



PMEG3005EEF

30 V, 0.5 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 $I_{F(AV)} \leq 0.5$ 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

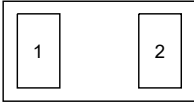

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20$ kHz; $T_{sp} \leq 134$ °C; square wave	-	-	0.5	A
V_R	reverse voltage	$T_j = 25$ °C	-	-	30	V
V_F	forward voltage	$I_F = 500$ mA; $T_j = 25$ °C; pulsed	-	560	670	mV
I_R	reverse current	$V_R = 30$ V; $T_j = 25$ °C; pulsed	[1]	2.1	15	μA

[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	 Transparent top view DFN0603-2 (SOD972E)	 <i>sym001</i>
2	A	anode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG3005EEF	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
PMEG3005EEF	M

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	$\delta = 1$; $T_{sp} \leq 132\text{ }^{\circ}\text{C}$; $f = 20\text{ kHz}$; square wave		-	0.71	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{amb} \leq 60\text{ }^{\circ}\text{C}$; square wave		-	0.5	A
		$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{sp} \leq 134\text{ }^{\circ}\text{C}$; square wave		-	0.5	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; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$		-	4.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	[1]	-	370	mW
			[2]	-	570	mW
T_j	junction temperature			-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature			-55	150	$^{\circ}\text{C}$
T_{stg}	storage temperature			-55	150	$^{\circ}\text{C}$

[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.

