# PMEG2015EPK

## 20 V, 1.5 A low VF Schottky barrier rectifier

21 September 2023 **Product data sheet**

## 1. General description

Planar Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a leadless ultra small SOD1608 (DFN1608D-2) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

## 2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 1.5$ A
- Reverse voltage: $V_R \leq 20$ V
- Low forward voltage $V_F \leq 420$ mV
- Low reverse current
- Solderable side pads
- Package height typ. 0.37 mm
- Ultra small and leadless SMD plastic package
- AEC-Q101 qualified

## 3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- LED backlight for mobile application
- Low power consumption applications
- Ultra high-speed switching
- Reverse polarity protection

## 4. Quick reference data

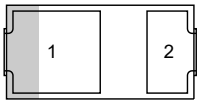
**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{F(AV)}$ | average forward current | δ < 0.5; f = 20 kHz; square wave; $T_{amb} \leq$ 100 °C | [1] | - | - | 1.5 | A |
| | | δ < 0.5; f = 20 kHz; square wave; $T_{sp} \leq$ 140 °C | | - | - | 1.5 | A |
| $V_R$ | reverse voltage | $T_j$ = 25 °C | | - | - | 20 | V |
| $V_F$ | forward voltage | $I_F$ = 1.5 A; pulsed; $t_p \leq$ 300 µs; δ ≤ 0.02; $T_j$ = 25 °C | | - | 375 | 420 | mV |
| $I_R$ | reverse current | $V_R$ = 10 V; $T_j$ = 25 °C | | - | 70 | 350 | µA |
| $t_{rr}$ | reverse recovery time | $I_F$ = 0.5 A; $I_R$ = 0.5 A; $I_{R(meas)}$ = 0.1 A; $T_j$ = 25 °C | | - | 5 | - | ns |

[1] Device mounted on a ceramic Printed-Circuit Board (PCB), $Al_2O_3$, standard footprint.

# 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | K | cathode[1] |  Transparent top view **DFN1608D-2 (SOD1608)** |  *sym001* |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PMEG2015EPK | DFN1608D-2 | plastic, leadless ultra small plastic package with side-wettable flanks (SWF); 2 terminals; 0.94 mm pitch; 1.6 mm x 0.8 mm x 0.37 mm body | SOD1608 |

