



PMEG2002ESF

20 V, 0.2 A low VF MEGA Schottky barrier rectifier

8 October 2013

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 DSN0603-2 (SOD962-2) leadless ultra small Surface-Mounted Device (SMD) package.

2. Features and benefits

- Average forward current $I_{F(AV)} \leq 0.2$ A
- Reverse voltage $V_R \leq 20$ V
- Low forward voltage typ. V_F 310 mV
- Low reverse current typ. I_R 0.88 μ A
- Ultra small and leadless SMD package
- Package height typ. 0.3 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

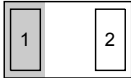

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20$ kHz; $T_{sp} \leq 125$ °C; square wave	-	-	0.2	A
		$\delta = 0.5$; $f = 20$ kHz; $T_{amb} \leq 115$ °C; square wave	[1]	-	0.2	A
V_R	reverse voltage	$T_j = 25$ °C	-	-	20	V
V_F	forward voltage	$I_F = 10$ mA; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °C	-	310	380	mV
I_R	reverse current	$V_R = 10$ V; $T_j = 25$ °C	-	0.37	-	μ A

[1] Device mounted on a ceramic Printed-Circuit Board (PCB), Al_2O_3 , standard footprint.



5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 <p>Transparent top view DSN0603-2 (SOD962-2)</p>	 sym001
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG2002ESF	DSN0603-2	Leadless ultra small package; 2 terminals; body 0.6 x 0.3 x 0.3 mm	SOD962-2

7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG2002ESF	E

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	$T_j = 25\text{ }^\circ\text{C}$	-	20	V
I_F	forward current	$T_{sp} \leq 120\text{ }^\circ\text{C}$	-	0.28	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{sp} \leq 125\text{ }^\circ\text{C}$; square wave	-	0.2	A
		$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{amb} \leq 115\text{ }^\circ\text{C}$; square wave	[1]	0.2	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	$t_p = 8\text{ ms}$; $T_{j(init)} = 25\text{ }^\circ\text{C}$; square wave	-	4.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^\circ\text{C}$	[2]	325	mW

Symbol	Parameter	Conditions		Min	Max	Unit
			[3]	-	525	mW
			[1]	-	950	mW
T_j	junction temperature			-	125	°C
T_{amb}	ambient temperature			-55	125	°C
T_{stg}	storage temperature			-65	150	°C

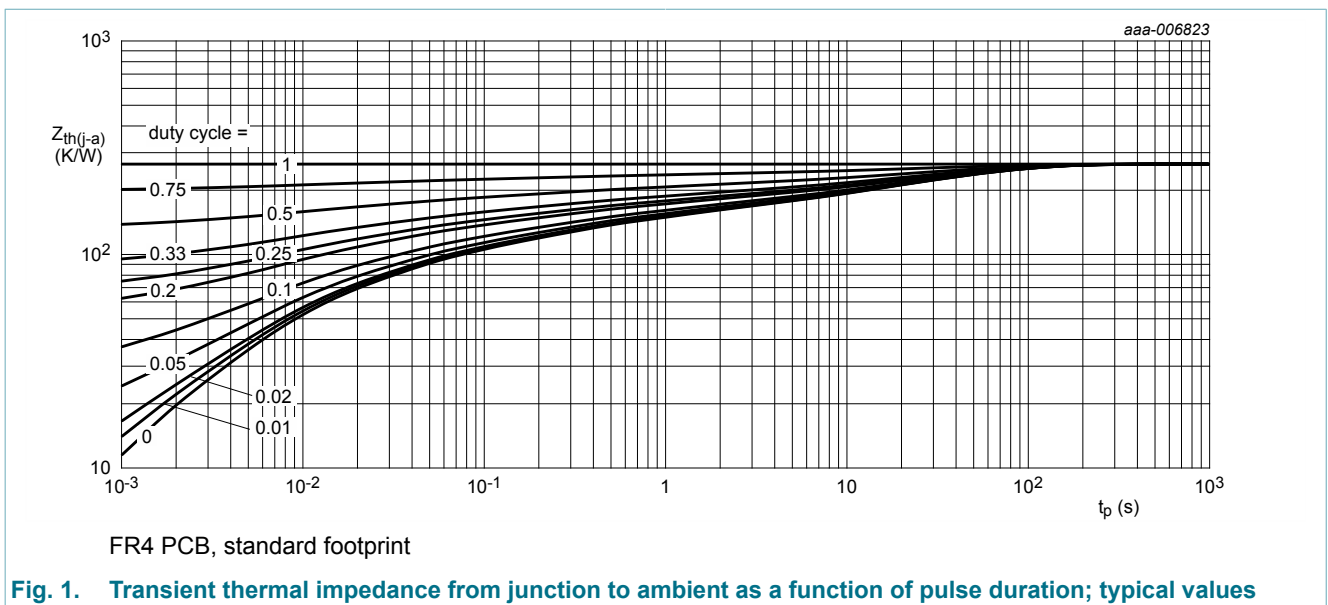
- [1] Device mounted on a ceramic Printed-Circuit Board (PCB), Al₂O₃, standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm² each.

