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	δ = 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.

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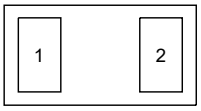
5. Pinning information

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
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 °C		-	30	V
I_F	forward current	δ = 1; T_{sp} ≤ 132 °C; f = 20 kHz; square wave		-	0.71	A
$I_{F(AV)}$	average forward current	δ = 0.5; f = 20 kHz; T_{amb} ≤ 60 °C; square wave		-	0.5	A
		δ = 0.5; f = 20 kHz; T_{sp} ≤ 134 °C; square wave		-	0.5	A
I_{FRM}	repetitive peak forward current	t_p ≤ 1 ms; δ ≤ 0.25		-	2.5	A
I_{FSM}	non-repetitive peak forward current	t_p = 8.3 ms; square wave; $T_{j(init)}$ = 25 °C		-	4.5	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

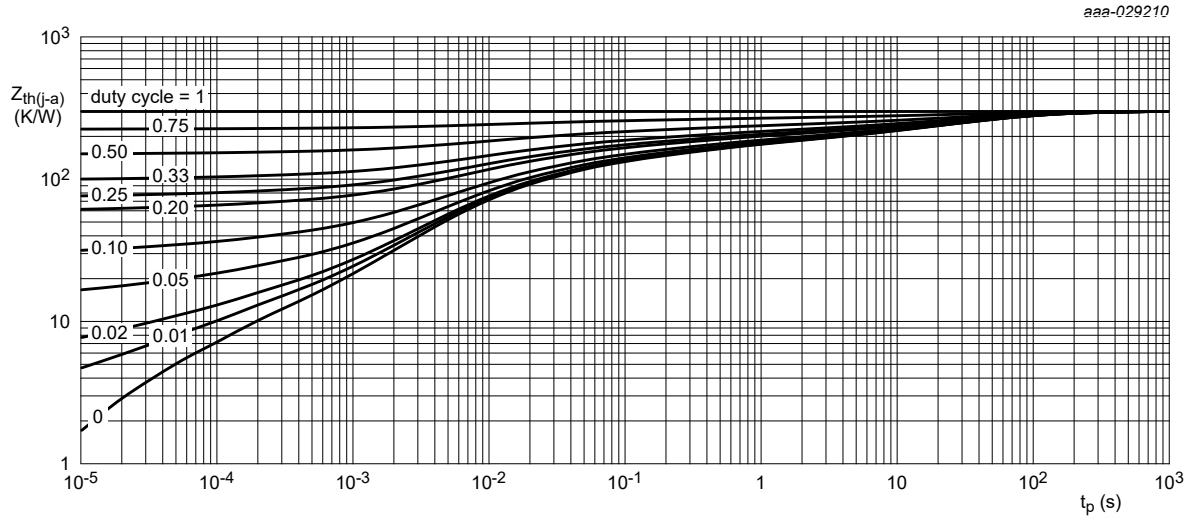
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm^2 each.

