



# PMEG3020EXD-Q

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
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 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	$\delta = 0.5$ ; $f = 20$ kHz; square wave; $T_{sp} \leq 167$ °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]		
2	A	anode		

[1] The marking bar indicates the cathode.

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## 6. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
PMEG3020EXD-Q	CFP2-HP	SOD323HP: plastic surface-mounted package with solderable lead ends; 2.2 mm x 1.3 mm x 0.68 mm body	<a href="#">SOD323HP</a>

## 7. Marking

**Table 4. Marking codes**

Type number	Marking code
PMEG3020EXD-Q	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	$T_j = 25 \text{ }^\circ\text{C}$		-	30	V
$I_F$	forward current	$\delta = 1; T_{sp} \leq 166 \text{ }^\circ\text{C}$		-	2.8	A
$I_{F(AV)}$	average forward current	$\delta = 0.5; f = 20 \text{ kHz}; \text{square wave}; T_{sp} \leq 167 \text{ }^\circ\text{C}$		-	2	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8.3 \text{ ms}; \text{half sine wave}; T_{j(\text{init})} = 25 \text{ }^\circ\text{C}$		-	25	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$	[1]	-	0.65	W
			[2]	-	1.2	W
$T_j$	junction temperature			-	175	$^\circ\text{C}$
$T_{amb}$	ambient temperature			-55	175	$^\circ\text{C}$
$T_{stg}$	storage temperature			-65	175	$^\circ\text{C}$

[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  $\text{cm}^2$ .

## 9. Thermal characteristics

Table 6. Thermal characteristics

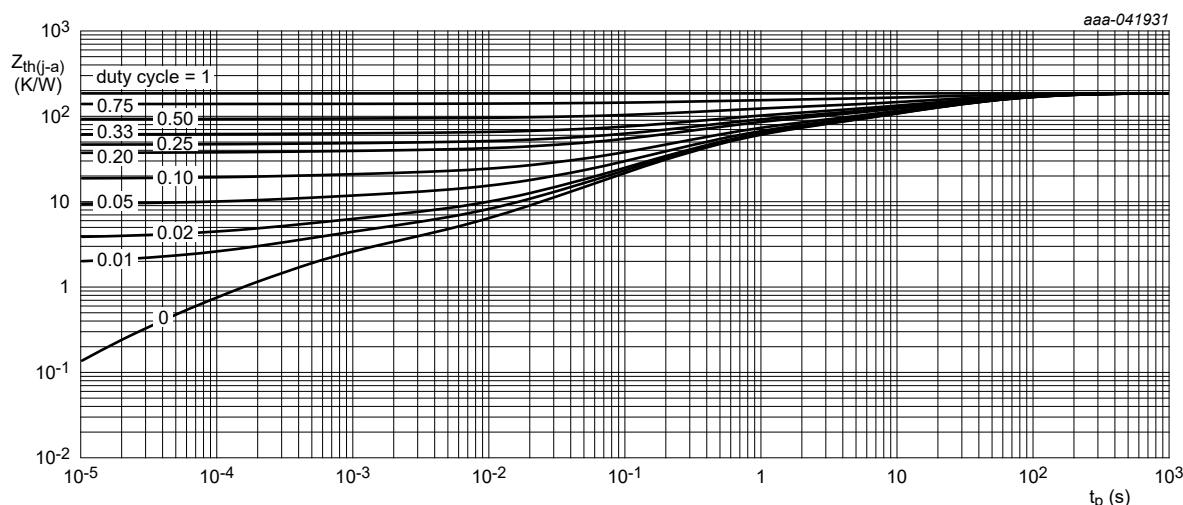
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	230	K/W
			[1] [3]	-	-	125	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	6	K/W

[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.

