

$V_{RRM} = 6500 \text{ V}$

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

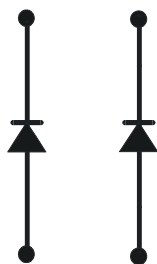


ABB HiPak

DIODE Module

5SLD 0600J650100

Doc. No. 5SYA 1412-02 09-2016

- Low-loss, rugged SPT diode
- Smooth switching SPT diode for good EMC
- Industry standard package
- High power density
- AlSiC base-plate for high power cycling capability
- AlN substrate for low thermal resistance
- 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}			6500	V
DC forward current	I_F			600	A
Peak forward current	I_{FRM}	$t_p = 1 \text{ ms}$		1200	A
Total power dissipation	P_{tot}	$T_c = 25 \text{ }^\circ\text{C}$, per diode		4760	W
Surge current	I_{FSM}	$V_R = 0 \text{ V}$, $T_{vj} = 125 \text{ }^\circ\text{C}$, $t_p = 10 \text{ ms}$, half-sinewave		6000	A
Isolation voltage	V_{isol}	1 min, $f = 50 \text{ Hz}$		10200	V
Junction temperature	T_{vj}			125	$^\circ\text{C}$
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	$^\circ\text{C}$

¹⁾ Maximum rated values indicate limits beyond which damage to the device may occur per IEC 60747

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Diode characteristic values ²⁾

Parameter	Symbol	Conditions	min	typ	max	Unit	
Forward voltage ³⁾	V _F	I _F = 600 A	T _{vj} = 25 °C		3.2	3.8	V
			T _{vj} = 125 °C		3.4	4.0	
Continuous reverse current	I _R	V _R = 6500 V	T _{vj} = 25 °C			6	mA
			T _{vj} = 125 °C		35	75	
Reverse recovery current	I _{rr}	V _R = 3600 V, I _F = 600 A, V _{GE} = ±15 V, di/dt = 2500 A/μs L _σ = 280 nH inductive load, switch:	T _{vj} = 25 °C		790		A
			T _{vj} = 125 °C		990		
Recovered charge	Q _{rr}		T _{vj} = 25 °C		700		μC
			T _{vj} = 125 °C		1200		
Reverse recovery time	t _{rr}		T _{vj} = 25 °C		1700		ns
			T _{vj} = 125 °C		2200		
Reverse recovery energy	E _{rec}		T _{vj} = 25 °C		1100		mJ
			T _{vj} = 125 °C		2200		
Module stray inductance	L _{σ AC}	per diode		36		nH	
Resistance, terminal-chip	R _{AA'+CC'}	per diode	T _C = 25 °C		0.2		mΩ
			T _C = 125 °C		0.3		

²⁾ Characteristic values according to IEC 60747 – 2³⁾ Forward voltage is given at chip level**Thermal properties** ⁴⁾

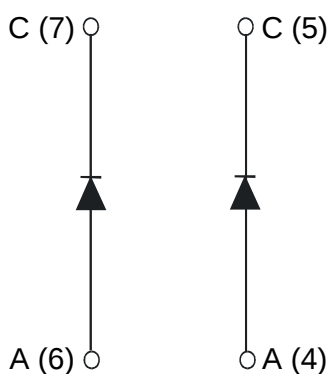
Parameter	Symbol	Conditions	min	typ	max	Unit
Diode thermal resistance junction to case	$R_{th(j-c)DIODE}$				0.021	K/W
Diode thermal resistance ⁵⁾ case to heatsink	$R_{th(c-s)DIODE}$	diode per switch, λ grease = $1\text{W}/\text{m} \times \text{K}$		0.018		K/W

