



# PMEG4010BEA

1 A very low VF MEGA Schottky barrier rectifier

15 July 2020

Product data sheet

## 1. General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a very small SOD323 (SC-76) Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Forward current: 1 A
- Reverse voltage: 40 V
- Very low forward voltage
- Very small plastic SMD package
- AEC-Q101 qualified

## 3. Applications

- High efficiency DC-to-DC conversion
- Voltage clamping
- Protection circuits
- Low voltage rectification
- Blocking diode
- Low power consumption applications

## 4. Quick reference data



Table 1. Quick reference data

| Symbol | Parameter       | Conditions                 |     | Min | Typ | Max | Unit |
|--------|-----------------|----------------------------|-----|-----|-----|-----|------|
| $I_F$  | forward current | $T_{sp} \leq 55\text{ °C}$ | [1] | -   | -   | 1   | A    |
| $V_R$  | reverse voltage |                            |     | -   | -   | 40  | V    |

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

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline  | Graphic symbol  |
|-----|--------|-------------|---|---|
| 1   | K      | cathode     | <br>SOD323 | <br>sym001 |
| 2   | A      | anode       |   |   |

## 6. Ordering information

Table 3. Ordering information

| Type number | Package |  |         |
|-------------|---------|--|---------|
|             | Name    | Description  | Version |
| PMEG4010BEA | SOD323  | plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body | SOD323  |

## 7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMEG4010BEA | V3           |

## 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] | -   | 1   | A    |
| $I_{FRM}$ | repetitive peak forward current     | $t_p \leq 1\text{ ms}; \delta \leq 0.5$ |     | -   | 3.5 | A    |
| $I_{FSM}$ | non-repetitive peak forward current | square-wave pulse; $t_p = 8\text{ ms}$  |     | -   | 10  | A    |
| $T_j$     | 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.

## 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] | -   | -   | 450 | K/W  |
|                |  |             | [1] [3] | -   | -   | 210 | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [4]     | -   | -   | 90  | 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.

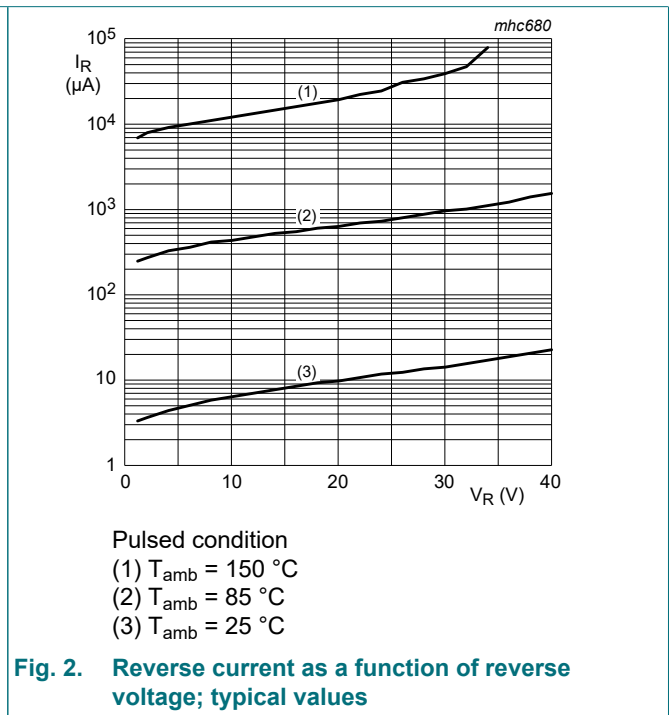
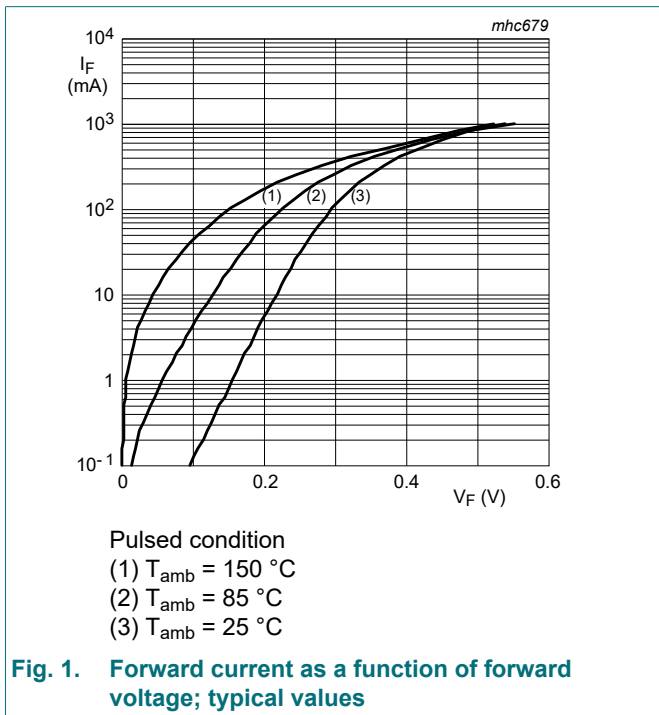
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

