



# PMEG030V050EPE

30 V, 5 A low VF Schottky barrier rectifier

15 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-bond 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; $T_{sp} \leq 171$ °C | -   | -   | 5   | A    |
| $V_R$       | reverse voltage         | $T_j = 25$ °C                                                    | -   | -   | 30  | V    |
| $V_F$       | forward voltage         | $I_F = 5$ A; pulsed; $T_j = 25$ °C                               | [1] | 440 | 500 | mV   |
| $I_R$       | reverse current         | $V_R = 30$ V; pulsed; $T_j = 25$ °C                              | [1] | 45  | 150 | μA   |

[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                  |
| PMEG030V050EPE | 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 |
|----------------|--------------|
| PMEG030V050EPE | 030V<br>U05E |

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                                                      |                     | -   | 30   | V    |
| I <sub>F</sub>     | forward current                     | δ = 1; T <sub>sp</sub> ≤ 170 °C                                             |                     | -   | 7    | A    |
| I <sub>F(AV)</sub> | average forward current             | δ = 0.5; f = 20 kHz; square wave; T <sub>sp</sub> ≤ 171 °C                  |                     | -   | 5    | 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 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.

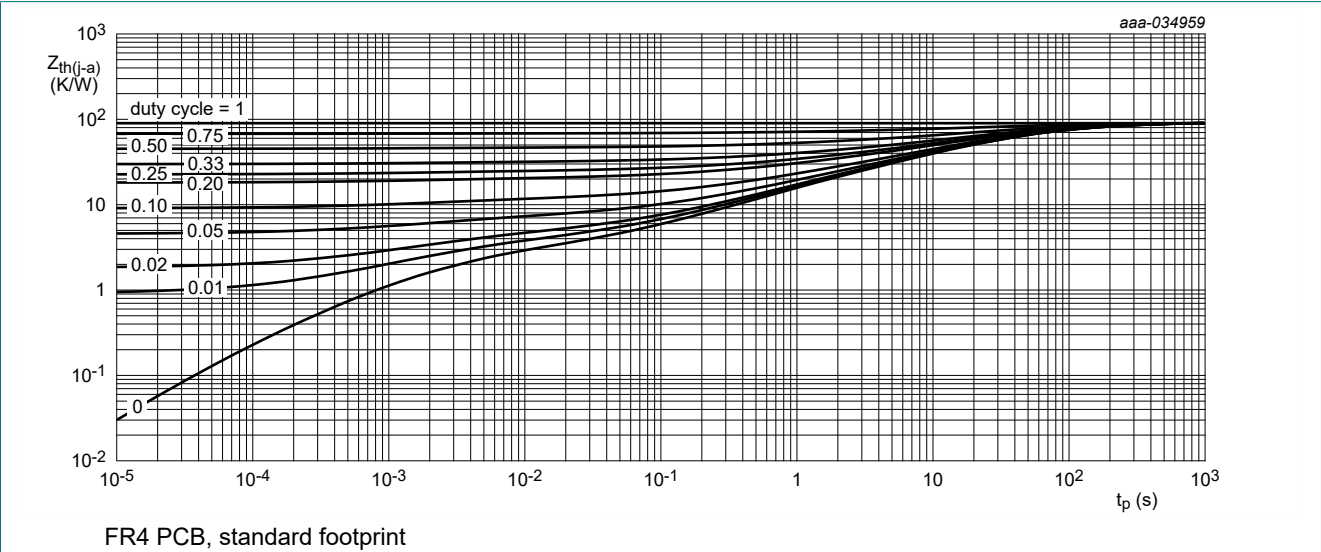


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

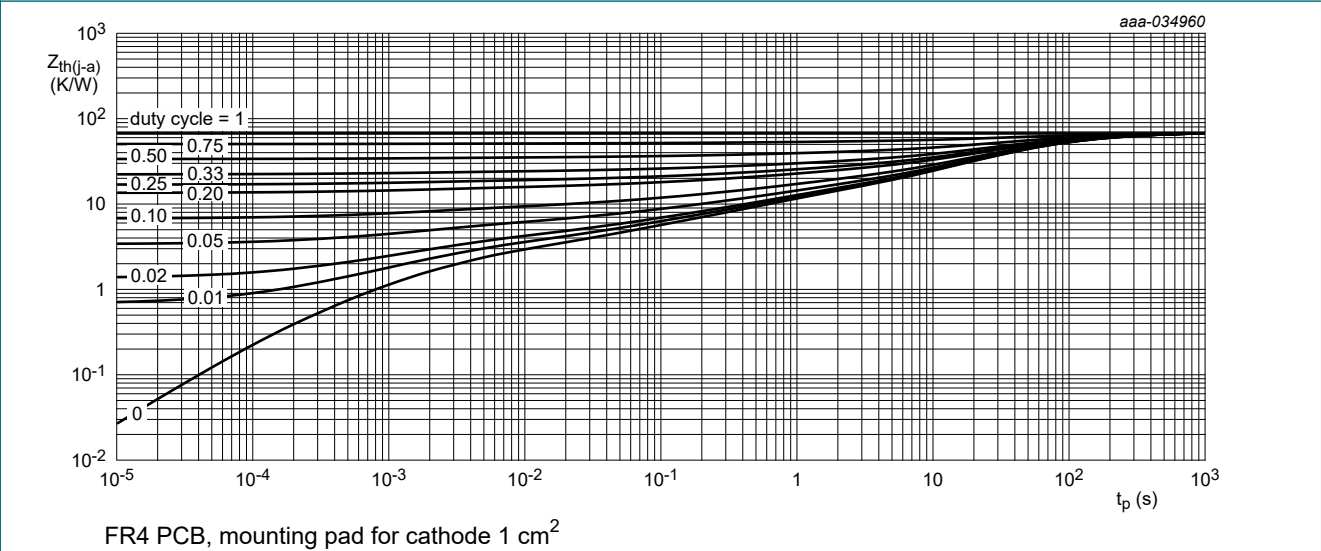


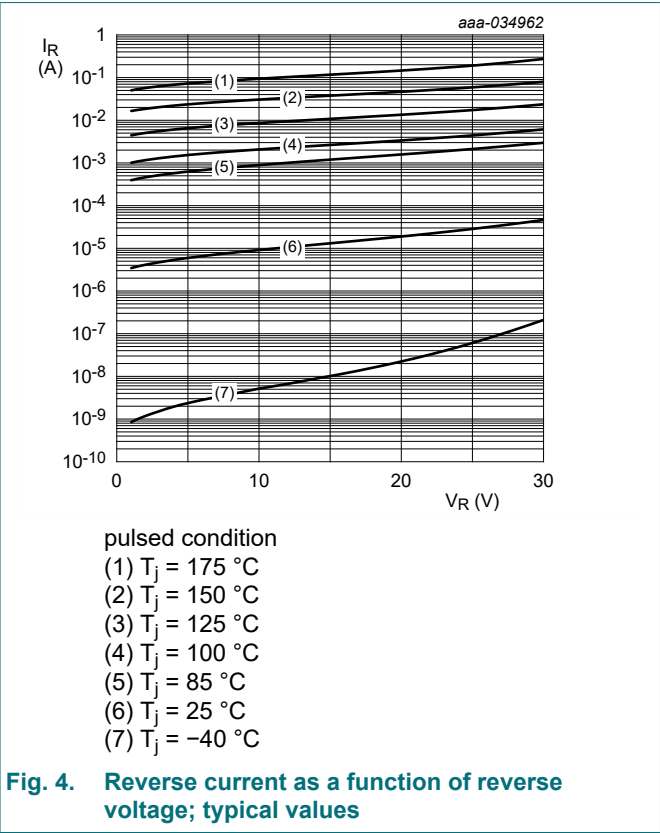
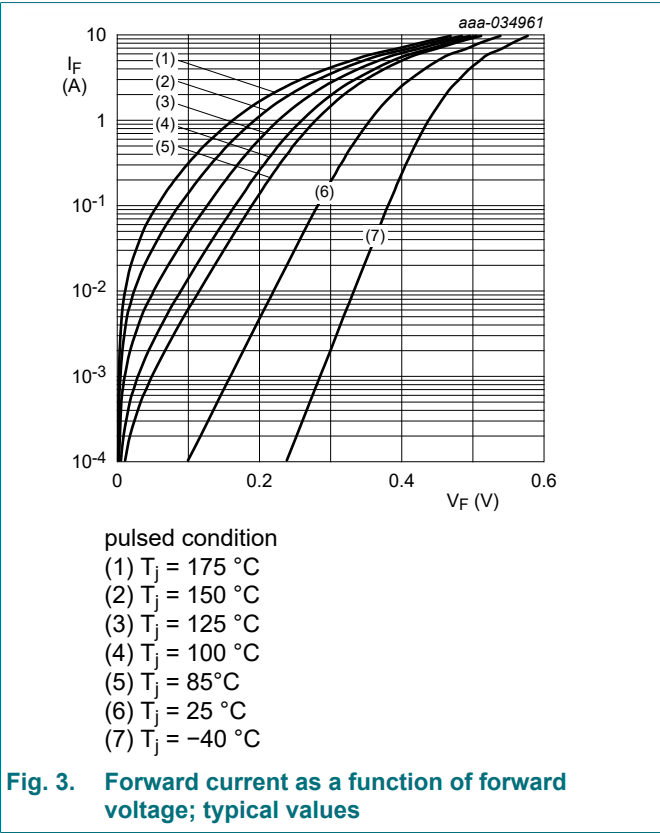
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