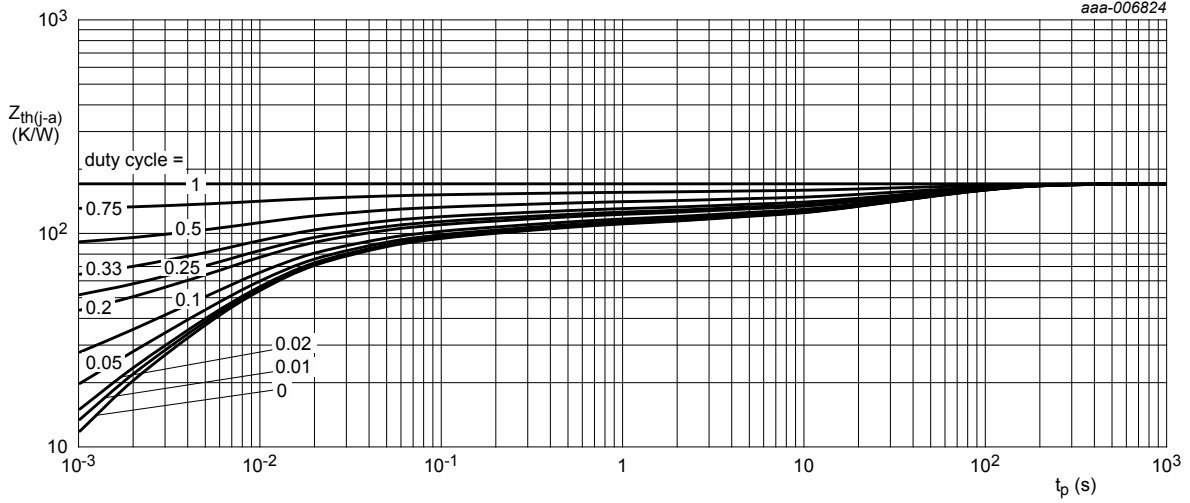
9. Thermal characteristics

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]	-	-	310	K/W
			[1][3]	-	-	190	K/W
			[1][4]	-	-	105	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[5]	-	-	40	K/W

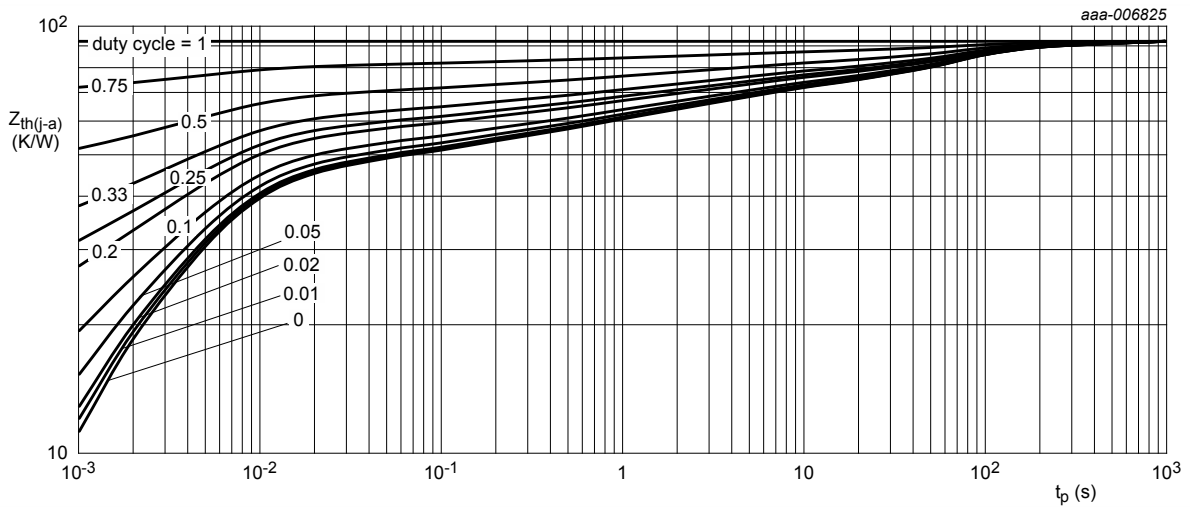
- [1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses P_R are a significant part of the total power losses.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm² each.
- [4] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.
- [5] Soldering point of cathode tab.





