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Electronic Components Sourcing Information

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## Product Reference Information

**Part Number:** PMEG050V030EPEZ  
**Manufacturer:** Nexperia USA Inc.  
**Package:** TO-277, 3-PowerDFN  
**Availability:** Please confirm with sales

### Product Page:

<https://antrexco.com/product/details/nexperia-usa-inc/pmeg050v030epezh.html>

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### Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

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# PMEG050V030EPE

50 V, 3 A low  $V_F$  Schottky barrier rectifier

20 July 2022

Product data sheet

## 1. General description

Planar Low  $V_F$  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-bonding technology
- Small and thin SMD plastic package

## 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 1. Quick reference data

| Symbol      | Parameter               | Conditions                                                       | Min | Typ | Max | Unit    |
|-------------|-------------------------|------------------------------------------------------------------|-----|-----|-----|---------|
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$ ; $f = 20$ kHz; square wave; $T_{sp} \leq 174$ °C | -   | -   | 3   | A       |
| $V_R$       | reverse voltage         | $T_j = 25$ °C                                                    | -   | -   | 50  | V       |
| $V_F$       | forward voltage         | $I_F = 3$ A; pulsed; $T_j = 25$ °C                               | [1] | 460 | 530 | mV      |
| $I_R$       | reverse current         | $V_R = 50$ V; pulsed; $T_j = 25$ °C                              | [1] | 35  | 100 | $\mu$ A |

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

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline       | Graphic symbol    |
|-----|--------|-------------|--------------------------|-------------------|
| 1   | A      | anode       | <p>CFP15B (SOT1289B)</p> | <p>aaa-009063</p> |
| 2   | A      | anode       |                          |                   |
| 3   | K      | cathode     |                          |                   |

6. Ordering information

Table 3. Ordering information

| Type number    | Package |                                                                                                    |                          |
|----------------|---------|----------------------------------------------------------------------------------------------------|--------------------------|
|                | Name    | Description                                                                                        | Version                  |
| PMEG050V030EPE | CFP15B  | plastic, thermal enhanced ultra thin SMD package; 3 leads; 2.13 mm pitch; 5.8 x 4.3 x 0.95 mm body | <a href="#">SOT1289B</a> |

7. Marking

Table 4. Marking codes

| Type number    | Marking code |
|----------------|--------------|
| PMEG050V030EPE | 050V<br>U03E |

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

| Symbol             | Parameter                           | Conditions                                                                  |                     | Min | Max  | Unit |
|--------------------|-------------------------------------|-----------------------------------------------------------------------------|---------------------|-----|------|------|
| V <sub>R</sub>     | reverse voltage                     | T <sub>j</sub> = 25 °C                                                      |                     | -   | 50   | V    |
| I <sub>F</sub>     | forward current                     | δ = 1; T <sub>sp</sub> ≤ 173 °C                                             |                     | -   | 4.2  | A    |
| I <sub>F(AV)</sub> | average forward current             | δ = 0.5; f = 20 kHz; square wave; T <sub>sp</sub> ≤ 174 °C                  |                     | -   | 3    | A    |
| I <sub>FSM</sub>   | non-repetitive peak forward current | half sine-wave pulse; t <sub>p</sub> = 8.3 ms; T <sub>j(init)</sub> = 25 °C |                     | -   | 120  | A    |
| P <sub>tot</sub>   | total power dissipation             | T <sub>amb</sub> ≤ 25 °C                                                    | <a href="#">[1]</a> | -   | 1.66 | W    |
|                    |                                     |                                                                             | <a href="#">[2]</a> | -   | 2.15 | W    |
| T <sub>j</sub>     | junction temperature                |                                                                             |                     | -   | 175  | °C   |
| T <sub>amb</sub>   | ambient temperature                 |                                                                             |                     | -55 | 175  | °C   |
| T <sub>stg</sub>   | storage temperature                 |                                                                             |                     | -65 | 175  | °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 cm<sup>2</sup>.

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] | -   | -   | 90  | K/W  |
|                |                                                  |             | [1] [3] | -   | -   | 70  | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [4]     | -   | -   | 3   | 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 cm<sup>2</sup>.
- [4] Soldering point of cathode tab.

