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## Product Reference Information

**Part Number:** PMEG4020ETR,115  
**Manufacturer:** Nexperia USA Inc.  
**Package:** SOD-123W  
**Availability:** Please confirm with sales

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<https://antrexco.com/product/details/nexperia-usa-inc/pmeg4020etr-115.html>

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This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

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# PMEG4020ETR

High temperature 40 V, 2 A low VF Schottky barrier rectifier

16 December 2024

Product data sheet

## 1. General description

Planar Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOD123W small and flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Average forward current:  $I_{F(AV)} \leq 2$  A
- Reverse voltage:  $V_R \leq 40$  V
- Low forward voltage
- High power capability due to clip-bonding technology
- Small and flat lead SMD plastic package
- High temperature  $T_j \leq 175$  °C

## 3. Applications

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

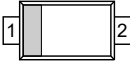
## 4. Quick reference data

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; $T_{sp} \leq 165$ °C | -   | -   | 2   | A    |
| $V_R$       | reverse voltage         | $T_j = 25$ °C                                                    | -   | -   | 40  | V    |
| $V_F$       | forward voltage         | $I_F = 2$ A; $T_j = 25$ °C                                       | -   | 430 | 490 | mV   |
| $I_R$       | reverse current         | $V_R = 40$ V; $T_j = 25$ °C                                      | -   | 25  | 100 | μA   |

## 5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline                                                                                    | Graphic symbol                                                                                  |
|-----|--------|-------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| 1   | K      | cathode[1]  | <br>CFP3 (SOD123W) | <br>sym001 |
| 2   | A      | anode       |                                                                                                       |                                                                                                 |

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

| Type number | Package |                                                                            |         |
|-------------|---------|----------------------------------------------------------------------------|---------|
|             | Name    | Description                                                                | Version |
| PMEG4020ETR | CFP3    | plastic, surface mounted package; 2 terminals; 2.6 mm x 1.7 mm x 1 mm body | SOD123W |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMEG4020ETR | C1           |

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                                                |     | -   | 40   | V    |
| I <sub>F(AV)</sub> | average forward current             | δ = 0.5; f = 20 kHz; square wave; T <sub>amb</sub> ≤ 110 °C           | [1] | -   | 2    | A    |
|                    |                                     | δ = 0.5; f = 20 kHz; square wave; T <sub>sp</sub> ≤ 165 °C            |     | -   | 2    | A    |
| I <sub>FSM</sub>   | non-repetitive peak forward current | t <sub>p</sub> = 8.3 ms; half sine wave; T <sub>j(init)</sub> = 25 °C |     | -   | 50   | A    |
| P <sub>tot</sub>   | total power dissipation             | T <sub>amb</sub> ≤ 25 °C                                              | [2] | -   | 680  | mW   |
|                    |                                     |                                                                       | [3] | -   | 1.15 | W    |
|                    |                                     |                                                                       | [1] | -   | 2.14 | 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 a ceramic Printed-Circuit Board (PCB), Al<sub>2</sub>O<sub>3</sub>, standard footprint.
- [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>.

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] | -   | -   | 220 | K/W  |
|                |                                                  |             | [1] [3] | -   | -   | 130 | K/W  |
|                |                                                  |             | [1] [4] | -   | -   | 70  | K/W  |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point |             | [5]     | -   | -   | 18  | 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] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.
- [5] Soldering point of cathode tab.

