



PMEG3001EEF

30 V, 0.1 A low VF MEGA Schottky barrier rectifier

14 November 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 $I_{F(AV)} \leq 0.1$ 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

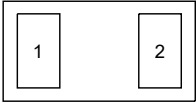

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20$ kHz; $T_{sp} \leq 147$ °C; square wave	-	-	0.1	A
V_R	reverse voltage	$T_j = 25$ °C	-	-	30	V
V_F	forward voltage	$I_F = 10$ mA; $T_j = 25$ °C; pulsed	-	415	460	mV
I_R	reverse current	$V_R = 10$ V; $T_j = 25$ °C; pulsed	[1]	0.02	0.3	μ A
		$V_R = 30$ V; $T_j = 25$ °C; pulsed	[1]	0.12	0.8	μ 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
PMEG3001EEF	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
PMEG3001EEF	J

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	$\delta = 1$; $T_{sp} \leq 146\text{ °C}$; $f = 20\text{ kHz}$; square wave		-	0.14	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{amb} \leq 131\text{ °C}$; square wave		-	0.1	A
		$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{sp} \leq 147\text{ °C}$; square wave		-	0.1	A
I_{FRM}	repetitive peak forward current	$t_p \leq 1\text{ ms}$; $\delta \leq 0.25$		-	1	A
I_{FSM}	non-repetitive peak forward current	$t_p = 8.3\text{ ms}$; square wave; $T_{j(\text{init})} = 25\text{ °C}$		-	3	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 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 cm^2 each.

[4] Soldering point of anode tab.

