



PMEG1201AESF

12 V, 0.1 A low VF MEGA Schottky barrier rectifier

14 July 2014

Preliminary 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 $I_{F(AV)} \leq 0.1$ A
- Reverse voltage $V_R \leq 12$ V
- Low forward voltage typ. $V_F = 160$ mV (at $I_F = 30$ mA; pulsed)
- Low reverse current typ. $I_R = 240$ μ A (at $V_R = 5$ V)
- Ultra small and leadless SMD package
- Package height typical 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

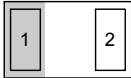

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20$ kHz; $T_{amb} \leq 115$ °C; square wave	[1]	-	-	0.1	A
		$\delta < 0.5$; $f = 20$ kHz; $T_{sp} \leq 125$ °C; square wave		-	-	0.1	A
V_R	reverse voltage	$T_j = 25$ °C		-	-	12	V
V_F	forward voltage	$I_F = 30$ mA; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °C		-	160	200	mV
I_R	reverse current	$V_R = 5$ V; $t_p \leq 300$ μ s; $T_j = 25$ °C; pulsed		-	240	1000	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</p> <p>DSN0603-2 (SOD962-2)</p>	 <p>sym001</p>
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG1201AESF	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
PMEG1201AESF	9

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	$T_j = 25\text{ °C}$		-	12	V
I_F	forward current	$T_{sp} = 120\text{ °C}; \delta = 1$		-	0.14	A
$I_{F(AV)}$	average forward current	$\delta = 0.5; f = 20\text{ kHz}; T_{amb} \leq 115\text{ °C};$ square wave	[1]	-	0.1	A
		$\delta < 0.5; f = 20\text{ kHz}; T_{sp} \leq 125\text{ °C};$ square wave		-	0.1	A
I_{FRM}	repetitive peak forward current	$t_p \leq 1\text{ ms}; \delta \leq 0.25$		-	2	A
I_{FSM}	non-repetitive peak forward current	$t_p = 8\text{ ms}; T_{j(init)} = 25\text{ °C};$ square wave		-	4	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[2]	-	325	mW
			[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), Al_2O_3 , 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 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]	-	-	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 cm^2 each.

[4] Device mounted on a ceramic PCB, Al_2O_3 , standard footprint.

[5] Soldering point of cathode tab.

