# PMEG2002AESFB

## 20 V, 0.2 A low VF MEGA Schottky barrier rectifier

**17 August 2017** **Product data sheet**

## 1. General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection in a DSN0603B-2 (SOD962B) leadless ultra small Surface-Mounted Device (SMD) package.

## 2. Features and benefits

- Average forward current $I_{F(AV)} \leq 0.2$ A
- Reverse voltage $V_R \leq 20$ V
- Low forward voltage
- Low leakage current
- Ultra small and leadless SMD package
- Package height typ. 0.2 mm

## 3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Low power consumption applications
- Ultra high-speed switching
- LED backlight for mobile application
- Smartcard-embedded 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; $T_{sp} \leq 125$ °C; square wave | | - | - | 0.2 | A |
| $V_R$ | reverse voltage | $T_j = 25$ °C | | - | - | 20 | V |
| $V_F$ | forward voltage | $I_F = 200$ mA; $T_j = 25$ °C; pulsed | [1] | - | 375 | 420 | mV |
| $I_R$ | reverse current | $V_R = 10$ V; $T_j = 25$ °C; pulsed | [1] | - | 5 | 25 | µA |
| | | $V_R = 20$ V; $T_j = 25$ °C; pulsed | [1] | - | 10 | 45 | µA |

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

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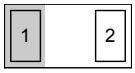
## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | K | cathode[1] |  Transparent top view **DSN0603B-2 (SOD962B)** |  *sym001* |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

## 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PMEG2002AESFB | DSN0603B-2 | silicon, leadless ultra small package; 2 terminals; 0.4 mm pitch; 0.6 x 0.3 x 0.2 mm body | SOD962B |

## 7. Marking

**Table 4. Marking codes**

| Type number | Marking code |
|---|---|
| PMEG2002AESFB | A |

# 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 | | - | 20 | V |
| $I_F$ | forward current | $T_{sp} \leq$ 120 °C; δ = 1 | | - | 0.28 | A |
| $I_{F(AV)}$ | average forward current | δ = 0.5 ; f = 20 kHz; $T_{amb} \leq$ 115 °C; square wave | | - | 0.2 | A |
| | | δ = 0.5 ; f = 20 kHz; $T_{sp} \leq$ 125 °C; square wave | | - | 0.2 | A |
| $I_{FRM}$ | repetitive peak forward current | $t_p \leq$ 1 ms; δ ≤ 0.25 | | - | 1.7 | A |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p$ = 8 ms; $T_{j(init)}$ = 25 °C; square wave | | - | 4 | A |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq$ 25 °C | [1] | - | 325 | mW |
| | | | [2] | - | 525 | mW |
| $T_j$ | junction temperature | | | - | 125 | °C |
| $T_{amb}$ | ambient temperature | | | -40 | 125 | °C |
| $T_{stg}$ | storage temperature | | | -40 | 125 | °C |

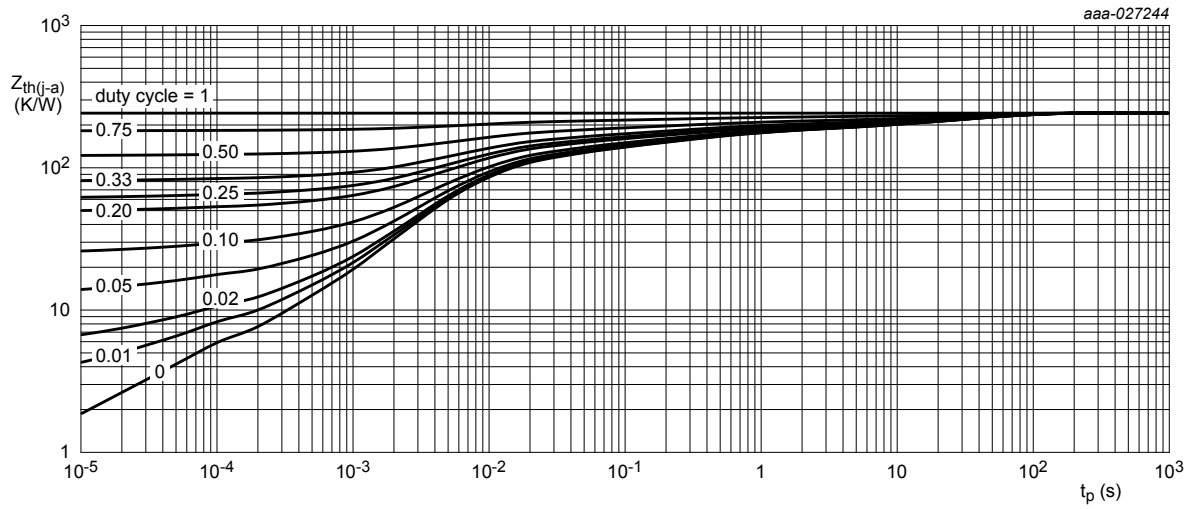
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 $cm^2$ each.

