

# PMEG2010EH; PMEG2010EJ; PMEG2010ET

1 A very low  $V_F$  MEGA Schottky barrier rectifiers

Rev. 04 — 20 March 2007

Product data sheet

## 1. Product profile

### 1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifiers with an integrated guard ring for stress protection, encapsulated in small Surface-Mounted Device (SMD) plastic packages.

Table 1. Product overview

| Type number | Package |       |          | Configuration |
|-------------|---------|-------|----------|---------------|
|             | NXP     | JEITA | JEDEC    |               |
| PMEG2010EH  | SOD123F | -     | -        | single        |
| PMEG2010EJ  | SOD323F | SC-90 | -        | single        |
| PMEG2010ET  | SOT23   | -     | TO-236AB | single        |

### 1.2 Features

- Forward current:  $I_F \leq 1$  A
- Reverse voltage:  $V_R \leq 20$  V
- Very low forward voltage
- Small SMD plastic packages

### 1.3 Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse polarity protection
- Low power consumption applications

### 1.4 Quick reference data

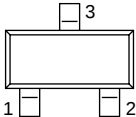
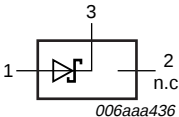
Table 2. Quick reference data

| Symbol | Parameter       | Conditions          | Min                   | Typ | Max | Unit |
|--------|-----------------|---------------------|-----------------------|-----|-----|------|
| $I_F$  | forward current | $T_{sp} \leq 55$ °C | -                     | -   | 1   | A    |
| $V_R$  | reverse voltage |                     | -                     | -   | 20  | V    |
| $V_F$  | forward voltage | $I_F = 1000$ mA     | <a href="#">[1]</a> - | 420 | 500 | mV   |

[1] Pulse test:  $t_p \leq 300$   $\mu$ s;  $\delta \leq 0.02$ .

## 2. Pinning information

Table 3. Pinning

| Pin              | Description | Simplified outline                                                                               | Symbol                                                                                           |
|------------------|-------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| SOD123F; SOD323F |             |                                                                                                  |                                                                                                  |
| 1                | cathode     | <br>001aab540 | <br>sym001    |
| 2                | anode       |                                                                                                  |                                                                                                  |
| SOT23            |             |                                                                                                  |                                                                                                  |
| 1                | anode       |               | <br>006aaa436 |
| 2                | n.c.        |                                                                                                  |                                                                                                  |
| 3                | cathode     |                                                                                                  |                                                                                                  |

[1] The marking bar indicates the cathode.

## 3. Ordering information

Table 4. Ordering information

| Type number | Package |                                          |         |
|-------------|---------|------------------------------------------|---------|
|             | Name    | Description                              | Version |
| PMEG2010EH  | -       | plastic surface-mounted package; 2 leads | SOD123F |
| PMEG2010EJ  | SC-90   | plastic surface-mounted package; 2 leads | SOD323F |
| PMEG2010ET  | -       | plastic surface-mounted package; 3 leads | SOT23   |

## 4. Marking

Table 5. Marking codes

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| PMEG2010EH  | A9                          |
| PMEG2010EJ  | AH                          |
| PMEG2010ET  | *AU                         |

[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 |
|-----------|-------------------------------------|------------------------------------------|-------|------|------|
| $V_R$     | reverse voltage                     |                                          | -     | 20   | V    |
| $I_F$     | forward current                     | $T_{sp} \leq 55\text{ °C}$               | -     | 1    | A    |
| $I_{FRM}$ | repetitive peak forward current     | $t_p \leq 1\text{ ms}; \delta \leq 0.25$ |       |      |      |
|           | PMEG2010EH                          |                                          | -     | 7    | A    |
|           | PMEG2010EJ                          |                                          | -     | 7    | A    |
|           | PMEG2010ET                          |                                          | -     | 5    | A    |
| $I_{FSM}$ | non-repetitive peak forward current | square wave;<br>$t_p = 8\text{ ms}$      | -     | 9    | A    |
| $P_{tot}$ | total power dissipation             | $T_{amb} \leq 25\text{ °C}$              |       |      |      |
|           | PMEG2010EH                          |                                          | [1] - | 375  | mW   |
|           |                                     |                                          | [2] - | 830  | mW   |
|           | PMEG2010EJ                          |                                          | [1] - | 350  | mW   |
|           |                                     |                                          | [2] - | 830  | mW   |
|           | PMEG2010ET                          |                                          | [1] - | 280  | mW   |
|           |                                     |                                          | [2] - | 420  | mW   |
| $T_j$     | junction temperature                |                                          | -     | 150  | °C   |
| $T_{amb}$ | ambient temperature                 |                                          | -65   | +150 | °C   |
| $T_{stg}$ | storage temperature                 |                                          | -65   | +150 | °C   |