# 7. Marking

**Table 4. Marking codes**

| Type number | Marking code |
|---|---|
| PMEG2015EPK | 1100<br>0000 |

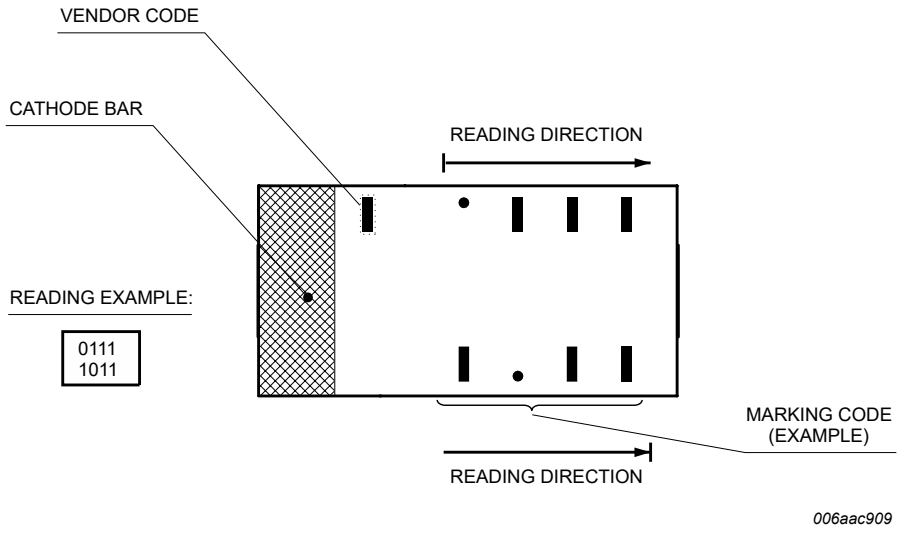



**Fig. 1. SOD1608 binary marking code description**

# 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 | $T_{sp} \leq$ 135 °C | | - | 2.1 | A |
| $I_{F(AV)}$ | average forward current | δ < 0.5; f = 20 kHz; square wave; $T_{amb} \leq$ 100 °C | [1] | - | 1.5 | A |
| | | δ < 0.5; f = 20 kHz; square wave; $T_{sp} \leq$ 140 °C | | - | 1.5 | A |
| $I_{FRM}$ | repetitive peak forward current | $t_p$ = 1 ms; δ = 0.25 | | - | 4 | A |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p$ = 8 ms; square wave; $T_{j(init)}$ = 25 °C | | - | 5 | A |
| $P_{tot}$ | total power dissipation | $T_{amb} \leq$ 25 °C | [2] [3] | - | 415 | mW |
| | | | [4] [3] | - | 895 | mW |
| | | | [1] [3] | - | 1565 | mW |
| $T_j$ | junction temperature | | | - | 150 | °C |
| $T_{amb}$ | ambient temperature | | | -55 | 150 | °C |
| $T_{stg}$ | storage temperature | | | -65 | 150 | °C |

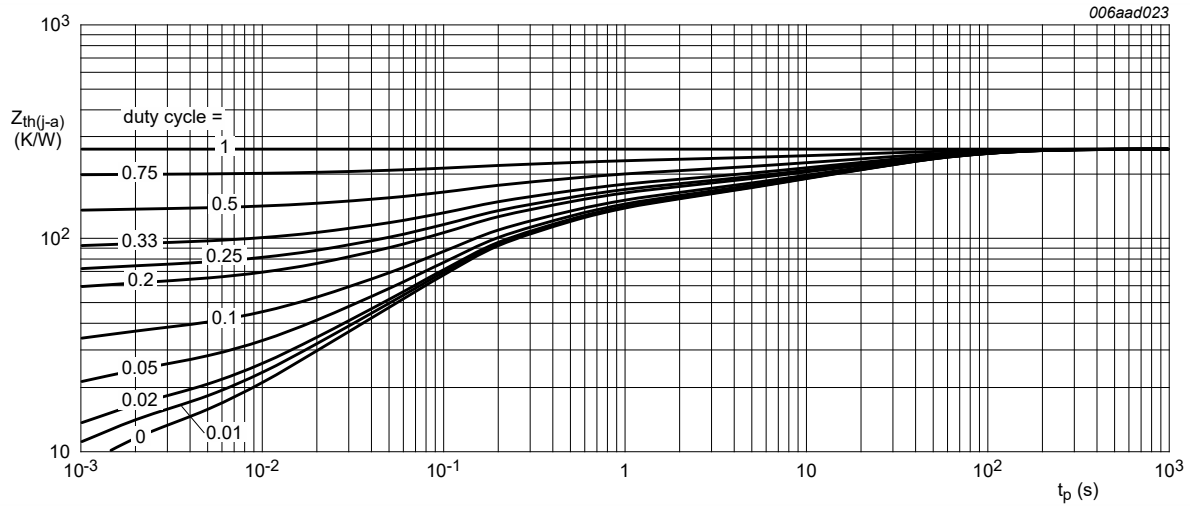
[1] Device mounted on a ceramic Printed-Circuit Board (PCB), $Al_2O_3$, standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[3] Reflow soldering is the only recommended soldering method.
[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 $cm^2$.

