

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
 Recognized under UL1557, File E196689



Maximum rated values ¹⁾

Parameter	Symbol	Conditions	min	max	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} \geq 25 \text{ }^{\circ}\text{C}$		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 Document No. 5SYA 2039

Diode characteristic values ³⁾

Parameter	Symbol	Conditions		min	typ	max	Unit
Forward voltage ⁴⁾	V _F	I _F = 600 A	T _{vj} = 25 °C		3.2	3.7	V
			T _{vj} = 125 °C		3.5	4.0	V
Continuous reverse current	I _R	V _R = 4500 V	T _{vj} = 25 °C			0.25	mA
			T _{vj} = 125 °C		12	23	mA
Peak reverse recovery current	I _{RM}	V _{CC} = 2800 V, I _F = 600 A, di/dt = 2.4 kA/μs L _σ = 300 nH, inductive load Per Diode	T _{vj} = 25 °C		730		A
			T _{vj} = 125 °C		800		A
Recovered charge	Q _r		T _{vj} = 25 °C		515		μC
			T _{vj} = 125 °C		830		μC
Reverse recovery time	t _{rr}		T _{vj} = 25 °C		635		ns
			T _{vj} = 125 °C		930		ns
Reverse recovery energy	E _{rec}		T _{vj} = 25 °C		815		mJ
			T _{vj} = 125 °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		

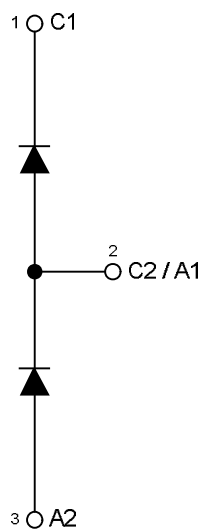
²⁾ For detailed mounting instructions refer to ABB Document No. 5SYA 2039

Mechanical properties ⁵⁾

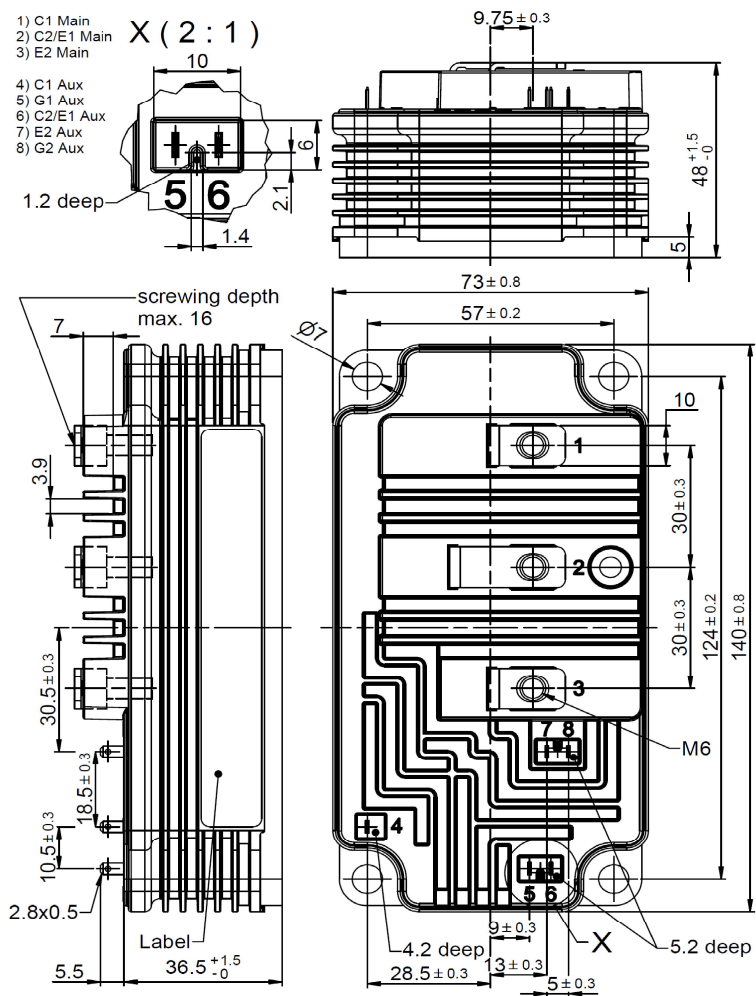
Parameter	Symbol	Conditions		min	typ	max	Unit
Dimensions	L x W x H	Typical		73 x 140 x 38			mm
Clearance distance in air	d_a	according to IEC 60664-1 and EN 50124-1	Term. to base:	35			mm
			Term. to term:	19			
Surface creepage distance	d_s	according to IEC 60664-1 and EN 50124-1	Term. to base:	64			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. IX.
This product has been designed and qualified for Industrial Level.

