

PMBD914

Single high-speed switching diode

Rev. 06 — 11 February 2009 Product data sheet

1. Product profile

1.1 General description

Single high-speed switching diode, fabricated in planar technology, and encapsulated in a small Surface-Mounted Device (SMD) plastic package.

Table 1. Product overview

Type number[1]	Package	
	NXP	JEDEC
PMBD914	SOT23	TO-236AB
PMBD914/DG		

[1] /DG: halogen-free

1.2 Features

- High switching speed: $t_{rr} \leq 4$ ns
- Low leakage current
- Repetitive peak reverse voltage: $V_{RRM} \leq 100$ V
- Low capacitance: $C_d \leq 1.5$ pF
- Reverse voltage: $V_R \leq 100$ V
- Small SMD plastic package

1.3 Applications

- High-speed switching

1.4 Quick reference data

Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_F	forward current		[1]	-	-	215	mA
V_R	reverse voltage			-	-	100	V
t_{rr}	reverse recovery time		[2]	-	-	4	ns

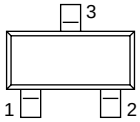
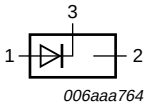
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] When switched from $I_F = 10$ mA to $I_R = 10$ mA; $R_L = 100\ \Omega$; measured at $I_R = 1$ mA.

NXP founded by Philips

2. Pinning information

Table 3. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	anode		
2	not connected		
3	cathode		

3. Ordering information

Table 4. Ordering information

Type number[1]	Package		
	Name	Description	Version
PMBD914	-	plastic surface-mounted package; 3 leads	SOT23
PMBD914/DG			

[1] /DG: halogen-free

4. Marking

Table 5. Marking codes

Type number	Marking code[1]
PMBD914	*5D
PMBD914/DG	YB*

[1] * = -: made in Hong Kong
* = p: made in Hong Kong
* = t: made in Malaysia
* = W: made in China

5. Limiting values

Table 6. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{RRM}	repetitive peak reverse voltage			-	100	V
V_R	reverse voltage			-	100	V
I_F	forward current		[1]	-	215	mA
I_{FRM}	repetitive peak forward current			-	500	mA
I_{FSM}	non-repetitive peak forward current	square wave	[2]			
		t_p = 1 µs		-	4	A
		t_p = 1 ms		-	1	A
		t_p = 1 s		-	0.5	A

© NXP B.V. 2009. All rights reserved.

Table 6. Limiting values *…continued*

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

Symbol	Parameter	Conditions		Min	Max	Unit
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1][3]	-	250	mW
T_j	junction temperature			-	150	°C
T_{stg}	storage temperature			–65	+150	°C

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] T_j = 25 °C prior to surge.

[3] Soldering point of cathode tab.

6. Thermal characteristics

Table 7. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W
$R_{th(j-t)}$	thermal resistance from junction to tie-point		[2]	-	-	330	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[2] Soldering point of cathode tab.

7. Characteristics

Table 8. Characteristics

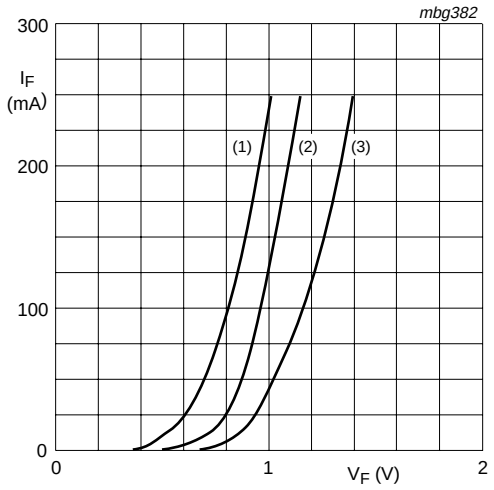
T_{amb} = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 1 mA		-	-	715	mV
		I_F = 10 mA		-	-	855	mV
		I_F = 50 mA		-	-	1	V
		I_F = 150 mA		-	-	1.25	V
I_R	reverse current	V_R = 25 V		-	-	25	nA
		V_R = 75 V		-	-	1	µA
		V_R = 25 V; T_j = 150 °C		-	-	30	µA
		V_R = 75 V; T_j = 150 °C		-	-	50	µA
C_d	diode capacitance	f = 1 MHz; V_R = 0 V		-	-	1.5	pF
t_{rr}	reverse recovery time		[1]	-	-	4	ns
V_{FR}	forward recovery voltage		[2]	-	-	1.75	V