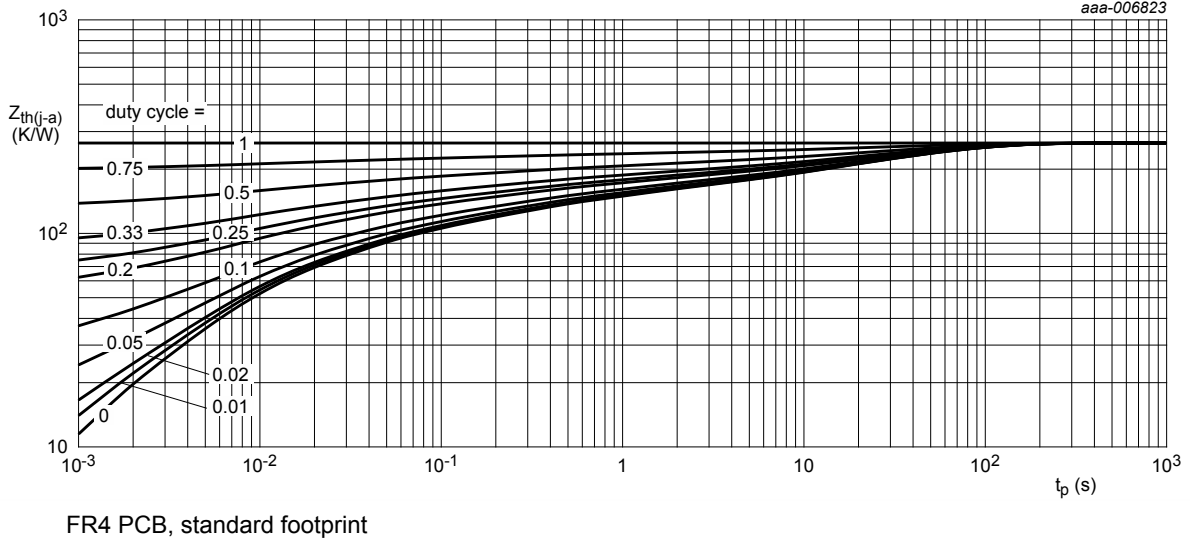


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

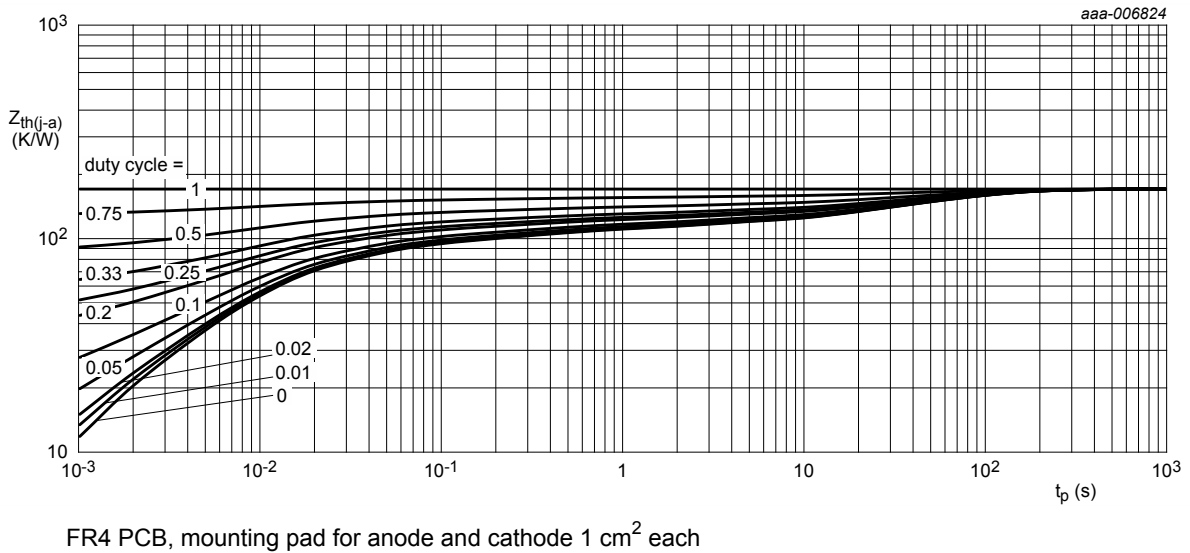
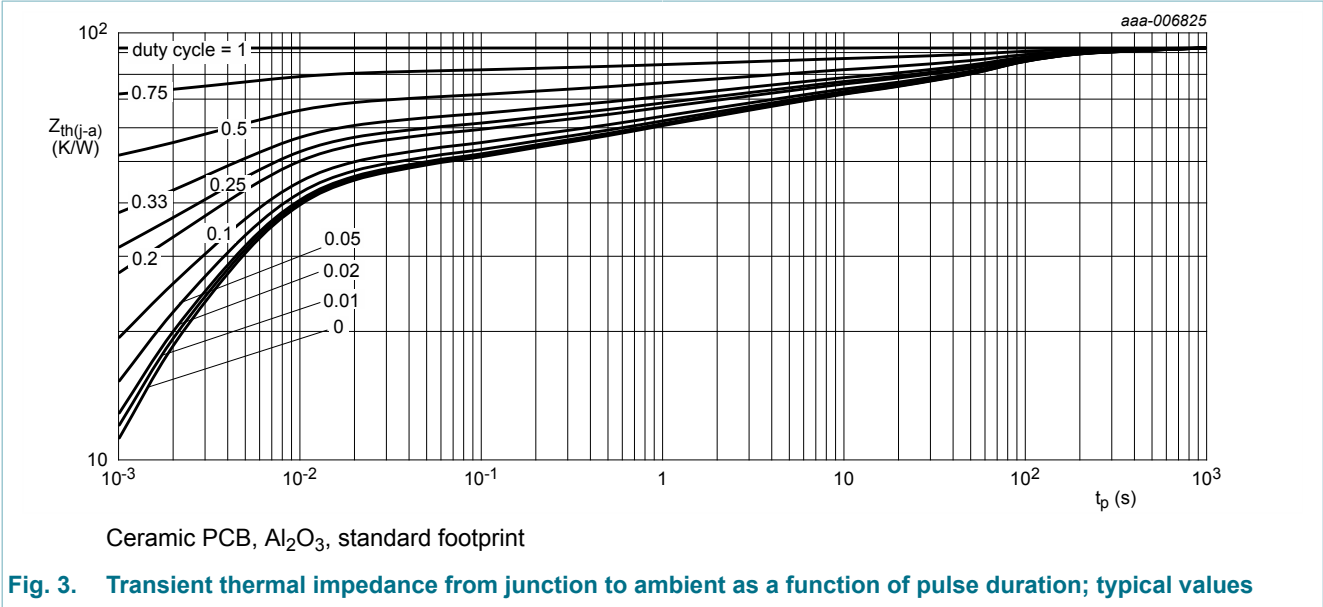


