# PMEG3020EXD

## 30 V, 2 A Schottky barrier rectifier

21 January 2025 **Product data sheet**

## 1. General description

Planar Schottky barrier rectifier encapsulated in a CFP2-HP (SOD323HP) power flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Low forward voltage
- High power capability due to clip-bond package
- Power flat lead plastic package with exposed heatsink for optimal thermal connection

## 3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Freewheeling
- Reverse polarity protection
- OR-ing

## 4. Quick reference data

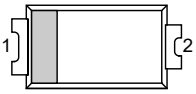
**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{F(AV)}$ | average forward current | δ = 0.5; f = 20 kHz; square wave; $T_{sp}$ ≤ 167 °C | | - | - | 2 | A |
| $V_R$ | reverse voltage | $T_j$ = 25 °C | | - | - | 30 | V |
| $V_F$ | forward voltage | $I_F$ = 2 A; pulsed; $T_j$ = 25 °C | [1] | - | 500 | 580 | mV |
| $I_R$ | reverse current | $V_R$ = 30 V; pulsed; $T_j$ = 25 °C | [1] | - | 10 | 60 | µA |
| | | $V_R$ = 30 V; pulsed; $T_j$ = 125 °C | [1] | - | 5 | 25 | mA |

[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 | K | cathode[1] |  Transparent top view **CFP2-HP (SOD323HP)** |  *sym001* |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PMEG3020EXD | CFP2-HP | SOD323HP: plastic surface-mounted package with solderable lead ends; 2.2 mm x 1.3 mm x 0.68 mm body | SOD323HP |

# 7. Marking

**Table 4. Marking codes**

| Type number | Marking code |
|---|---|
| PMEG3020EXD | 8M |

# 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 °C | | - | 30 | V |
| $I_F$ | forward current | δ = 1; $T_{sp}$ ≤ 166 °C | | - | 2.8 | A |
| $I_{F(AV)}$ | average forward current | δ = 0.5; f = 20 kHz; square wave; $T_{sp}$ ≤ 167 °C | | - | 2 | A |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p$ = 8.3 ms; half sine wave; $T_{j(init)}$ = 25 °C | | - | 25 | A |
| $P_{tot}$ | total power dissipation | $T_{amb}$ ≤ 25 °C | [1] | - | 0.65 | W |
| | | | [2] | - | 1.2 | W |
| $T_j$ | junction temperature | | | - | 175 | °C |
| $T_{amb}$ | ambient temperature | | | -55 | 175 | °C |
| $T_{stg}$ | storage temperature | | | -65 | 175 | °C |

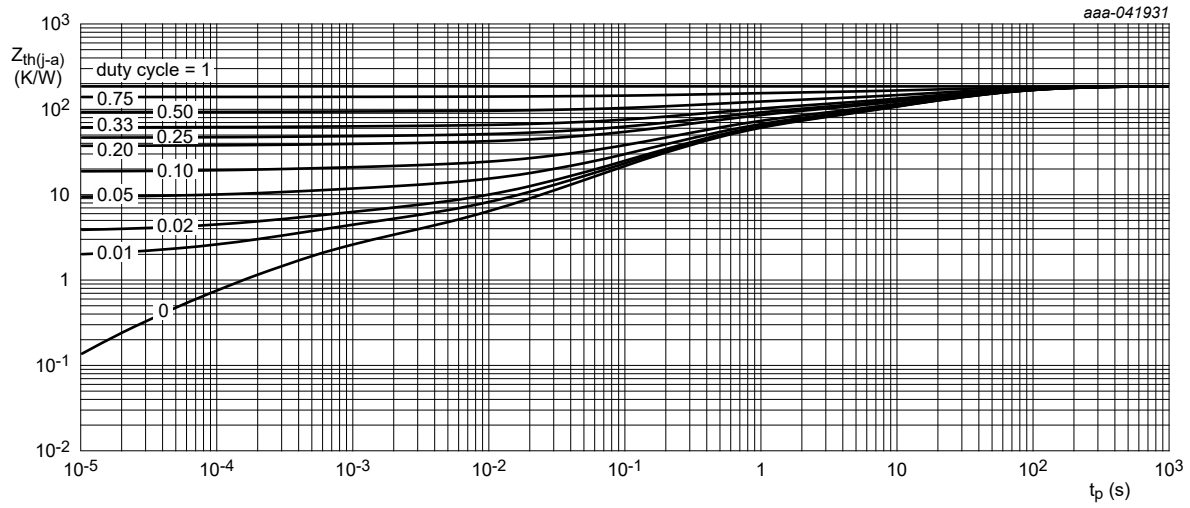
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 $cm^2$.

