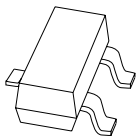


# PMBD914

## 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**

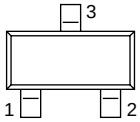
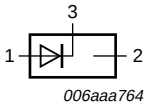
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_F$ | forward current | | [1] | - | - | 215 | mA |
| $V_R$ | reverse voltage | | | - | - | 100 | V |
| $t_{rr}$ | reverse recovery time | | [2] | - | - | 4 | ns |

[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.

## 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 |

**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

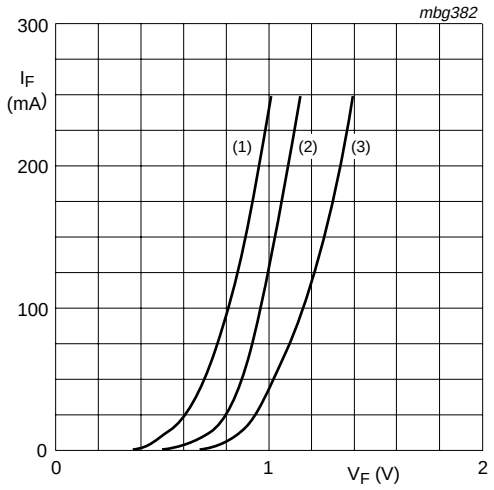
**Table 8. Characteristics**

*$T_{amb}$ = 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.

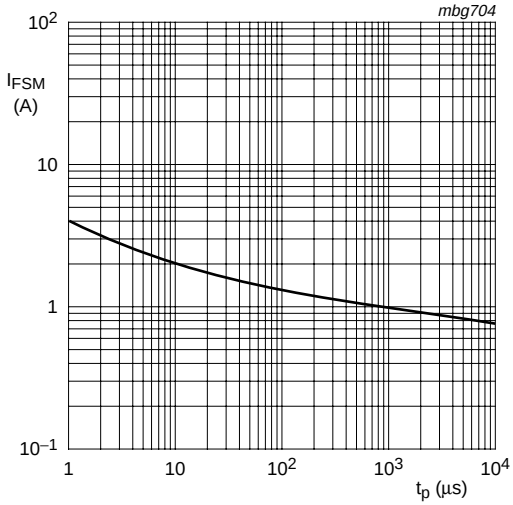



(1) $T_{amb}$ = 150 °C; typical values

(2) $T_{amb}$ = 25 °C; typical values

(3) $T_{amb}$ = 25 °C; maximum values

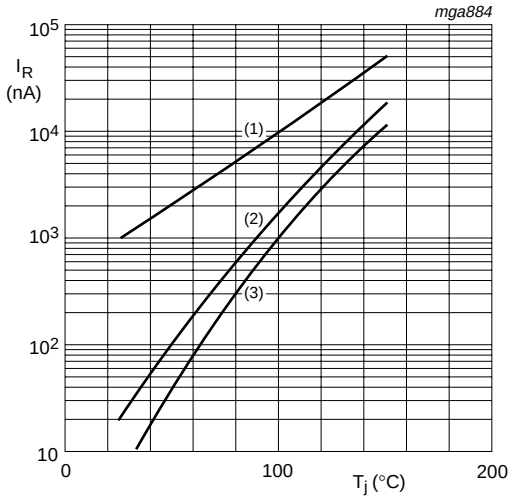
**Fig 1. Forward current as a function of forward voltage**




