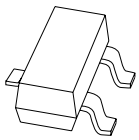


# PMEGxx05ET series

## 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 |
|---|---|---|---|
| | NXP | 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

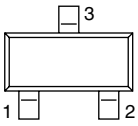
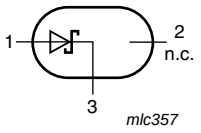
Table 2. Quick reference data

| 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 mA | [1] | | | | |
| | PMEG2005ET | | | - | 355 | 390 | mV |
| | PMEG3005ET | | | - | 380 | 430 | mV |
| | PMEG4005ET | | | - | 420 | 470 | 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 |
|---|---|---|---|
| 1 | anode |  |  |
| 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[1] |
|---|---|
| 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 | $t_p \leq 1$ ms; $\delta \leq 0.5$ | | - | 3.9 | A |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p = 8$ ms square wave | [1] | - | 10 | A |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq 25$ °C | [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 $cm^2$.

## 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 $cm^2$.

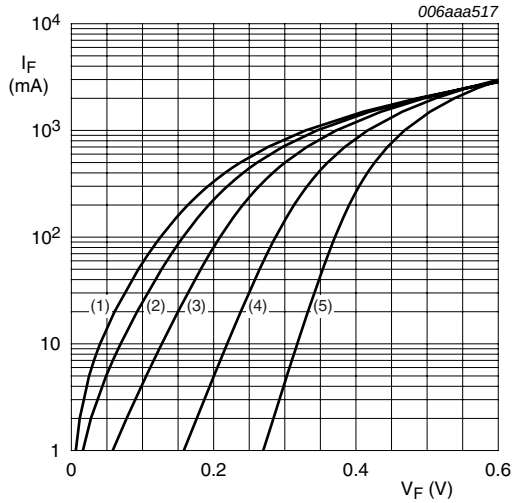
## 7. Characteristics

**Table 8. Characteristics**

*$T_{amb}$ = 25 °C unless otherwise specified.*

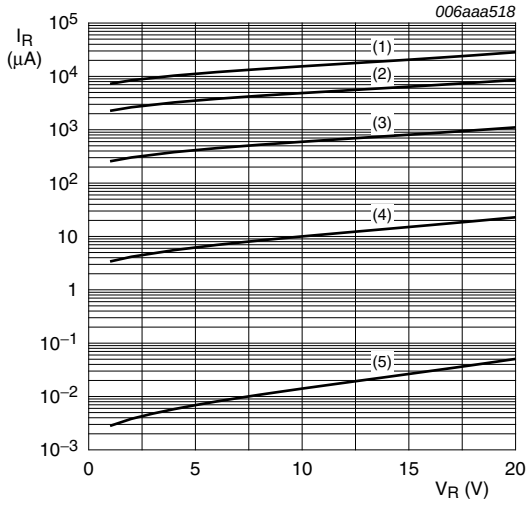
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_F$ | forward voltage | | [1] | | | | |
| | PMEG2005ET | $I_F$ = 0.1 mA | | - | 90 | 130 | mV |
| | | $I_F$ = 1 mA | | - | 150 | 190 | mV |
| | | $I_F$ = 10 mA | | - | 210 | 240 | mV |
| | | $I_F$ = 100 mA | | - | 280 | 330 | mV |
| | | $I_F$ = 500 mA | | - | 355 | 390 | mV |
| | PMEG3005ET | $I_F$ = 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 |
| | PMEG4005ET | $I_F$ = 0.1 mA | | - | 95 | 130 | mV |
| | | $I_F$ = 1 mA | | - | 155 | 210 | mV |
| | | $I_F$ = 10 mA | | - | 220 | 270 | mV |
| | | $I_F$ = 100 mA | | - | 295 | 350 | mV |
| | | $I_F$ = 500 mA | | - | 420 | 470 | mV |
| $I_R$ | reverse current | | | | | | |
| | PMEG2005ET | $V_R$ = 10 V | | - | 15 | 40 | µA |
| | | $V_R$ = 20 V | | - | 40 | 200 | µA |
| | PMEG3005ET | $V_R$ = 10 V | | - | 12 | 30 | µA |
| | | $V_R$ = 30 V | | - | 40 | 150 | µA |
| | PMEG4005ET | $V_R$ = 10 V | | - | 7 | 20 | µA |
| | | $V_R$ = 40 V | | - | 30 | 100 | µA |
| $C_d$ | diode capacitance | $V_R$ = 1 V; f = 1 MHz | | | | | |
| | PMEG2005ET | | | - | 66 | 80 | pF |
| | PMEG3005ET | | | - | 55 | 70 | pF |
| | PMEG4005ET | | | - | 43 | 50 | pF |