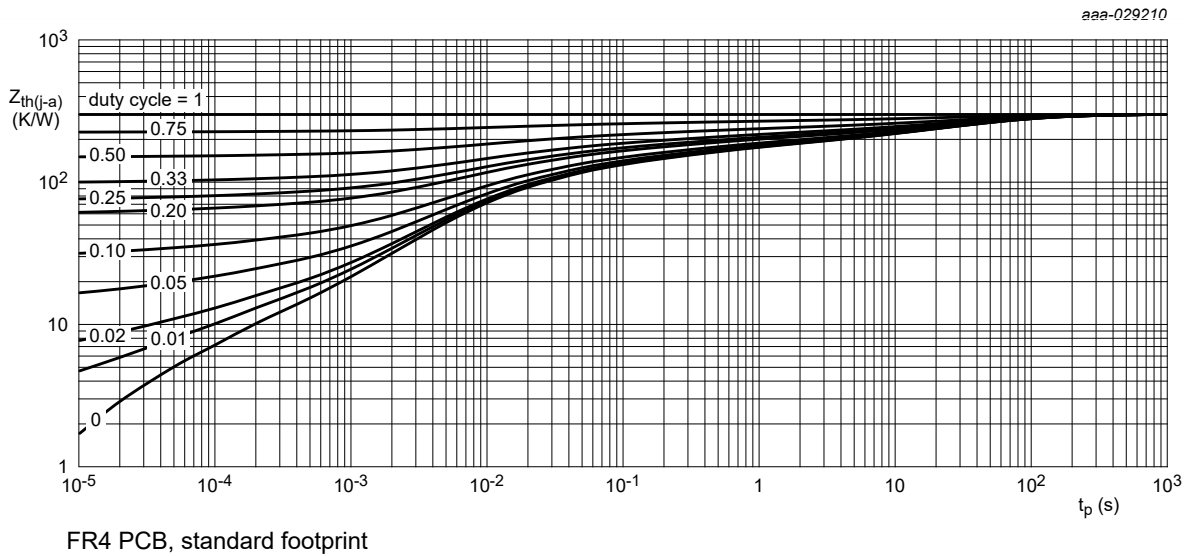


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

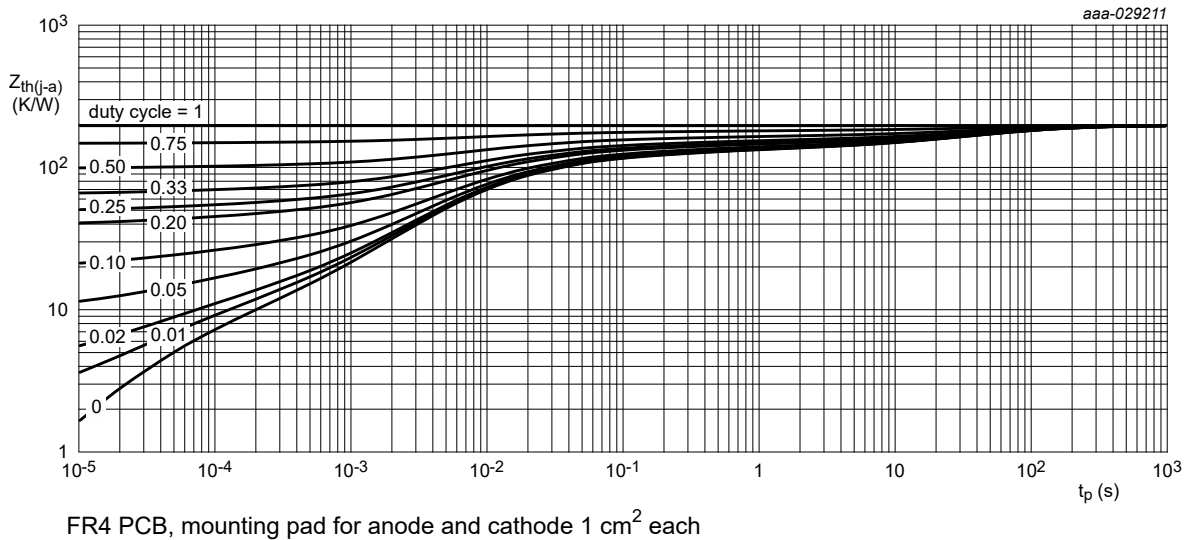


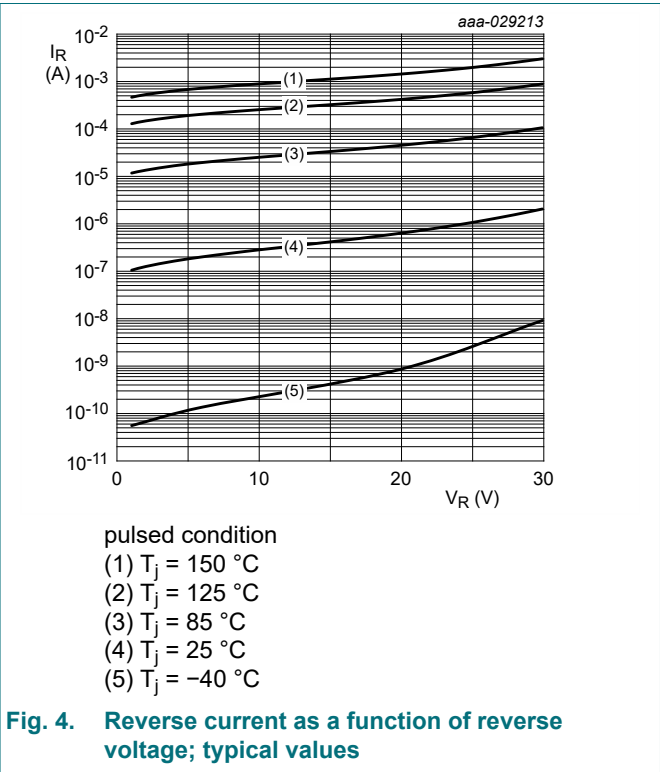
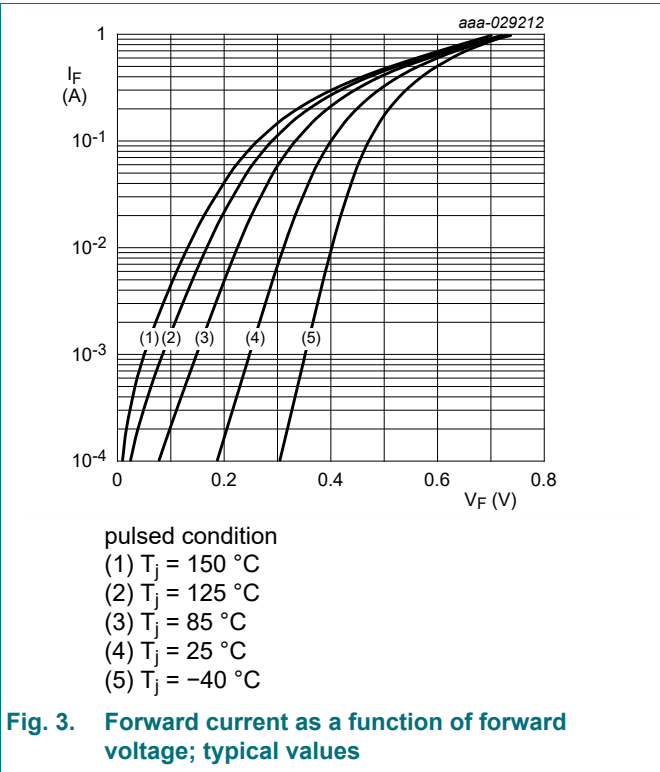
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

