



# PMEG3002EEF

30 V, 0.2 A low VF MEGA Schottky barrier rectifier

6 December 2018

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 DFN0603-2 (SOD972E) leadless ultra small Surface-Mounted Device (SMD) package.

## 2. Features and benefits

- Average forward current  $I_{F(AV)} \leq 0.2$  A
- Reverse voltage  $V_R \leq 30$  V
- Low forward voltage
- Low leakage current
- Ultra small and leadless SMD package
- Package height typ. 0.25 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

## 4. Quick reference data

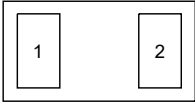

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20$ kHz; $T_{sp} \leq 146$ °C; square wave	-	-	0.2	A
$V_R$	reverse voltage	$T_j = 25$ °C	-	-	30	V
$V_F$	forward voltage	$I_F = 200$ mA; $T_j = 25$ °C; pulsed	-	450	520	mV
$I_R$	reverse current	$V_R = 30$ V; $T_j = 25$ °C; pulsed	[1]	2.1	15	$\mu$ A

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

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 <p>Transparent top view DFN0603-2 (SOD972E)</p>	 <i>sym001</i>
2	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG3002EEF	DFN0603-2	plastic, ultra small and leadless full encapsulated package; 2 terminals; 0.4 mm pitch; 0.63 mm x 0.33 mm x 0.25 mm body	SOD972E

## 7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG3002EEF	K

## 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	$T_j = 25\text{ °C}$		-	30	V
$I_F$	forward current	$\delta = 1$ ; $T_{sp} \leq 145\text{ °C}$ ; $f = 20\text{ kHz}$ ; square wave		-	0.28	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20\text{ kHz}$ ; $T_{amb} \leq 126\text{ °C}$ ; square wave		-	0.2	A
		$\delta = 0.5$ ; $f = 20\text{ kHz}$ ; $T_{sp} \leq 146\text{ °C}$ ; square wave		-	0.2	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1\text{ ms}$ ; $\delta \leq 0.25$		-	2.5	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8.3\text{ ms}$ ; square wave; $T_{j(init)} = 25\text{ °C}$		-	4.5	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1]	-	370	mW
			[2]	-	570	mW
$T_j$	junction temperature			-	150	°C
$T_{amb}$	ambient temperature			-55	150	°C
$T_{stg}$	storage temperature			-55	150	°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  $1\text{ cm}^2$  each.

## 9. Thermal characteristics

**Table 6. Thermal characteristics**

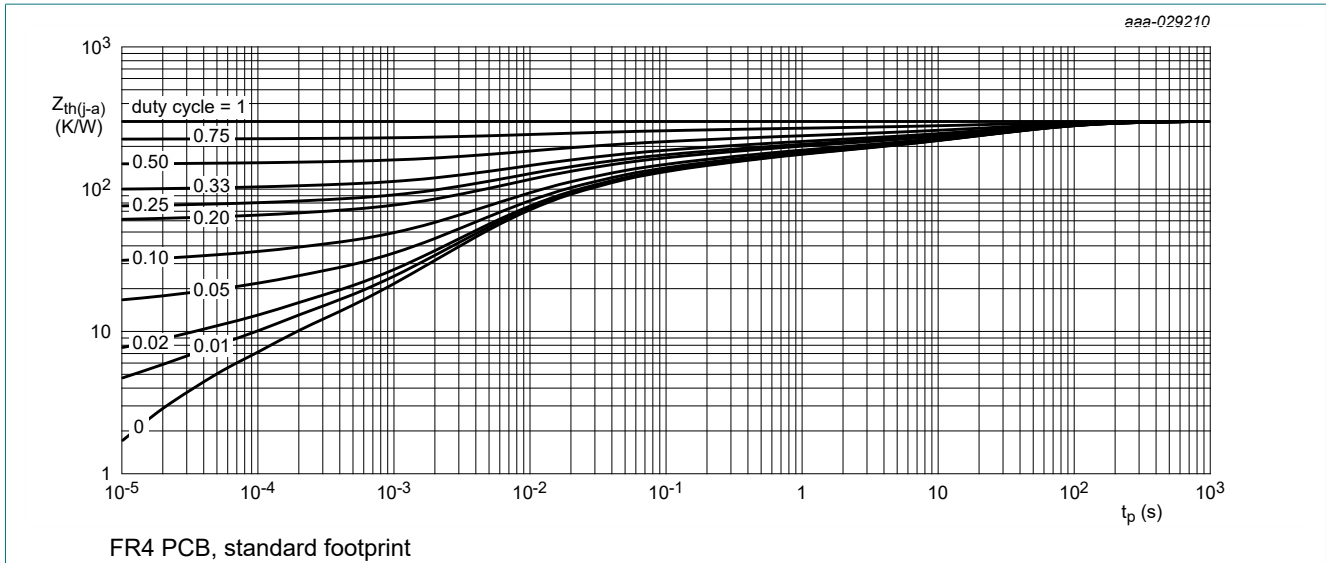
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	340	K/W
			[1] [3]	-	-	220	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	35	K/W

[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.