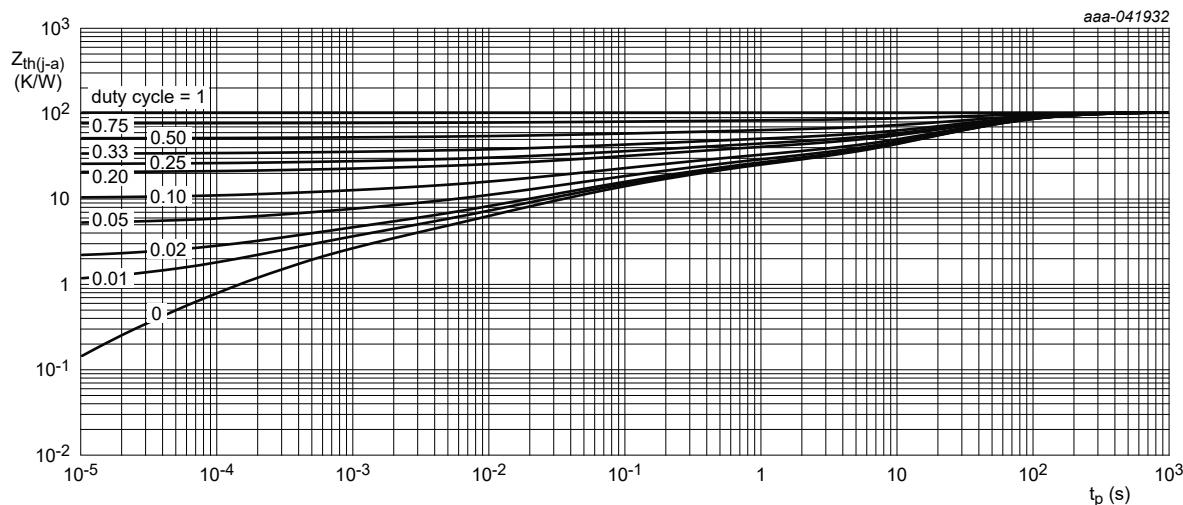
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1 \text{ cm}^2$ .

[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  $1 \text{ cm}^2$

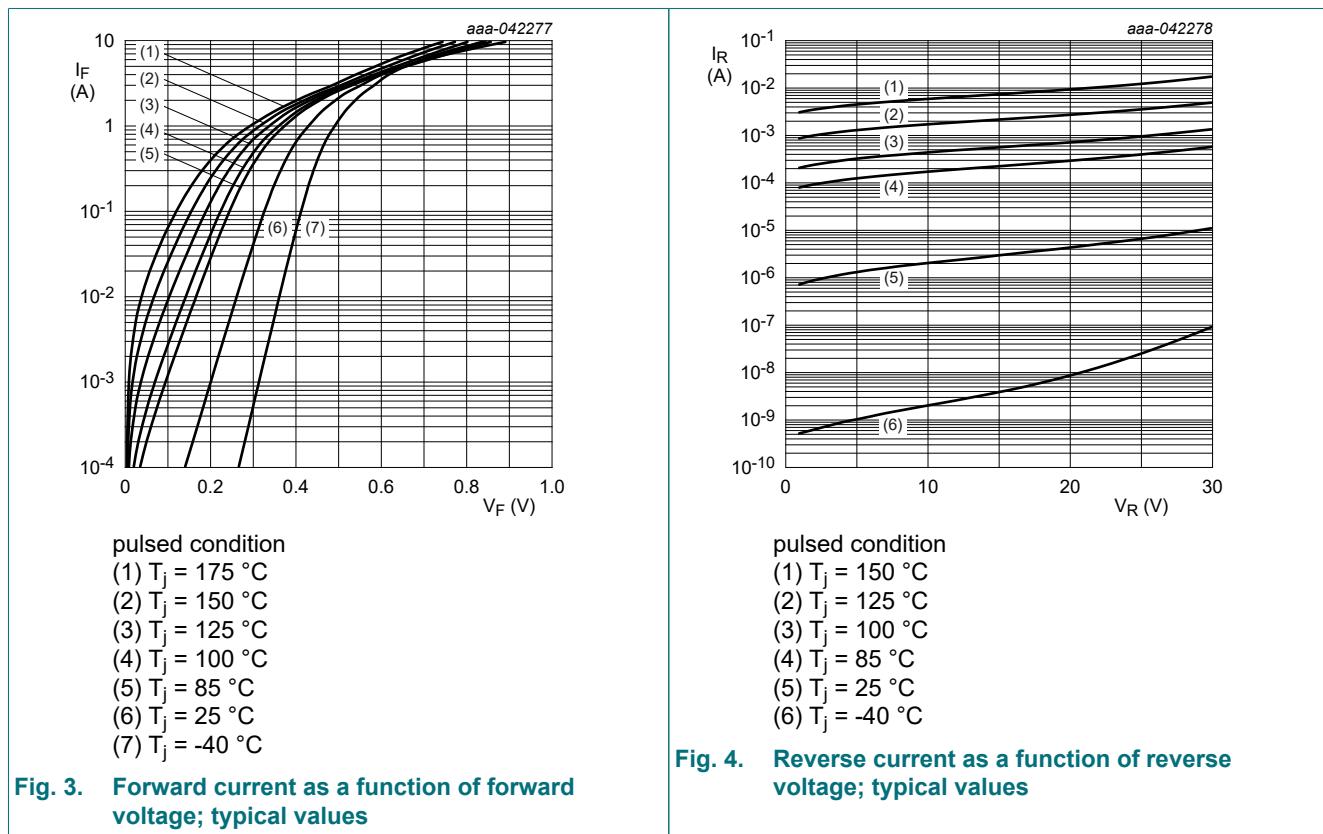
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