Mechanical properties ⁴⁾

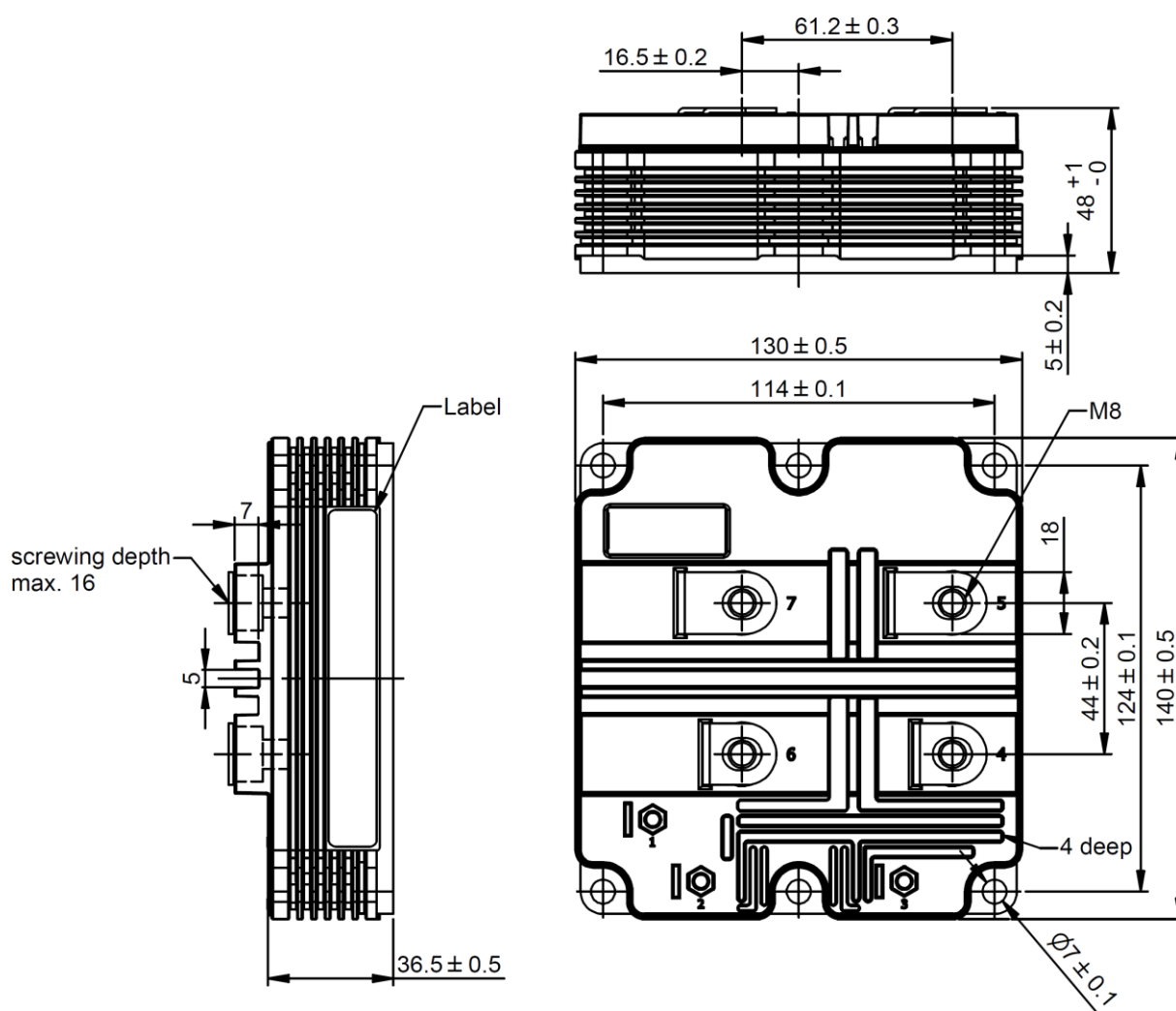
Parameter	Symbol	Conditions	min	typ	max	Unit
Dimensions	$L \times W \times H$	Typical , see outline drawing	130 × 140 × 48			mm
Clearance distance in air	d_a	according to IEC 60664-1 and EN 50124-1	Term. to base:	40		mm
			Term. to term:	26		
Surface creepage distance	d_s	according to IEC 60664-1 and EN 50124-1	Term. to base:	64		mm
			Term. to term:	56		
Comparative tracking index	CTI		≥ 600			
Mounting torques ⁵⁾	M_s	Base-heatsink, M6 screws	4		6	Nm
	M_{t1}	Main terminals, M8 screws	8		10	
Mass	m			980		g

⁴⁾ Thermal and mechanical properties according to IEC 60747 – 15⁵⁾ For detailed mounting instructions refer to ABB document no. 5SYA 2039 - 01

Electrical configuration



Outline drawing ⁵⁾



Note: all dimensions are shown in mm

⁵⁾ For detailed mounting instructions refer to ABB document no. 5SYA 2039 - 01

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.