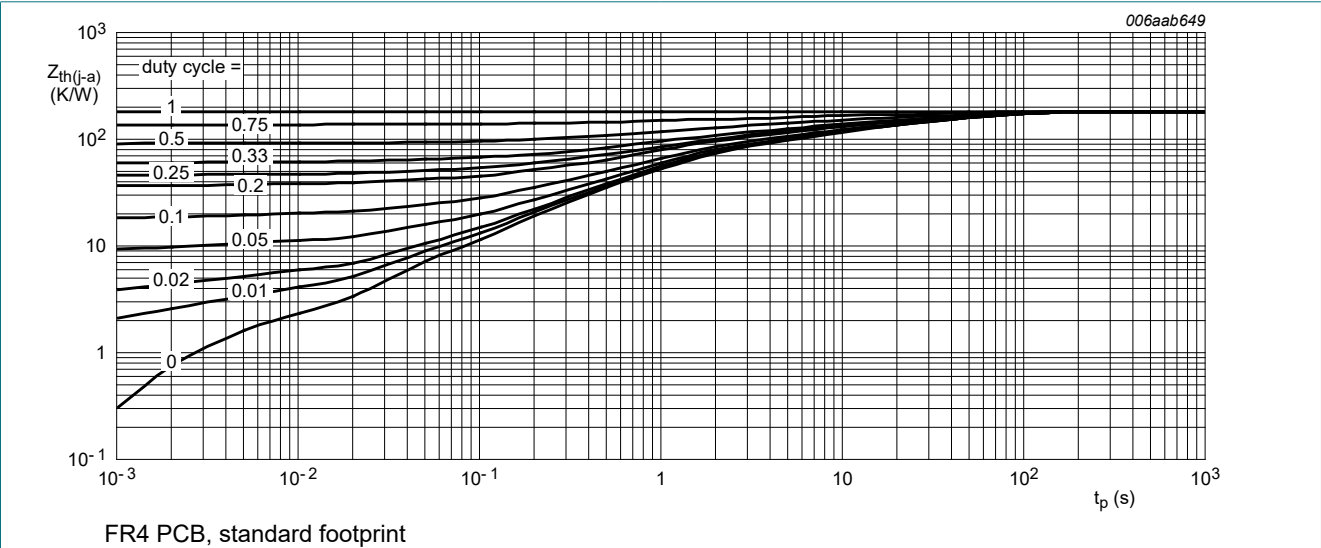


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

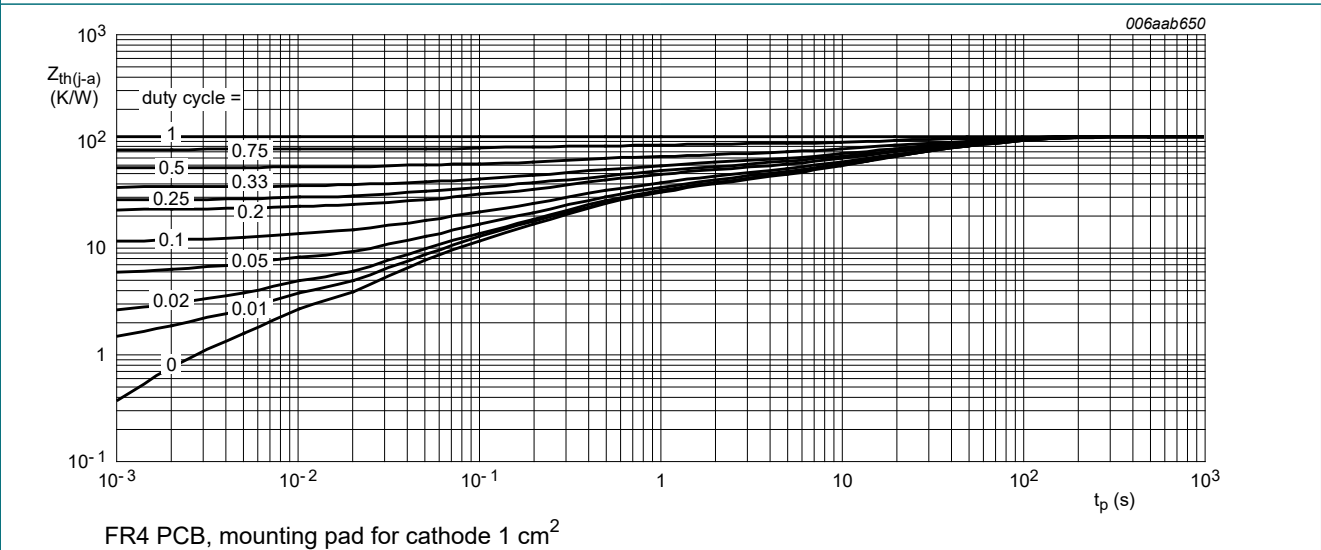
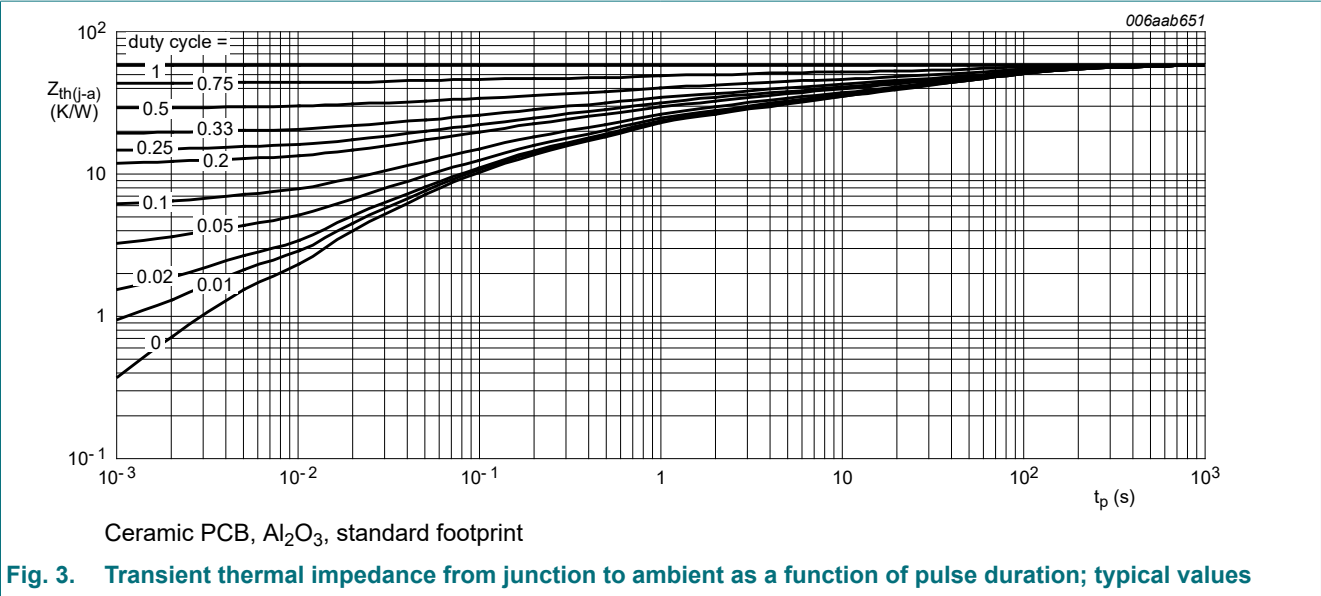


