# PMEG3010EH; PMEG3010EJ; PMEG3010ET

## 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 | |
| PMEG3010EH | SOD123F | - | - | single |
| PMEG3010EJ | SOD323F | SC-90 | - | single |
| PMEG3010ET | SOT23 | - | TO-236AB | single |

## 1.2 Features

- Forward current: $I_F \leq 1$ A
- Reverse voltage: $V_R \leq 30$ 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 | | | - | - | 30 | V |
| $V_F$ | forward voltage | $I_F = 1000$ mA | [1] | - | 450 | 560 | mV |

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

## 2. Pinning information

**Table 3. Pinning**

| Pin | Description | Simplified outline | Symbol |
|---|---|---|---|
| **SOD123F; SOD323F** | | | |
| 1 | cathode [1] | | |
| 2 | anode | | |
| **SOT23** | | | |
| 1 | anode | | |
| 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 |
| PMEG3010EH | - | plastic surface-mounted package; 2 leads | SOD123F |
| PMEG3010EJ | SC-90 | plastic surface-mounted package; 2 leads | SOD323F |
| PMEG3010ET | - | plastic surface-mounted package; 3 leads | SOT23 |

## 4. Marking

**Table 5. Marking codes**

| Type number | Marking code[1] |
|---|---|
| PMEG3010EH | AA |
| PMEG3010EJ | AK |
| PMEG3010ET | *AV |

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


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## 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 | | | - | 30 | V |
| $I_F$ | forward current | $T_{sp} \leq 55$ °C | | - | 1 | A |
| $I_{FRM}$ | repetitive peak forward current | $t_p \leq 1$ ms; $\delta \leq 0.25$ | | | | |
| | PMEG3010EH | | | - | 7 | A |
| | PMEG3010EJ | | | - | 7 | A |
| | PMEG3010ET | | | - | 5 | A |
| $I_{FSM}$ | non-repetitive peak forward current | square wave; $t_p = 8$ ms | | - | 9 | A |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | | | | |
| | PMEG3010EH | | [1] | - | 375 | mW |
| | | | [2] | - | 830 | mW |
| | PMEG3010EJ | | [1] | - | 350 | mW |
| | | | [2] | - | 830 | mW |
| | PMEG3010ET | | [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 $cm^2$.



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## 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] | | | | |
| | PMEG3010EH | | [2] | - | - | 330 | K/W |
| | | | [3] | - | - | 150 | K/W |
| | PMEG3010EJ | | [2] | - | - | 350 | K/W |
| | | | [3] | - | - | 150 | K/W |
| | PMEG3010ET | | [2] | - | - | 440 | K/W |
| | | | [3] | - | - | 300 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [4] | | | | |
| | PMEG3010EH | | | - | - | 60 | K/W |
| | PMEG3010EJ | | | - | - | 55 | K/W |
| | PMEG3010ET | | | - | - | 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 $cm^2$.

[4] 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 | | [1] | | | | |
| | | $I_F$ = 0.1 mA | | - | 90 | 130 | mV |
| | | $I_F$ = 1 mA | | - | 150 | 200 | mV |
| | | $I_F$ = 10 mA | | - | 215 | 250 | mV |
| | | $I_F$ = 100 mA | | - | 285 | 340 | mV |
| | | $I_F$ = 500 mA | | - | 380 | 430 | mV |
| | | $I_F$ = 1000 mA | | - | 450 | 560 | mV |
| $I_R$ | reverse current | $V_R$ = 10 V | | - | 12 | 30 | µA |
| | | $V_R$ = 30 V | | - | 40 | 150 | µA |
| $C_d$ | diode capacitance | $V_R$ = 1 V; f = 1 MHz | | - | 55 | 70 | pF |

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



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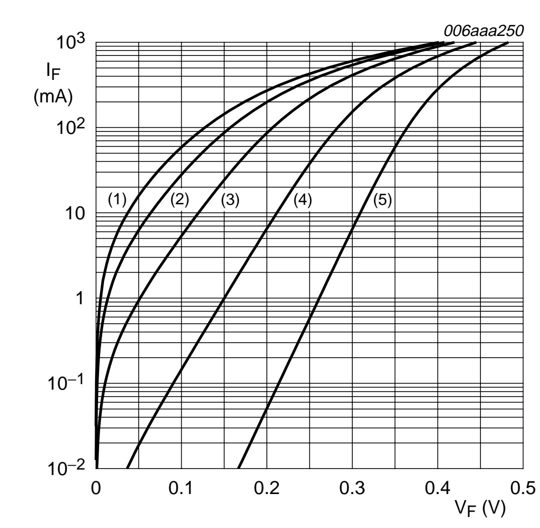



