



PMEG2002ESF

20 V, 0.2 A low VF MEGA Schottky barrier rectifier

10 March 2017

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	forward current	$T_{sp} \leq 120$ °C	-	-	0.28	A
V_R	reverse voltage	$T_j = 25$ °C	-	-	20	V
V_F	forward voltage	$I_F = 200$ mA; $t_p \leq 300$ μ s; $\delta \leq 0.02$; pulsed; $T_j = 25$ °C	-	435	490	mV
I_R	reverse current	$V_R = 10$ V; $T_j = 25$ °C	-	0.37	-	μ A

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	$T_j = 25\text{ °C}$		-	20	V
I_F	forward current	$T_{sp} \leq 120\text{ °C}$		-	0.28	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{sp} \leq 125\text{ °C}$; square wave		-	0.2	A
		$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{amb} \leq 115\text{ °C}$; 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	$t_p = 8\text{ ms}$; $T_{j(init)} = 25\text{ °C}$; square wave		-	4.5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[2]	-	325	mW
			[3]	-	525	mW

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

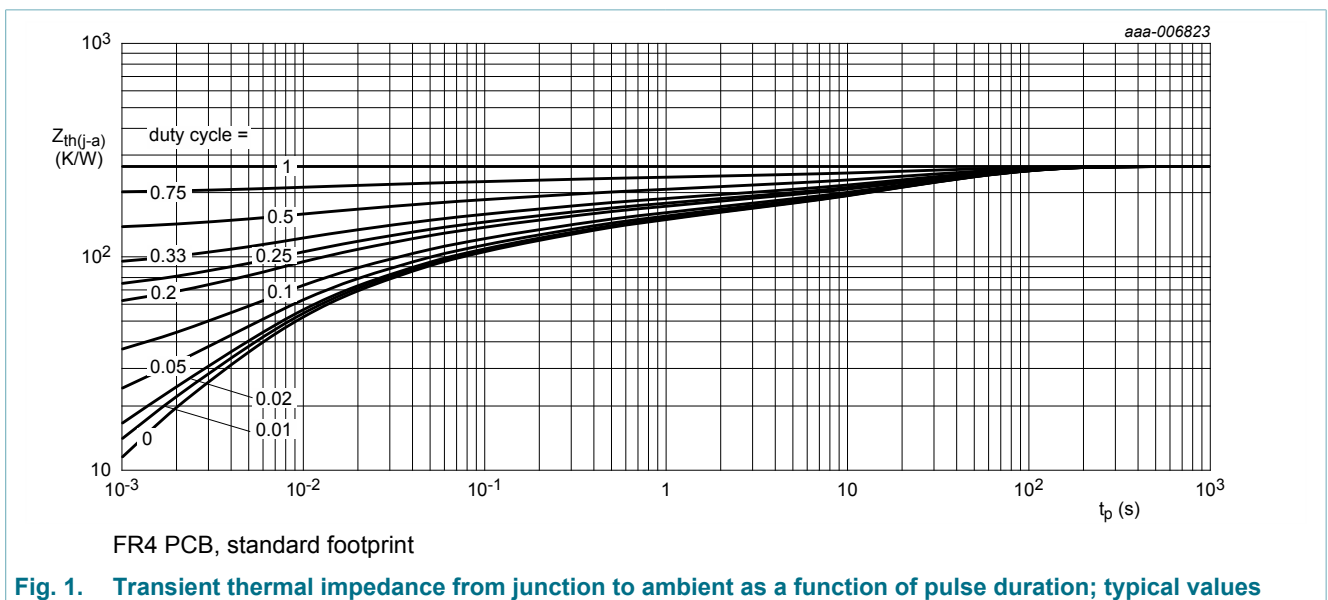
- [1] Device mounted on a ceramic Printed-Circuit Board (PCB), Al₂O₃, standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm² each.

