

PMEG4010EH; PMEG4010EJ; PMEG4010ET

1 A very low V_F MEGA Schottky barrier rectifiers

Rev. 04 — 21 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 |
|-------------|----------|-------|----------|---------------|
| | Nexperia | JEITA | JEDEC | |
| PMEG4010EH | SOD123F | - | - | single |
| PMEG4010EJ | SOD323F | SC-90 | - | single |
| PMEG4010ET | SOT23 | - | TO-236AB | single |

1.2 Features

- Forward current: $I_F \leq 1$ A
- Reverse voltage: $V_R \leq 40$ 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



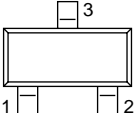
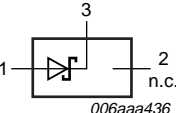
Table 2. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-----------------|---------------------|-----------------------|-----|-----|------|
| I_F | forward current | $T_{sp} \leq 55$ °C | - | - | 1 | A |
| V_R | reverse voltage | | - | - | 40 | V |
| V_F | forward voltage | $I_F = 1000$ mA | [1] - | 540 | 640 | mV |

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

2. Pinning information

Table 3. Pinning

| Pin | Description | Simplified outline | Symbol |
|-------------------------|-------------|--|--|
| SOD123F; SOD323F | | | |
| 1 | cathode |  001aab540 |  sym001 |
| 2 | anode | | |
| SOT23 | | | |
| 1 | anode |  |  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 |
| PMEG4010EH | - | plastic surface-mounted package; 2 leads | SOD123F |
| PMEG4010EJ | SC-90 | plastic surface-mounted package; 2 leads | SOD323F |
| PMEG4010ET | - | plastic surface-mounted package; 3 leads | SOT23 |

4. Marking

Table 5. Marking codes

| Type number | Marking code ^[1] |
|-------------|-----------------------------|
| PMEG4010EH | AB |
| PMEG4010EJ | AL |
| PMEG4010ET | *AW |

[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 | | - | 40 | V | | |
| I_F | forward current | $T_{sp} \leq 55\text{ °C}$ | - | 1 | A | | |
| I_{FRM} | repetitive peak forward current | $t_p \leq 1\text{ ms}; \delta \leq 0.25$ | | | | | |
| | | | PMEG4010EH | - | 7 | A | |
| | | | PMEG4010EJ | - | 7 | A | |
| | | | PMEG4010ET | - | 5 | A | |
| I_{FSM} | non-repetitive peak forward current | square wave; $t_p = 8\text{ ms}$ | - | 9 | A | | |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | | | | | |
| | | | PMEG4010EH | [1][3] | - | 375 | mW |
| | | | | [2][3] | - | 830 | mW |
| | | | PMEG4010EJ | [1][3] | - | 350 | mW |
| | | | | [2][3] | - | 830 | mW |
| | | | PMEG4010ET | [1] | - | 280 | mW |
| | | | | [2] | - | 420 | mW |
| | | | T_j | junction temperature | | - | 150 |
| 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 cm².

[3] Reflow soldering is the only recommended soldering method.

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] | | | | | |
| | | | PMEG4010EH | [2][4] | - | - | 330 | K/W |
| | | | | [3][4] | - | - | 150 | K/W |
| | PMEG4010EJ | [2][4] | - | - | 350 | K/W | | |
| | | | | [3][4] | - | - | 150 | K/W |
| | PMEG4010ET | [2] | - | - | 440 | K/W | | |
| | | | [3] | - | - | 300 | K/W | |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [5] | | | | | |
| | | PMEG4010EH | | - | - | 60 | K/W | |
| | | PMEG4010EJ | | - | - | 55 | K/W | |
| | | PMEG4010ET | | - | - | 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 cm².

[4] Reflow soldering is the only recommended soldering method.

[5] Soldering point of cathode tab.