[1] When switched from I_F = 10 mA to I_R = 10 mA; R_L = 100 Ω; measured at I_R = 1 mA.

[2] When switched from I_F = 10 mA; t_r = 20 ns.

© NXP B.V. 2009. All rights reserved.

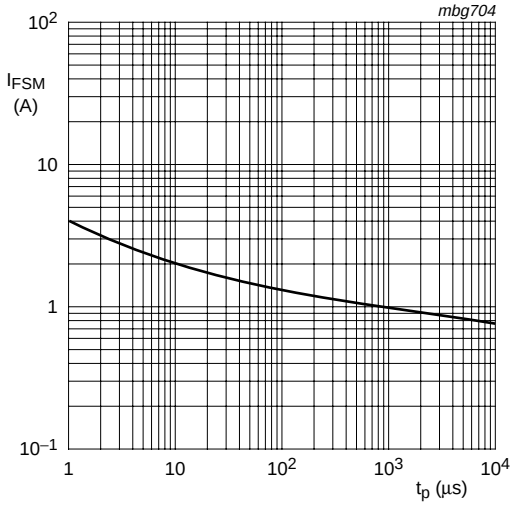


(1) T_{amb} = 150 °C; typical values

(2) T_{amb} = 25 °C; typical values

(3) T_{amb} = 25 °C; maximum values

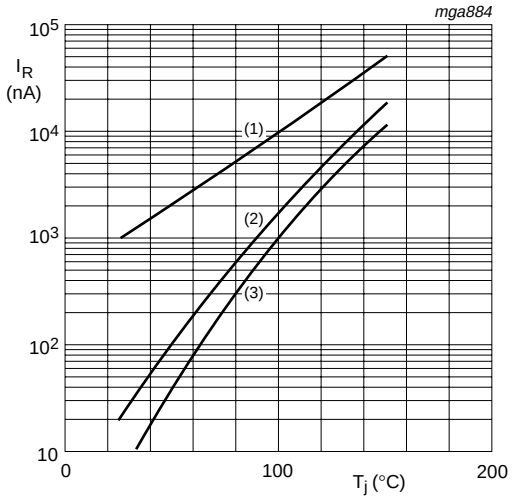
Fig 1. Forward current as a function of forward voltage



Based on square wave currents.

T_j = 25 °C; prior to surge

Fig 2. Non-repetitive peak forward current as a function of pulse duration; maximum values