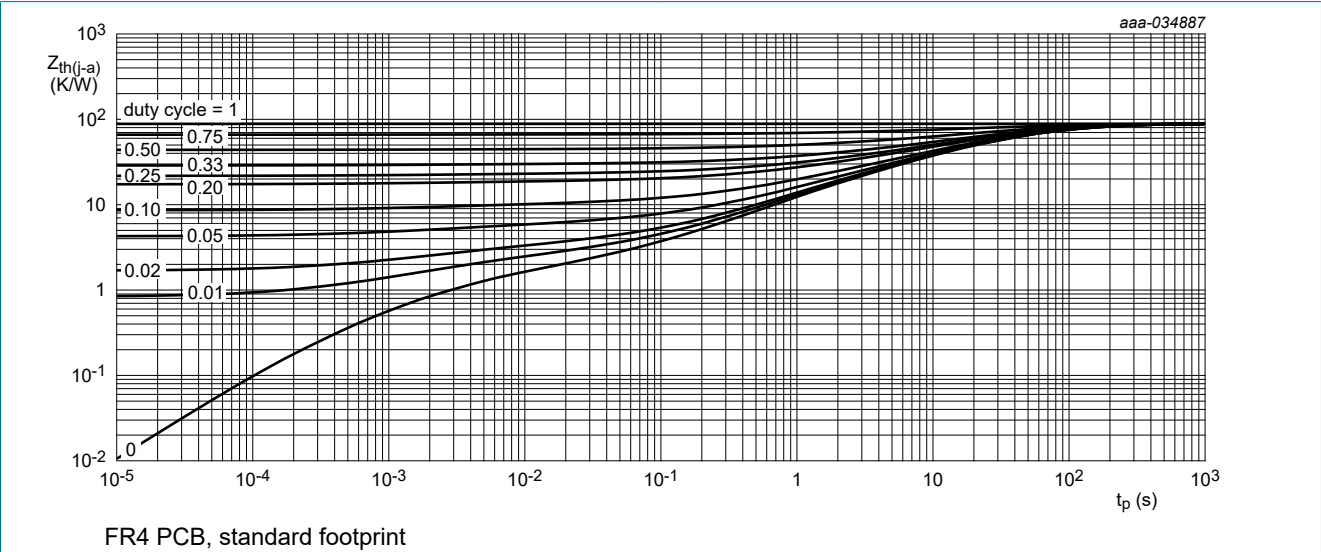


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

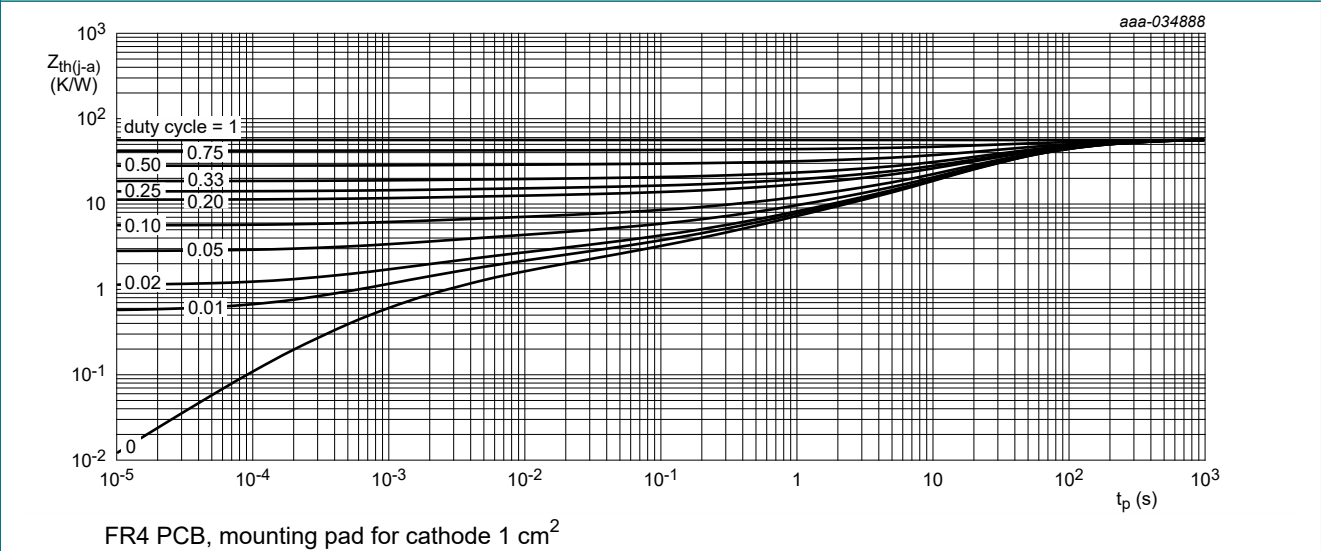