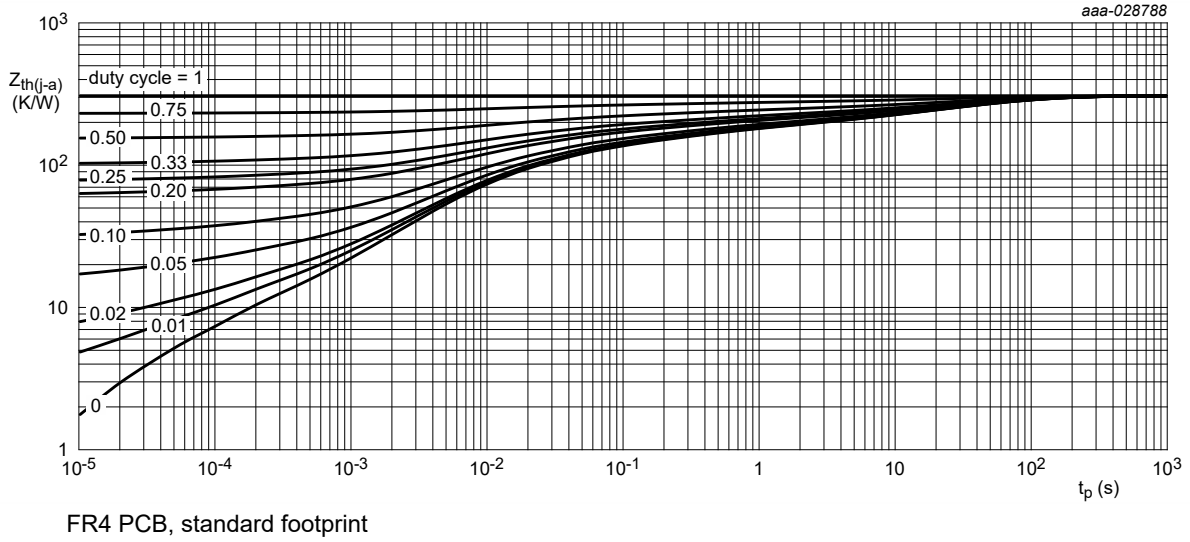


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

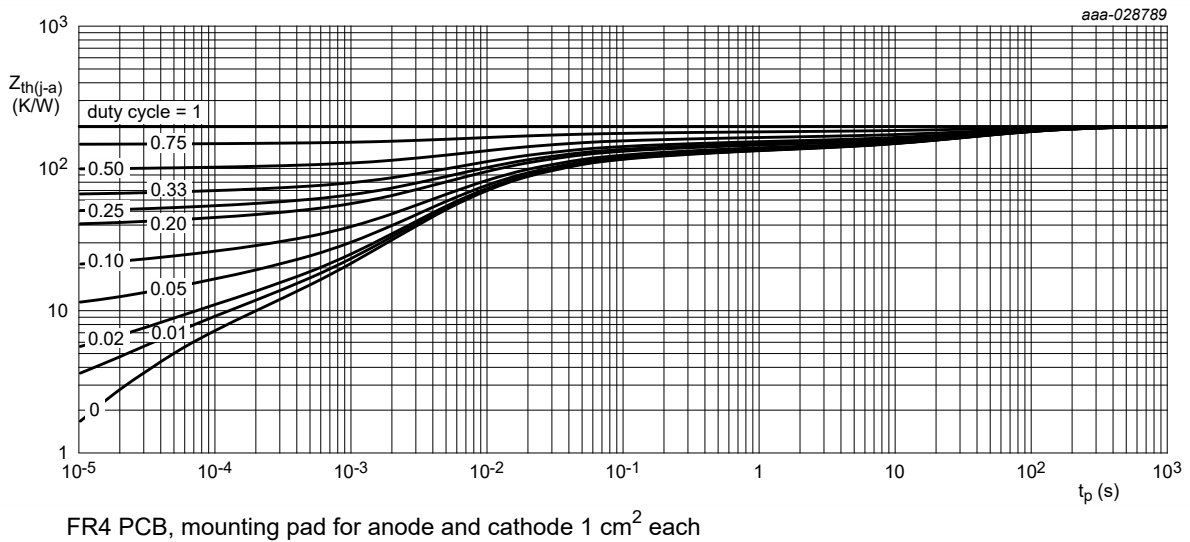


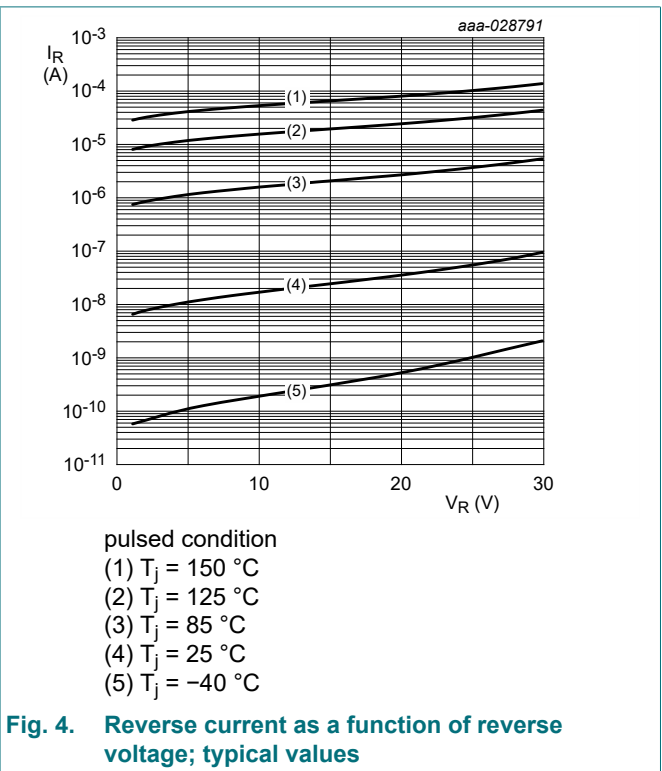
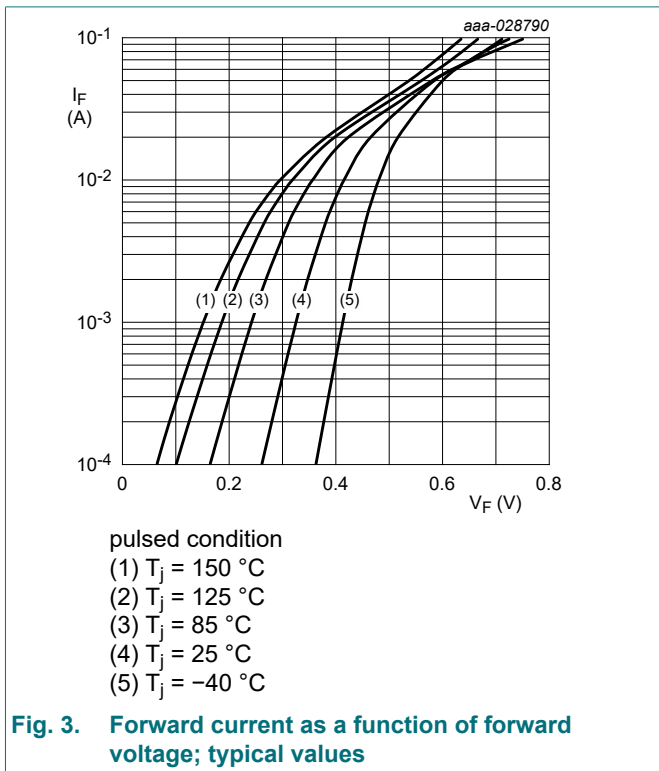
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