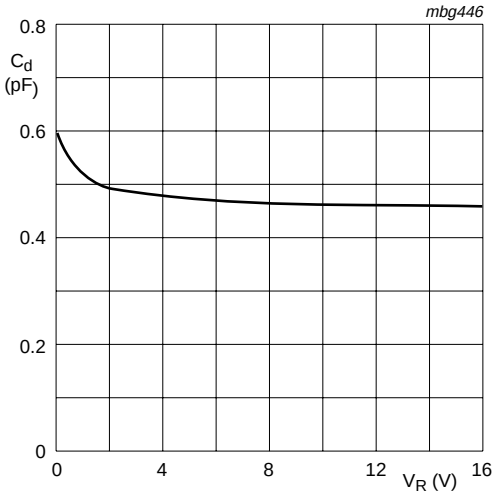


(1) V_R = 75 V; maximum values

(2) V_R = 75 V; typical values

(3) V_R = 25 V; typical values

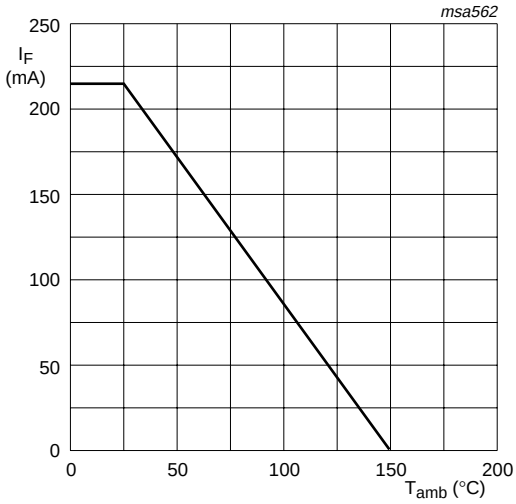
Fig 3. Reverse current as a function of junction temperature



f = 1 MHz; T_{amb} = 25 °C

Fig 4. Diode capacitance as a function of reverse voltage; typical values

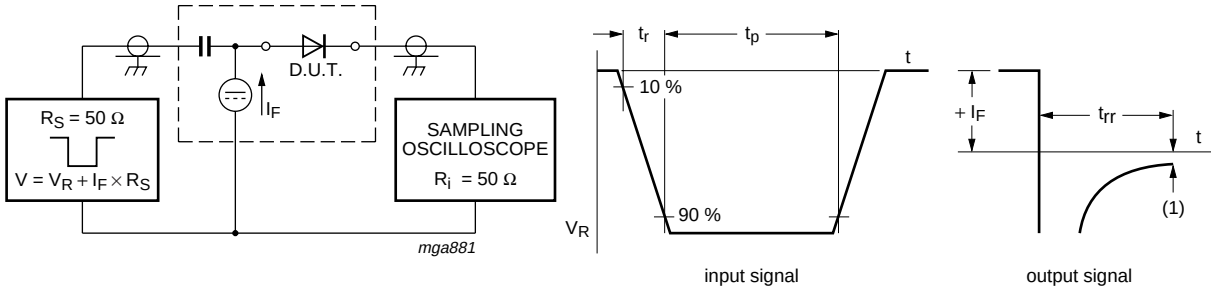
© NXP B.V. 2009. All rights reserved.



FR4 PCB, standard footprint

Fig 5. Forward current as a function of ambient temperature; derating curve

8. Test information



(1) I_R = 1 mA

Fig 6. Reverse recovery time test circuit and waveforms

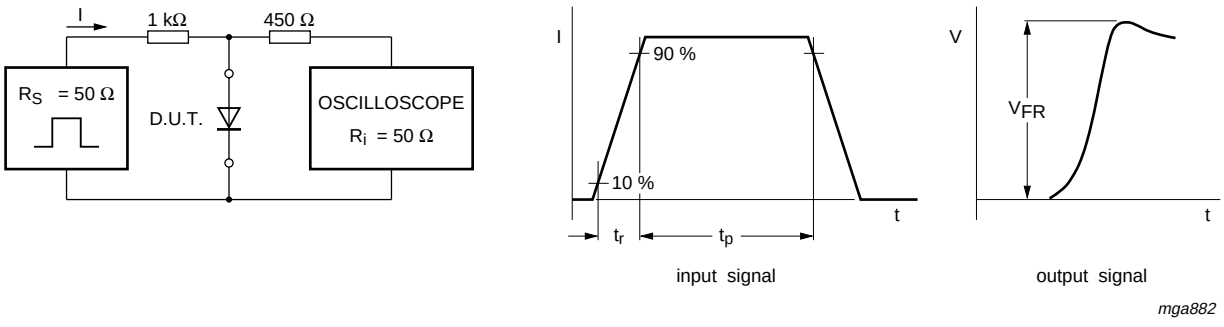


Fig 7. Forward recovery voltage test circuit and waveforms

© NXP B.V. 2009. All rights reserved.

