

5SLG 0600P450300

HiPak DIODE Module

$$V_{RRM} = 4500 \text{ V}$$

$$I_F = 2 \times 600 \text{ A}$$

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



Maximum rated values ¹⁾

Parameter	Symbol	Conditions	min	max	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} \geq 25 \text{ }^\circ\text{C}$		4500	V
DC forward current	I_F			600	A
Peak forward current	I_{FRM}	$t_p = 1 \text{ ms, per Diode}$		1200	A
Total power dissipation	P_{tot}	$T_C = 25 \text{ }^\circ\text{C, } T_{vj} = 125 \text{ }^\circ\text{C, per Diode}$		2650	W
Surge current	I_{FSM}	$V_R = 0 \text{ V, } T_{vj} = 125 \text{ }^\circ\text{C, } t_p = 10 \text{ ms, half-sine wave, per Diode}$		4500	A
Isolation voltage	V_{isol}	1 min, $f = 50 \text{ Hz}$		10200	V
Junction temperature	T_{vj}			150	$^\circ\text{C}$
Junction operating temperature	$T_{vj(op)}$		-50	125	$^\circ\text{C}$
Case temperature	T_C		-50	125	$^\circ\text{C}$
Storage temperature	T_{stg}		-50	125	$^\circ\text{C}$
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 ABB Document No. 5SYA 2039

Diode characteristic values ³⁾

Parameter	Symbol	Conditions		min	typ	max	Unit
Forward voltage ⁴⁾	V_F	$I_F = 600 \text{ A}$	$T_{vj} = 25 \text{ }^\circ\text{C}$		3.2	3.7	V
			$T_{vj} = 125 \text{ }^\circ\text{C}$		3.5	4.0	V
Continuous reverse current	I_R	$V_R = 4500 \text{ V}$	$T_{vj} = 25 \text{ }^\circ\text{C}$			0.25	mA
			$T_{vj} = 125 \text{ }^\circ\text{C}$		12	23	mA
Peak reverse recovery current	I_{RM}		$T_{vj} = 25 \text{ }^\circ\text{C}$		730		A
			$T_{vj} = 125 \text{ }^\circ\text{C}$		800		A
Recovered charge	Q_r	$V_{CC} = 2800 \text{ V}$, $I_F = 600 \text{ A}$, $di/dt = 2.4 \text{ kA}/\mu\text{s}$ $L_\sigma = 300 \text{ nH}$, inductive load Per Diode	$T_{vj} = 25 \text{ }^\circ\text{C}$		515		μC
			$T_{vj} = 125 \text{ }^\circ\text{C}$		830		μC
Reverse recovery time	t_{rr}		$T_{vj} = 25 \text{ }^\circ\text{C}$		635		ns
			$T_{vj} = 125 \text{ }^\circ\text{C}$		930		ns
Reverse recovery energy	E_{rec}		$T_{vj} = 25 \text{ }^\circ\text{C}$		815		mJ
			$T_{vj} = 125 \text{ }^\circ\text{C}$		1365		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				0.038	K/W
Diode thermal resistance ²⁾ case to heatsink	$R_{th(c-s)DIODE}$	Per Diode, λ grease = 1W/m x K			0.036		K/W
Partial discharge extinction voltage	V_e	$f = 50 \text{ Hz}$, $Q_{PD} \leq 10 \text{ pC}$ (acc. To IEC 61287)		5100			V
Comparative tracking index	CTI				> 600		
Module stray inductance	$L_{\sigma AC}$	between $C_1 - A_2$			125		nH
Resistance, terminal-chip	$R_{AA'+CC'}$	Per Diode	$T_C = 25 \text{ }^\circ\text{C}$		0.25		m Ω
			$T_C = 125 \text{ }^\circ\text{C}$		0.33		

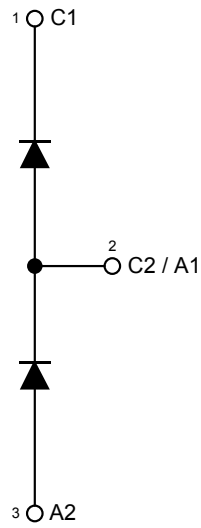
²⁾ For detailed mounting instructions refer to ABB Document No. 5SYA 2039