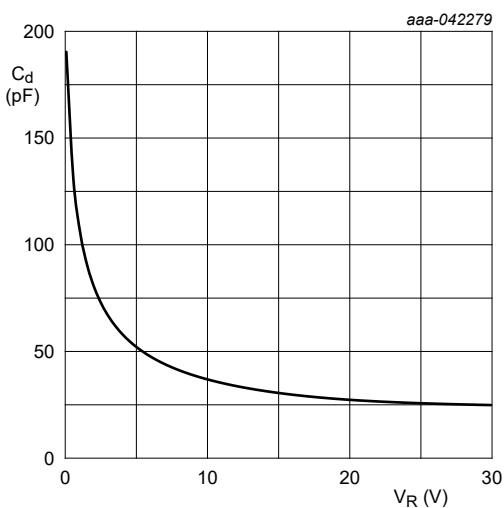
## 10. Characteristics

Table 7. Characteristics

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

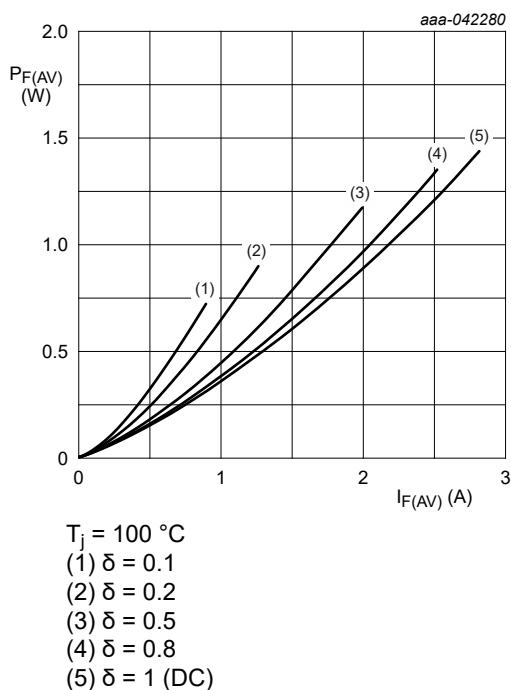
[1] Very short pulse, in order to maintain a stable junction temperature.



