

5SLA 3600E170300

HiPak Single DIODE Module

$$V_{RRM} = 1700 \text{ V}$$

$$I_F = 3600 \text{ A}$$

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



Maximum rated values ¹⁾

Parameter	Symbol	Conditions	min	max	Unit
Repetitive peak reverse voltage	V_{RRM}	$T_{vj} \geq 25 \text{ }^\circ\text{C}$		1700	V
DC forward current	I_F			3600	A
Peak forward current	I_{FRM}	$t_p = 1 \text{ ms}$		7200	A
Total power dissipation	P_{tot}	$T_C = 25 \text{ }^\circ\text{C}, T_{vj} = 150 \text{ }^\circ\text{C}$		10300	W
Surge current	I_{FSM}	$V_R = 0 \text{ V}, T_{vj} = 150 \text{ }^\circ\text{C}, t_p = 10 \text{ ms, half-sinewave}$		18000	A
Isolation voltage	V_{isol}	1 min, $f = 50 \text{ Hz}$		4000	V
Junction temperature	T_{vj}			150	$^\circ\text{C}$
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 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	$I_F = 3600 \text{ A}$	$T_{vj} = 25 \text{ °C}$	1.85	2.2	V
			$T_{vj} = 125 \text{ °C}$	1.95	2.3	V
			$T_{vj} = 150 \text{ °C}$	1.9		V
Continuous reverse current	I_R	$V_R = 1700 \text{ A}$	$T_{vj} = 25 \text{ °C}$	0.02		mA
			$T_{vj} = 125 \text{ °C}$	20	40	mA
			$T_{vj} = 150 \text{ °C}$	70		mA
Reverse recovery current	I_{rr}		$T_{vj} = 25 \text{ °C}$	2030		A
			$T_{vj} = 125 \text{ °C}$	2340		A
			$T_{vj} = 150 \text{ °C}$	2500		A
Recovered charge	Q_{rr}	$V_{CC} = 900 \text{ V}$, $I_F = 3600 \text{ A}$, $di/dt = 11.5 \text{ kA}/\mu\text{s}$ $L_{\sigma} = 50 \text{ nH}$, inductive load switch: 5SNA 3600E170300	$T_{vj} = 25 \text{ °C}$	1000		μC
			$T_{vj} = 125 \text{ °C}$	1560		μC
			$T_{vj} = 150 \text{ °C}$	1820		μC
Reverse recovery time	t_{rr}		$T_{vj} = 25 \text{ °C}$	900		ns
			$T_{vj} = 125 \text{ °C}$	1230		ns
			$T_{vj} = 150 \text{ °C}$	1320		ns
Reverse recovery energy	E_{rec}		$T_{vj} = 25 \text{ °C}$	710		mJ
			$T_{vj} = 125 \text{ °C}$	1080		mJ
			$T_{vj} = 150 \text{ °C}$	1260		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	$R_{th(j-c)DIODE}$				0.012	K/W
Diode thermal resistance ²⁾ case to heatsink	$R_{th(c-s)DIODE}$	Diode, λ grease = $1\text{W}/\text{m} \times \text{K}$		0.018		K/W
Comparative tracking index	CTI		600			
Module stray inductance	$L_{\sigma AC}$			8		nH
Resistance, terminal-chip	$R_{AA'+CC'}$		$T_C = 25 \text{ °C}$	0.055		m Ω
			$T_C = 125 \text{ °C}$	0.075		
			$T_C = 150 \text{ °C}$	0.080		

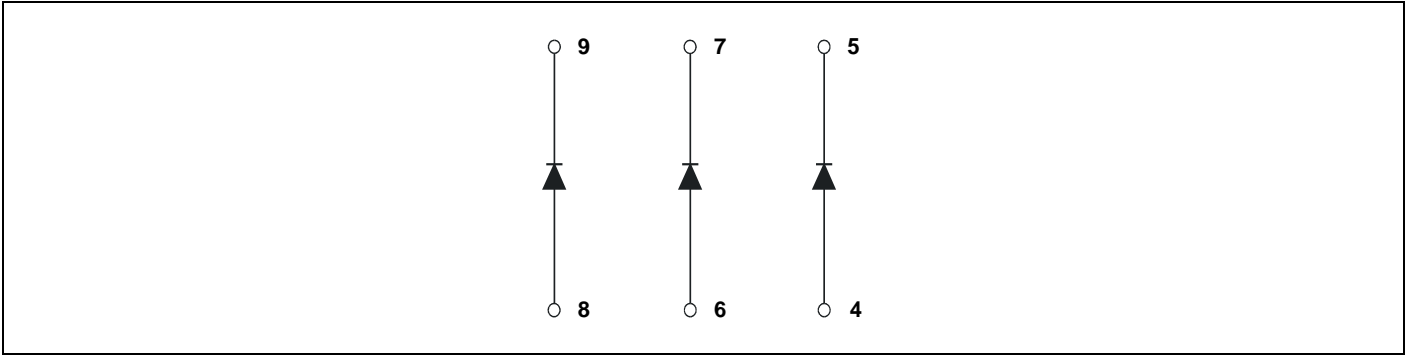
²⁾ For detailed mounting instructions refer to ABB Document No. 5SYA 2039