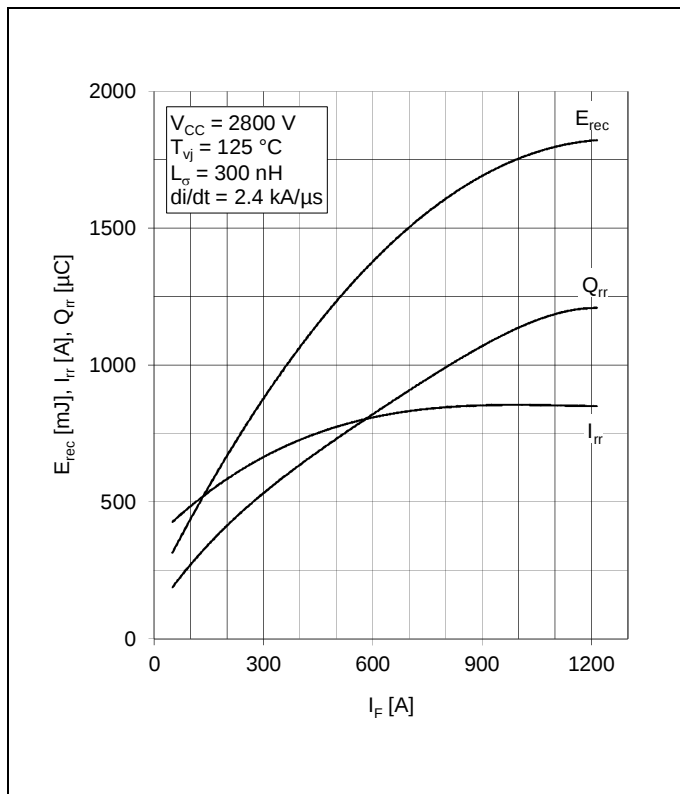


Fig. 1 Typical reverse recovery characteristics vs. forward current

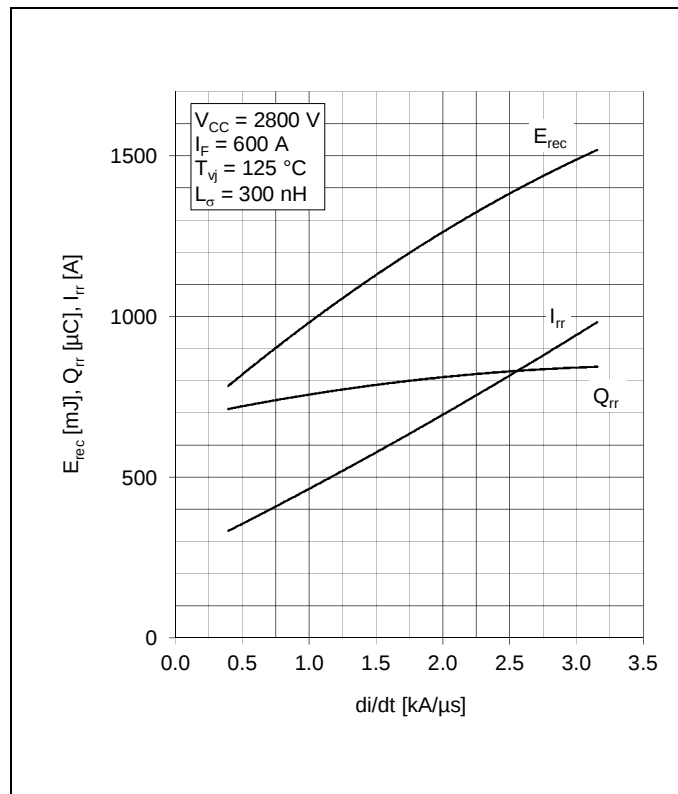


Fig. 2 Typical reverse recovery characteristics vs. di/dt

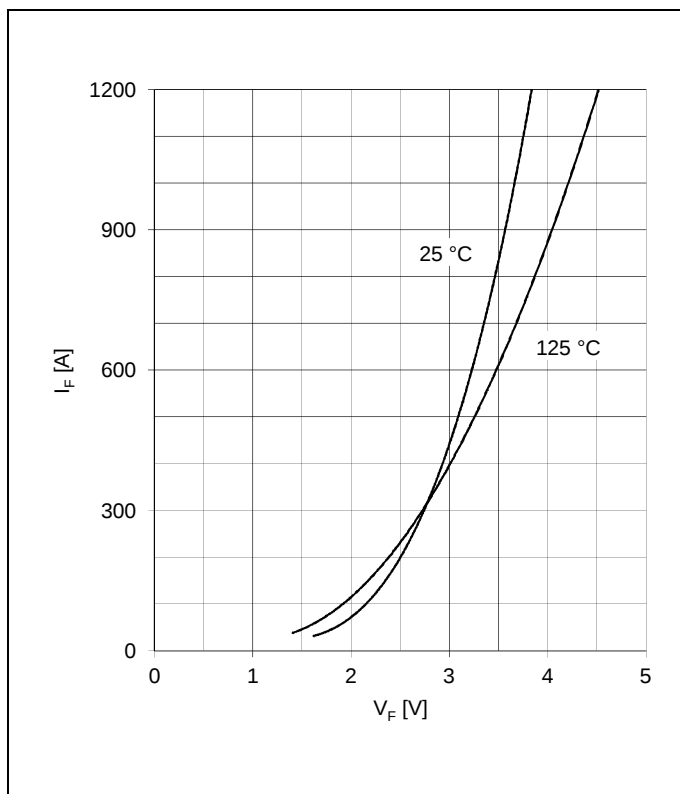


Fig. 3 Typical diode forward characteristics chip level

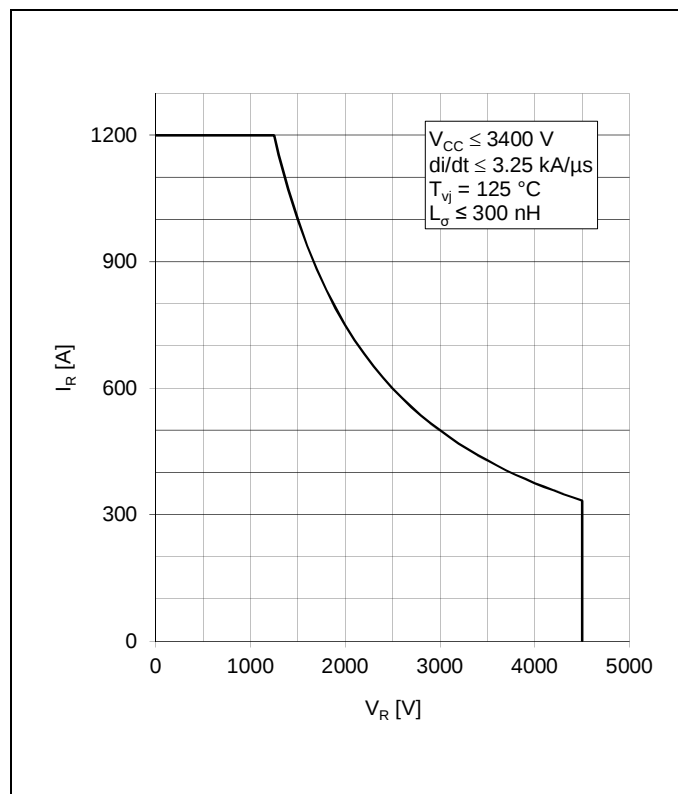