(1) $T_{amb}$ = 150 °C

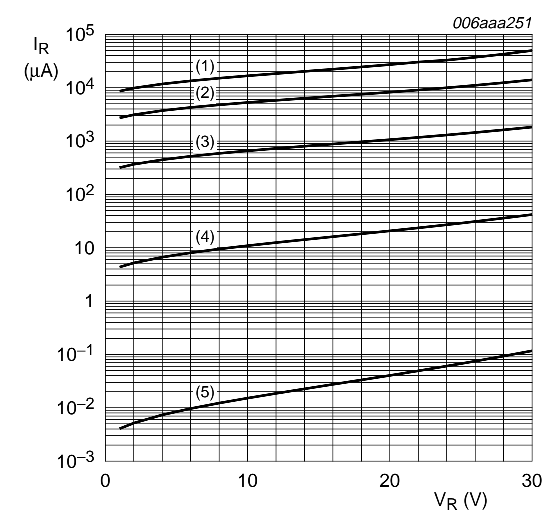
(2) $T_{amb}$ = 125 °C

(3) $T_{amb}$ = 85 °C

(4) $T_{amb}$ = 25 °C

(5) $T_{amb}$ = −40 °C

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




(1) $T_{amb}$ = 150 °C

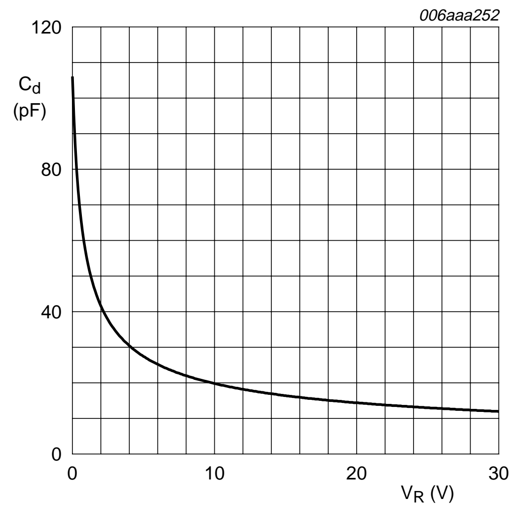
(2) $T_{amb}$ = 125 °C

(3) $T_{amb}$ = 85 °C

(4) $T_{amb}$ = 25 °C

(5) $T_{amb}$ = −40 °C

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




f = 1 MHz; $T_{amb}$ = 25 °C

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



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# 8. Test information

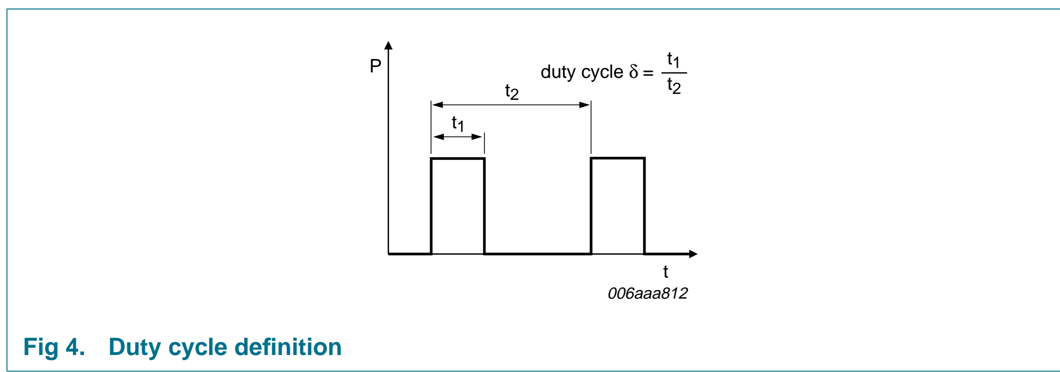


Fig 4. Duty cycle definition

# 9. Package outline

Dimensions in mm

04-11-29

Fig 5. Package outline SOD123F

Dimensions in mm

04-09-13

Fig 6. Package outline SOD323F (SC-90)