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

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

## 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] |     |     |         |
|                |                                                  |             | [2] | -   | -   | 330 K/W |
|                |                                                  |             | [3] | -   | -   | 150 K/W |
|                | PMEG2010EJ                                       |             | [2] | -   | -   | 350 K/W |
|                |                                                  |             | [3] | -   | -   | 150 K/W |
|                | PMEG2010ET                                       |             | [2] | -   | -   | 440 K/W |
|                |                                                  |             | [3] | -   | -   | 300 K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [4] |     |     |         |
|                |                                                  |             | -   | -   | 60  | K/W     |
|                |                                                  |             | -   | -   | 55  | K/W     |
|                |                                                  |             | -   | -   | 120 | K/W     |

[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses.

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

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

[4] Soldering point of cathode tab.

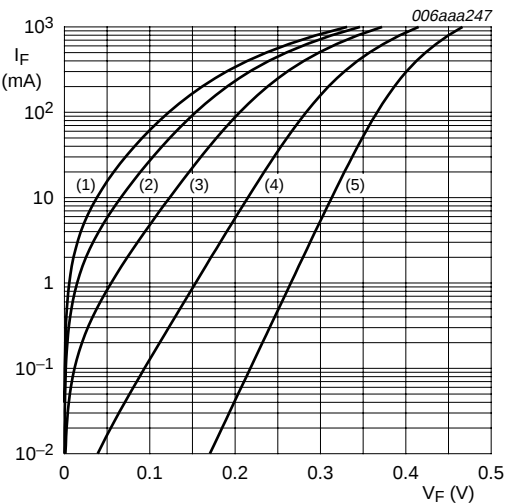
## 7. Characteristics

**Table 8. Characteristics**

$T_{amb} = 25^\circ\text{C}$  unless otherwise specified.

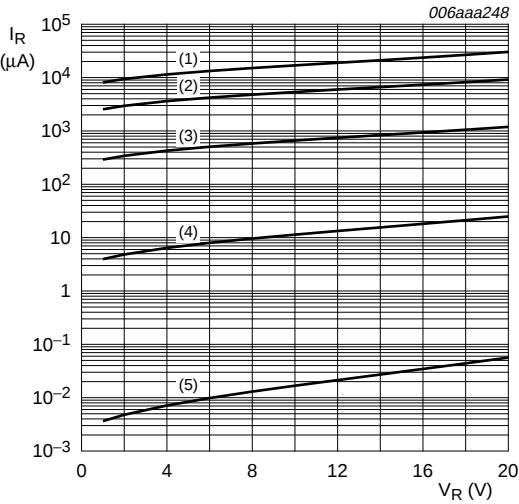
| Symbol | Parameter         | Conditions                                | Min                    | Typ | Max | Unit          |
|--------|-------------------|-------------------------------------------|------------------------|-----|-----|---------------|
| $V_F$  | forward voltage   |                                           | [1]                    |     |     |               |
|        |                   |                                           | $I_F = 0.1\text{ mA}$  | -   | 90  | 130 mV        |
|        |                   |                                           | $I_F = 1\text{ mA}$    | -   | 150 | 190 mV        |
|        |                   |                                           | $I_F = 10\text{ mA}$   | -   | 210 | 240 mV        |
|        |                   |                                           | $I_F = 100\text{ mA}$  | -   | 280 | 330 mV        |
|        |                   |                                           | $I_F = 500\text{ mA}$  | -   | 355 | 390 mV        |
|        |                   |                                           | $I_F = 1000\text{ mA}$ | -   | 420 | 500 mV        |
| $I_R$  | reverse current   | $V_R = 10\text{ V}$                       | -                      | 15  | 40  | $\mu\text{A}$ |
|        |                   | $V_R = 20\text{ V}$                       | -                      | 40  | 200 | $\mu\text{A}$ |
| $C_d$  | diode capacitance | $V_R = 1\text{ V};$<br>$f = 1\text{ MHz}$ | -                      | 66  | 80  | pF            |