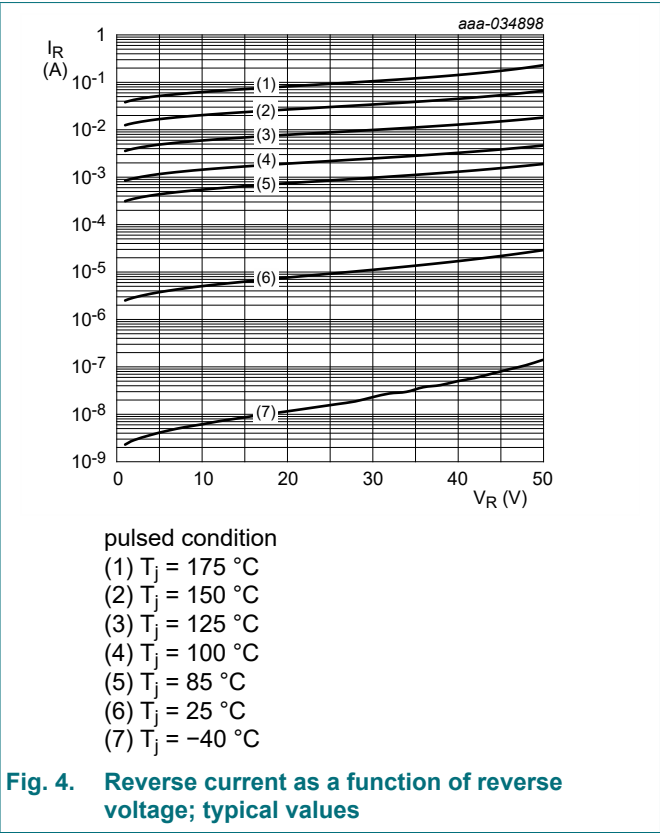
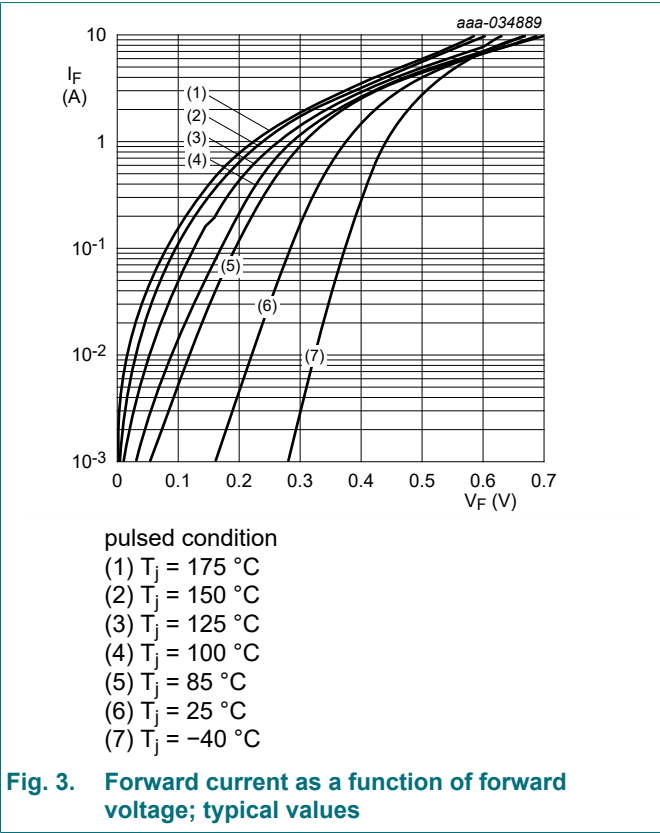
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