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



10. Characteristics

Table 7. Characteristics

| Symbol         | Parameter         | Conditions                                               | Min | Typ | Max | Unit |
|----------------|-------------------|----------------------------------------------------------|-----|-----|-----|------|
| V <sub>F</sub> | forward voltage   | I <sub>F</sub> = 0.1 A; T <sub>j</sub> = 25 °C           | -   | 295 | 330 | mV   |
|                |                   | I <sub>F</sub> = 1 A; T <sub>j</sub> = 25 °C             | -   | 380 | 440 | mV   |
|                |                   | I <sub>F</sub> = 2 A; T <sub>j</sub> = 25 °C             | -   | 430 | 490 | mV   |
|                |                   | I <sub>F</sub> = 2 A; T <sub>j</sub> = 125 °C            | -   | 330 | 380 | mV   |
| I <sub>R</sub> | reverse current   | V <sub>R</sub> = 10 V; T <sub>j</sub> = 25 °C            | -   | 5   | -   | μA   |
|                |                   | V <sub>R</sub> = 40 V; T <sub>j</sub> = 25 °C            | -   | 25  | 100 | μA   |
|                |                   | V <sub>R</sub> = 10 V; T <sub>j</sub> = 125 °C           | -   | 4   | -   | mA   |
|                |                   | V <sub>R</sub> = 40 V; T <sub>j</sub> = 125 °C           | -   | 15  | -   | mA   |
| C <sub>d</sub> | diode capacitance | V <sub>R</sub> = 1 V; f = 1 MHz; T <sub>j</sub> = 25 °C  | -   | 250 | -   | pF   |
|                |                   | V <sub>R</sub> = 10 V; f = 1 MHz; T <sub>j</sub> = 25 °C | -   | 95  | -   | pF   |