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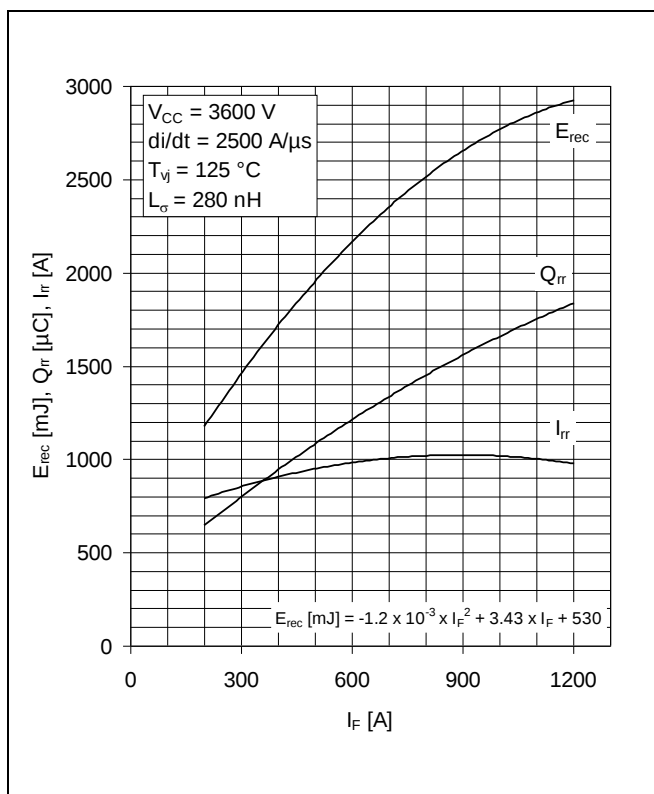