9. Package outline

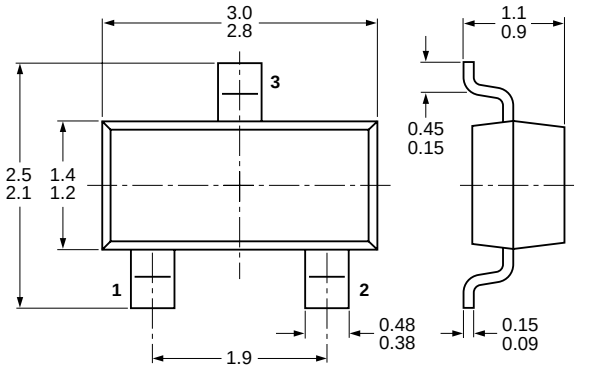


Fig 8. Package outline SOT23 (TO-236AB)

10. Packing information

Table 9. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.[1]

Type number[2]	Package	Description	Packing quantity	
			3000	10000
PMBD914	SOT23	4 mm pitch, 8 mm tape and reel	-215	-235
PMBD914/DG				

[1] For further information and the availability of packing methods, see Section 14.

[2] /DG: halogen-free

© NXP B.V. 2009. All rights reserved.

11. Soldering

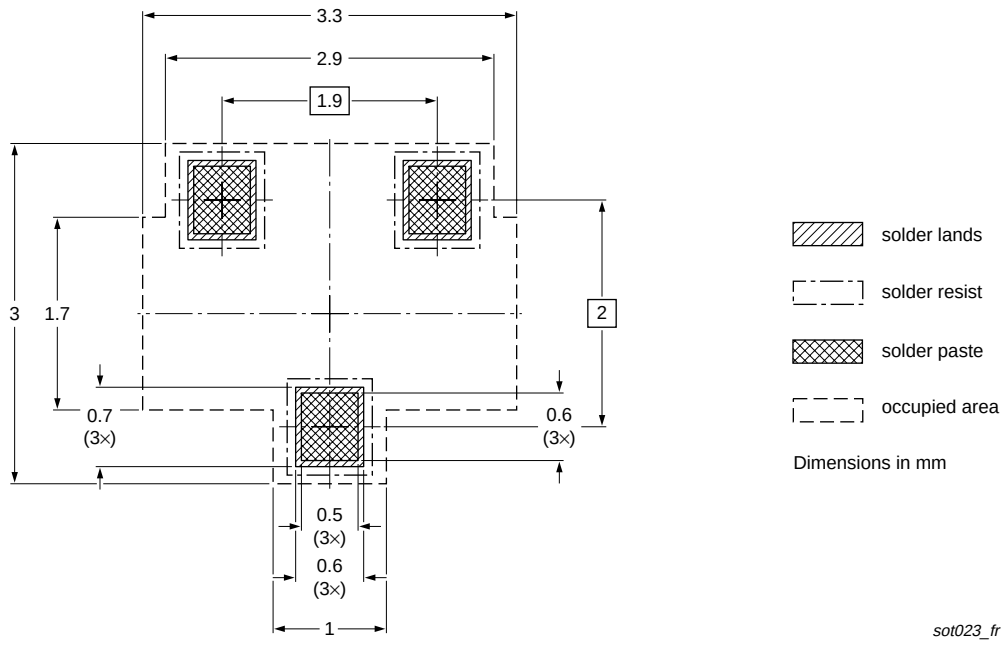


Fig 9. Reflow soldering footprint SOT23 (TO-236AB)

