



PMEG6020EP

60 V, 2 A low VF Schottky barrier rectifier

20 February 2023

Product data sheet

1. General description

Planar Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOD128 small and flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 2 \text{ A}$
- Reverse voltage: $V_R \leq 60 \text{ V}$
- Low forward voltage
- High power capability due to clip-bond technology
- Small and flat lead SMD plastic package
- Suitable for both reflow and wave soldering

3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch Mode Power Supply (SMPS)
- Reverse polarity protection
- Low power consumption applications

4. Quick reference data

Table 1. Quick reference data

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-------------|-------------------------|---------------------------------------------------------------------------------------|-----|-----|-----|---------------|
| $I_{F(AV)}$ | average forward current | $\delta = 0.5; f = 20 \text{ kHz}; \text{square wave}; T_{sp} \leq 140^\circ\text{C}$ | - | - | 2 | A |
| V_R | reverse voltage | $T_j = 25^\circ\text{C}$ | - | - | 60 | V |
| V_F | forward voltage | $I_F = 2 \text{ A}; T_j = 25^\circ\text{C}$ | - | 460 | 530 | mV |
| I_R | reverse current | $V_R = 60 \text{ V}; T_j = 25^\circ\text{C}$ | - | 60 | 150 | μA |

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--------------------|----------------|
| 1 | K | cathode[1] | | |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|---------|-------------------------------------------------------------------------------------------|------------------------|
| | Name | Description | Version |
| PMEG6020EP | CFP5 | plastic, surface mounted package; 2 terminals; 4 mm pitch; 3.8 mm x 2.6 mm x 1 mm body | SOD128 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| PMEG6020EP | AA |

8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|-------------|-------------------------------------|-----------------------------------------------------------------------------------------------|-----|-----|------|------------------|
| V_R | reverse voltage | $T_j = 25 \text{ }^\circ\text{C}$ | | - | 60 | V |
| $I_{F(AV)}$ | average forward current | $\delta = 0.5$; $f = 20 \text{ kHz}$; square wave; $T_{amb} \leq 85 \text{ }^\circ\text{C}$ | [1] | - | 2 | A |
| | | $\delta = 0.5$; $f = 20 \text{ kHz}$; square wave; $T_{sp} \leq 140 \text{ }^\circ\text{C}$ | | - | 2 | A |
| I_{FSM} | non-repetitive peak forward current | $t_p = 8.3 \text{ ms}$; half sine wave; $T_{j(init)} = 25 \text{ }^\circ\text{C}$ | | - | 50 | A |
| P_{tot} | total power dissipation | $T_{amb} \leq 25 \text{ }^\circ\text{C}$ | [2] | - | 625 | mW |
| | | | [3] | - | 1.05 | W |
| | | | [1] | - | 2.1 | W |
| T_j | junction temperature | | | - | 150 | $^\circ\text{C}$ |
| T_{amb} | ambient temperature | | | -55 | 150 | $^\circ\text{C}$ |
| T_{stg} | storage temperature | | | -65 | 150 | $^\circ\text{C}$ |

[1] Device mounted on a ceramic PCB, Al_2O_3 , 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^2 .

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] | - | - | 200 | K/W |
| | | | [1] [3] | - | - | 120 | K/W |
| | | | [1] [4] | - | - | 60 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [5] | - | - | 12 | 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^2 .
- [4] Device mounted on a ceramic PCB, Al_2O_3 , standard footprint.
- [5] Soldering point of cathode tab.