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

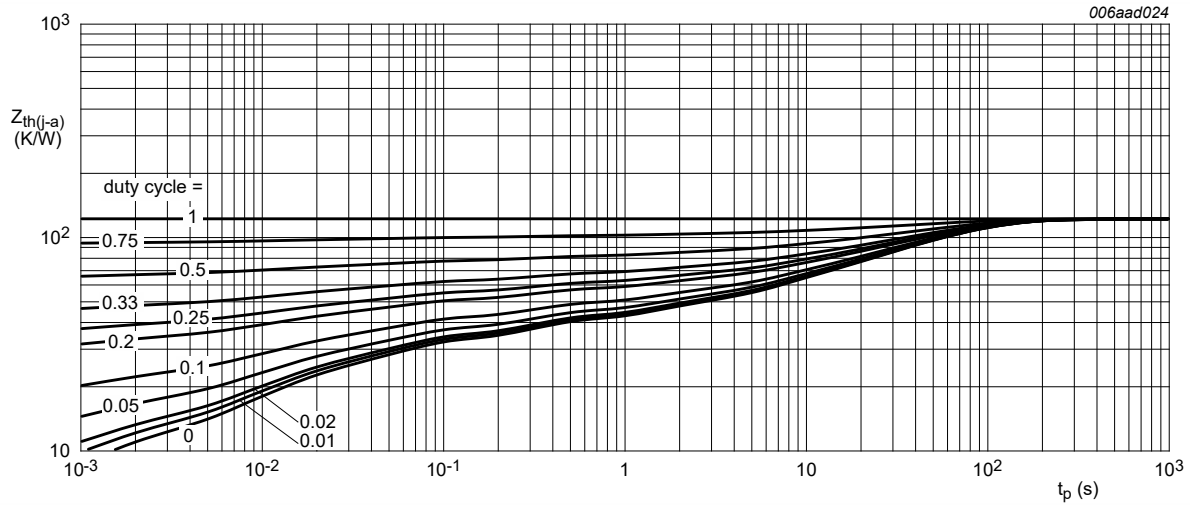
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] [2] [3] | - | - | 300 | K/W |
| | | | [1] [4] [3] | - | - | 140 | K/W |
| | | | [1] [5] [3] | - | - | 80 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [6] | - | - | 20 | 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] Reflow soldering is the only recommended soldering method.
[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 $cm^2$.
[5] Device mounted on a ceramic PCB, $Al_2O_3$, standard footprint.
[6] Soldering point of cathode tab.