9. Thermal characteristics

Table 6. Thermal characteristics

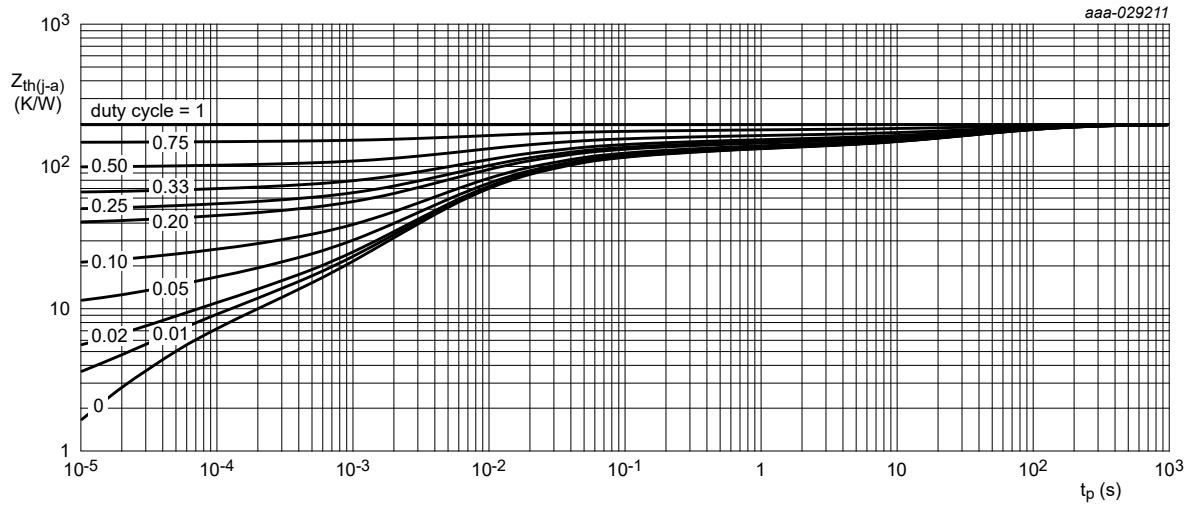
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	340	K/W
			[1] [3]	-	-	220	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	35	K/W

[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

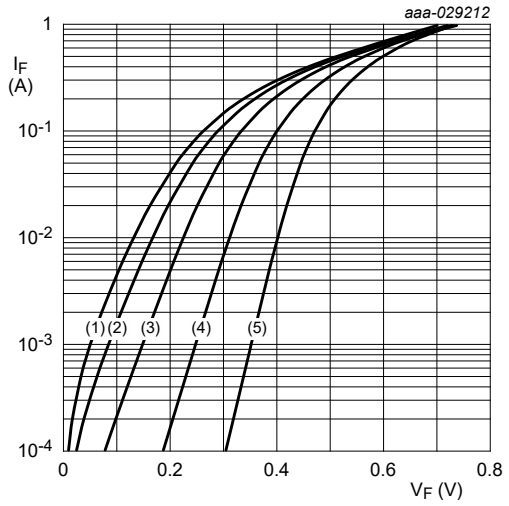
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

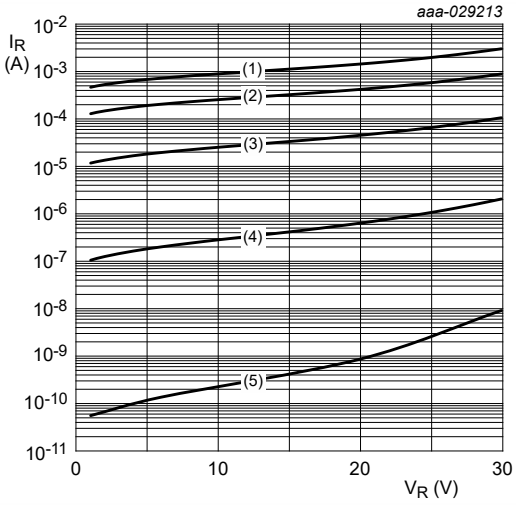
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	I_R = 0.1 mA; T_j = 25 °C; pulsed	[1]	30	-	-	V
V_F	forward voltage	I_F = 1 mA; T_j = 25 °C; pulsed		-	250	290	mV
		I_F = 10 mA; T_j = 25 °C; pulsed		-	310	360	mV
		I_F = 100 mA; T_j = 25 °C; pulsed		-	400	470	mV
		I_F = 200 mA; T_j = 25 °C; pulsed		-	450	520	mV
		I_F = 500 mA; T_j = 25 °C; pulsed		-	560	670	mV
I_R	reverse current	V_R = 10 V; T_j = 25 °C; pulsed	[1]	-	0.3	3	µA
		V_R = 30 V; T_j = 25 °C; pulsed	[1]	-	2.1	15	µA
C_d	diode capacitance	V_R = 1 V; f = 1 MHz; T_j = 25 °C		-	17	-	pF
		V_R = 10 V; f = 1 MHz; T_j = 25 °C		-	7	-	pF
t_{rr}	reverse recovery time	I_F = 500 mA; I_R = 500 mA; $I_{R(meas)}$ = 100 mA; T_j = 25 °C		-	2	-	ns

