



PMEG050V150EPD

50 V, 15 A low VF MEGA Schottky barrier rectifier

4 July 2014

Preliminary 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 CFP15 (SOT1289) power and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 15$ A
- Reverse voltage: $V_R \leq 50$ V
- Extremely low forward voltage
- High power capability due to clip-bonding technology and heat sink
- Small and thin SMD power plastic package, typical height 0.78 mm
- AEC-Q101 qualified

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Freewheeling application
- Reverse polarity protection
- Low power consumption application

4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------|-------------------------|--|-----|-----|------|---------|
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; $f = 20$ kHz; $T_{sp} \leq tbd$ °C; square wave | - | - | 15 | A |
| V_R | reverse voltage | $T_j = 25$ °C | - | - | 50 | V |
| V_F | forward voltage | $I_F = 15$ A; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °C; pulsed | - | 441 | 500 | mV |
| I_R | reverse current | $V_R = 10$ V; $t_p \leq 3$ ms; $\delta = 0.3$; $T_j = 25$ °C; pulsed | - | 30 | 70 | μ A |
| | | $V_R = 50$ V; $t_p \leq 3$ ms; $\delta = 0.3$; $T_j = 25$ °C; pulsed | - | 480 | 1000 | μ A |

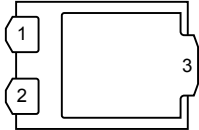
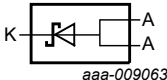


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5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--|---|
| 1 | A | anode |  <p>CFP15 (SOT1289)</p> |  <p>aaa-009063</p> |
| 2 | A | anode | | |
| 3 | K | cathode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|----------------|---------|--|---------|
| | Name | Description | Version |
| PMEG050V150EPD | CFP15 | plastic, thermal enhanced ultra thin SMD package; 3 leads; body: 5.8 x 4.3 x 0.78 mm | SOT1289 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|----------------|--------------|
| PMEG050V150EPD | 050V 150E |

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 | $T_j = 25\text{ °C}$ | | - | 50 | V |
| I_F | forward current | $T_{sp} = tbd\text{ °C}; \delta = 1$ | | - | 21 | A |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5; f = 20\text{ kHz}; T_{sp} \leq tbd\text{ °C};$ square wave | | - | 15 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | [1] | - | 780 | mW |
| | | | [2] | - | 1080 | mW |
| T_j | junction temperature | | | - | 150 | °C |
| T_{amb} | ambient temperature | | | -55 | 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] | - | - | 160 | K/W |
| | | | [1][3] | - | - | 115 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [4] | - | - | 4 | 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.
- [4] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|-------------|---------------------------|---|--|-----|------|------|---------------|
| V_F | forward voltage | $I_F = 1\text{ A}; t_p \leq 300\ \mu\text{s}; \delta \leq 0.02;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed | | - | 303 | 350 | mV |
| | | $I_F = 5\text{ A}; t_p \leq 300\ \mu\text{s}; \delta \leq 0.02;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed | | - | 364 | 420 | mV |
| | | $I_F = 10\text{ A}; t_p \leq 300\ \mu\text{s}; \delta \leq 0.02;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed | | - | 406 | - | mV |
| | | $I_F = 15\text{ A}; t_p \leq 300\ \mu\text{s}; \delta \leq 0.02;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed | | - | 441 | 500 | mV |
| I_R | reverse current | $V_R = 5\text{ V}; t_p \leq 3\text{ ms}; \delta = 0.3; T_j = 25\text{ }^\circ\text{C};$ pulsed | | - | 20 | - | μA |
| | | $V_R = 10\text{ V}; t_p \leq 3\text{ ms}; \delta = 0.3;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed | | - | 30 | 70 | μA |
| | | $V_R = 30\text{ V}; t_p \leq 3\text{ ms}; \delta = 0.3;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed | | - | 92 | - | μA |
| | | $V_R = 50\text{ V}; t_p \leq 3\text{ ms}; \delta = 0.3;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed | | - | 480 | 1000 | μA |
| C_d | diode capacitance | $V_R = 1\text{ V}; f = 1\text{ MHz}; T_j = 25\text{ }^\circ\text{C}$ | | - | 1800 | - | pF |
| | | $V_R = 10\text{ V}; f = 1\text{ MHz}; T_j = 25\text{ }^\circ\text{C}$ | | - | 600 | - | pF |
| $V_{(BR)R}$ | reverse breakdown voltage | $I_R = 5\text{ mA}; T_j = 25\text{ }^\circ\text{C}; t_p \leq 1.2\text{ ms};$ $\delta = 0.12;$ pulsed | | 50 | - | - | V |