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**

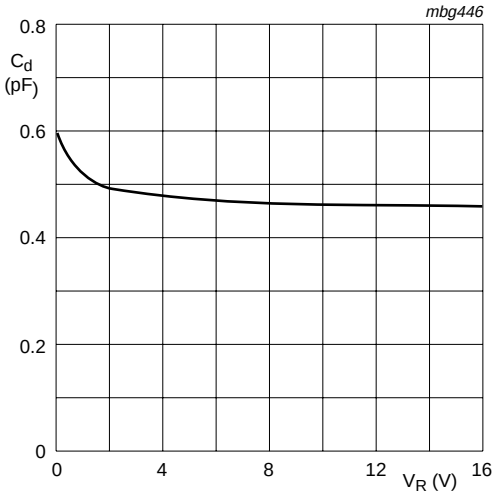



(1) $V_R$ = 75 V; maximum values

(2) $V_R$ = 75 V; typical values

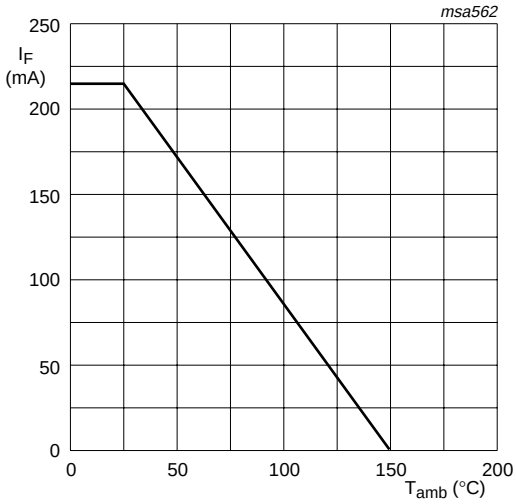
(3) $V_R$ = 25 V; typical values

**Fig 3. Reverse current as a function of junction temperature**




f = 1 MHz; $T_{amb}$ = 25 °C

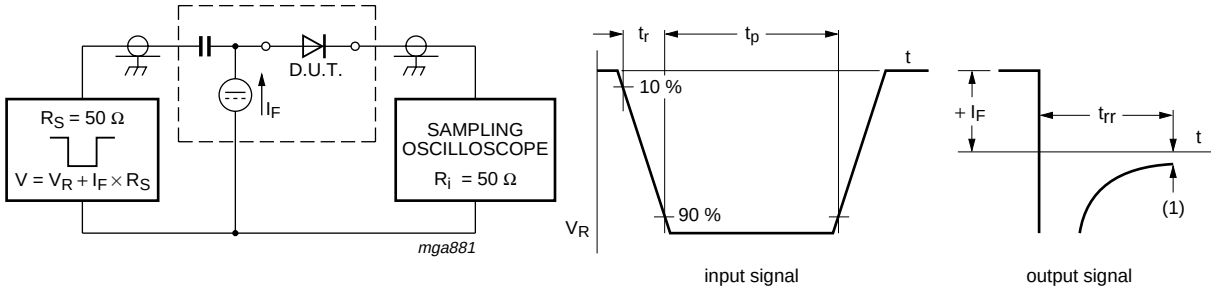
**Fig 4. Diode capacitance as a function of reverse voltage; typical values**