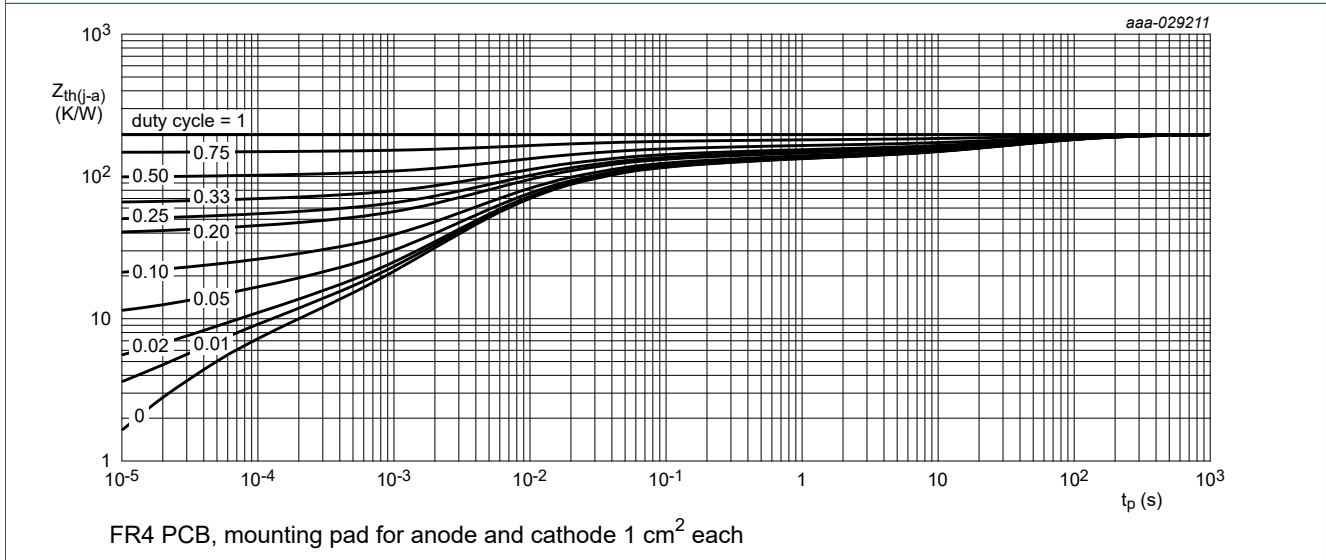
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

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

[4] Soldering point of anode tab.