Dimensions in mm

04-11-04

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



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## 10. Packing information

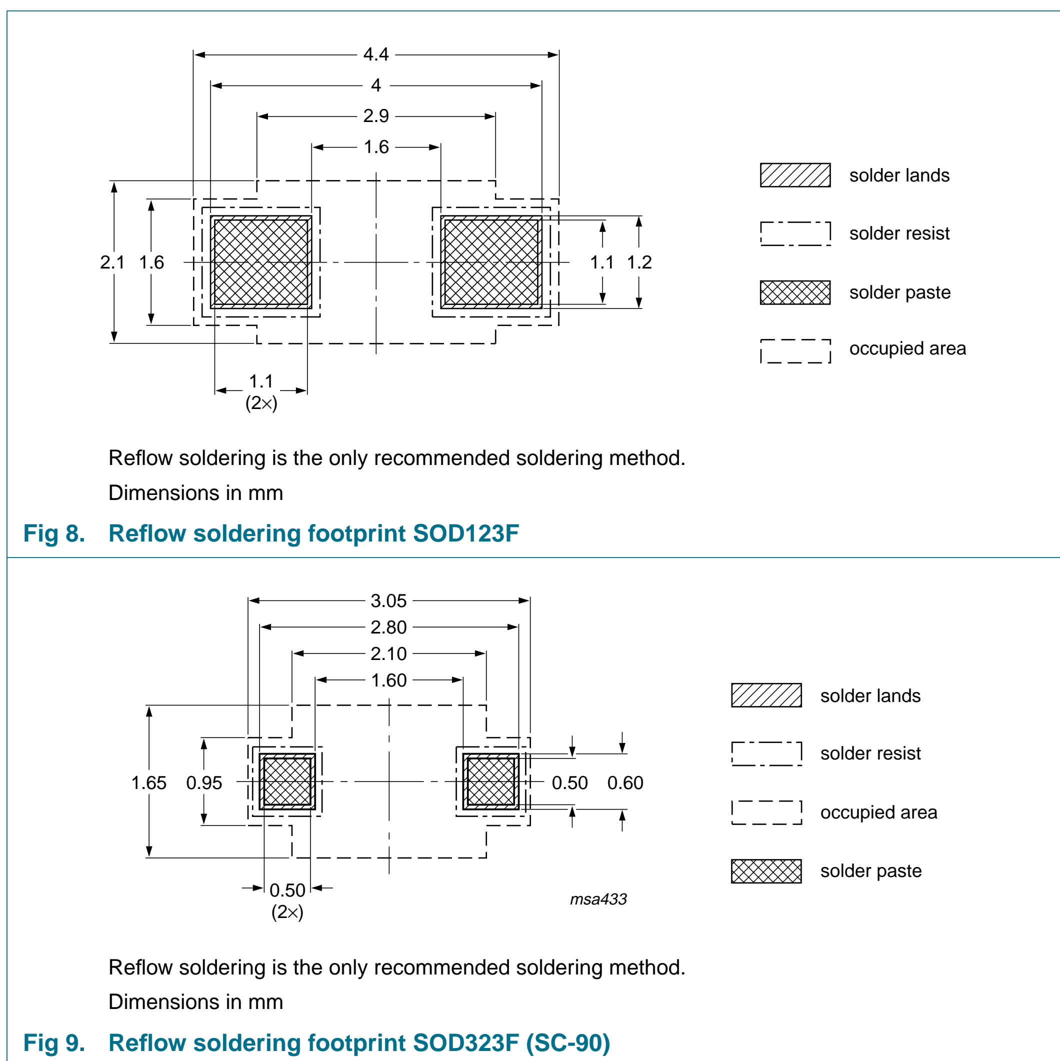
**Table 9. Packing methods**

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

| Type number | Package | Description | Packing quantity | |
|---|---|---|---|---|
| | | | **3000** | **10000** |
| PMEG3010EH | SOD123F | 4 mm pitch, 8 mm tape and reel | -115 | -135 |
| PMEG3010EJ | SOD323F | 4 mm pitch, 8 mm tape and reel | -115 | -135 |
| PMEG3010ET | 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)**



