# PMEG6030ETP

## High-temperature 60 V, 3 A 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: $I_{F(AV)} \leq 3$ A
- Reverse voltage: $V_R \leq 60$ 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
- Suitable for both reflow and wave soldering

## 3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- 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; $T_{sp} \leq$ 165 °C | | - | - | 3 | A |
| $V_R$ | reverse voltage | $T_j$ = 25 °C | | - | - | 60 | V |
| $V_F$ | forward voltage | $I_F$ = 3 A; $T_j$ = 25 °C | | - | 460 | 530 | mV |
| $I_R$ | reverse current | $V_R$ = 60 V; $t_p \leq$ 300 µs; δ ≤ 0.02; $T_j$ = 25 °C; pulsed | | - | 80 | 200 | µA |

## 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | K | cathode[1] |   CFP5 (SOD128) |   sym001 |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PMEG6030ETP | 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 |
|---|---|
| PMEG6030ETP | DA |

# 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 | | - | 60 | V |
| $I_F$ | forward current | $T_{sp}$ = 160 °C | | - | 4.2 | A |
| $I_{F(AV)}$ | average forward current | δ = 0.5; f = 20 kHz; square wave; $T_{amb}$ ≤ 80 °C | [1] | - | 3 | A |
| | | δ = 0.5; f = 20 kHz; square wave; $T_{sp}$ ≤ 165 °C | | - | 3 | A |
| $I_{FSM}$ | non-repetitive peak forward current | $t_p$ = 8.3 ms; half sine wave; $T_{j(init)}$ = 25 °C | | - | 50 | A |
| $P_{tot}$ | total power dissipation | $T_{amb}$ ≤ 25 °C | [2] | - | 750 | mW |
| | | | [3] | - | 1.25 | W |
| | | | [1] | - | 2.5 | W |
| $T_j$ | junction temperature | | | - | 175 | °C |
| $T_{amb}$ | ambient temperature | | | -55 | 175 | °C |
| $T_{stg}$ | storage temperature | | | -65 | 175 | °C |

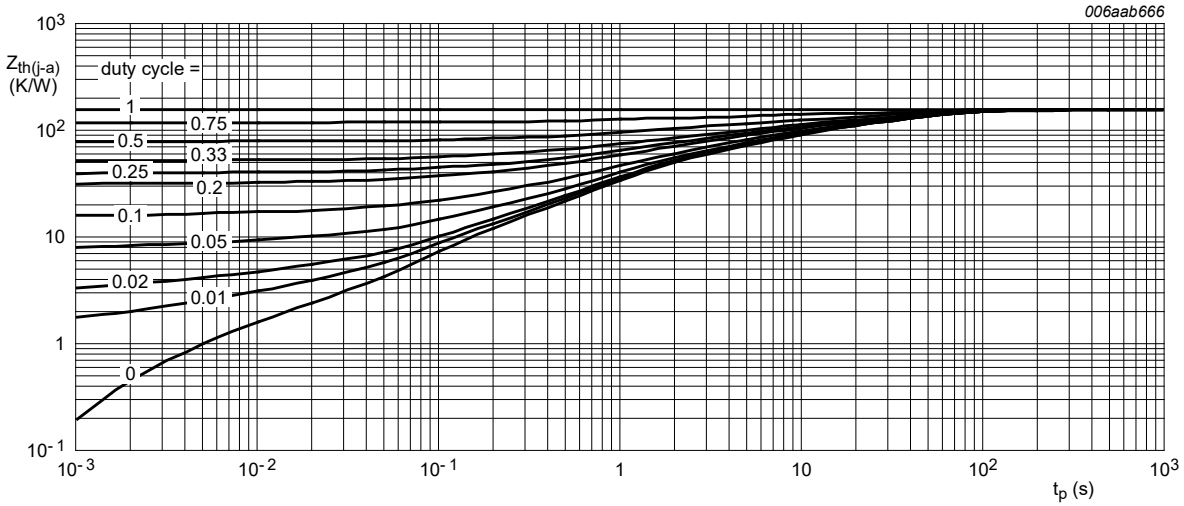
[1] Device mounted on a ceramic PCB, $Al_2O_3$, standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 $cm^2$.