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



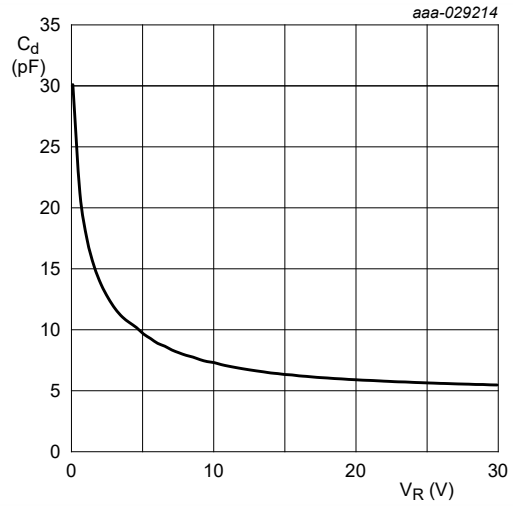
pulsed condition
(1) T_j = 150 °C
(2) T_j = 125 °C
(3) T_j = 85 °C
(4) T_j = 25 °C
(5) T_j = −40 °C

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



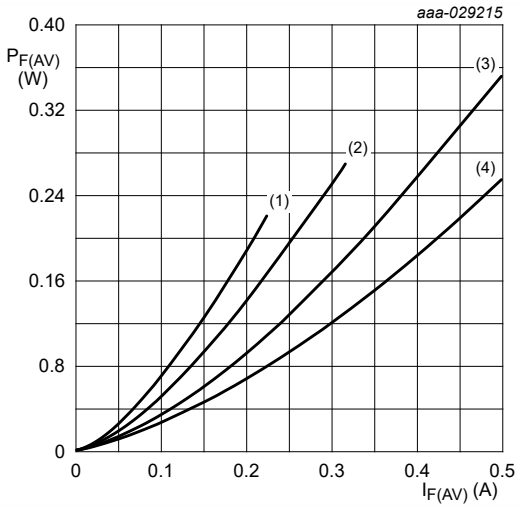
pulsed condition
(1) T_j = 150 °C
(2) T_j = 125 °C
(3) T_j = 85 °C
(4) T_j = 25 °C
(5) T_j = −40 °C