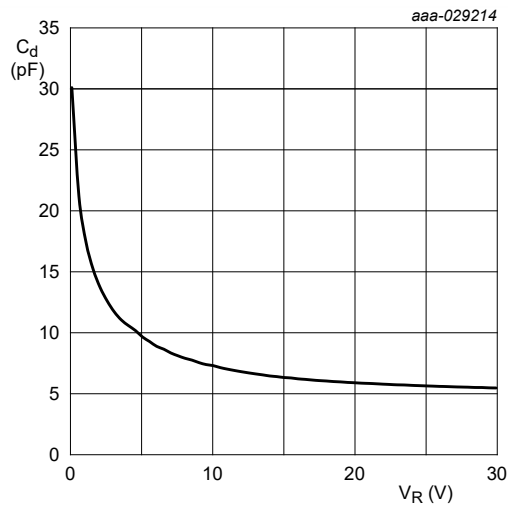
10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse 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
		$I_F = 500\text{ mA}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed		-	560	670	mV
I_R	reverse current	$V_R = 10\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed	[1]	-	0.3	3	μA
		$V_R = 30\text{ V}$; $T_j = 25\text{ }^{\circ}\text{C}$; pulsed	[1]	-	2.1	15	μA
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

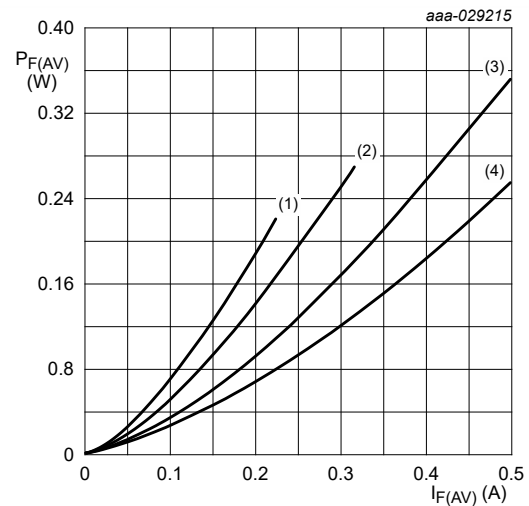
[1] Very short pulse, to maintain a stable junction temperature.





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

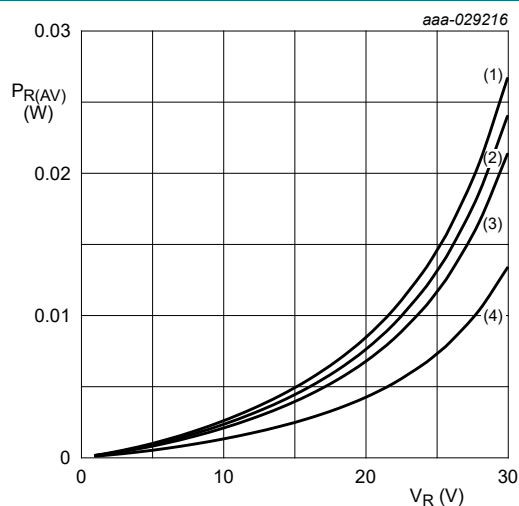
Fig. 5. Diode capacitance as a function of reverse voltage; typical values