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



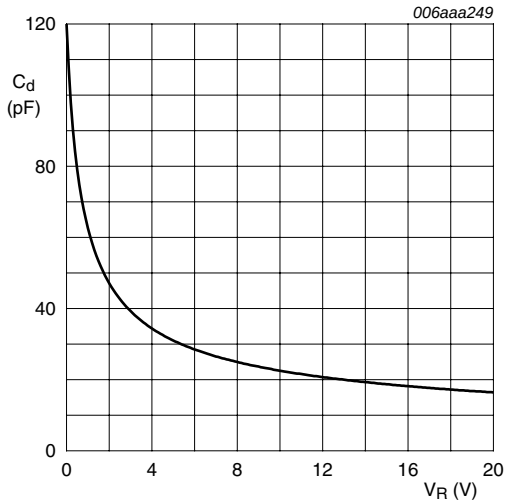

(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 125 °C
(3) $T_{amb}$ = 85 °C
(4) $T_{amb}$ = 25 °C
(5) $T_{amb}$ = –40 °C

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



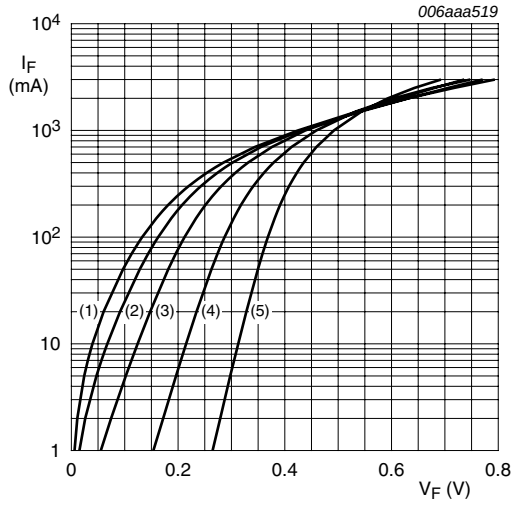

(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 125 °C
(3) $T_{amb}$ = 85 °C
(4) $T_{amb}$ = 25 °C
(5) $T_{amb}$ = –40 °C

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



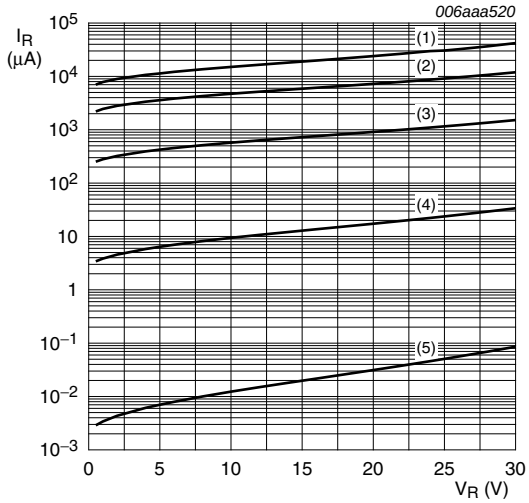

$T_{amb}$ = 25 °C; f = 1 MHz

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



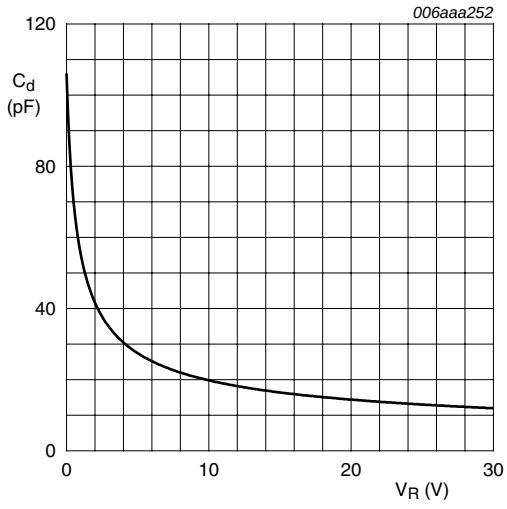

(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 125 °C
(3) $T_{amb}$ = 85 °C
(4) $T_{amb}$ = 25 °C
(5) $T_{amb}$ = –40 °C

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



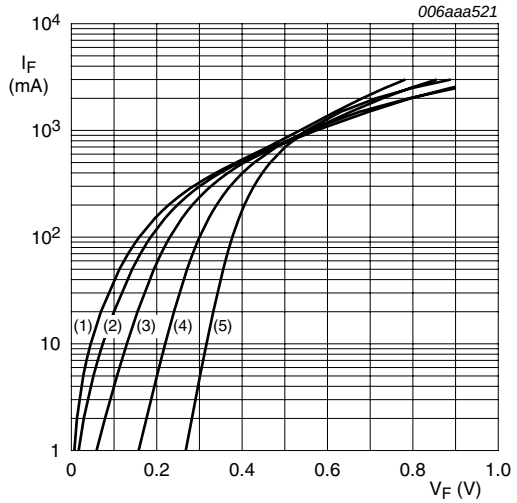

(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 125 °C
(3) $T_{amb}$ = 85 °C
(4) $T_{amb}$ = 25 °C
(5) $T_{amb}$ = –40 °C