# 9. Thermal characteristics

**Table 6. Thermal characteristics**

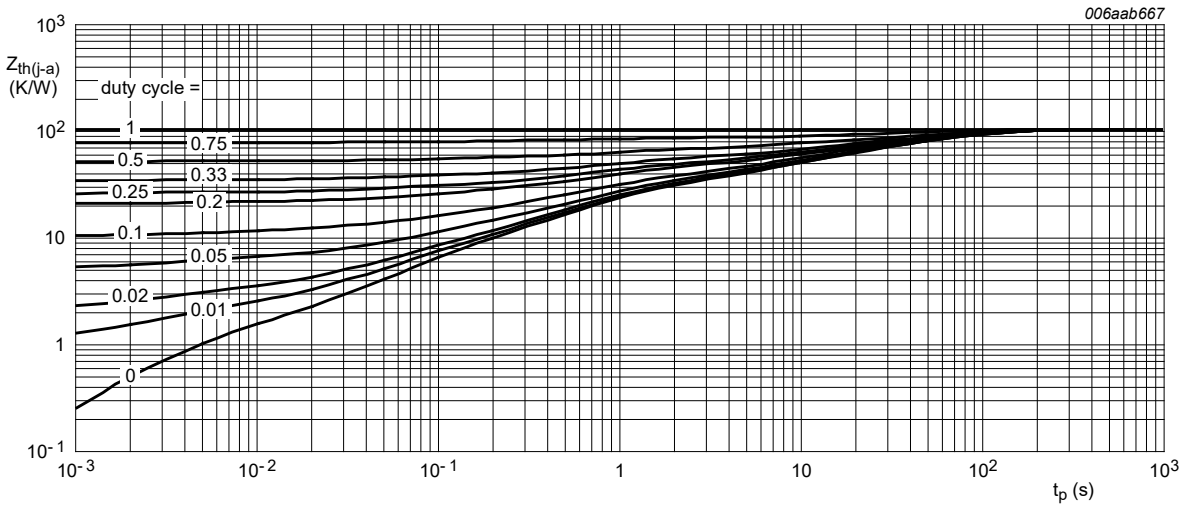
| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | in free air | [1] [2] | - | - | 200 | K/W |
| | | | [1] [3] | - | - | 120 | K/W |
| | | | [1] [4] | - | - | 60 | K/W |
| $R_{th(j-sp)}$ | thermal 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.



