



**THE DATASHEET OF  
PMEG2005ET,215**





# PMEGxx05ET series

0.5 A very low  $V_F$  MEGA Schottky barrier rectifiers in SOT23 package

Rev. 02 — 13 January 2010

Product data sheet

## 1. Product profile

### 1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOT23 small Surface Mounted Device (SMD) plastic package.

Table 1. Product overview

| Type number | Package  |       | Configuration |
|-------------|----------|-------|---------------|
|             | Nexperia | JEITA |               |
| PMEG2005ET  | SOT23    | -     | single diode  |
| PMEG3005ET  | SOT23    | -     | single diode  |
| PMEG4005ET  | SOT23    | -     | single diode  |

### 1.2 Features

- Forward current: 0.5 A
- Very low forward voltage
- Small SMD plastic package

### 1.3 Applications

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

## 1.4 Quick reference data

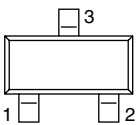
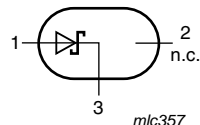
Table 2. Quick reference data

| Symbol | Parameter       | Conditions             | Min | Typ | Max | Unit |
|--------|-----------------|------------------------|-----|-----|-----|------|
| $I_F$  | forward current |                        | -   | -   | 0.5 | A    |
| $V_R$  | reverse voltage |                        |     |     |     |      |
|        | PMEG2005ET      |                        | -   | -   | 20  | V    |
|        | PMEG3005ET      |                        | -   | -   | 30  | V    |
|        | PMEG4005ET      |                        | -   | -   | 40  | V    |
| $V_F$  | forward voltage | $I_F = 500 \text{ mA}$ | [1] |     |     |      |
|        | PMEG2005ET      |                        | -   | 355 | 390 | mV   |
|        | PMEG3005ET      |                        | -   | 380 | 430 | mV   |
|        | PMEG4005ET      |                        | -   | 420 | 470 | mV   |

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

## 2. Pinning information

Table 3. Pinning

| Pin | Description   | Simplified outline  | Symbol   |
|-----|---------------|---|--|
| 1   | anode         |  | <br><i>m1c357</i> |
| 2   | not connected |   |  |
| 3   | cathode       |   |  |

## 3. Ordering information

Table 4. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description                              | Version |
| PMEG2005ET  | -       | plastic surface mounted package; 3 leads | SOT23   |
| PMEG3005ET  | -       | plastic surface mounted package; 3 leads | SOT23   |
| PMEG4005ET  | -       | plastic surface mounted package; 3 leads | SOT23   |

## 4. Marking

**Table 5. Marking codes**

| Type number | Marking code <sup>[1]</sup> |
|-------------|-----------------------------|
| PMEG2005ET  | P3*                         |
| PMEG3005ET  | P4*                         |
| PMEG4005ET  | P5*                         |

- [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                     |   |       |      |                  |
|           | PMEG2005ET                          |   | -     | 20   | V                |
|           | PMEG3005ET                          |   | -     | 30   | V                |
|           | PMEG4005ET                          |   | -     | 40   | V                |
| $I_F$     | forward current                     |   | -     | 0.5  | A                |
| $I_{FRM}$ | repetitive peak forward current     | $t_p \leq 1 \text{ ms}$ ; $\delta \leq 0.5$ | -     | 3.9  | A                |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p = 8 \text{ ms}$ square wave            | [1] - | 10   | A                |
| $P_{tot}$ | total power dissipation             | $T_{amb} \leq 25 \text{ }^\circ\text{C}$    | [1] - | 280  | mW               |
|           |                                     |   | [2] - | 420  | mW               |
| $T_j$     | junction temperature                |   | -     | 150  | $^\circ\text{C}$ |
| $T_{amb}$ | ambient temperature                 |   | -65   | +150 | $^\circ\text{C}$ |
| $T_{stg}$ | storage temperature                 |   | -65   | +150 | $^\circ\text{C}$ |

[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] - | -   | 440 | K/W  |
|               |   |             | [1][3] - | -   | 300 | K/W  |

[1] For Schottky barrier diodes thermal run-away has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses. Nomograms for determining the reverse power losses  $P_R$  and  $I_{F(AV)}$  rating will be available on request.

[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>.