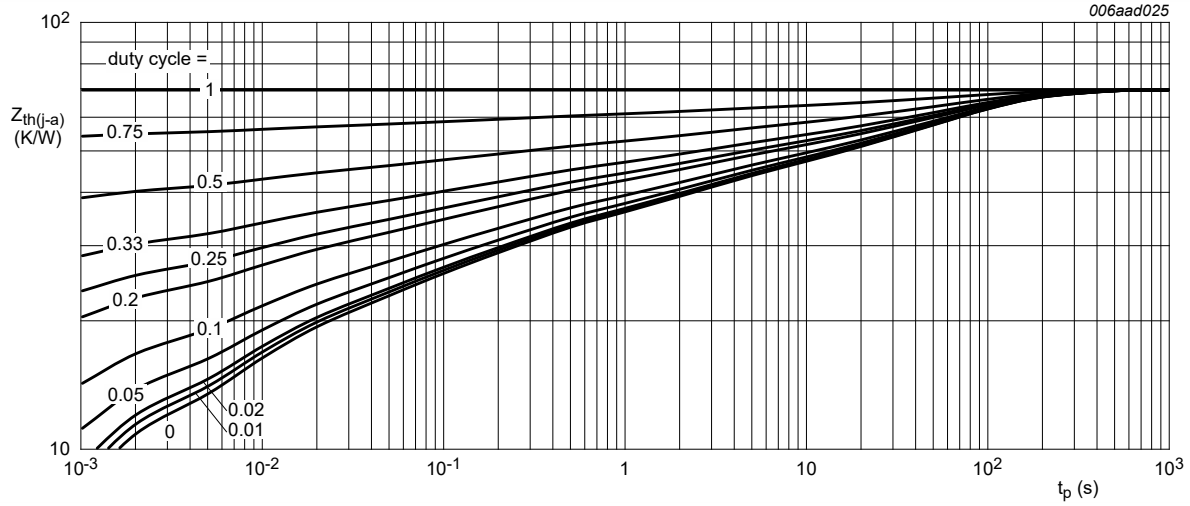

FR4 PCB, standard footprint

**Fig. 2. 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. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**



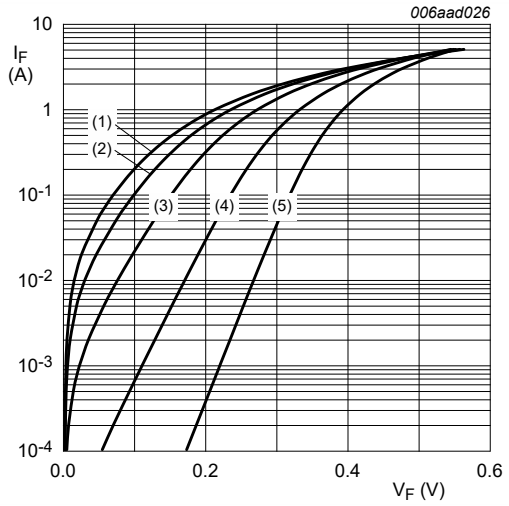

Ceramic PCB, $Al_2O_3$, standard footprint

**Fig. 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

## 10. Characteristics

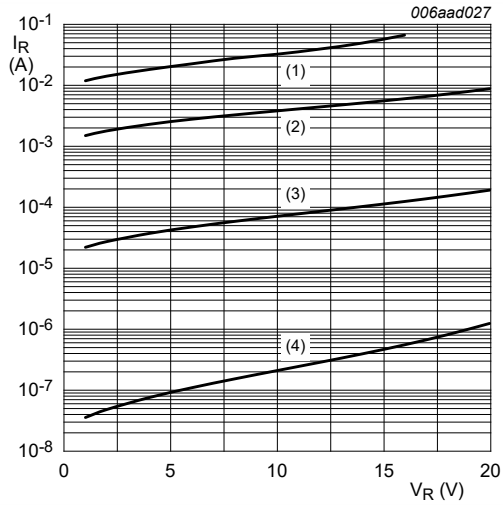
**Table 7. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 100 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_j$ = 25 °C | | - | 230 | 260 | mV |
| | | $I_F$ = 500 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_j$ = 25 °C | | - | 290 | 330 | mV |
| | | $I_F$ = 1 A; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_j$ = 25 °C | | - | 330 | 380 | mV |
| | | $I_F$ = 1.5 A; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_j$ = 25 °C | | - | 375 | 420 | mV |
| $I_R$ | reverse current | $V_R$ = 10 V; $T_j$ = 25 °C | | - | 70 | 350 | µA |
| | | $V_R$ = 20 V; $T_j$ = 25 °C | | - | 220 | 900 | µA |
| $C_d$ | diode capacitance | $V_R$ = 1 V; f = 1 MHz; $T_j$ = 25 °C | | - | 105 | 120 | pF |
| | | $V_R$ = 10 V; f = 1 MHz; $T_j$ = 25 °C | | - | 40 | 50 | pF |
| $t_{rr}$ | reverse recovery time | $I_F$ = 0.5 A; $I_R$ = 0.5 A; $I_{R(meas)}$ = 0.1 A; $T_j$ = 25 °C | | - | 5 | - | ns |
| $V_{FRM}$ | peak forward recovery voltage | $I_F$ = 0.5 A; $dI_F/dt$ = 20 A/µs; $T_j$ = 25 °C | | - | 320 | - | mV |