[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .



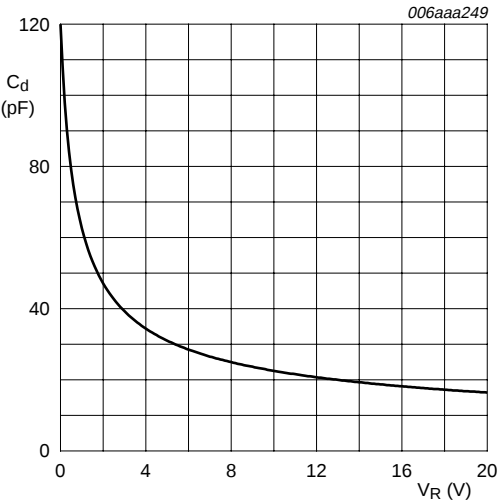
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

Fig 1. Forward current as a function of forward voltage; typical values



- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

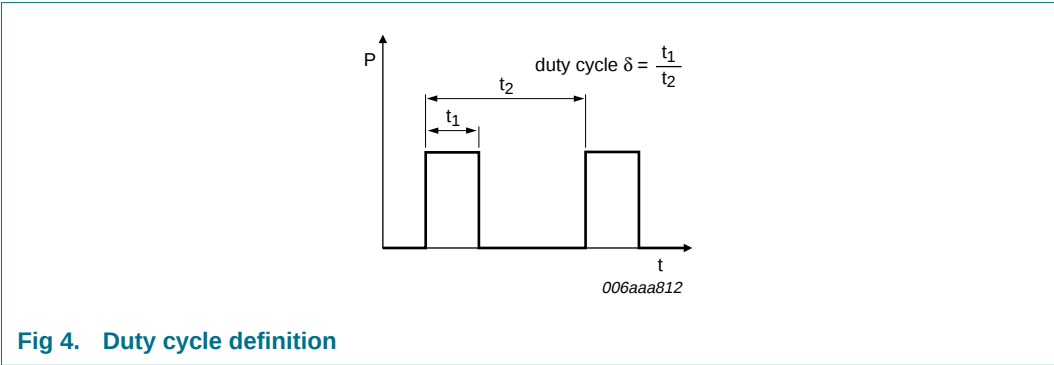
Fig 2. Reverse current as a function of reverse voltage; typical values