Mechanical properties ⁵⁾

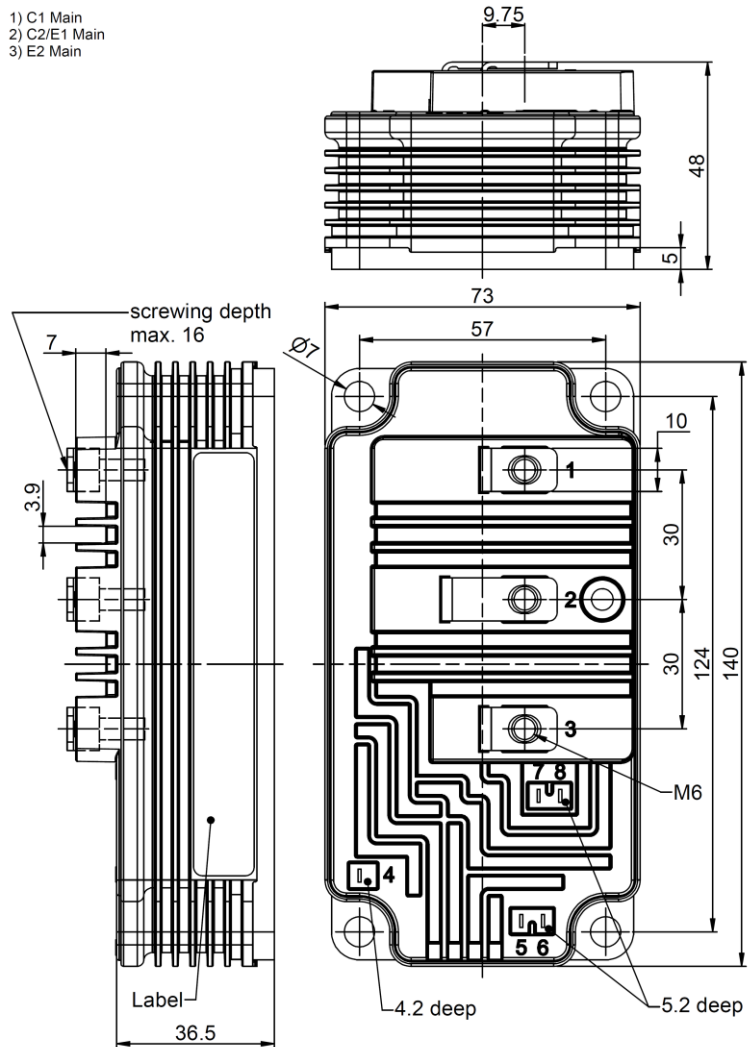
Parameter	Symbol	Conditions		min	typ	max	Unit
Dimensions	L x W x H	Typical			73 x 140 x 38		mm
Clearance distance in air	d_a	according to IEC 60664-1 and EN 50124-1	Term. to base:	35			mm
			Term. to term:	19			
Surface creepage distance	d_s	according to IEC 60664-1 and EN 50124-1	Term. to base:	64			mm
			A1 to C1:	54			
			A2 to C2:	78			
Mass	m				460		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 ABB Document No. 5SYA 2039

This is an electrostatic sensitive device, please observe the international standard IEC 60747-1, chap. VIII.
This product has been designed and qualified for Industrial Level.