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

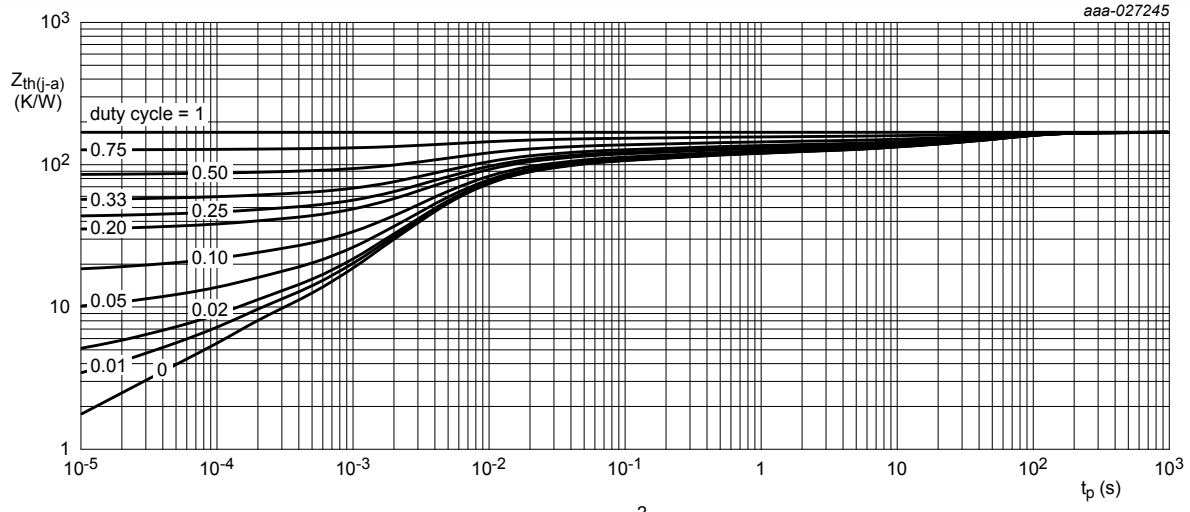
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] [2] | - | - | 310 | K/W |
| | | | [1] [3] | - | - | 190 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [4] | - | - | 40 | 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 anode and cathode 1 $cm^2$ each.
[4] Soldering point of anode 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 anode and cathode 1 $cm^2$ each

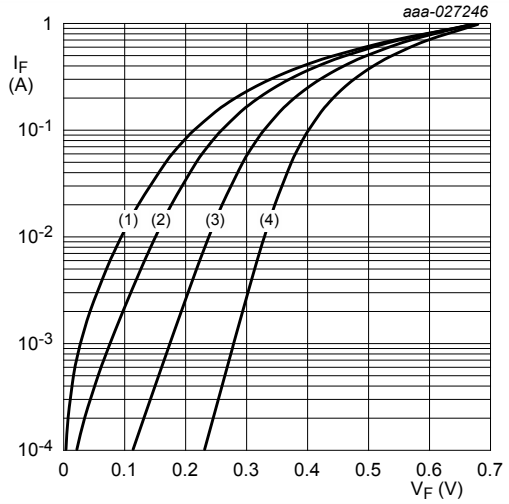
**Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