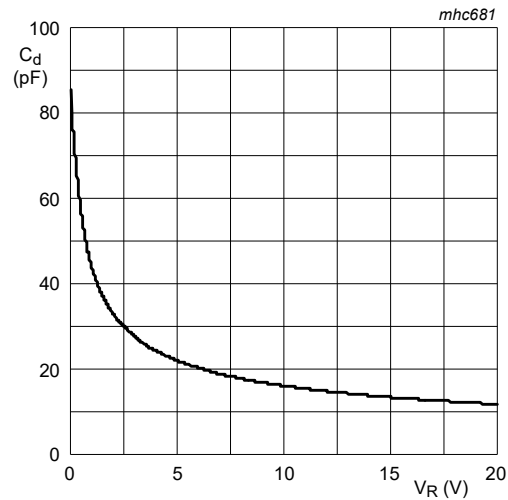
[4] Soldering point of cathode tab.

## 10. Characteristics

Table 7. Characteristics

| Symbol         | Parameter         | Conditions   | Min | Typ | Max | Unit |
|----------------|-------------------|--|-----|-----|-----|------|
| V <sub>F</sub> | forward voltage   | I <sub>F</sub> = 0.1 mA; T <sub>amb</sub> = 25 °C                                  | -   | 95  | 130 | mV   |
|                |                   | I <sub>F</sub> = 1 mA; T <sub>amb</sub> = 25 °C                                    | -   | 155 | 210 | mV   |
|                |                   | I <sub>F</sub> = 10 mA; T <sub>amb</sub> = 25 °C                                   | -   | 220 | 270 | mV   |
|                |                   | I <sub>F</sub> = 100 mA; T <sub>amb</sub> = 25 °C                                  | -   | 295 | 350 | mV   |
|                |                   | I <sub>F</sub> = 500 mA; T <sub>amb</sub> = 25 °C                                  | -   | 420 | 470 | mV   |
|                |                   | I <sub>F</sub> = 1000 mA; T <sub>amb</sub> = 25 °C                                 | -   | 540 | 640 | mV   |
| I <sub>R</sub> | reverse current   | V <sub>R</sub> = 10 V; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C | -   | 7   | 20  | μA   |
|                |                   | V <sub>R</sub> = 40 V; t <sub>p</sub> ≤ 300 μs; δ ≤ 0.02; T <sub>amb</sub> = 25 °C | -   | 30  | 100 | μA   |
| C <sub>d</sub> | diode capacitance | V <sub>R</sub> = 1 V; f = 1 MHz; T <sub>amb</sub> = 25 °C                          | -   | 43  | 50  | pF   |