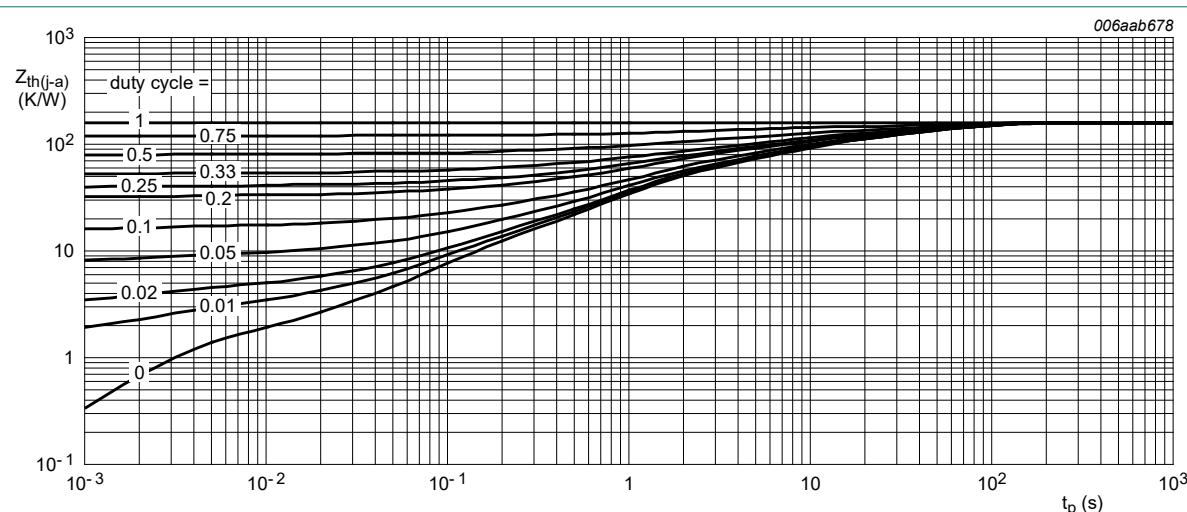


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

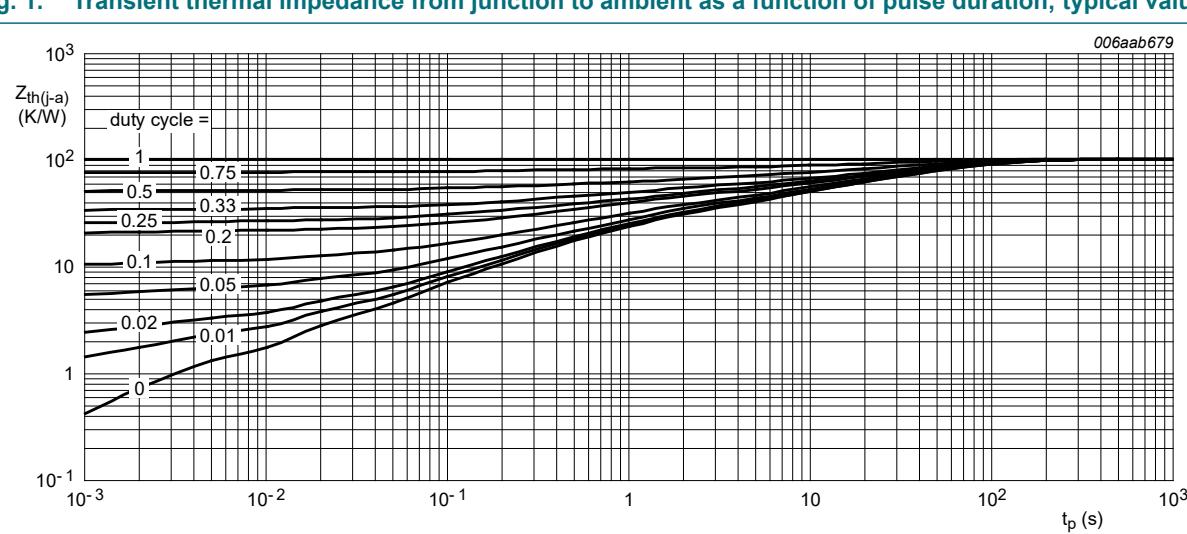


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

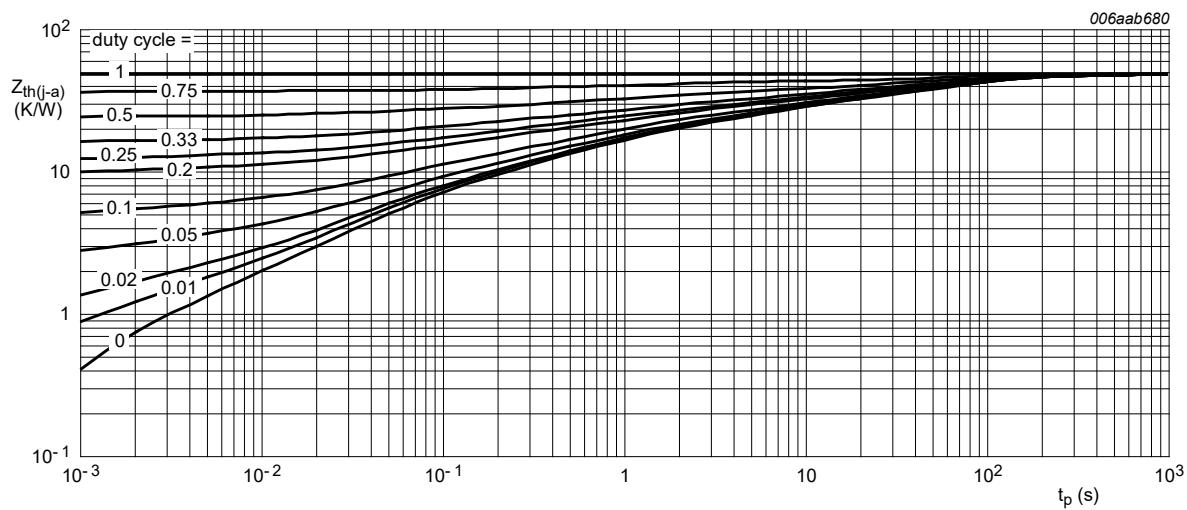


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-------------------|-----------------------------------------------------------------|-----|-----|-----|---------------|
| V_F | forward voltage | $I_F = 0.1 \text{ A}; T_j = 25^\circ\text{C}$ | - | 300 | 340 | mV |
| | | $I_F = 0.5 \text{ A}; T_j = 25^\circ\text{C}$ | - | 360 | 420 | mV |
| | | $I_F = 1 \text{ A}; T_j = 25^\circ\text{C}$ | - | 400 | 460 | mV |
| | | $I_F = 1.5 \text{ A}; T_j = 25^\circ\text{C}$ | - | 430 | 500 | mV |
| | | $I_F = 2 \text{ A}; T_j = 25^\circ\text{C}$ | - | 460 | 530 | mV |
| I_R | reverse current | $V_R = 5 \text{ V}; T_j = 25^\circ\text{C}$ | - | 2.5 | - | μA |
| | | $V_R = 10 \text{ V}; T_j = 25^\circ\text{C}$ | - | 3.5 | - | μA |
| | | $V_R = 60 \text{ V}; T_j = 25^\circ\text{C}$ | - | 60 | 150 | μA |
| C_d | diode capacitance | $V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$ | - | 240 | - | pF |
| | | $V_R = 10 \text{ V}; f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$ | - | 80 | - | pF |

