 °C	0.166		mΩ
			T <sub>C</sub> = 125 °C	0.226		
			T <sub>C</sub> = 150 °C	0.240		

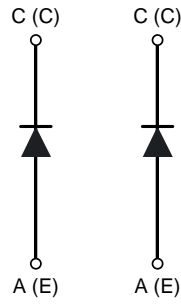
<sup>2)</sup> For detailed mounting instructions refer to ABB Document No. 5SYA 2039

### Mechanical properties <sup>5)</sup>

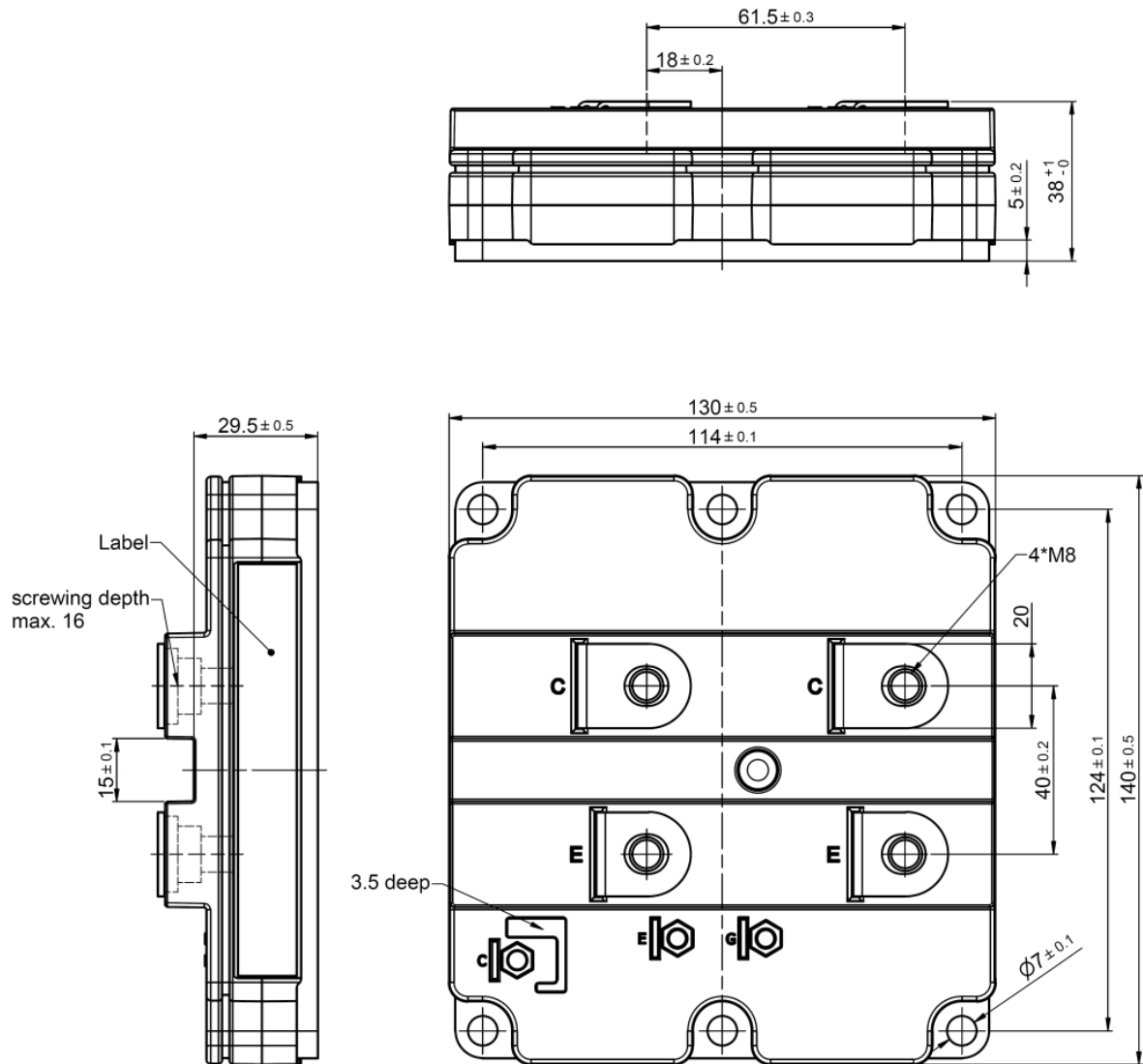
Parameter	Symbol	Conditions	min	typ	max	Unit
Dimensions	L x W x H	Typical		130 x 140 x 38		mm
Clearance distance in air	d <sub>a</sub>	according to IEC 60664-1 and EN 50124-1	Term. to base:	19		mm
			Term. to term:	19		
Surface creepage distance	d <sub>s</sub>	according to IEC 60664-1 and EN 50124-1	Term. to base:	28.2		mm
			Term. to term:	28.2		
Mass	m			790		g

<sup>5)</sup> Package and mechanical properties according to IEC 60747 - 15

## Electrical configuration



## Outline drawing <sup>2)</sup>



Note: all dimensions are shown in millimeters

<sup>2)</sup> For detailed mounting instructions refer to ABB Document No. 5SYA 2039

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.