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

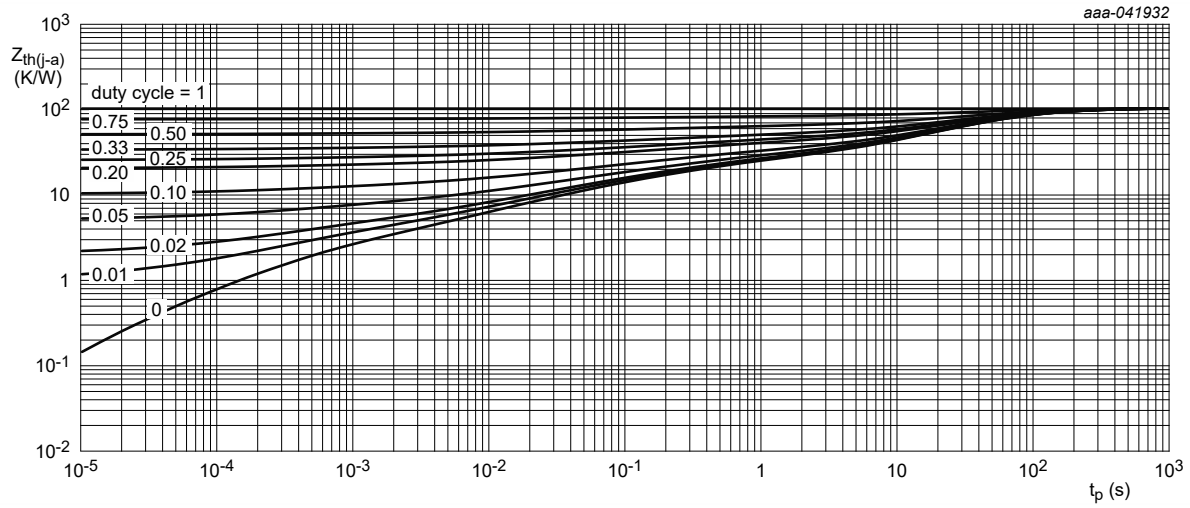
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] [2] | - | - | 230 | K/W |
| | | | [1] [3] | - | - | 125 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [4] | - | - | 6 | 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] Soldering point of cathode tab.




FR4 PCB, standard footprint

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




FR4 PCB, mounting pad for cathode 1 $cm^2$

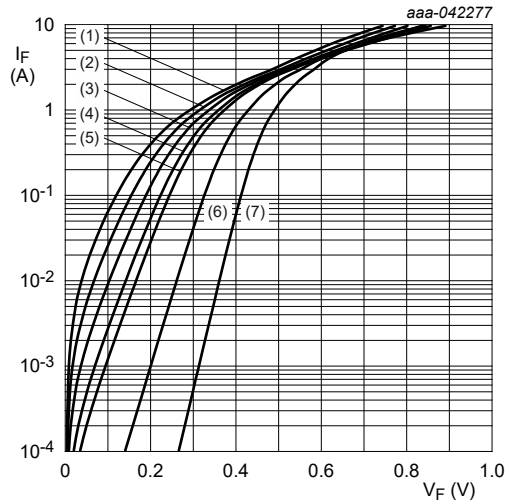
**Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