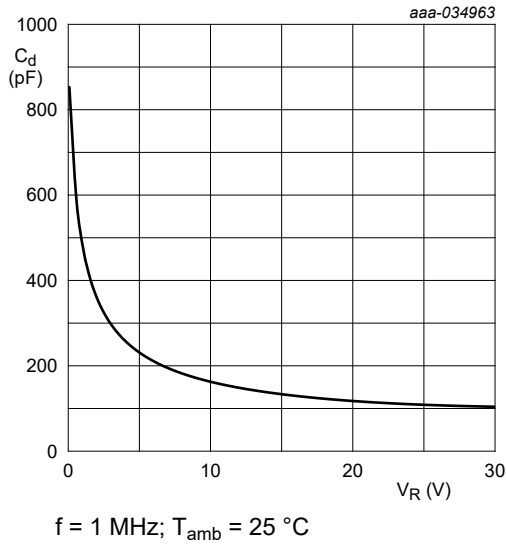
10. Characteristics

Table 7. Characteristics

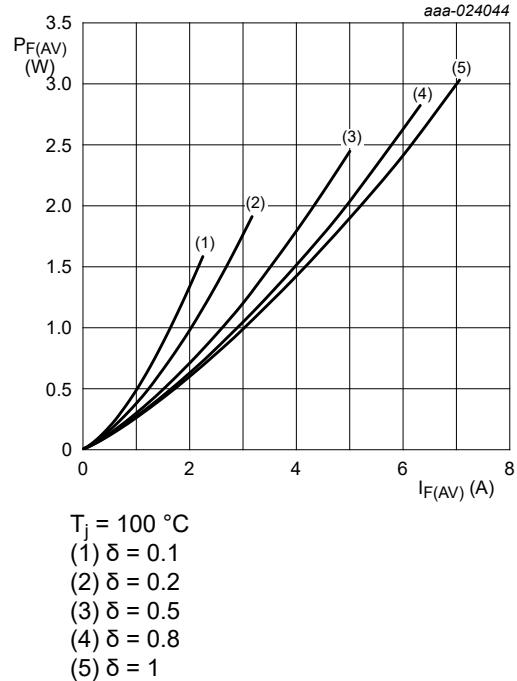
| Symbol      | Parameter                     | Conditions                                                                                                             |     | Min | Typ | Max | Unit          |
|-------------|-------------------------------|------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|-----|---------------|
| $V_{(BR)R}$ | reverse breakdown voltage     | $I_R = 3\text{ mA}$ ; pulsed; $T_j = 25\text{ }^{\circ}\text{C}$                                                       | [1] | 30  | -   | -   | V             |
| $V_F$       | forward voltage               | $I_F = 1\text{ A}$ ; pulsed; $T_j = 25\text{ }^{\circ}\text{C}$                                                        | [1] | -   | 350 | 400 | mV            |
|             |                               | $I_F = 3\text{ A}$ ; pulsed; $T_j = 25\text{ }^{\circ}\text{C}$                                                        | [1] | -   | 400 | 450 | mV            |
|             |                               | $I_F = 5\text{ A}$ ; pulsed; $T_j = 25\text{ }^{\circ}\text{C}$                                                        | [1] | -   | 440 | 500 | mV            |
|             |                               | $I_F = 5\text{ A}$ ; pulsed; $T_j = -40\text{ }^{\circ}\text{C}$                                                       | [1] | -   | 500 | 580 | mV            |
|             |                               | $I_F = 5\text{ A}$ ; pulsed; $T_j = 125\text{ }^{\circ}\text{C}$                                                       | [1] | -   | 360 | 430 | mV            |
| $I_R$       | reverse current               | $V_R = 30\text{ V}$ ; pulsed; $T_j = 25\text{ }^{\circ}\text{C}$                                                       | [1] | -   | 45  | 150 | $\mu\text{A}$ |
| $C_d$       | diode capacitance             | $V_R = 1\text{ V}$ ; $f = 1\text{ MHz}$ ; $T_j = 25\text{ }^{\circ}\text{C}$                                           |     | -   | 470 | -   | pF            |
|             |                               | $V_R = 10\text{ V}$ ; $f = 1\text{ MHz}$ ; $T_j = 25\text{ }^{\circ}\text{C}$                                          |     | -   | 160 | -   | pF            |
| $t_{rr}$    | reverse recovery time         | $I_F = 0.5\text{ A}$ ; $I_R = 0.5\text{ A}$ ; $I_{R(\text{meas})} = 0.1\text{ A}$ ; $T_j = 25\text{ }^{\circ}\text{C}$ |     | -   | 16  | -   | ns            |
|             | step recovery                 |                                                                                                                        |     | -   | 12  | -   | ns            |
| $V_{FRM}$   | peak forward recovery voltage | $I_F = 0.5\text{ A}$ ; $dI_F/dt = 20\text{ A}/\mu\text{s}$ ; $T_j = 25\text{ }^{\circ}\text{C}$                        |     | -   | 340 | -   | mV            |