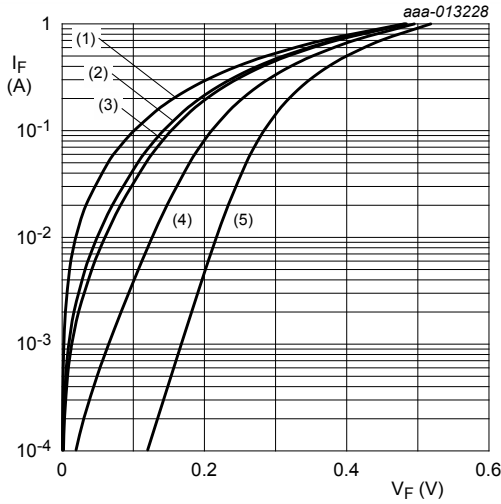
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



10. Characteristics

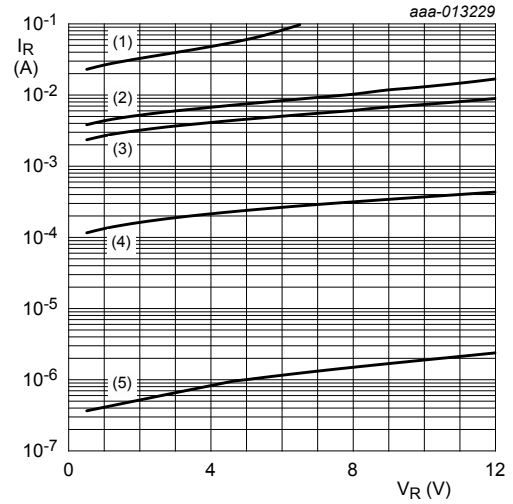
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _F	forward voltage	I _F = 0.1 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C	-	20	60	mV
		I _F = 1 mA; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C; pulsed	-	70	110	mV
		I _F = 10 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C	-	130	170	mV
		I _F = 20 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C	-	150	190	mV
		I _F = 30 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C	-	160	200	mV
		I _F = 100 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C	-	210	250	mV
I _R	reverse current	V _R = 5 V; t _p ≤ 300 μs; T _j = 25 °C; pulsed	-	240	1000	μA
		V _R = 10 V; t _p ≤ 300 s; T _j = 25 °C; pulsed	-	370	1500	μA
		V _R = 12 V; t _p ≤ 300 μs; T _j = 25 °C; pulsed	-	430	2000	μA
C _d	diode capacitance	V _R = 1 V; f = 1 MHz; T _j = 25 °C	-	26	-	pF
		V _R = 10 V; f = 1 MHz; T _j = 25 °C	-	10	-	pF