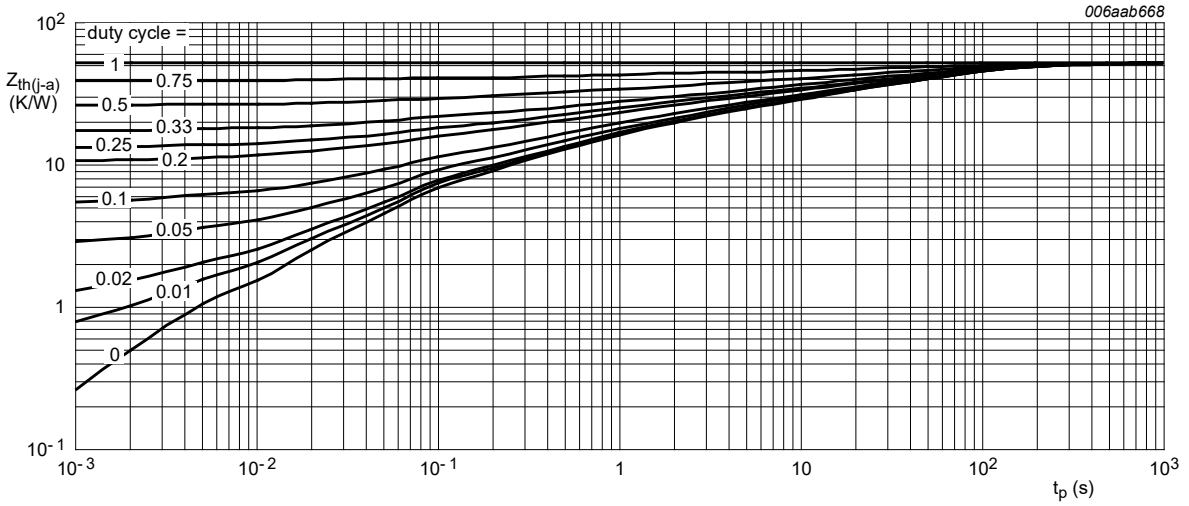

FR4 PCB, standard footprint

**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**



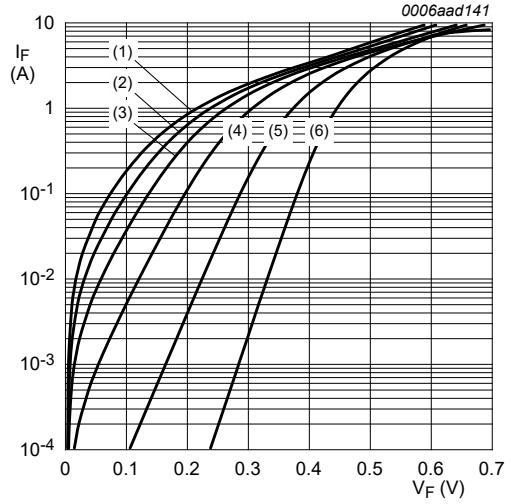

Ceramic PCB, $Al_2O_3$, standard footprint

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

## 10. Characteristics

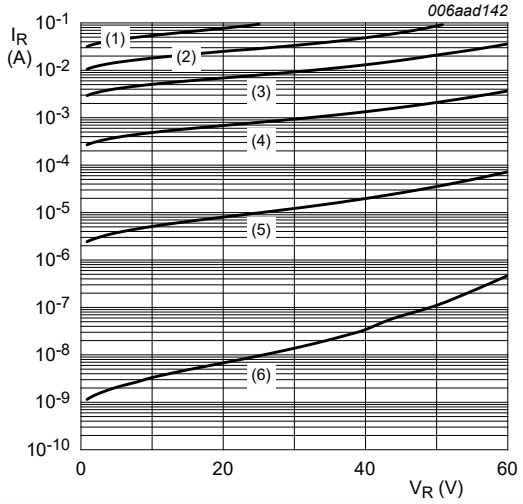
**Table 7. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_F$ | forward voltage | $I_F$ = 0.1 A; $T_j$ = 25 °C | | - | 290 | 330 | mV |
| | | $I_F$ = 0.5 A; $T_j$ = 25 °C | | - | 340 | 400 | mV |
| | | $I_F$ = 1 A; $T_j$ = 25 °C | | - | 380 | 440 | mV |
| | | $I_F$ = 1.5 A; $T_j$ = 25 °C | | - | 400 | 470 | mV |
| | | $I_F$ = 2 A; $T_j$ = 25 °C | | - | 430 | 500 | mV |
| | | $I_F$ = 3 A; $T_j$ = 25 °C | | - | 460 | 530 | mV |
| | | $I_F$ = 3 A; $T_j$ = -40 °C | | - | 510 | 590 | mV |
| | | $I_F$ = 3 A; $T_j$ = 125 °C | | - | 405 | 480 | mV |
| | | $I_F$ = 3 A; $T_j$ = 150 °C | | - | 390 | 460 | mV |
| | | $I_F$ = 3 A; $T_j$ = 175 °C | | - | 370 | 450 | mV |
| $I_R$ | reverse current | $V_R$ = 5 V; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_j$ = 25 °C; pulsed | | - | 4 | - | µA |
| | | $V_R$ = 10 V; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_j$ = 25 °C; pulsed | | - | 5 | - | µA |
| | | $V_R$ = 60 V; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_j$ = 25 °C; pulsed | | - | 80 | 200 | µA |
| | | $V_R$ = 60 V; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_j$ = -40 °C; pulsed | | - | 0.5 | 10 | µA |
| | | $V_R$ = 60 V; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; $T_j$ = 125 °C; pulsed | | - | 45 | 150 | mA |
| $C_d$ | diode capacitance | $V_R$ = 1 V; f = 1 MHz; $T_j$ = 25 °C | | - | 360 | - | pF |
| | | $V_R$ = 10 V; f = 1 MHz; $T_j$ = 25 °C | | - | 120 | - | 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 | | - | 12 | - | ns |
| $V_{FRM}$ | peak forward recovery voltage | $I_F$ = 1 A; $dI_F/dt$ = 40 A/µs; $T_j$ = 25 °C | | - | 425 | - | mV |