# 10. Characteristics

**Table 7. Characteristics**

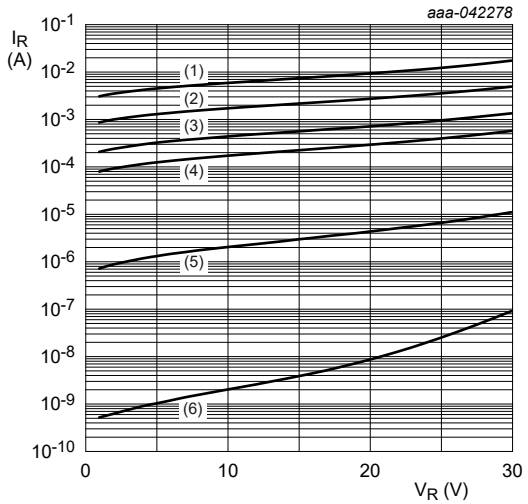
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{(BR)R}$ | reverse breakdown voltage | $I_R$ = 3 mA; pulsed; $T_j$ = 25 °C | [1] | 30 | - | - | V |
| $V_F$ | forward voltage | $I_F$ = 1 A; pulsed; $T_j$ = 25 °C | [1] | - | 430 | 500 | mV |
| | | $I_F$ = 2 A; pulsed; $T_j$ = 25 °C | [1] | - | 500 | 580 | mV |
| | | $I_F$ = 2 A; pulsed; $T_j$ = -40 °C | [1] | - | 535 | 620 | mV |
| | | $I_F$ = 2 A; pulsed; $T_j$ = 125 °C | [1] | - | 425 | 495 | mV |
| $I_R$ | reverse current | $V_R$ = 30 V; pulsed; $T_j$ = 25 °C | [1] | - | 10 | 60 | µA |
| | | $V_R$ = 30 V; pulsed; $T_j$ = 125 °C | [1] | - | 5 | 25 | mA |
| $C_d$ | diode capacitance | $V_R$ = 1 V; f = 1 MHz; $T_j$ = 25 °C | | - | 105 | - | pF |
| | | $V_R$ = 10 V; f = 1 MHz; $T_j$ = 25 °C | | - | 37 | - | pF |
| $t_{rr}$ | reverse recovery time step recovery | $I_F$ = 0.5 A; $I_R$ = 1 A; $I_{R(meas)}$ = 0.25 A; $T_j$ = 25 °C | | - | 3.1 | - | ns |
| | reverse recovery time ramp recovery | $dI_F/dt$ = 100 A/µs; $I_F$ = 1 A; $V_R$ = 30 V; $T_j$ = 25 °C | | - | 6.3 | - | ns |
| $I_{RM}$ | peak reverse recovery current | | | - | 0.26 | - | A |
| $Q_{rr}$ | reverse recovery charge | | | - | 1 | - | nC |
| $V_{FRM}$ | peak forward recovery voltage | $I_F$ = 0.5 A; $dI_F/dt$ = 20 A/µs; $T_j$ = 25 °C | | - | 390 | - | mV |

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



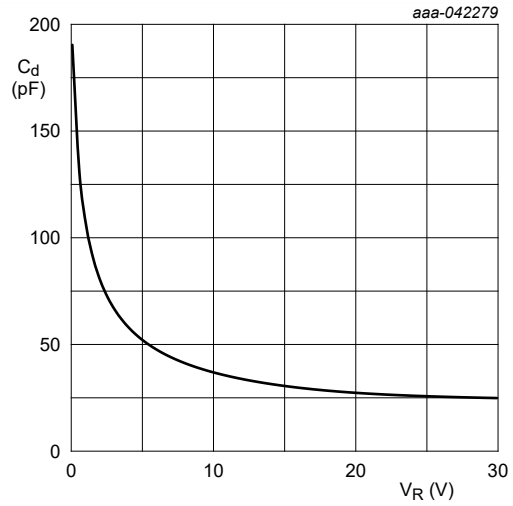

pulsed condition
(1) $T_j$ = 175 °C
(2) $T_j$ = 150 °C
(3) $T_j$ = 125 °C
(4) $T_j$ = 100 °C
(5) $T_j$ = 85 °C
(6) $T_j$ = 25 °C
(7) $T_j$ = -40 °C

**Fig. 3. Forward current as a function of forward voltage; typical values**



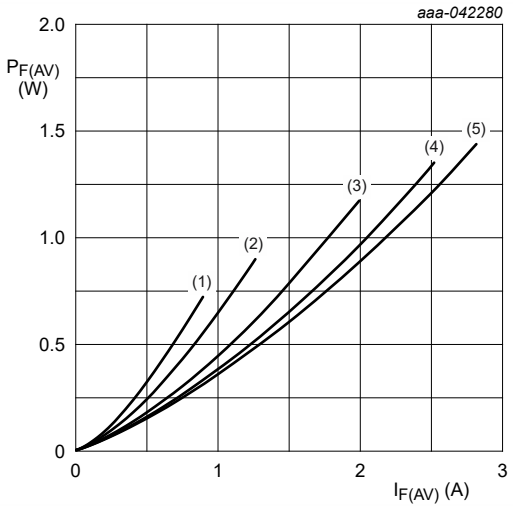

pulsed condition
(1) $T_j$ = 150 °C
(2) $T_j$ = 125 °C
(3) $T_j$ = 100 °C
(4) $T_j$ = 85 °C
(5) $T_j$ = 25 °C
(6) $T_j$ = -40 °C