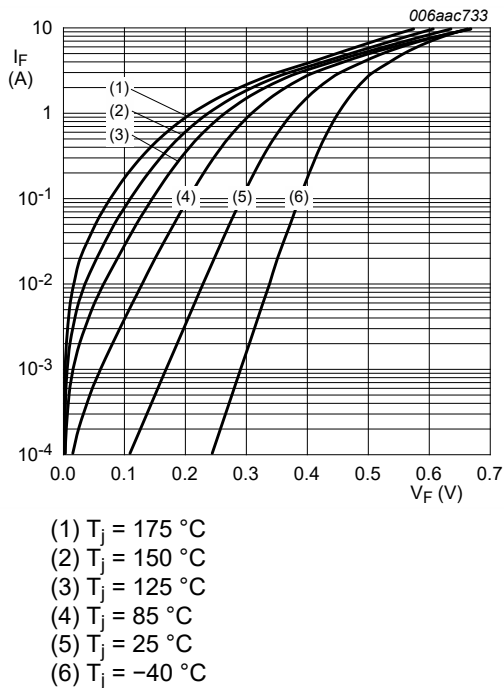


Fig. 4. Forward current as a function of forward voltage; typical values

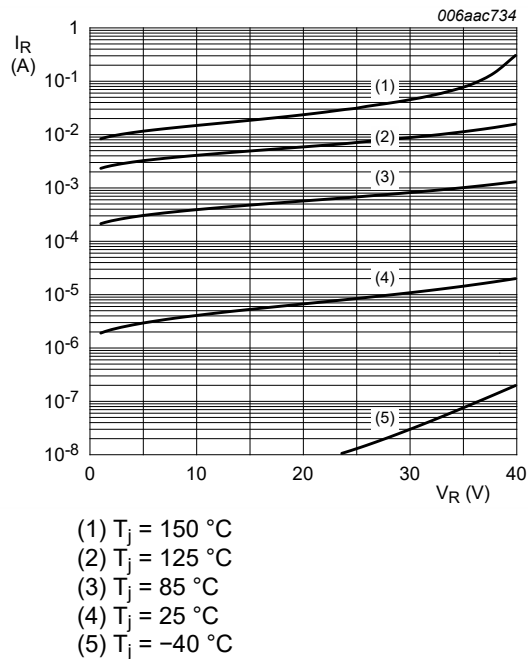


Fig. 5. Reverse current as a function of reverse voltage; typical values

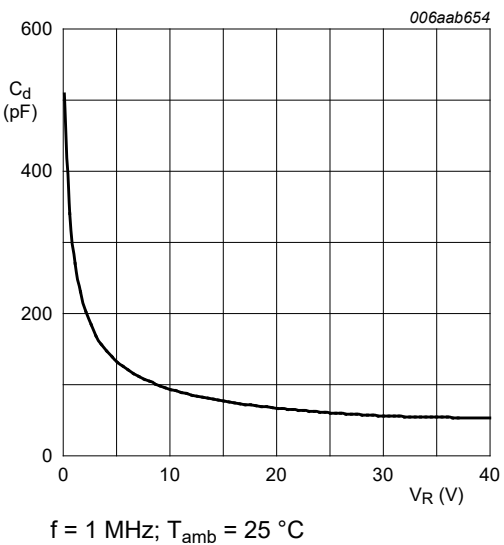


Fig. 6. Diode capacitance as a function of reverse voltage; typical values

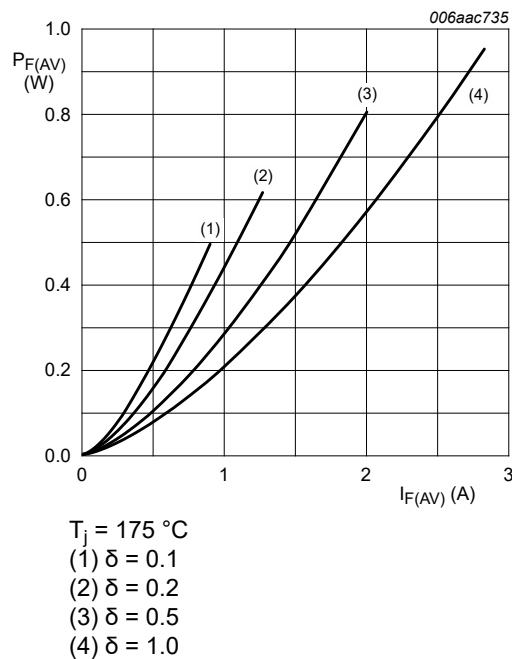


Fig. 7. Average forward power dissipation as a function of average forward current; typical values