Mechanical properties ⁵⁾

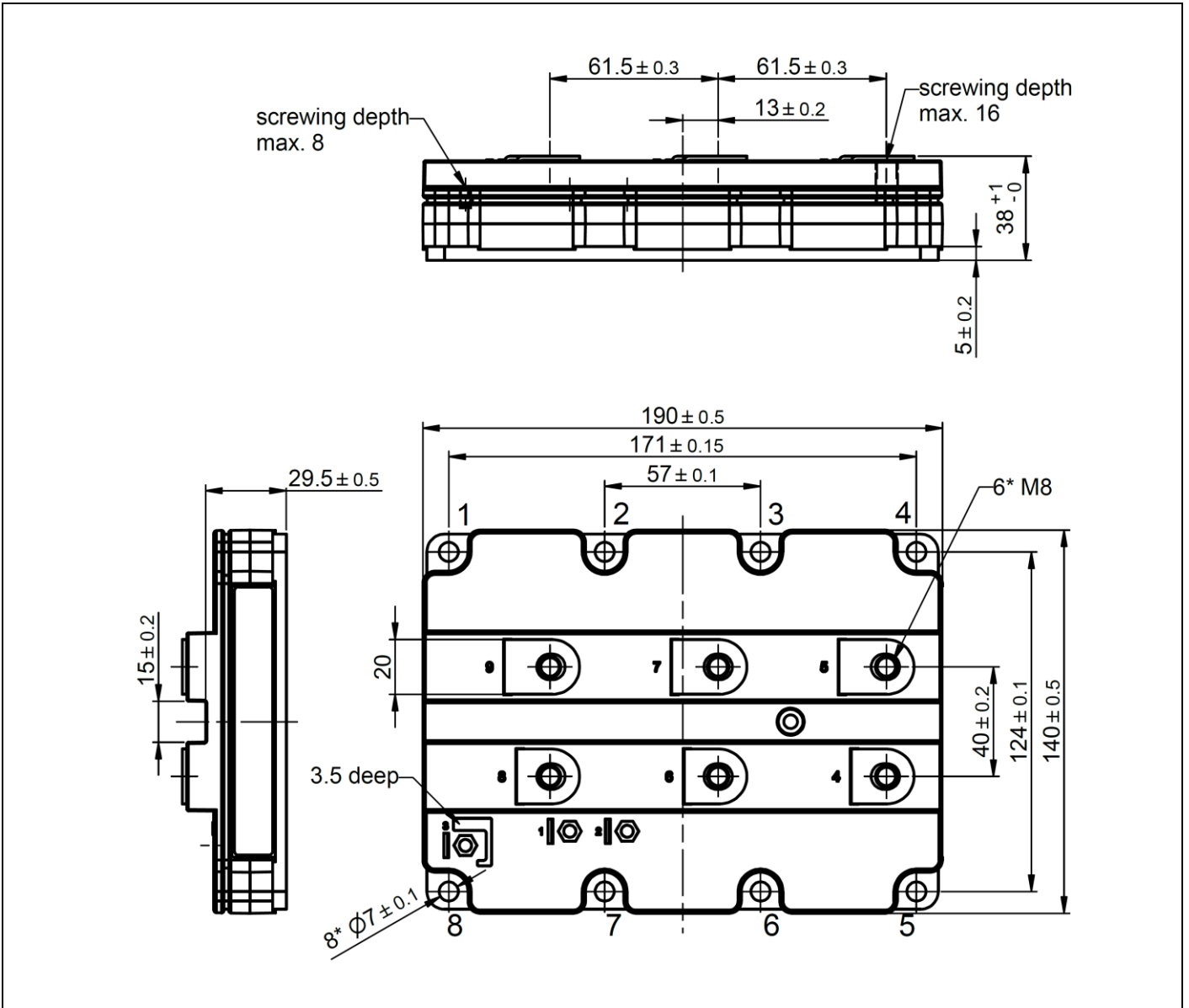
Parameter	Symbol	Conditions	min	typ	max	Unit
Dimensions	L x W x H	Typical		190 x 140 x 38		mm
Clearance distance in air	d_a	according to IEC 60664-1 and EN 50124-1	Term. to base:	23		mm
			Term. to term:	19		
Surface creepage distance	d_s	according to IEC 60664-1 and EN 50124-1	Term. to base:	28.2		mm
			Term. to term:	28.2		
Mass	m			1200		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.