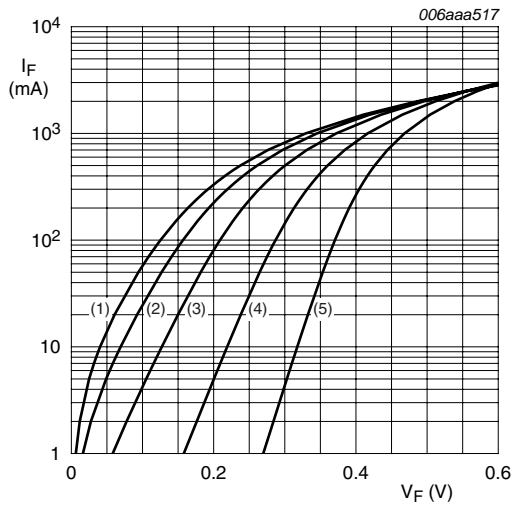
## 7. Characteristics

**Table 8. Characteristics**

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

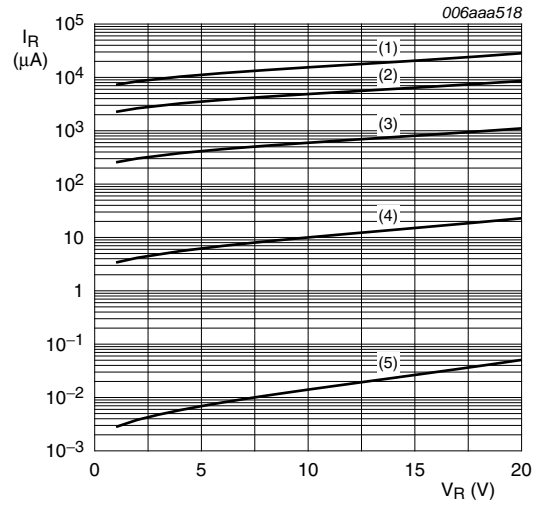
| Symbol              | Parameter           | Conditions                           | Min                   | Typ        | Max                 | Unit |               |     |               |
|---------------------|---------------------|--------------------------------------|-----------------------|------------|---------------------|------|---------------|-----|---------------|
| $V_F$               | forward voltage     |                                      | [1]                   |            |                     |      |               |     |               |
|                     |                     | PMEG2005ET                           | $I_F = 0.1\text{ mA}$ | -          | 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            |     |               |
|                     |                     | PMEG3005ET                           | $I_F = 0.1\text{ mA}$ | -          | 90                  | 130  | mV            |     |               |
|                     |                     |                                      | $I_F = 1\text{ mA}$   | -          | 150                 | 200  | mV            |     |               |
|                     |                     |                                      | $I_F = 10\text{ mA}$  | -          | 215                 | 250  | mV            |     |               |
|                     |                     |                                      | $I_F = 100\text{ mA}$ | -          | 285                 | 340  | mV            |     |               |
|                     |                     |                                      | $I_F = 500\text{ mA}$ | -          | 380                 | 430  | mV            |     |               |
|                     |                     | PMEG4005ET                           | $I_F = 0.1\text{ mA}$ | -          | 95                  | 130  | mV            |     |               |
|                     |                     |                                      | $I_F = 1\text{ mA}$   | -          | 155                 | 210  | mV            |     |               |
|                     |                     |                                      | $I_F = 10\text{ mA}$  | -          | 220                 | 270  | mV            |     |               |
|                     |                     |                                      | $I_F = 100\text{ mA}$ | -          | 295                 | 350  | mV            |     |               |
|                     |                     |                                      | $I_F = 500\text{ mA}$ | -          | 420                 | 470  | mV            |     |               |
|                     |                     | $I_R$                                | reverse current       | PMEG2005ET | $V_R = 10\text{ V}$ | -    | 15            | 40  | $\mu\text{A}$ |
|                     |                     |                                      |                       |            | $V_R = 20\text{ V}$ | -    | 40            | 200 | $\mu\text{A}$ |
|                     |                     |                                      |                       | PMEG3005ET | $V_R = 10\text{ V}$ | -    | 12            | 30  | $\mu\text{A}$ |
| $V_R = 30\text{ V}$ | -                   |                                      |                       |            | 40                  | 150  | $\mu\text{A}$ |     |               |
| PMEG4005ET          | $V_R = 10\text{ V}$ |                                      |                       | -          | 7                   | 20   | $\mu\text{A}$ |     |               |
|                     | $V_R = 40\text{ V}$ |                                      |                       | -          | 30                  | 100  | $\mu\text{A}$ |     |               |
| $C_d$               | diode capacitance   | $V_R = 1\text{ V}; f = 1\text{ MHz}$ | PMEG2005ET            | -          | 66                  | 80   | pF            |     |               |
|                     |                     |                                      | PMEG3005ET            | -          | 55                  | 70   | pF            |     |               |
|                     |                     |                                      | PMEG4005ET            | -          | 43                  | 50   | pF            |     |               |
|                     |                     |                                      |                       |            |                     |      |               |     |               |