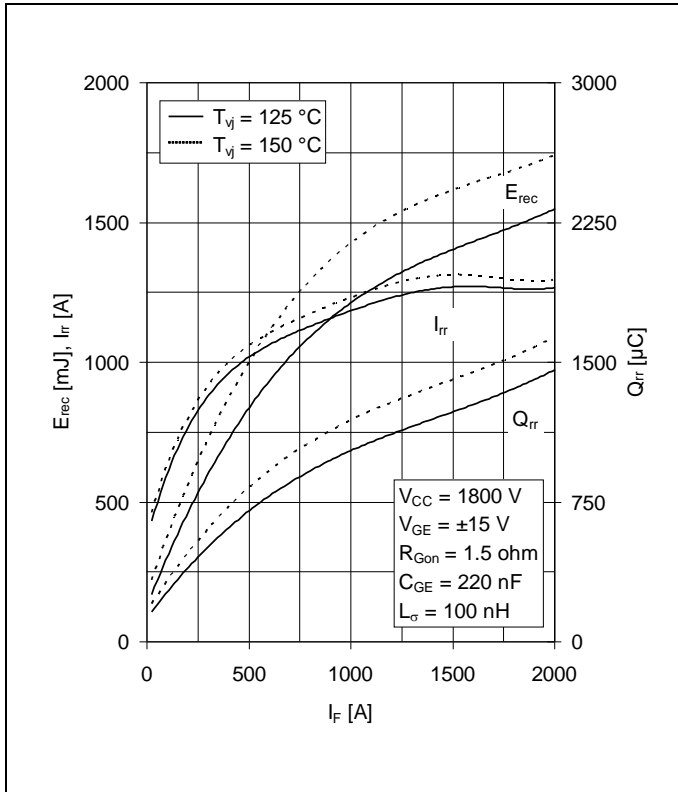


Fig. 1 Typical reverse recovery characteristics vs. forward current

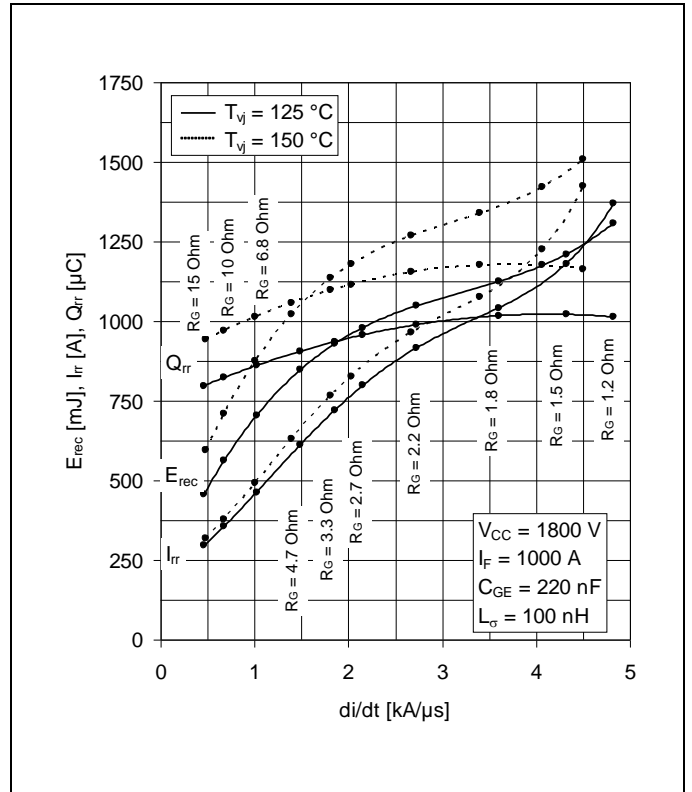


Fig. 2 Typical reverse recovery characteristics vs. di/dt

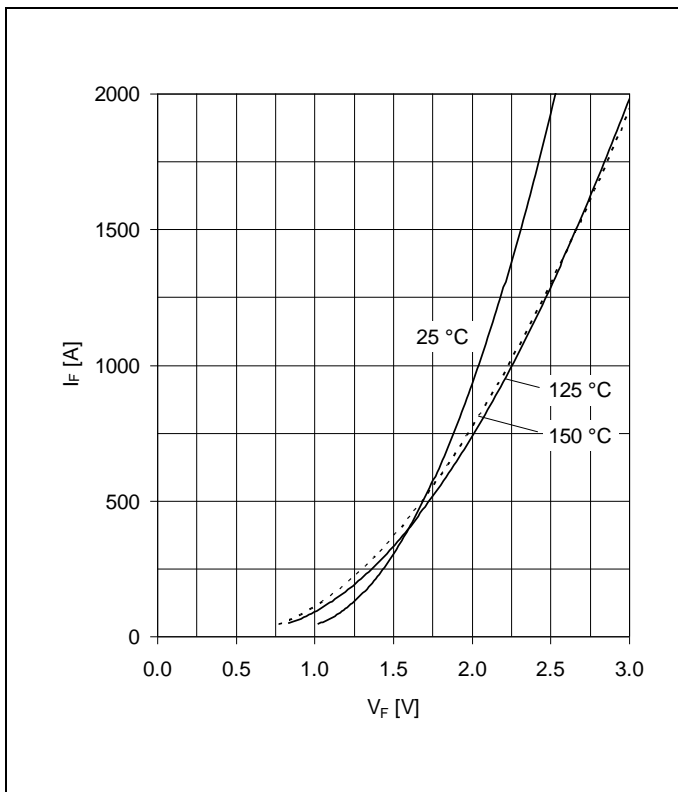


Fig. 3 Typical diode forward characteristics chip level

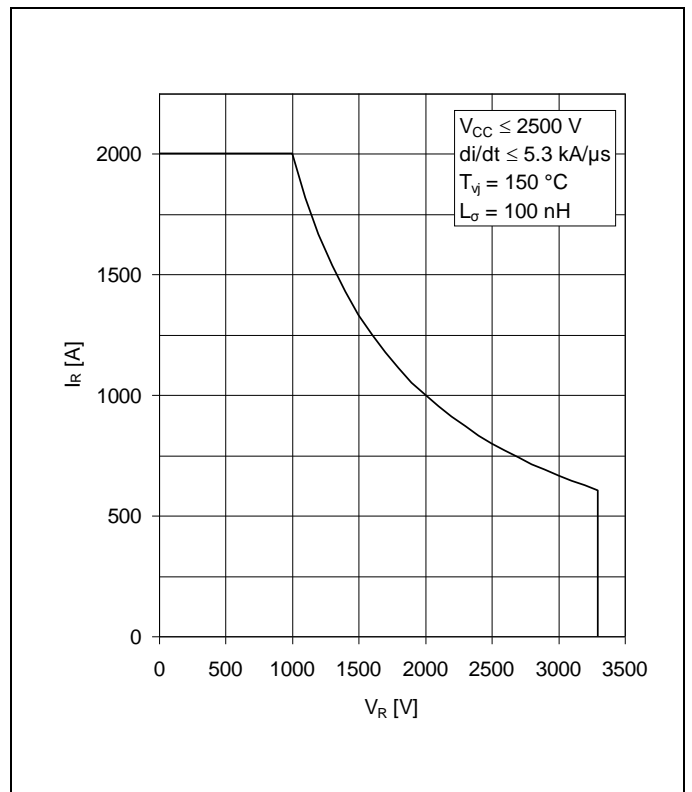


Fig. 4 Safe operating area diode (SOA)

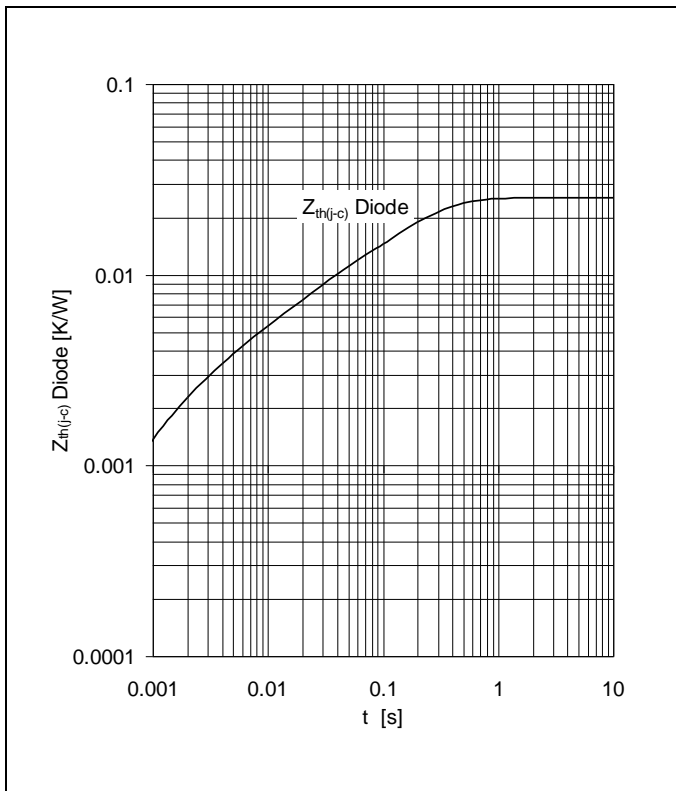


Fig. 5 Thermal impedance vs. time

Analytical function for transient thermal impedance:

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

DIODE	R <sub>i</sub> (K/kW)	17.1	4.28	1.92	1.92	
	τ <sub>i</sub> (ms)	203.6	30.1	7.53	1.57	

**Related documents:**

- 5SYA 2042 Failure rates of HiPak modules due to cosmic rays
- 5SYA 2043 Load - cycle capability of HiPaks
- 5SYA 2045 Thermal runaway during blocking
- 5SYA 2058 Surge currents for IGBT diodes
- 5SZK 9111 Specification of environmental class for HiPak Storage
- 5SZK 9112 Specification of environmental class for HiPak Transportation
- 5SZK 9113 Specification of environmental class for HiPak Operation (Industry)
- 5SZK 9120 Specification of environmental class for HiPak

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