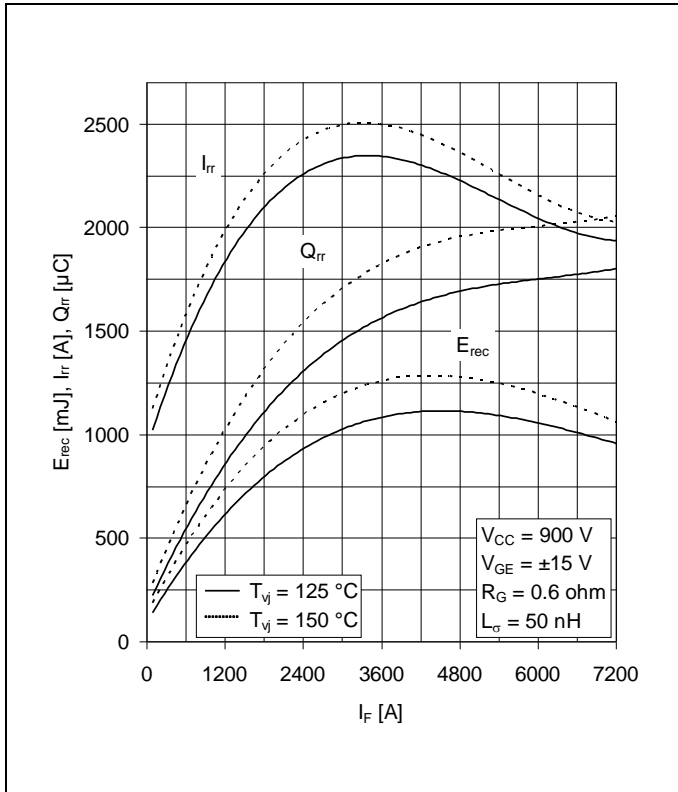


Fig. 1 Typical reverse recovery characteristics vs. forward current

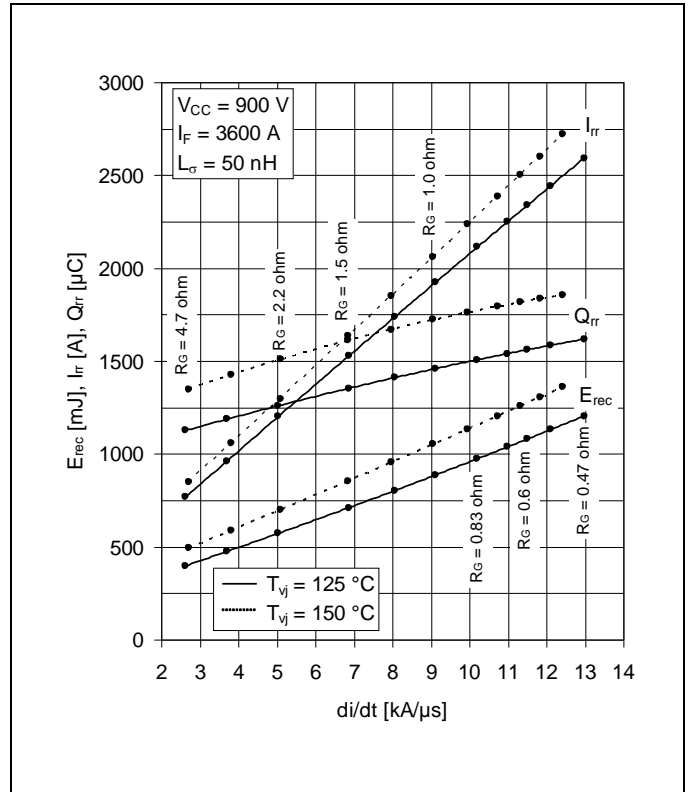


Fig. 2 Typical reverse recovery characteristics vs. di/dt

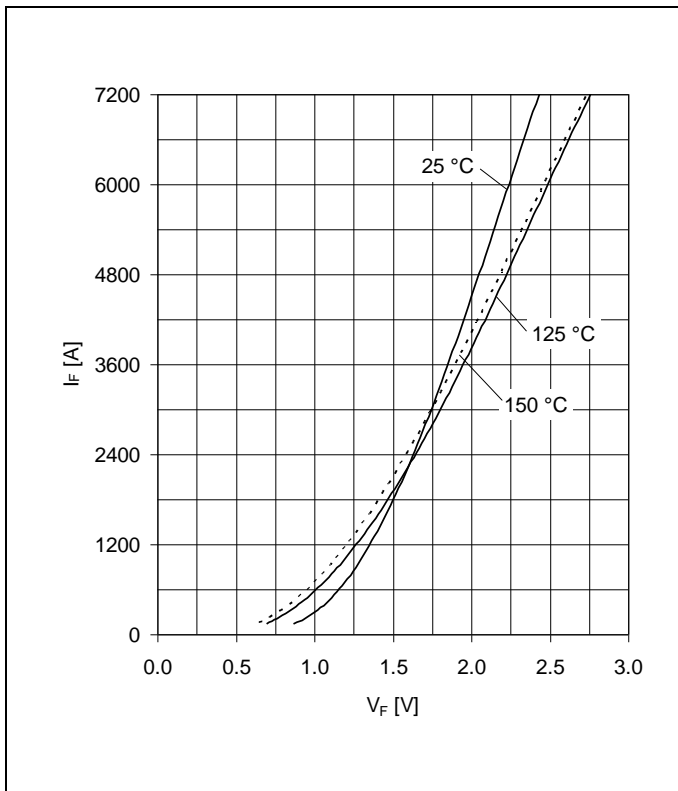


Fig. 3 Typical diode forward characteristics chip level

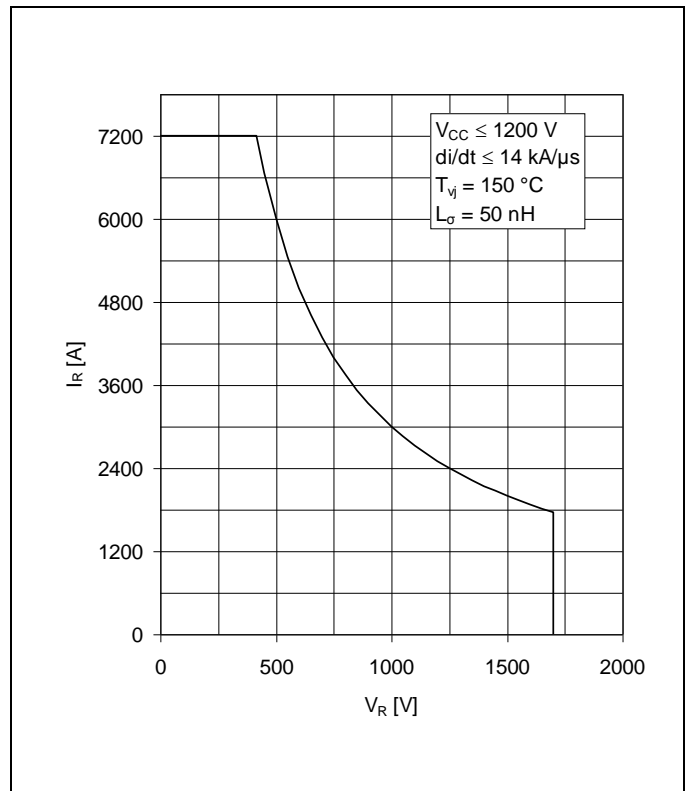


Fig. 4 Safe operating area diode (SOA)

