Data Sheet, Doc. No. 5SYA 1435-01 01-2014

5SLG 0500P330300
HiPak DIODE Module

V_{RRM} = 3300 V
I_F = 2 x 500 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
Recognized under UL1557, File E196689

Maximum rated values [1)]

Parameter	Symbol	Conditions	min	max	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} \geq 25$ °C		3300	V
DC forward current	I_F			500	A
Peak forward current	I_{FRM}	t_p = 1 ms, per Diode		1000	A
Total power dissipation	P_{tot}	T_C = 25 °C, T_{vj} = 150 °C, per Diode		2450	W
Surge current	I_{FSM}	V_R = 0 V, T_{vj} = 150 °C, t_p = 10 ms, half-sine wave, per Diode		4500	A
Isolation voltage	V_{isol}	1 min, f = 50 Hz		6000	V
Junction temperature	T_{vj}			175	°C
Junction operating temperature	$T_{vj(op)}$		-50	150	°C
Case temperature	T_C		-50	125	°C
Storage temperature	T_{stg}		-50	125	°C
Mounting torques [2)]	M_s	Base-heatsink, M6 screws	4	6	Nm
	M_{t1}	Main terminals, M6 screws	4	6	

[1)] Maximum rated values indicate limits beyond which damage to the device may occur per IEC 60747
[2)] For detailed mounting instructions refer to Document No. 5SYA 2039

Diode characteristic values [3]

Parameter	Symbol	Conditions		min	typ	max	Unit
Forward voltage [4]	V_F	I_F = 500 A	T_{vj} = 25 °C		2.05	2.5	V
			T_{vj} = 125 °C		2.25	2.6	V
			T_{vj} = 150 °C		2.20		V
Continuous reverse current	I_R	V_R = 3300 V	T_{vj} = 25 °C			0.25	mA
			T_{vj} = 125 °C		3	6	mA
			T_{vj} = 150 °C		15		mA
Peak reverse recovery current	I_{RM}	V_{CC} = 1800 V, I_F = 500 A, di/dt = 2.1 kA/µs L_σ = 200 nH, inductive load Per Diode	T_{vj} = 25 °C		505		A
			T_{vj} = 125 °C		590		A
			T_{vj} = 150 °C		615		A
Recovered charge	Q_r		T_{vj} = 25 °C		315		µC
			T_{vj} = 125 °C		510		µC
			T_{vj} = 150 °C		590		µC
Reverse recovery time	t_{rr}		T_{vj} = 25 °C		1125		ns
			T_{vj} = 125 °C		1440		ns
			T_{vj} = 150 °C		1630		ns
Reverse recovery energy	E_{rec}		T_{vj} = 25 °C		350		mJ
			T_{vj} = 125 °C		605		mJ
			T_{vj} = 150 °C		710		mJ

[3] Characteristic values according to IEC 60747 – 2
[4] Forward voltage is given at chip level

Package properties [5]

Parameter	Symbol	Conditions		min	typ	max	Unit
Diode thermal resistance junction to case	$R_{th(j-c)DIODE}$	Per Diode				0.050	K/W
Diode thermal resistance [2] case to heatsink	$R_{th(c-s)DIODE}$	Per Diode, λ grease = 1W/m x K			0.048		K/W
Comparative tracking index	CTI				> 600		
Module stray inductance	$L_{\sigma AC}$	between C1 – A2			125		nH
Resistance, terminal-chip	$R_{AA'+CC'}$	Per Diode	T_C = 25 °C		0.25		mΩ
			T_C = 125 °C		0.33		
			T_C = 150 °C		0.35		

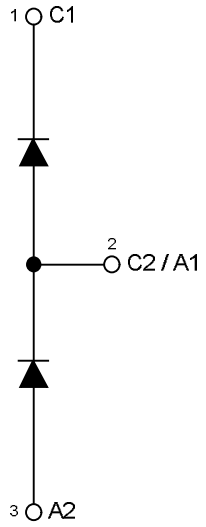
[2] For detailed mounting instructions refer to ABB Document No. 5SYA 2039

Mechanical properties [5]