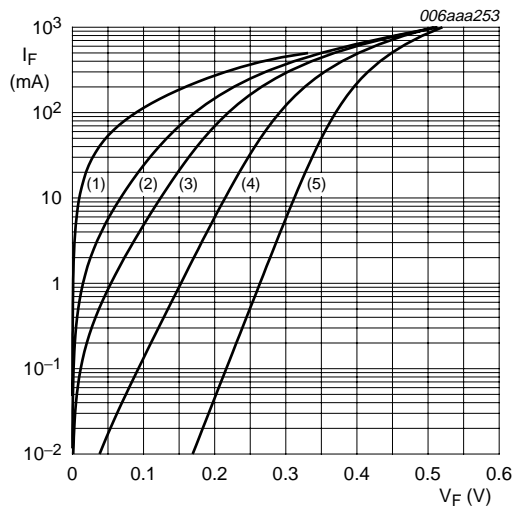
7. Characteristics

Table 8. Characteristics

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

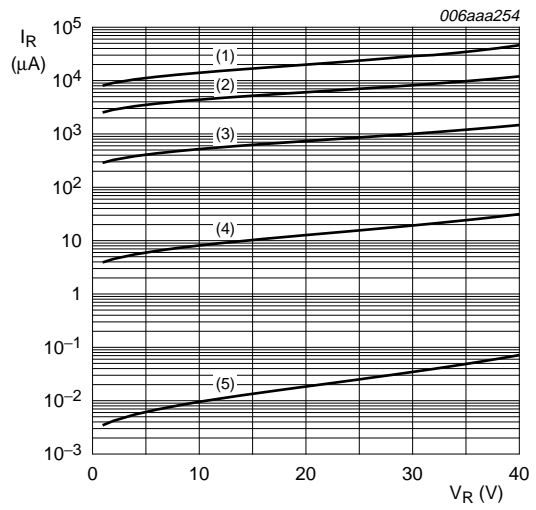
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-------------------|---|-----|-----|-----|---------------|
| V_F | forward voltage | | [1] | | | |
| | | $I_F = 0.1\text{ mA}$ | - | 95 | 130 | mV |
| | | $I_F = 1\text{ mA}$ | - | 155 | 210 | mV |
| | | $I_F = 10\text{ mA}$ | - | 220 | 270 | mV |
| | | $I_F = 100\text{ mA}$ | - | 295 | 350 | mV |
| | | $I_F = 500\text{ mA}$ | - | 420 | 470 | mV |
| | | $I_F = 1000\text{ mA}$ | - | 540 | 640 | mV |
| I_R | reverse current | $V_R = 10\text{ V}$ | - | 7 | 20 | μA |
| | | $V_R = 40\text{ V}$ | - | 30 | 100 | μA |
| C_d | diode capacitance | $V_R = 1\text{ V};$ $f = 1\text{ MHz}$ | - | 43 | 50 | pF |

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



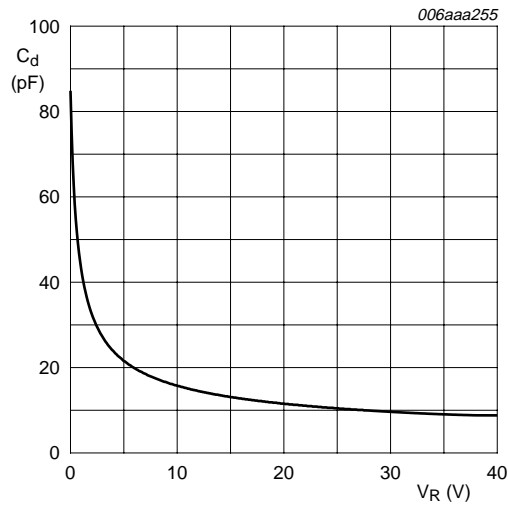
- (1) $T_{amb} = 150\text{ °C}$
- (2) $T_{amb} = 125\text{ °C}$
- (3) $T_{amb} = 85\text{ °C}$
- (4) $T_{amb} = 25\text{ °C}$
- (5) $T_{amb} = -40\text{ °C}$

