



# PMEG4010EJ

40 V, 1 A very low VF Schottky barrier rectifier

28 November 2022

Product data sheet

## 1. General description

Planar Schottky barrier rectifiers with an integrated guard ring for stress protection, encapsulated in a SOD323F (SC-90) small Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Forward current:  $I_F \leq 1$  A
- Reverse voltage:  $V_R \leq 40$  V
- Very low forward voltage
- AEC-Q101 qualified

## 3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse 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 | $T_{sp} \leq 55$ °C  | -   | -   | 1   | A       |
| $V_R$  | reverse voltage |  | -   | -   | 40  | V       |
| $V_F$  | forward voltage | $I_F = 1$ A; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ;<br>$T_{amb} = 25$ °C | -   | 540 | 640 | mV      |
| $I_R$  | reverse current | $V_R = 40$ V; $T_{amb} = 25$ °C  | -   | 30  | 100 | $\mu$ A |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline  | Graphic symbol |
|-----|--------|-------------|---------------------|----------------|
| 1   | K      | cathode     | <br>SC-90 (SOD323F) | <br>sym001     |
| 2   | A      | anode       |                     |                |

## 6. Ordering information

Table 3. Ordering information

| Type number                | Package |   |                         |
|----------------------------|---------|---|-------------------------|
|                            | Name    | Description   | Version                 |
| <a href="#">PMEG4010EJ</a> | SC-90   | plastic, surface-mounted package; 2 leads; 1.7 mm x 1.25 mm x 0.7 mm body | <a href="#">SOD323F</a> |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMEG4010EJ  | AL           |

## 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                     | $T_{sp} \leq 55\text{ °C}$                  |         | -   | 1   | A    |
| $I_{FRM}$ | repetitive peak forward current     | $t_p \leq 1\text{ ms}$ ; $\delta \leq 0.25$ |         | -   | 7   | A    |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p = 8\text{ ms}$ ; square wave           |         | -   | 9   | A    |
| $P_{tot}$ | total power dissipation             | $T_{amb} \leq 25\text{ °C}$                 | [1] [2] | -   | 350 | mW   |
|           |                                     |   | [3] [2] | -   | 830 | 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] Reflow soldering is the only recommended soldering method.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

## 9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol         | Parameter  | Conditions  | Min | Typ | Max | Unit |
|----------------|--|-------------|-----|-----|-----|------|
| $R_{th(j-a)}$  | thermal resistance from junction to ambient      | [1] [2] [3] | -   | -   | 350 | K/W  |
|                |  | [4] [2] [3] | -   | -   | 150 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | [5]         | -   | -   | 55  | K/W  |

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

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

[3] 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.

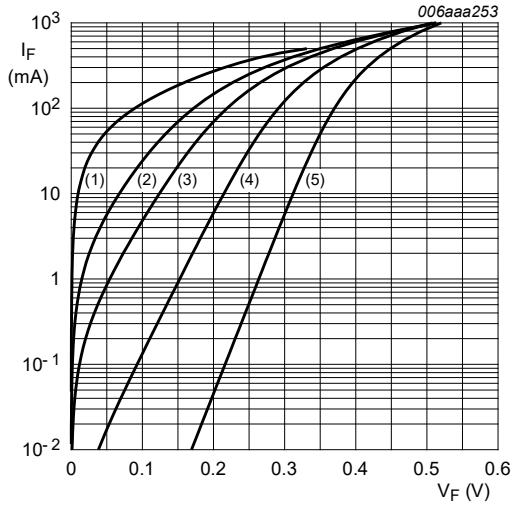
[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

[5] Soldering point of cathode tab.