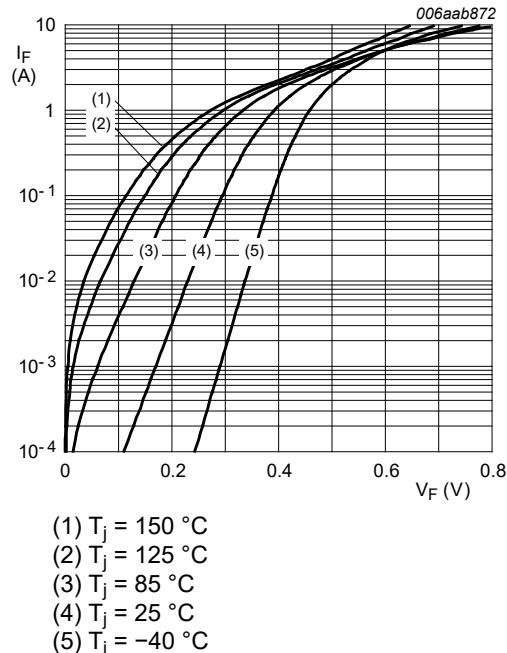


Fig. 4. Forward current as a function of forward voltage; typical values

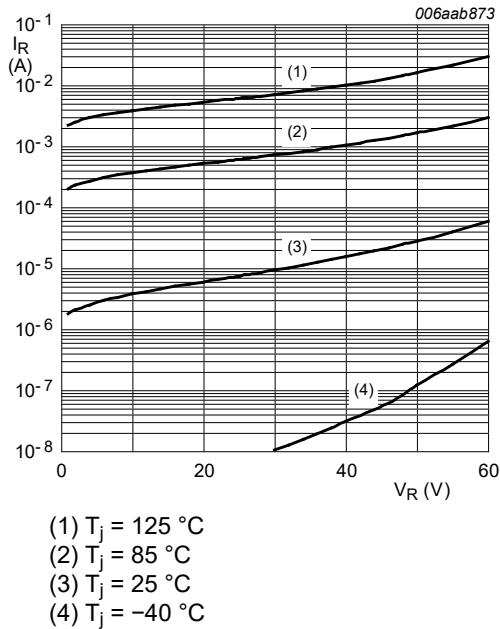


Fig. 5. Reverse current as a function of reverse voltage; typical values

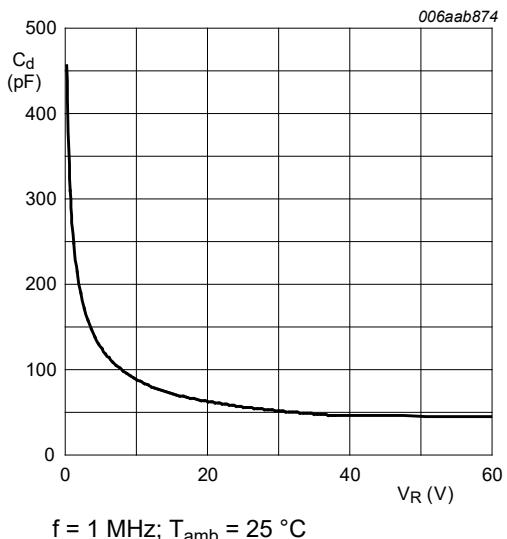


Fig. 6. Diode capacitance as a function of reverse voltage; typical values

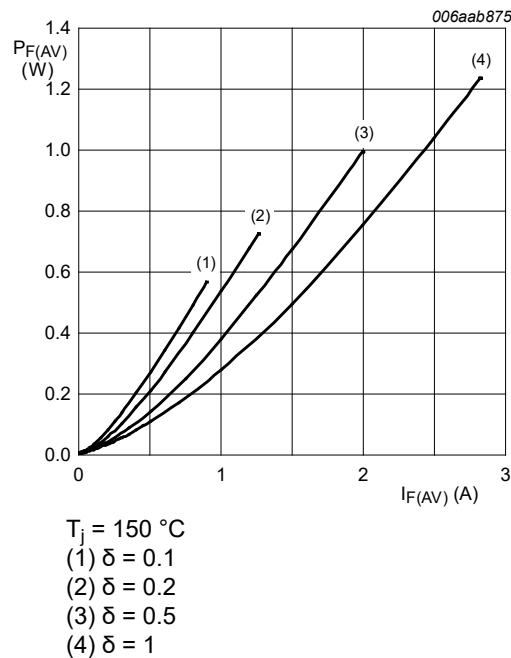


Fig. 7. Average forward power dissipation as a function of average forward current; typical values

