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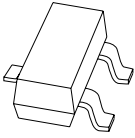
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Kind regards,

Team Nexperia



PMBD7000

Double high-speed switching diode

Rev. 4 — 16 September 2010

Product data sheet

1. Product profile

1.1 General description

The PMBD7000 consists of two high-speed switching diodes connected in series, fabricated in planar technology, and encapsulated in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- High switching speed: $t_{rr} \leq 4$ ns
- Repetitive peak forward current: $I_{FRM} \leq 450$ mA
- Small SMD plastic package
- Reverse voltage: $V_R \leq 100$ V
- Repetitive peak reverse voltage: $V_{RRM} \leq 100$ V
- AEC-Q101 qualified

1.3 Applications

- High-speed switching
- General-purpose switching

1.4 Quick reference data

Table 1. Quick reference data

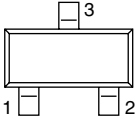
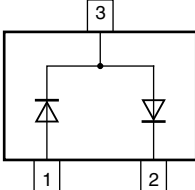
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|-----------------------|---------------|-----|-----|-----|---------|
| Per diode | | | | | | |
| I_R | reverse current | $V_R = 100$ V | - | - | 0.5 | μ A |
| V_R | reverse voltage | | - | - | 100 | V |
| t_{rr} | reverse recovery time | | [1] | - | 4 | ns |

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



2. Pinning information

Table 2. Pinning

| Pin | Description | Simplified outline | Graphic symbol |
|-----|---------------------------------------|---|---|
| 1 | anode (diode 1) |  |  |
| 2 | cathode (diode 2) | | |
| 3 | cathode (diode 1), anode (diode 2) | | |

006aaa763

3. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| PMBD7000 | - | plastic surface-mounted package; 3 leads | SOT23 |

4. Marking

Table 4. Marking codes

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| PMBD7000 | *5C |

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

5. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-------------------|-------------------------------------|--|----------|------|------------------|
| Per diode | | | | | |
| V_{RRM} | repetitive peak reverse voltage | | - | 100 | V |
| V_R | reverse voltage | | - | 100 | V |
| I_F | forward current | | [1] - | 215 | mA |
| | | | [2] - | 125 | mA |
| I_{FRM} | repetitive peak forward current | | - | 450 | mA |
| I_{FSM} | non-repetitive peak forward current | square wave | [3] | | |
| | | $t_p = 1 \mu\text{s}$ | - | 4 | A |
| | | $t_p = 1 \text{ms}$ | - | 1 | A |
| | | $t_p = 1 \text{s}$ | - | 0.5 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25 \text{ }^\circ\text{C}$ | [1][4] - | 250 | mW |
| Per device | | | | | |
| T_j | junction temperature | | - | 150 | $^\circ\text{C}$ |
| T_{amb} | ambient temperature | | -55 | +150 | $^\circ\text{C}$ |
| T_{stg} | storage temperature | | -65 | +150 | $^\circ\text{C}$ |

[1] Single diode loaded.

[2] Double diode loaded.

[3] $T_j = 25 \text{ }^\circ\text{C}$ prior to surge.

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

6. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---------------|---|-------------|----------|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1][2] - | - | 500 | K/W |
| $R_{th(j-t)}$ | thermal resistance from junction to tie-point | | - | - | 360 | K/W |

[1] Single diode loaded.