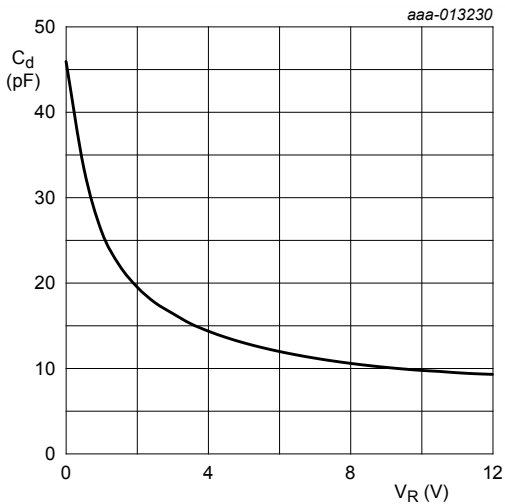
- (1) $T_j = 125\text{ }^\circ\text{C}$
- (2) $T_j = 85\text{ }^\circ\text{C}$
- (3) $T_j = 75\text{ }^\circ\text{C}$
- (4) $T_j = 25\text{ }^\circ\text{C}$
- (5) $T_j = -40\text{ }^\circ\text{C}$

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



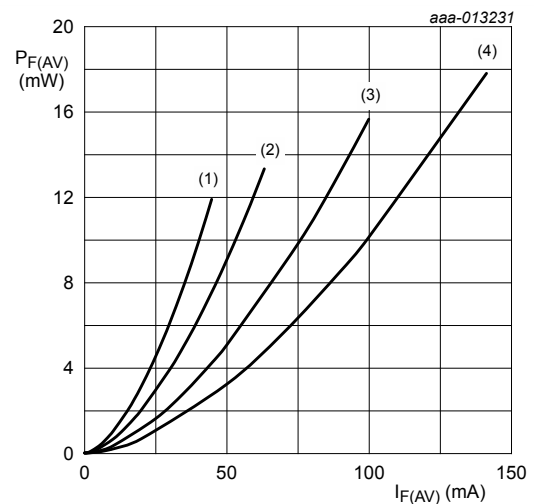
- (1) $T_j = 125\text{ }^\circ\text{C}$
- (2) $T_j = 85\text{ }^\circ\text{C}$
- (3) $T_j = 75\text{ }^\circ\text{C}$
- (4) $T_j = 25\text{ }^\circ\text{C}$
- (5) $T_j = -40\text{ }^\circ\text{C}$

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



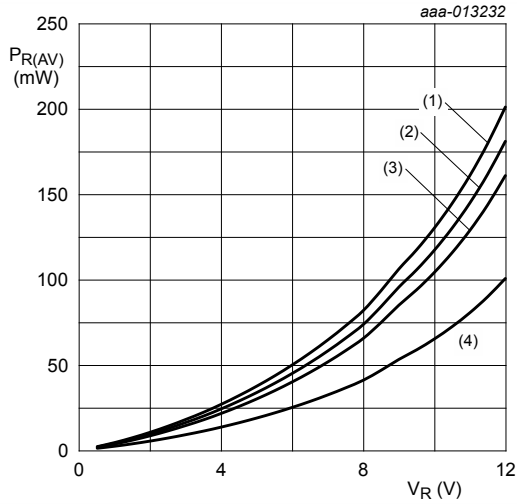
$f = 1\text{ MHz}; T_{amb} = 25\text{ }^\circ\text{C}$

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



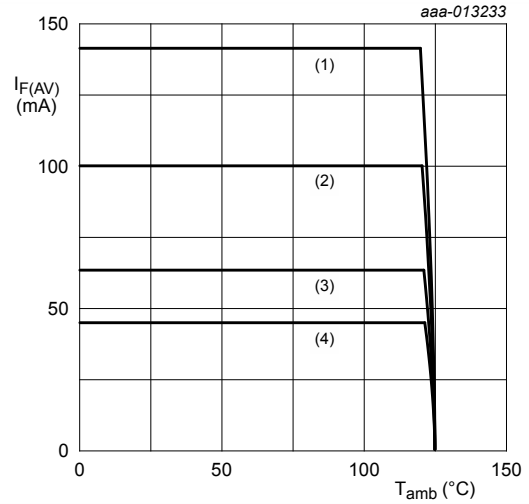
- $T_j = 125\text{ }^\circ\text{C}$
- (1) $\delta = 0.1$
- (2) $\delta = 0.2$
- (3) $\delta = 0.5$
- (4) $\delta = 1$