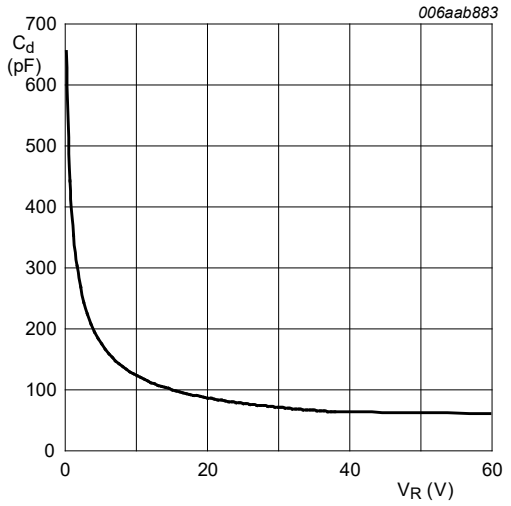

(1) $T_j$ = 175 °C
(2) $T_j$ = 150 °C
(3) $T_j$ = 125 °C
(4) $T_j$ = 85 °C
(5) $T_j$ = 25 °C
(6) $T_j$ = −40 °C

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



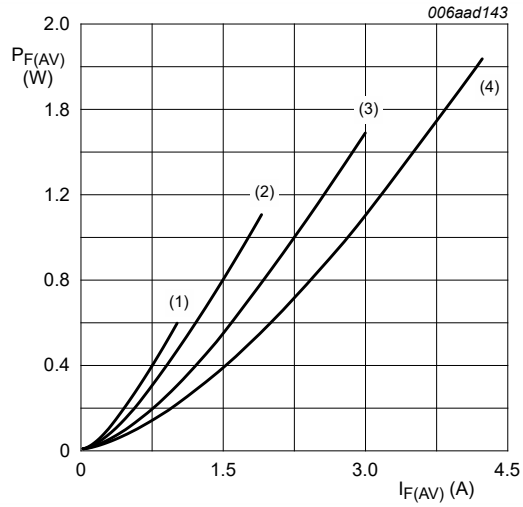

(1) $T_j$ = 175 °C
(2) $T_j$ = 150 °C
(3) $T_j$ = 125 °C
(4) $T_j$ = 85 °C
(5) $T_j$ = 25 °C
(6) $T_j$ = −40 °C