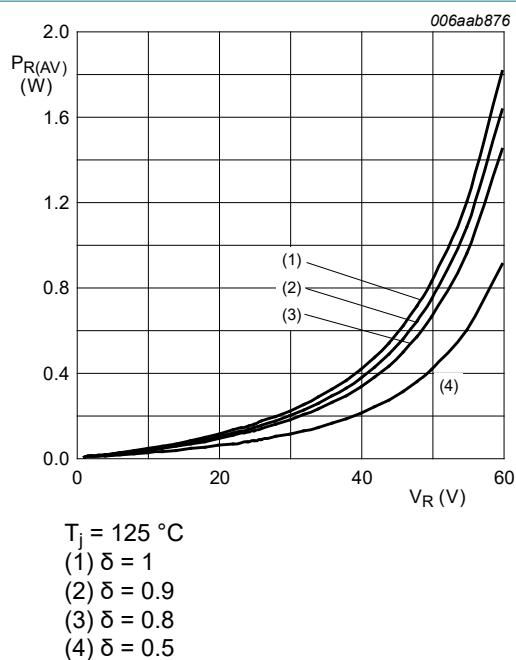


Fig. 8. Average reverse power dissipation as a function of reverse voltage; typical values

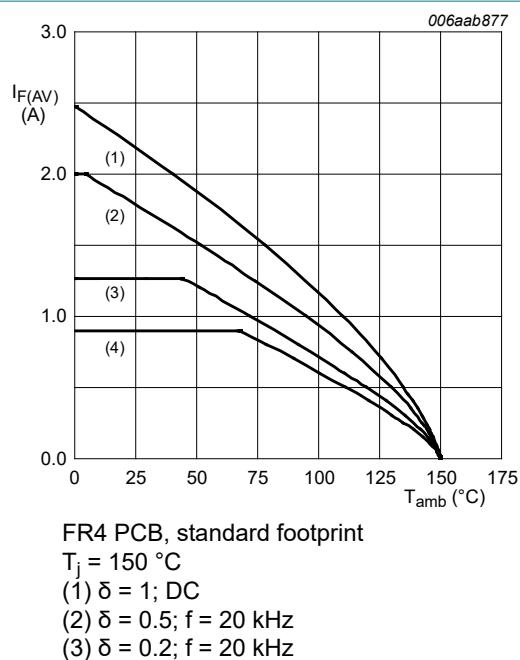


Fig. 9. Average forward current as a function of ambient temperature; typical values

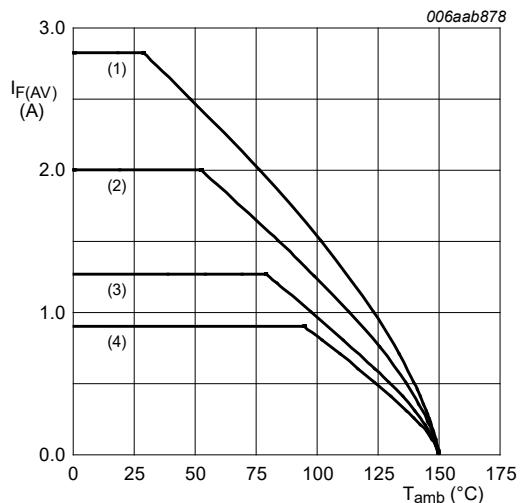


Fig. 10. Average forward current as a function of ambient temperature; typical values