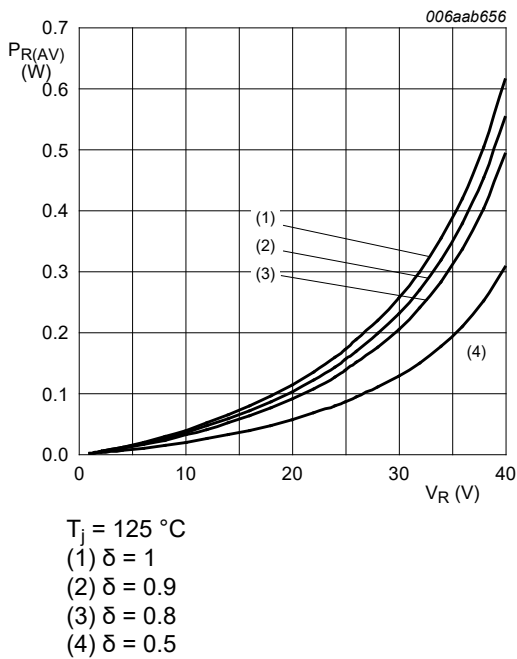


Fig. 8. Average reverse power dissipation as a function of reverse voltage; typical values

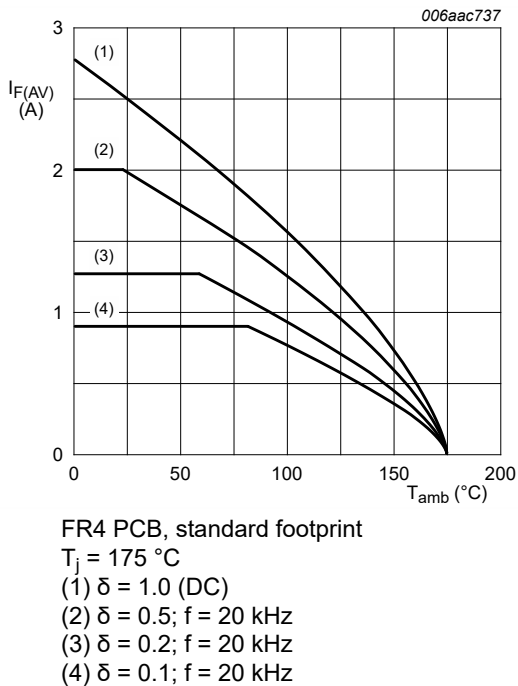


Fig. 9. Average forward current as a function of ambient temperature; typical values

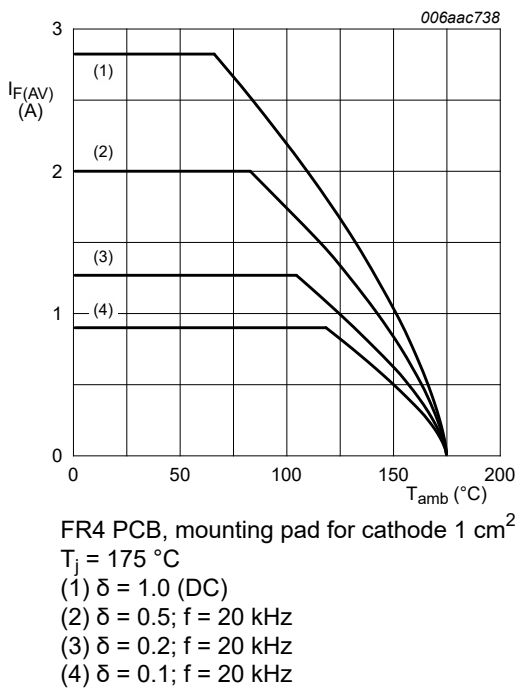


Fig. 10. Average forward current as a function of ambient temperature; typical values

