1. General description

Planar Low V\textsubscript{F} Schottky barrier rectifier encapsulated in a CFP15B (SOT1289B) power and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Very low forward voltage
- High power capability due to clip-bond technology
- Small and thin SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

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

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\textsubscript{F}</td>
<td>forward current</td>
<td>(\delta = 1; T_{sp} \leq 170 , ^\circ\text{C})</td>
<td>-</td>
<td>-</td>
<td>4.2</td>
<td>A</td>
</tr>
<tr>
<td>V\textsubscript{R}</td>
<td>reverse voltage</td>
<td>(T_j = 25 , ^\circ\text{C})</td>
<td>-</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>I\textsubscript{R}</td>
<td>reverse current</td>
<td>(V_R = 30 , V;) pulsed; (T_j = 25 , ^\circ\text{C}) [1]</td>
<td>-</td>
<td>45</td>
<td>150</td>
<td>(\mu\text{A})</td>
</tr>
<tr>
<td>t\textsubscript{rr}</td>
<td>reverse recovery time</td>
<td>(I_F = 0.5 , A; I_R = 0.5 , A; I_{R(meas)} = 0.1 , A; T_j = 25 , ^\circ\text{C})</td>
<td>-</td>
<td>16</td>
<td>-</td>
<td>ns</td>
</tr>
</tbody>
</table>

[1] Very short pulse, in order to maintain a stable junction temperature.

5. Pinning information

<table>
<thead>
<tr>
<th>Pin</th>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>anode</td>
</tr>
<tr>
<td>2</td>
<td>A</td>
<td>anode</td>
</tr>
<tr>
<td>3</td>
<td>K</td>
<td>cathode</td>
</tr>
</tbody>
</table>

![Schematic diagram of CFP15B (SOT1289B)]
6. Ordering information

<table>
<thead>
<tr>
<th>Type number</th>
<th>Package</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG030V030EPE-Q</td>
<td>CFP15B</td>
<td>plastic, thermal enhanced ultra thin SMD package; 3 leads; 2.13 mm pitch; 5.8 x 4.3 x 0.95 mm body</td>
</tr>
</tbody>
</table>

7. Marking

<table>
<thead>
<tr>
<th>Type number</th>
<th>Marking code</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMEG030V030EPE-Q</td>
<td>030V003E</td>
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8. Limiting values

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter</th>
<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>$T_j = 25 ^\circ C$</td>
<td>-</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>$I_F$</td>
<td>forward current</td>
<td>$\delta = 1; T_{sp} \leq 170 ^\circ C$</td>
<td>-</td>
<td>4.2</td>
<td>A</td>
</tr>
<tr>
<td>$I_{F(AV)}$</td>
<td>average forward current</td>
<td>$\delta = 0.5; f = 20 kHz; square wave; T_{sp} \leq 173 ^\circ C$</td>
<td>-</td>
<td>3</td>
<td>A</td>
</tr>
<tr>
<td>$I_{FSM}$</td>
<td>non-repetitive peak forward current</td>
<td>half sine-wave pulse; $t_p = 8.3$ ms; $T_{j(init)} = 25 ^\circ C$</td>
<td>-</td>
<td>120</td>
<td>A</td>
</tr>
<tr>
<td>$P_{tot}$</td>
<td>total power dissipation</td>
<td>$T_{amb} \leq 25 ^\circ C$</td>
<td>[1]</td>
<td>1.66</td>
<td>W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[2]</td>
<td>2.15</td>
<td>W</td>
</tr>
<tr>
<td>$T_j$</td>
<td>junction temperature</td>
<td></td>
<td></td>
<td></td>
<td>°C</td>
</tr>
<tr>
<td>$T_{amb}$</td>
<td>ambient temperature</td>
<td></td>
<td>-55</td>
<td>175</td>
<td>°C</td>
</tr>
<tr>
<td>$T_{stg}$</td>
<td>storage temperature</td>
<td></td>
<td>-65</td>
<td>175</td>
<td>°C</td>
</tr>
</tbody>
</table>

[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

<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>$R_{th(j-a)}$</td>
<td>thermal resistance from junction to ambient</td>
<td>in free air</td>
<td>[1]</td>
<td>[2]</td>
<td>-</td>
<td>90   K/W</td>
</tr>
<tr>
<td>$R_{th(j-sp)}$</td>
<td>thermal resistance from junction to solder point</td>
<td></td>
<td>[1]</td>
<td>[3]</td>
<td>-</td>
<td>70   K/W</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[4]</td>
<td>-</td>
<td>3</td>
<td>K/W</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.