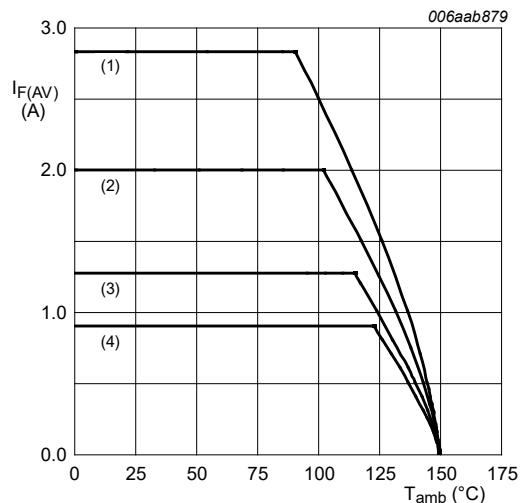
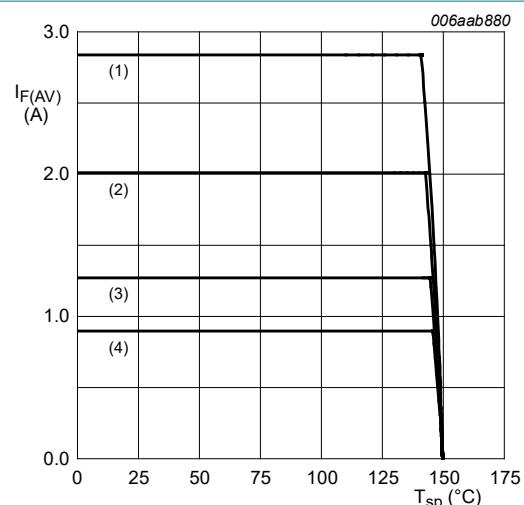


Fig. 11. Average forward current as a function of ambient temperature; typical values



$T_j = 150 \text{ }^{\circ}\text{C}$

(1) $\delta = 1$; 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

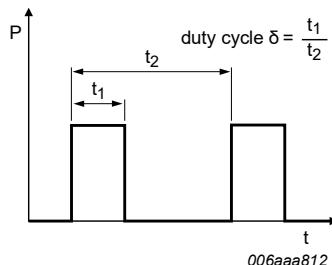


Fig. 13. Duty cycle definition

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

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

$$I_{RMS} = I_{F(AV)} \text{ at DC}$$

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

12. Package outline

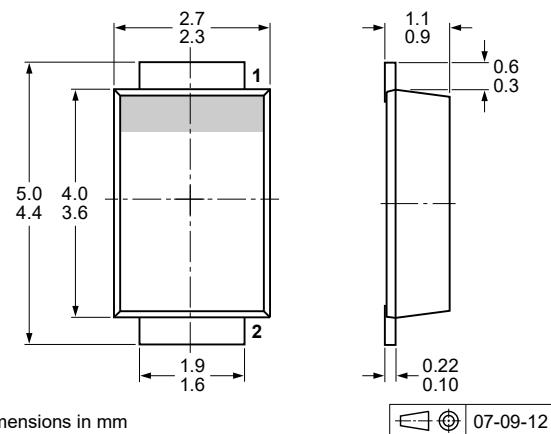


Fig. 14. Package outline CFP5 (SOD128)