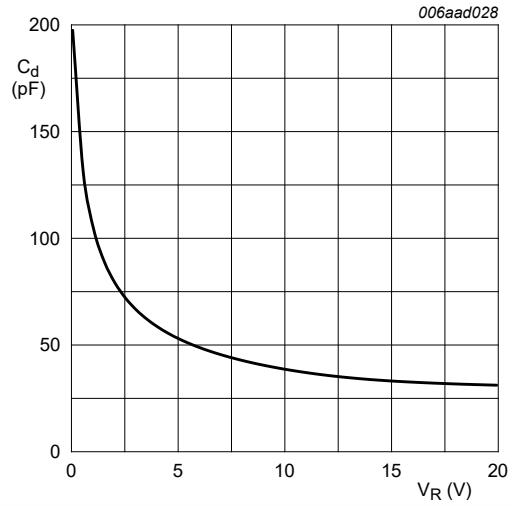

(1) $T_j$ = 150 °C
(2) $T_j$ = 125 °C
(3) $T_j$ = 85 °C
(4) $T_j$ = 25 °C
(5) $T_j$ = −40 °C

**Fig. 5. Forward current as a function of forward voltage; typical values**



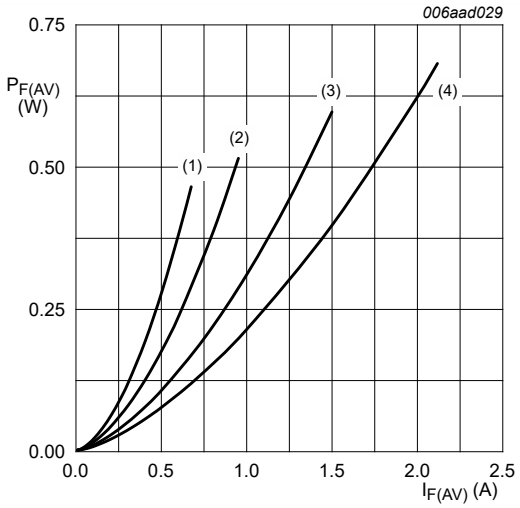

(1) $T_j$ = 125 °C
(2) $T_j$ = 85 °C
(3) $T_j$ = 25 °C
(4) $T_j$ = −40 °C

**Fig. 6. Reverse current as a function of reverse voltage; typical values**



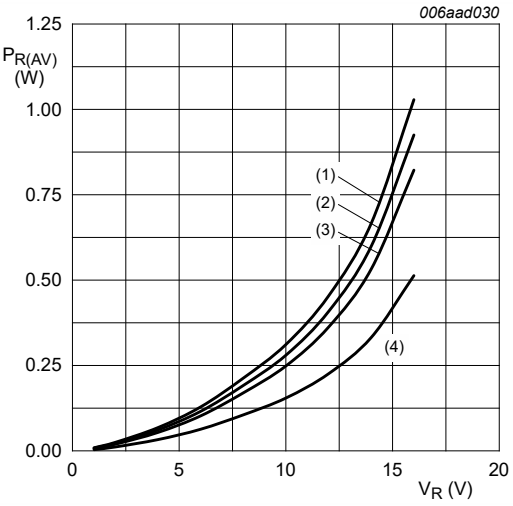

f = 1 MHz; $T_{amb}$ = 25 °C

**Fig. 7. Diode capacitance as a function of reverse voltage; typical values**



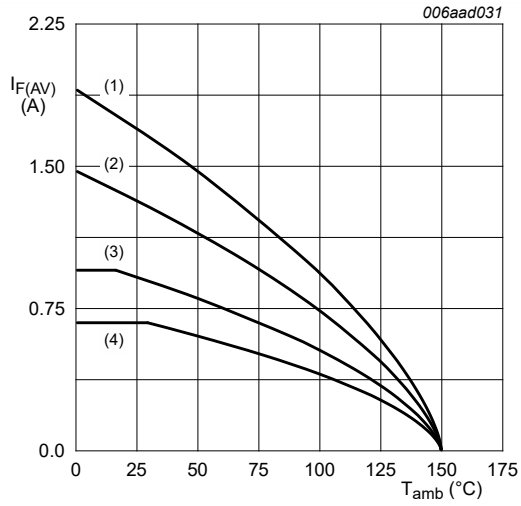

$T_j$ = 150 °C
(1) δ = 0.1
(2) δ = 0.2
(3) δ = 0.5
(4) δ = 1