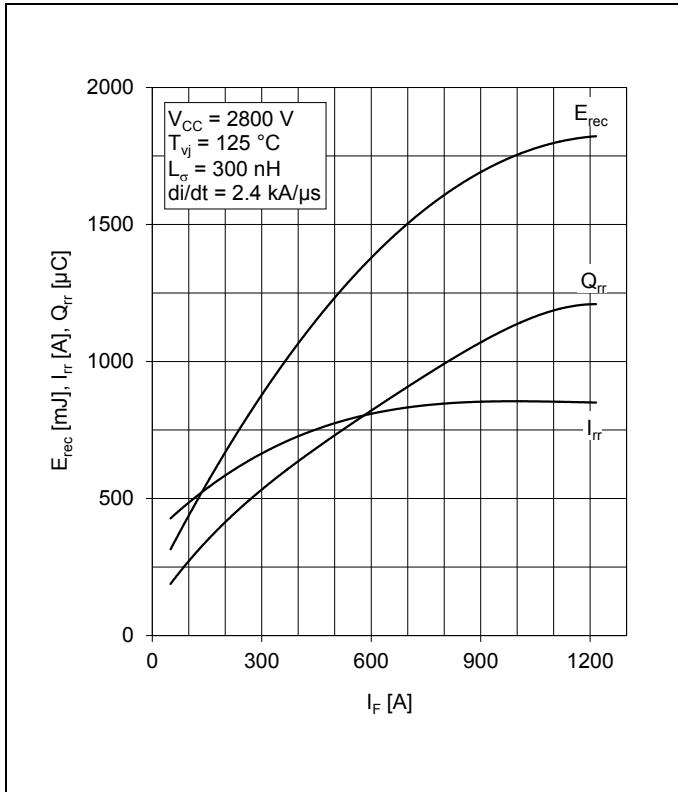


Fig. 1 Typical reverse recovery characteristics vs. forward current

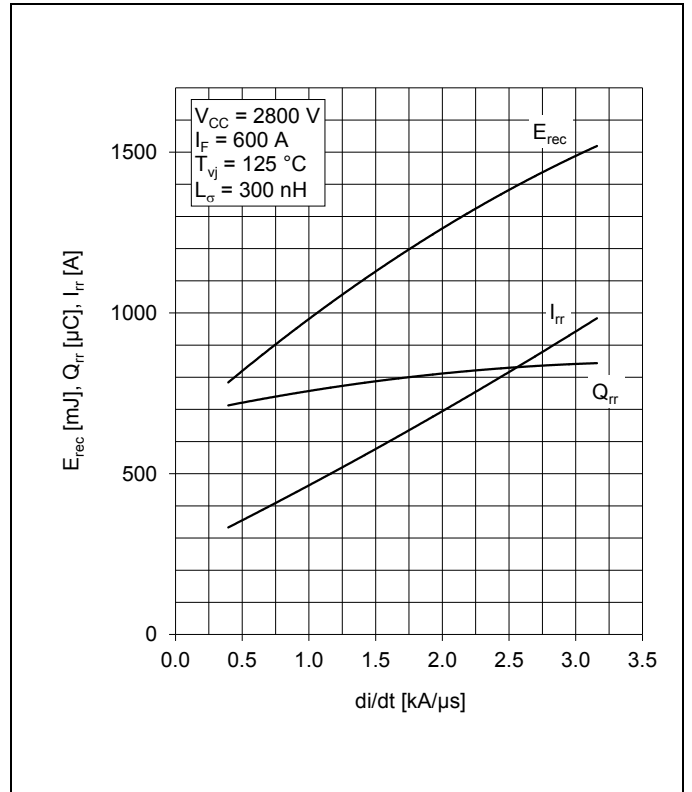


Fig. 2 Typical reverse recovery characteristics vs. di/dt

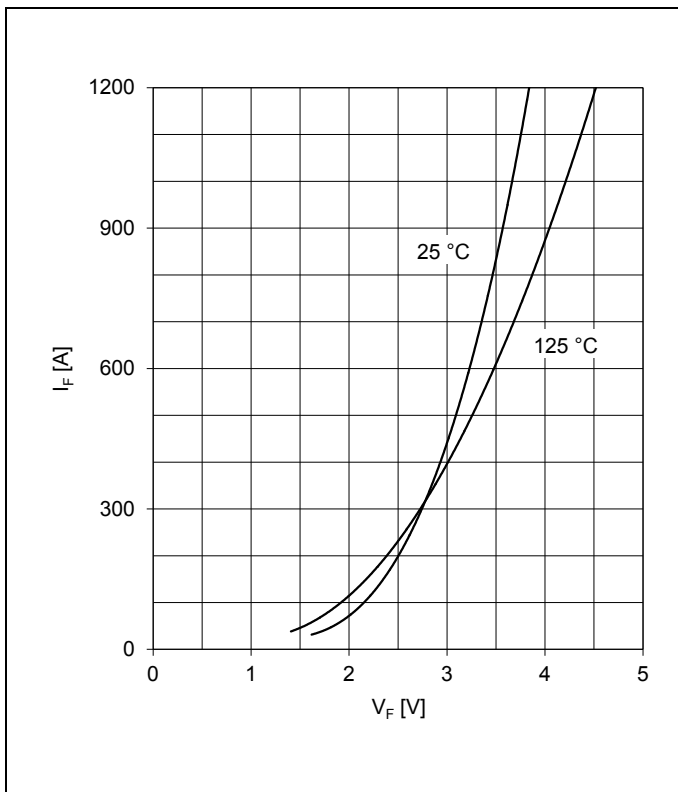


Fig. 3 Typical diode forward characteristics chip level

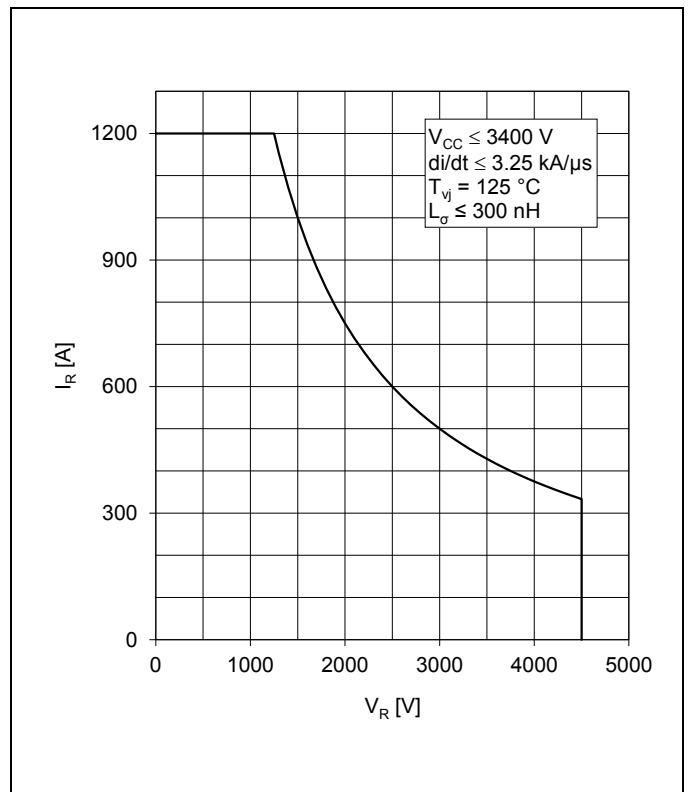


Fig. 4 Safe operating area diode (SOA)

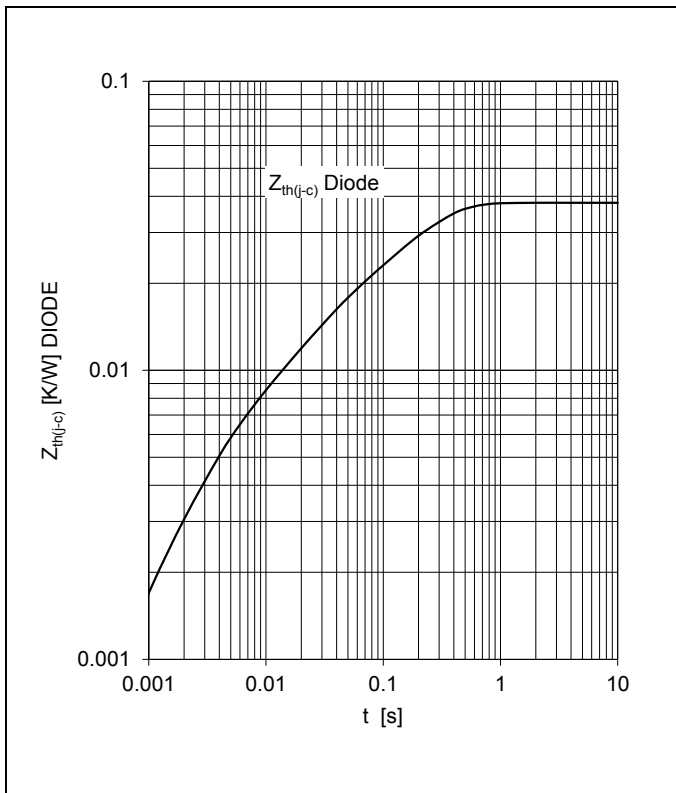


Fig. 5 Thermal impedance vs. time

Analytical function for transient thermal impedance:

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

DIODE	R _i (K/kW)	24.9	8.75	4.31		
	τ _i (ms)	192	22.6	3.1		

Related documents:

- 5SYA 2039 Mounting instructions for HiPak modules
- 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

We reserve the right to make technical changes or to modify the contents of this document without prior notice.

We reserve all rights in this document and the information contained therein. Any reproduction or utilization of this document or parts thereof for commercial purposes without our prior written consent is forbidden.

Any liability for use of our products contrary to the instructions in this document is excluded.

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

Phone: +41 58 586 1419
Fax: +41 58 586 1306
E-Mail: abbsem@ch.abb.com
Internet: www.abb.com/semiconductors