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



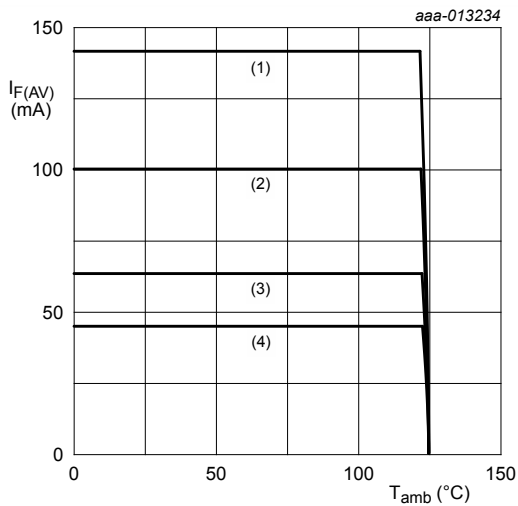
$T_j = 85\text{ °C}$
 (1) $\delta = 1$
 (2) $\delta = 0.9$
 (3) $\delta = 0.8$
 (4) $\delta = 0.5$

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



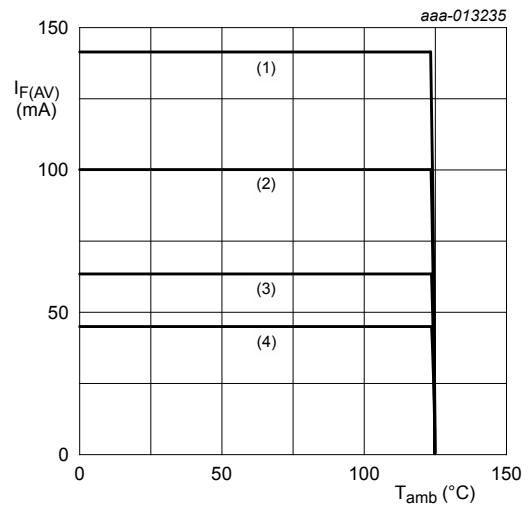
FR4 PCB, standard footprint
 $T_j = 125\text{ °C}$
 (1) $\delta = 1$; DC
 (2) $\delta = 0.5$; $f = 20\text{ kHz}$
 (3) $\delta = 0.2$; $f = 20\text{ kHz}$
 (4) $\delta = 0.1$; $f = 20\text{ kHz}$

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



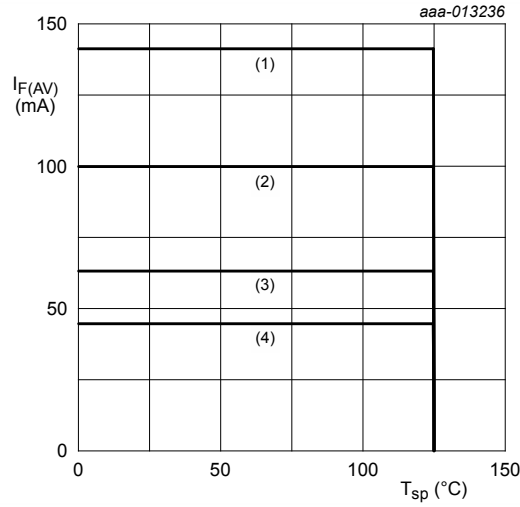
FR4 PCB, mounting pad for anode and cathode
 1 cm² each
 $T_j = 125\text{ °C}$
 (1) $\delta = 1$; DC
 (2) $\delta = 0.5$; $f = 20\text{ kHz}$
 (3) $\delta = 0.2$; $f = 20\text{ kHz}$
 (4) $\delta = 0.1$; $f = 20\text{ kHz}$

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



Ceramic PCB, Al₂O₃, standard footprint
 $T_j = 125\text{ °C}$
 (1) $\delta = 1$; 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. 11. Average forward current as a function of ambient temperature; typical values