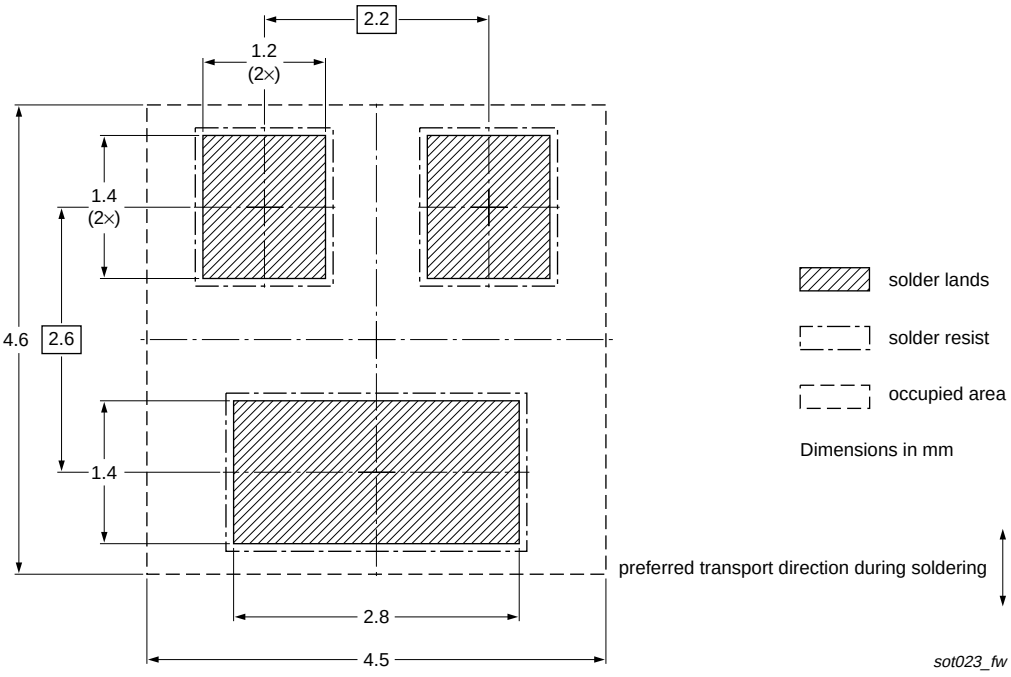


Fig 10. Wave soldering footprint SOT23 (TO-236AB)

© NXP B.V. 2009. All rights reserved.

12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PMBD914_6	20090211	Product data sheet	-	PMBD914_5
Modifications:	• Type number PMBD914/DG added • Section 13 “Legal information”: updated			
PMBD914_5	20071126	Product data sheet	-	PMBD914_4
PMBD914_4	20040106	Product specification	-	PMBD914_3
PMBD914_3	19990511	Product specification	-	PMBD914_2
PMBD914_2	19960918	Product specification	-	PMBD914_1
PMBD914_1	19960404	Product specification	-	-

© NXP B.V. 2009. All rights reserved.

13. Legal information

13.1 Data sheet status

Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

13.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

13.3 Disclaimers

General — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

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

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

Terms and conditions of sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nxp.com/profile/terms, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

13.4 Trademarks

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

14. Contact information

For more information, please visit: **http://www.nxp.com**

For sales office addresses, please send an email to: **salesaddresses@nxp.com**

© NXP B.V. 2009. All rights reserved.

15. Contents

1	**Product profile**	**1**
1.1	General description	1
1.2	Features	1
1.3	Applications	1
1.4	Quick reference data	1
2	**Pinning information**	**2**
3	**Ordering information**	**2**
4	**Marking**	**2**
5	**Limiting values**	**2**
6	**Thermal characteristics**	**3**
7	**Characteristics**	**3**
8	**Test information**	**5**
9	**Package outline**	**6**
10	**Packing information**	**6**
11	**Soldering**	**7**
12	**Revision history**	**8**
13	**Legal information**	**9**
13.1	Data sheet status	9
13.2	Definitions	9
13.3	Disclaimers	9
13.4	Trademarks	9
14	**Contact information**	**9**
15	**Contents**	**10**

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

© NXP B.V. 2009. **All rights reserved.**

For more information, please visit: http://www.nxp.com
For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 11 February 2009
Document identifier: PMBD914_6

founded by

PHILIPS