11. Test information

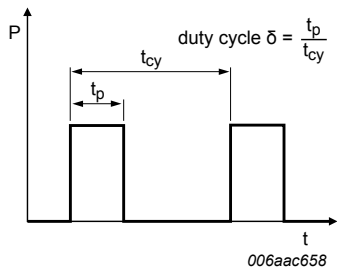


Fig. 1. Duty cycle definition

The current ratings for the typical waveforms are calculated according to the equations:
 $I_{F(AV)} = I_M \times \delta$ with I_M defined as peak current, $I_{RMS} = I_{F(AV)}$ at DC, and $I_{RMS} = I_M \times \sqrt{\delta}$ with I_{RMS} defined as RMS current.

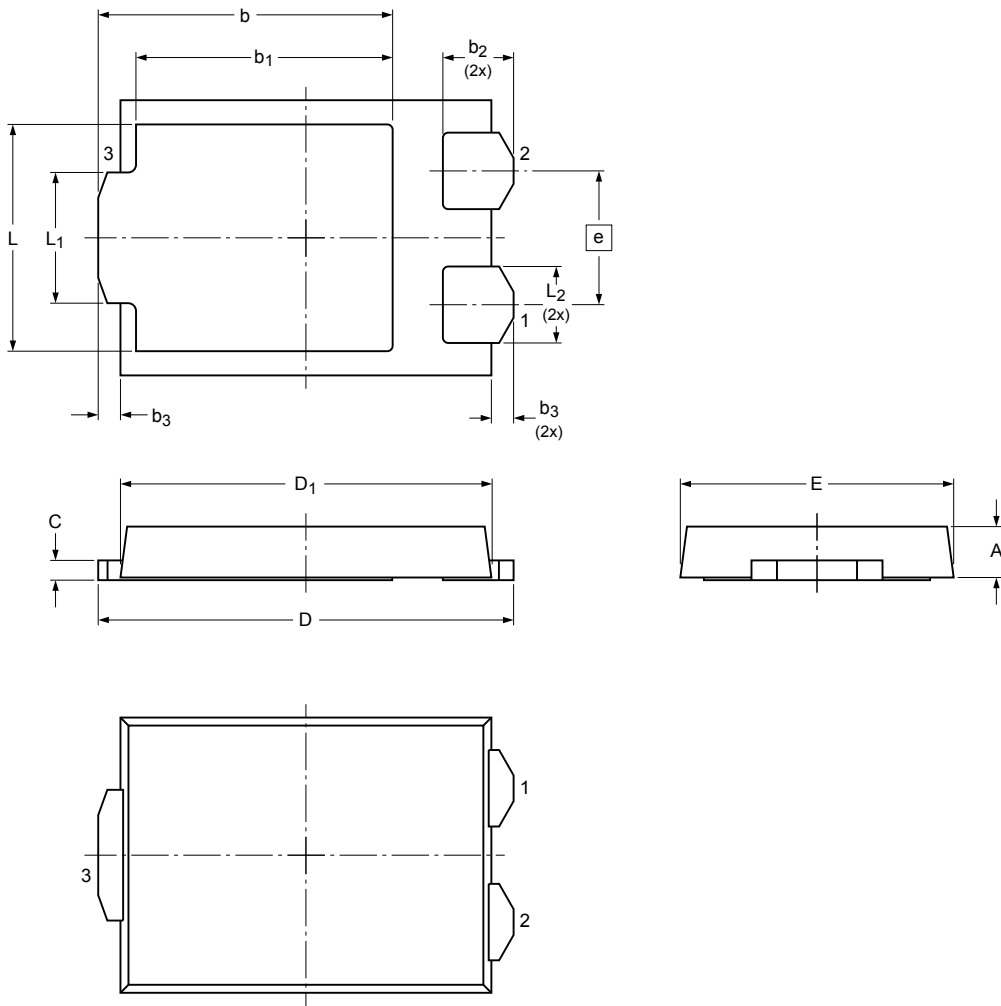
11.1 Quality information

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

CFP15: plastic, thermal enhanced ultra thin SMD package; 3 leads; body: 5.8 x 4.3 x 0.78 mm

SOT1289



Dimensions (mm are the original dimensions)

| Unit | A | C | D | D ₁ | E | e | b | b ₁ | b ₂ | b ₃ | L | L ₁ | L ₂ |
|------|-----|------|-----|----------------|-----|-----|------|----------------|----------------|----------------|------|----------------|----------------|
| max | | | 6.6 | 5.9 | 4.4 | | 4.71 | 4.11 | 1.19 | 0.45 | 3.41 | 2.15 | 1.3 |
| mm | nom | 0.78 | 0.2 | 6.5 | 5.8 | 4.3 | 2.13 | 4.61 | 4.01 | 1.09 | 0.35 | 3.31 | 2.05 |
| | min | | | 6.4 | 5.7 | 4.2 | | 4.51 | 3.91 | 0.99 | 0.25 | 3.21 | 1.95 |