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



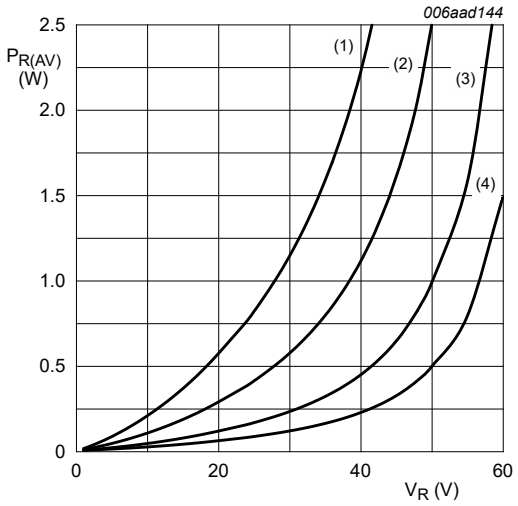

f = 1 MHz; $T_{amb}$ = 25 °C

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



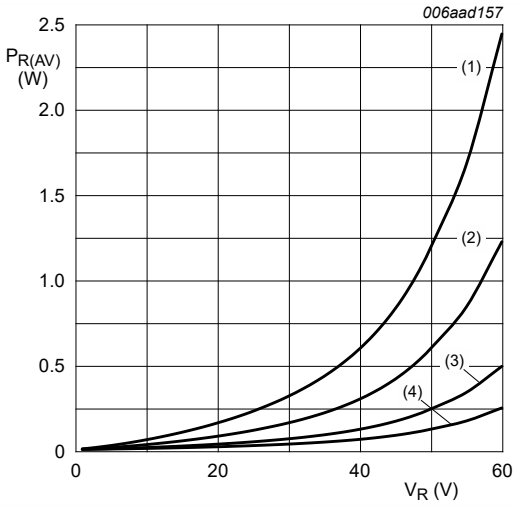

$T_j$ = 175 °C
(1) δ = 0.1
(2) δ = 0.2
(3) δ = 0.5
(4) δ = 1

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



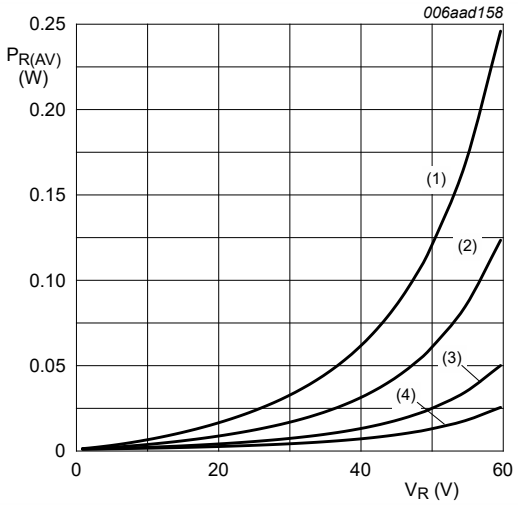

$T_j$ = 150 °C
(1) δ = 1
(2) δ = 0.5
(3) δ = 0.2
(4) δ = 0.1

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



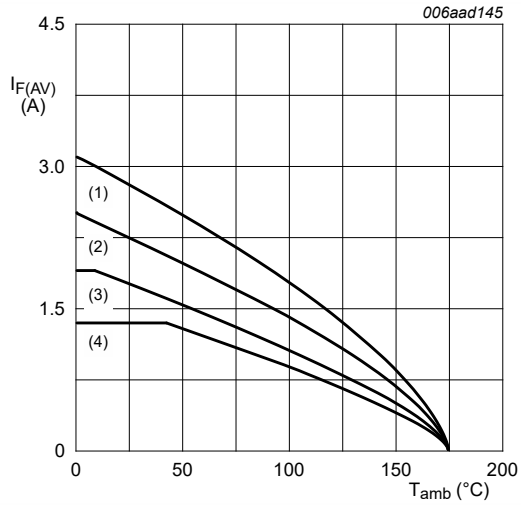

$T_j$ = 125 °C
(1) δ = 1
(2) δ = 0.5
(3) δ = 0.2
(4) δ = 0.1

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



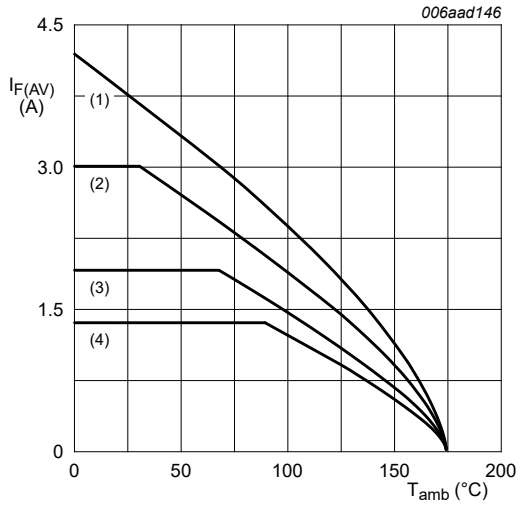

$T_j$ = 85 °C
(1) δ = 1
(2) δ = 0.5
(3) δ = 0.2
(4) δ = 0.1