$T_j = 125\text{ °C}$

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

11. Test information

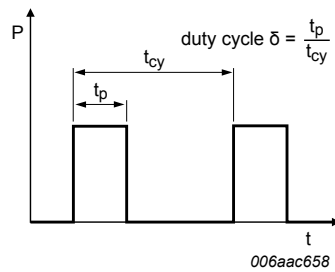


Fig. 13. Duty cycle definition

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

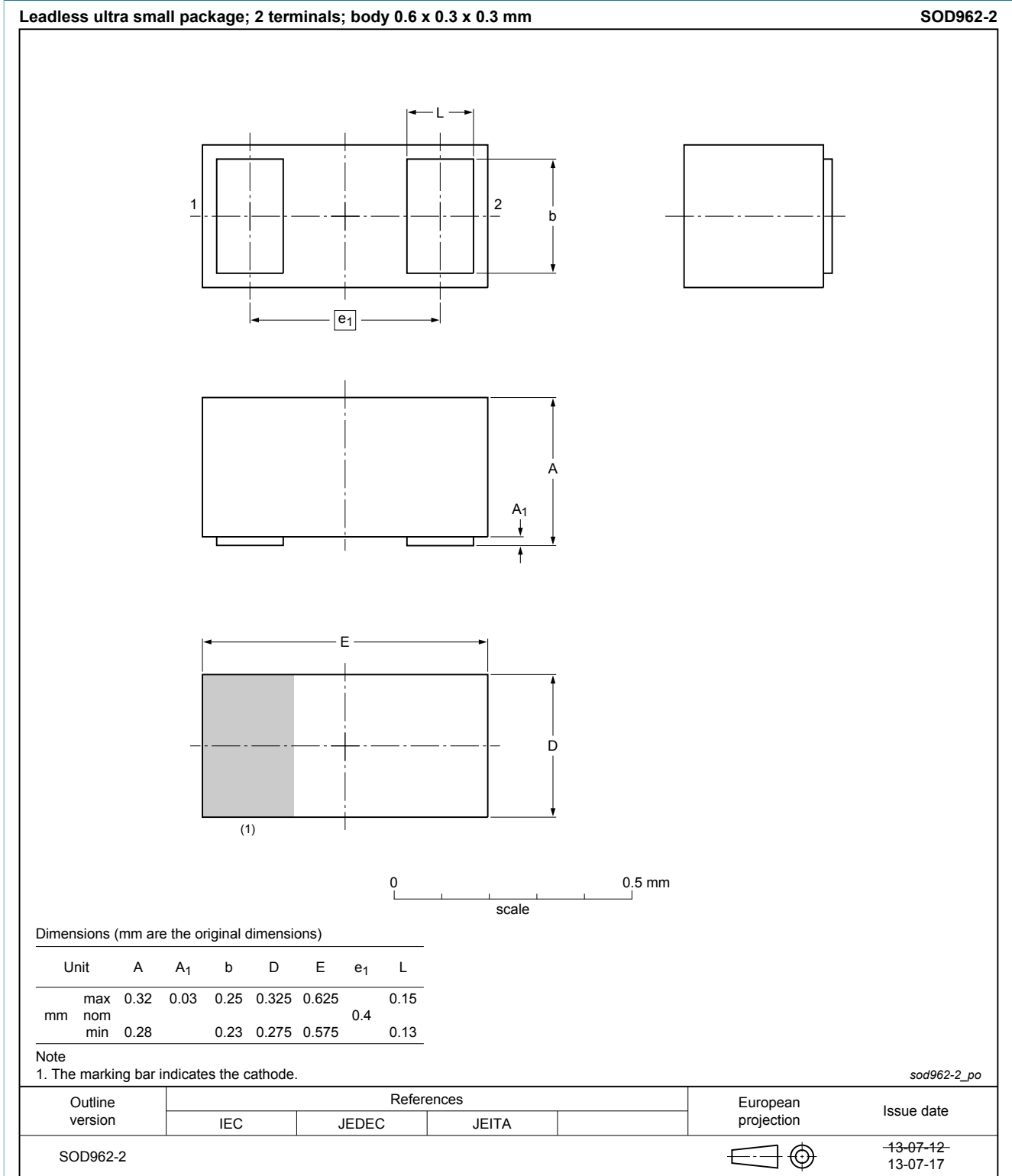