FR4 PCB, mounting pad for anode and cathode 1 cm² each

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



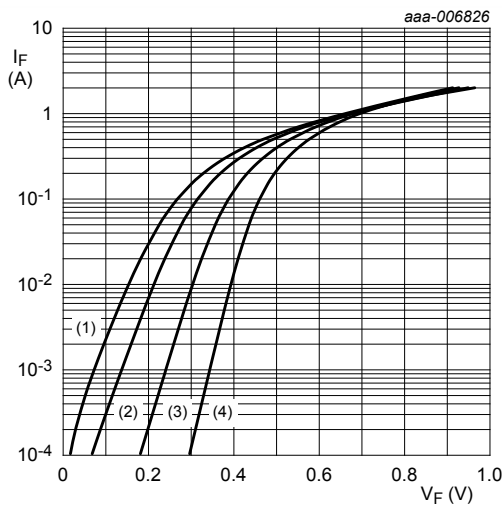
Ceramic PCB, Al₂O₃, standard footprint

Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

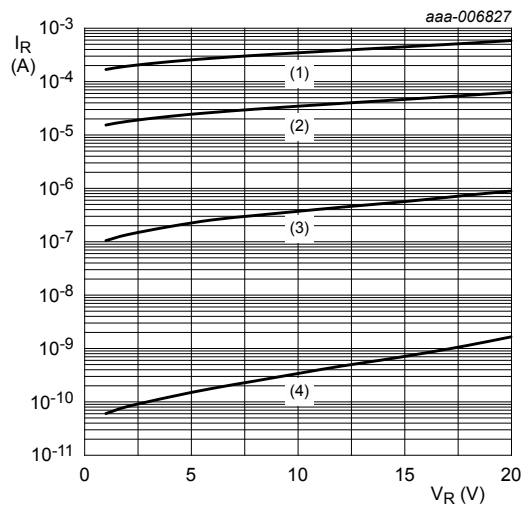
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _F	forward voltage	I _F = 0.1 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02 ; T _j = 25 °C	-	185	250	mV
		I _F = 1 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02 ; T _j = 25 °C	-	245	320	mV
		I _F = 10 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02 ; T _j = 25 °C	-	310	380	mV
		I _F = 100 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02 ; T _j = 25 °C	-	390	450	mV
		I _F = 200 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02 ; T _j = 25 °C	-	435	490	mV
I _R	reverse current	V _R = 6 V; T _j = 25 °C	-	0.26	1.5	μA
		V _R = 10 V; T _j = 25 °C	-	0.37	-	μA
		V _R = 20 V; T _j = 25 °C	-	0.88	3.5	μA
C _d	diode capacitance	V _R = 1 V; f = 1 MHz; T _j = 25 °C	-	25	-	pF
		V _R = 10 V; f = 1 MHz; T _j = 25 °C	-	9	-	pF
t _{rr}	reverse recovery time	I _F = 200 mA; I _R = 200 mA; I _{R(meas)} = 40 mA; T _j = 25 °C	-	1.9	-	ns



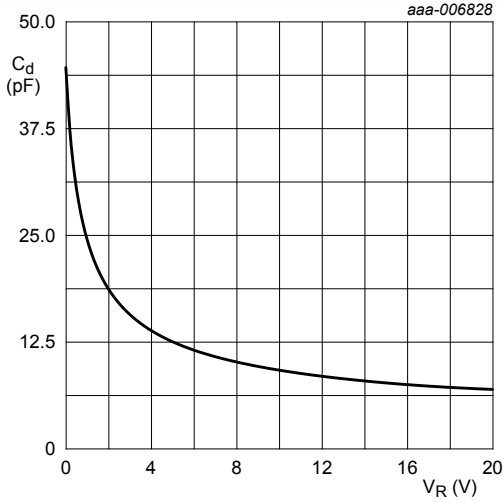
- (1) T_j = 125 °C
- (2) T_j = 85 °C
- (3) T_j = 25 °C
- (4) T_j = -40 °C