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



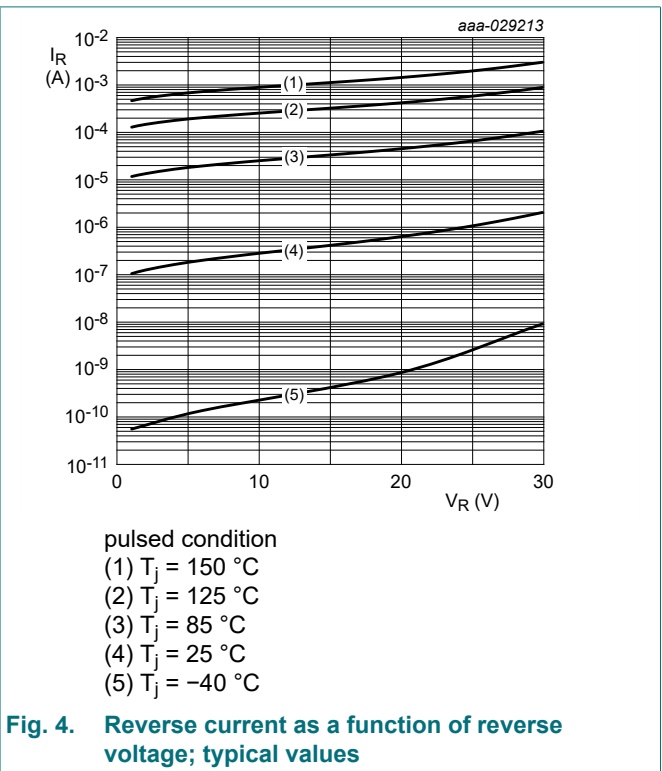
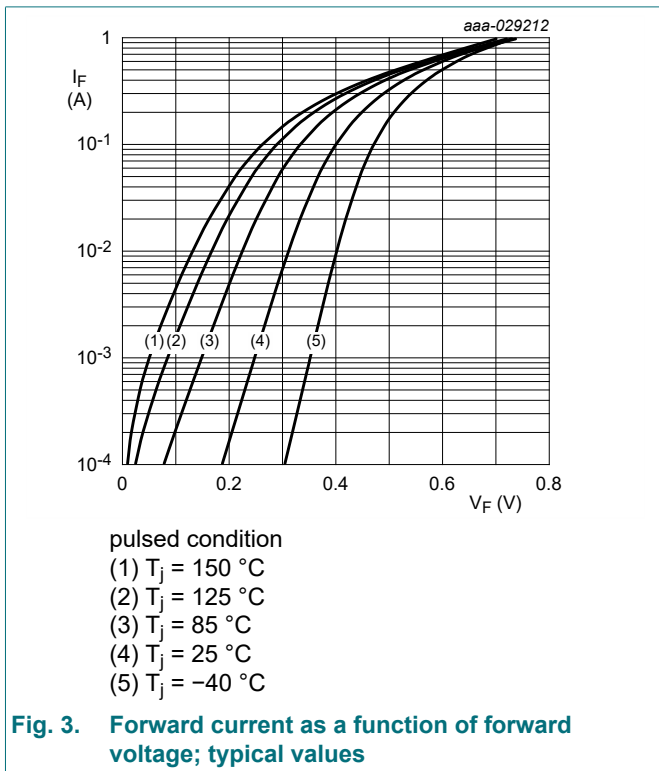
**Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values**

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 0.1 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	30	-	V
$V_F$	forward voltage	$I_F = 1 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	-	250	290	mV
		$I_F = 10 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	-	310	360	mV
		$I_F = 100 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	-	400	470	mV
		$I_F = 200 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	-	450	520	mV
$I_R$	reverse current	$V_R = 10 \text{ V}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	0.3	3	$\mu\text{A}$
		$V_R = 30 \text{ V}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	2.1	15	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	17	-	pF
		$V_R = 10 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	7	-	pF
$t_{rr}$	reverse recovery time	$I_F = 500 \text{ mA}$ ; $I_R = 500 \text{ mA}$ ; $I_{R(\text{meas})} = 100 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$	-	2	-	ns

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



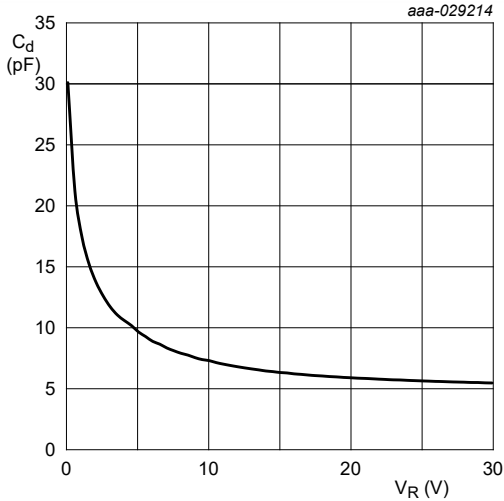


Fig. 5. Diode capacitance as a function of reverse voltage; typical values

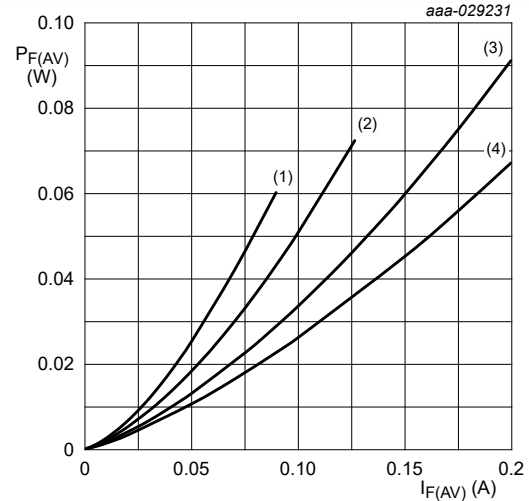


Fig. 6. Average forward power dissipation as a function of average forward current; typical values