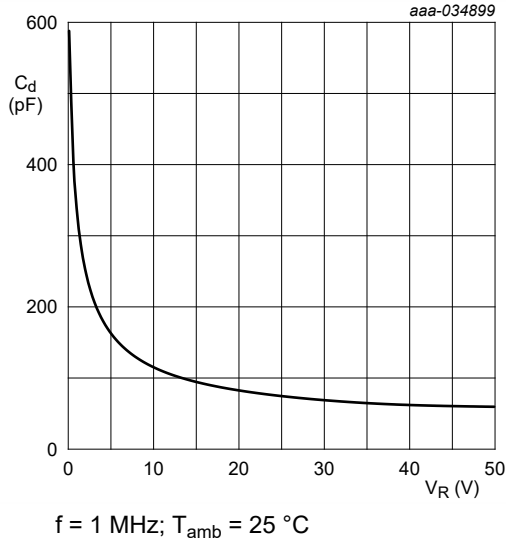
10. Characteristics

Table 7. Characteristics

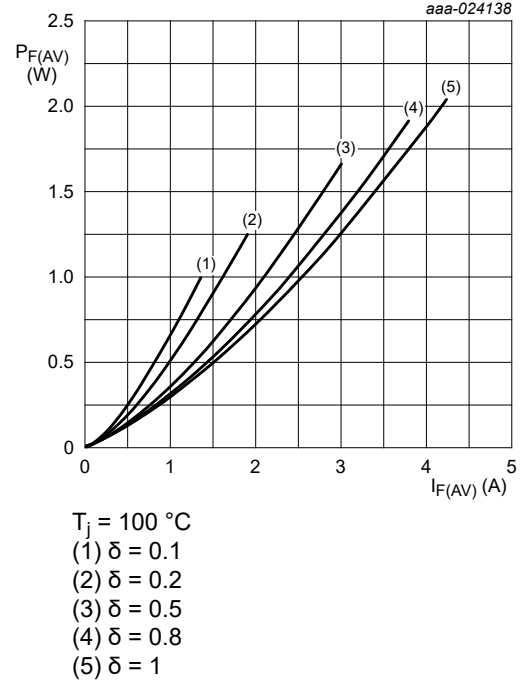
| Symbol      | Parameter                           | Conditions                                                                                        |     | Min | Typ | Max | Unit          |
|-------------|-------------------------------------|---------------------------------------------------------------------------------------------------|-----|-----|-----|-----|---------------|
| $V_{(BR)R}$ | reverse breakdown voltage           | $I_R = 3\text{ mA}$ ; pulsed; $T_j = 25\text{ °C}$                                                | [1] | 50  | -   | -   | V             |
| $V_F$       | forward voltage                     | $I_F = 1\text{ A}$ ; pulsed; $T_j = 25\text{ °C}$                                                 | [1] | -   | 375 | 400 | mV            |
|             |                                     | $I_F = 2\text{ A}$ ; pulsed; $T_j = 25\text{ °C}$                                                 | [1] | -   | 420 | 500 | mV            |
|             |                                     | $I_F = 3\text{ A}$ ; pulsed; $T_j = 25\text{ °C}$                                                 | [1] | -   | 460 | 530 | mV            |
|             |                                     | $I_F = 3\text{ A}$ ; pulsed; $T_j = -40\text{ °C}$                                                | [1] | -   | 505 | 600 | mV            |
|             |                                     | $I_F = 3\text{ A}$ ; pulsed; $T_j = 125\text{ °C}$                                                | [1] | -   | 400 | 490 | mV            |
| $I_R$       | reverse current                     | $V_R = 50\text{ V}$ ; pulsed; $T_j = 25\text{ °C}$                                                | [1] | -   | 35  | 100 | $\mu\text{A}$ |
| $C_d$       | diode capacitance                   | $V_R = 1\text{ V}$ ; $f = 1\text{ MHz}$ ; $T_j = 25\text{ °C}$                                    |     | -   | 323 | -   | pF            |
|             |                                     | $V_R = 10\text{ V}$ ; $f = 1\text{ MHz}$ ; $T_j = 25\text{ °C}$                                   |     | -   | 113 | -   | pF            |
| $t_{rr}$    | reverse recovery time step recovery | $I_F = 0.5\text{ A}$ ; $I_R = 0.5\text{ A}$ ; $I_{R(meas)} = 0.1\text{ A}$ ; $T_j = 25\text{ °C}$ |     | -   | 12  | -   | ns            |
|             | reverse recovery time ramp recovery | $dI_F/dt = 100\text{ A}/\mu\text{s}$ ; $I_F = 3\text{ A}$ ; $V_R = 30\text{ V}$                   |     | -   | 10  | -   | ns            |
| $V_{FRM}$   | peak forward recovery voltage       | $I_F = 0.5\text{ A}$ ; $dI_F/dt = 20\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ °C}$                 |     | -   | 344 | -   | mV            |