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

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>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 = 3 \text{ mA}; \text{ pulsed; } T_j = 25 , ^\circ\text{C})</td>
<td>[1]</td>
<td>30</td>
<td>-</td>
<td>-</td>
<td>V</td>
</tr>
<tr>
<td>(V_F)</td>
<td>forward voltage</td>
<td>(I_F = 1 , \text{A; pulsed; } T_j = 25 , ^\circ\text{C})</td>
<td>[1]</td>
<td>-</td>
<td>350</td>
<td>400</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(I_F = 3 , \text{A; pulsed; } T_j = 25 , ^\circ\text{C})</td>
<td>[1]</td>
<td>-</td>
<td>400</td>
<td>450</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(I_F = 3 , \text{A; pulsed; } T_j = -40 , ^\circ\text{C})</td>
<td>[1]</td>
<td>-</td>
<td>470</td>
<td>550</td>
<td>mV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(I_F = 3 , \text{A; pulsed; } T_j = 125 , ^\circ\text{C})</td>
<td>[1]</td>
<td>-</td>
<td>300</td>
<td>370</td>
<td>mV</td>
</tr>
<tr>
<td>(I_R)</td>
<td>reverse current</td>
<td>(V_R = 30 , \text{V; pulsed; } T_j = 25 , ^\circ\text{C})</td>
<td>[1]</td>
<td>-</td>
<td>45</td>
<td>150</td>
<td>µA</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>-</td>
<td>470</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(V_R = 10 , \text{V; } f = 1 , \text{MHz}; T_j = 25 , ^\circ\text{C})</td>
<td></td>
<td>-</td>
<td>160</td>
<td>-</td>
<td>pF</td>
</tr>
<tr>
<td>(t_{rr})</td>
<td>reverse recovery time step recovery</td>
<td>(I_F = 0.5 , \text{A; } I_R = 0.5 , \text{A; } I_{R(\text{meas})} = 0.1 , \text{A; } T_j = 25 , ^\circ\text{C})</td>
<td></td>
<td>-</td>
<td>16</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>reverse recovery time ramp recovery</td>
<td></td>
<td>-</td>
<td>12</td>
<td>-</td>
<td>ns</td>
</tr>
<tr>
<td>(V_{FRM})</td>
<td>peak forward recovery voltage</td>
<td>(I_F = 0.5 , \text{A; } dI_F/dt = 20 , \text{A/µs; } T_j = 25 , ^\circ\text{C})</td>
<td></td>
<td>-</td>
<td>340</td>
<td>-</td>
<td>mV</td>
</tr>
</tbody>
</table>

[1] Very short pulse, in order to maintain a stable junction temperature.
**PMEG030V030EPE-Q**

30 V, 3 A low VF Schottky barrier rectifier

---

**Fig. 5.** Diode capacitance as a function of reverse voltage; typical values

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

---

**Fig. 6.** Average forward power dissipation as a function of average forward current; typical values

- $T_J = 100 \degree \text{C}$
  - (1) $\delta = 0.1$
  - (2) $\delta = 0.2$
  - (3) $\delta = 0.5$
  - (4) $\delta = 0.8$
  - (5) $\delta = 1$

---

**Fig. 7.** Average reverse power dissipation as a function of reverse voltage; typical values

- $T_J = 100 \degree \text{C}$
  - (1) $\delta = 1$
  - (2) $\delta = 0.9$
  - (3) $\delta = 0.8$
  - (4) $\delta = 0.5$
  - (5) $\delta = 0.2$

---

**Fig. 8.** Average forward current as a function of ambient temperature; typical values

- FR4 PCB, standard footprint
  - $T_J = 175 \degree \text{C}$
    - (1) $\delta = 1; \ \text{DC}$
    - (2) $\delta = 0.5; \ f = 20 \text{ kHz}$
    - (3) $\delta = 0.2; \ f = 20 \text{ kHz}$
    - (4) $\delta = 0.1; \ f = 20 \text{ kHz}$

---

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Product data sheet 15 July 2022
11. Test information

Fig. 9. Average forward current as a function of ambient temperature; typical values

FR4 PCB, mounting pad for cathode 1 cm²

- $T_j = 175 \, ^\circ C$
- (1) $\delta = 1$; DC
- (2) $\delta = 0.5$; $f = 20$ kHz
- (3) $\delta = 0.2$; $f = 20$ kHz
- (4) $\delta = 0.1$; $f = 20$ kHz

Fig. 10. Average forward current as a function of solder point temperature; typical values

- $T_j = 175 \, ^\circ C$
- (1) $\delta = 1$; DC
- (2) $\delta = 0.5$; $f = 20$ kHz
- (3) $\delta = 0.2$; $f = 20$ kHz
- (4) $\delta = 0.1$; $f = 20$ kHz

Fig. 11. Reverse recovery definition; step recovery
Fig. 12. Reverse recovery definition; ramp recovery

Fig. 13. Forward recovery definition

Fig. 14. 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.

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

![Package outline CFP15B (SOT1289B)](image)

Fig. 15. Package outline CFP15B (SOT1289B)

13. Soldering

![Footprint information for reflow soldering of CFP15B package](image)

Fig. 16. Reflow soldering footprint for CFP15B (SOT1289B)
14. Revision history

Table 8. Revision history

<table>
<thead>
<tr>
<th>Data sheet ID</th>
<th>Release date</th>
<th>Data sheet status</th>
<th>Change notice</th>
<th>Supersedes</th>
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<td>PMEG030V030EPE-Q v.1</td>
<td>20220715</td>
<td>Product data sheet</td>
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<td>-</td>
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15. Legal information

Data sheet status

<table>
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<tr>
<th>Document status</th>
<th>Product status</th>
<th>Definition</th>
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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>
</tr>
</tbody>
</table>

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