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

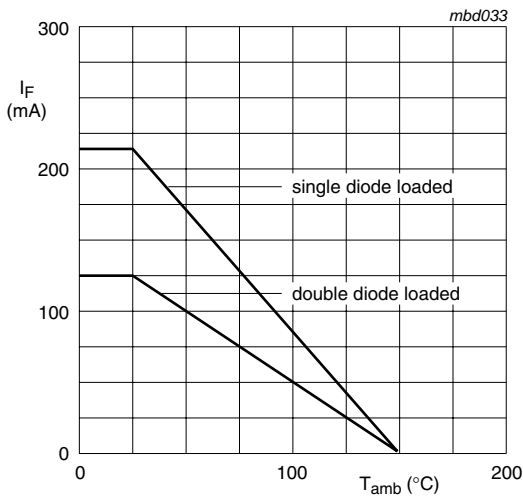
7. Characteristics

Table 7. Characteristics
 $T_j = 25\text{ °C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|------------------|--------------------------|--|-----|------|------|---------------|
| Per diode | | | | | | |
| V_F | forward voltage | $I_F = 1\text{ mA}$ | - | 550 | 700 | mV |
| | | $I_F = 10\text{ mA}$ | - | 670 | 820 | mV |
| | | $I_F = 50\text{ mA}$ | - | - | 1 | V |
| | | $I_F = 100\text{ mA}$ | - | 0.75 | 1.1 | V |
| | | $I_F = 150\text{ mA}$ | - | - | 1.25 | V |
| I_R | reverse current | $V_R = 50\text{ V}$ | - | - | 300 | nA |
| | | $V_R = 100\text{ V}$ | - | - | 500 | nA |
| | | $V_R = 50\text{ V}; T_j = 150\text{ °C}$ | - | - | 100 | μA |
| C_d | diode capacitance | $f = 1\text{ MHz}; V_R = 0\text{ V}$ | - | - | 1.5 | pF |
| t_{rr} | reverse recovery time | | [1] | - | 4 | ns |
| V_{FR} | forward recovery voltage | | [2] | - | 1.75 | V |

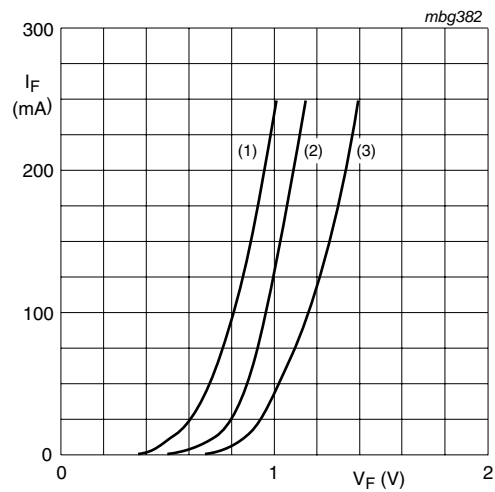
[1] When switched from $I_F = 10\text{ mA}$ to $I_R = 10\text{ mA}$; $R_L = 100\ \Omega$; measured at $I_R = 1\text{ mA}$.

[2] When switched from $I_F = 10\text{ mA}$; $t_r = 20\text{ ns}$.



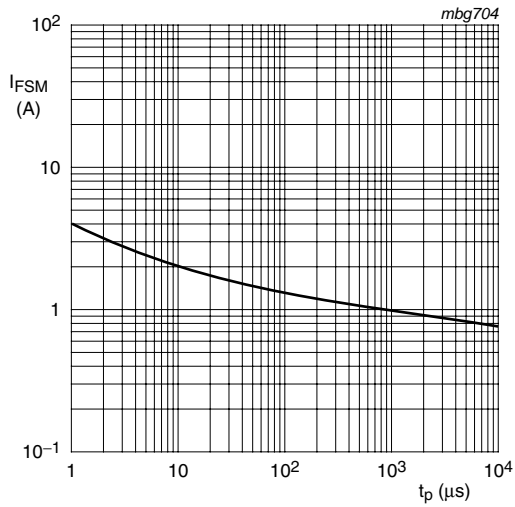
FR4 PCB, standard footprint

Fig 1. Forward current as a function of ambient temperature; derating curve



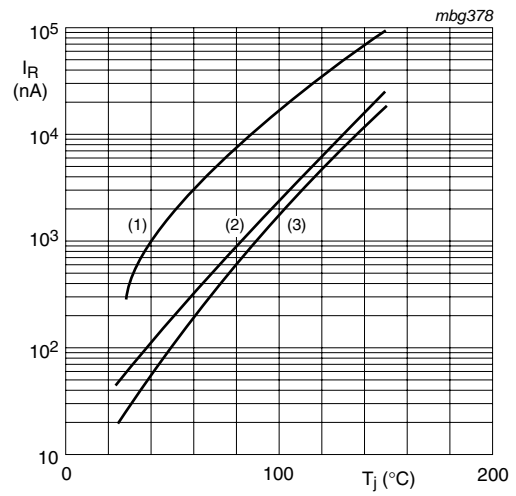
- (1) $T_j = 150\text{ °C}$; typical values
- (2) $T_j = 25\text{ °C}$; typical values
- (3) $T_j = 25\text{ °C}$; maximum values