Fig. 4. Forward current as a function of forward voltage; typical values



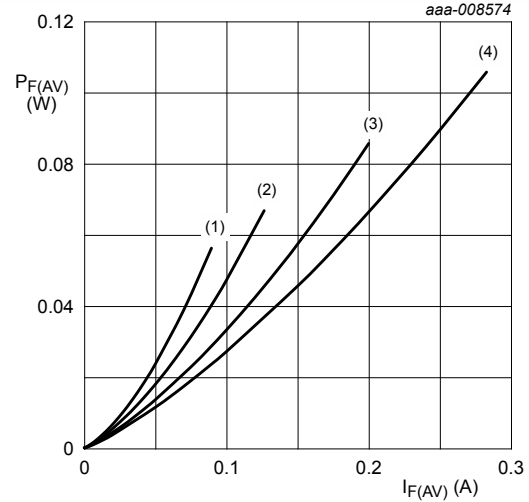
- (1) T_j = 125 °C
- (2) T_j = 85 °C
- (3) T_j = 25 °C
- (4) T_j = -40 °C

Fig. 5. Reverse current as a function of reverse voltage; typical values



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

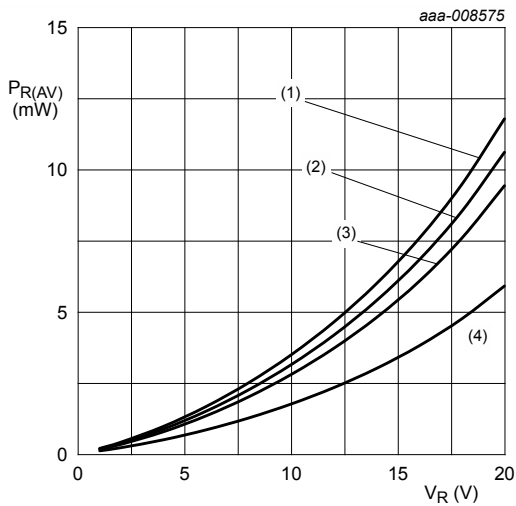
Fig. 6. Diode capacitance as a function of reverse voltage; typical values



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

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

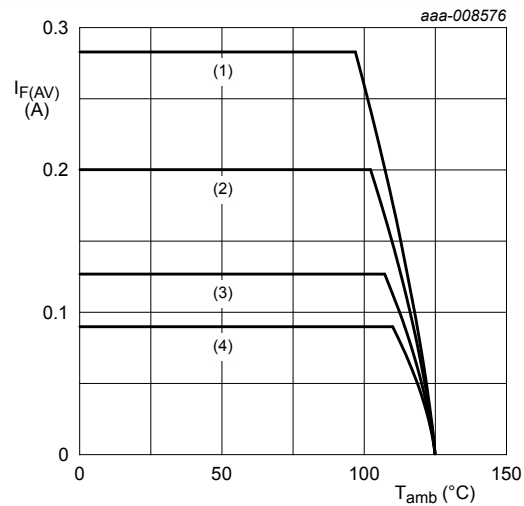
Fig. 7. Average forward power dissipation as a function of average forward current; typical values



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

- (1) $\delta = 1 \text{ (DC)}$
- (2) $\delta = 0.9; f = 20 \text{ kHz}$
- (3) $\delta = 0.8; f = 20 \text{ kHz}$
- (4) $\delta = 0.5; f = 20 \text{ kHz}$

Fig. 8. Average reverse power dissipation as a function of reverse voltage; typical values

