BYC8X-600

Rectifier diode ultrafast, low switching loss

Rev. 01.mm — 4 April 2006 Preliminary data sheet

1. Product profile

1.1 General description

Ultrafast, epitaxial rectifier diode in a SOD113 (2-lead TO220 full pack) plastic package.

1.2 Features

- Extremely fast switching
- Low reverse recovery current
- Low thermal resistance
- Reduces switching loss in associated MOSFET
- Isolated package

1.3 Applications

- Half-bridge / full bridge switched-mode power supplies
- Half-bridge lighting ballasts
- CCM PFC
- Active power factor correction

1.4 Quick reference data

- $V_R \leq 600$ V
- $V_F \leq 1.85$ V
- $I_F \leq 8$ A
- $t_{rr} \leq 19$ ns

2. Pinning information

Table 1: Pinning

Pin	Description	Simplified outline	Symbol
1	cathode		
2	anode		
mb	isolated		

PHILIPS

3. Ordering information

Table 2: Ordering information

Type number	Package		
	Name	Description	Version
BYC8X-600	TO220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 2-lead TO220 full pack	SOD113

4. Limiting values

Table 3: Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RRM}	repetitive peak reverse voltage		-	-	600	V
V_{RWM}	crest working reverse voltage		-	-	600	V
V_R	continuous reverse voltage	$T_h \leq 100$ °C	-	-	500	
$I_{F(AV)}$	average rectified output current	square wave; $\delta = 0.5$; with reapplied $V_{RRM(MAX)}$; $T_h \leq 64$ °C	-	-	8	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; with reapplied $V_{RRM(MAX)}$; $T_h \leq 64$ °C	-	-	16	A
I_{FSM}	non-repetitive peak forward current	t = 10 ms; sinusoidal	-	-	80	A
		t = 8.3 ms; sinusoidal	-	-	88	A
T_{stg}	storage temperature		-40	–	+150	°C
T_j	junction temperature		-	-	150	°C
V_{isol}	r.m.s isolation voltage from both terminals to external heatsink	f = 50 to 60z; sinusiodal waveform; R.H. ≤ 65 %; $T_h = 25$ °C	-	-	2500	V
C_{isol}	capacitance from both terminals to external heatsink	f = 1 MHz; $T_h = 25$ °C	-	10	-	pF

5. Thermal characteristics

Table 4: Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound;	-	-	4.8	K/W
		without heatsink compound	-	-	5.9	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	55	-	K/W

6. Static characteristics

Table 5: Static characteristics

T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	I_F = 8 A; T_j = 150 °C	-	1.4	1.85	V
		I_F = 16 A; T_j = 150 °C	-	1.7	2.3	V
		I_F = 8 A	-	2.0	2.9	V
I_R	reverse current	V_R = 600 V	-	9	150	µA
		V_R = 500 V; T_j = 100 °C	-	1.1	3.0	mA

7. Dynamic characteristics

Table 6: Dynamic characteristics

Symbol	Parameter	Conditions	<tbd>			Unit
			Min	Typ	Max	
t_{rr}	reverse recovery time	I_F = 1 A to V_R = 30 V; dI_F/dt = 50 A / µs	-	30	52	ns
t_{rr}	reverse recovery time	I_F = 8 A to V_R = 400 V; dI_F/dt = 500 A / µs	-	19	-	ns
t_{rr}	reverse recovery time	I_F = 8 A to V_R = 400 V; dI_F/dt = 500 A / µs; T_j= 100 ° C	-	32	40	ns
I_{rrm}	peak reverse recovery current	I_F = 8 A to V_R = 400 V; dI_F/dt = 50 A / µs; T_J = 125 ° C	-	1.5	5.5	A
I_{rrm}	peak reverse recovery current	I_F = 8 A to V_R = 400 V; dI_F/dt = 50 A / µs; T_J = 100 ° C	-	9.5	12	A
V_{fr}	forward recovery voltage	I_F = 10 A; dI_F/dt = 100 A / µs	-	8	10	V

8. Revision history

Table 7: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BCY8X_600_1		Preliminary text only data sheet	-	-	-

9. Data sheet status

Level	Data sheet status [1]	Product status [2] [3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

10. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

11. Disclaimers

Life support — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

12. Trademarks

Notice — All referenced brands, product names, service names and trademarks are the property of their respective owners.

13. Contact information

For additional information, please visit: **http://www.semiconductors.philips.com**

For sales office addresses, send an email to: **sales.addresses@www.semiconductors.philips.com**

14. Contents