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



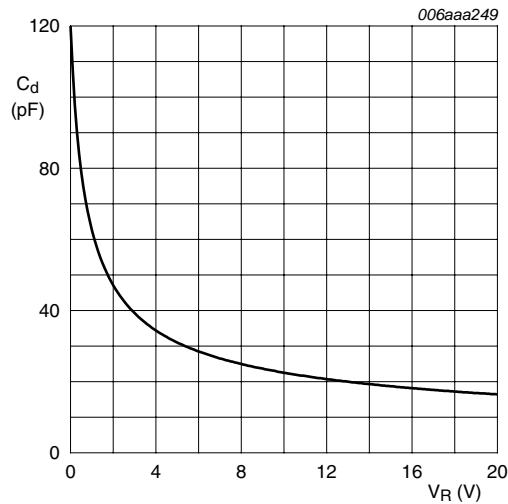
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 1. PMEG2005ET: Forward current as a function of forward voltage; typical values**



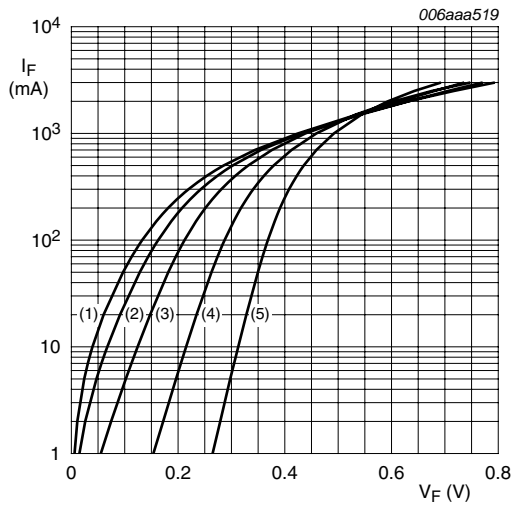
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 2. PMEG2005ET: Reverse current as a function of reverse voltage; typical values**



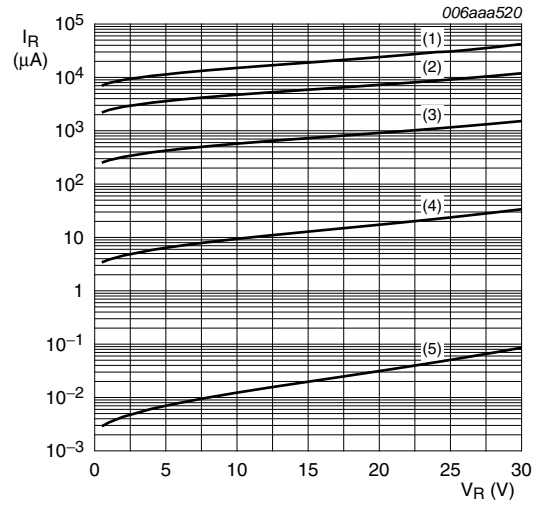
$T_{amb} = 25\text{ °C}; f = 1\text{ MHz}$

**Fig 3. PMEG2005ET: Diode capacitance as a function of reverse voltage; typical values**



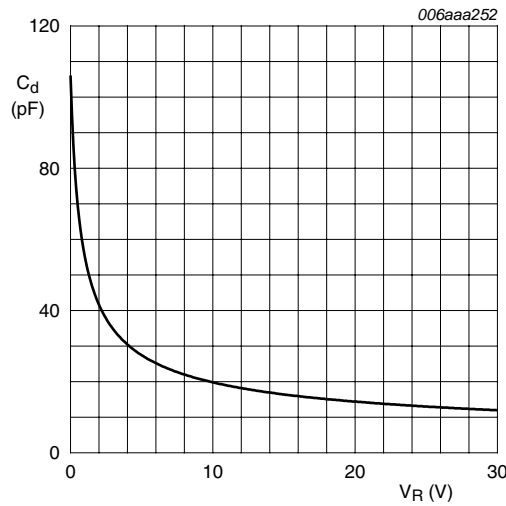
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 4. PMEG3005ET: Forward current as a function of forward voltage; typical values**