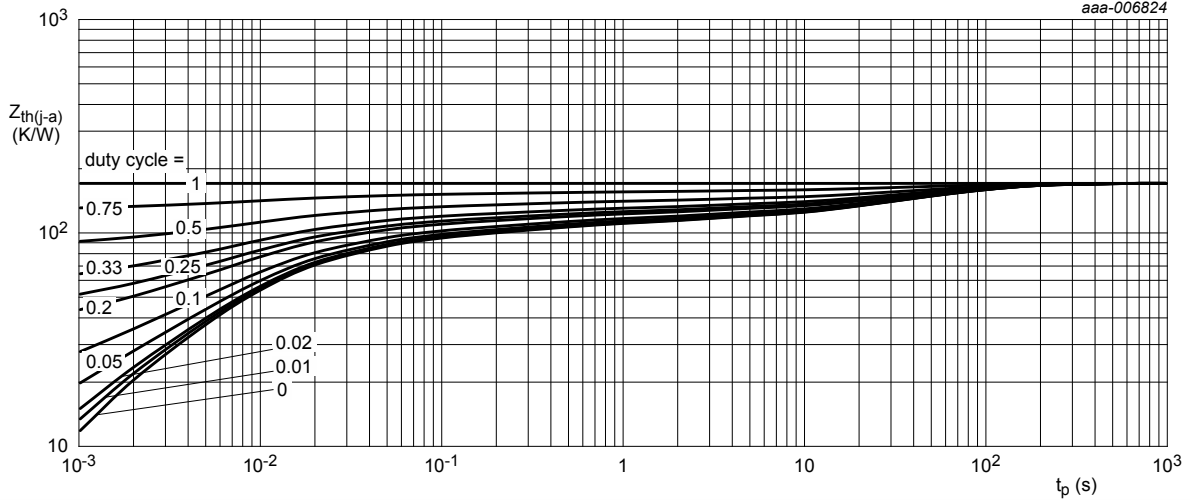
9. Thermal characteristics

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

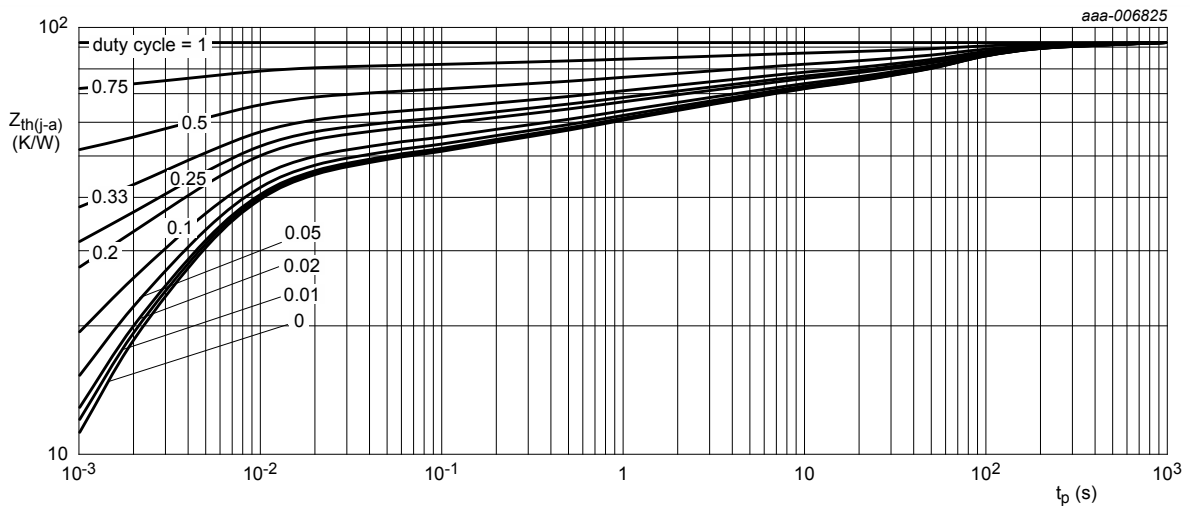
- [1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses P_R are a significant part of the total power losses.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [3] Device mounted on an FR4 PCB, 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; t _p ≤ 300 μs; δ ≤ 0.02 ; pulsed; T _J = 25 °C	-	185	250	mV
		I _F = 1 mA; t _p ≤ 300 μs; δ ≤ 0.02 ; pulsed; T _J = 25 °C	-	245	320	mV
		I _F = 10 mA; t _p ≤ 300 μs; δ ≤ 0.02 ; pulsed; T _J = 25 °C	-	310	380	mV
		I _F = 100 mA; t _p ≤ 300 μs; δ ≤ 0.02 ; pulsed; T _J = 25 °C	-	390	450	mV