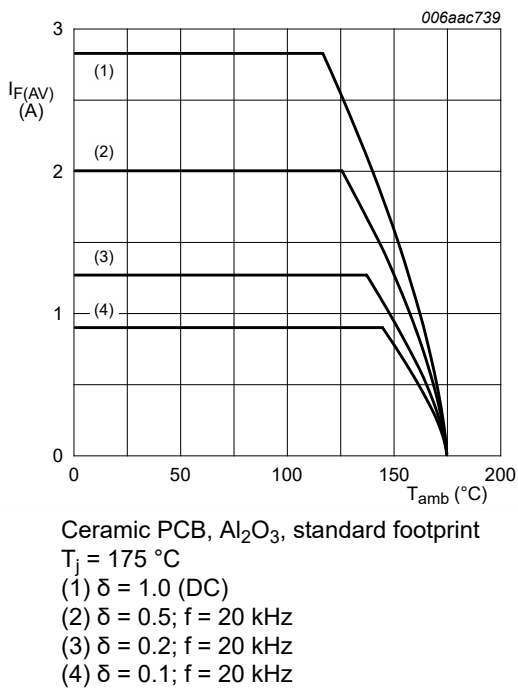
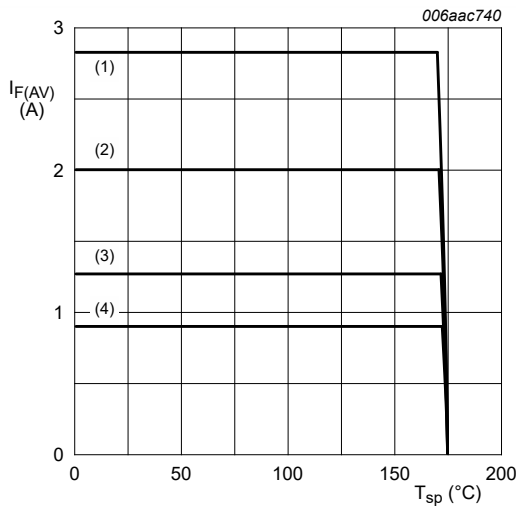


Fig. 11. Average forward current as a function of ambient temperature; typical values



$T_j = 175^\circ\text{C}$   
(1)  $\delta = 1.0$  (DC)  
(2)  $\delta = 0.5$ ;  $f = 20\text{ kHz}$   
(3)  $\delta = 0.2$ ;  $f = 20\text{ kHz}$   
(4)  $\delta = 0.1$ ;  $f = 20\text{ kHz}$

Fig. 12. Average forward current as a function of solder point temperature; typical values

11. Test information

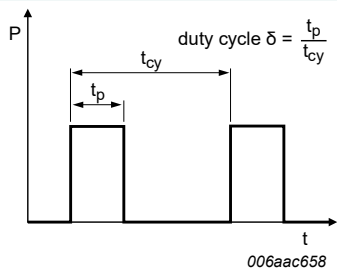


Fig. 13. Duty cycle definition

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

$I_{RMS} = I_M \times \sqrt{\delta}$  with  $I_{RMS}$  defined as RMS current

12. Package outline

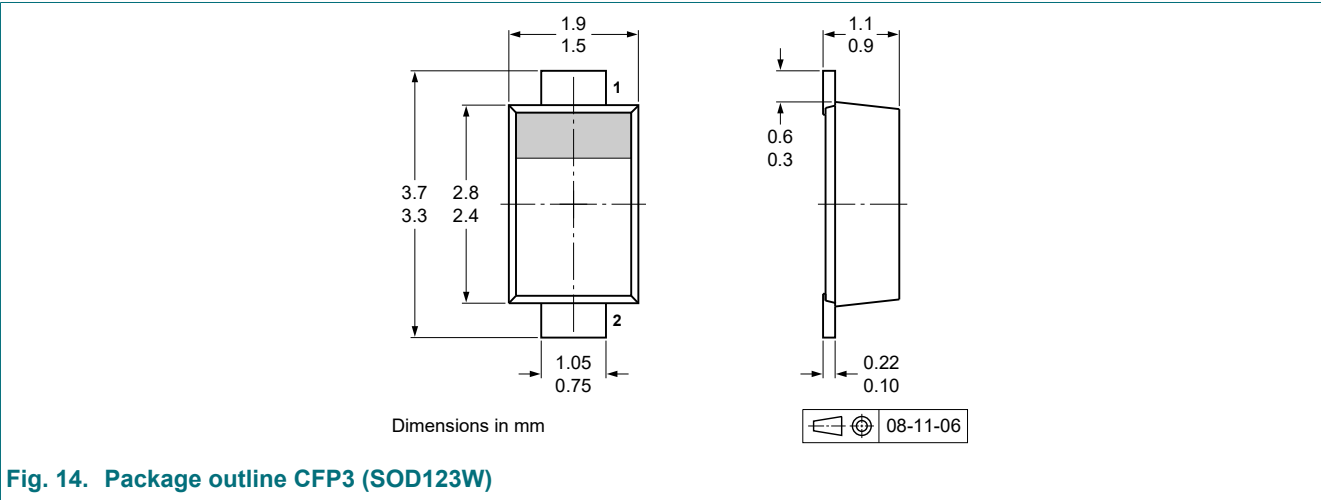


Fig. 14. Package outline CFP3 (SOD123W)

