1. General description

Trench Maximum Efficiency General Application (MEGA) Schottky barrier rectifier, encapsulated in a CFP15 (SOT1289) power and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 15 \text{ A}$
- Reverse voltage: $V_R \leq 45 \text{ V}$
- Low forward voltage
- Low leakage current due to Trench MEGA Schottky technology
- High power capability due to clip-bonding technology and heat sink
- Small and thin SMD power plastic package, typical height 0.78 mm

3. Applications

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

4. Quick reference data

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5$ ; $f = 20 \text{ kHz}$; $T_{sp} \leq 120 \text{ °C}$; square wave</td>
<td>-</td>
<td>-</td>
<td>15</td>
<td>A</td>
</tr>
<tr>
<td>$V_R$</td>
<td>reverse voltage</td>
<td>$T_j = 25 \text{ °C}$</td>
<td>-</td>
<td>-</td>
<td>45</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 15 \text{ A}$; $t_p \leq 300 \text{ µs}$; $\delta \leq 0.02$ ; $T_j = 25 \text{ °C}$; pulsed</td>
<td>-</td>
<td>480</td>
<td>580</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 10 \text{ V}$; $t_p \leq 3 \text{ ms}$; $\delta \leq 0.03$ ; $T_j = 25 \text{ °C}$; pulsed</td>
<td>-</td>
<td>16</td>
<td>50</td>
<td>µA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 45 \text{ V}$; $t_p \leq 3 \text{ ms}$; $\delta \leq 0.03$ ; $T_j = 25 \text{ °C}$; pulsed</td>
<td>-</td>
<td>30</td>
<td>100</td>
<td>µA</td>
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5. Pinning information

Table 2. Pinning information

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<th>Pin</th>
<th>Symbol</th>
<th>Description</th>
<th>Simplified outline</th>
<th>Graphic symbol</th>
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<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>anode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>anode</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>K</td>
<td>cathode</td>
<td></td>
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</table>

6. Ordering information

Table 3. Ordering information

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<th>Package</th>
<th>Name</th>
<th>Description</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG45T15EPD</td>
<td>CFP15</td>
<td></td>
<td>plastic, thermal enhanced ultra thin SMD package; 3 leads; body: 5.8 x 4.3 x 0.78 mm</td>
<td>SOT1289</td>
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</table>

7. Marking

Table 4. Marking codes

<table>
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<th>Marking code</th>
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<tr>
<td>PMEG45T15EPD</td>
<td>4515 TTTT</td>
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</table>
8. Limiting values

Table 5. Limiting values
In accordance with the Absolute Maximum Rating System (IEC 60134).

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<thead>
<tr>
<th>Symbol</th>
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<th>Conditions</th>
<th>Min</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_R</td>
<td>reverse voltage</td>
<td>T_j = 25 °C</td>
<td>-</td>
<td>45</td>
<td>V</td>
</tr>
<tr>
<td>I_F</td>
<td>forward current</td>
<td>T_sp = 115 °C; δ = 1</td>
<td>-</td>
<td>21</td>
<td>A</td>
</tr>
<tr>
<td>I_{F(AV)}</td>
<td>average forward current</td>
<td>δ = 0.5 ; f = 20 kHz; T_sp ≤ 120 °C; square wave</td>
<td>-</td>
<td>15</td>
<td>A</td>
</tr>
<tr>
<td>I_{FSM}</td>
<td>non-repetitive peak forward current</td>
<td>t_p = 8 ms; T_{j(initial)} = 25 °C; square wave</td>
<td>-</td>
<td>210</td>
<td>A</td>
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<tr>
<td>P_{tot}</td>
<td>total power dissipation</td>
<td>T_amb ≤ 25 °C</td>
<td>[1]</td>
<td>-</td>
<td>1.4</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>[2]</td>
<td>-</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[3]</td>
<td>-</td>
<td>3.1</td>
</tr>
<tr>
<td>T_j</td>
<td>junction temperature</td>
<td></td>
<td>-</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>T_amb</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>150</td>
<td>°C</td>
</tr>
<tr>
<td>T_{stg}</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>150</td>
<td>°C</td>
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</table>


9. Thermal characteristics

Table 6. Thermal characteristics

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<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>R_{th(j-a)}</td>
<td>thermal resistance</td>
<td>in free air</td>
<td>[1]</td>
<td>-</td>
<td>90</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td>from junction to ambient</td>
<td></td>
<td>[2]</td>
<td>-</td>
<td>70</td>
<td>K/W</td>
</tr>
<tr>
<td>R_{th(j-sp)}</td>
<td>thermal resistance</td>
<td></td>
<td>[4]</td>
<td>-</td>
<td>3</td>
<td>K/W</td>
</tr>
<tr>
<td></td>
<td>from junction to solder point</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[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.
PMEG45T15EPD