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$I_F = 200 \text{ mA}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02$; pulsed; $T_j = 25 \text{ }^\circ\text{C}$	-	435	490	mV
I_R	reverse current	$V_R = 6 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	0.26	1.5	μA
		$V_R = 10 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	0.37	-	μA
		$V_R = 20 \text{ V}; T_j = 25 \text{ }^\circ\text{C}$	-	0.88	3.5	μA
C_d	diode capacitance	$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	25	-	pF
		$V_R = 10 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ }^\circ\text{C}$	-	9	-	pF
t_{rr}	reverse recovery time	$I_F = 200 \text{ mA}; I_R = 200 \text{ mA};$ $I_{R(\text{meas})} = 40 \text{ mA}; T_j = 25 \text{ }^\circ\text{C}$	-	1.9	-	ns

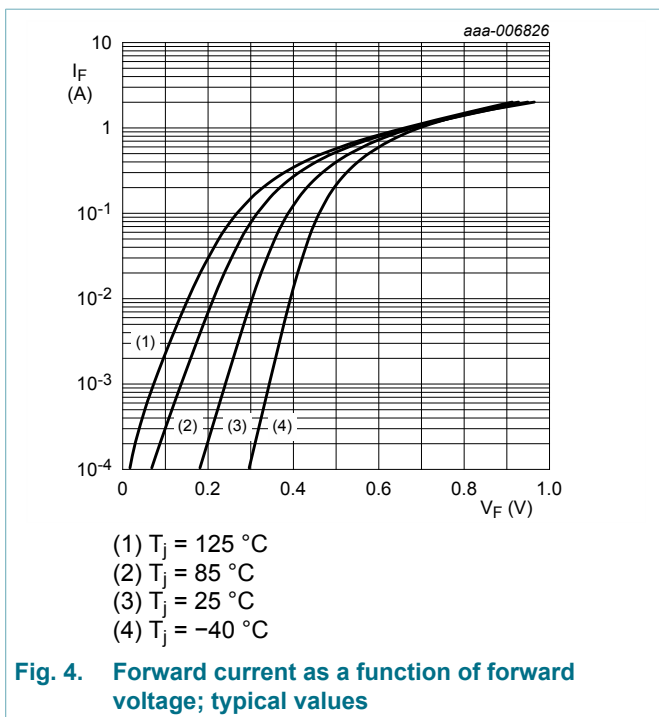


Fig. 4. Forward current as a function of forward voltage; typical values

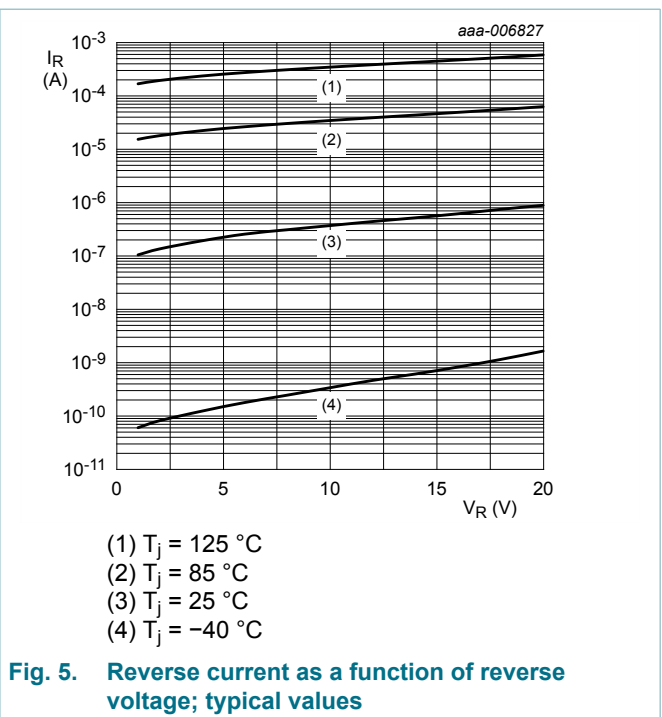
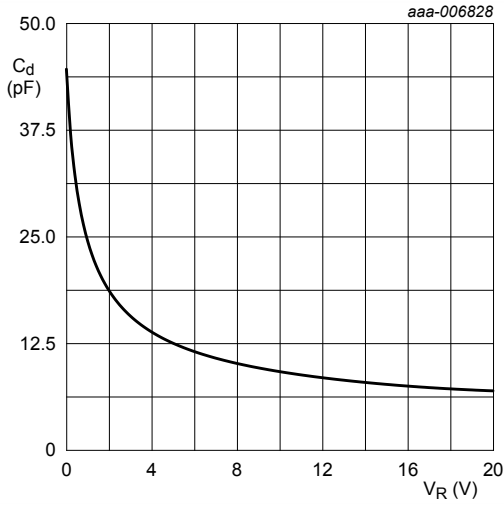
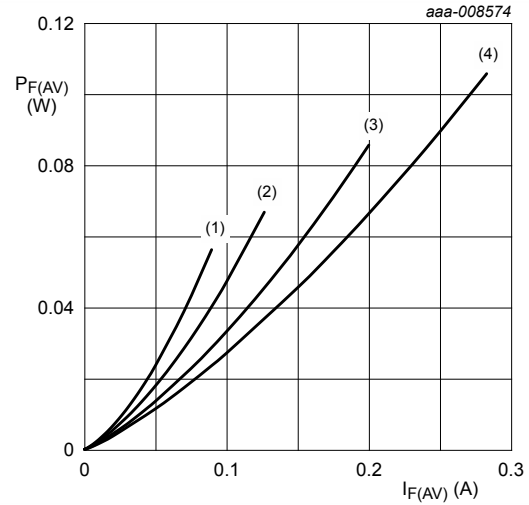


Fig. 5. Reverse current as a function of reverse voltage; typical values



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

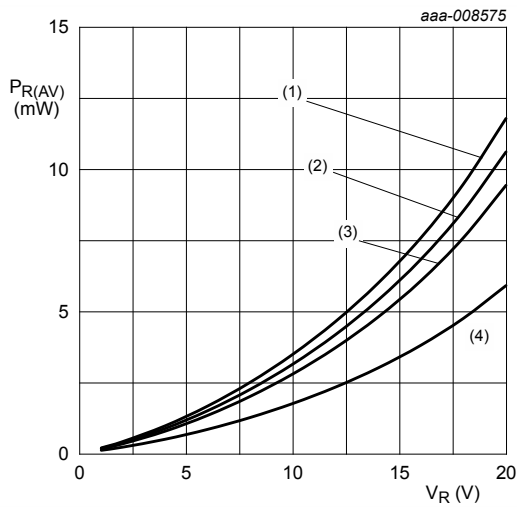
Fig. 6. Diode capacitance as a function of reverse voltage; typical values