Fig. 1 Typical reverse recovery characteristics vs forward current

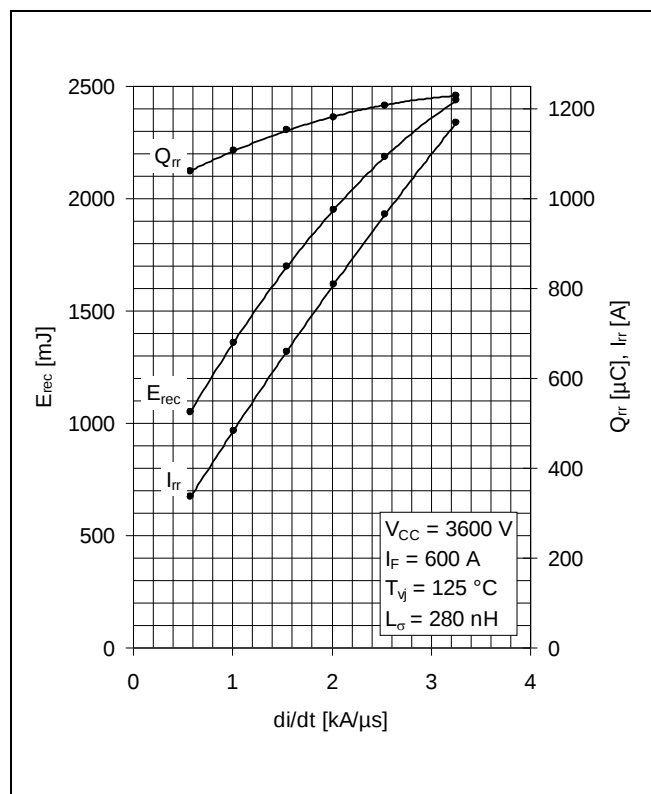


Fig. 2 Typical reverse recovery characteristics vs di/dt

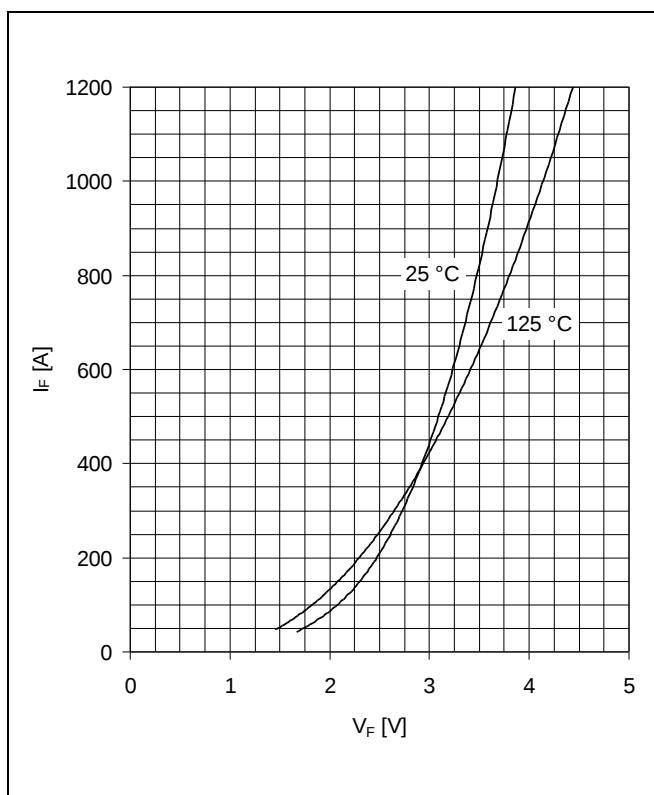


Fig. 3 Typical diode forward characteristics, chip level

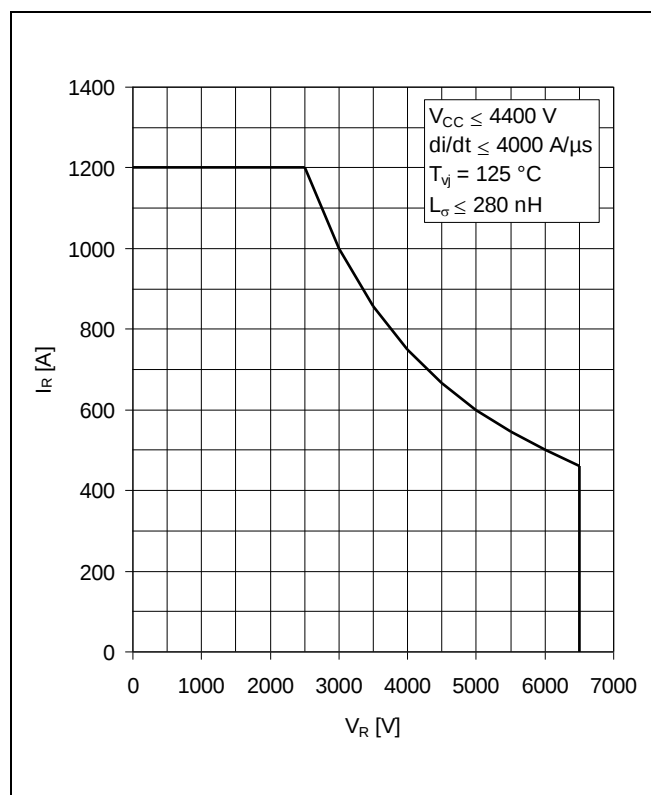


Fig. 4 Safe operating area diode (SOA)

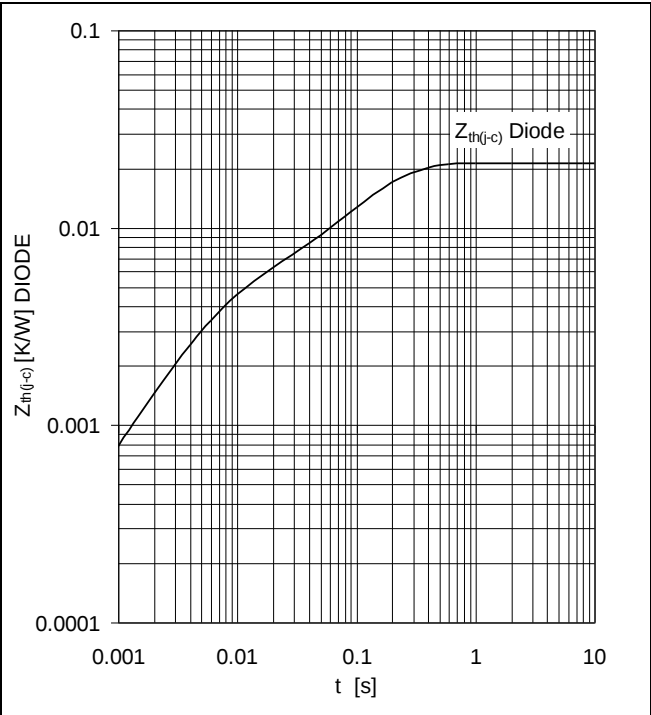


Fig. 5 Thermal impedance vs time

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 2057 IGBT diode safe operating area (SOA)
- 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

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
DIODE	R _i (K/KW)	17	4.2			
	τ _i (ms)	144	5.83			

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