**Fig. 10. Average reverse power dissipation as a function of reverse voltage; typical values**



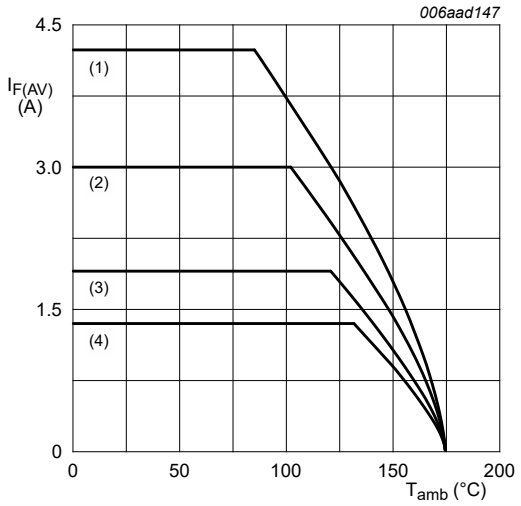

FR4 PCB, standard footprint
$T_j$ = 175 °C
(1) δ = 1 (DC)
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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



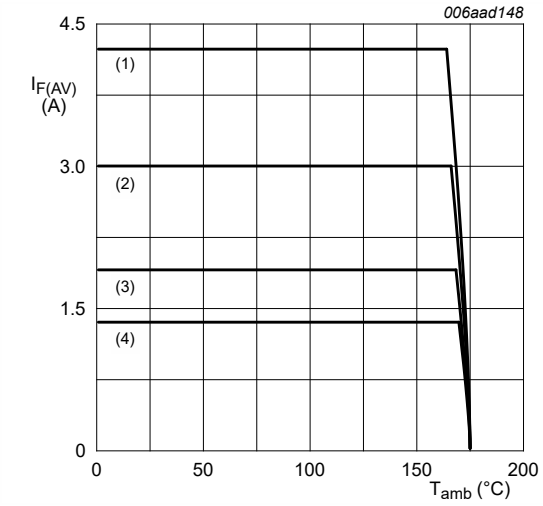

FR4 PCB, mounting pad for cathode 1 $cm^2$
$T_j$ = 175 °C
(1) δ = 1 (DC)
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

**Fig. 12. Average forward current as a function of ambient temperature; typical values**




Ceramic PCB, $Al_2O_3$, 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. 13. 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. 14. Average forward current as a function of solder point temperature; typical values**

