



PMEG4005EH-Q

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

6 August 2021

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 small SOD123F Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Very low forward voltage
- Flat lead SMD package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

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 | $T_{sp} \leq 55\text{ °C}$ | - | - | 0.5 | A |
| V_R | reverse voltage | $T_{amb} = 25\text{ °C}$ | - | - | 40 | V |
| V_F | forward voltage | $I_F = 500\text{ mA}$; $t_p \leq 300\text{ }\mu\text{s}$; $\delta \leq 0.02$; pulsed; $T_{amb} = 25\text{ °C}$ | - | 420 | 470 | mV |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--|---|
| 1 | K | cathode[1] |  SOD123F |  sym001 |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|--------------|---------|--|---------|
| | Name | Description | Version |
| PMEG4005EH-Q | SOD123F | plastic, surface-mounted package; 2 leads; 2.6 mm x 1.6 mm x 1.1 mm body | SOD123F |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|--------------|--------------|
| PMEG4005EH-Q | A5 |

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 | $T_{amb} = 25\text{ °C}$ | | - | 40 | V |
| I_F | forward current | $T_{sp} \leq 55\text{ °C}$ | | - | 0.5 | 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 | $t_p = 8\text{ ms}; \text{square wave}; T_{j(\text{init})} = 25\text{ °C}$ | | - | 10 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | [1] | - | 375 | mW |
| | | | [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 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] | - | - | 330 | K/W |
| | | | [1] [3] | - | - | 150 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | | - | - | 60 | 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. Nomograms for determination of 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.

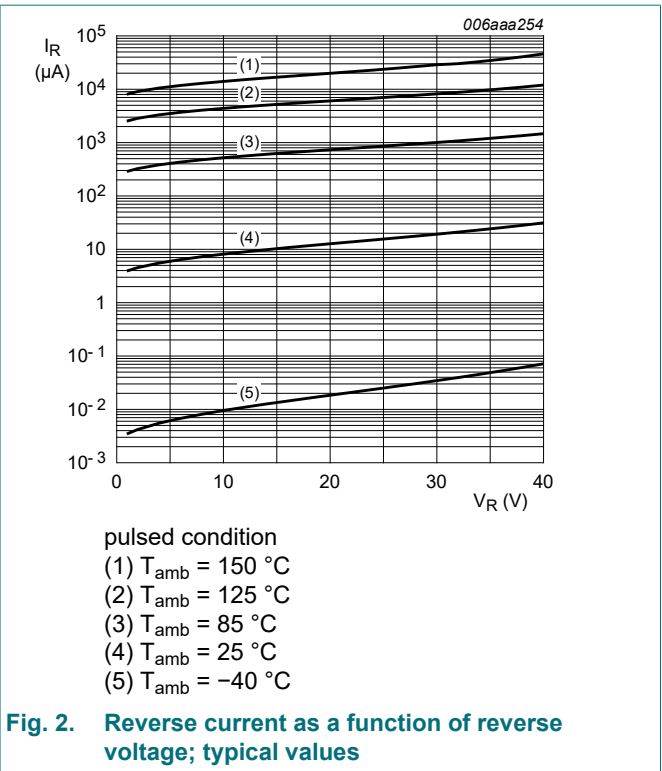
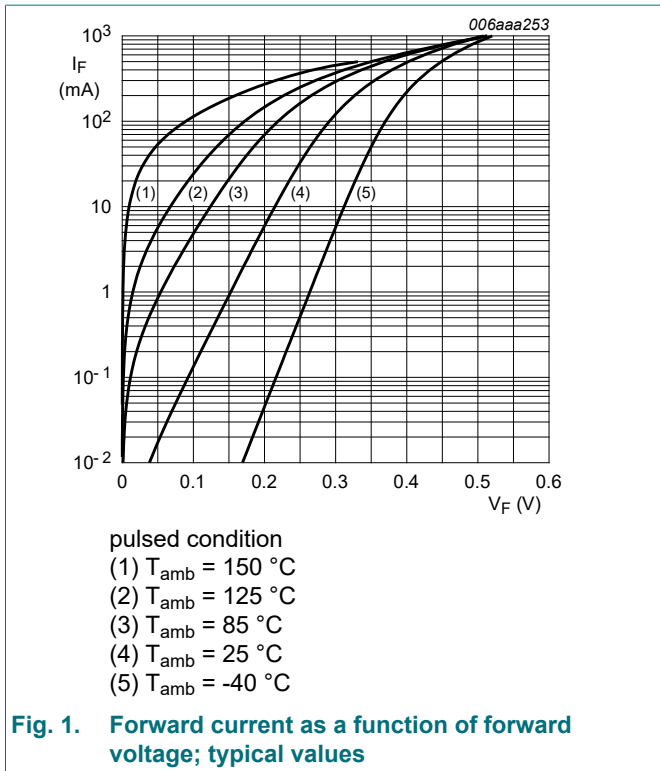
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².

