PMEG3001EEF

30 V, 0.1 A low VF MEGA Schottky barrier rectifier

17 September 2019 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	δ = 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	0.1	µA
		V_R = 30 V; T_j = 25 °C; pulsed	[1]	-	0.14	0.5	µA

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

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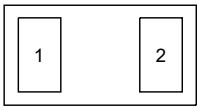
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 Transparent top view **DFN0603-2 (SOD972E)**	 *sym001*
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 °C		-	30	V
I_F	forward current	δ = 1; T_{sp} ≤ 146 °C; f = 20 kHz; square wave		-	0.14	A
$I_{F(AV)}$	average forward current	δ = 0.5; f = 20 kHz; T_{amb} ≤ 131 °C; square wave		-	0.1	A
		δ = 0.5; f = 20 kHz; T_{sp} ≤ 147 °C; square wave		-	0.1	A
I_{FRM}	repetitive peak forward current	t_p ≤ 1 ms; δ ≤ 0.25		-	1	A
I_{FSM}	non-repetitive peak forward current	t_p = 8.3 ms; square wave; $T_{j(init)}$ = 25 °C		-	3	A
P_{tot}	total power dissipation	T_{amb} ≤ 25 °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

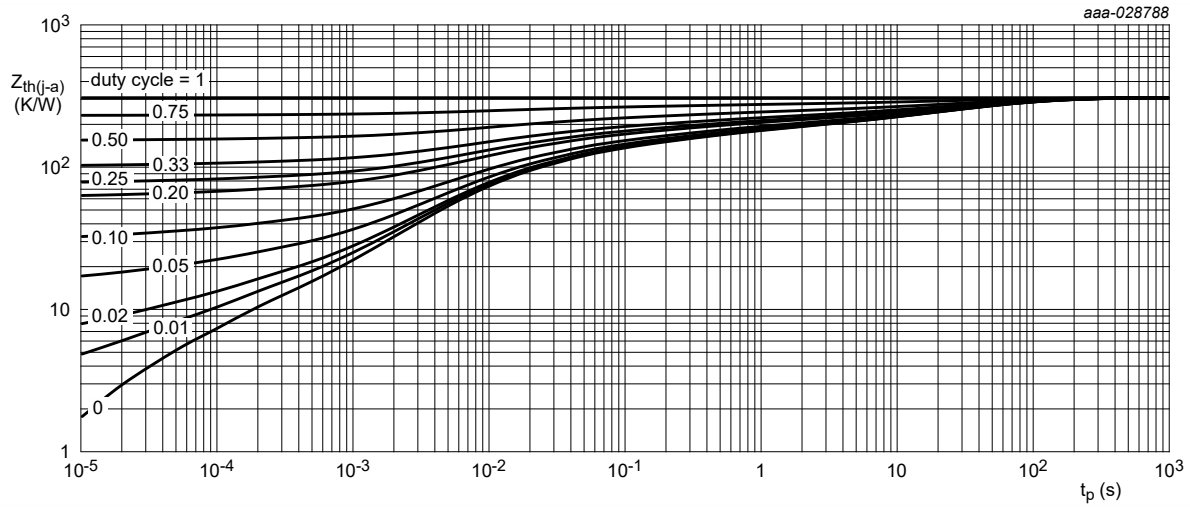
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm^2 each.