Fig 2. Forward current as a function of forward voltage



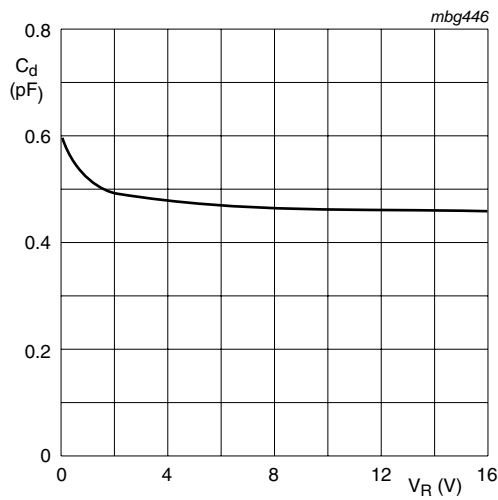
Based on square wave currents.
 $T_j = 25\text{ }^\circ\text{C}$; prior to surge

Fig 3. Non-repetitive peak forward current as a function of pulse duration; maximum values



- (1) $V_R = 50\text{ V}$; maximum values
- (2) $V_R = 30\text{ V}$; typical values
- (3) $V_R = 50\text{ V}$; typical values

Fig 4. Reverse current as a function of junction temperature



$f = 1\text{ MHz}$; $T_{amb} = 25\text{ }^\circ\text{C}$

Fig 5. Diode capacitance as a function of reverse voltage; typical values

8. Test information

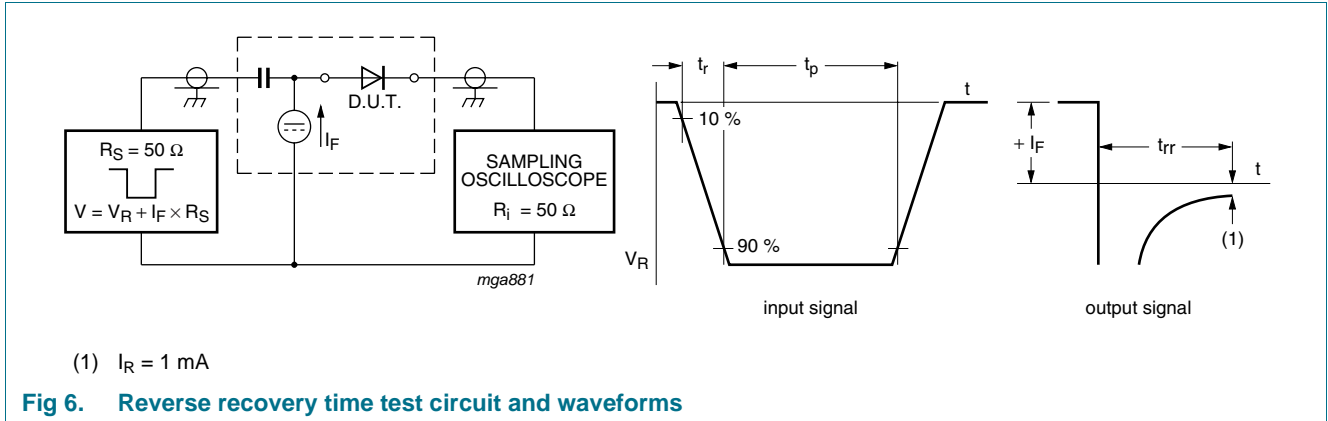


Fig 6. Reverse recovery time test circuit and waveforms