Fig 1. 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

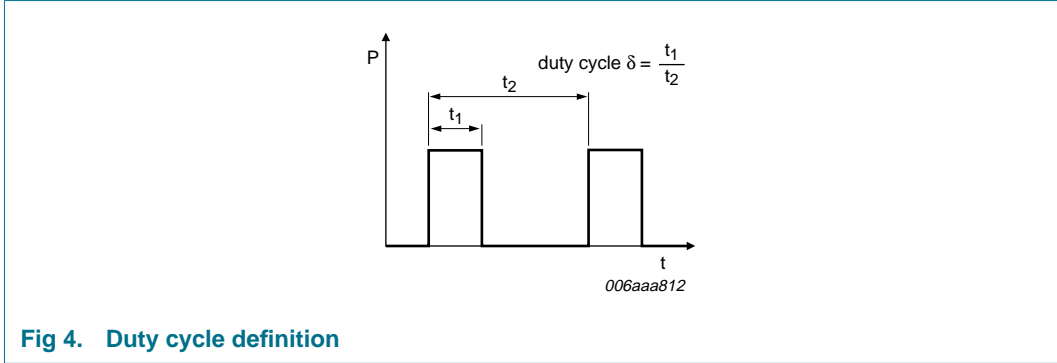


Fig 4. Duty cycle definition

9. Package outline

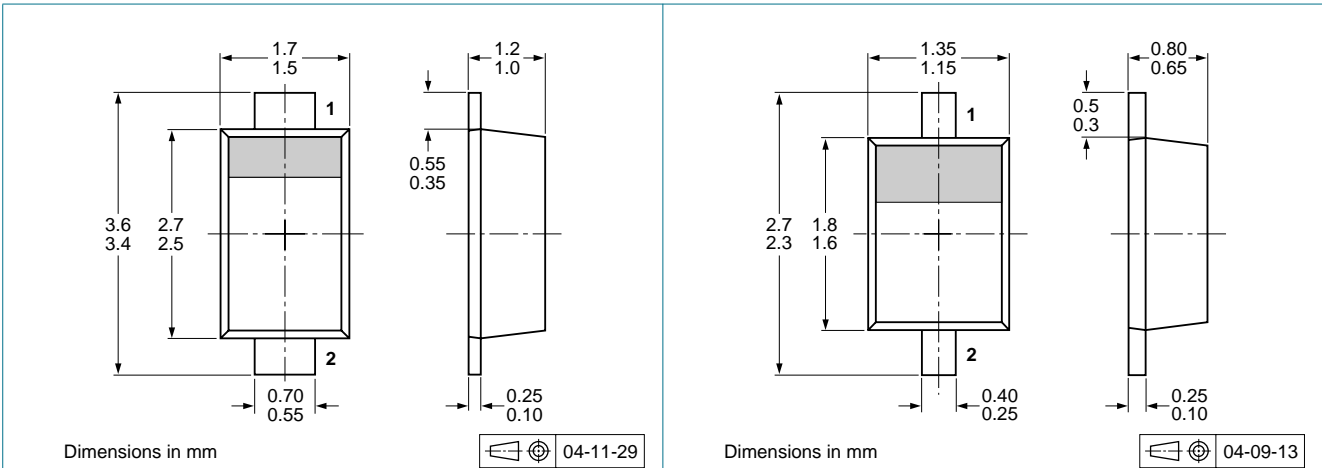


Fig 5. Package outline SOD123F

Fig 6. Package outline SOD323F (SC-90)

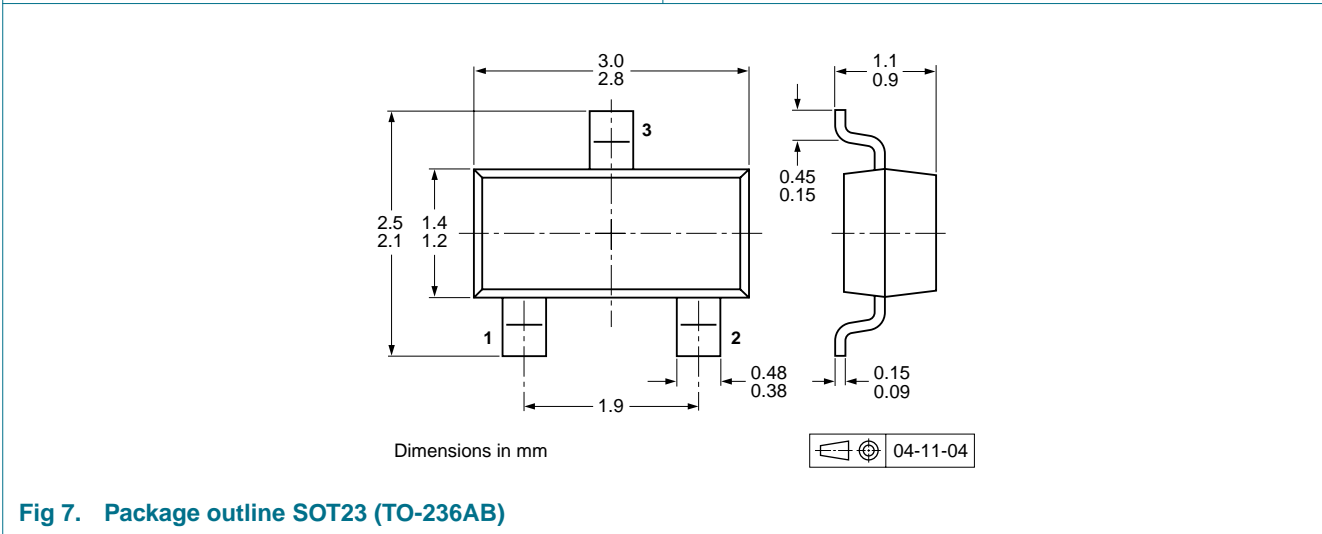


Fig 7. Package outline SOT23 (TO-236AB)

