

$V_{RRM} = 5500 \text{ V}$   
 $I_{FAVM} = 360 \text{ A}$   
 $I_{FRMS} = 570 \text{ A}$   
 $I_{FSM} = 10 \text{ kA}$   
 $V_{F0} = 2.70 \text{ V}$   
 $r_F = 4.0 \text{ m}\Omega$   
 $V_{DClink} = 3300 \text{ V}$

# Fast Recovery Diode for IGCT applications

## 5SDF 04F6004

### PRELIMINARY

Doc. No. 5SYA 1150-02 Feb. 99

- Patented free-floating technology
- Industry standard housing
- Cosmic radiation withstand rating
- Low on-state and switching losses
- Optimized to use in snubberless operation

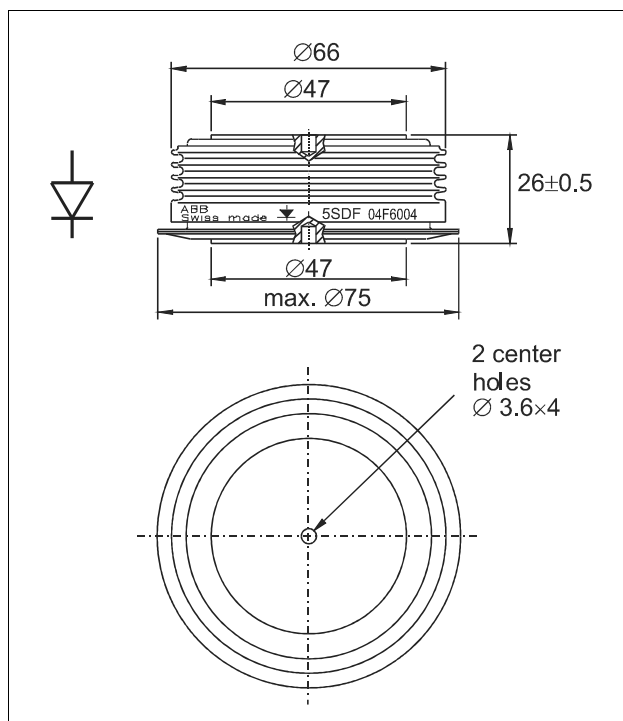
### Blocking

$V_{RRM}$	Repetitive peak reverse voltage	5500 V	Half sine wave, $t_P = 10 \text{ ms}$ , $f = 50 \text{ Hz}$	
$I_{RRM}$	Repetitive peak reverse current	$\leq 50 \text{ mA}$	$T_J = 115 \text{ }^\circ\text{C}$ , $V_R = V_{RRM}$	
$V_{DClink}$	Permanent DC voltage for 100 FIT failure rate	3300 V 3900 V	100% Duty 5% Duty	Ambient cosmic radiation at sea level in open air.

### Mechanical

$F_M$	Mounting force	min.	20 kN
		max.	24 kN
a	Acceleration:		
	Device unclamped		50 m/s <sup>2</sup>
	Device clamped		200 m/s <sup>2</sup>
m	Weight		0.46 kg
$D_S$	Surface creepage distance		33 mm
$D_a$	Air strike distance		20 mm

**Fig. 1**  
 Outline drawing.  
 All dimensions are in millimeters and represent nominal values unless stated otherwise.



**On-state**

$I_{FAVM}$	Max. average on-state current	360 A	Half sine wave, $T_c = 70\text{ °C}$	
$I_{FRMS}$	Max. RMS on-state current	570 A		
$I_{FSM}$	Max. peak non-repetitive surge current	10 kA	$t_p = 10\text{ ms}$	Before surge
		22 kA	$t_p = 1\text{ ms}$	$T_j = 115\text{ °C}$
$\int i^2 dt$	Max. surge current integral	$0.50 \cdot 10^6\text{ A}^2\text{s}$	$t_p = 10\text{ ms}$	After surge:
		$0.24 \cdot 10^6\text{ A}^2\text{s}$	$t_p = 1\text{ ms}$	$V_R \approx 0\text{ V}$
$V_F$	Forward voltage drop	$\leq 6.30\text{ V}$	$I_F = 900\text{ A}$	$T_j = 115\text{ °C}$
$V_{F0}$	Threshold voltage	2.70 V	Approximation for	
$r_F$	Slope resistance	4.0 mΩ	$I_F = 200 \dots 2000\text{ A}$	

**Turn-on**

$V_{fr}$	Peak forward recovery voltage	$\leq 80\text{ V}$	$di/dt = 500\text{ A}/\mu\text{s}$ , $T_j = 115\text{ °C}$
----------	-------------------------------	--------------------	--

**Turn-off**

$di/dt_{crit}$	Max. decay rate of on-state current	$\leq 400\text{ A}/\mu\text{s}$	$I_F = 900\text{ A}$ , $T_j = 115\text{ °C}$ $V_{DClint} = 3300\text{ V}$
$I_{rr}$	Reverse recovery current	$\leq 470\text{ A}$	$I_F = 900\text{ A}$ , $V_{DClint} = 3300\text{ V}$ $di/dt = 350\text{ A}/\mu\text{s}$ , $T_j = 115\text{ °C}$
$E_{rr}$	Reverse recovery energy	$\leq 2.90\text{ J}$	

**Thermal**

$T_j$	Operating junction temperature range	-40...115 °C		
$T_{stg}$	Storage temperature range	-40...125 °C		
$R_{thJC}$	Thermal resistance junction to case	$\leq 40\text{ K/W}$	Anode side cooled	$F_M = 20 \dots 24\text{ kN}$
		$\leq 40\text{ K/W}$	Cathode side cooled	
		$\leq 20\text{ K/W}$	Double side cooled	
$R_{thCH}$	Thermal resistance case to heatsink	$\leq 10\text{ K/W}$	Single side cooled	
		$\leq 5\text{ K/W}$	Double side cooled	

ABB Semiconductors AG reserves the right to change specifications without notice.



**ABB Semiconductors AG**  
 Fabrikstrasse 2  
 CH-5600 Lenzburg, Switzerland

Doc. No. 5SYA 1150-02 Feb. 99

Tel: +41 (0)62 888 6419  
 Fax: +41 (0)62 888 6306  
 E-mail: info@ch.abb.com  
 Internet: www.abbsem.com