13. Soldering

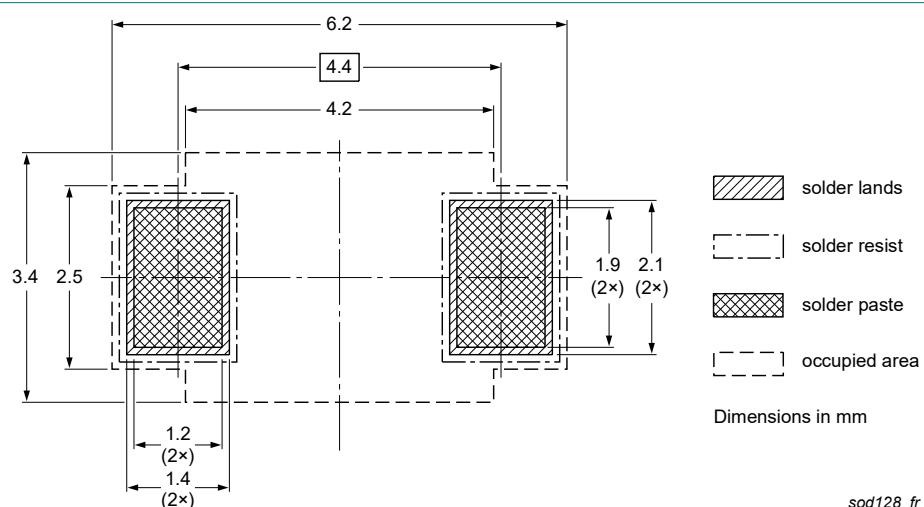
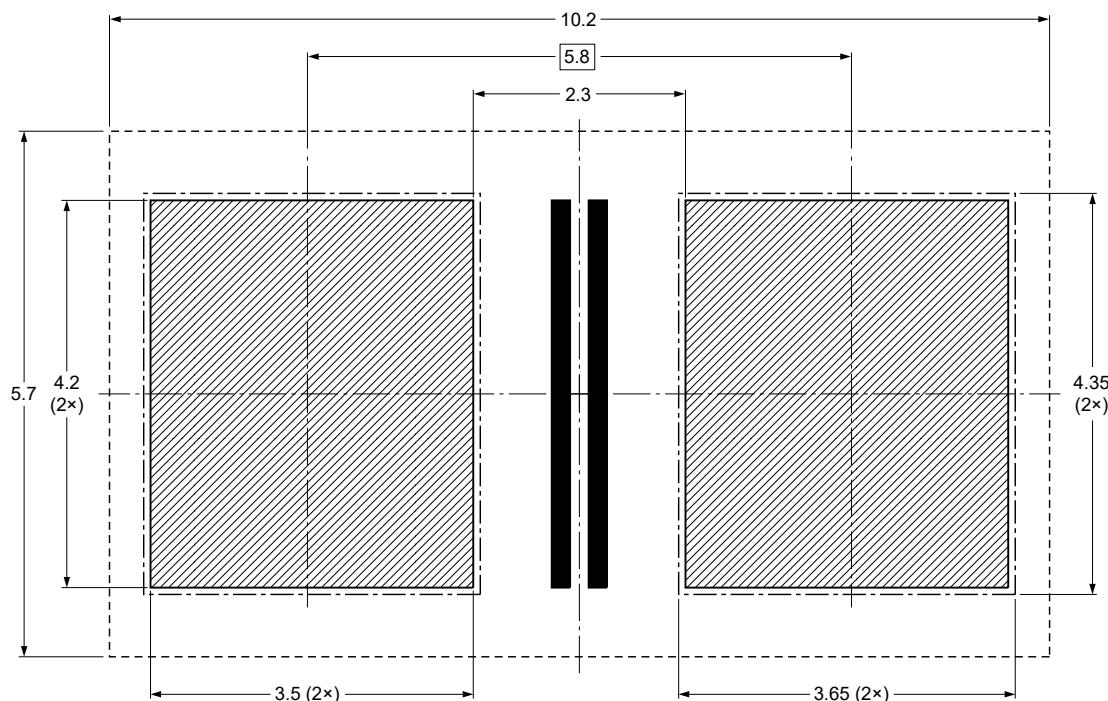


Fig. 15. Reflow soldering footprint for CFP5 (SOD128)

Wave soldering footprint information

SOD128



occupied area

solder resist

solder lands

dummy track (solder resist and Cu free)

Dimensions in mm

Issue date 17-06-06
17-06-07

sod128_fw

Fig. 16. Wave soldering footprint for CFP5 (SOD128)

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|----------------|
| PMEG6020EP v.4 | 20230220 | Product data sheet | - | PMEG6020EP v.3 |
| Modifications: | <ul style="list-style-type: none">Limiting values: Measurement conditions for I_{F5M} changed from square wave to half-sine wave. | | | |
| PMEG6020EP v.3 | 20230101 | Product data sheet | - | PMEG6020EP_2 |
| PMEG6020EP v.2 | 20190228 | Product data sheet | - | PMEG6020EP_1 |
| PMEG6020EP_1 | 20100317 | Product 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. |

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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 20 February 2023