10. Packing information

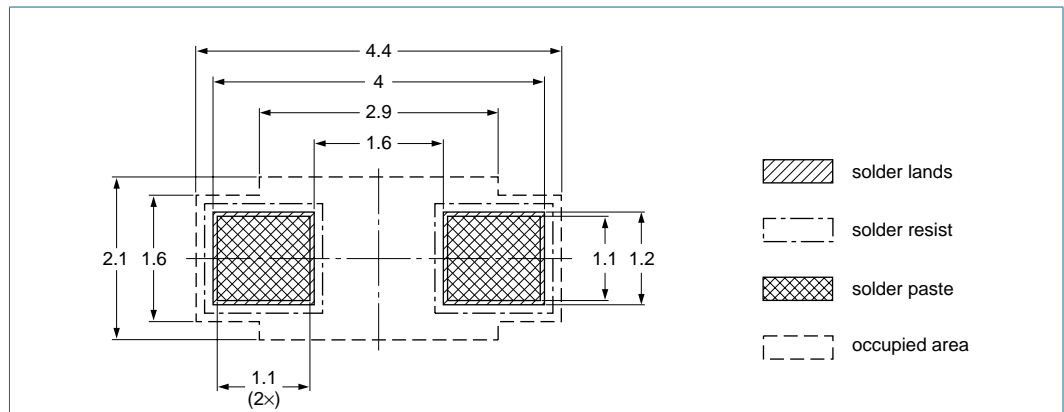
Table 9. Packing methods

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

| Type number | Package | Description | Packing quantity | |
|-------------|---------|--------------------------------|------------------|-------|
| | | | 3000 | 10000 |
| PMEG4010EH | SOD123F | 4 mm pitch, 8 mm tape and reel | -115 | -135 |
| PMEG4010EJ | SOD323F | 4 mm pitch, 8 mm tape and reel | -115 | -135 |
| PMEG4010ET | SOT23 | 4 mm pitch, 8 mm tape and reel | -215 | -235 |

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

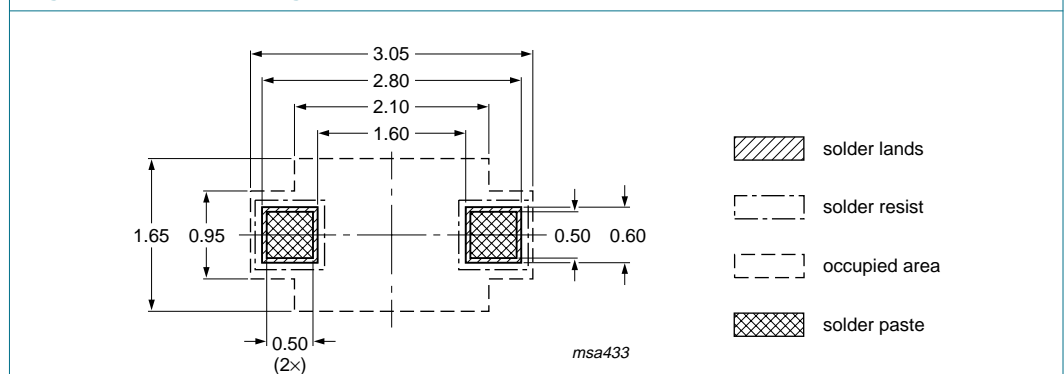
11. Soldering



Reflow soldering is the only recommended soldering method.

Dimensions in mm

Fig 8. Reflow soldering footprint SOD123F



Reflow soldering is the only recommended soldering method.