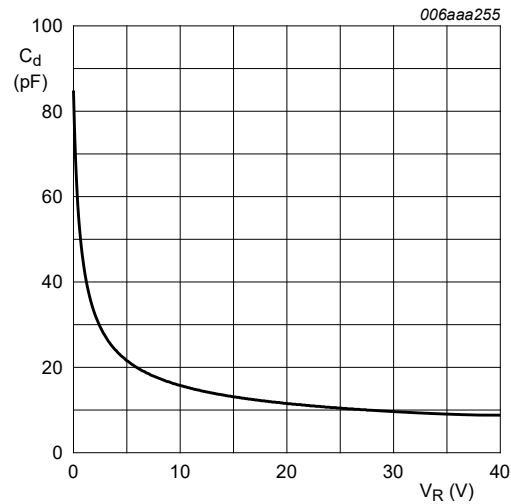
10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|----------------|-------------------|--|-----|-----|-----|------|
| V _F | forward voltage | I _F = 0.1 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C | - | 95 | 130 | mV |
| | | I _F = 1 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C | - | 155 | 210 | mV |
| | | I _F = 10 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C | - | 220 | 270 | mV |
| | | I _F = 100 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C | - | 295 | 350 | mV |
| | | I _F = 500 mA; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C | - | 420 | 470 | mV |
| I _R | reverse current | V _R = 10 V; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C | [1] | 7 | 20 | μA |
| | | V _R = 40 V; t _p ≤ 300 μs; δ ≤ 0.02; pulsed; T _{amb} = 25 °C | [1] | 30 | 100 | μA |
| C _d | diode capacitance | V _R = 1 V; f = 1 MHz; T _{amb} = 25 °C | - | 43 | 50 | pF |

[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. Nomograms for determination of the reverse power losses P_R and I_{F(AV)} rating will be available on request.





