

PMEG2020EH; PMEG2020EJ

20 V, 2 A very low V_F MEGA Schottky barrier rectifiers

Rev. 03 — 10 August 2005

Product data sheet

1. Product profile

1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifiers with an integrated guard ring for stress protection, encapsulated in small and flat lead Surface Mounted Device (SMD) plastic packages.

Table 1: Product overview

| Type number | Package | | Configuration |
|-------------|---------|-------|---------------|
| | Philips | JEITA | |
| PMEG2020EH | SOD123F | - | single diode |
| PMEG2020EJ | SOD323F | SC-90 | single diode |

1.2 Features

- Forward current: 2 A
- Reverse voltage: 20 V
- Very low forward voltage
- Small and flat lead 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 | $T_{sp} \leq 55 \text{ °C}$ | - | - | 2 | A |
| V_R | reverse voltage | | - | - | 20 | V |
| V_F | forward voltage | $I_F = 2 \text{ A}$ | [1] - | 450 | 525 | mV |

[1] Pulse test: $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$.

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2. Pinning information

Table 3: Pinning

| Pin | Description | Simplified outline | Symbol |
|-----|-------------|---|---|
| 1 | cathode | [1] | 1  2 |
| 2 | anode |  | <i>sym001</i> |

001aab540

[1] The marking bar indicates the cathode.

3. Ordering information

Table 4: Ordering information

| Type number | Package | | |
|-------------|---------|--|---------|
| | Name | Description | Version |
| PMEG2020EH | - | plastic surface mounted package; 2 leads | SOD123F |
| PMEG2020EJ | SC-90 | plastic surface mounted package; 2 leads | SOD323F |

4. Marking

Table 5: Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMEG2020EH | A6 |
| PMEG2020EJ | CA |

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 | | - | 20 | V | | |
| I_F | forward current | $T_{sp} \leq 55\text{ °C}$ | - | 2 | A | | |
| I_{FRM} | repetitive peak forward current | $t_p \leq 1\text{ ms}; \delta \leq 0.5$ | - | 7 | A | | |
| I_{FSM} | non-repetitive peak forward current | $t_p = 8\text{ ms}$; square wave | - | 9 | A | | |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | | | | | |
| | | | PMEG2020EH | [1] | - | 375 | mW |
| | | | | [2] | - | 830 | mW |
| | | | PMEG2020EJ | [1] | - | 360 | mW |
| | | | | [2] | - | 830 | mW |
| | | | T_j | junction temperature | | - | 150 |
| 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.

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 | | | | | | |
| | | | PMEG2020EH | [1][2] | - | - | 330 | K/W |
| | | | | [1][3] | - | - | 150 | K/W |
| | | | PMEG2020EJ | [1][2] | - | - | 350 | K/W |
| | | | | [1][3] | - | - | 150 | K/W |
| | | | $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [4] | | |
| PMEG2020EH | - | - | | | | 60 | K/W | |
| PMEG2020EJ | - | - | | | | 55 | 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 cm².

[4] Soldering point of cathode tab.

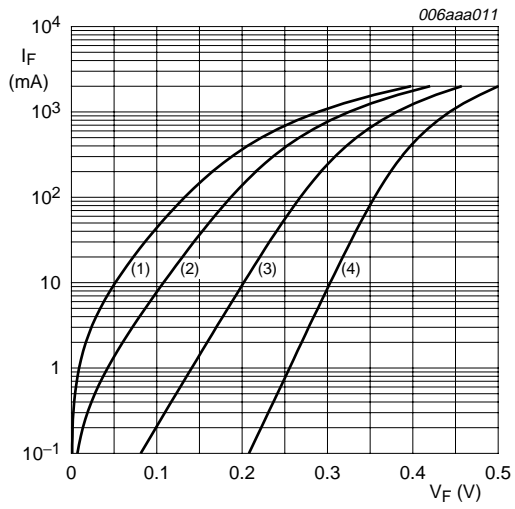
7. Characteristics

Table 8: Characteristics

$T_{amb} = 25^\circ\text{C}$ unless otherwise specified.

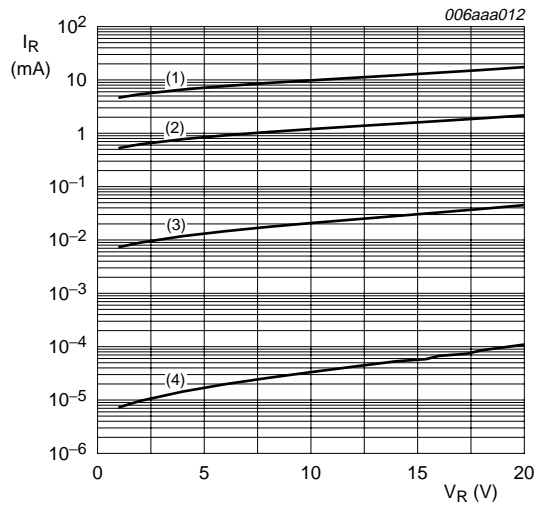
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-------------------|--------------------------------------|-----|-----|-----|---------------|
| V_F | forward voltage | | [1] | | | |
| | | $I_F = 0.01\text{ A}$ | - | 200 | 220 | mV |
| | | $I_F = 0.1\text{ A}$ | - | 260 | 290 | mV |
| | | $I_F = 1\text{ A}$ | - | 370 | 430 | mV |
| | | $I_F = 2\text{ A}$ | - | 450 | 525 | mV |
| I_R | reverse current | $V_R = 5\text{ V}$ | - | 15 | 50 | μA |
| | | $V_R = 10\text{ V}$ | - | 20 | 80 | μA |
| | | $V_R = 20\text{ V}$ | - | 45 | 200 | μA |
| | | $V_R = 5\text{ V}; f = 1\text{ MHz}$ | - | 50 | 60 | pF |
| C_d | diode capacitance | $V_R = 5\text{ V}; f = 1\text{ MHz}$ | - | 50 | 60 | pF |