Dimensions in mm

Fig 9. Reflow soldering footprint SOD323F (SC-90)

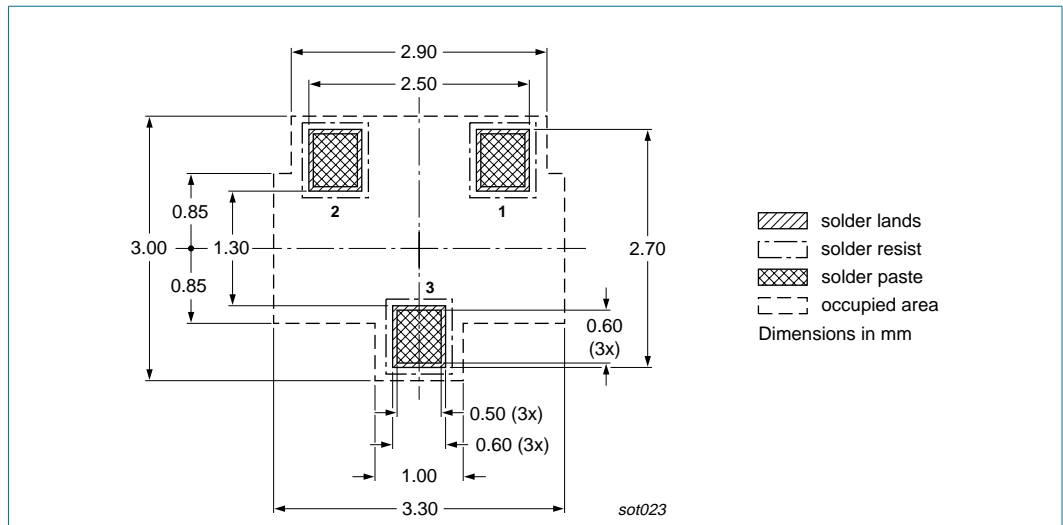


Fig 10. Reflow soldering footprint SOT23 (TO-236AB)

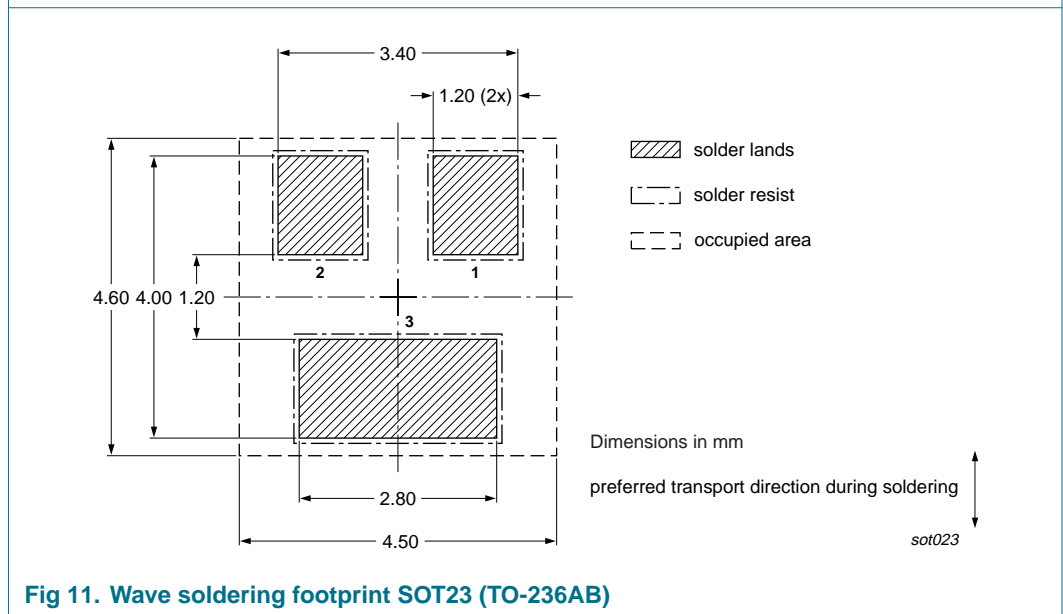


Fig 11. Wave soldering footprint SOT23 (TO-236AB)

12. Revision history

Table 10. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|--------------|----------------------|---------------|---------------------|
| PMEG4010EH_EJ_ET_4 | 20070321 | Product data sheet | - | PMEGXX10EH_EJ_SER_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. • Type numbers PMEG4010EH and PMEG4010EJ separated from data sheet PMEGXX10EH_EJ_SER_3 • Type number PMEG4010ET added • Section 1.1 “General description”: amended • Section 1.2 “Features”: amended • Section 1.3 “Applications”: amended • Section 8 “Test information”: added • Figure 7, 10 and 11: added • Section 13 “Legal information”: updated | | | | |
| 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 ^{[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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