# 10. Characteristics

**Table 7. Characteristics**

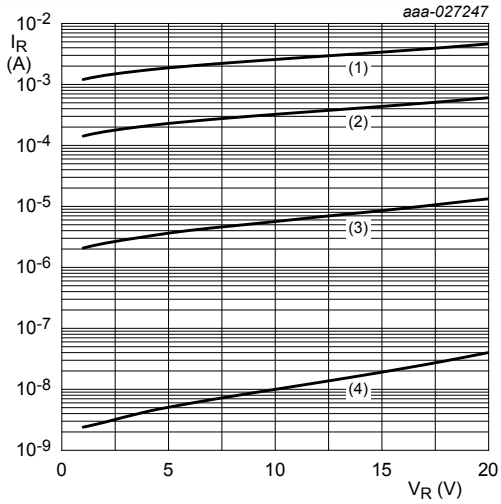
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{(BR)R}$ | reverse breakdown voltage | $I_R$ = 0.1 mA; $T_j$ = 25 °C; pulsed | [1] | 20 | - | - | V |
| $V_F$ | forward voltage | $I_F$ = 0.1 mA; $T_j$ = 25 °C; pulsed | [1] | - | 120 | 180 | mV |
| | | $I_F$ = 1 mA; $T_j$ = 25 °C; pulsed | [1] | - | 180 | 250 | mV |
| | | $I_F$ = 10 mA; $T_j$ = 25 °C; pulsed | [1] | - | 245 | 310 | mV |
| | | $I_F$ = 100 mA; $T_j$ = 25 °C; pulsed | [1] | - | 330 | 380 | mV |
| | | $I_F$ = 200 mA; $T_j$ = 25 °C; pulsed | [1] | - | 375 | 420 | mV |
| $I_R$ | reverse current | $V_R$ = 6 V; $T_j$ = 25 °C; pulsed | [1] | - | 3.2 | 20 | µA |
| | | $V_R$ = 10 V; $T_j$ = 25 °C; pulsed | [1] | - | 5 | 25 | µA |
| | | $V_R$ = 20 V; $T_j$ = 25 °C; pulsed | [1] | - | 10 | 45 | µA |
| $C_d$ | diode capacitance | $V_R$ = 1 V; f = 1 MHz; $T_j$ = 25 °C | | - | 25 | - | pF |
| | | $V_R$ = 10 V; f = 1 MHz; $T_j$ = 25 °C | | - | 10 | - | pF |
| $t_{rr}$ | reverse recovery time | $I_F$ = 200 mA; $I_R$ = 200 mA; $I_{R(meas)}$ = 40 mA; $T_j$ = 25 °C | | - | 1.9 | - | ns |