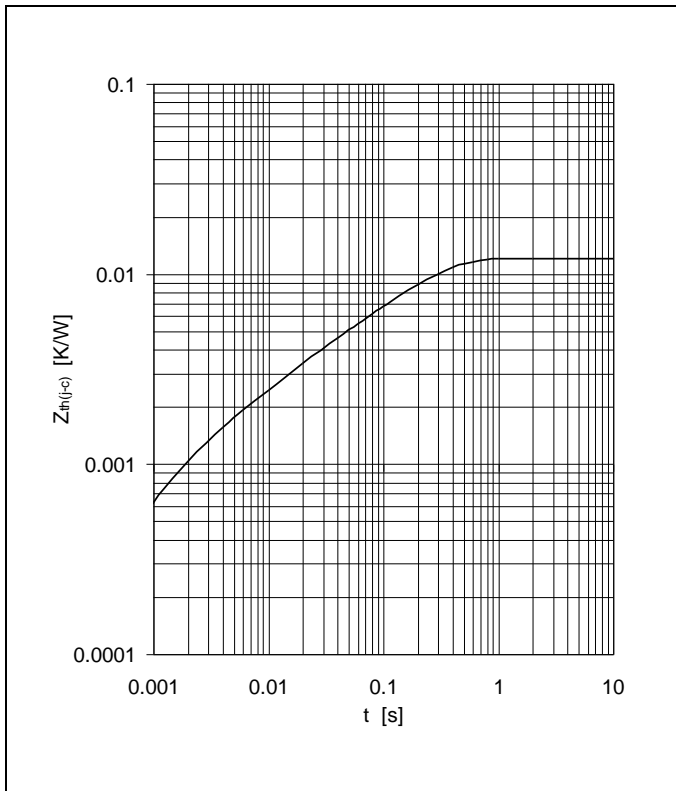


Fig. 5 Thermal impedance vs. time

Analytical function for transient thermal impedance:

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

DIODE	R _i (K/kW)	8.432	1.928	0.866	0.839	
	τ _i (ms)	210	29.6	7.01	1.49	

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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