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



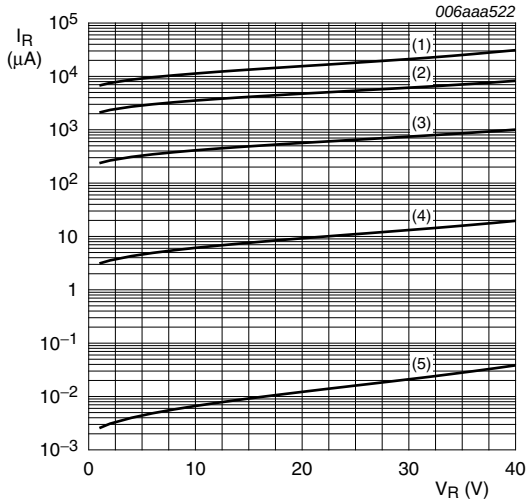

$T_{amb}$ = 25 °C; f = 1 MHz

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



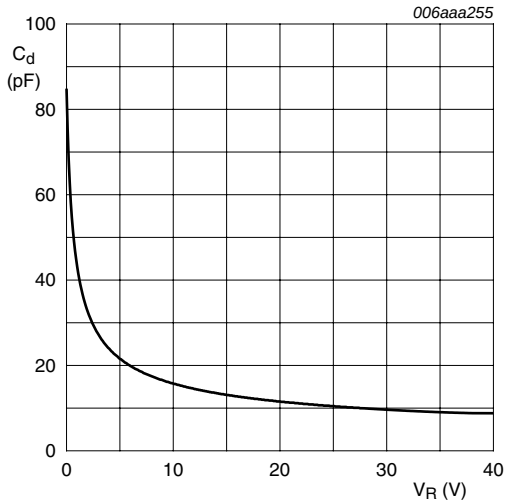

(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 125 °C
(3) $T_{amb}$ = 85 °C
(4) $T_{amb}$ = 25 °C
(5) $T_{amb}$ = –40 °C

**Fig 7. PMEG4005ET: 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 8. PMEG4005ET: Reverse current as a function of reverse voltage; typical values**




$T_{amb}$ = 25 °C; f = 1 MHz

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

## 8. Package outline

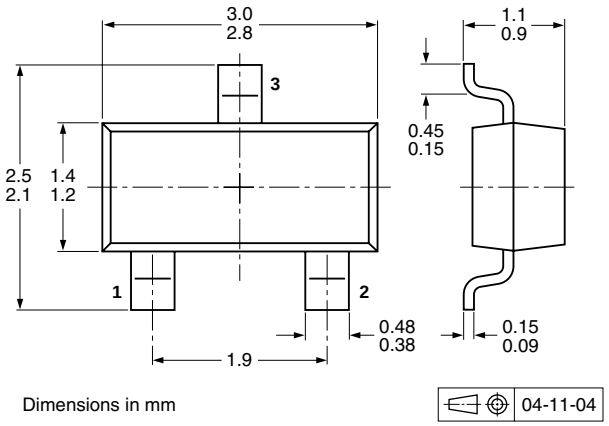



**Fig 10. Package outline SOT23 (TO-236AB)**

## 9. Packing information

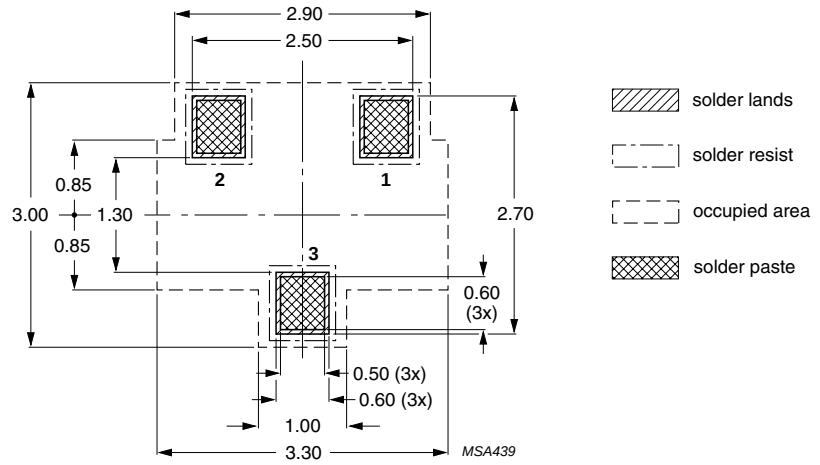
**Table 9. Packing methods**

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

| 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




Reflow soldering is the only recommended soldering method.

Dimensions in mm

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

## 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: | • 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.<br>• Figure 11 “Reflow soldering footprint SOT23 (TO-236AB)”: updated | | | |
| PMEGXX05ET_SER_1 | 20050715 | Product data sheet | - | - |

# 12. Legal information

## 12.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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## 14. Contents





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