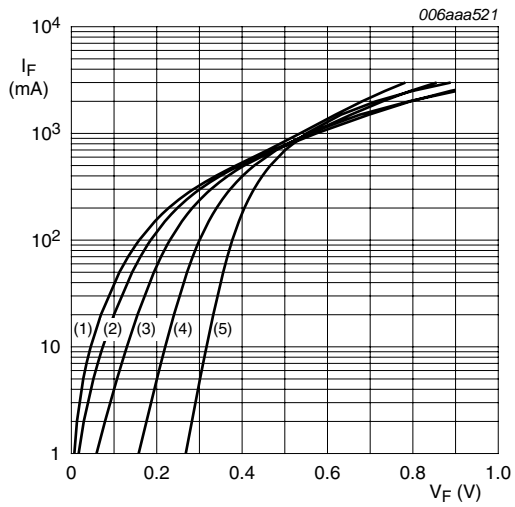
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 5. PMEG3005ET: Reverse current as a function of reverse voltage; typical values**



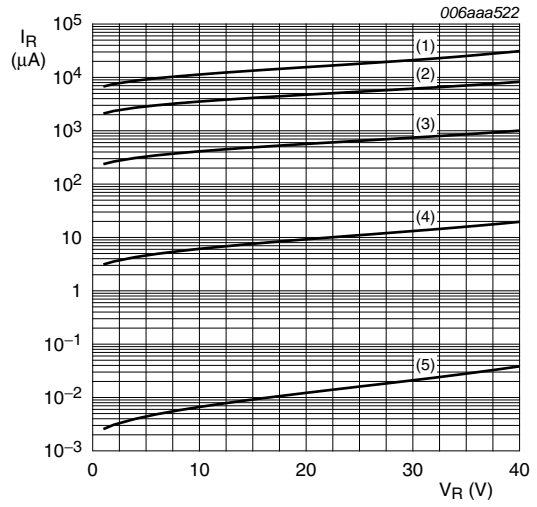
$T_{amb} = 25\text{ °C}; f = 1\text{ MHz}$

**Fig 6. PMEG3005ET: Diode capacitance as a function of reverse voltage; typical values**



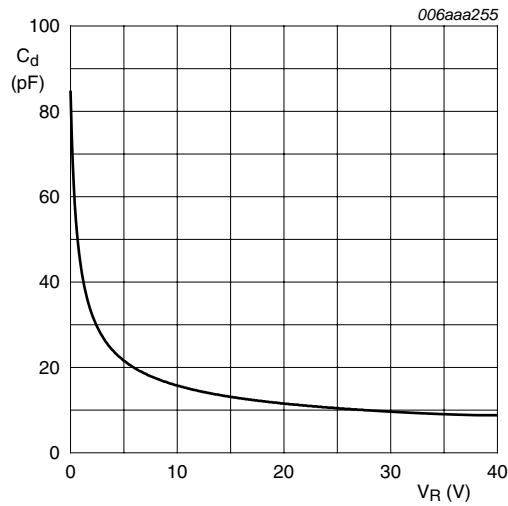
- (1)  $T_{amb} = 150\text{ °C}$
- (2)  $T_{amb} = 125\text{ °C}$
- (3)  $T_{amb} = 85\text{ °C}$
- (4)  $T_{amb} = 25\text{ °C}$
- (5)  $T_{amb} = -40\text{ °C}$

**Fig 7. PMEG4005ET: 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)  $T_{amb} = -40\text{ °C}$

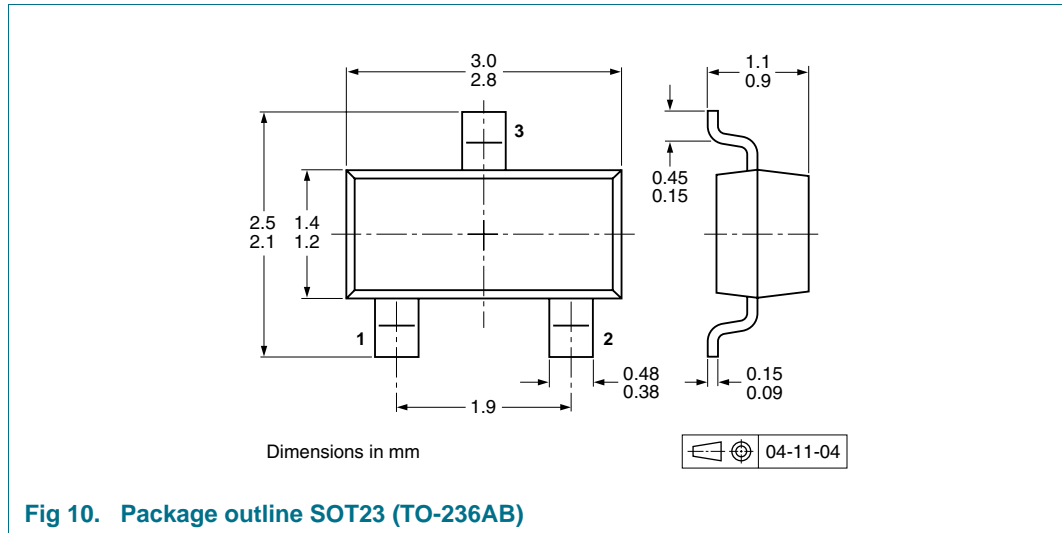
**Fig 8. PMEG4005ET: Reverse current as a function of reverse voltage; typical values**