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

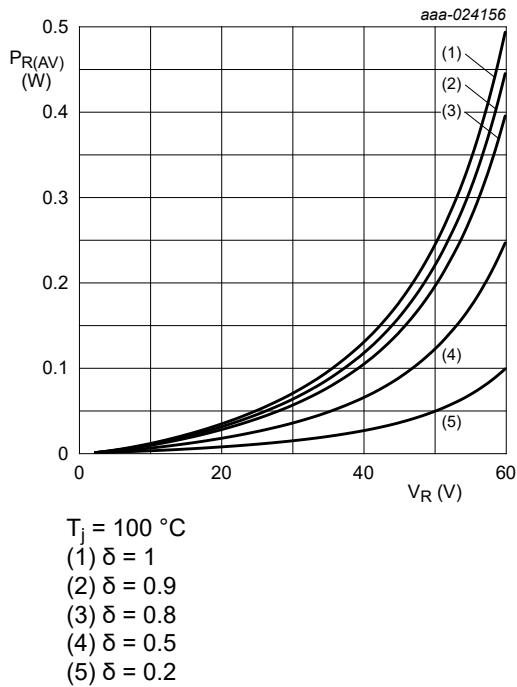




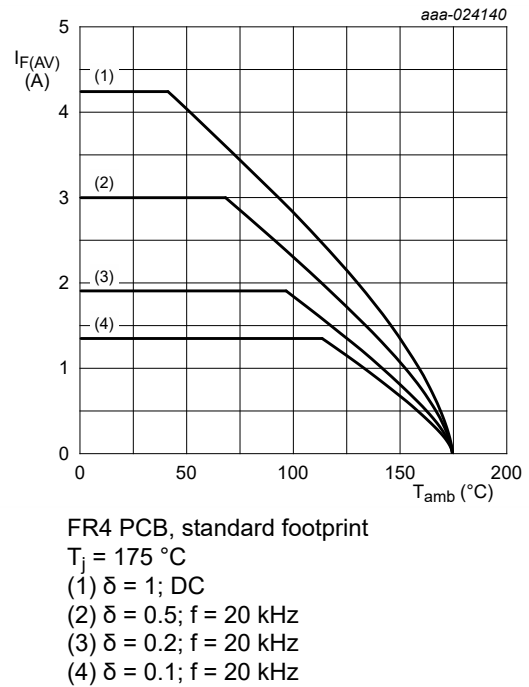
**Fig. 5. Diode capacitance as a function of reverse voltage; typical values**