13. Soldering

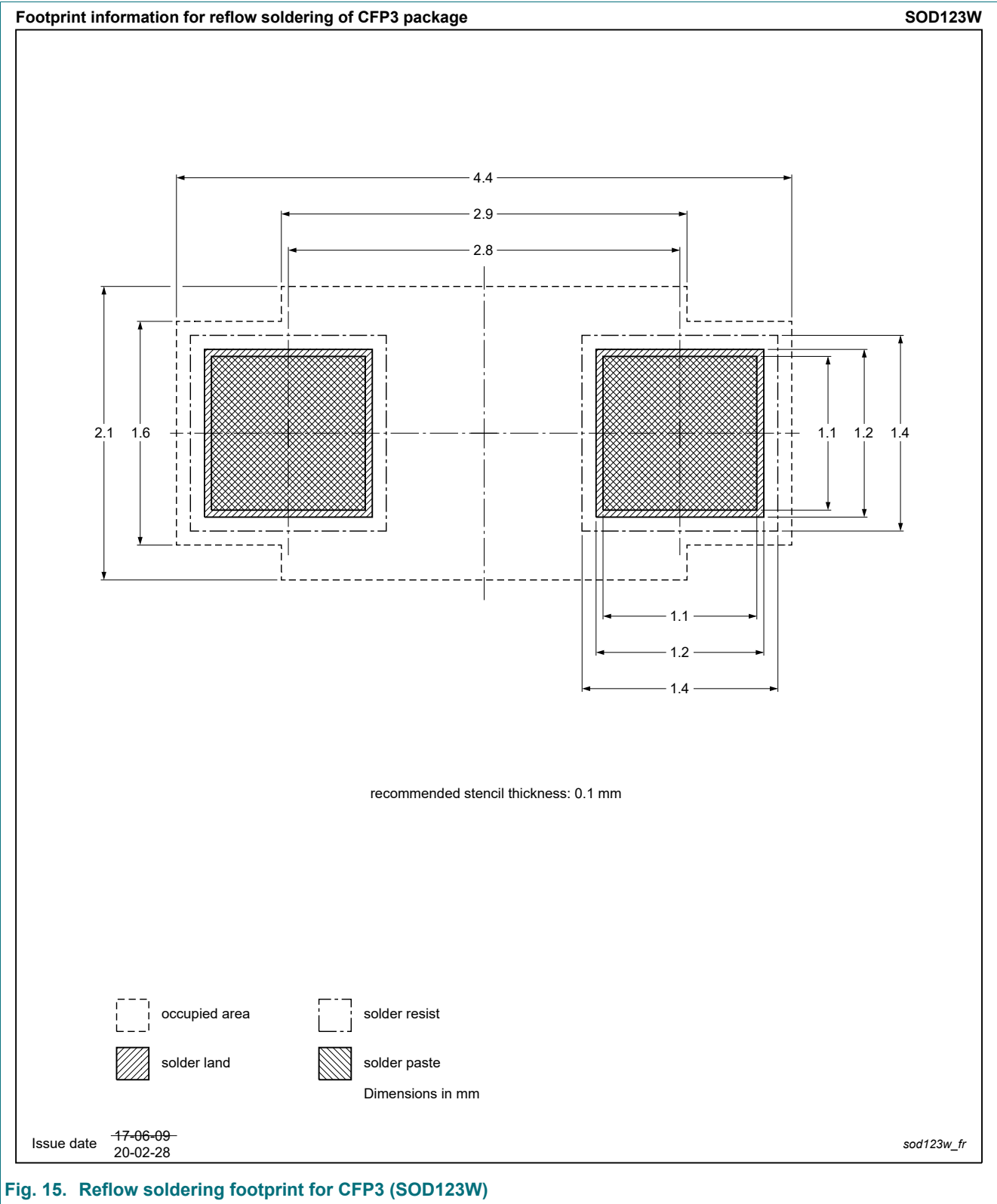


Fig. 15. Reflow soldering footprint for CFP3 (SOD123W)