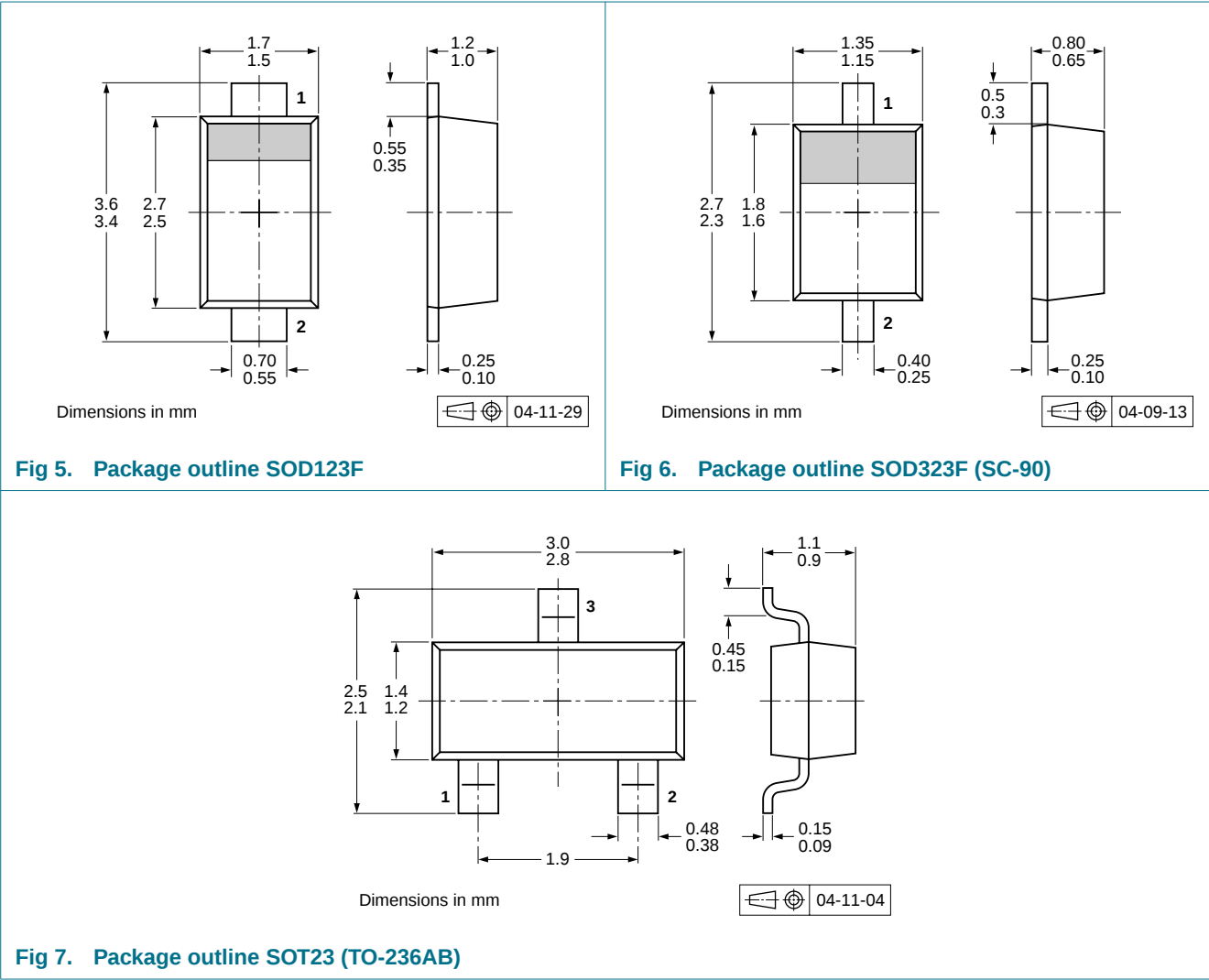
$f = 1\text{ MHz}$ ;  $T_{amb} = 25\text{ °C}$