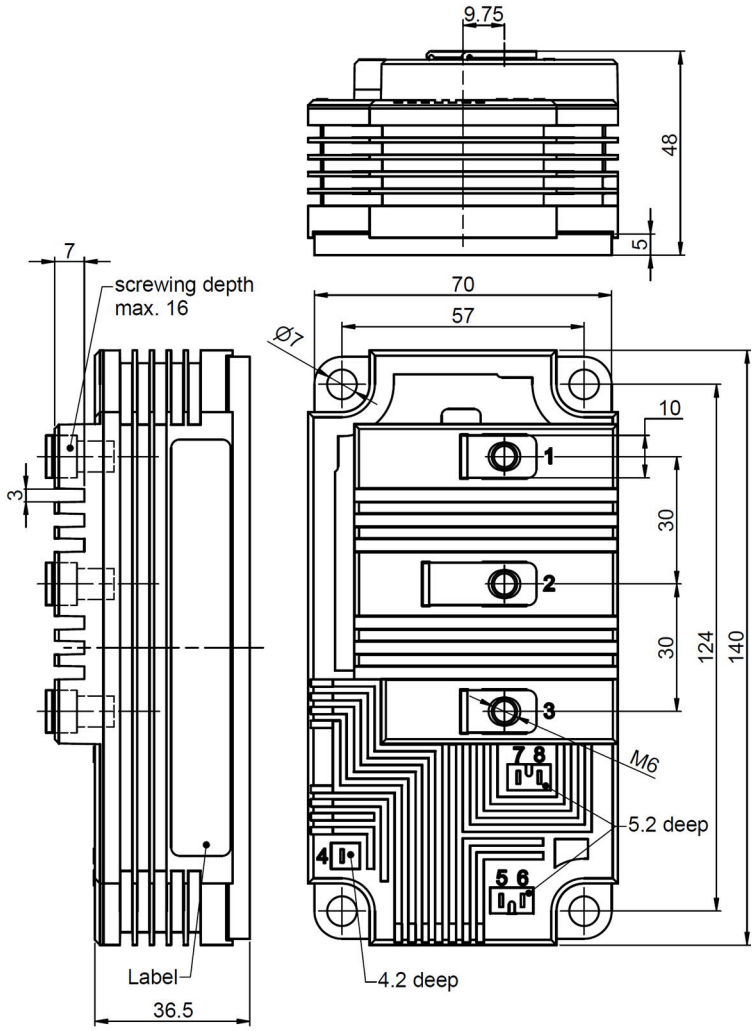
Parameter	Symbol	Conditions		min	typ	max	Unit
Dimensions	L x W x H	Typical			73 x 140 x 38		mm
Clearance distance in air	d_a	according to IEC 60664-1 and EN 50124-1	Term. to base:	35			mm
			Term. to term:	19			
Surface creepage distance	d_s	according to IEC 60664-1 and EN 50124-1	Term. to base:	64			mm
			A1 to C1:	54			
			A2 to C2:	78			
Mass	m				610		g

[5] Package and mechanical properties according to IEC 60747 – 15

Electrical configuration



Outline drawing [2)]



Note: all dimensions are shown in millimeters
[2)] For detailed mounting instructions refer to 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.