45 V, 15 A low VF Trench MEGA Schottky barrier rectifier

FR4 PCB, standard footprint

Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

FR4 PCB, mounting pad for cathode 1 cm²

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
## 10. Characteristics

### Table 7. Characteristics

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<th>Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{(BR)R}$</td>
<td>reverse breakdown voltage</td>
<td>$I_R = 5 \text{ mA}; T_j = 25 , ^\circ\text{C}; t_p \leq 1.2 \text{ ms}; \delta \leq 0.12; \text{ pulsed}$</td>
<td>45</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>$V_F$</td>
<td>forward voltage</td>
<td>$I_F = 5 \text{ A}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02 ; T_j = 25 , ^\circ\text{C}; \text{ pulsed}$</td>
<td>-</td>
<td>320</td>
<td>380</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 10 \text{ A}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02 ; T_j = 25 , ^\circ\text{C}; \text{ pulsed}$</td>
<td>-</td>
<td>390</td>
<td>460</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$I_F = 15 \text{ A}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02 ; T_j = 125 , ^\circ\text{C}; \text{ pulsed}$</td>
<td>-</td>
<td>480</td>
<td>580</td>
<td>mV</td>
</tr>
<tr>
<td>$I_R$</td>
<td>reverse current</td>
<td>$V_R = 5 \text{ V}; t_p \leq 3 \text{ ms}; \delta \leq 0.03 ; T_j = 25 , ^\circ\text{C}; \text{ pulsed}$</td>
<td>-</td>
<td>12</td>
<td>-</td>
<td>\mu\text{A}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 10 \text{ V}; t_p \leq 3 \text{ ms}; \delta \leq 0.03 ; T_j = 25 , ^\circ\text{C}; \text{ pulsed}$</td>
<td>-</td>
<td>16</td>
<td>50</td>
<td>\mu\text{A}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 45 \text{ V}; t_p \leq 3 \text{ ms}; \delta \leq 0.03 ; T_j = 25 , ^\circ\text{C}; \text{ pulsed}$</td>
<td>-</td>
<td>30</td>
<td>100</td>
<td>\mu\text{A}</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$V_R = 45 \text{ V}; t_p \leq 3 \text{ ms}; \delta \leq 0.03 ; T_j = 125 , ^\circ\text{C}; \text{ pulsed}$</td>
<td>-</td>
<td>22</td>
<td>-</td>
<td>mA</td>
</tr>
<tr>
<td>$C_d$</td>
<td>diode capacitance</td>
<td>$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25 , ^\circ\text{C}$</td>
<td>-</td>
<td>2200</td>
<td>-</td>
<td>pF</td>
</tr>
</tbody>
</table>

![Diagram](image)

Ceramic PCB, Al$_2$O$_3$, standard footprint

**Fig. 3.** Transient thermal impedance from junction to ambient as a function of pulse duration; typical values
## Symbol | Parameter | Conditions | Min | Typ | Max | Unit
--- | --- | --- | --- | --- | --- | ---
$t_{rr}$ | reverse recovery time | $V_R = 10 \text{ V}; f = 1 \text{ MHz}; T_j = 25 ^\circ \text{C}$ | - | 800 | - | pF
$t_{rr}$ | step recovery | $I_F = 0.5 \text{ A}; I_R = 0.5 \text{ A}; I_{R(meas)} = 0.1 \text{ A}; T_j = 25 ^\circ \text{C}$ | - | 60 | - | ns
$t_{rr}$ | ramp recovery | $dI_F/dt = 200 \text{ A/µs}; T_j = 25 ^\circ \text{C}; I_F = 6 \text{ A}; V_R = 26 \text{ V}$ | - | 20 | - | ns
$V_{FRM}$ | peak forward recovery voltage | $I_F = 0.5 \text{ A}; dI_F/dt = 20 \text{ A/µs}; T_j = 25 ^\circ \text{C}$ | - | 305 | - | mV

### Fig. 4. Forward current as a function of forward voltage; typical values

- Pulsed condition:
  - (1) $T_j = 150 ^\circ \text{C}$
  - (2) $T_j = 125 ^\circ \text{C}$
  - (3) $T_j = 100 ^\circ \text{C}$
  - (4) $T_j = 85 ^\circ \text{C}$
  - (5) $T_j = 25 ^\circ \text{C}$
  - (6) $T_j = -40 ^\circ \text{C}$

### Fig. 5. Reverse current as a function of reverse voltage; typical values

- Pulsed condition:
  - (1) $T_j = 150 ^\circ \text{C}$
  - (2) $T_j = 125 ^\circ \text{C}$
  - (3) $T_j = 100 ^\circ \text{C}$
  - (4) $T_j = 85 ^\circ \text{C}$
  - (5) $T_j = 25 ^\circ \text{C}$
  - (6) $T_j = -40 ^\circ \text{C}$
Fig. 6. Diode capacitance as a function of reverse voltage; typical values

11. Test information

Fig. 7. Reverse recovery definition; step recovery
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.
12. Package outline

Fig. 11. Package outline CFP15 (SOT1289)

13. Soldering

Fig. 12. Reflow soldering footprint for CFP15 (SOT1289)
14. Revision history

Table 8. Revision history

<table>
<thead>
<tr>
<th>Data sheet ID</th>
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<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
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<td>PMEG45T15EPD v.2</td>
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<td><strong>Modifications:</strong></td>
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<td>• Editorial edit in conditions of $V_F$</td>
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<td>PMEG45T15EPD v.2</td>
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<td>Objective data sheet</td>
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15. Legal information

15.1 Data sheet status

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<tr>
<td>Objective [short] data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary [short] data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product [short] data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
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[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 URL http://www.nexperia.com.

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