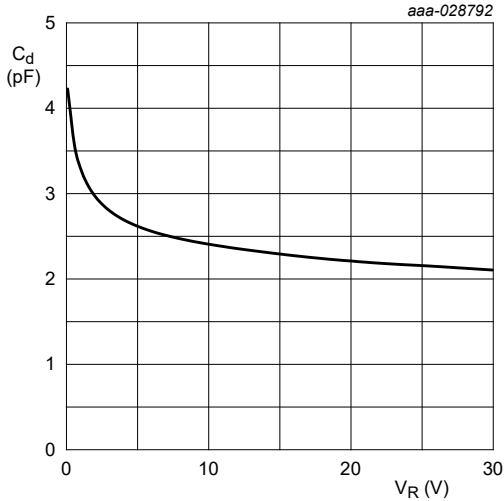
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{(BR)R}$	reverse reverse breakdown voltage	$I_R = 0.1 \text{ mA}$; $T_j = 25 \text{ }^\circ\text{C}$; pulsed	[1]	30	-	V	
V_F	forward voltage	$I_F = 0.1 \text{ mA}$; $T_j = 25 \text{ }^\circ\text{C}$; pulsed		-	260	mV	
		$I_F = 1 \text{ mA}$; $T_j = 25 \text{ }^\circ\text{C}$; pulsed		-	325	360	mV
		$I_F = 10 \text{ mA}$; $T_j = 25 \text{ }^\circ\text{C}$; pulsed		-	415	460	mV
		$I_F = 100 \text{ mA}$; $T_j = 25 \text{ }^\circ\text{C}$; pulsed		-	725	840	mV
I_R	reverse current	$V_R = 10 \text{ V}$; $T_j = 25 \text{ }^\circ\text{C}$; pulsed	[1]	-	0.02	0.3	μA
		$V_R = 30 \text{ V}$; $T_j = 25 \text{ }^\circ\text{C}$; pulsed	[1]	-	0.12	0.8	μA
C_d	diode capacitance	$V_R = 1 \text{ V}$; $f = 1 \text{ MHz}$; $T_j = 25 \text{ }^\circ\text{C}$		-	4	-	pF
		$V_R = 10 \text{ V}$; $f = 1 \text{ MHz}$; $T_j = 25 \text{ }^\circ\text{C}$		-	3	-	pF
t_{rr}	reverse recovery time ; step recovery	$I_F = 100 \text{ mA}$; $I_R = 100 \text{ mA}$; $I_{R(\text{meas})} = 20 \text{ mA}$; $T_j = 25 \text{ }^\circ\text{C}$		-	1.5	-	ns

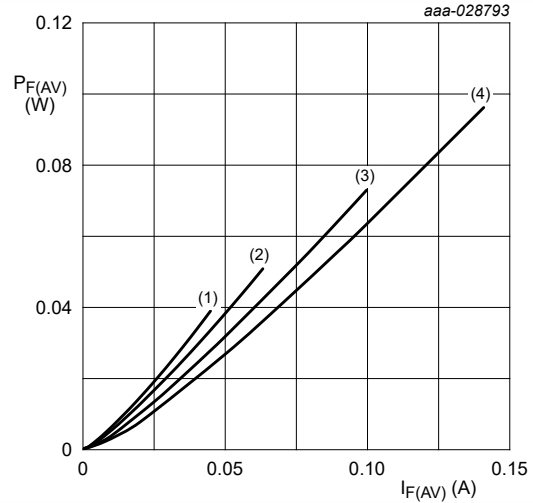
[1] Very short pulse, to maintain a stable junction temperature.