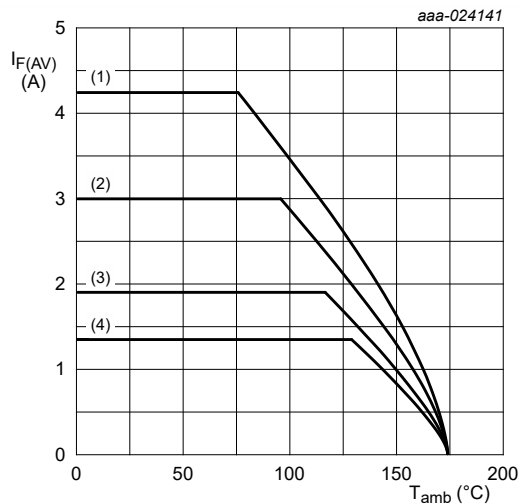
**Fig. 6. Average forward power dissipation as a function of average forward current; typical values**



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

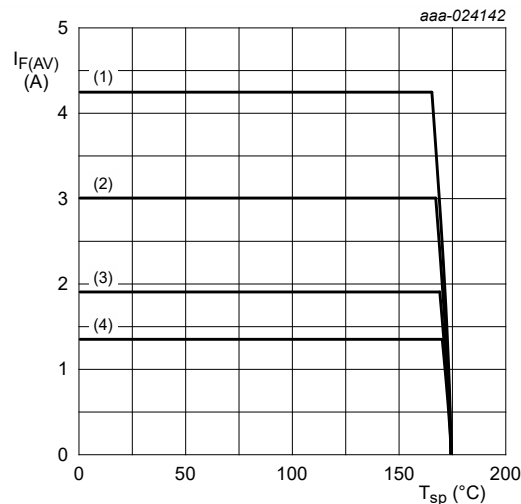


**Fig. 8. Average forward current as a function of ambient temperature; typical values**



FR4 PCB, mounting pad for cathode 1 cm<sup>2</sup>  
 $T_j = 175$  °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. 9. Average forward current as a function of ambient temperature; typical values