Note

1. Dimension A is excluding plating thickness.

sot1289_po

| Outline version | References | | | European projection | Issue date |
|-----------------|------------|-------|-------|---------------------|---------------------------------|
| | IEC | JEDEC | JEITA | | |
| SOT1289 | | | | | 13-08-27 14-04-29 |

Fig. 2. Package outline CFP15 (SOT1289)

13. Soldering

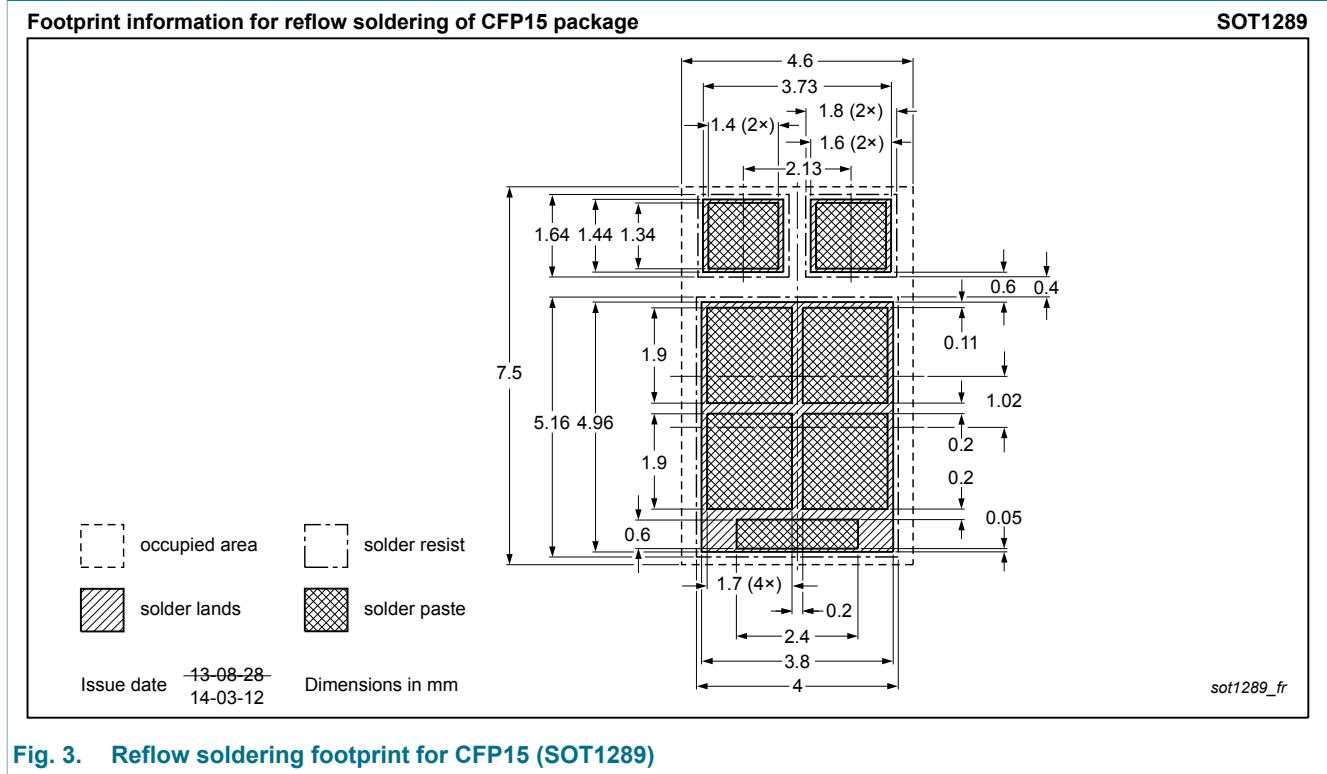


Fig. 3. Reflow soldering footprint for CFP15 (SOT1289)

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|--------------------|--|------------------------|---------------|--------------------|
| PMEG050V150EPD v.2 | 20140704 | Preliminary data sheet | - | PMEG050V150EPD v.1 |
| Modifications: | <ul style="list-style-type: none">Product status changed | | | |
| PMEG050V150EPD v.1 | 20140519 | Objective data sheet | - | - |

15. Legal information

15.1 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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