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

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

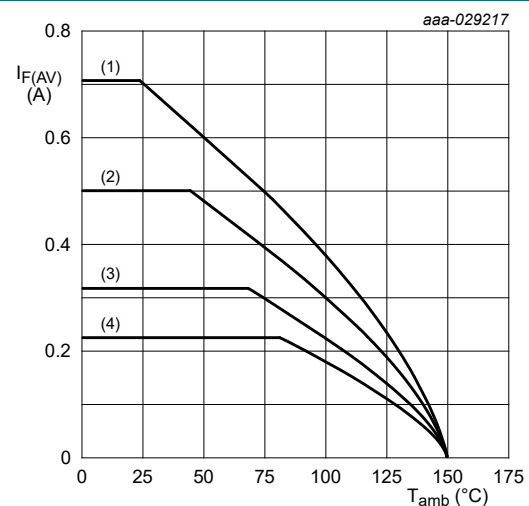
Fig. 6. Average forward power dissipation as a function of average forward current; typical values



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

- (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

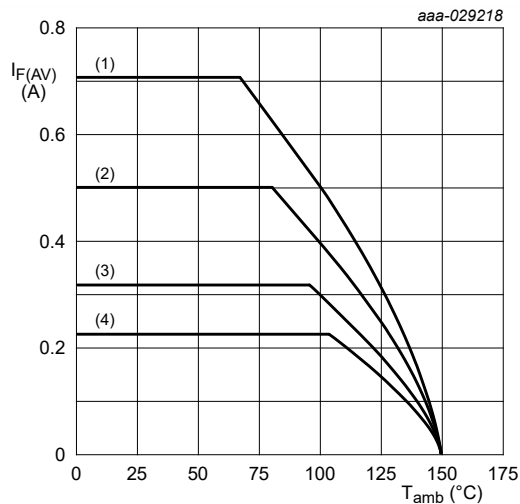


FR4 PCB, standard footprint

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

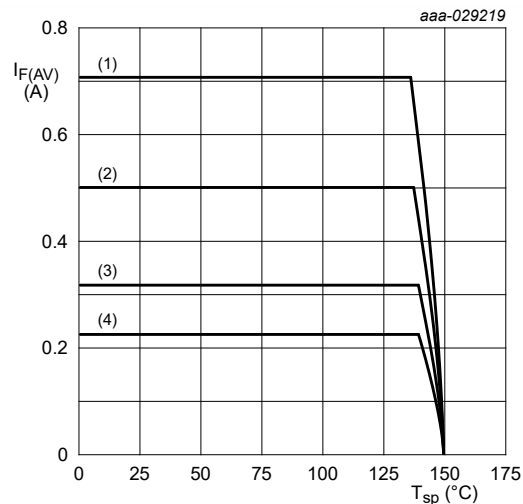
- (1) $\delta = 1$; DC
- (2) $\delta = 0.5$; $f = 20 \text{ kHz}$
- (3) $\delta = 0.2$; $f = 20 \text{ kHz}$
- (4) $\delta = 0.1$; $f = 20 \text{ kHz}$