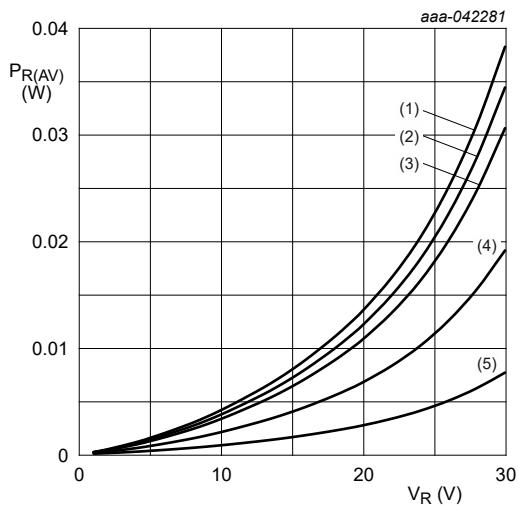


$f = 1$  MHz;  $T_{amb} = 25$  °C

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

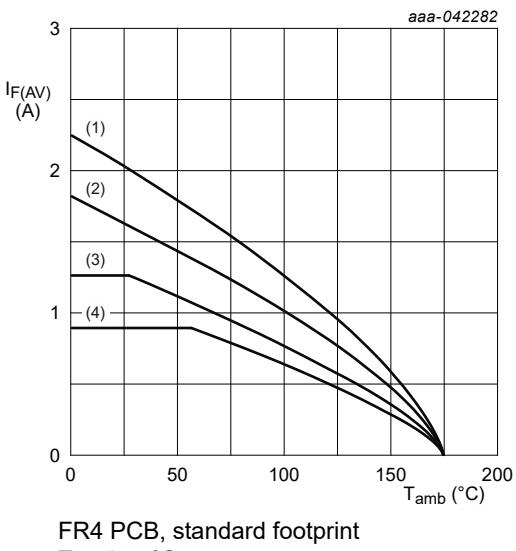


**Fig. 6. Average forward power dissipation as a function of average forward current; typical values**



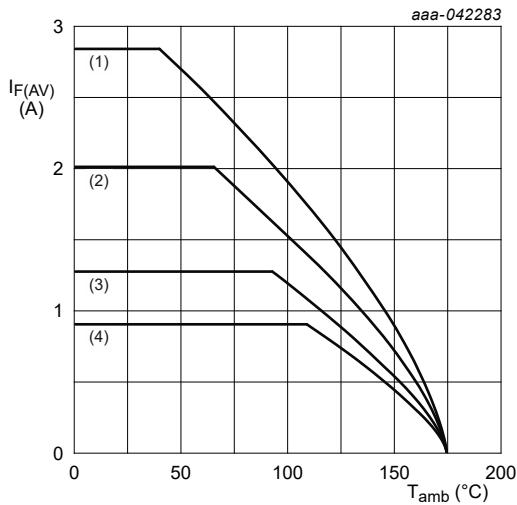
$T_j = 100$  °C  
(1)  $\delta = 1$   
(2)  $\delta = 0.9$   
(3)  $\delta = 0.8$   
(4)  $\delta = 0.5$   
(5)  $\delta = 0.2$

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



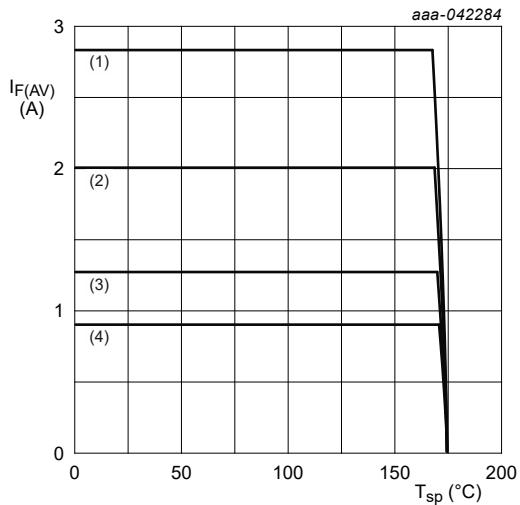
FR4 PCB, standard footprint  
 $T_j = 175$  °C  
(1)  $\delta = 1$  (DC)  
(2)  $\delta = 0.5$ ;  $f = 20$  kHz  
(3)  $\delta = 0.2$ ;  $f = 20$  kHz  
(4)  $\delta = 0.1$ ;  $f = 20$  kHz

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



FR4 PCB, mounting pad for cathode 1 cm<sup>2</sup>  
 $T_j = 175$  °C  
(1)  $\delta = 1$  (DC)  
(2)  $\delta = 0.5$ ;  $f = 20$  kHz  
(3)  $\delta = 0.2$ ;  $f = 20$  kHz  
(4)  $\delta = 0.1$ ;  $f = 20$  kHz