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**

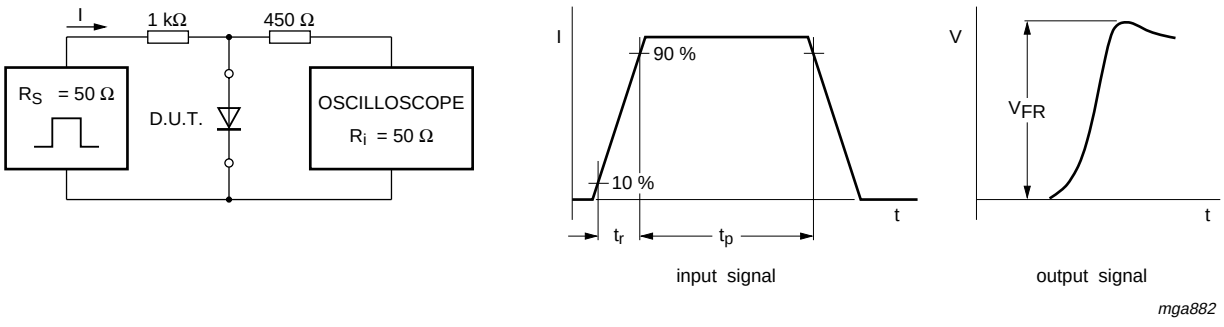



**Fig 7. Forward recovery voltage test circuit and waveforms**

## 9. Package outline

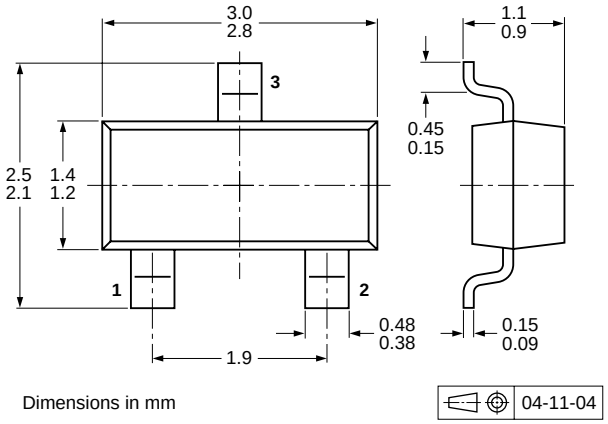



**Fig 8. Package outline SOT23 (TO-236AB)**

## 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

## 11. Soldering

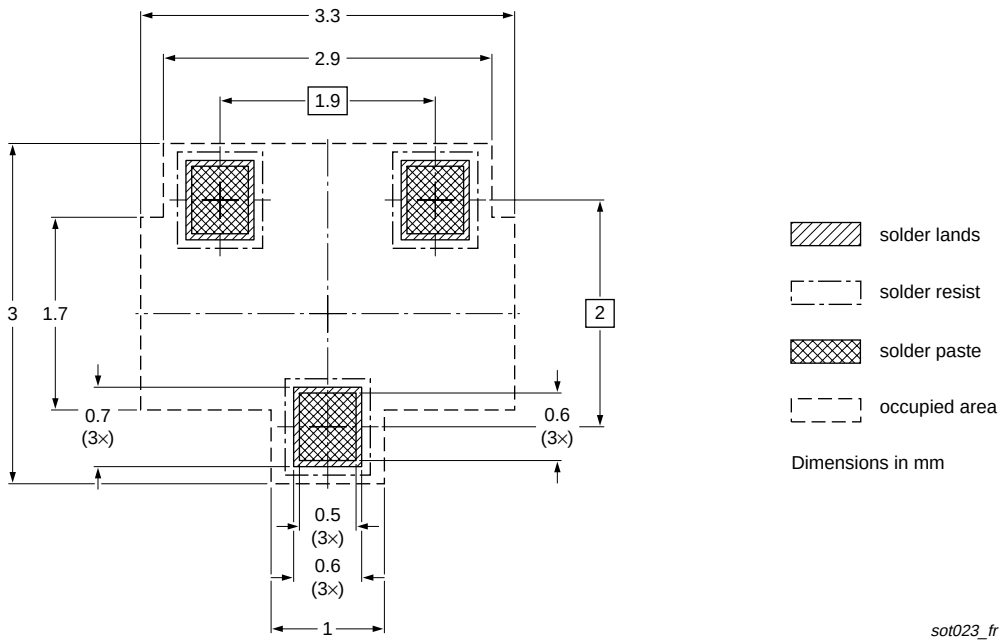



**Fig 9. Reflow soldering footprint SOT23 (TO-236AB)**

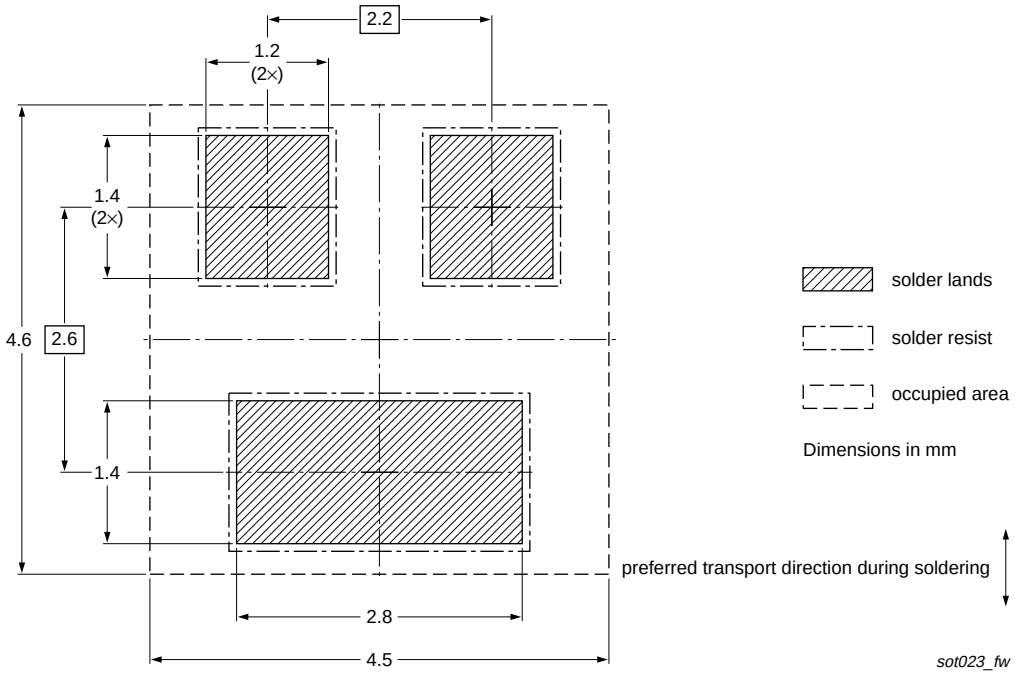



**Fig 10. Wave soldering footprint SOT23 (TO-236AB)**

## 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<br>• 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 | - | - |

# 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".

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