[1] Pulse test: $t_p \leq 300\ \mu\text{s}$; $\delta \leq 0.02$.



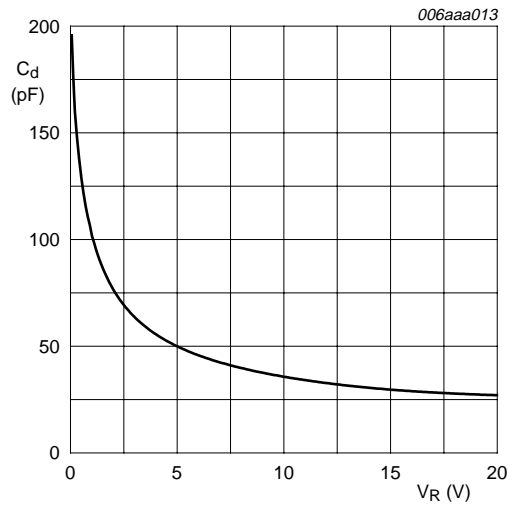
- (1) $T_{amb} = 125\text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 85\text{ }^{\circ}\text{C}$
- (3) $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (4) $T_{amb} = -40\text{ }^{\circ}\text{C}$

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



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

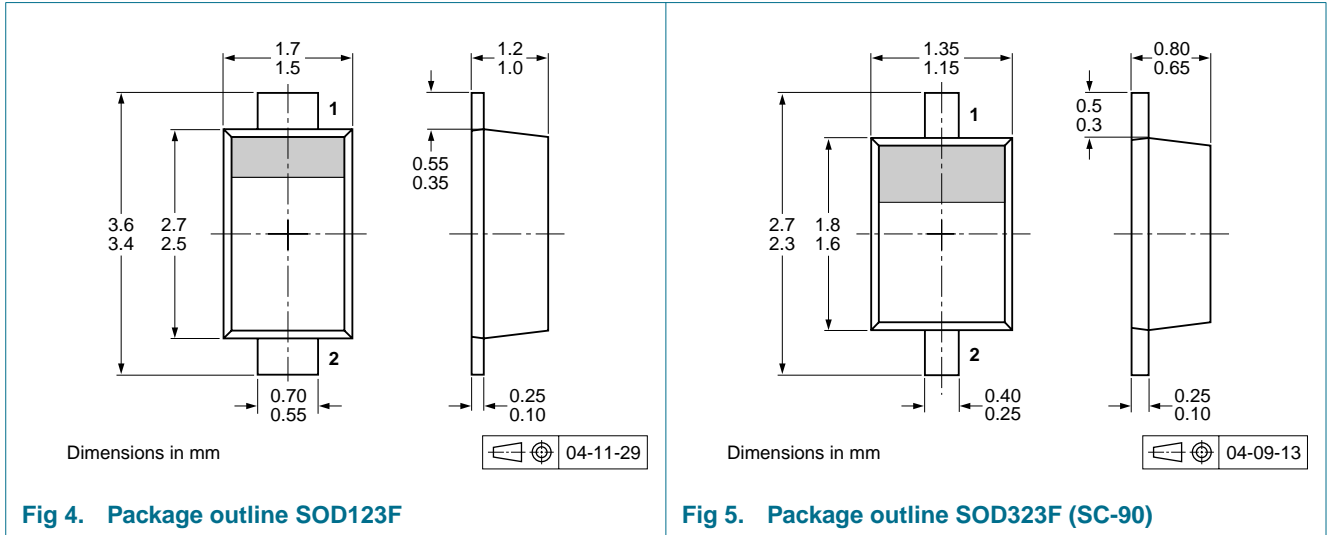
Fig 2. Reverse current as a function of reverse voltage; typical values