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

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

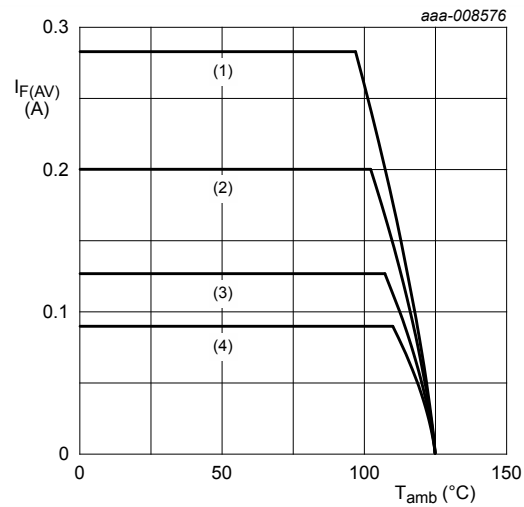
Fig. 7. Average forward power dissipation as a function of average forward current; typical values



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

- (1) $\delta = 1$ (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

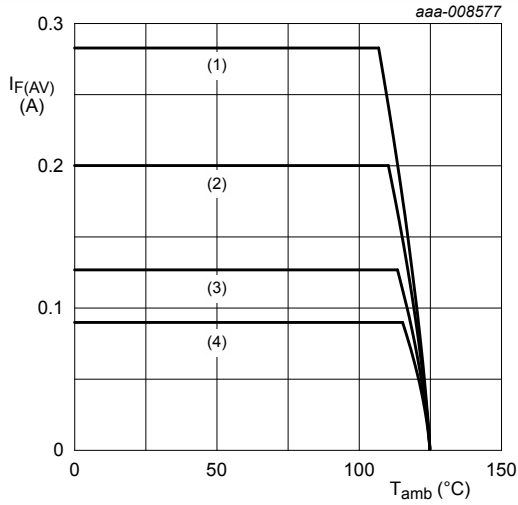


FR4 PCB, standard footprint

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

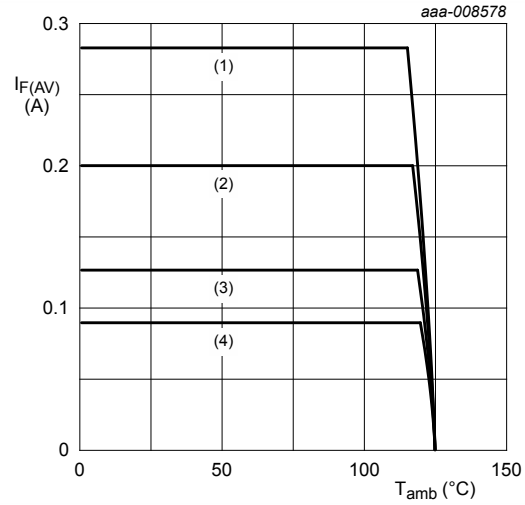
- (1) $\delta = 1$
- (2) $\delta = 0.5$
- (3) $\delta = 0.2$
- (4) $\delta = 0.1$

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



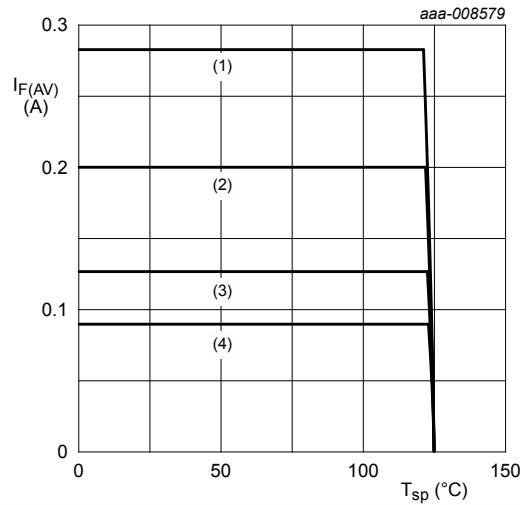
FR4 PCB, mounting pad for anode and cathode 1 cm² each
 $T_j = 125\text{ °C}$
 (1) $\delta = 1$
 (2) $\delta = 0.5$
 (3) $\delta = 0.2$
 (4) $\delta = 0.1$