Fig 3. Diode capacitance as a function of reverse voltage; typical values

8. Test information



9. Package outline



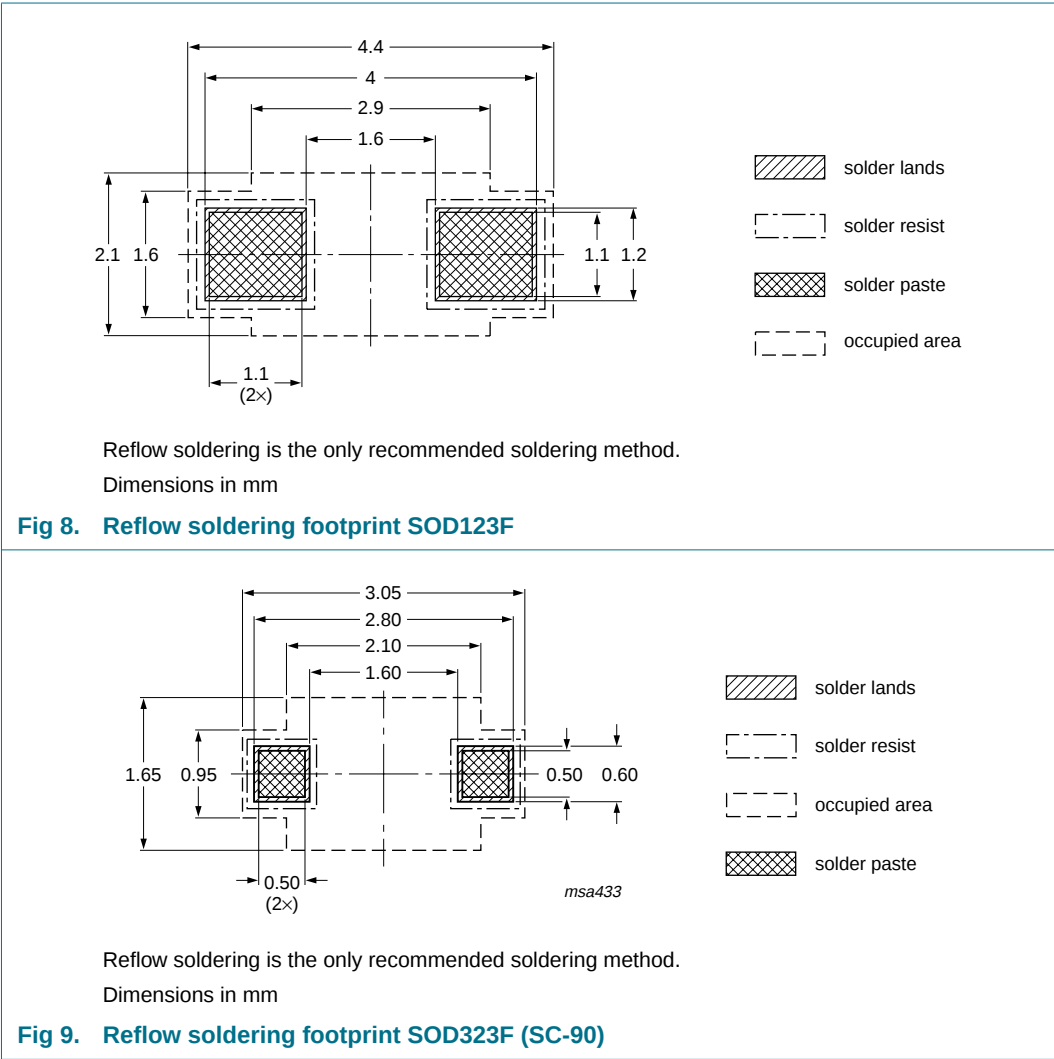
10. Packing information

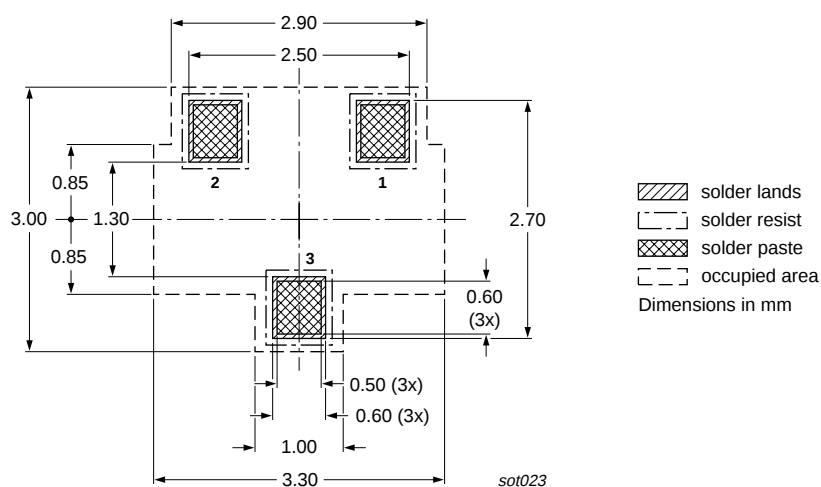
Table 9. Packing methods  
The indicated -xxx are the last three digits of the 12NC ordering code.[\[1\]](#)