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

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

## 11. Test information

### 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

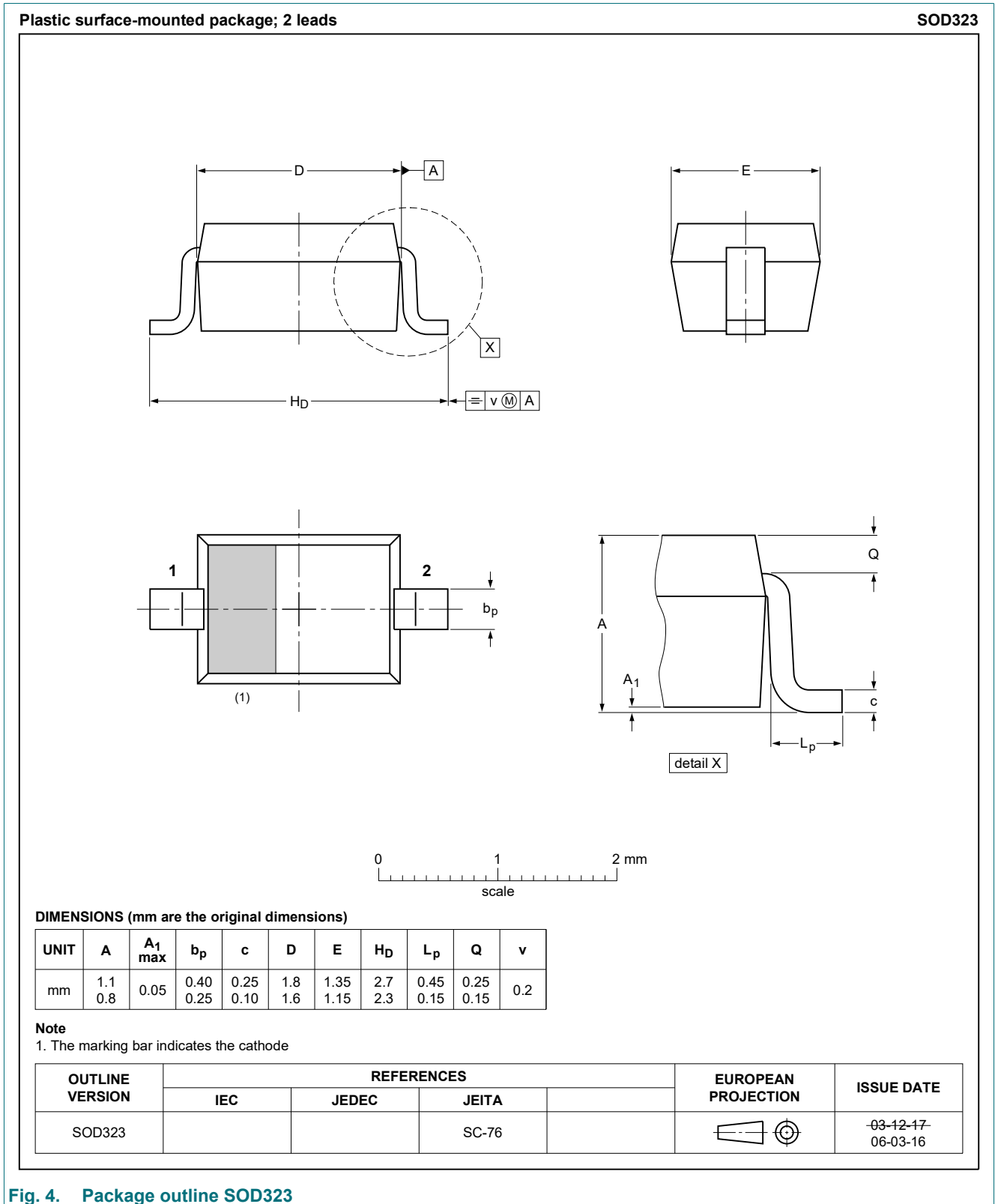


Fig. 4. Package outline SOD323

### 13. Soldering

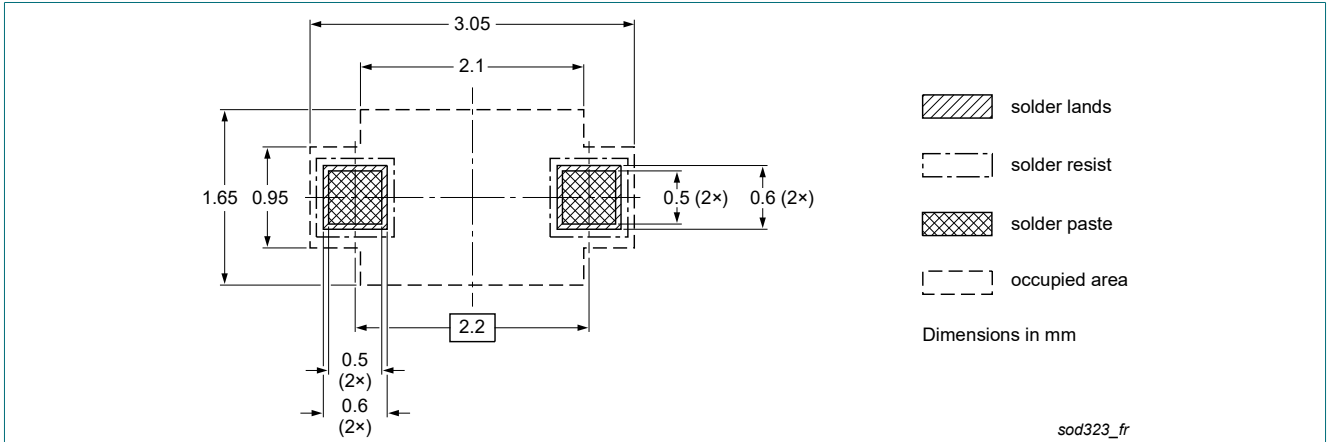


Fig. 5. Reflow soldering footprint for SOD323

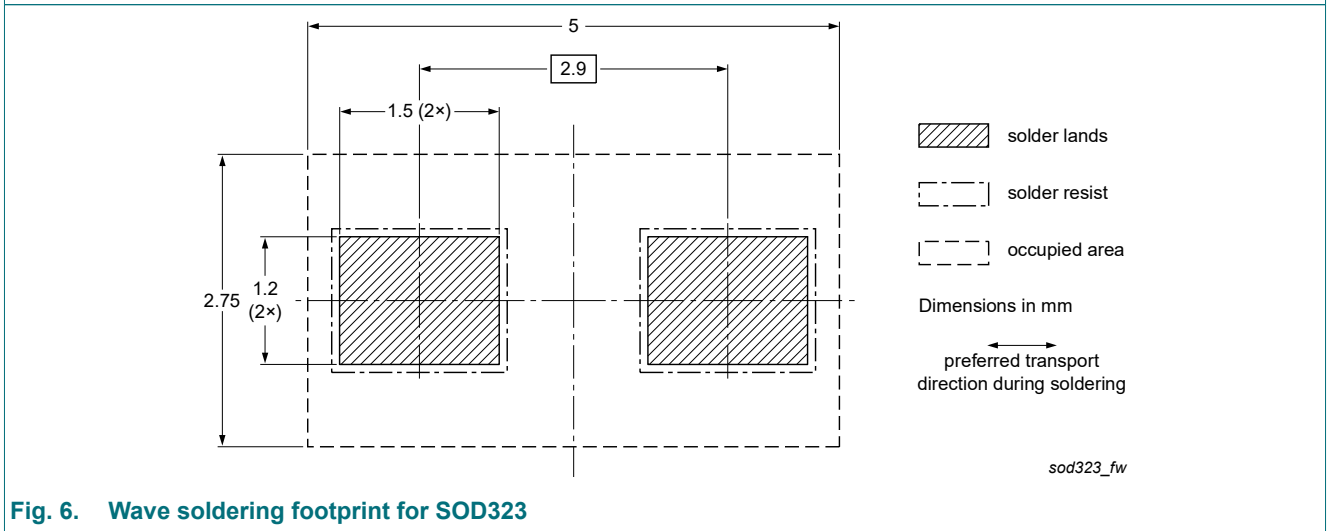


Fig. 6. Wave soldering footprint for SOD323

## 14. Revision history

Table 8. Revision history

| Data sheet ID                   | Release date  | Data sheet status  | Change notice | Supersedes                      |
|---------------------------------|---|--------------------|---------------|---------------------------------|
| PMEG4010BEA v.3                 | 20200715  | Product data sheet | -             | PMEGXX10BEA_<br>PMEGXX10BEV v.2 |
| Modifications:                  | <ul style="list-style-type: none"> <li>Family data sheet reduced to single type data sheet.</li> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul> |                    |               |                                 |
| PMEGXX10BEA_<br>PMEGXX10BEV v.2 | 200406142   | Product data sheet | -             | PMEGXX10BEA_<br>PMEGXX10BEV v.1 |
| PMEGXX10BEA_<br>PMEGXX10BEV v.1 | 20040402  | Product 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".
- [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 <https://www.nexperia.com>.

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## Contents

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|                                 |   |
|---------------------------------|---|
| 1. General description.....     | 1 |
| 2. Features and benefits.....   | 1 |
| 3. Applications.....            | 1 |
| 4. Quick reference data.....    | 1 |
| 5. Pinning information.....     | 2 |
| 6. Ordering information.....    | 2 |
| 7. Marking.....                 | 2 |
| 8. Limiting values.....         | 3 |
| 9. Thermal characteristics..... | 3 |
| 10. Characteristics.....        | 4 |
| 11. Test information.....       | 5 |
| 12. Package outline.....        | 6 |
| 13. Soldering.....              | 7 |
| 14. Revision history.....       | 8 |
| 15. Legal information.....      | 9 |

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