**Fig. 4. Reverse current as a function of reverse voltage; typical values**



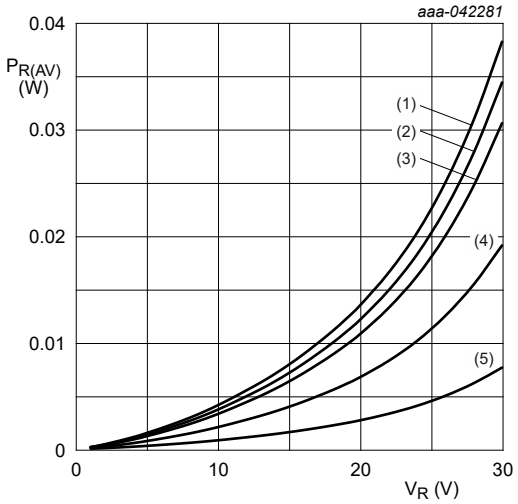

f = 1 MHz; $T_{amb}$ = 25 °C

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



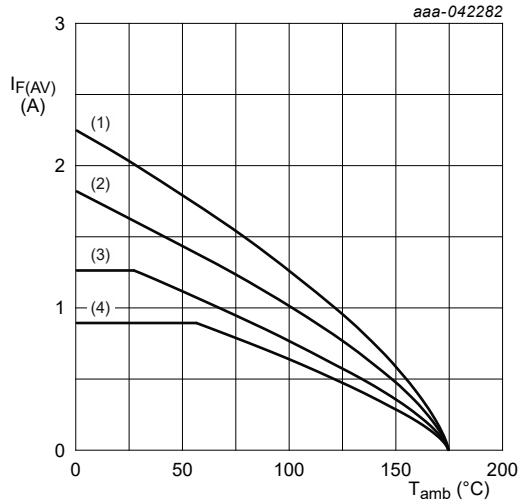

$T_j$ = 100 °C
(1) δ = 0.1
(2) δ = 0.2
(3) δ = 0.5
(4) δ = 0.8
(5) δ = 1 (DC)

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



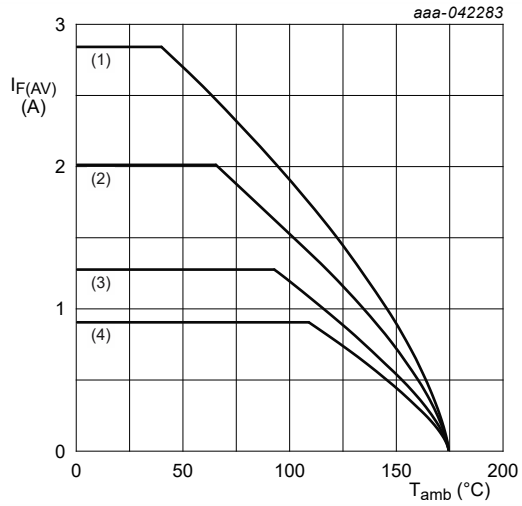

$T_j$ = 100 °C
(1) δ = 1
(2) δ = 0.9
(3) δ = 0.8
(4) δ = 0.5
(5) δ = 0.2

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



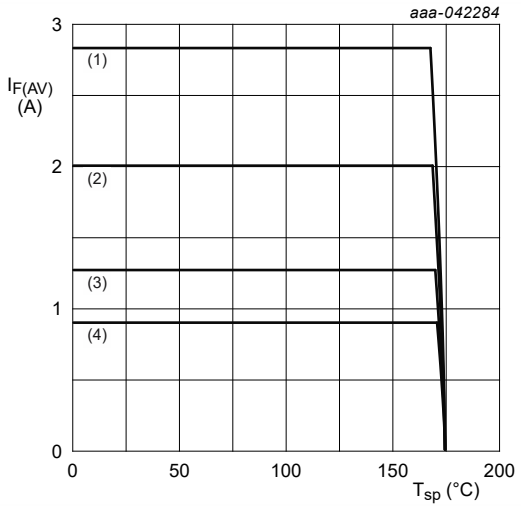

FR4 PCB, standard footprint
$T_j$ = 175 °C
(1) δ = 1 (DC)
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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