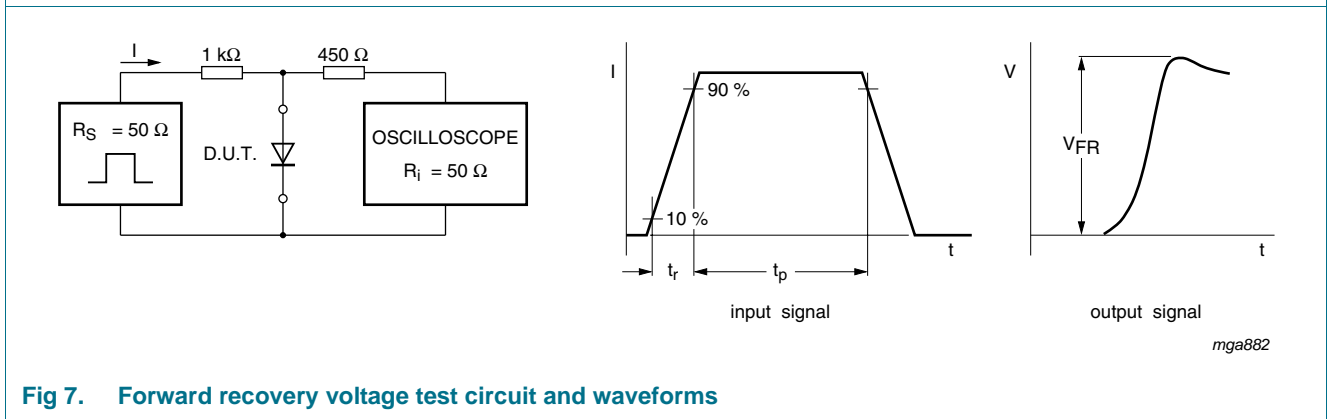
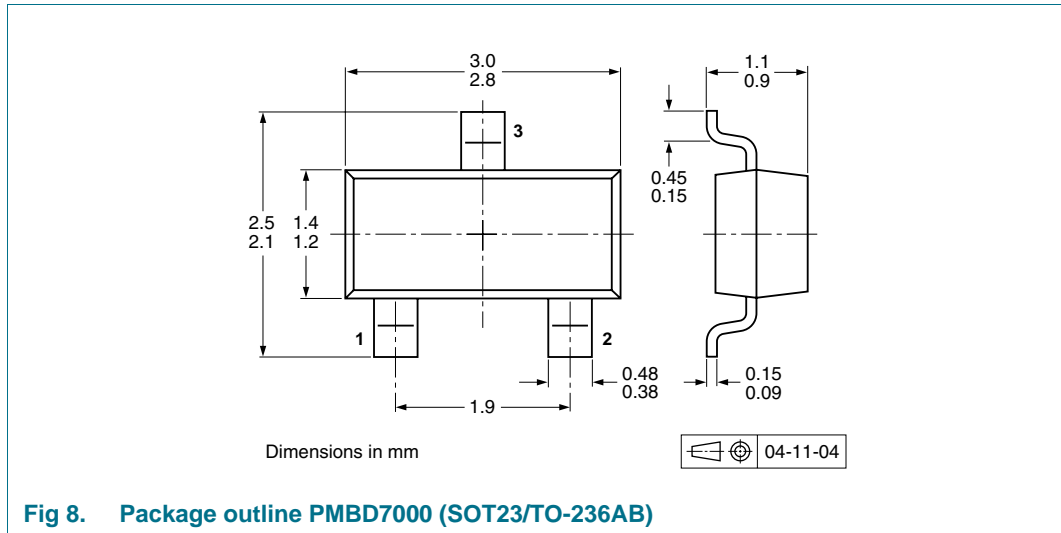


Fig 7. Forward recovery voltage test circuit and waveforms

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard *Q101 - Stress test qualification for discrete semiconductors*, and is suitable for use in automotive applications.

9. Package outline



10. Packing information

Table 8. Packing methods

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

| Type number | Package | Description | Packing quantity | |
|-------------|---------|--------------------------------|------------------|-------|
| | | | 3000 | 10000 |
| PMBD7000 | SOT23 | 4 mm pitch, 8 mm tape and reel | -215 | -235 |