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



Ceramic PCB, Al₂O₃, standard footprint
 $T_j = 125\text{ °C}$
 (1) $\delta = 1$
 (2) $\delta = 0.5$
 (3) $\delta = 0.2$
 (4) $\delta = 0.1$

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



$T_j = 125\text{ °C}$
 (1) $\delta = 1$
 (2) $\delta = 0.5$
 (3) $\delta = 0.2$
 (4) $\delta = 0.1$

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

11. Test information

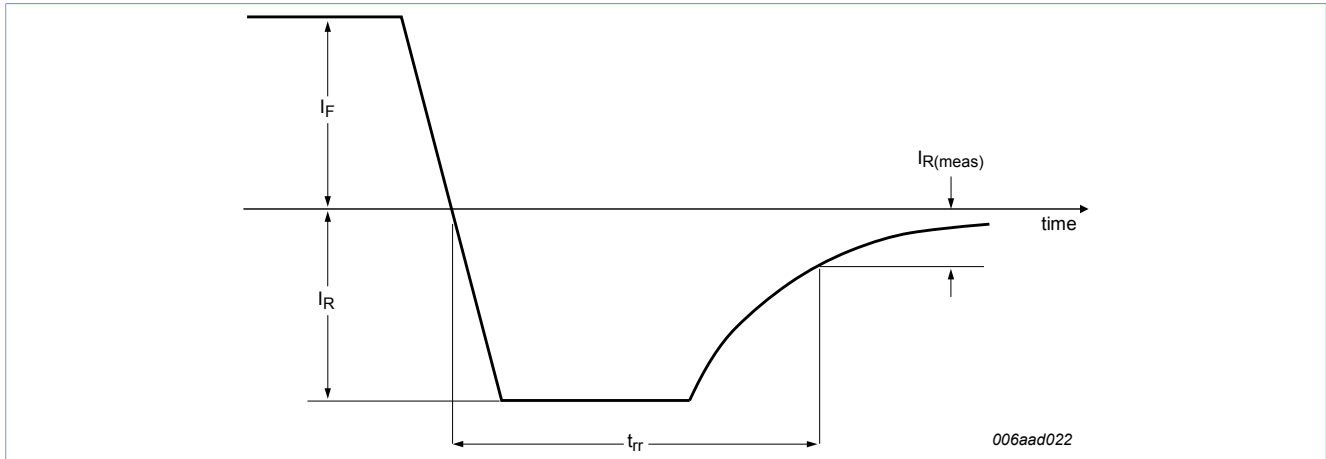


Fig. 13. Reverse recovery definition

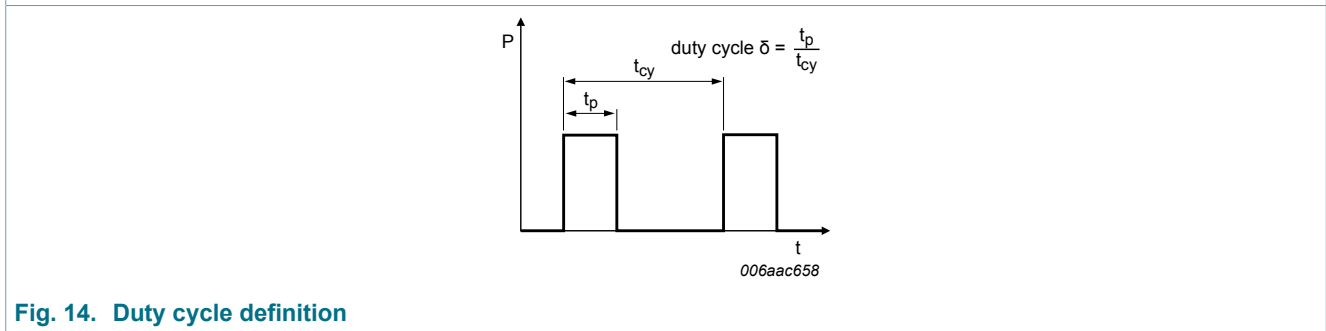


Fig. 14. Duty cycle definition

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

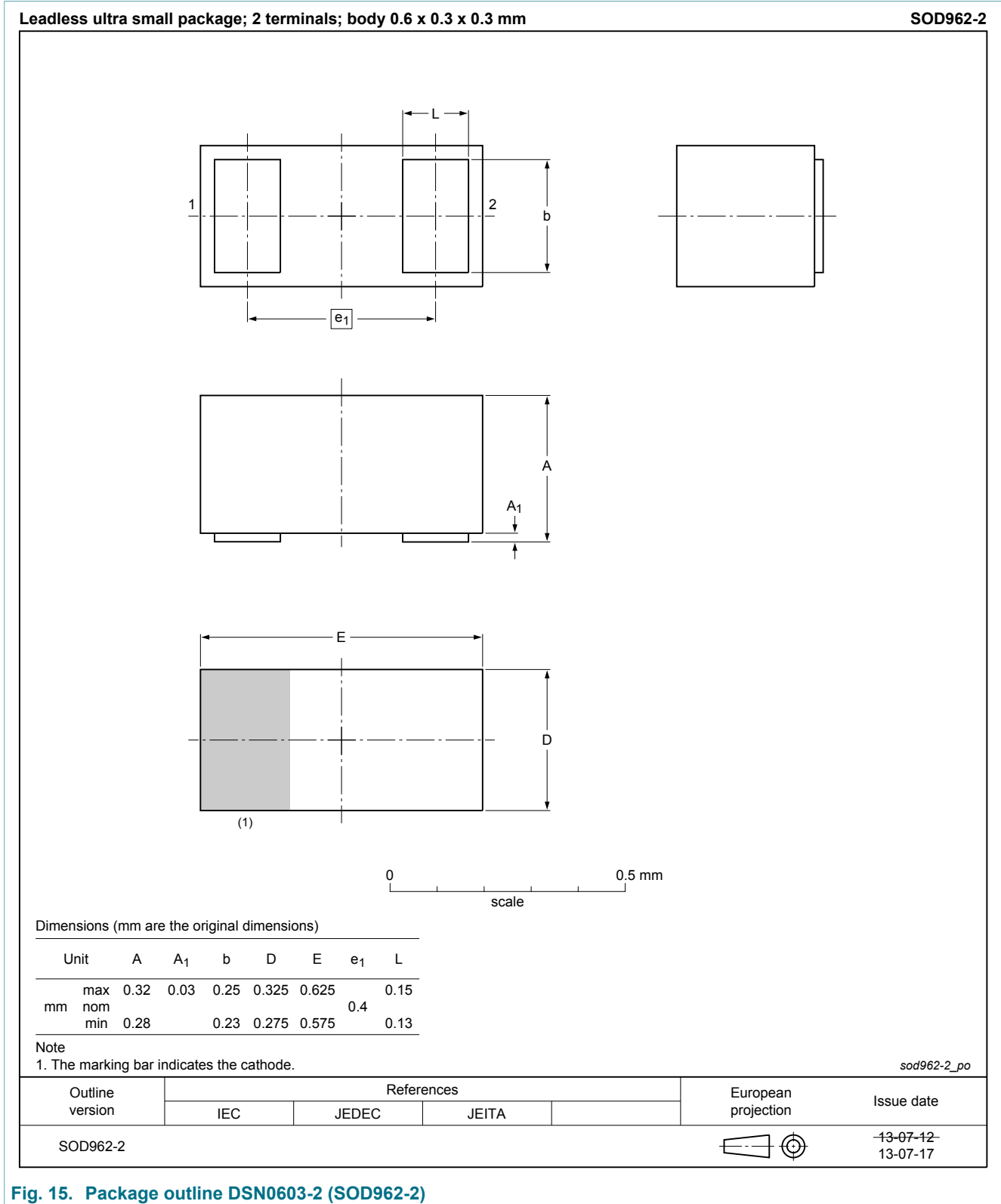


Fig. 15. Package outline DSN0603-2 (SOD962-2)