FR4 PCB, mounting pad for cathode 1 $cm^2$
$T_j$ = 175 °C
(1) δ = 1 (DC)
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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




$T_j$ = 175 °C
(1) δ = 1 (DC)
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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

## 11. Test information

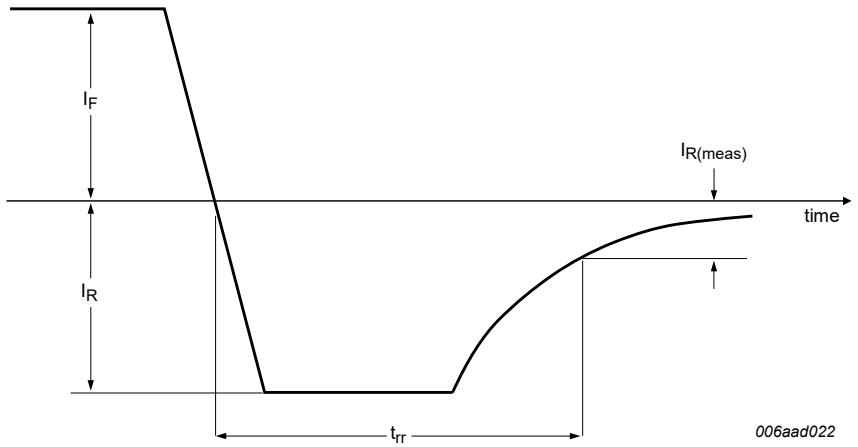



**Fig. 11. Reverse recovery definition; step recovery**

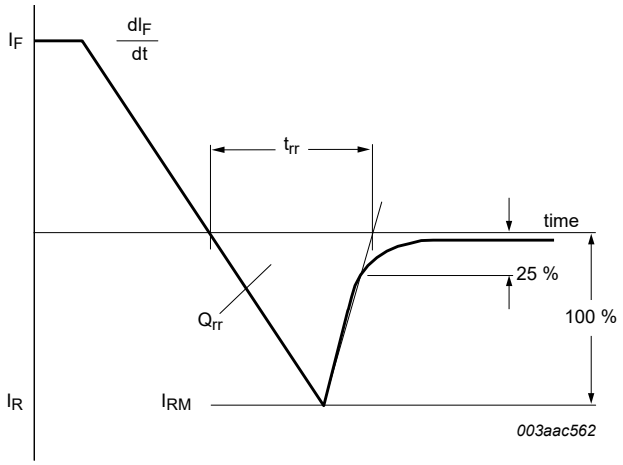



**Fig. 12. Reverse recovery definition; ramp recovery**

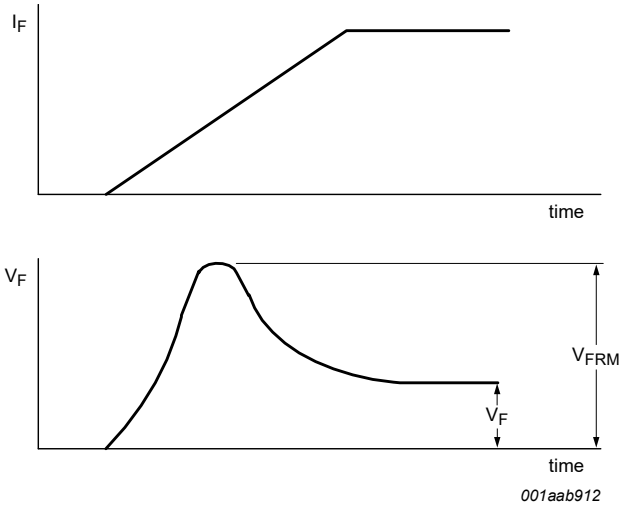



**Fig. 13. Forward recovery definition**

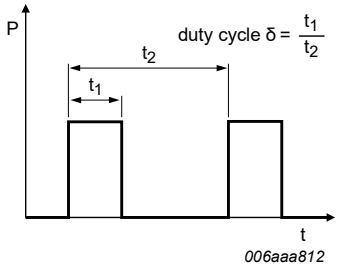



**Fig. 14. Duty cycle definition**

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

$I_{F(AV)} = I_M \times \delta$ 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.