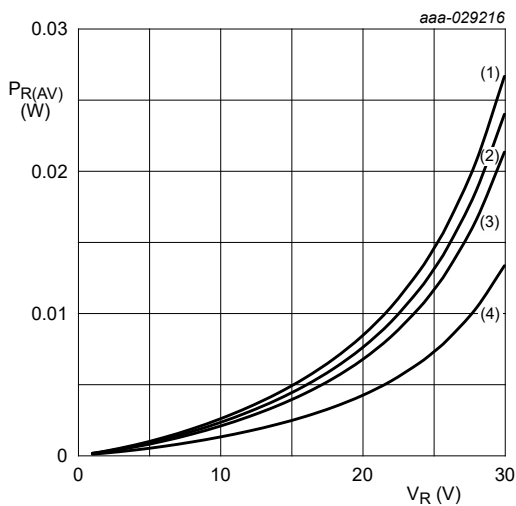


Fig. 7. Average reverse power dissipation as a function of reverse voltage; typical values

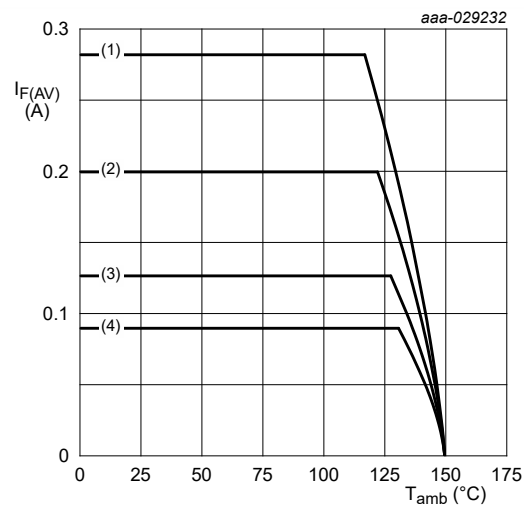
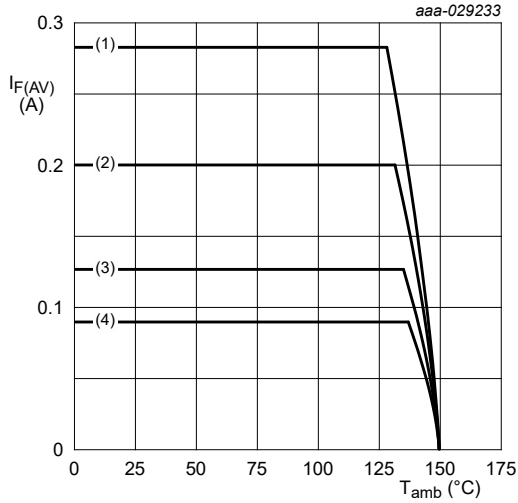
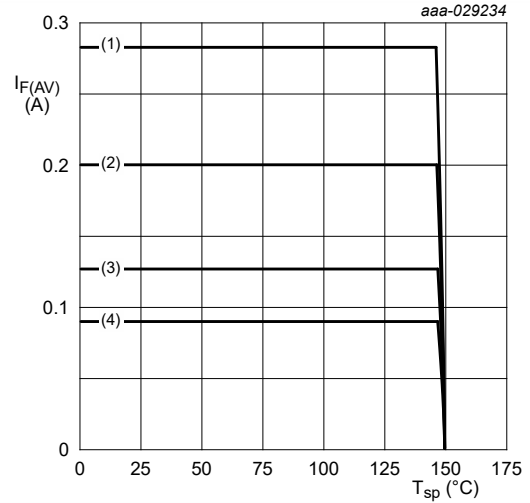


Fig. 8. Average forward current as a function of ambient temperature; typical values



FR4 PCB, mounting pad for anode and cathode 1 cm<sup>2</sup> each  
 $T_j = 150$  °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