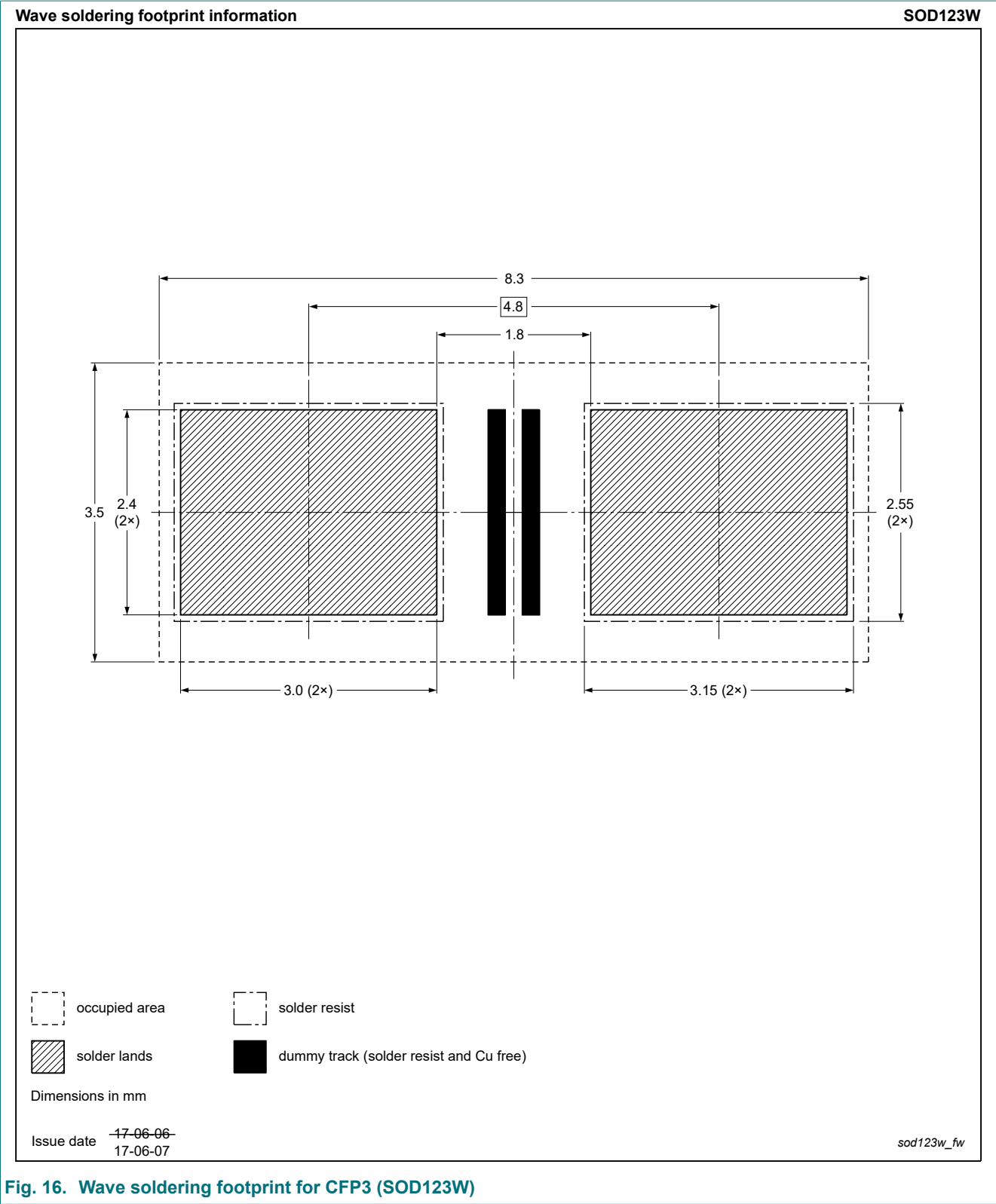


Fig. 16. Wave soldering footprint for CFP3 (SOD123W)

14. Revision history

Table 8. Revision history

| Data sheet ID   | Release date                                | Data sheet status  | Change notice | Supersedes      |
|-----------------|---------------------------------------------|--------------------|---------------|-----------------|
| PMEG4020ETR v.5 | 20241216                                    | Product data sheet | -             | PMEG4020ETR v.4 |
| Modifications:  | • Characteristics: Figure 8 graph exchanged |                    |               |                 |
| PMEG4020ETR v.4 | 20230101                                    | Product data sheet | -             | PMEG4020ETR v.3 |
| PMEG4020ETR v.3 | 20171113                                    | Product data sheet | -             | PMEG4020ETR v.2 |
| PMEG4020ETR v.2 | 20171109                                    | Product data sheet | -             | PMEG4020ETR v.1 |

## 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. |
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- [2] The term 'short data sheet' is explained in section "Definitions".
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