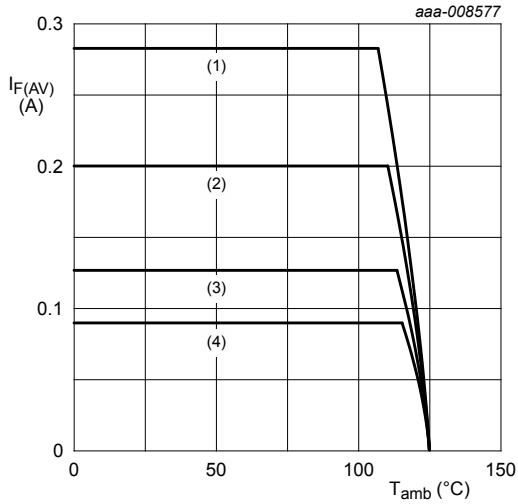


FR4 PCB, standard footprint

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

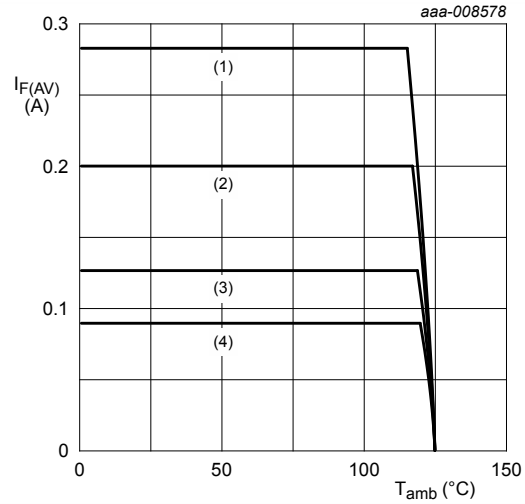
- (1) $\delta = 1$
- (2) $\delta = 0.5$
- (3) $\delta = 0.2$
- (4) $\delta = 0.1$

Fig. 9. Average forward current as a function of ambient temperature; typical values



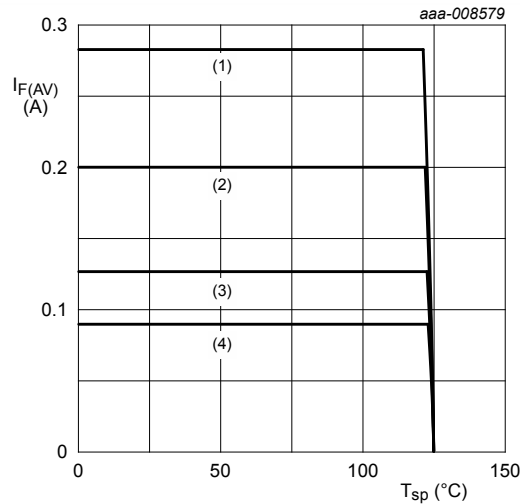
FR4 PCB, mounting pad for anode and cathode 1 cm² each
 T_j = 125 °C
 (1) δ = 1
 (2) δ = 0.5
 (3) δ = 0.2
 (4) δ = 0.1

Fig. 10. Average forward current as a function of ambient temperature; typical values



Ceramic PCB, Al₂O₃, standard footprint
 T_j = 125 °C
 (1) δ = 1
 (2) δ = 0.5
 (3) δ = 0.2
 (4) δ = 0.1

Fig. 11. Average forward current as a function of ambient temperature; typical values



T_j = 125 °C
 (1) δ = 1
 (2) δ = 0.5
 (3) δ = 0.2
 (4) δ = 0.1

Fig. 12. Average forward current as a function of solder point temperature; typical values