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



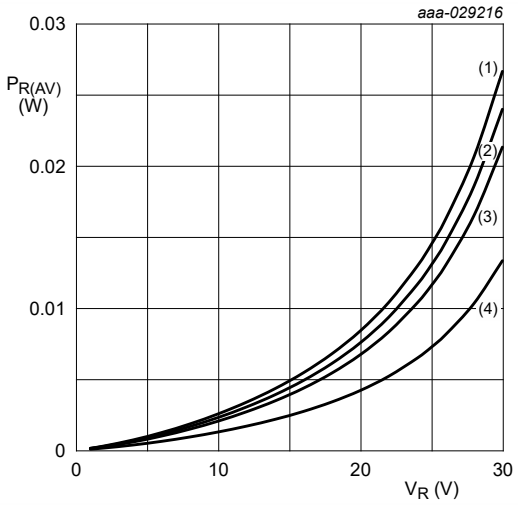
f = 1 MHz; T_{amb} = 25 °C

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



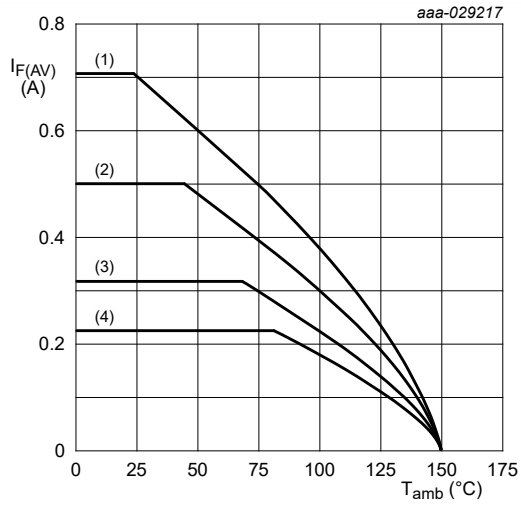
T_j = 150 °C
(1) δ = 0.1
(2) δ = 0.2
(3) δ = 0.5
(4) δ = 1

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



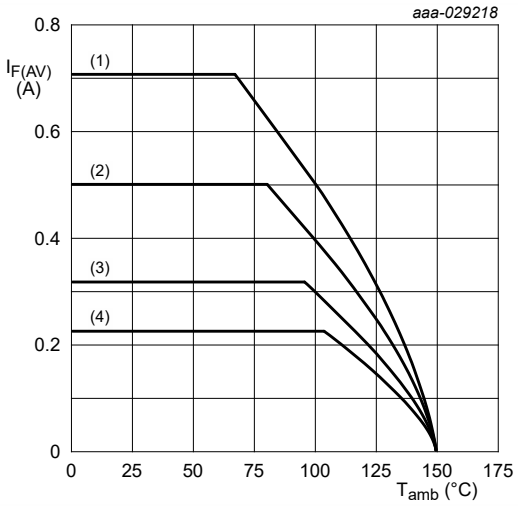
T_j = 125 °C
(1) δ = 1
(2) δ = 0.9
(3) δ = 0.8
(4) δ = 0.5

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



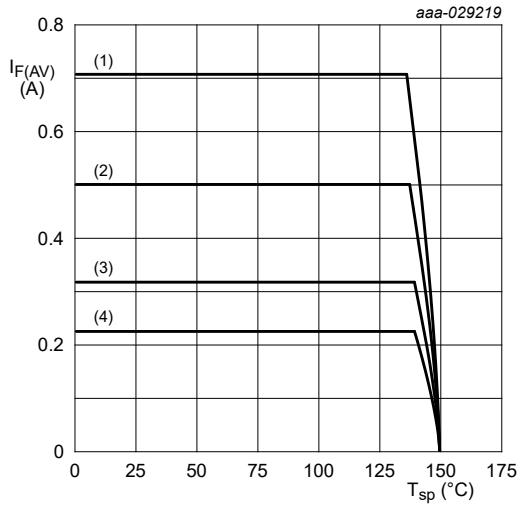
FR4 PCB, standard footprint
T_j = 150 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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