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

11. Soldering

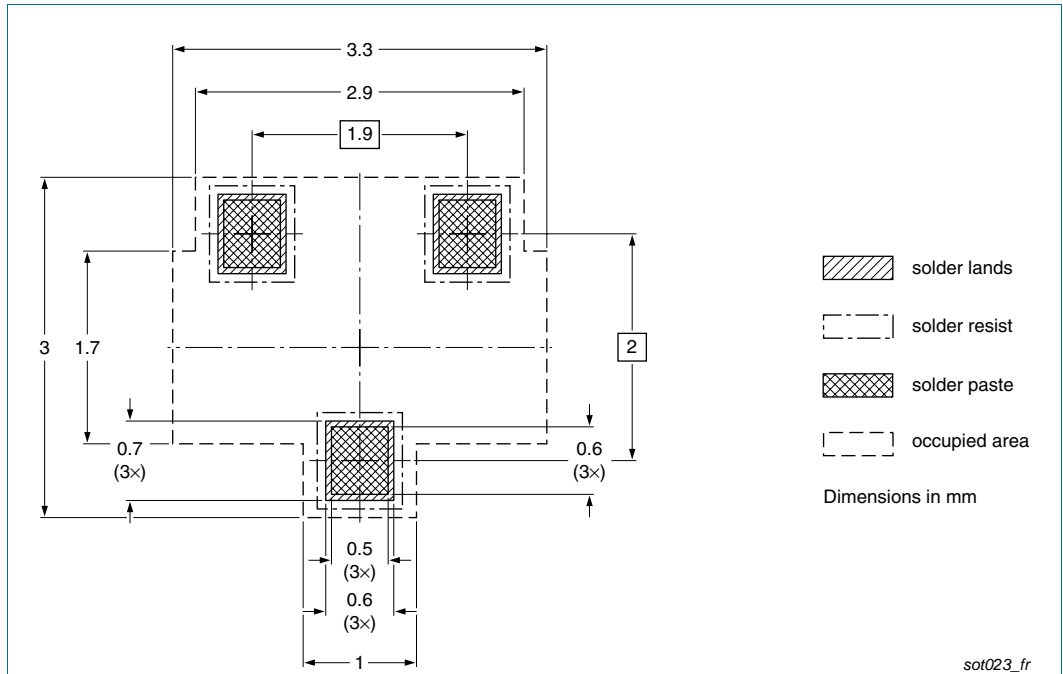


Fig 9. Reflow soldering footprint PMBD7000 (SOT23/TO-236AB)

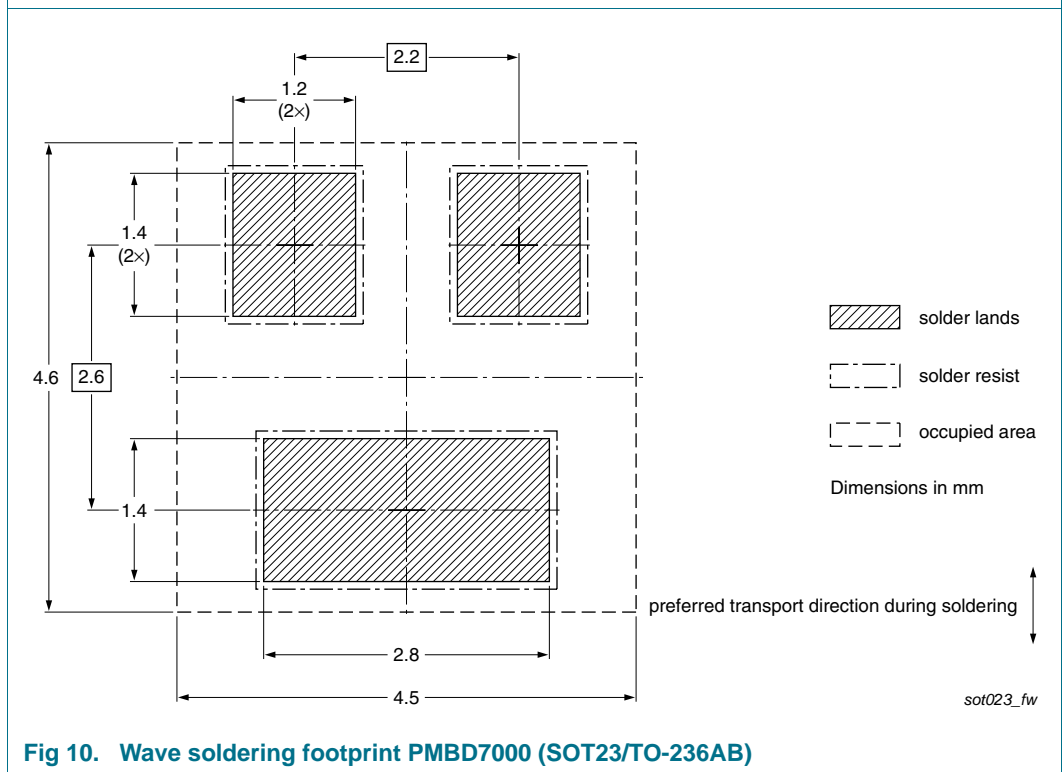


Fig 10. Wave soldering footprint PMBD7000 (SOT23/TO-236AB)

12. Revision history

Table 9. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|-----------------------|---------------|------------|
| PMBD7000 v.4 | 20100916 | Product data sheet | - | PMBD7000_3 |
| Modifications: | <ul style="list-style-type: none"> • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Table 4 “Marking codes”: updated • Table 7 “Characteristics”: corrected V_F unit for condition $I_F = 150$ mA • Figure 2: updated • Section 8 “Test information”: figure title of Figure 6 amended • Section 8.1 “Quality information”: added • Section 13 “Legal information”: updated | | | |
| PMBD7000_3 | 19990511 | Product specification | - | PMBD7000_2 |
| PMBD7000_2 | 19960918 | Product specification | - | PMBD7000_1 |
| PMBD7000_1 | 19960419 | 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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