Fig. 4 Safe operating area diode (SOA)

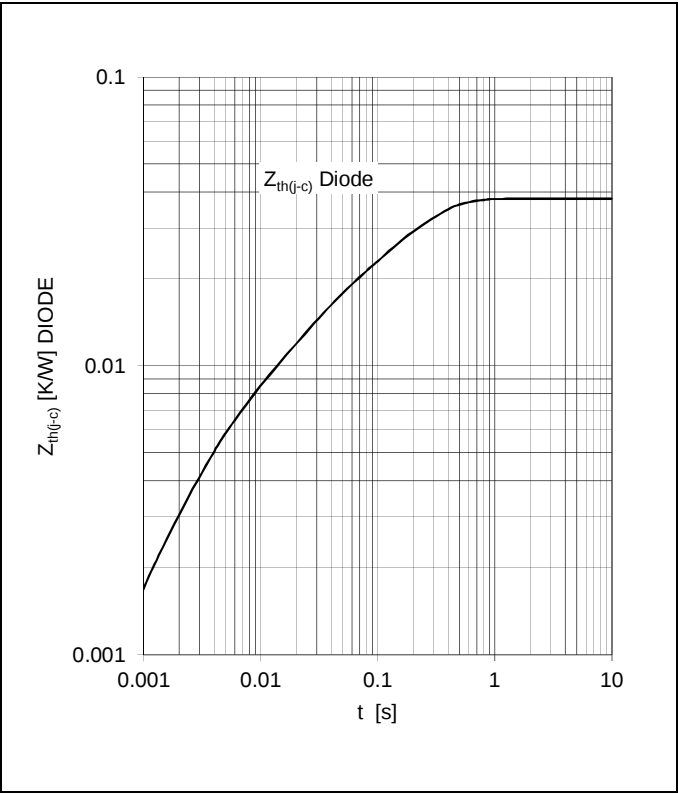


Fig. 5 Thermal impedance vs. time

Analytical function for transient thermal impedance:
$$Z_{th(j-c)}(t) = \sum_{i=1}^n R_i (1 - e^{-t/\tau_i})$$

DIODE	Ri(K/kW)	24.9	8.75	4.31		
	τi(ms)	192	22.6	3.1		

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

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