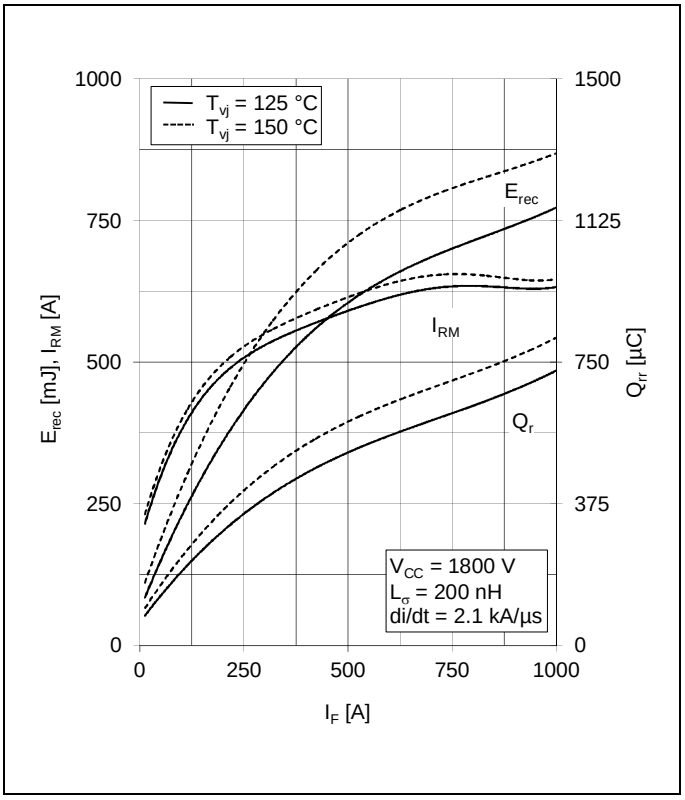


Fig. 1 Typical reverse recovery characteristics vs. forward current

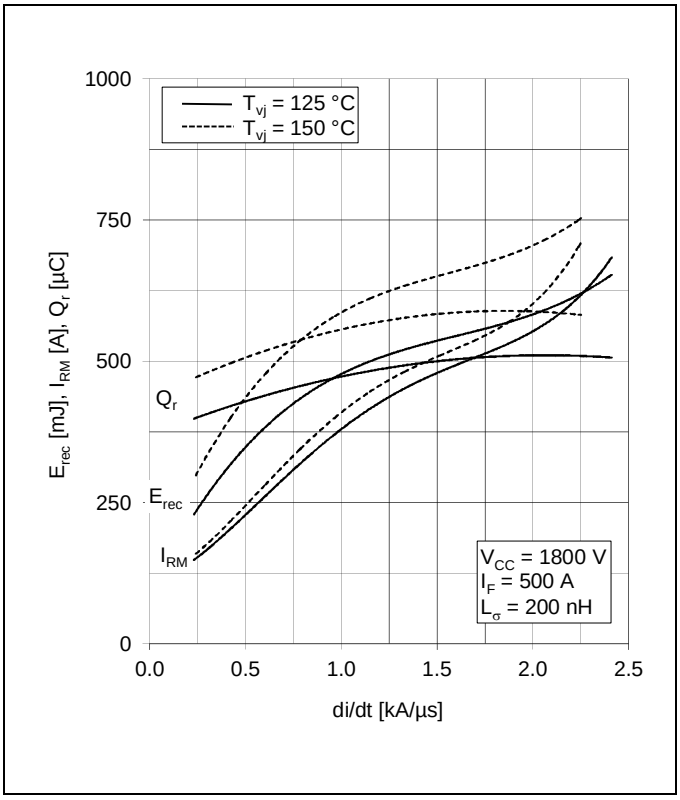


Fig. 2 Typical reverse recovery characteristics vs. di/dt

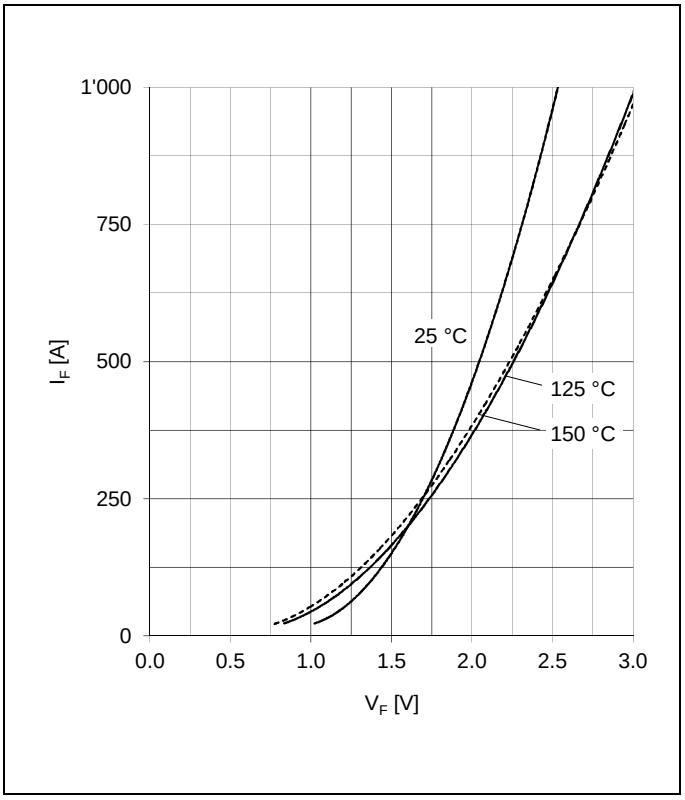


Fig. 3 Typicial diode forward characteristics chip level

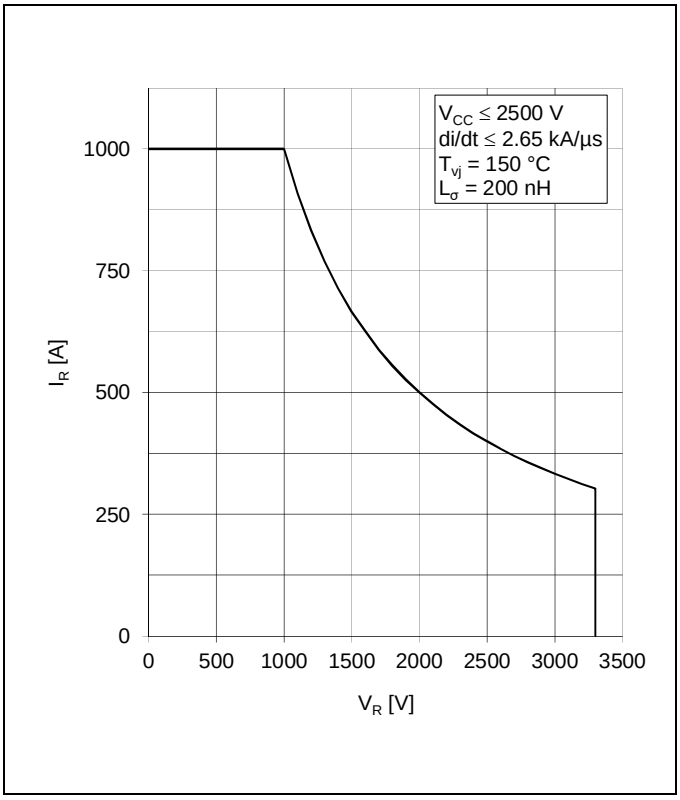


Fig. 4 Safe operating area diode (SOA)

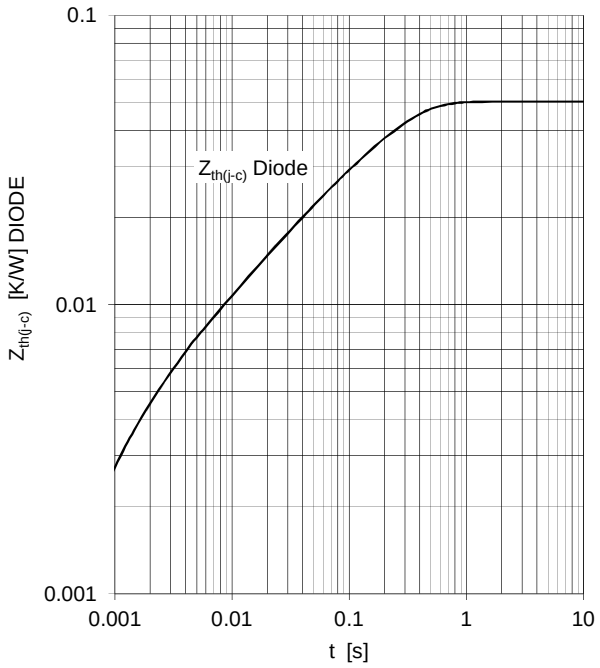


Fig. 5 Thermal impedance vs. time

Analytical function for transient thermal impedance:

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

DIODE	Ri(K/kW)	34.2	8.55	3.85	3.84	
	τi(ms)	203.6	30.1	7.53	1.57	

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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 2053 Applying IGBT
5SYA 2058 Surge currents for IGBT diodes
5SYA 2093 Thermal design of IGBT modules
5SYA 2098 Paralleling of IGBT modules
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

ABB Power Grids Switzerland Ltd, Semiconductors
A Hitachi ABB Joint Venture
Fabrikstrasse 3
CH-5600 Lenzburg
Switzerland
www.hitachiabb-powergrids.com/semiconductors

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