11. Test information

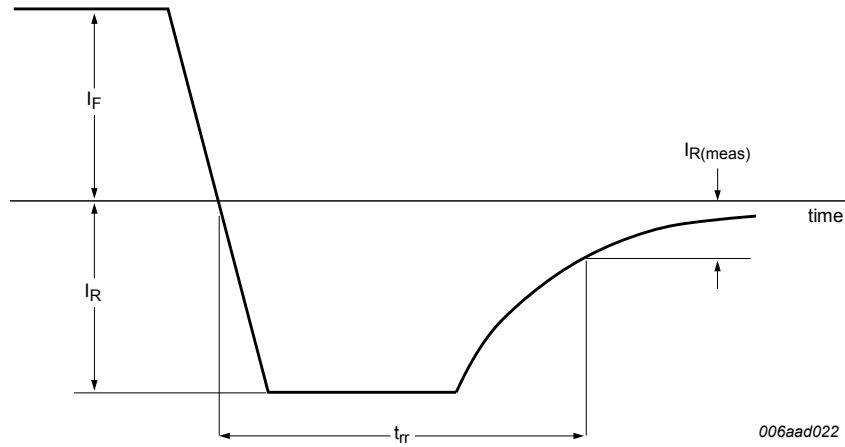


Fig. 13. Reverse recovery definition

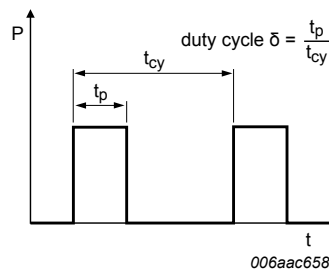


Fig. 14. Duty cycle definition

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

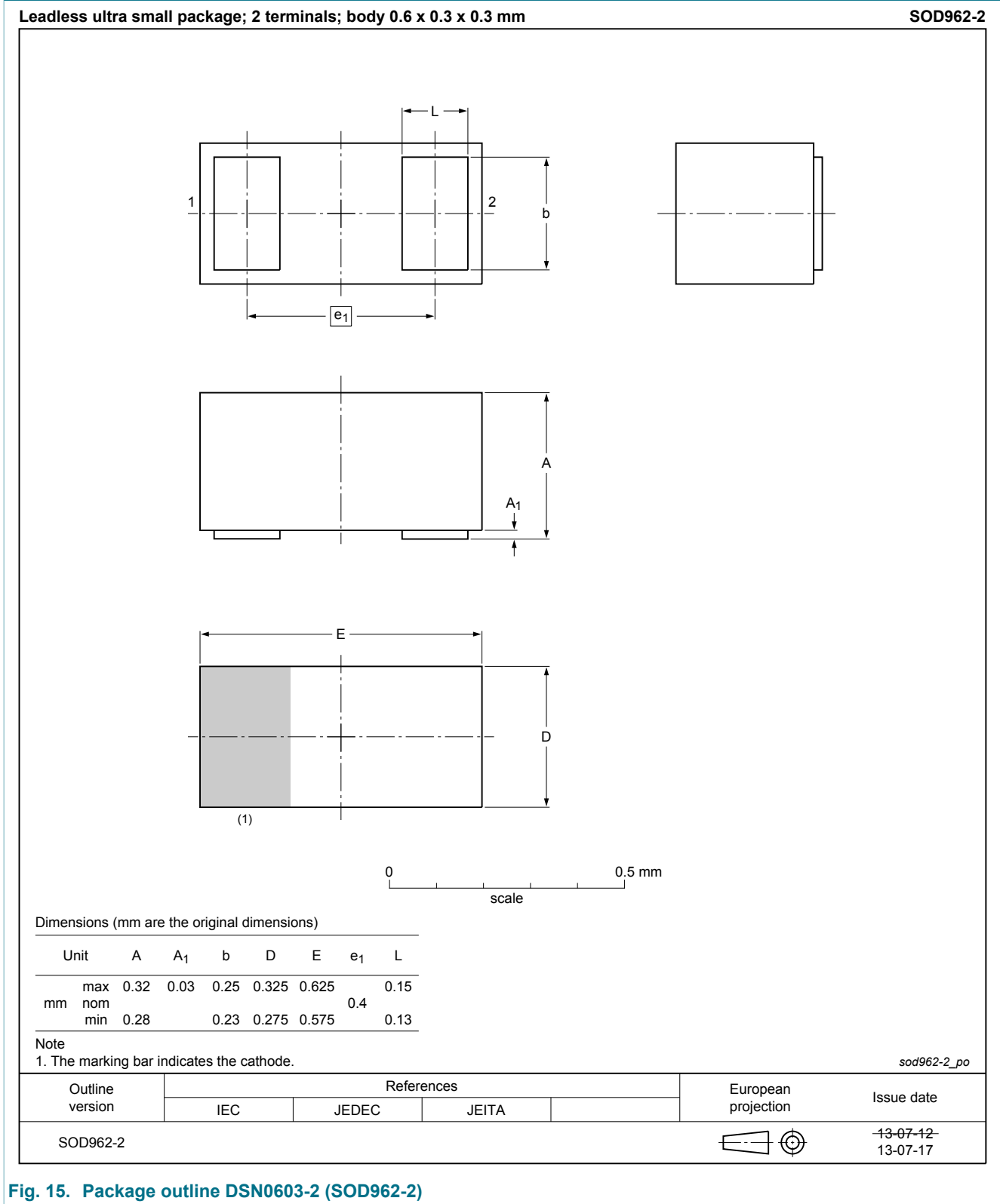


Fig. 15. Package outline DSN0603-2 (SOD962-2)