13. Soldering

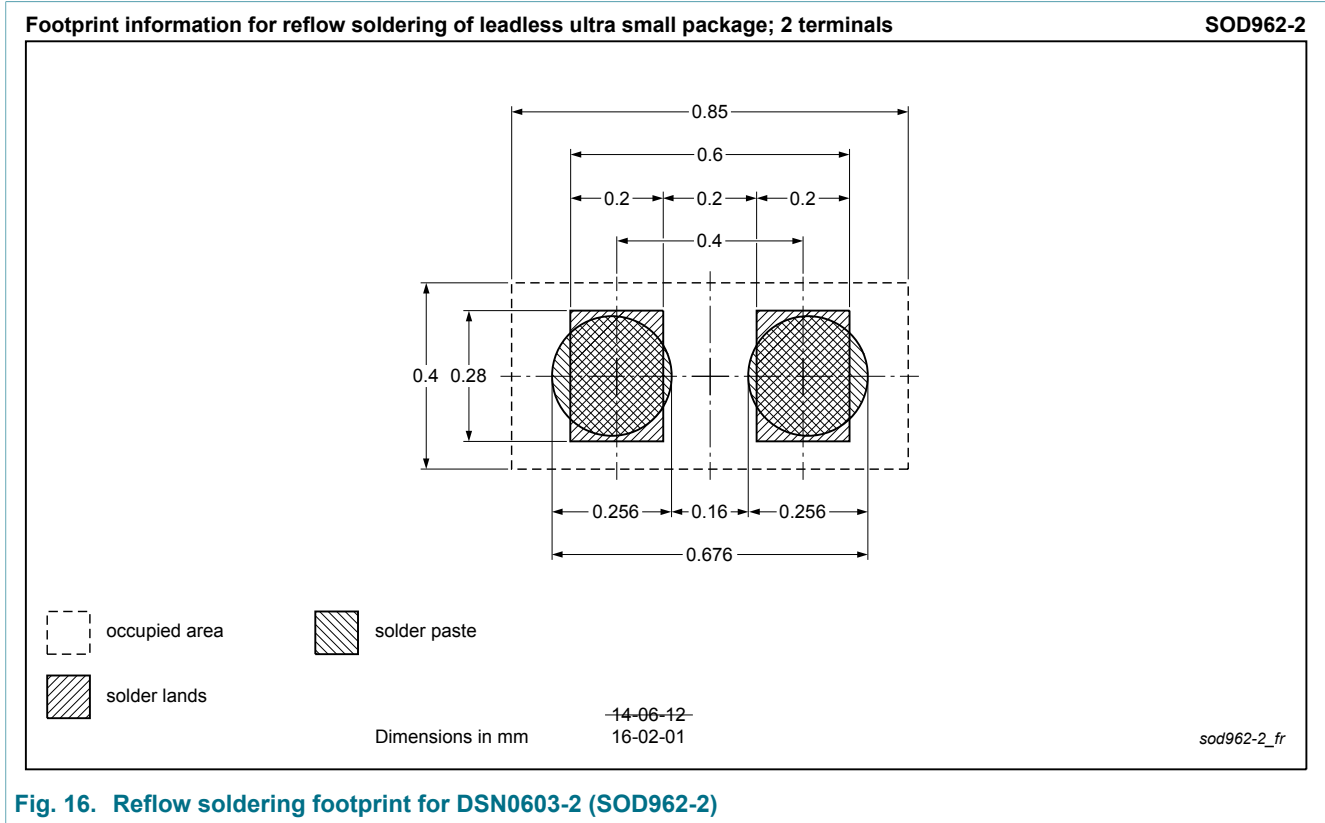


Fig. 16. Reflow soldering footprint for DSN0603-2 (SOD962-2)

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

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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