9. Thermal characteristics

Table 6. Thermal characteristics

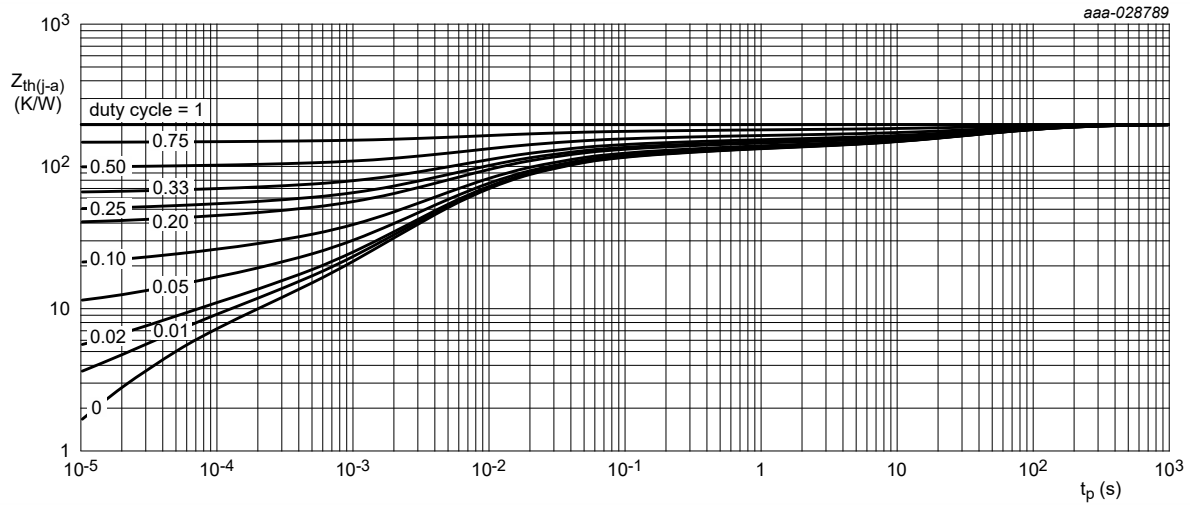
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	340	K/W
			[1] [3]	-	-	220	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	35	K/W

[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.



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 anode and cathode 1 cm^2 each

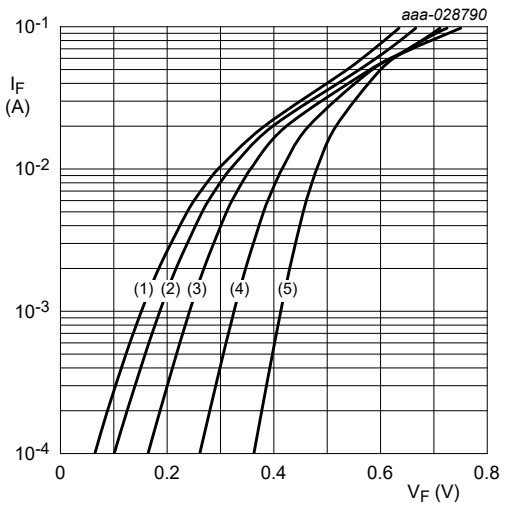
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

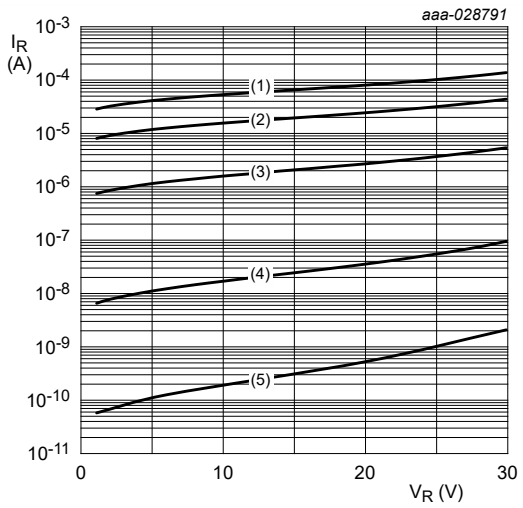
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse reverse breakdown voltage	I_R = 0.1 mA; pulsed; T_j = 25 °C	[1]	30	-	-	V
V_F	forward voltage	I_F = 0.1 mA; T_j = 25 °C; pulsed		-	260	-	mV
		I_F = 1 mA; T_j = 25 °C; pulsed		-	325	360	mV
		I_F = 10 mA; T_j = 25 °C; pulsed		-	415	460	mV
		I_F = 100 mA; T_j = 25 °C; pulsed		-	725	840	mV
I_R	reverse current	V_R = 10 V; T_j = 25 °C; pulsed	[1]	-	0.02	0.1	µA
		V_R = 30 V; T_j = 25 °C; pulsed	[1]	-	0.14	0.5	µA
C_d	diode capacitance	V_R = 1 V; f = 1 MHz; T_j = 25 °C		-	4	-	pF
		V_R = 10 V; f = 1 MHz; T_j = 25 °C		-	3	-	pF
t_{rr}	reverse recovery time ; step recovery	I_F = 100 mA; I_R = 100 mA; $I_{R(meas)}$ = 20 mA; T_j = 25 °C		-	1.5	-	ns