| Type number | Package | Description                    | Packing quantity |       |
|-------------|---------|--------------------------------|------------------|-------|
|             |         |                                | 3000             | 10000 |
| PMEG2010EH  | SOD123F | 4 mm pitch, 8 mm tape and reel | -115             | -135  |
| PMEG2010EJ  | SOD323F | 4 mm pitch, 8 mm tape and reel | -115             | -135  |
| PMEG2010ET  | SOT23   | 4 mm pitch, 8 mm tape and reel | -215             | -235  |

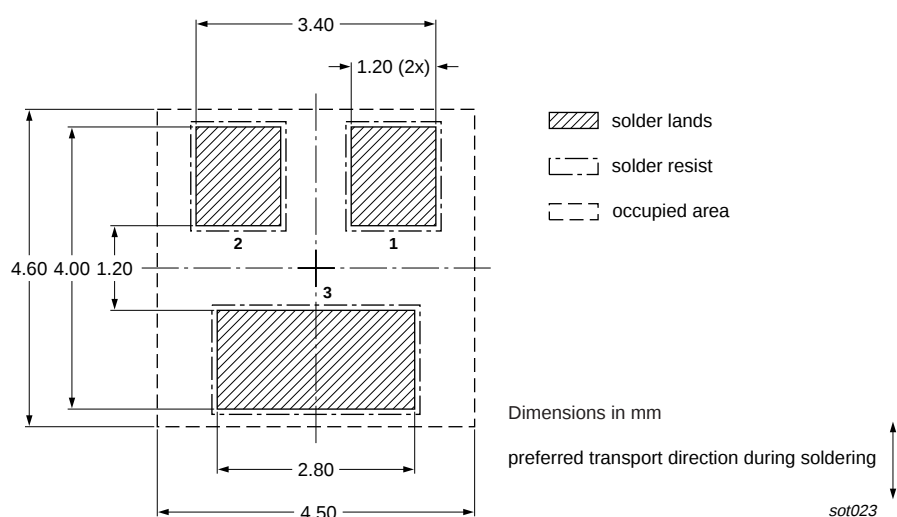
[1] For further information and the availability of packing methods, see [Section 14](#).

11. Soldering





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



**Fig 11. Wave soldering footprint SOT23 (TO-236AB)**

## 12. Revision history

Table 10. Revision history

| Document ID                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Release date | Data sheet status    | Change notice | Supersedes          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------|---------------|---------------------|
| PMEG2010EH_EJ_ET_4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 20070320     | Product data sheet   | -             | PMEGXX10EH_EJ_SER_3 |
| Modifications: <ul style="list-style-type: none"> <li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>• Legal texts have been adapted to the new company name where appropriate.</li> <li>• Type numbers PMEG2010EH and PMEG2010EJ separated from data sheet PMEGXX10EH_EJ_SER_3</li> <li>• Type number PMEG2010ET added</li> <li>• <a href="#">Section 1.1 "General description"</a>: amended</li> <li>• <a href="#">Section 1.2 "Features"</a>: amended</li> <li>• <a href="#">Section 1.3 "Applications"</a>: amended</li> <li>• <a href="#">Section 8 "Test information"</a>: added</li> <li>• <a href="#">Figure 7</a>, <a href="#">10</a> and <a href="#">11</a>: added</li> <li>• <a href="#">Section 13 "Legal information"</a>: updated</li> </ul> |              |                      |               |                     |
| PMEGXX10EH_EJ_SER_3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 20050411     | Product data sheet   | -             | PMEGXX10EJ_SER_2    |
| PMEGXX10EJ_SER_2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20050131     | Product data sheet   | -             | PMEGXX10EJ_SER_1    |
| PMEGXX10EJ_SER_1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20040907     | Objective data sheet | -             | -                   |

## 13. Legal information

### 13.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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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