**Fig. 8. Average forward power dissipation as a function of average forward current; typical values**



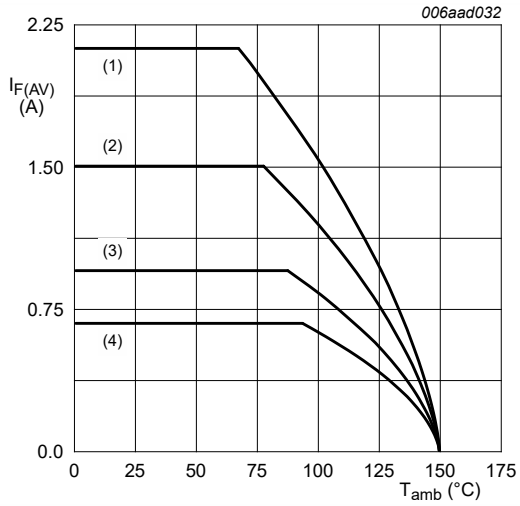

$T_j$ = 125 °C
(1) δ = 1
(2) δ = 0.9
(3) δ = 0.8
(4) δ = 0.5

**Fig. 9. Average reverse power dissipation as a function of reverse voltage; typical values**



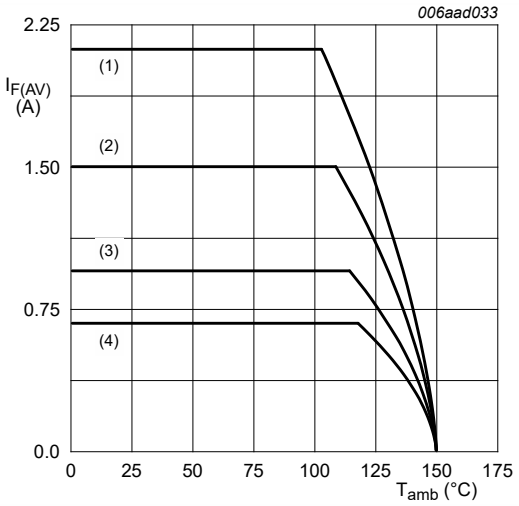

FR4 PCB, standard footprint
$T_j$ = 150 °C
(1) δ = 1 (DC)
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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



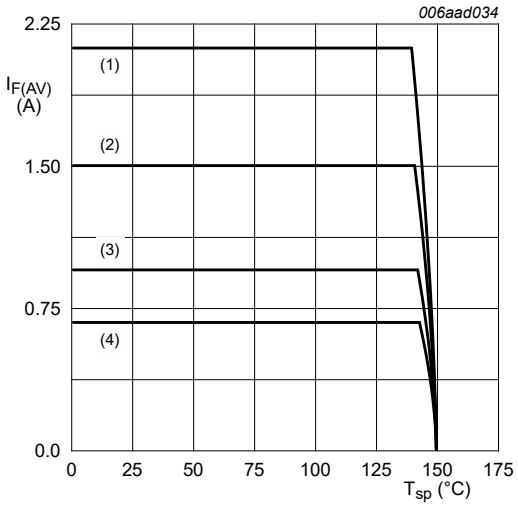

FR4 PCB, mounting pad for cathode 1 $cm^2$
$T_j$ = 150 °C
(1) δ = 1 (DC)
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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