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

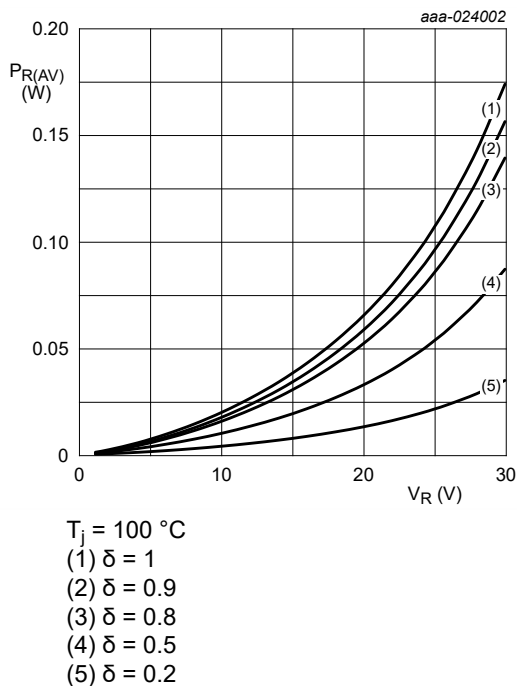




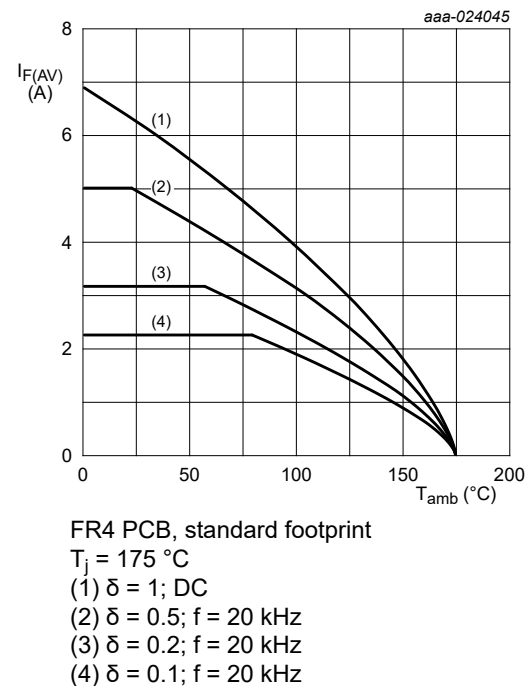
**Fig. 5.** Diode capacitance as a function of reverse voltage; typical values



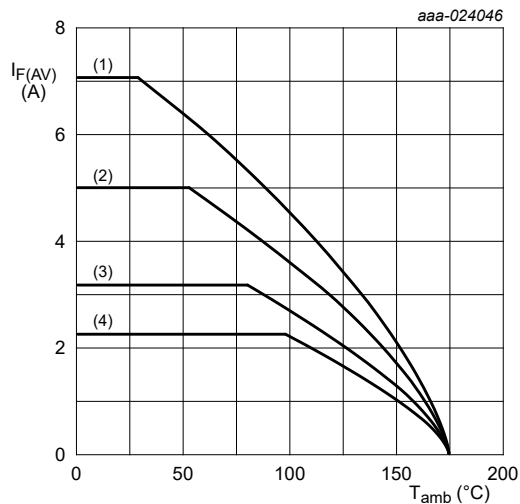
**Fig. 6.** Average forward power dissipation as a function of average forward current; typical values