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



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

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

## 11. Test information

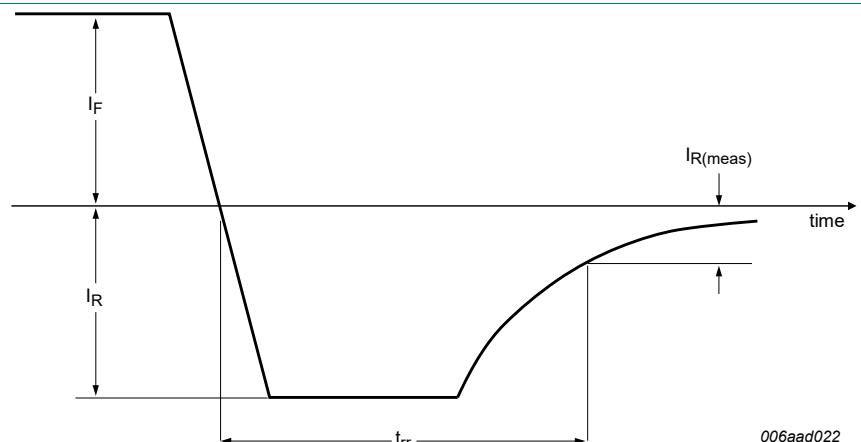


Fig. 11. Reverse recovery definition; step recovery

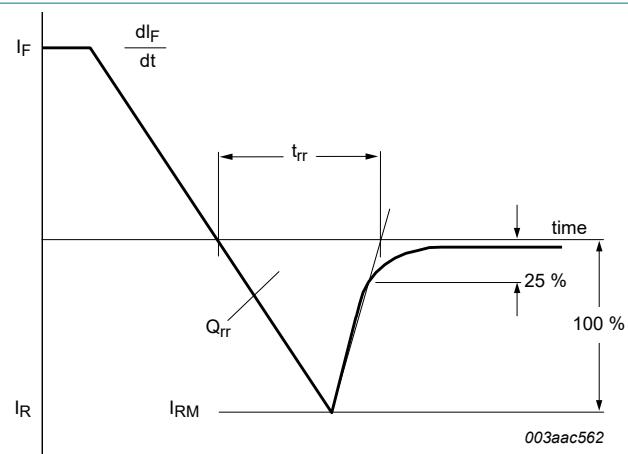


Fig. 12. Reverse recovery definition; ramp recovery

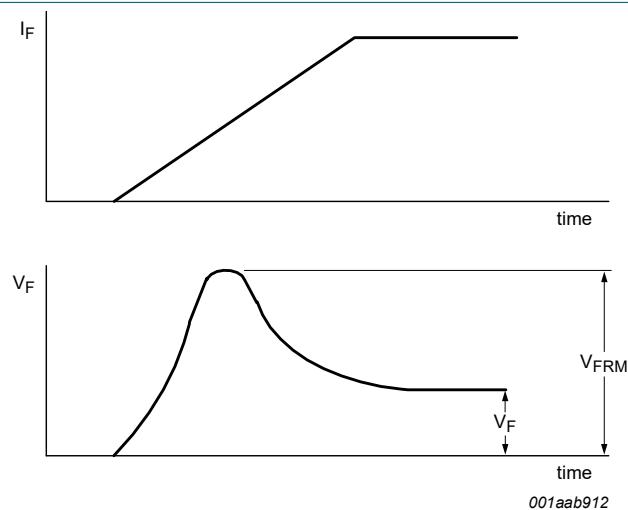


Fig. 13. Forward recovery definition

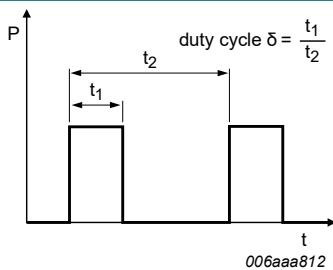


Fig. 14. Duty cycle definition

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

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

$$I_{RMS} = I_{F(AV)} \text{ at DC, and } I_{RMS} = I_M \times \sqrt{\delta}$$