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



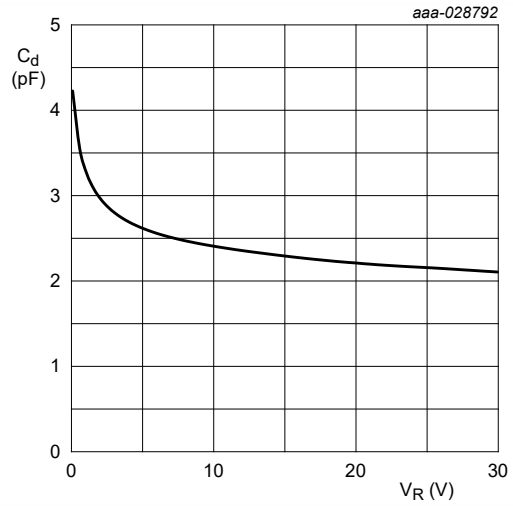
pulsed condition
(1) T_j = 150 °C
(2) T_j = 125 °C
(3) T_j = 85 °C
(4) T_j = 25 °C
(5) T_j = −40 °C

Fig. 3. Forward current as a function of forward voltage; typical values



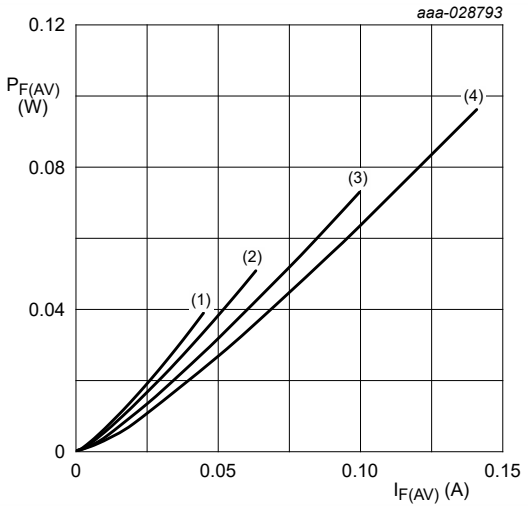
pulsed condition
(1) T_j = 150 °C
(2) T_j = 125 °C
(3) T_j = 85 °C
(4) T_j = 25 °C
(5) T_j = −40 °C