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

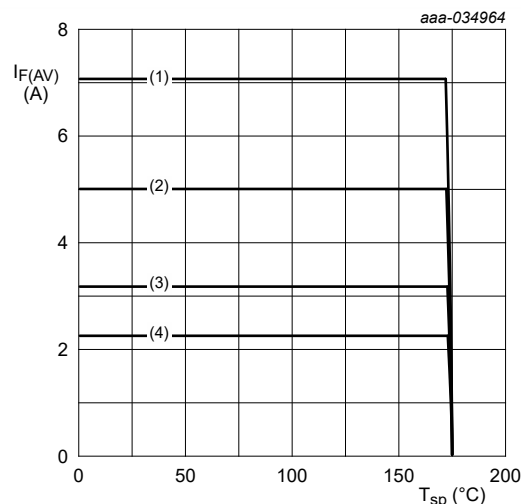


**Fig. 8.** Average forward current as a function of ambient temperature; typical values



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

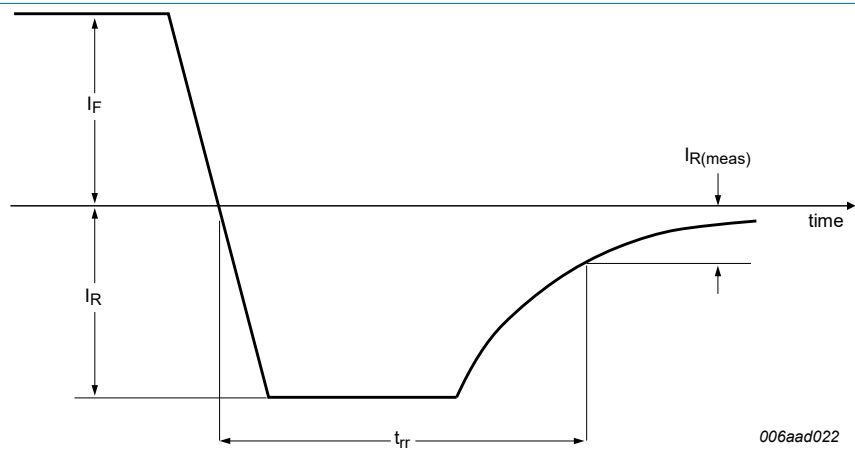


Fig. 11. Reverse recovery definition; step recovery

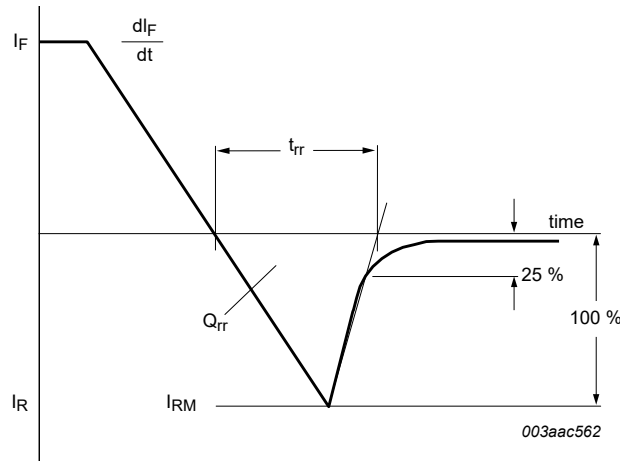