## 11. Test information

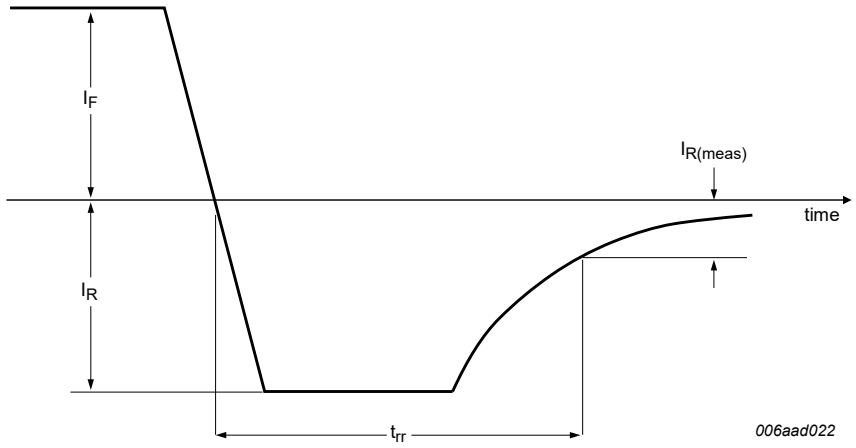



Fig. 15. Reverse recovery definition

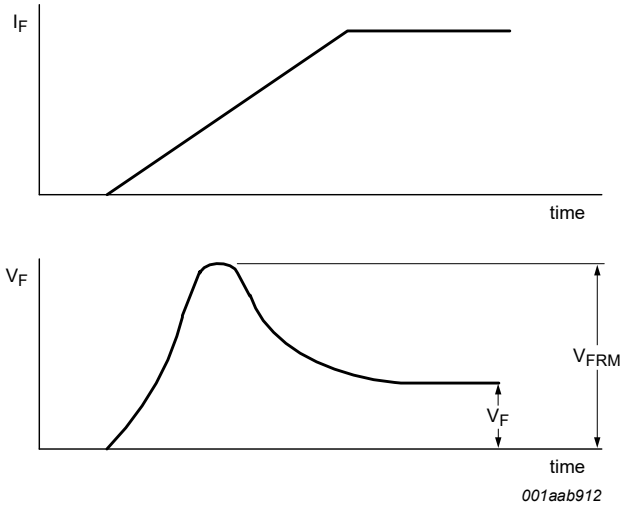



Fig. 16. Forward recovery definition

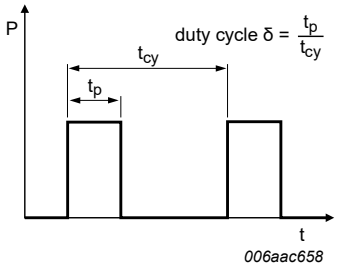



Fig. 17. Duty cycle definition

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

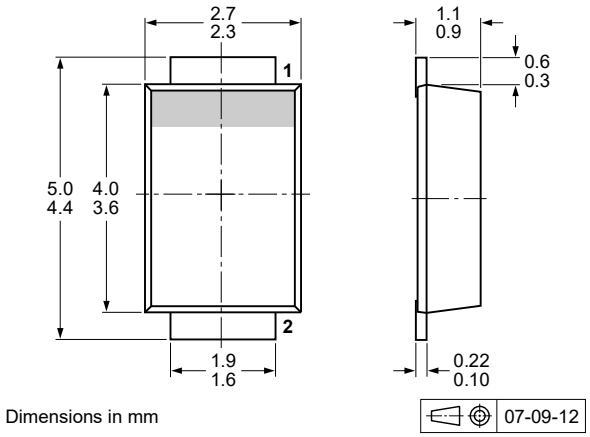



**Fig. 18. Package outline CFP5 (SOD128)**

## 13. Soldering

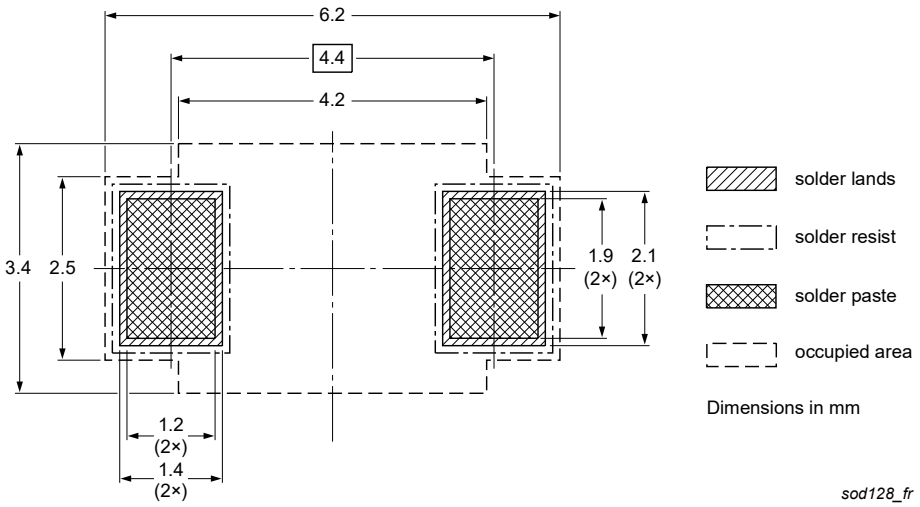
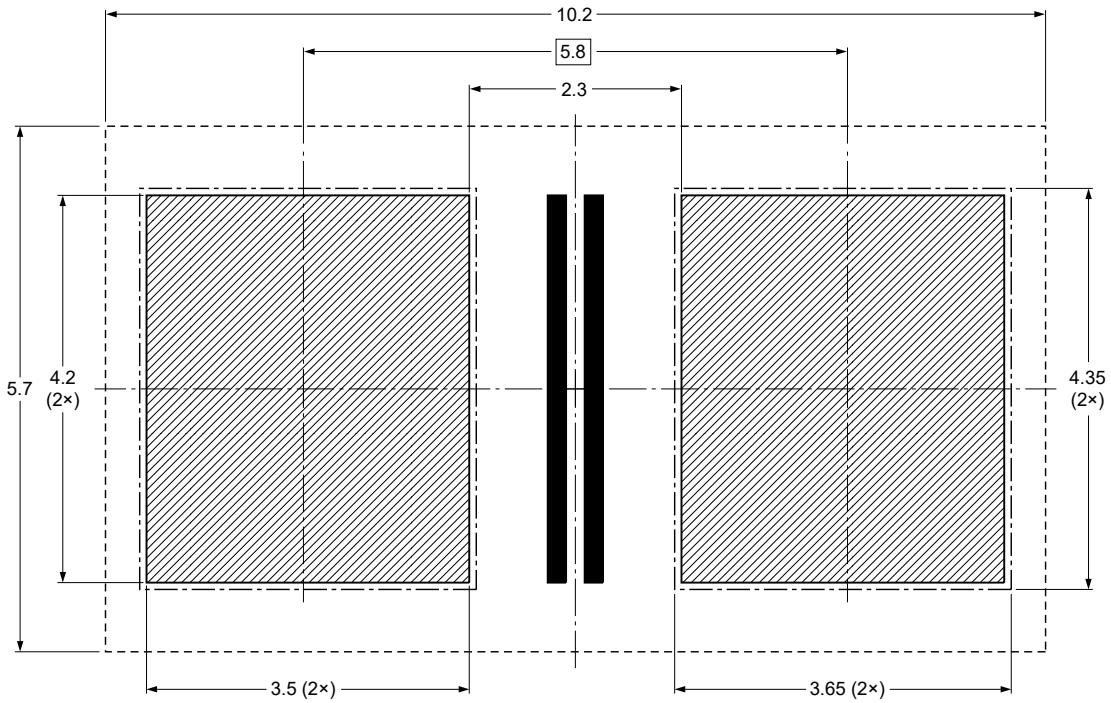



**Fig. 19. Reflow soldering footprint for CFP5 (SOD128)**

**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. 20. Wave soldering footprint for CFP5 (SOD128)**

# 14. Revision history

**Table 8. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PMEG6030ETP v.4 | 20230220 | Product data sheet | - | PMEG6030ETP v.3 |
| Modifications: | • Limiting values: Measurement conditions for $I_{FSM}$ changed from square wave to half-sine wave. | | | |
| PMEG6030ETP v.3 | 20230101 | Product data sheet | - | PMEG6030ETP v.2 |
| PMEG6030ETP v.2 | 20180822 | Product data sheet | - | PMEG6030ETP v.1 |
| PMEG6030ETP v.1 | 20121015 | 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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