Fig. 4. Reverse current as a function of reverse voltage; typical values



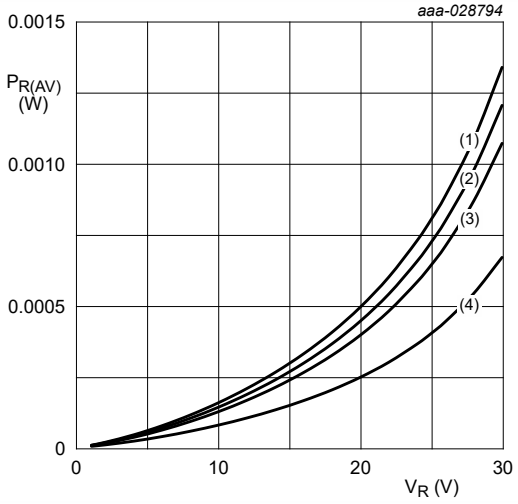
f = 1 MHz; T_{amb} = 25 °C

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



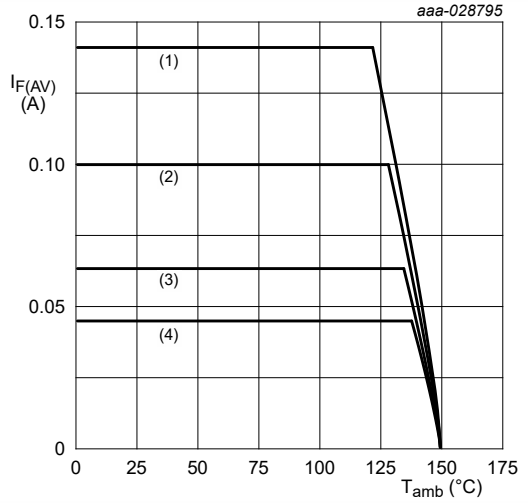
T_j = 150 °C
(1) δ = 0.1
(2) δ = 0.2
(3) δ = 0.5
(4) δ = 1

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



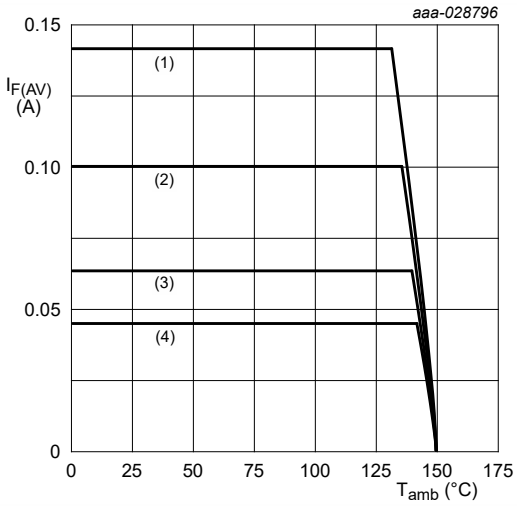
T_j = 125 °C
(1) δ = 1
(2) δ = 0.9
(3) δ = 0.8
(4) δ = 0.5

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



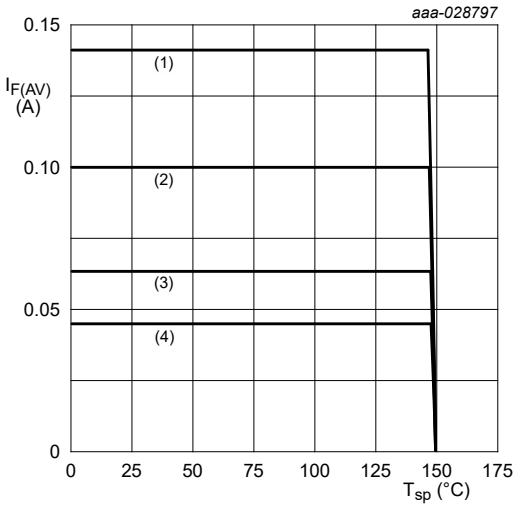
FR4 PCB, standard footprint
T_j = 150 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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



FR4 PCB, mounting pad for anode and cathode 1 cm^2 each
T_j = 150 °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. 9. Average forward current as a function of ambient temperature; typical values



T_j = 150 °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. 10. Average forward current as a function of solder point temperature; typical values

