

5SLD 1200J450350

HiPak DIODE Module

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

$$I_F = 2 \times 1200 \text{ A}$$

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
 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			1200	A
Peak forward current	I_{FRM}	$t_p = 1 \text{ ms, per Diode}$		2400	A
Total power dissipation	P_{tot}	$T_C = 25 \text{ }^{\circ}\text{C}, T_{vj} = 125 \text{ }^{\circ}\text{C, per Diode}$		5300	W
Surge current	I_{FSM}	$V_R = 0 \text{ V}, T_{vj} = 125 \text{ }^{\circ}\text{C},$ $t_p = 10 \text{ ms, half-sinewave, per Diode}$		9000	A
Isolation voltage	V_{isol}	1 min, $f = 50 \text{ Hz}$		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, M8 screws	8	10	

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 = 1200 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		0.5	mA
			T _{Vj} = 125 °C	23	46	mA
Reverse recovery current	I _{rr}	V _{CC} = 2800 V, I _F = 1200 A, di/dt = 4.8 kA/μs L _σ = 150 nH, inductive load switch: 5SNA 1200G450350 Per Diode	T _{Vj} = 25 °C	1460		A
			T _{Vj} = 125 °C	1600		A
Recovered charge	Q _{rr}		T _{Vj} = 25 °C	1030		μC
			T _{Vj} = 125 °C	1660		μC
Reverse recovery time	t _{rr}		T _{Vj} = 25 °C	1270		ns
			T _{Vj} = 125 °C	1860		ns
Reverse recovery energy	E _{rec}		T _{Vj} = 25 °C	1630		mJ
			T _{Vj} = 125 °C	2730		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			0.019	K/W
Diode thermal resistance ²⁾ case to heatsink	$R_{th(c-s)DIODE}$	Per Diode, λ grease = 1W/m x K		0.018		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	$L_{\sigma AC}$	Per Diode		36		nH
Resistance, terminal-chip	$R_{AA'+CC'}$	Per Diode	$T_C = 25\text{ °C}$	0.2		m Ω
			$T_C = 125\text{ °C}$	0.3		

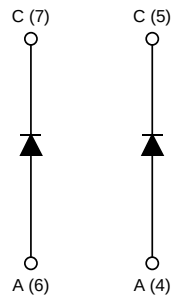
²⁾ For detailed mounting instructions refer to ABB Document No. 5SYA 2039