Ceramic PCB, $Al_2O_3$, standard footprint
$T_j$ = 150 °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. 12. Average forward current as a function of ambient temperature; typical values**




$T_j$ = 150 °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. 13. Average forward current as a function of solder point temperature; typical values**

## 11. Test information

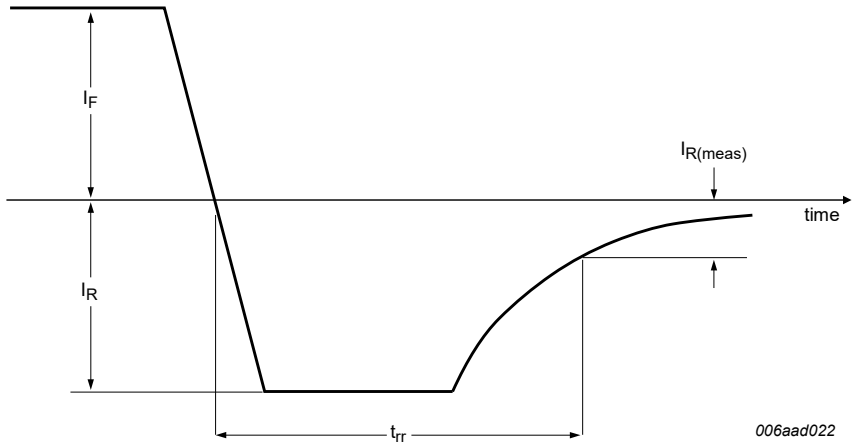



Fig. 14. Reverse recovery definition

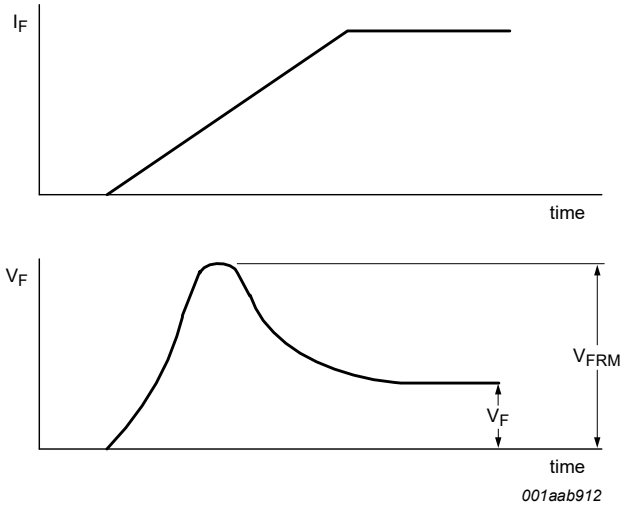



Fig. 15. Forward recovery definition

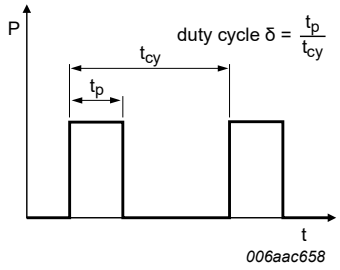



Fig. 16. Duty cycle definition

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.

### Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

## 12. Package outline

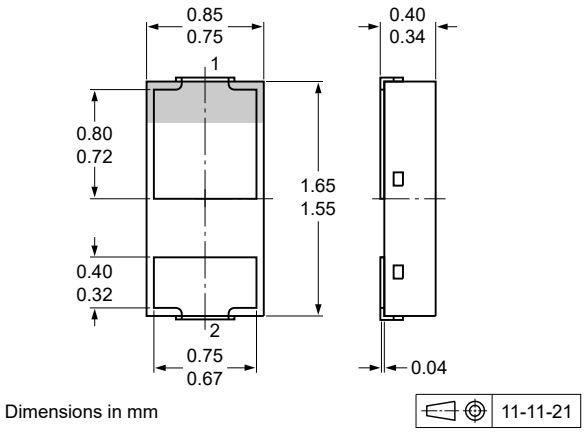



Fig. 17. Package outline DFN1608D-2 (SOD1608)