Fig. 12. Reverse recovery definition; ramp recovery

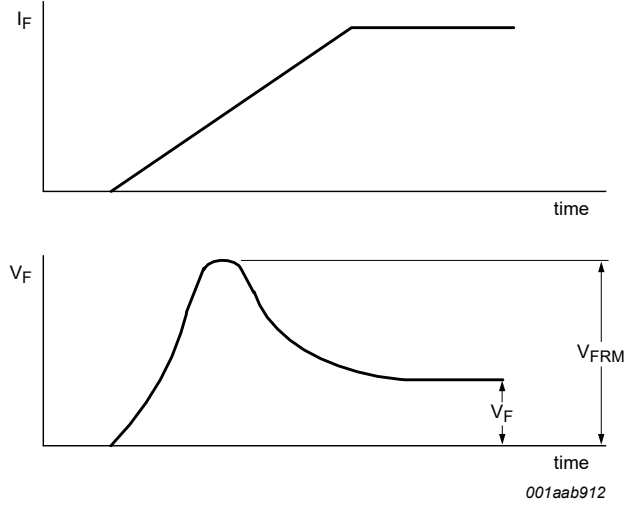


Fig. 13. Forward recovery definition

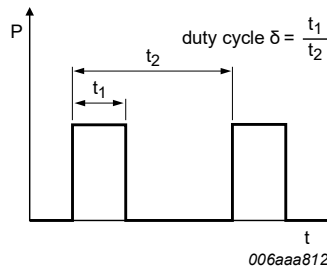


Fig. 14. Duty cycle definition

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

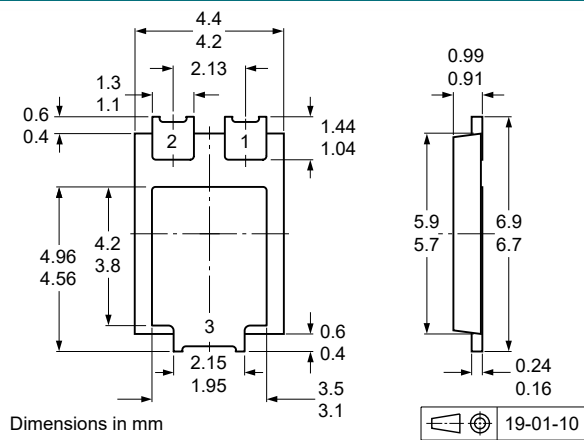


Fig. 15. Package outline CFP15B (SOT1289B)