Mechanical properties ⁵⁾

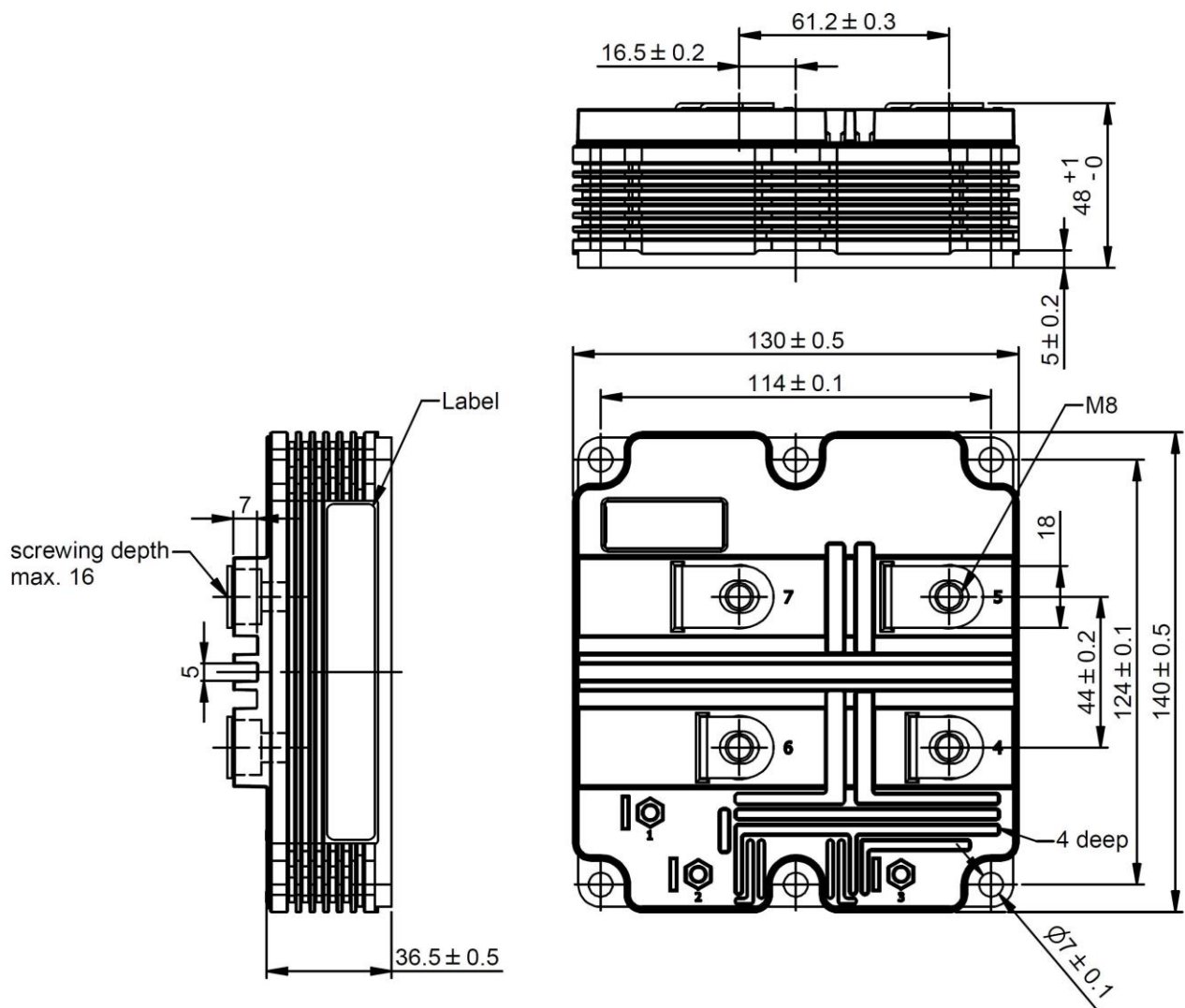
Parameter	Symbol	Conditions	min	typ	max	Unit
Dimensions	L x W x H	Typical	130 x 140 x 48			mm
Clearance distance in air	d_a	according to IEC 60664-1 and EN 50124-1	Term. to base:	40		mm
			Term. to term:	26		
Surface creepage distance	d_s	according to IEC 60664-1 and EN 50124-1	Term. to base:	64		mm
			Term. to term:	56		
Mass	m			980		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.