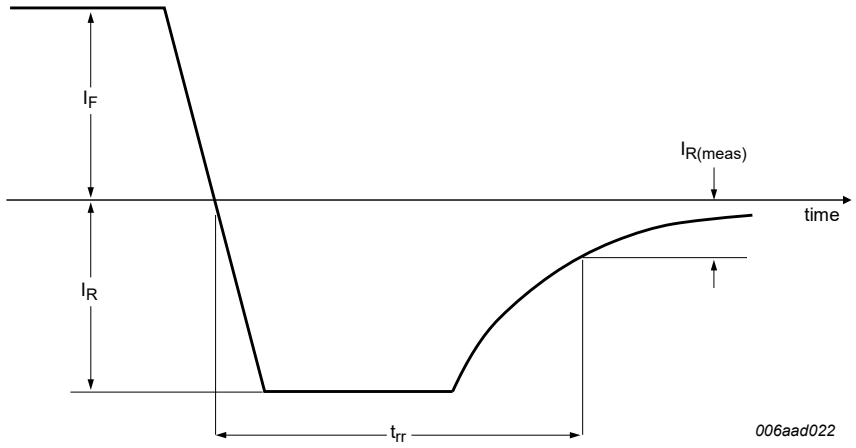


Fig. 11. Reverse recovery definition

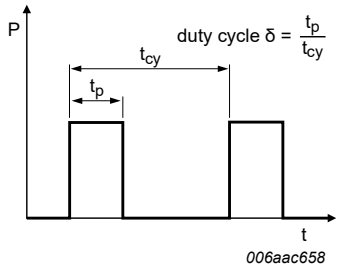
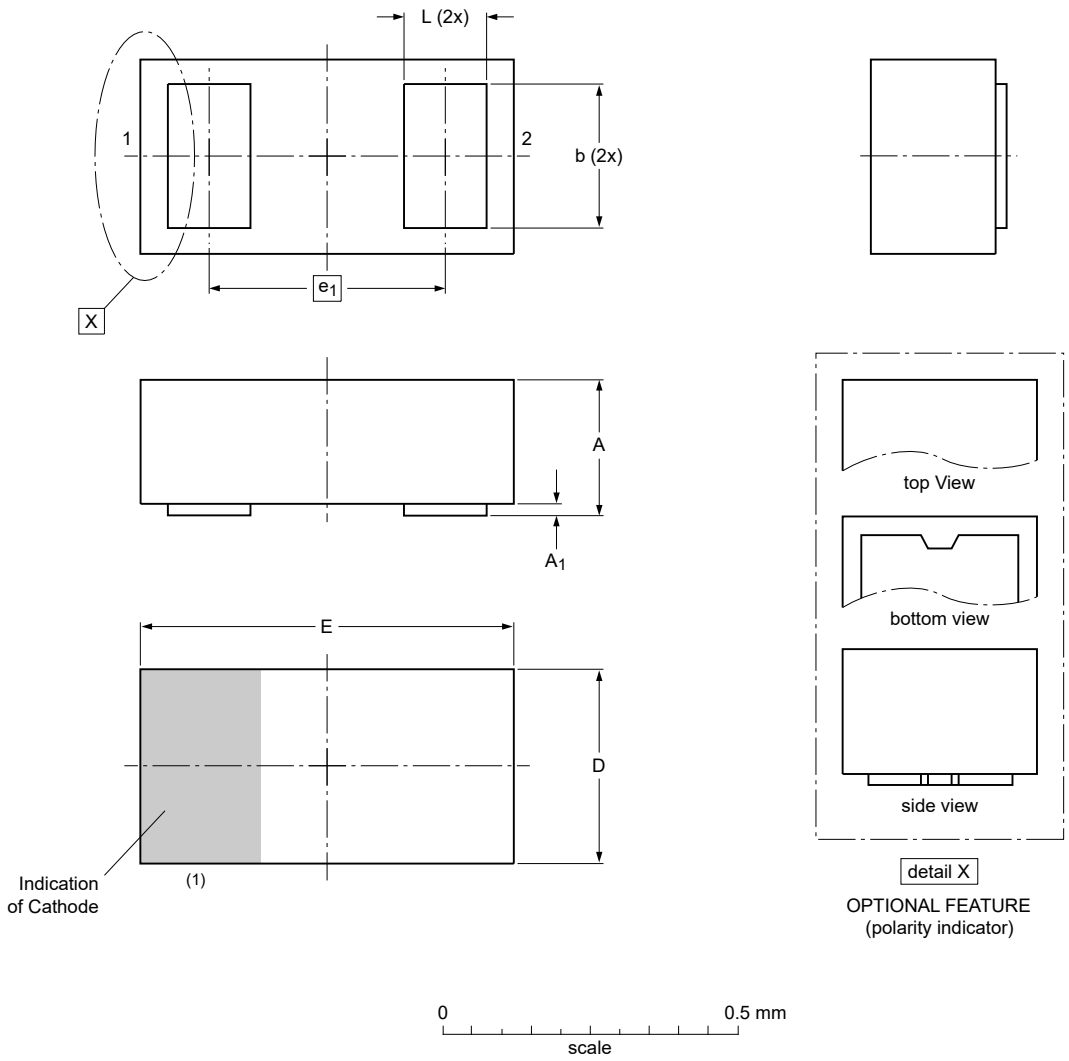