13. Soldering

Footprint information for reflow soldering of CFP15B package

SOT1289B

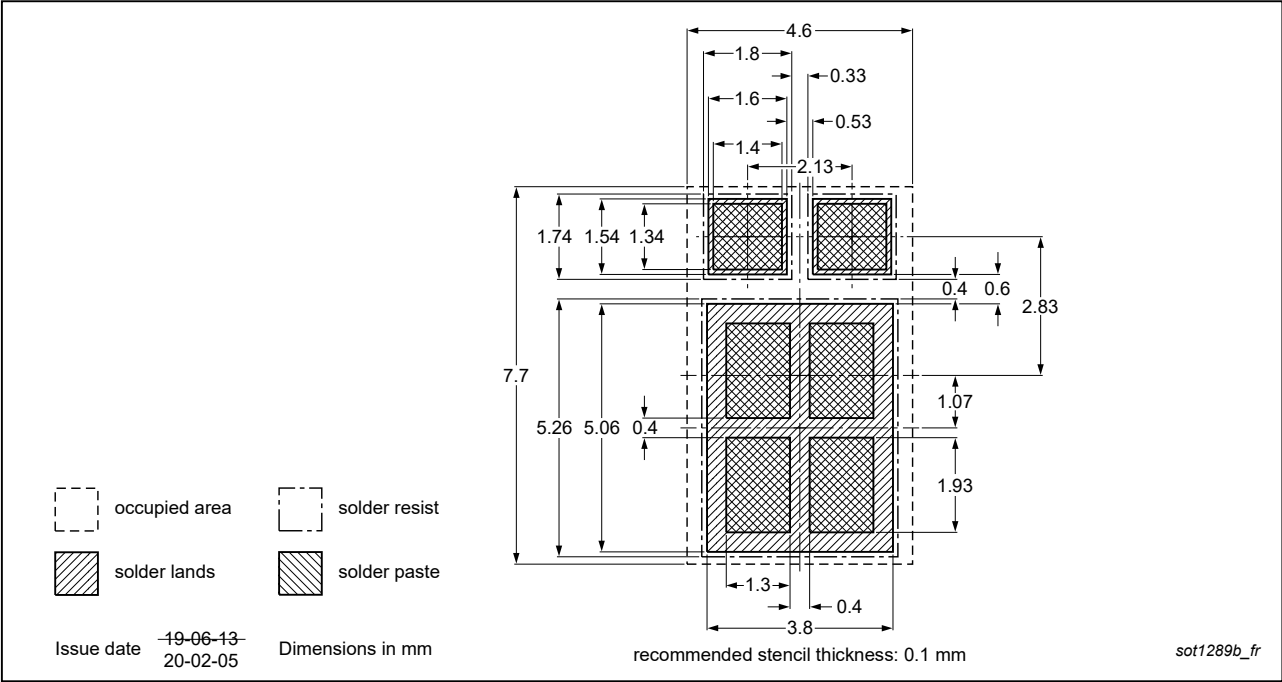


Fig. 16. Reflow soldering footprint for CFP15B (SOT1289B)

14. Revision history

Table 8. Revision history

| Data sheet ID      | Release date | Data sheet status  | Change notice | Supersedes |
|--------------------|--------------|--------------------|---------------|------------|
| PMEG030V050EPE v.1 | 20220715     | Product data sheet | -             | -          |

## 15. Legal information

### Data sheet status

| Document status<br>[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.                       |
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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 15 July 2022