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

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

8. Package outline



9. Packing information

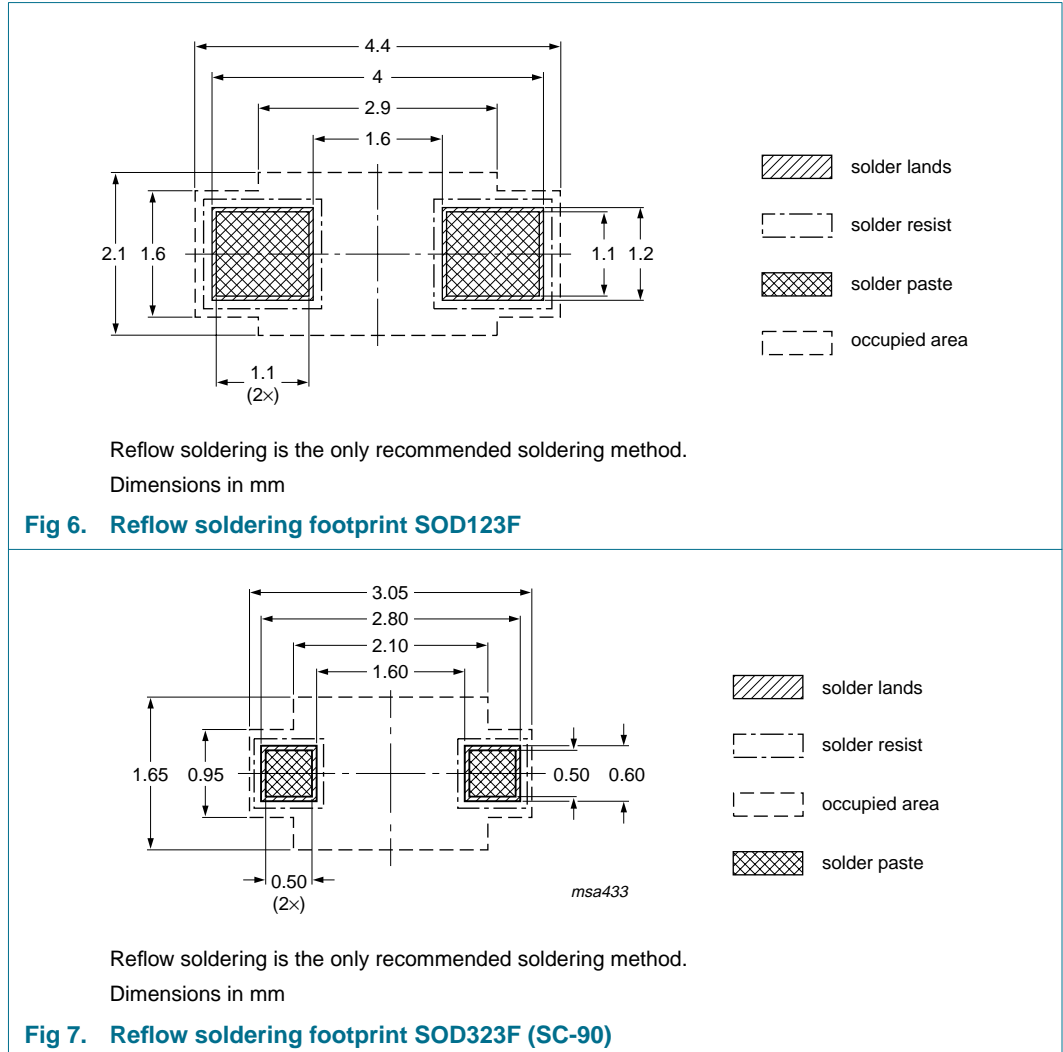
Table 9: Packing methods

The -xxx numbers are the last three digits of the 12NC ordering code. [\[1\]](#)

| Type number | Package | Description | Packing quantity | |
|-------------|---------|--------------------------------|------------------|-------|
| | | | 3000 | 10000 |
| PMEG2020EH | SOD123F | 4 mm pitch, 8 mm tape and reel | -115 | -135 |
| PMEG2020EJ | SOD323F | | | |

[1] For further information and the availability of packing methods, see [Section 16](#).

10. Soldering



11. Revision history

Table 10: Revision history

| Document ID | Release date | Data sheet status | Change notice | Doc. number | Supersedes |
|-----------------|--------------|------------------------|---------------|----------------|---|
| PMEG2020EH_EJ_3 | 20050810 | Product data sheet | - | - | PMEG2020EH_2 PMEG2020EJ_2 |
| Modifications: | | | | | <ul style="list-style-type: none"> • This data sheet is a combination of data sheets PMEG2020EH_2 and PMEG2020EJ_2. • Table 6 “Limiting values”: amended value for I_{FSM} non-repetitive peak forward current • Table 6 “Limiting values”: added PMEG2020EJ values for P_{tot} total power dissipation • Table 7: added PMEG2020EJ values for $R_{th(j-a)}$ thermal resistance from junction to ambient |
| PMEG2020EH_2 | 20050523 | Product data sheet | - | 9397 750 15081 | PMEG2020EH_1 |
| PMEG2020EH_1 | 20050304 | Preliminary data sheet | - | 9397 750 14518 | - |
| PMEG2020EJ_2 | 20050131 | Product data sheet | - | 9397 750 14314 | PMEG2020EJ_1 |
| PMEG2020EJ_1 | 20040830 | Preliminary data sheet | - | 9397 750 13536 | - |

12. Data sheet status

| Level | Data sheet status ^[1] | Product status ^{[2] [3]} | Definition |
|-------|----------------------------------|-----------------------------------|--|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
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