13. Soldering

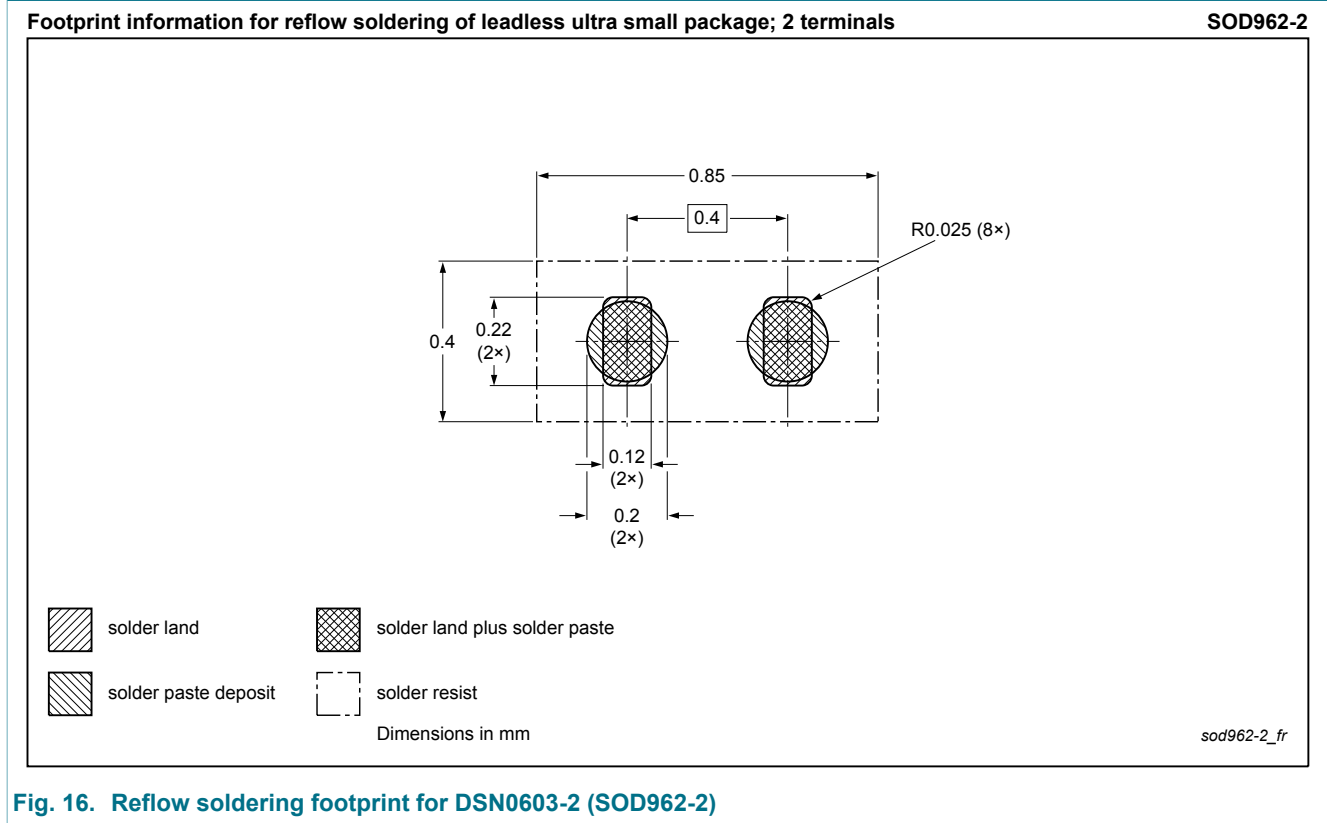


Fig. 16. Reflow soldering footprint for DSN0603-2 (SOD962-2)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG2002ESF v.2	20131008	Product data sheet	-	PMEG2002ESF v.1
Modifications:	<ul style="list-style-type: none"> Product status changed 			
PMEG2002ESF v.1	20130301	Objective data sheet	-	-

15. Legal information

15.1 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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Date of release: 8 October 2013