11. Test information

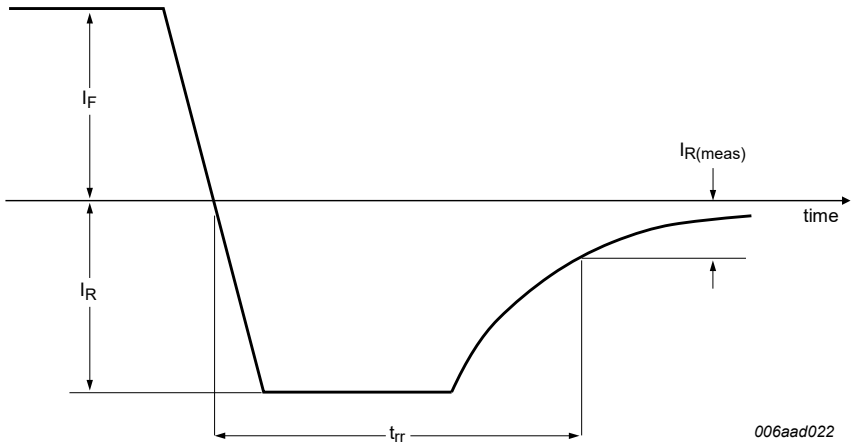


Fig. 11. Reverse recovery definition

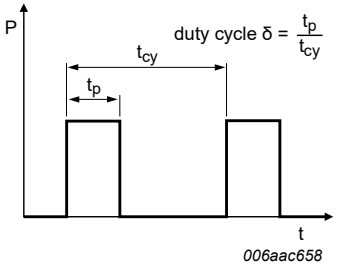
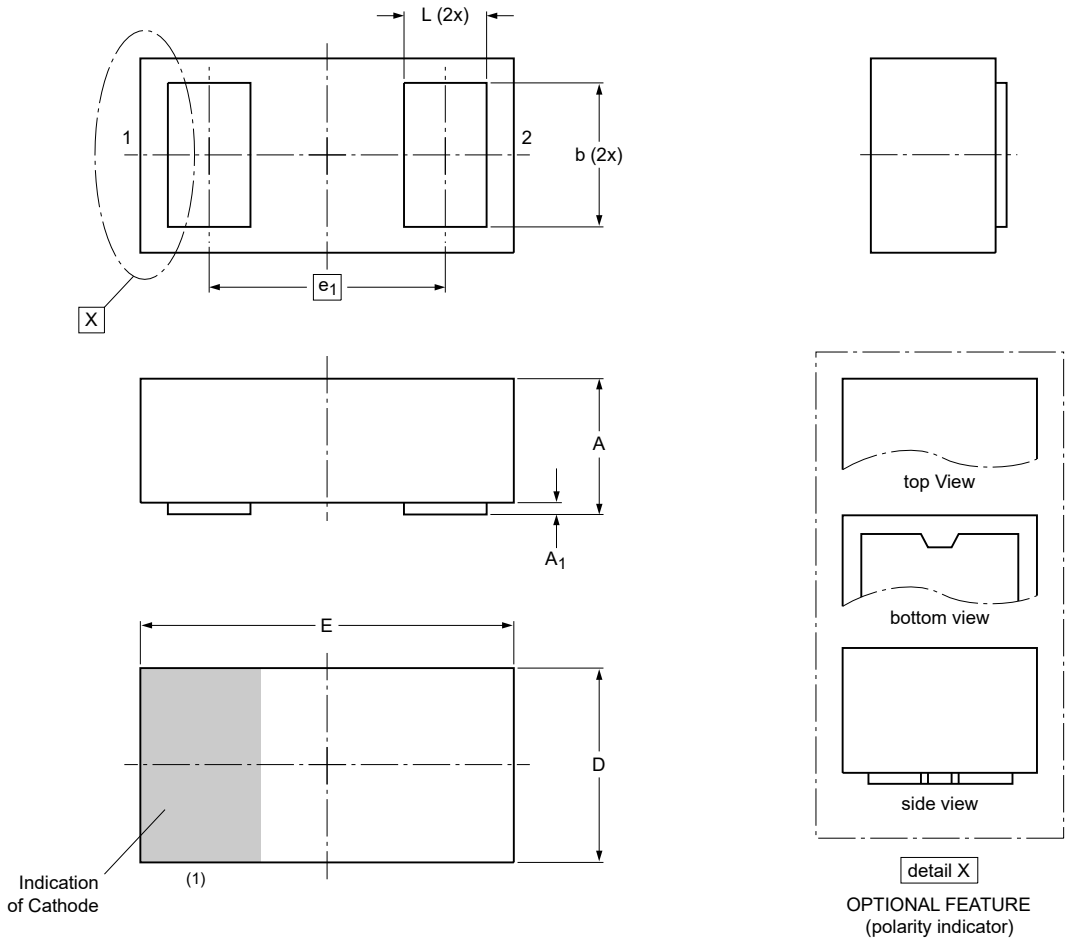


Fig. 12. Duty cycle definition

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

DFN0603-2, ultra small and leadless encapsulated package; 2 terminals; body 0.63 x 0.33 x 0.25 mm **SOD972E**



