

BYC10X-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

- $V_R \leq 600 \text{ V}$
- $V_F \leq 1.8 \text{ V}$
- $I_F \leq 10 \text{ A}$
- $t_{rr} \leq 19 \text{ ns}$

2. Pinning information

Table 1: Pinning

Pin	Description	Simplified outline	Symbol
1	cathode		
2	anode		
mb	isolated		

3. Ordering information

Table 2: Ordering information

Type number	Package		Version
	Name	Description	
BYC10X-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	$T_h \leq 100\text{ °C}$	-	-	500	
$I_{F(AV)}$	average rectified output current	square wave; $\delta = 0.5$; with reappplied $V_{RRM(MAX)}$; $T_h \leq 40\text{ °C}$	-	-	10	A
I_{FRM}	repetitive peak forward current	$\delta = 0.5$; with reappplied $V_{RRM(MAX)}$; $T_h \leq 40\text{ °C}$	-	-	20	A
I_{FSM}	non-repetitive peak forward current	$t = 10\text{ ms}$; sinusoidal	-	-	91	A
		$t = 8.3\text{ ms}$; sinusoidal	-	-	100	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	$f = 50\text{ to }60\text{z}$; sinusoidal waveform; R.H. $\leq 65\%$; $T_h = 25\text{ °C}$			2500	V
C_{isol}	capacitance from both terminals to external heatsink	$f = 1\text{ MHz}$; $T_h = 25\text{ °C}$		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

$T_j = 25\text{ °C}$ unless otherwise specified.

Symbol	Parameter	Conditions				Unit
			Min	Typ	Max	
V_F	forward voltage	$I_F = 10\text{ A}; T_j = 150\text{ °C}$	-	1.4	1.8	V
		$I_F = 20\text{ A}; T_j = 150\text{ °C}$	-	1.7	2.3	V
		$I_F = 10\text{ A}$	-	2.0	2.9	V
I_R	reverse current	$V_R = 600\text{ V}$	-	9	200	μA
		$V_R = 500\text{ V}; T_j = 100\text{ °C}$	-	1.1	3.0	mA

7. Dynamic characteristics

Table 6: Dynamic characteristics

Symbol	Parameter	Conditions				Unit
			Min	Typ	Max	
t_{rr}	reverse recovery time	$I_F = 1 \text{ A}$ to $V_R = 30 \text{ V}$; $di_F/dt = 50 \text{ A} / \mu\text{s}$	-	35	55	ns
t_{rr}	reverse recovery time	$I_F = 10 \text{ A}$ to $V_R = 400 \text{ V}$; $di_F/dt = 500 \text{ A} / \mu\text{s}$	-	19	-	ns
t_{rr}	reverse recovery time	$I_F = 10 \text{ A}$ to $V_R = 400 \text{ V}$; $di_F/dt = 500 \text{ A} / \mu\text{s}$; $T_j = 100 \text{ }^\circ\text{C}$	-	32	40	ns
I_{rrm}	peak reverse recovery current	$I_F = 10 \text{ A}$ to $V_R = 400 \text{ V}$; $di_F/dt = 50 \text{ A} / \mu\text{s}$; $T_j = 125 \text{ }^\circ\text{C}$	-	3.0	7.5	A
I_{rrm}	peak reverse recovery current	$I_F = 10 \text{ A}$ to $V_R = 400 \text{ V}$; $di_F/dt = 500 \text{ A} / \mu\text{s}$; $T_j = 100 \text{ }^\circ\text{C}$	-	9.5	12	A
V_{fr}	forward recovery voltage	$I_F = 10 \text{ A}$; $di_F/dt = 100 \text{ A} / \mu\text{s}$	-	8	11	V

8. Revision history

Table 7: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BCY10X_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.
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