## 12. Package outline

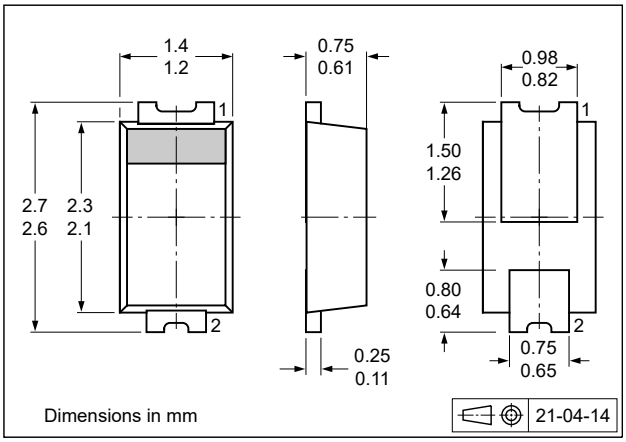



**Fig. 15. Package outline CFP2-HP (SOD323HP)**

## 13. Soldering

**Footprint information for reflow soldering of SOD323HP** **SOD323HP**

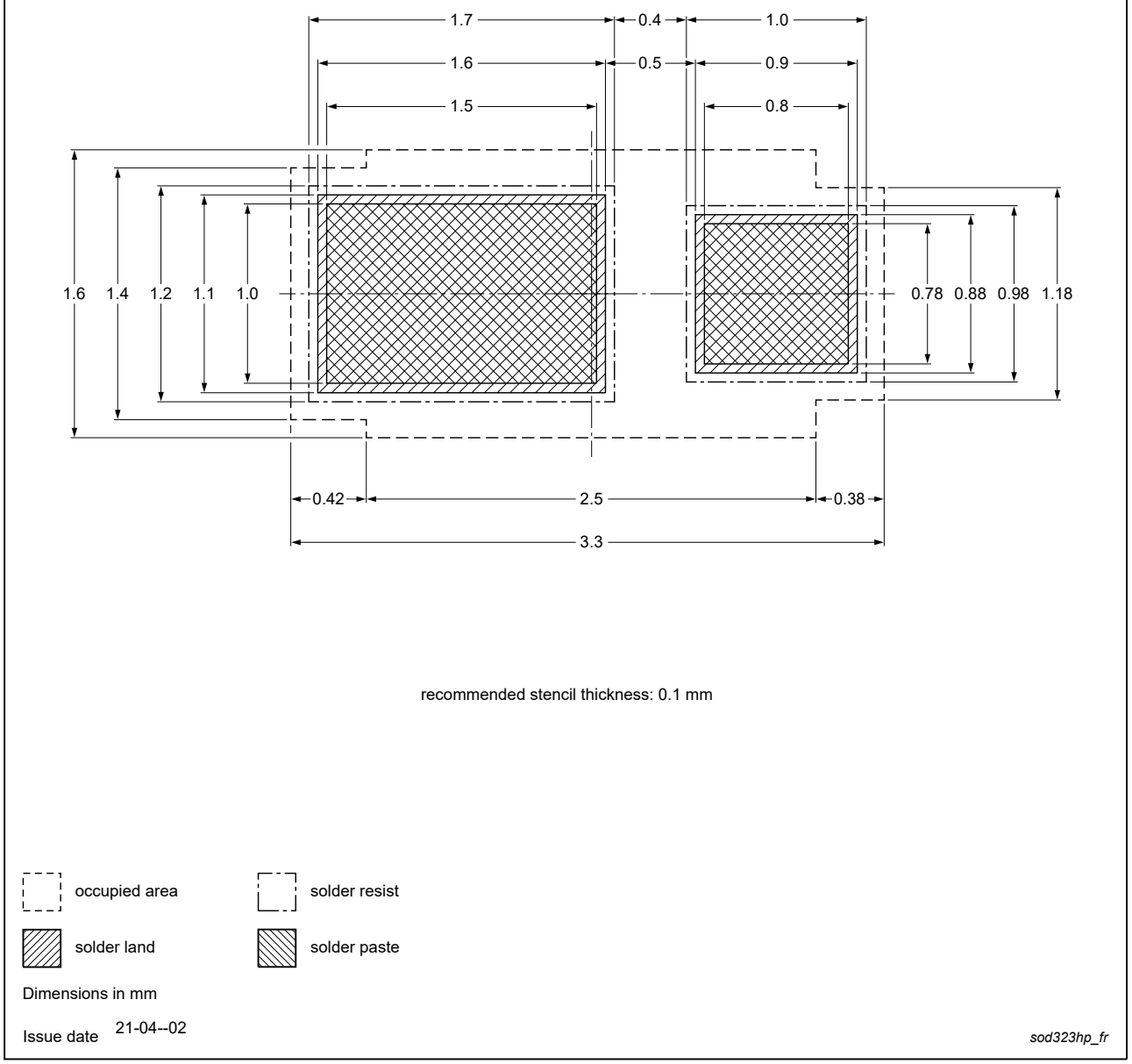
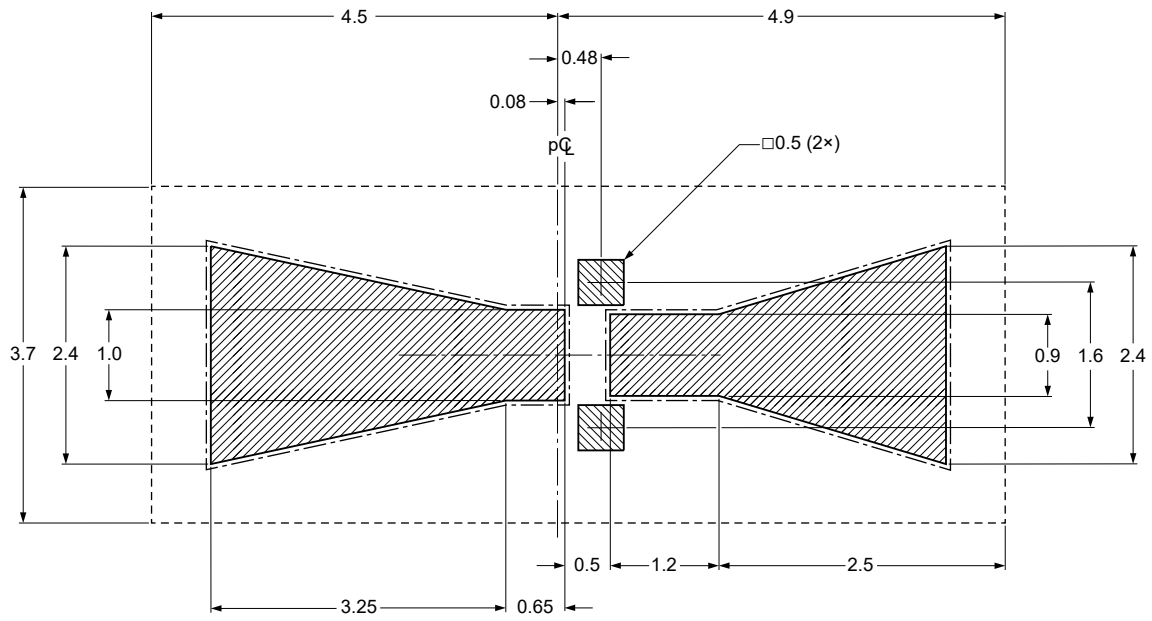



**Fig. 16. Reflow soldering footprint for CFP2-HP (SOD323HP)**

**Wave soldering footprint information for CFP2-HP package** **SOD323HP**




preferred transport direction during soldering

= package center line

Wave soldering

occupied area

solder resist (0.05 mm offset from Cu)

solder land

glue position (0.1 mm stencil thickness)

Dimensions in mm

Issue date 23-07-05

*sod323hp_fw*

**Fig. 17. Wave soldering footprint for CFP2-HP (SOD323HP)**

# 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMEG3020EXD v.1 | 20250121 | Product data sheet | - | - |

# 15. Legal information

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| 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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