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

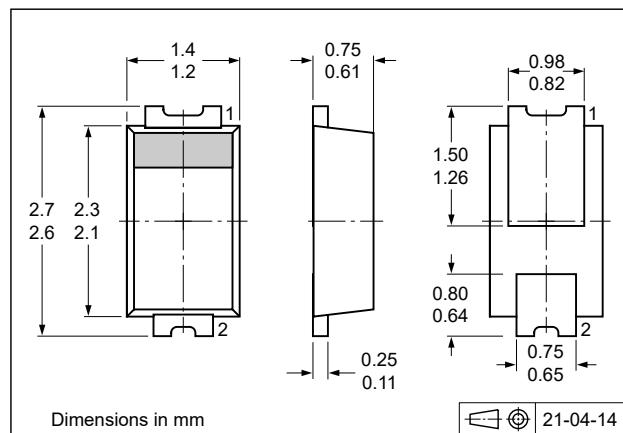
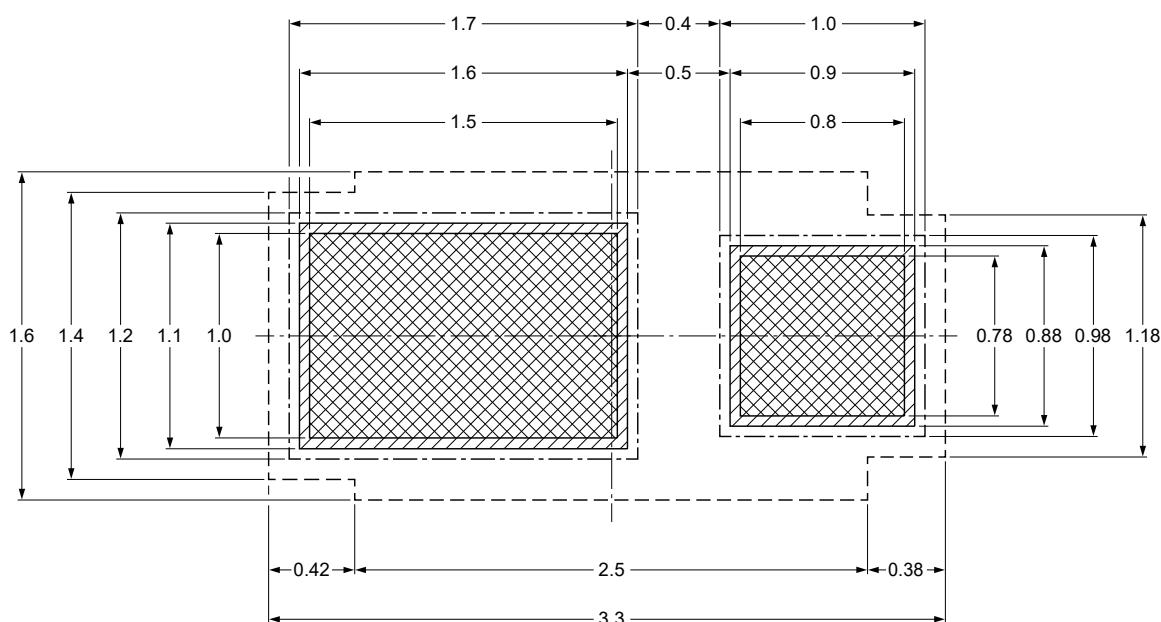


Fig. 15. Package outline CFP2-HP (SOD323HP)

## 13. Soldering

Footprint information for reflow soldering of SOD323HP

SOD323HP



recommended stencil thickness: 0.1 mm

occupied area

solder resist

solder land

solder paste

Dimensions in mm

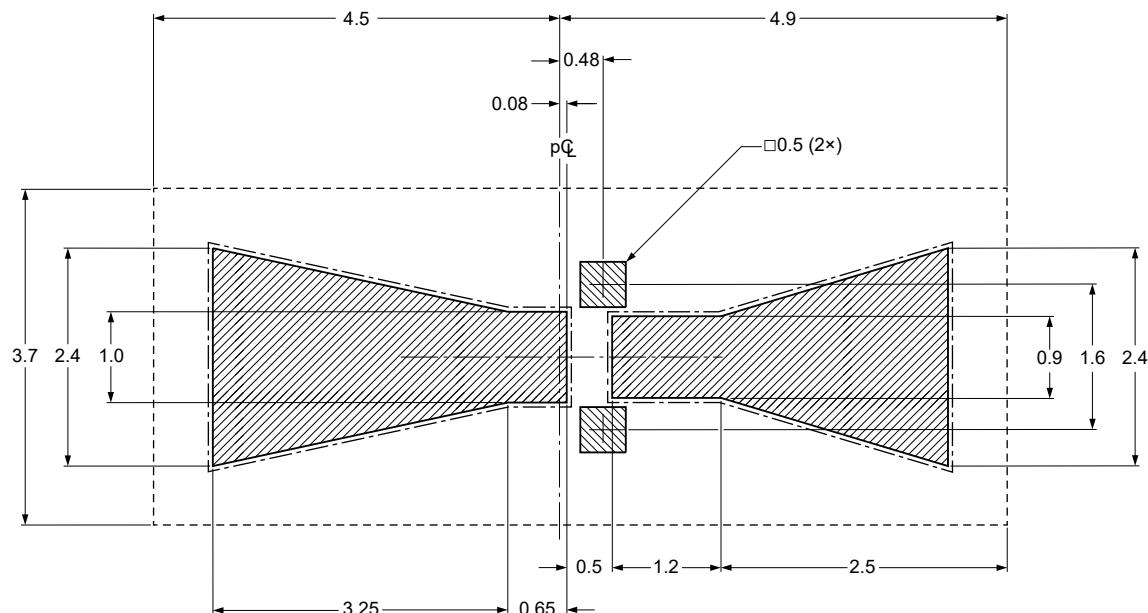
Issue date 21-04-02

sod323hp\_fr

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

## Wave soldering footprint information for CFP2-HP package

SOD323HP



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-Q v.1	20250121	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".
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