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



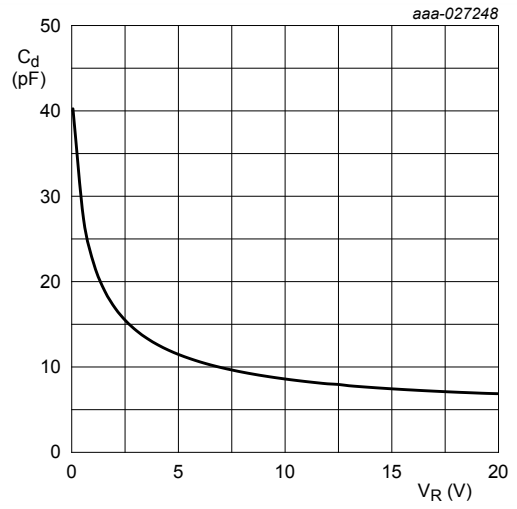

(1) $T_j$ = 125 °C
(2) $T_j$ = 85 °C
(3) $T_j$ = 25 °C
(4) $T_j$ = −40 °C

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



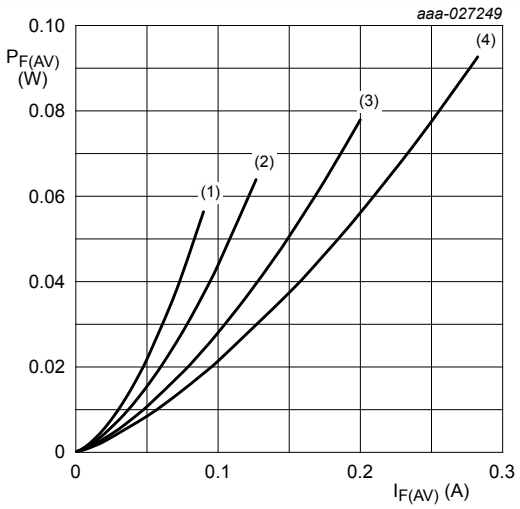

(1) $T_j$ = 125 °C
(2) $T_j$ = 85 °C
(3) $T_j$ = 25 °C
(4) $T_j$ = −40 °C

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



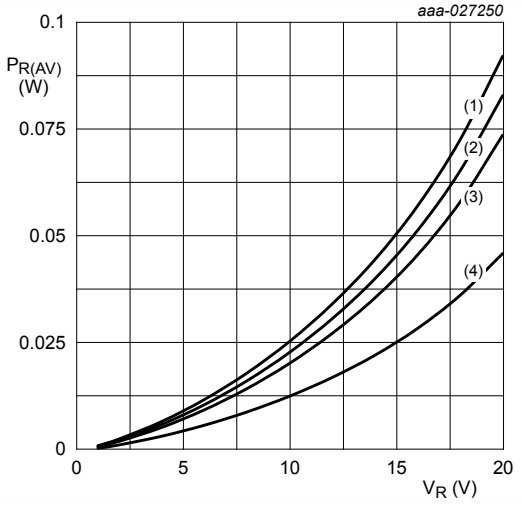

f = 1 MHz; $T_{amb}$ = 25 °C

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



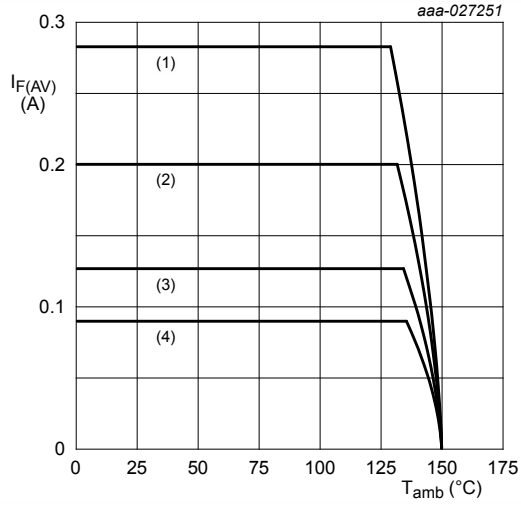

$T_j$ = 125 °C
(1) δ = 0.1
(2) δ = 0.2
(3) δ = 0.5
(4) δ = 1; DC

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



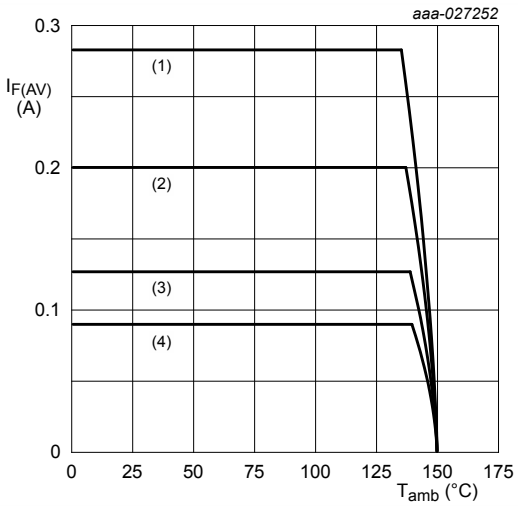

$T_j$ = 125 °C
(1) δ = 1; DC
(2) δ = 0.9; f = 20 kHz
(3) δ = 0.8; f = 20 kHz
(4) δ = 0.5; f = 20 kHz