$T_j = 175$  °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

11. Test information

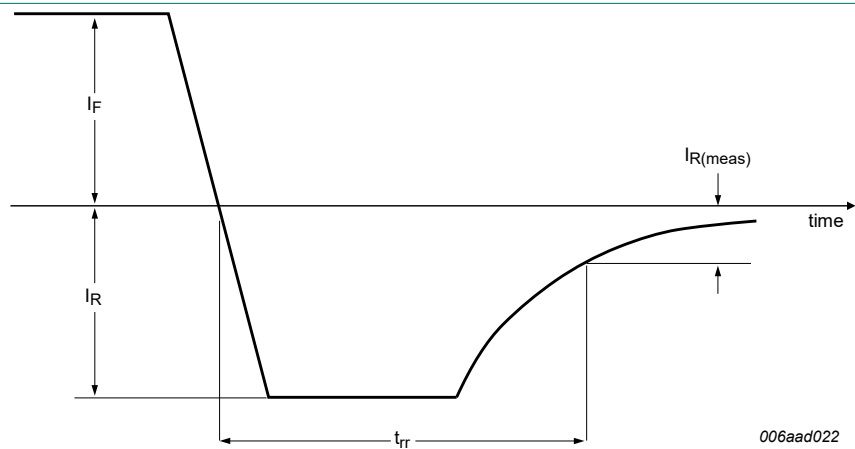


Fig. 11. Reverse recovery definition; step recovery

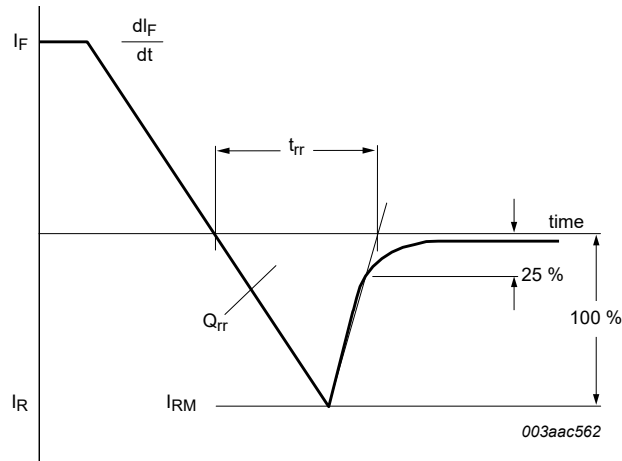


Fig. 12. Reverse recovery definition; ramp recovery

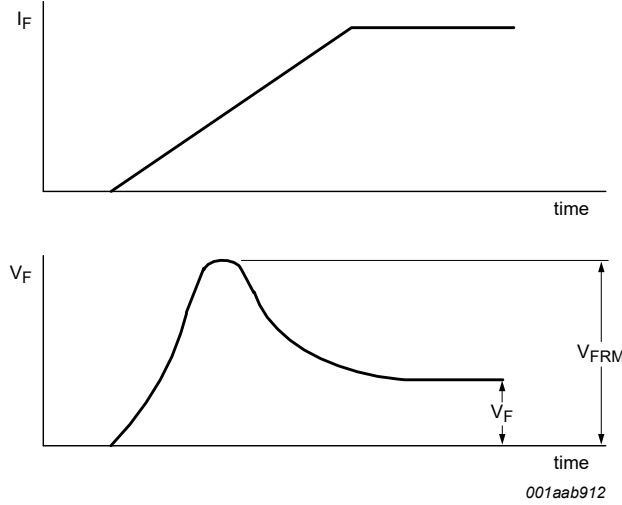


Fig. 13. Forward recovery definition

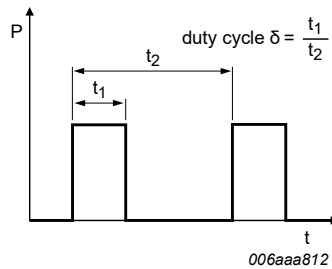


Fig. 14. Duty cycle definition

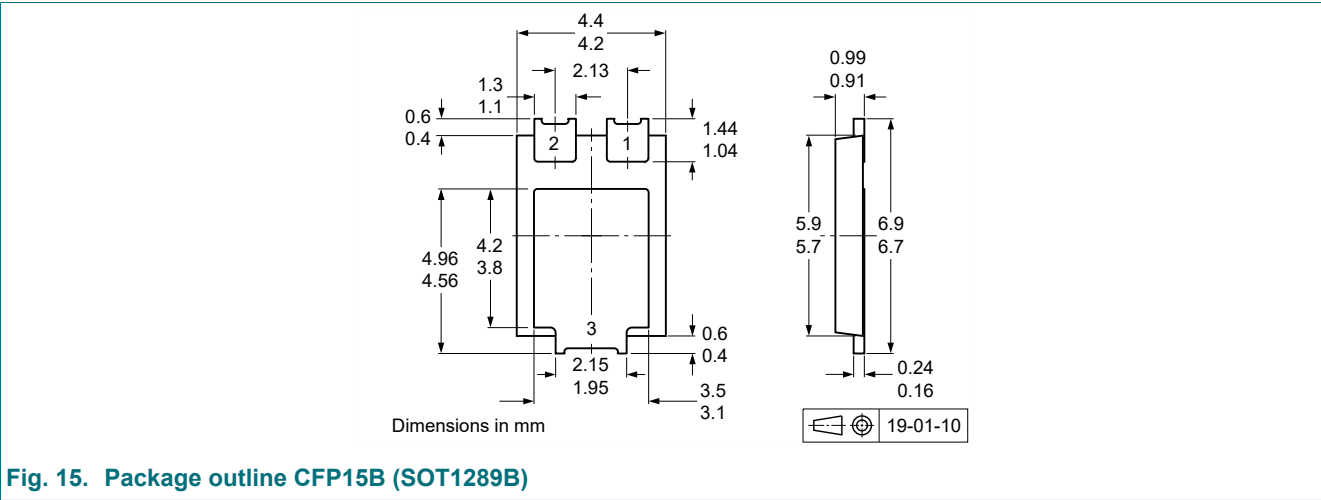
The current ratings for the typical waveforms are calculated according to the equations:

$$I_{F(AV)} = I_M \times \delta \text{ with } I_M \text{ defined as peak current}$$