Dimensions (mm are the original dimensions)

Unit		A	A_1	b	D	E	e	L
mm	max	0.275	0.03	0.25	0.355	0.655		0.15
	nom						0.4	
	min	0.225		0.23	0.305	0.605		0.13

Note
1. The marking bar indicates the cathode.

sod972e_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOD972E		---				~~18-04-16~~ 18-05-09

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

13. Soldering

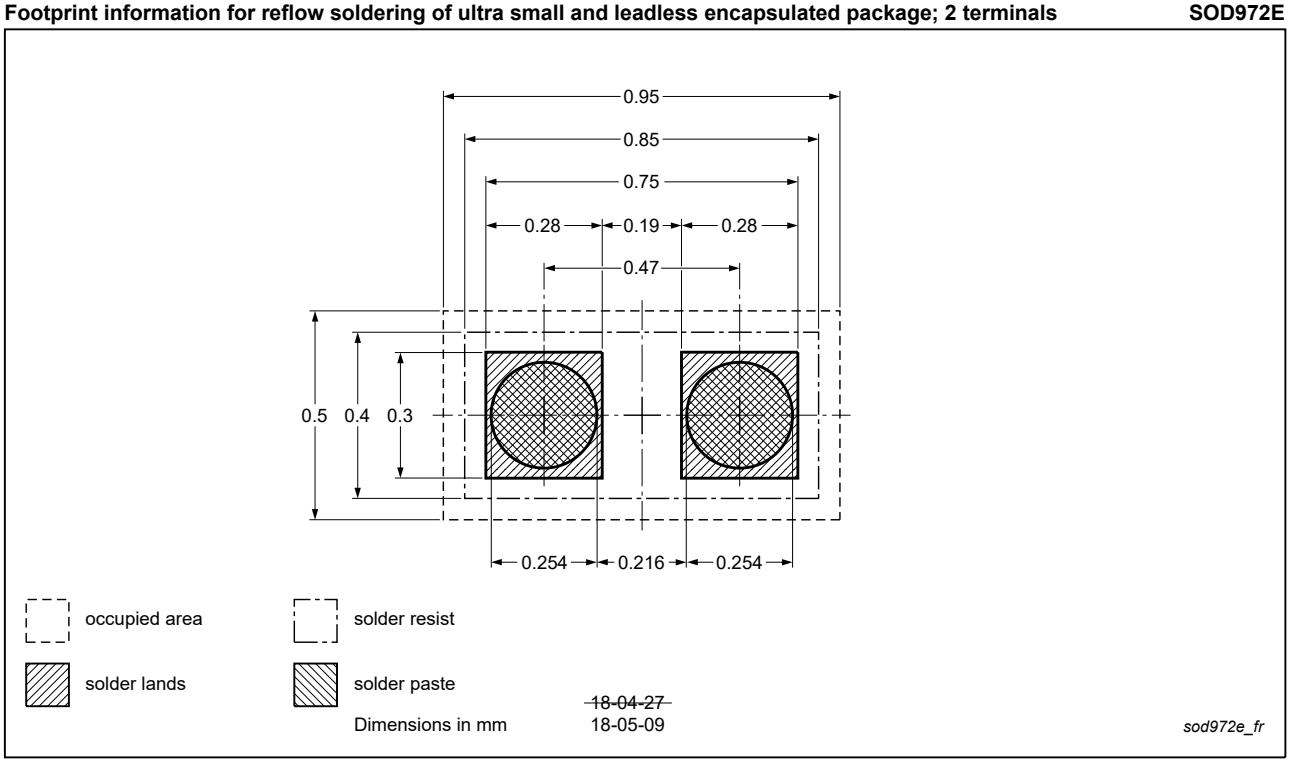


Fig. 14. Reflow soldering footprint for DFN0603-2 (SOD972E)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG3001EEF v.5	20190917	Product data sheet	-	PMEG3001EEF v.4
Modifications:	• Quick reference data and Characteristics: I_R: values revised			
PMEG3001EEF v.4	20181114	Product data sheet	-	PMEG3001EEF v.3
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.

[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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