$T_j = 150$  °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

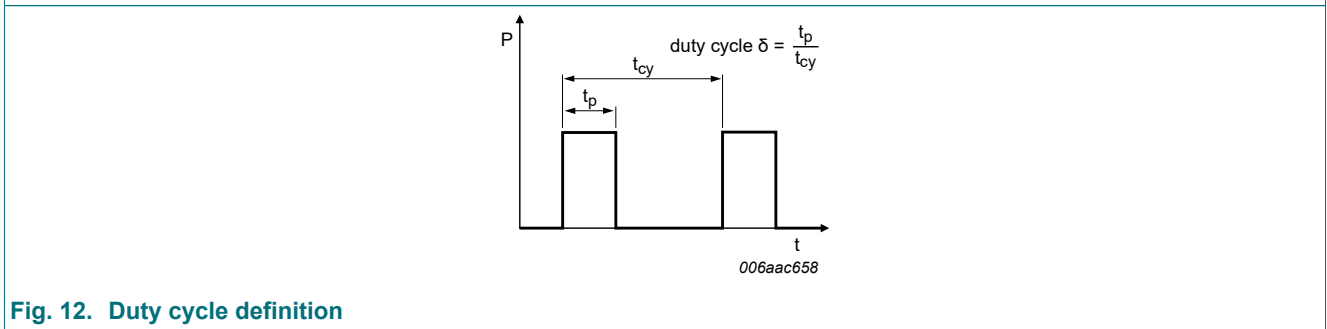


Fig. 12. Duty cycle definition

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

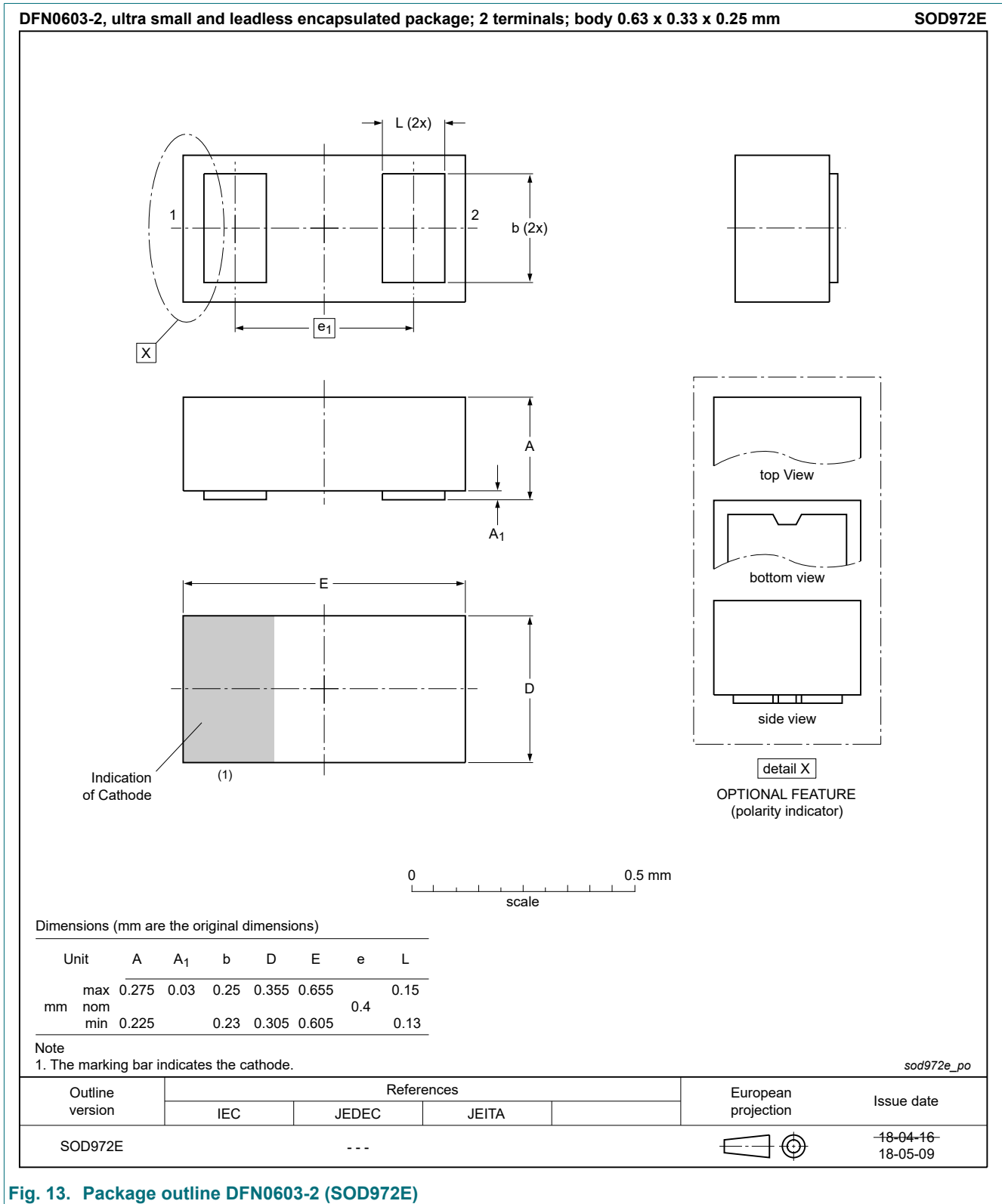


Fig. 13. Package outline DFN0603-2 (SOD972E)