## 13. Soldering

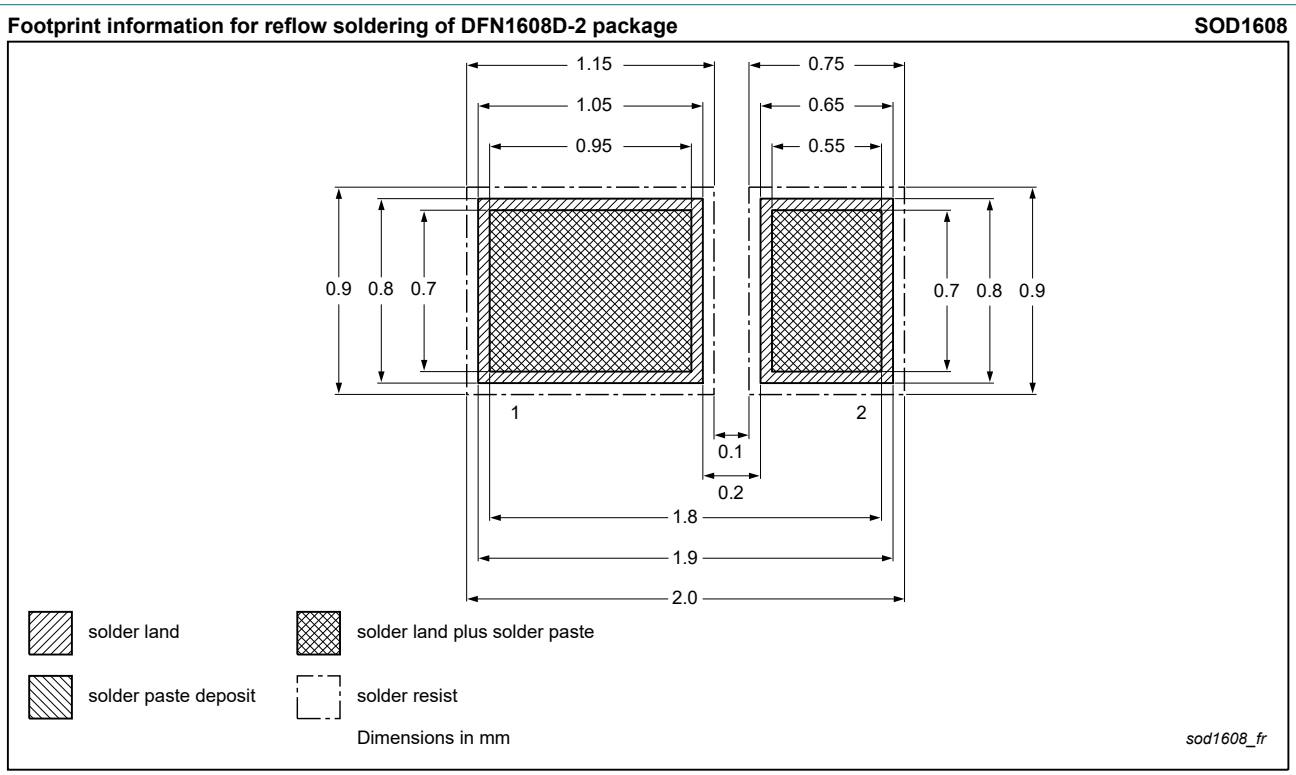



Fig. 18. Reflow soldering footprint for DFN1608D-2 (SOD1608)

# 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMEG2015EPK v.2 | 20230921 | Product data sheet | - | PMEG2015EPK v.1 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.<br>• Legal texts have been adapted to the new company name where appropriate. | | | |
| PMEG2015EPK v.1 | 20120306 | 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. |

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at https://www.nexperia.com.

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**Date of release: 21 September 2023**

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