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

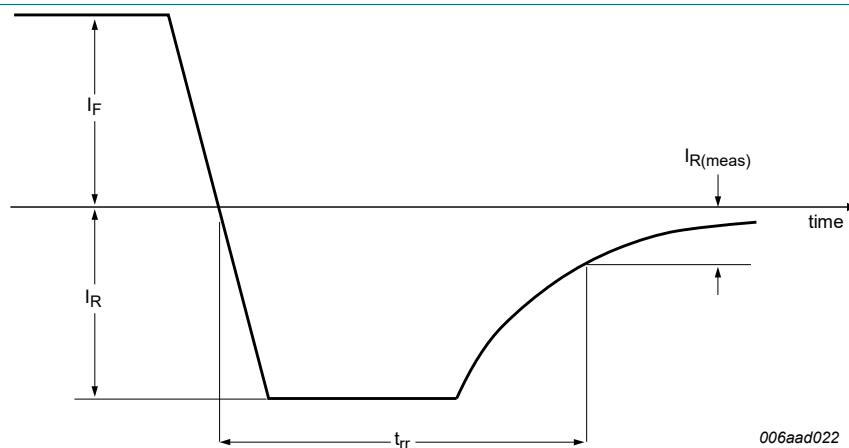


Fig. 11. Reverse recovery definition

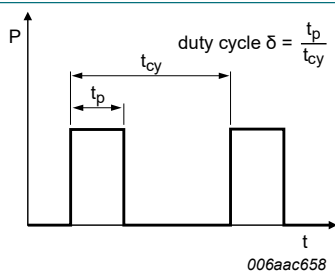
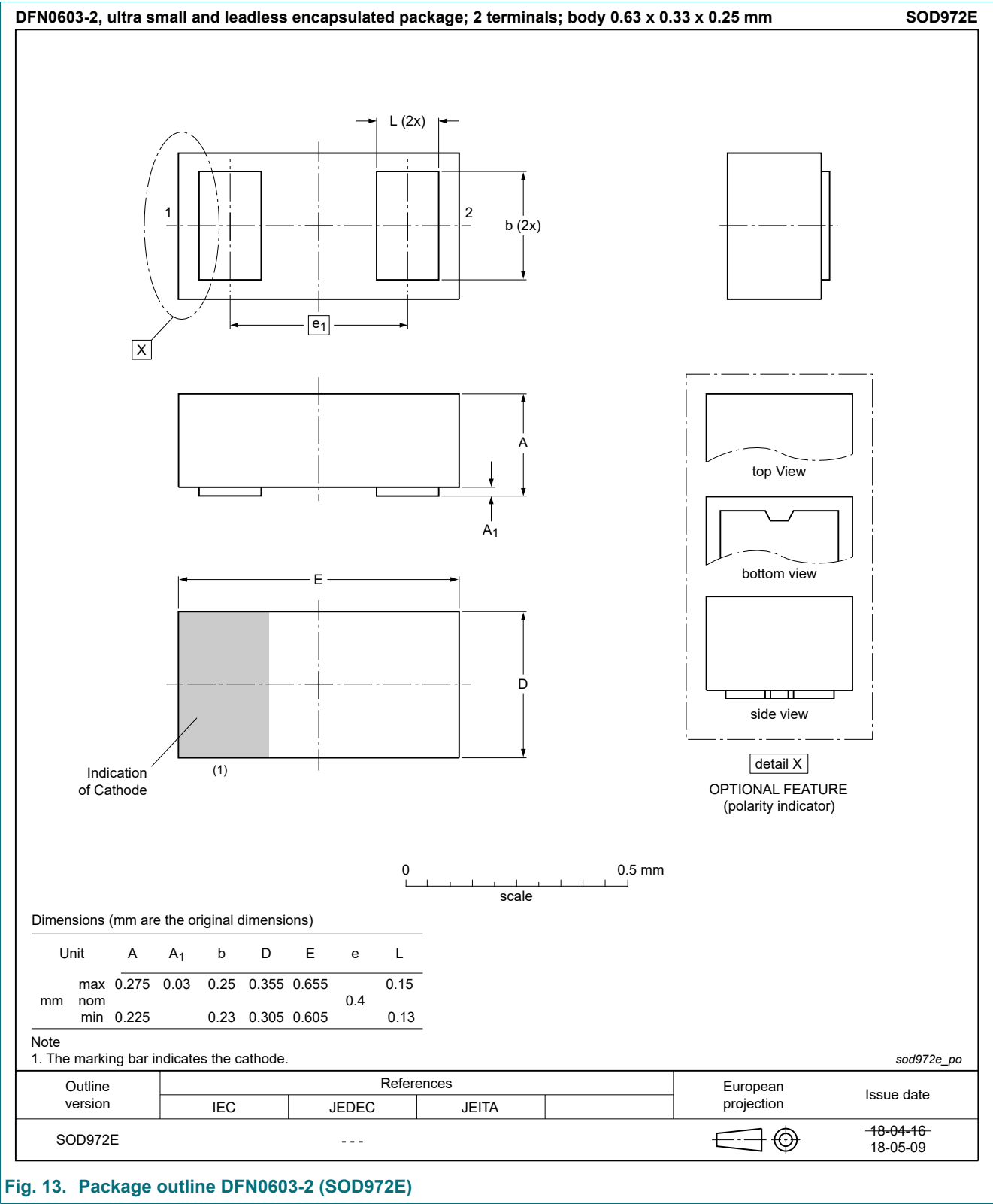


