# PMEG4005ET

## 40 V, 0.5 A very low VF Schottky barrier rectifier

1 October 2022 **Product data sheet**

## 1. General description

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

## 2. Features and benefits

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

## 3. Applications

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

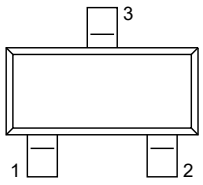
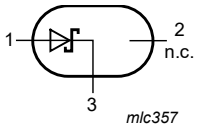
## 4. Quick reference data

**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_F$ | forward current | | | - | - | 0.5 | A |
| $V_R$ | reverse voltage | | | - | - | 40 | V |
| $V_F$ | forward voltage | $I_F$ = 500 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; $T_{amb}$ = 25 °C | | - | 420 | 470 | mV |
| $I_R$ | reverse current | $V_R$ = 40 V; $T_{amb}$ = 25 °C | | - | 30 | 100 | µA |

## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | A | anode |   SOT23 |   |
| 2 | n.c. | not connected | | |
| 3 | K | cathode | | |

# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PMEG4005ET | SOT23 | plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body | SOT23 |

# 7. Marking

**Table 4. Marking codes**

| Type number | Marking code[1] |
|---|---|
| PMEG4005ET | P5% |

[1] % = placeholder for manufacturing site code

# 8. Limiting values

**Table 5. 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 | | | - | 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 cm².

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

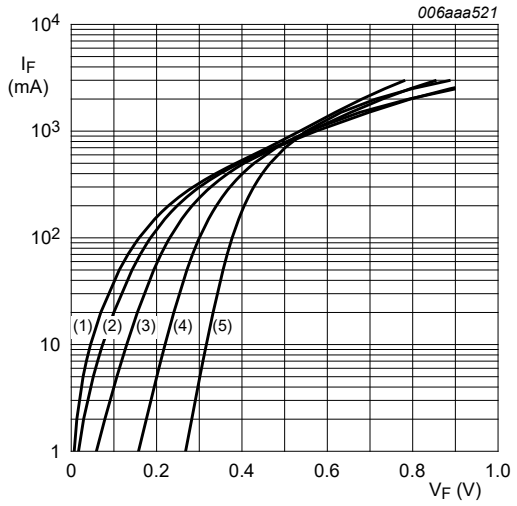
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] [2] | - | - | 440 | K/W |
| | | | [3] [1] | - | - | 300 | K/W |

[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.

## 10. Characteristics

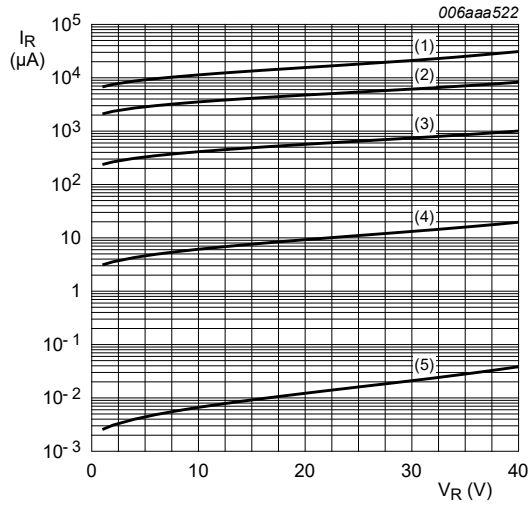
**Table 7. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 0.1 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; $T_{amb}$ = 25 °C | | - | 95 | 130 | mV |
| | | $I_F$ = 1 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; $T_{amb}$ = 25 °C | | - | 155 | 210 | mV |
| | | $I_F$ = 10 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; $T_{amb}$ = 25 °C | | - | 220 | 270 | mV |
| | | $I_F$ = 100 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; $T_{amb}$ = 25 °C | | - | 295 | 350 | mV |
| | | $I_F$ = 500 mA; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; pulsed; $T_{amb}$ = 25 °C | | - | 420 | 470 | mV |
| $I_R$ | reverse current | $V_R$ = 10 V; $T_{amb}$ = 25 °C | | - | 7 | 20 | µA |
| | | $V_R$ = 40 V; $T_{amb}$ = 25 °C | | - | 30 | 100 | µA |
| $C_d$ | diode capacitance | $V_R$ = 1 V; f = 1 MHz; $T_{amb}$ = 25 °C | | - | 43 | 50 | pF |