### 13. Soldering

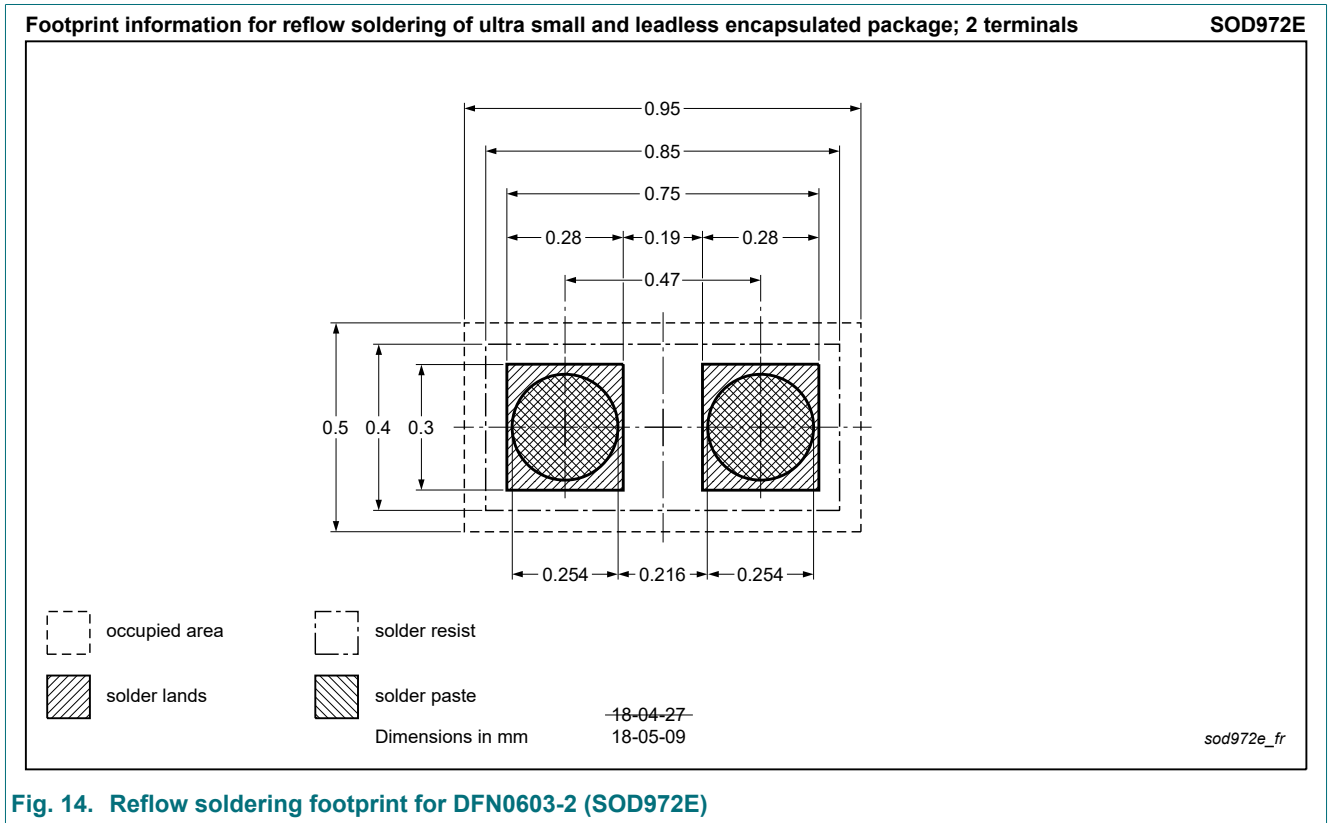


Fig. 14. Reflow soldering footprint for DFN0603-2 (SOD972E)

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG3002EEF v.1	20181206	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.

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