Fig. 12. Duty cycle definition

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

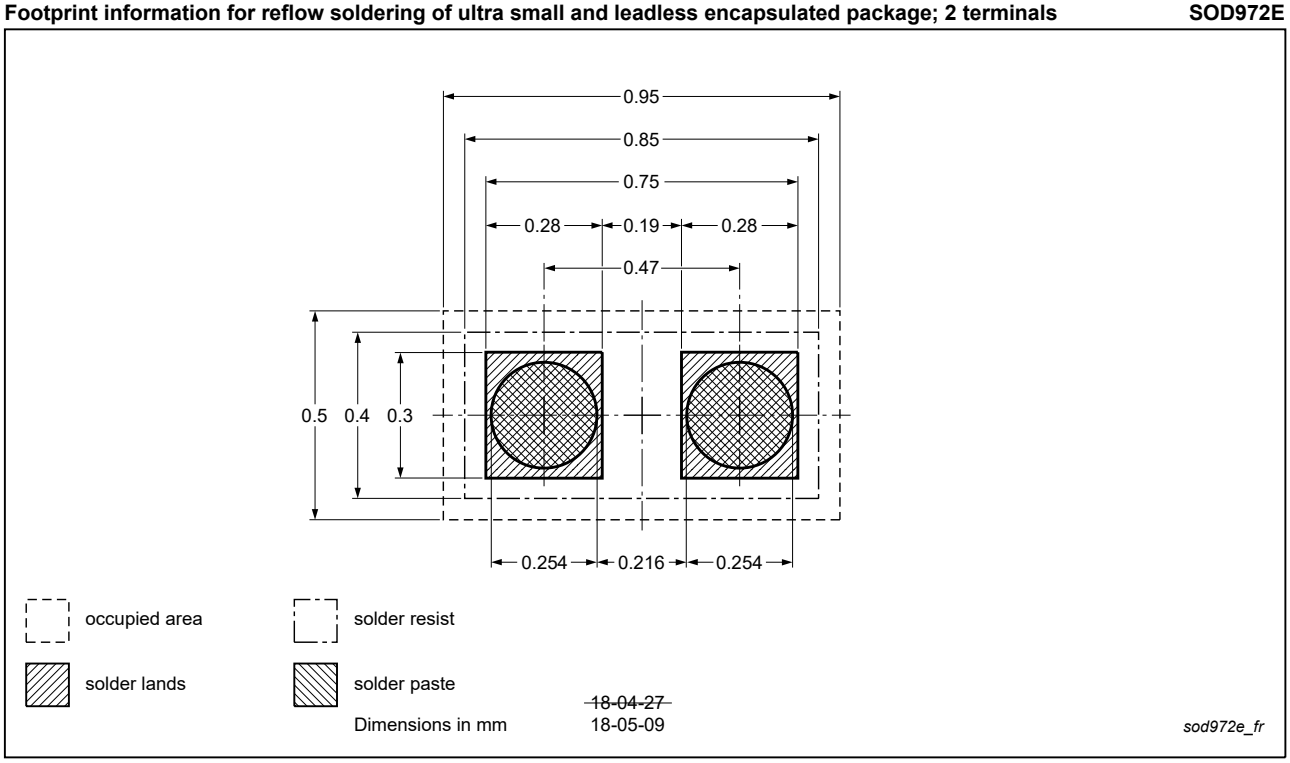


Fig. 14. Reflow soldering footprint for DFN0603-2 (SOD972E)

14. Revision history

Table 8. Revision history

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

[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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