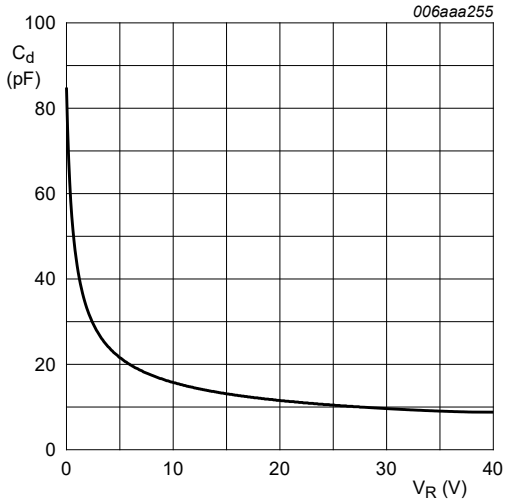

pulsed condition
(1) $T_{amb}$ = 150 °C
(2) $T_{amb}$ = 125 °C
(3) $T_{amb}$ = 85 °C
(4) $T_{amb}$ = 25 °C
(5) $T_{amb}$ = -40 °C

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




pulsed condition
(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**

## 11. Package outline

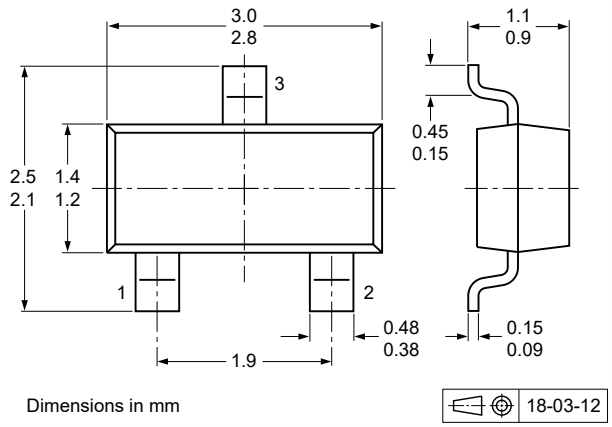



**Fig. 4. Package outline SOT23**

## 12. Soldering

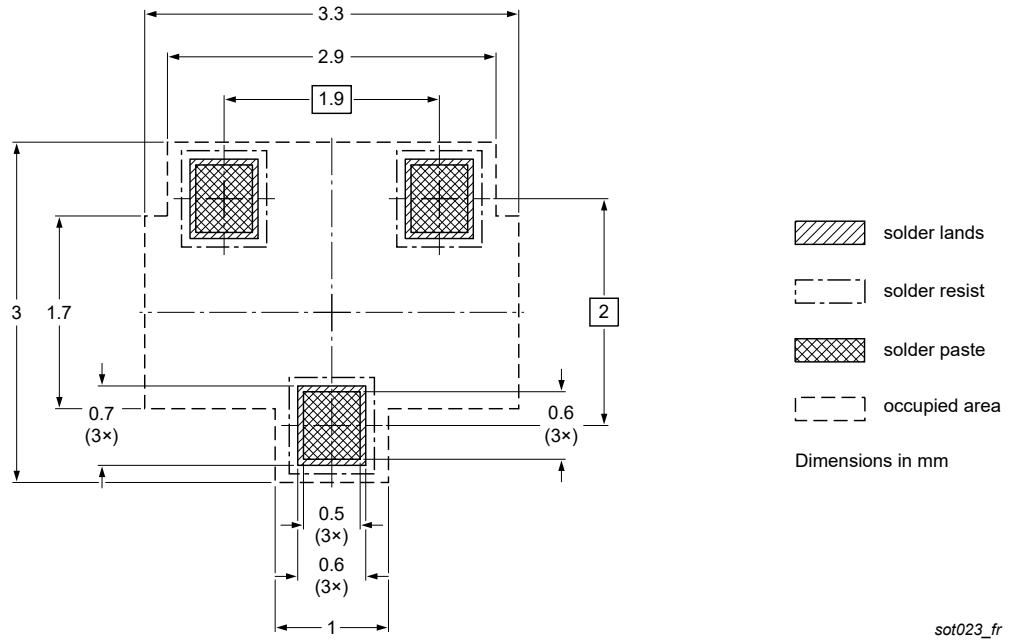



**Fig. 5. Reflow soldering footprint for SOT23**

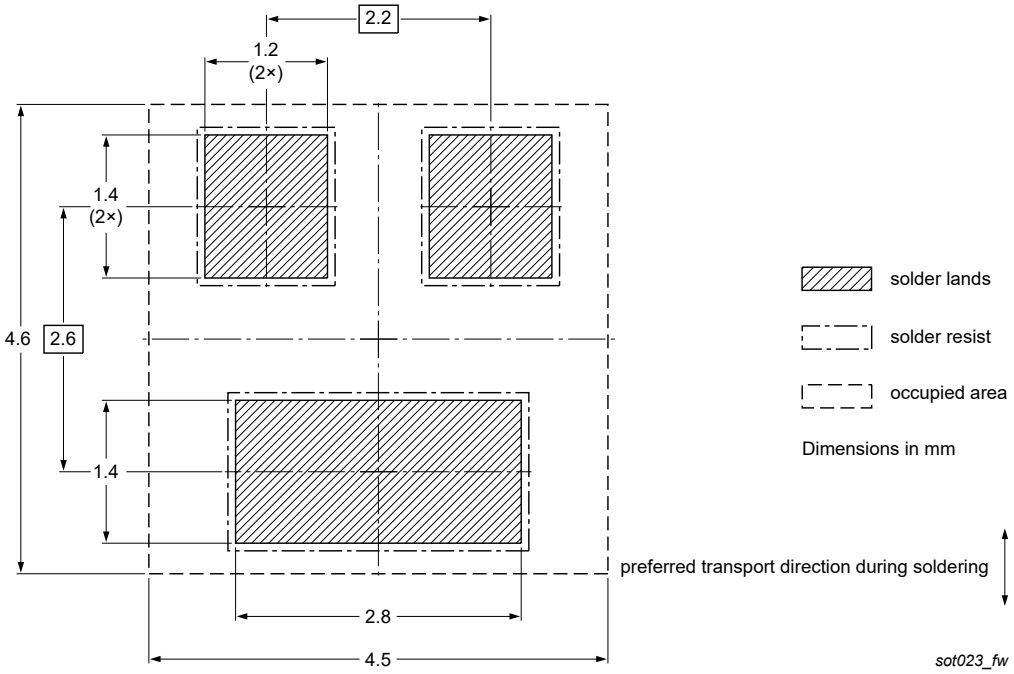



**Fig. 6. Wave soldering footprint for SOT23**

## 13. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMEG4005ET v.3 | 20221001 | Product data sheet | - | PMEGXX05ET_SER_2 |
| Modifications: | • Family data sheet reduced to single type data sheet.<br>• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.<br>• Legal texts have been adapted to the new company name where appropriate.<br>• Product changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).<br>• Packing information removed. | | | |
| PMEGXX05ET_SER_2 | 20100113 | Product data sheet | - | PMEGXX05ET_SER_1 |
| PMEGXX05ET_SER_1 | 20050715 | Product data sheet | - | - |

# 14. Legal information

## 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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