$f = 1 \text{ MHz}; T_{\text{amb}} = 25 \text{ }^\circ\text{C}$

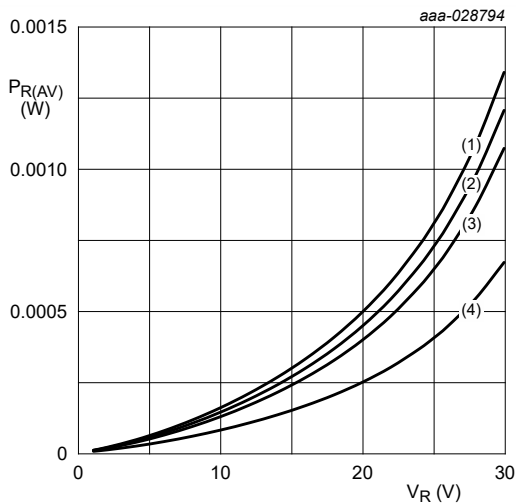
Fig. 5. Diode capacitance as a function of reverse voltage; typical values



$T_j = 150 \text{ }^\circ\text{C}$

- (1) $\delta = 0.1$
- (2) $\delta = 0.2$
- (3) $\delta = 0.5$
- (4) $\delta = 1$

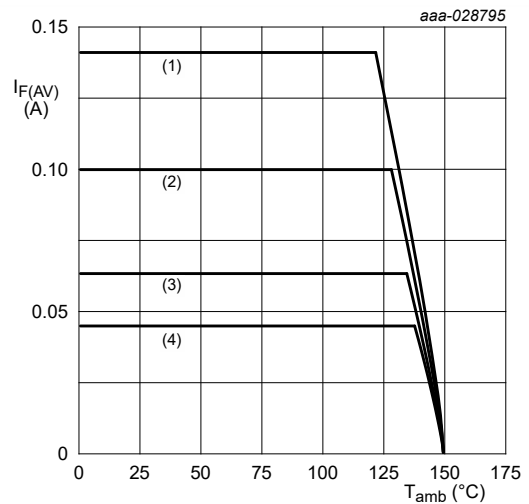
Fig. 6. Average forward power dissipation as a function of average forward current; typical values



$T_j = 125 \text{ }^\circ\text{C}$

- (1) $\delta = 1$
- (2) $\delta = 0.9$
- (3) $\delta = 0.8$
- (4) $\delta = 0.5$

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

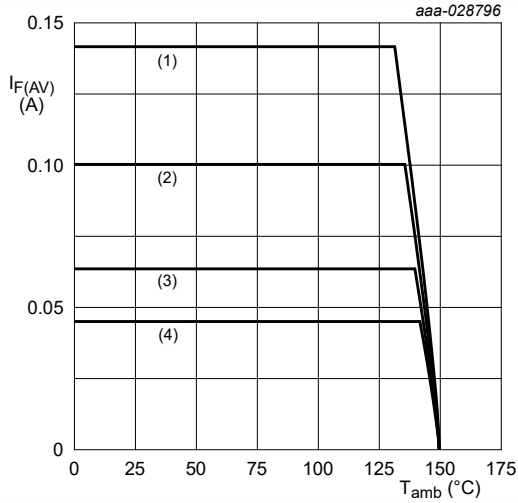


FR4 PCB, standard footprint

$T_j = 150 \text{ }^\circ\text{C}$

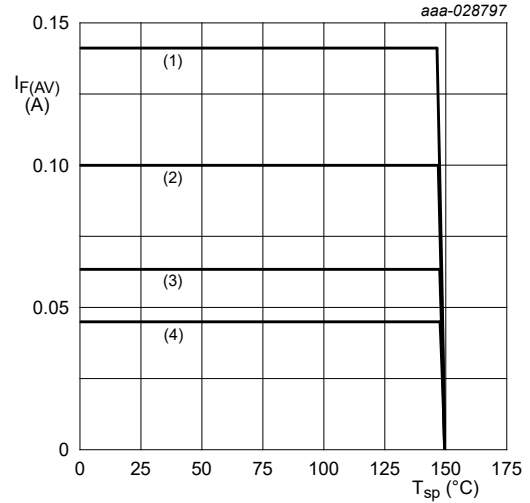
- (1) $\delta = 1; \text{DC}$
- (2) $\delta = 0.5; f = 20 \text{ kHz}$
- (3) $\delta = 0.2; f = 20 \text{ kHz}$
- (4) $\delta = 0.1; f = 20 \text{ kHz}$