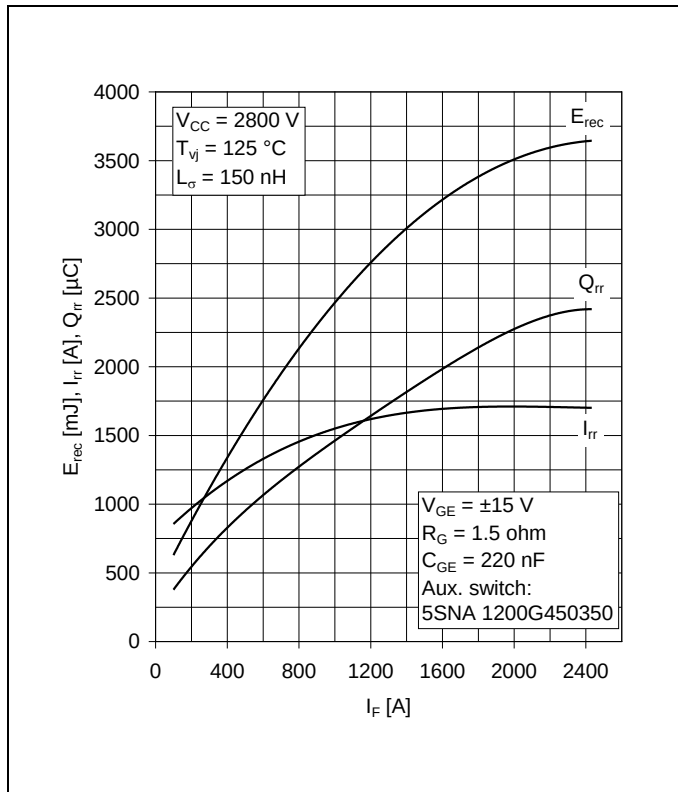


Fig. 1 Typical reverse recovery characteristics vs. forward current

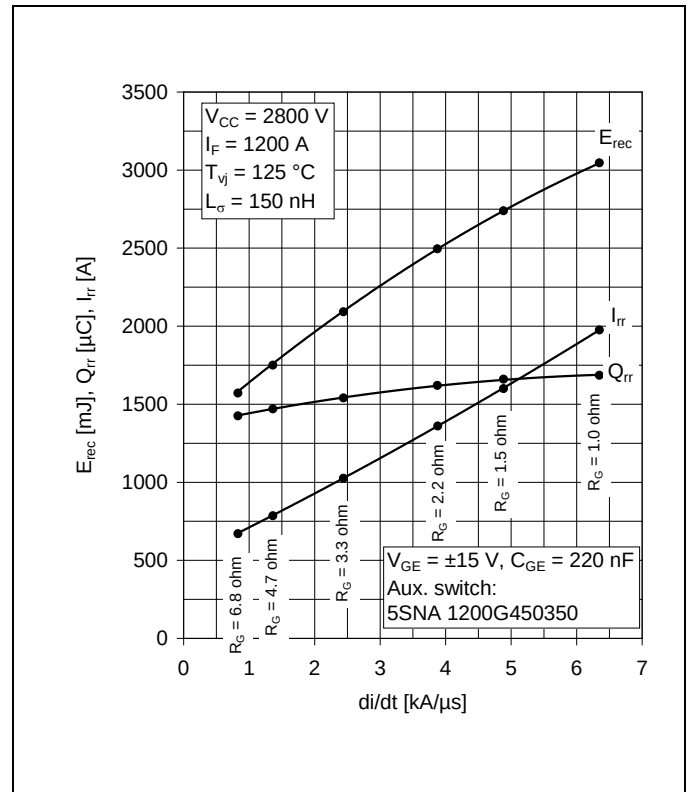


Fig. 2 Typical reverse recovery characteristics vs. di/dt

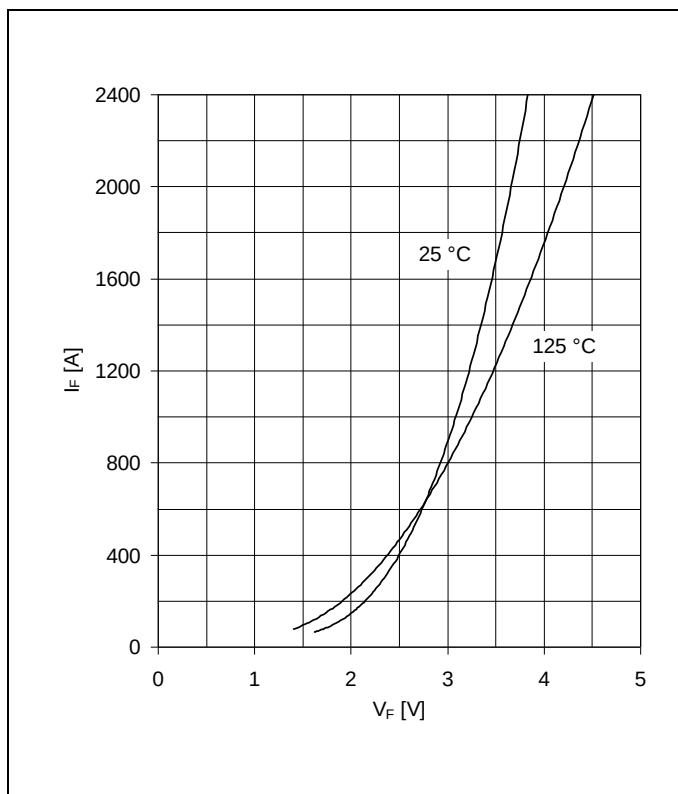


Fig. 3 Typical diode forward characteristics chip level

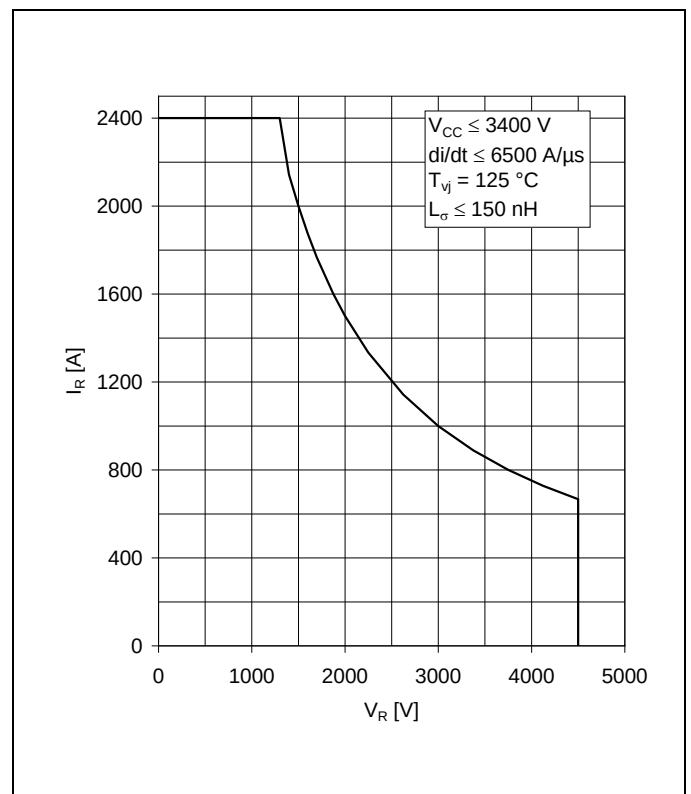


Fig. 4 Safe operating area diode (SOA)

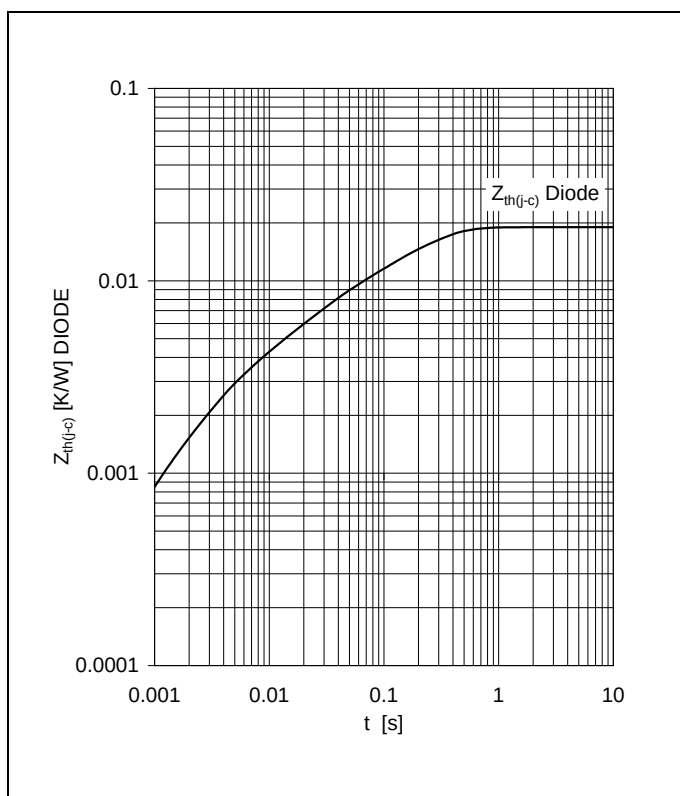


Fig. 5 Thermal impedance vs. time

Analytical function for transient thermal impedance:

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

i	1	2	3	4	5
$R_i(K/kW)$	12.5	4.37	2.16		
$\tau_i(ms)$	192	22.6	3.1		

DIODE

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 2057 IGBT diode safe operating area (SOA)
 5SYA 2058 Surge currents for IGBT diodes
 5SYA 2093 Thermal design 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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