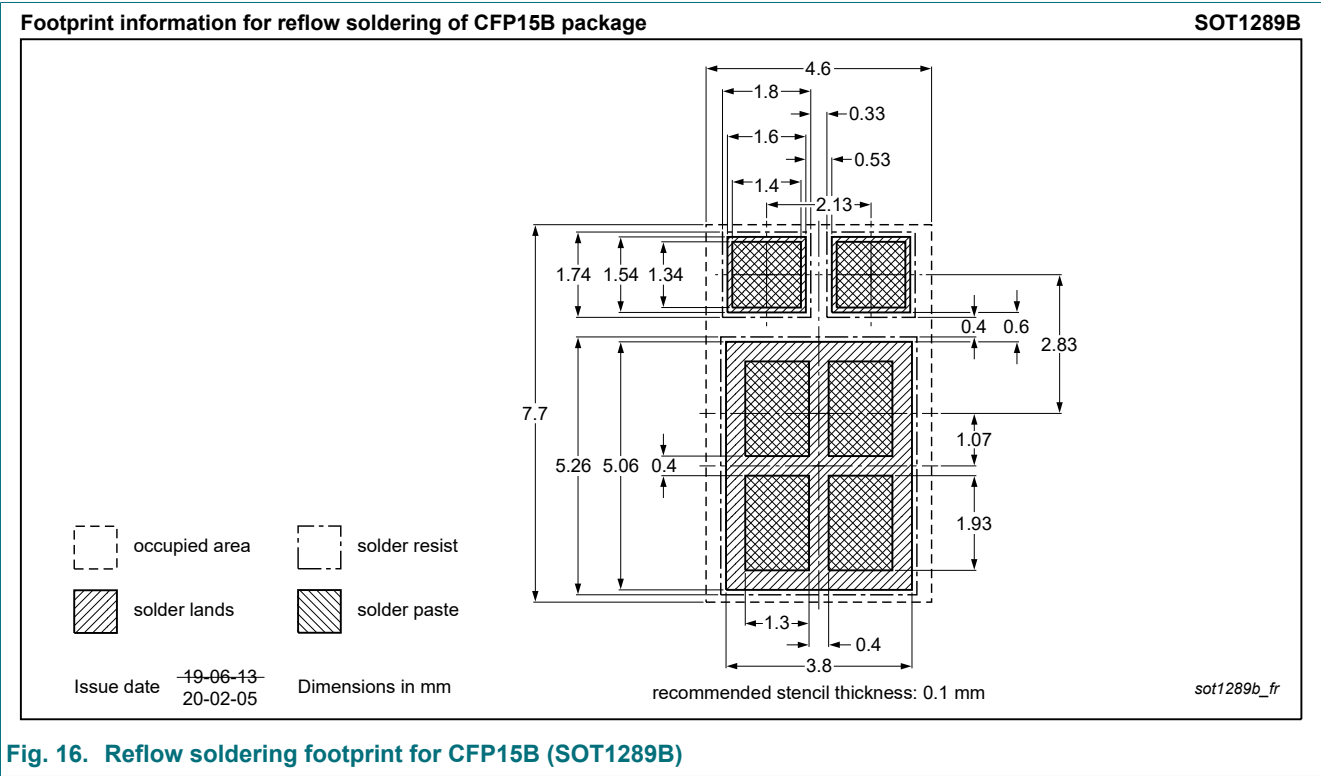
$$I_{RMS} = I_{F(AV)} \text{ at DC, and } I_{RMS} = I_M \times \sqrt{\delta}$$

with  $I_{RMS}$  defined as RMS current.

12. Package outline



13. Soldering



14. Revision history

Table 8. Revision history

| Data sheet ID      | Release date                                      | Data sheet status      | Change notice | Supersedes         |
|--------------------|---------------------------------------------------|------------------------|---------------|--------------------|
| PMEG050V030EPE v.2 | 20220720                                          | Product data sheet     | -             | PMEG050V030EPE v.1 |
| Modifications:     | • Changed document status to "Product data sheet" |                        |               |                    |
| PMEG050V030EPE v.1 | 20220530                                          | Preliminary 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.                                     |

- [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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