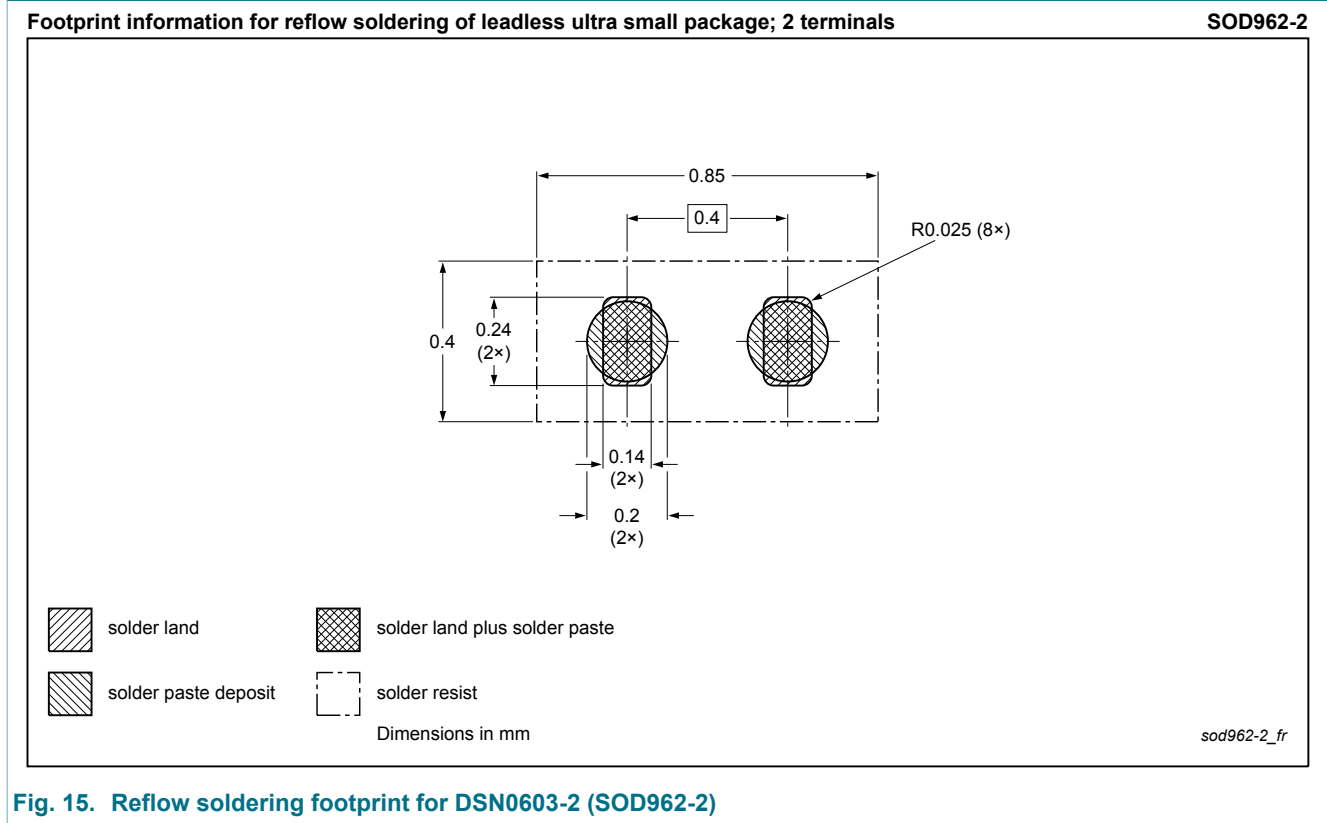


Fig. 14. Package outline DSN0603-2 (SOD962-2)

13. Soldering



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG1201AESF v. 1	20140714	Preliminary 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.
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