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



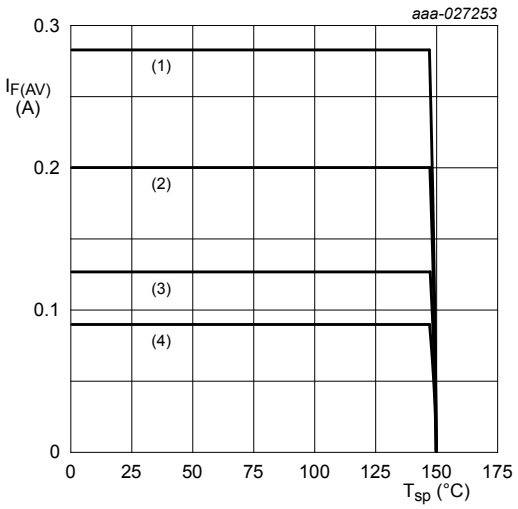

FR4 PCB, standard footprint
$T_j$ = 125 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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




FR4 PCB, mounting pad for anode and cathode 1 $cm^2$ each
$T_j$ = 125 °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**




$T_j$ = 125 °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

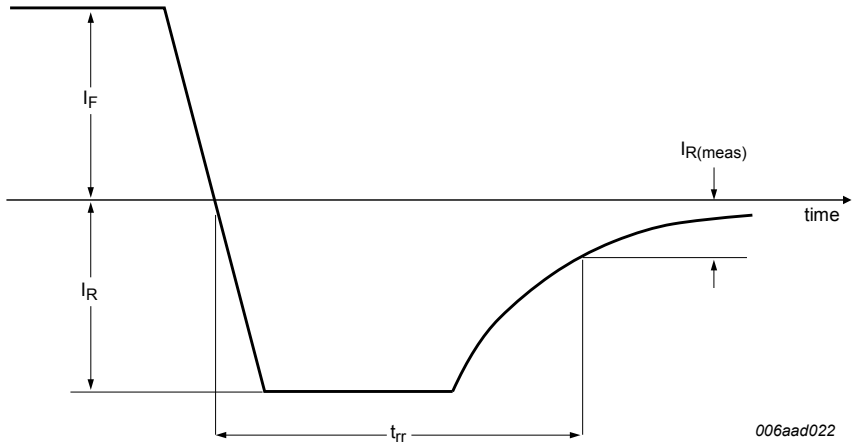



**Fig. 11. Reverse recovery definition**

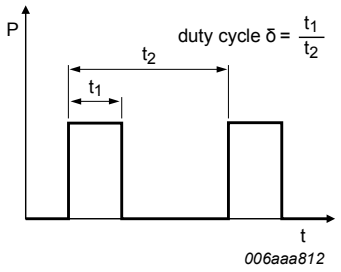