## 10. Characteristics

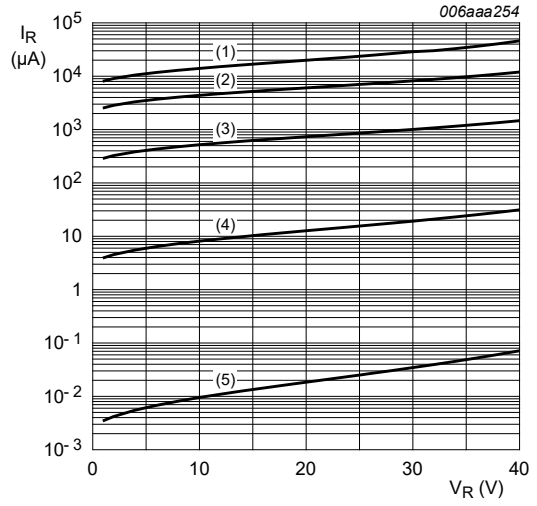
Table 7. Characteristics

| Symbol | Parameter         | Conditions   | Min | Typ | Max | Unit          |
|--------|-------------------|--|-----|-----|-----|---------------|
| $V_F$  | forward voltage   | $I_F = 0.1 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>$T_{amb} = 25 \text{ }^\circ\text{C}$ | -   | 95  | 130 | mV            |
|        |                   | $I_F = 1 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>$T_{amb} = 25 \text{ }^\circ\text{C}$   | -   | 155 | 210 | mV            |
|        |                   | $I_F = 10 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>$T_{amb} = 25 \text{ }^\circ\text{C}$  | -   | 220 | 270 | mV            |
|        |                   | $I_F = 100 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>$T_{amb} = 25 \text{ }^\circ\text{C}$ | -   | 295 | 350 | mV            |
|        |                   | $I_F = 500 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>$T_{amb} = 25 \text{ }^\circ\text{C}$ | -   | 420 | 470 | mV            |
|        |                   | $I_F = 1 \text{ A}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02;$<br>$T_{amb} = 25 \text{ }^\circ\text{C}$    | -   | 540 | 640 | mV            |
| $I_R$  | reverse current   | $V_R = 10 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$  | -   | 7   | 20  | $\mu\text{A}$ |
|        |                   | $V_R = 40 \text{ V}; T_{amb} = 25 \text{ }^\circ\text{C}$  | -   | 30  | 100 | $\mu\text{A}$ |
| $C_d$  | diode capacitance | $V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_{amb} = 25 \text{ }^\circ\text{C}$                                  | -   | 43  | 50  | pF            |



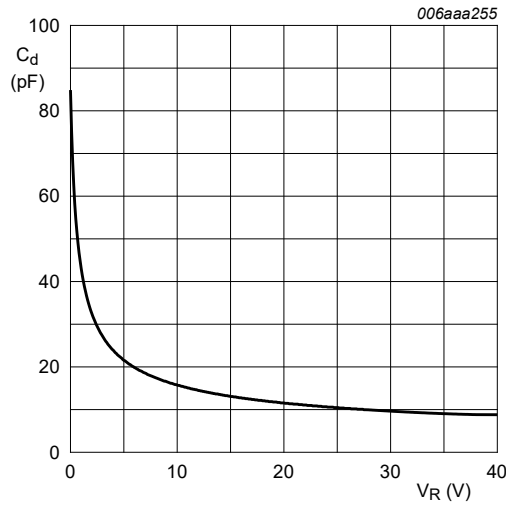
pulsed condition  
 (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 125\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 85\text{ }^{\circ}\text{C}$   
 (4)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (5)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

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



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

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



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

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

## 11. Test information

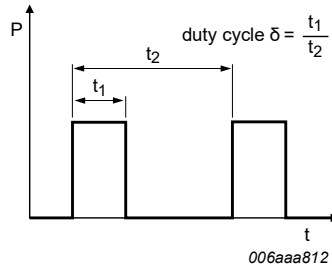


Fig. 4. Duty cycle definition

### Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

## 12. Package outline

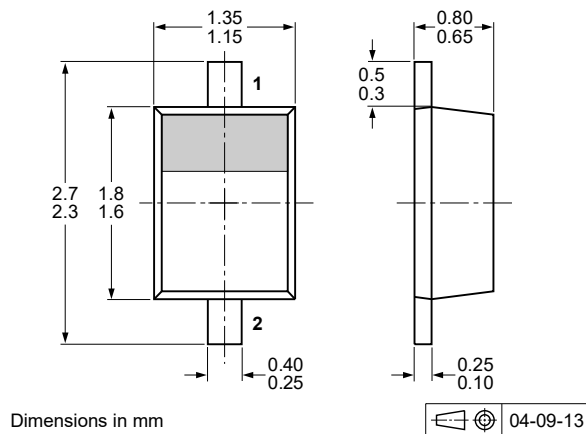


Fig. 5. Package outline SC-90 (SOD323F)

## 13. Soldering

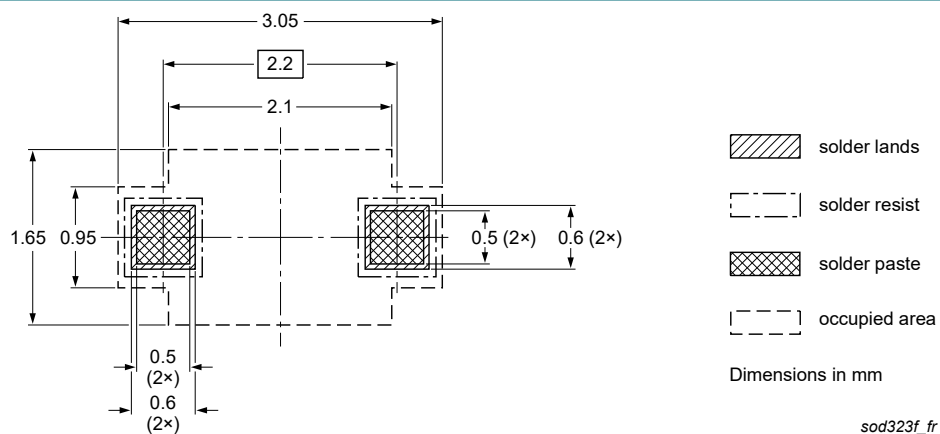


Fig. 6. Reflow soldering footprint for SC-90 (SOD323F)

## 14. Revision history

Table 8. Revision history

| Data sheet ID       | Release date  | Data sheet status    | Change notice | Supersedes          |
|---------------------|---|----------------------|---------------|---------------------|
| PMEG4010EJ v.5      | 20220928  | Product data sheet   | -             | PMEG4010EH_EJ_ET_4  |
| Modifications:      | <ul style="list-style-type: none"> <li>Family data sheet reduced to single type data sheets.</li> <li>Packing information removed.</li> </ul> |                      |               |                     |
| PMEG4010EH_EJ_ET_4  | 20070321  | Product data sheet   | -             | PMEGXX10EH_EJ_SER_3 |
| 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 | -             | -                   |

## 15. 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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