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

**Fig 9. PMEG4005ET: Diode capacitance as a function of reverse voltage; typical values**

## 8. Package outline



## 9. Packing information

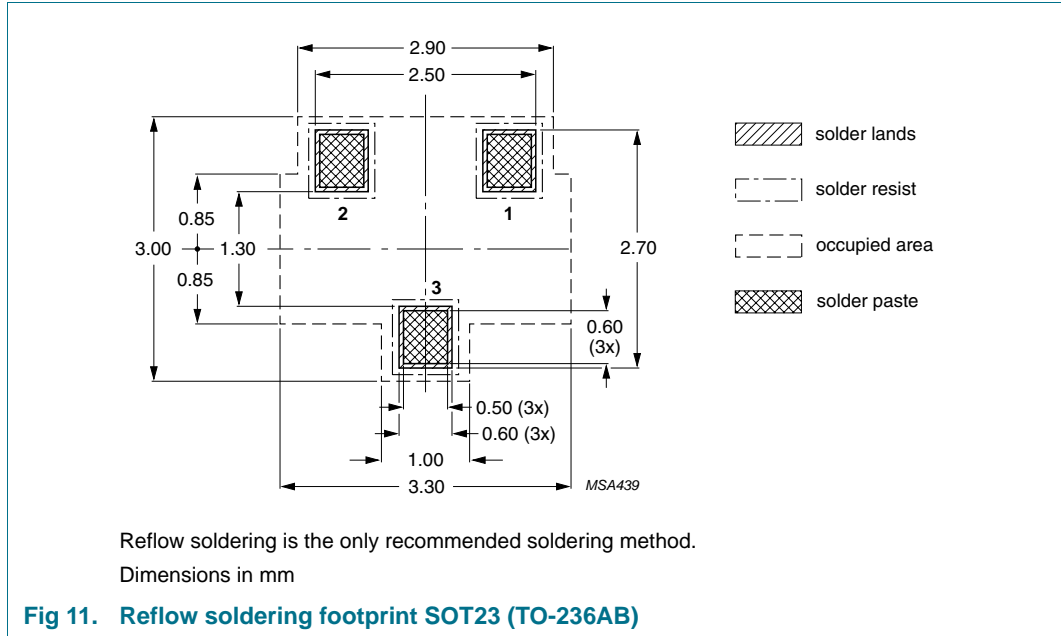
**Table 9. Packing methods**

The -xxx numbers are the last three digits of the 12NC ordering code.<sup>[1]</sup>

| Type number | Package | Description                    | Packing quantity |       |
|-------------|---------|--------------------------------|------------------|-------|
|             |         |                                | 3000             | 10000 |
| PMEG2005ET  | SOT23   | 4 mm pitch, 8 mm tape and reel | -215             | -235  |
| PMEG3005ET  |         |                                |                  |       |
| PMEG4005ET  |         |                                |                  |       |

[1] For further information and the availability of packing methods, see [Section 13](#).

**10. Soldering**



## 11. Revision history

Table 10. Revision history

| Document ID      | Release date | Data sheet status  | Change notice  | Supersedes       |
|------------------|--------------|--------------------|--|------------------|
| PMEGXX05ET_SER_2 | 20100113     | Product data sheet | -  | PMEGXX05ET_SER_1 |
| Modifications:   |              |                    |  |                  |
|                  |              |                    | <ul style="list-style-type: none"><li>This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content.</li><li><a href="#">Figure 11 "Reflow soldering footprint SOT23 (TO-236AB)"; updated</a></li></ul> |                  |
| PMEGXX05ET_SER_1 | 20050715     | Product data sheet | -  | -                |

## 12. Legal information

### 12.1 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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