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



FR4 PCB, mounting pad for anode and cathode 1 cm² 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

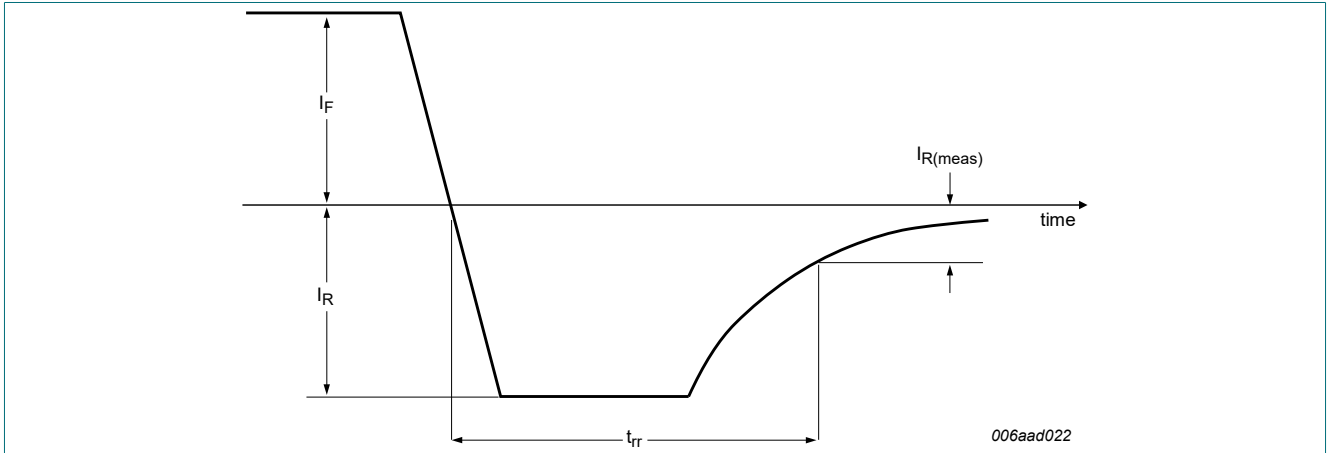


Fig. 11. Reverse recovery definition

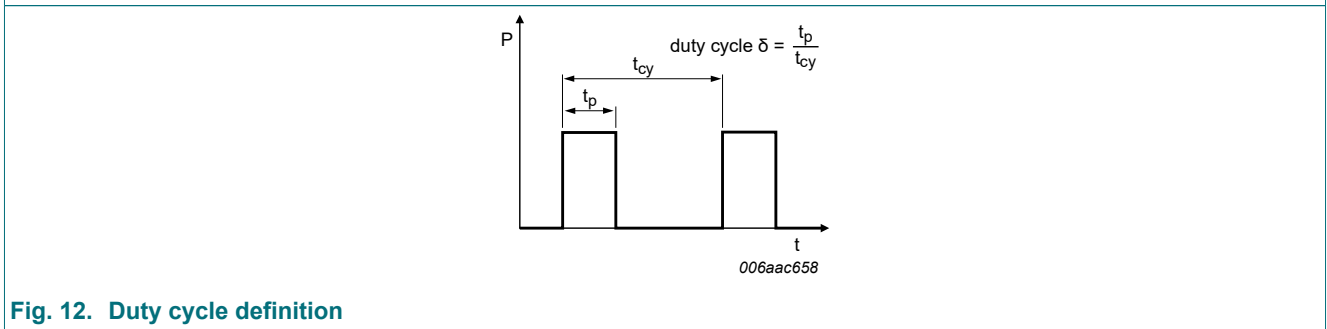


Fig. 12. Duty cycle definition

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

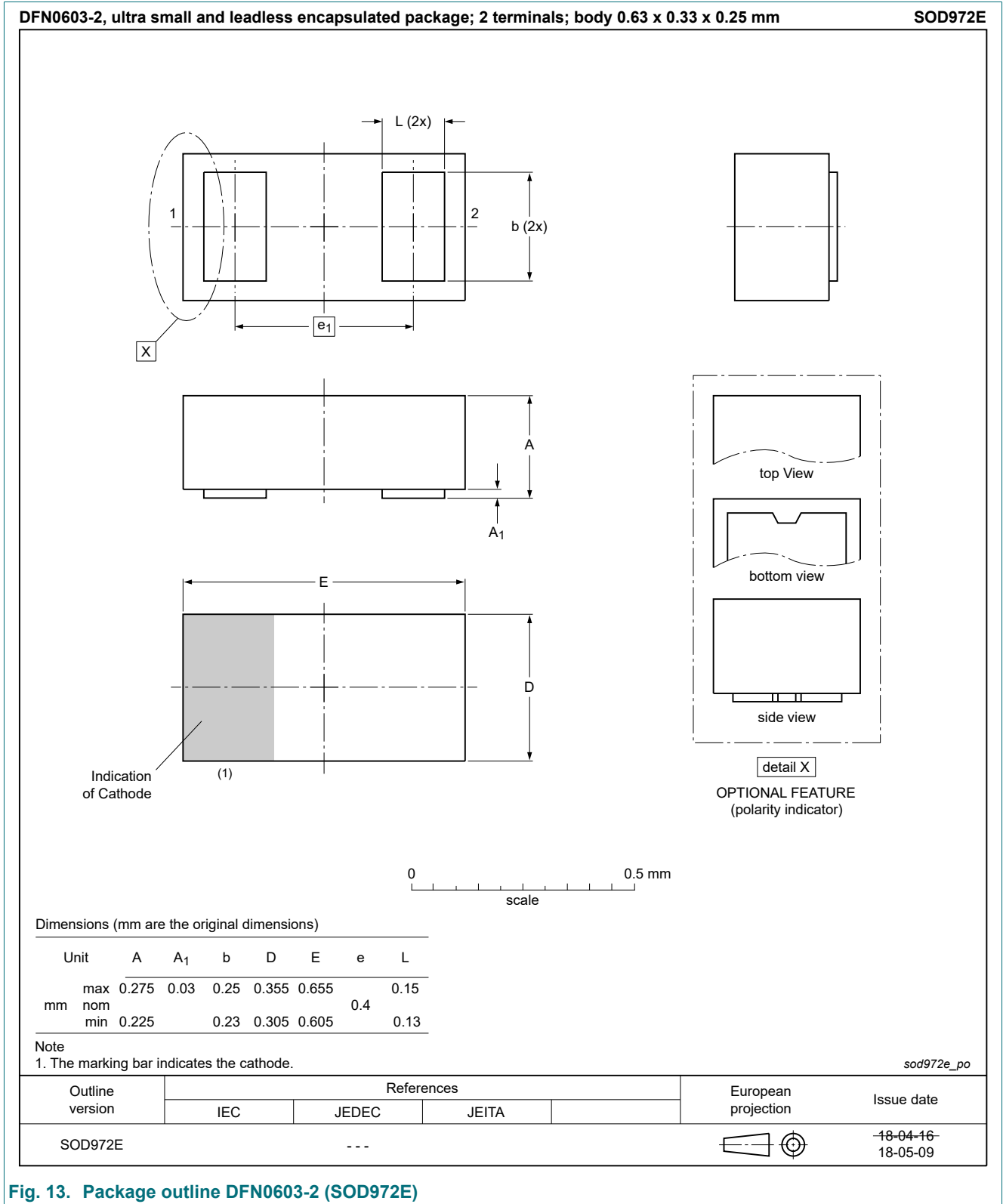
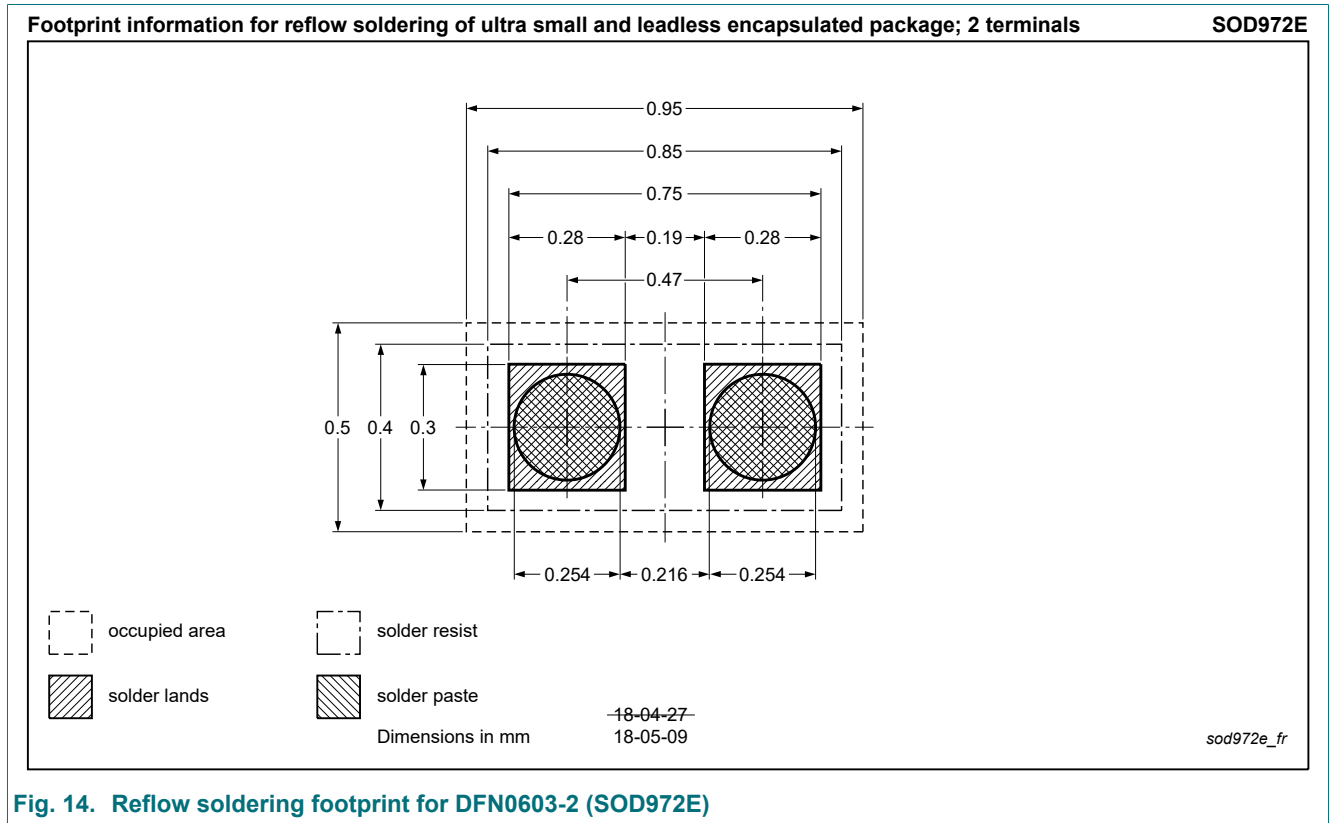


Fig. 13. Package outline DFN0603-2 (SOD972E)

13. Soldering



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG3001EEF v.4	20181114	Product data sheet	-	PMEG3001EEF v.3
Modifications:	<ul style="list-style-type: none">• Pinning: Footnote removed• Limiting values: Conditions corrected at I_F, I_{FRM} and I_{FSM}			
PMEG3001EEF v.3	20181012	Product data sheet	-	PMEG3001EEF v.2
PMEG3001EEF v.2	20181002	Product data sheet	-	PMEG3001EEF v.1
PMEG3001EEF v.1	20180716	Objective 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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- [2] The term 'short data sheet' is explained in section "Definitions".
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Contents

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	3
9. Thermal characteristics.....	3
10. Characteristics.....	5
11. Test information.....	8
12. Package outline.....	9
13. Soldering.....	10
14. Revision history.....	11
15. Legal information.....	12

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