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

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

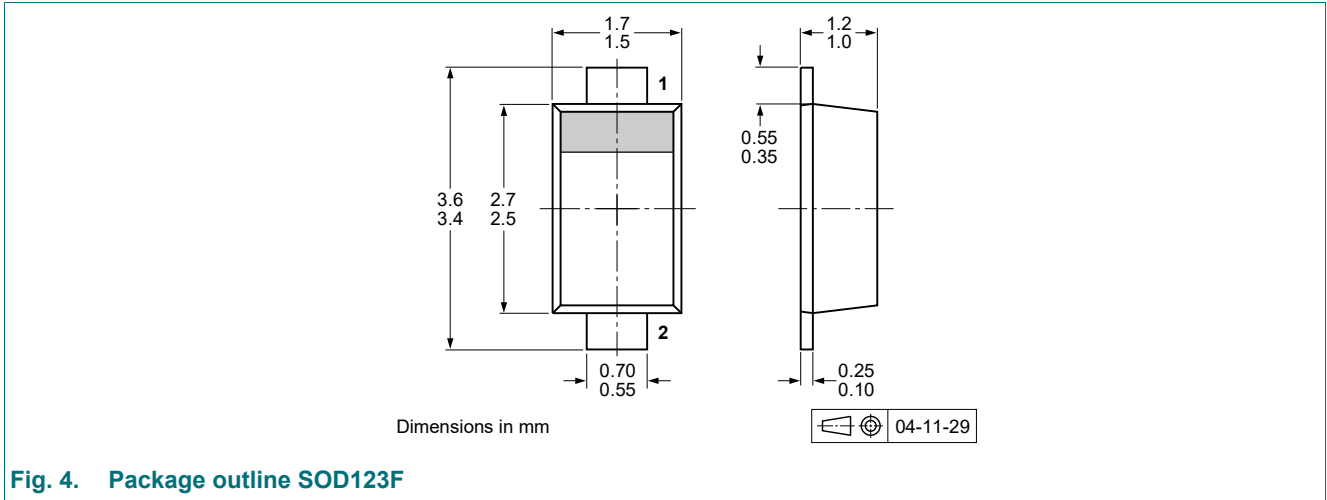
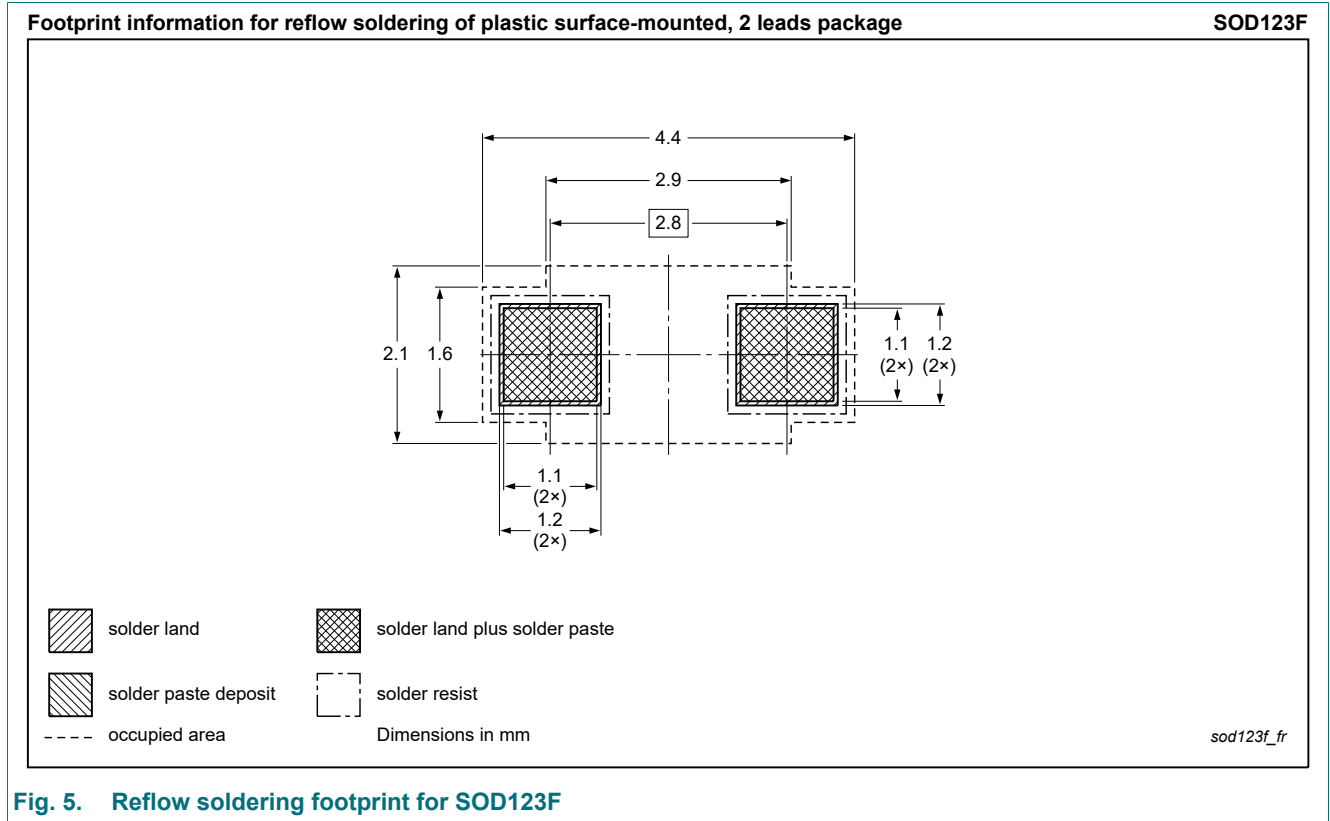


Fig. 4. Package outline SOD123F

13. Soldering



14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|------------------|--------------|--------------------|---------------|------------|
| PMEG4005EH-Q v.1 | 20210806 | 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. |

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