Fig. 12. Duty cycle definition

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



13. Soldering

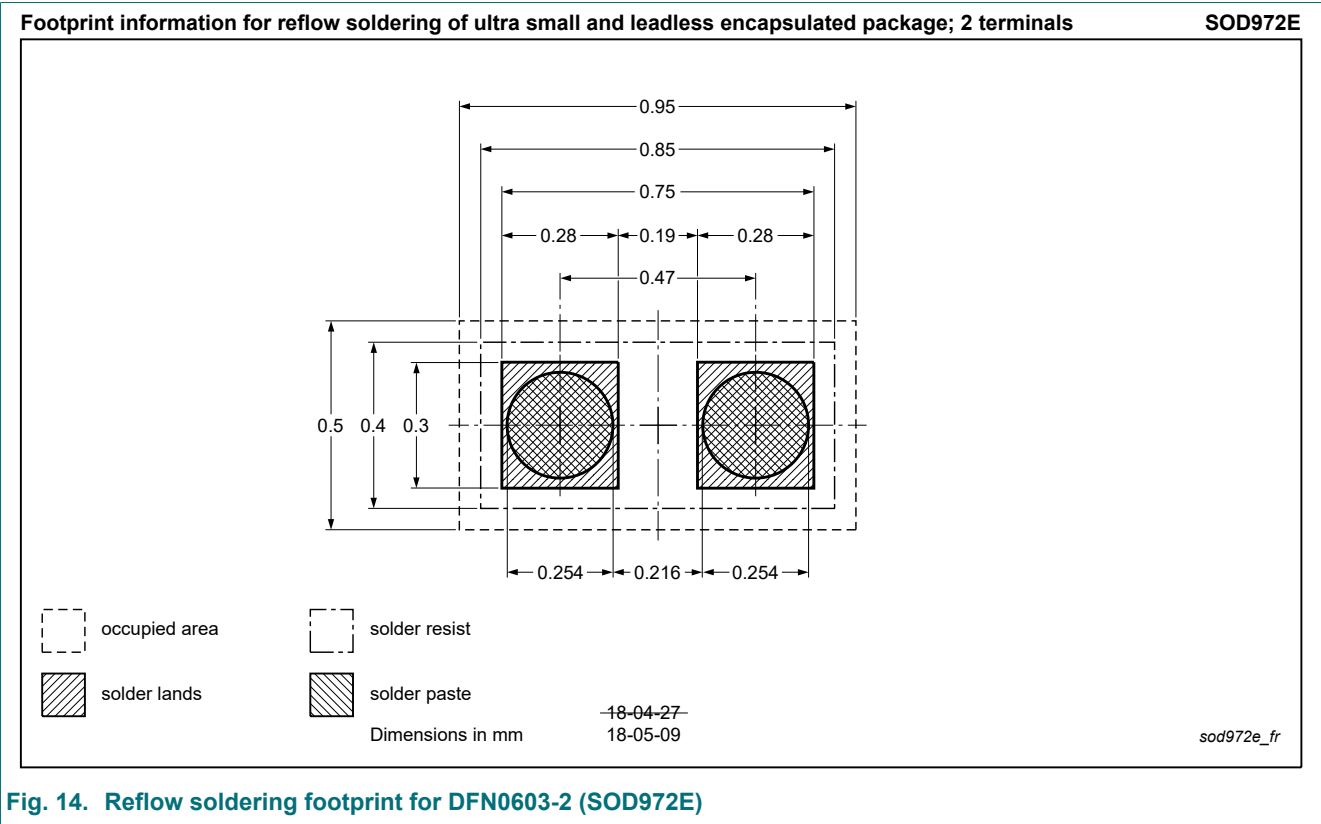


Fig. 14. Reflow soldering footprint for DFN0603-2 (SOD972E)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG3005EEF 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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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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