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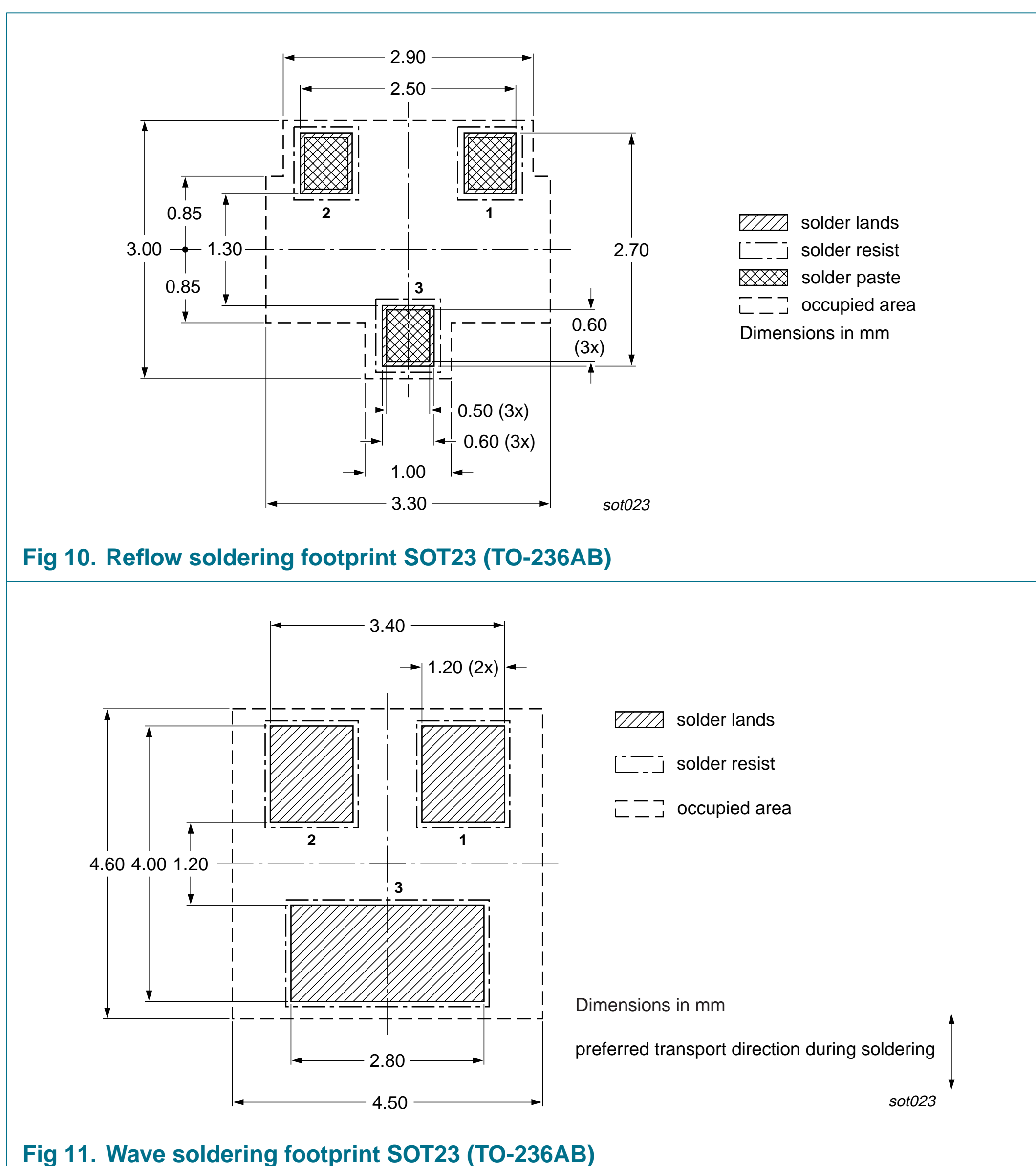


**Fig 10. Reflow soldering footprint SOT23 (TO-236AB)**



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


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## 12. Revision history

Table 10. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMEG3010EH_EJ_ET_4 | 20070320 | Product data sheet | - | PMEGXX10EH_EJ_SER_3 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.<br>• Legal texts have been adapted to the new company name where appropriate.<br>• Type numbers PMEG3010EH and PMEG3010EJ separated from data sheet PMEGXX10EH_EJ_SER_3<br>• Type number PMEG3010ET added<br>• Section 1.1 “General description”: amended<br>• Section 1.2 “Features”: amended<br>• Section 1.3 “Applications”: amended<br>• Section 8 “Test information”: added<br>• Figure 7, 10 and 11: added<br>• 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 | - | - |



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| Document status[1][2] | Product status[3] | Definition |
|---|---|---|
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| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

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[2] The term 'short data sheet' is explained in section "Definitions".

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