**Fig. 12. Duty cycle definition**

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

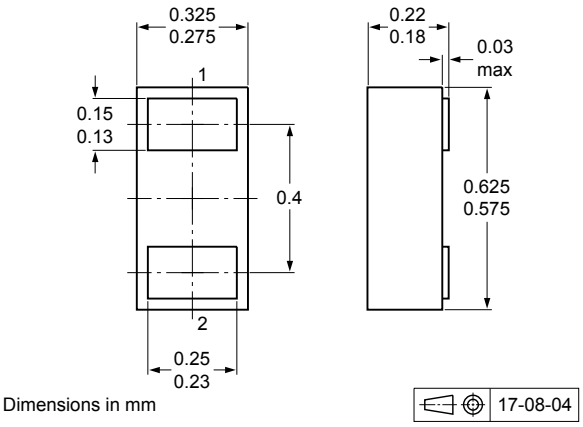



**Fig. 13. Package outline DSN0603B-2 (SOD962B)**

# 13. Soldering

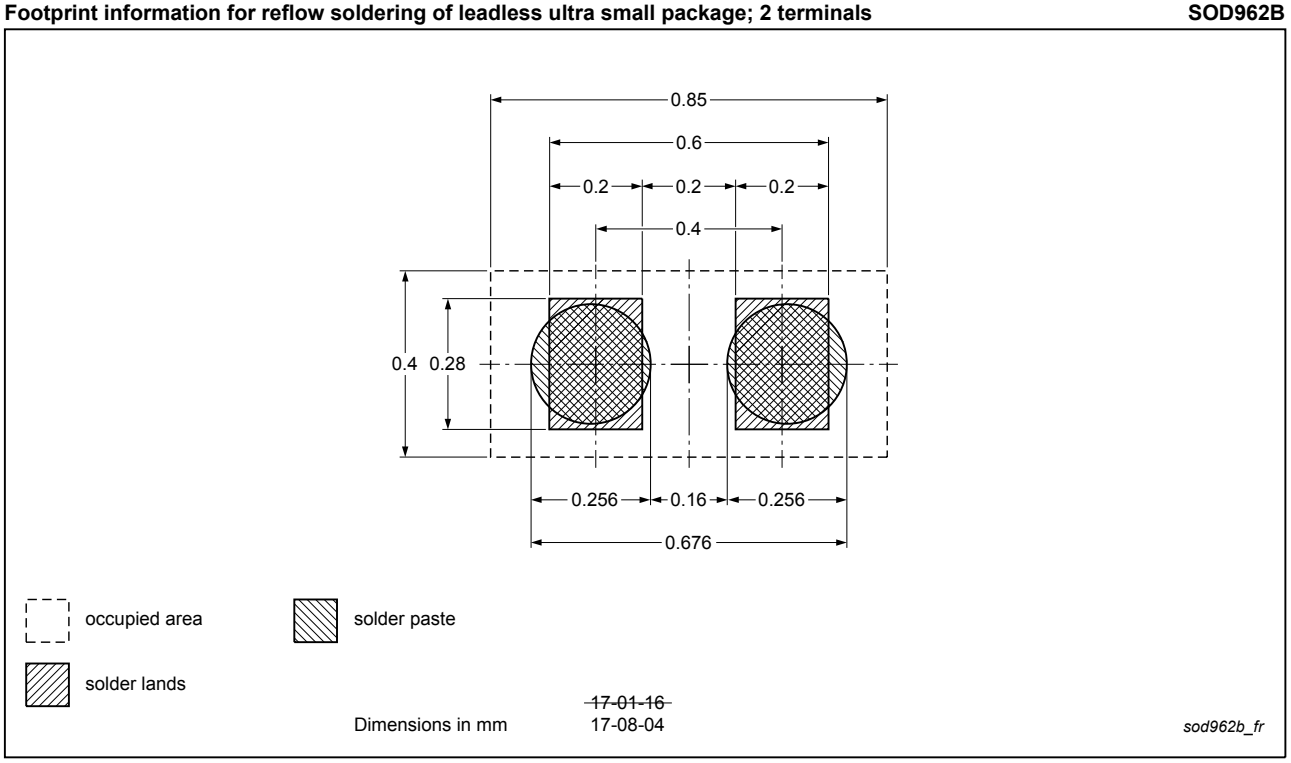



**Fig. 14. Reflow soldering footprint for DSN0603B-2 (SOD962B)**

# 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMEG2002AESFB v.1 | 20170817 | 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. |
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**Date of release: 17 August 2017**