



# PMEG3005AESF

30 V, 0.5 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 Chip-Scale Package (CSP).

## 2. Features and benefits

- Average forward current  $I_{F(AV)} \leq 0.5$  A
- Reverse voltage  $V_R \leq 30$  V
- Low forward voltage typ.  $V_F = 250$  mV
- Low reverse current typ.  $I_R = 4$   $\mu$ A
- Package height typ. 0.3 mm

## 3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- 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	$T_{sp} \leq 135$ °C; $\delta = 1$	-	-	0.7	A
$V_R$	reverse voltage	$T_j = 25$ °C	-	-	30	V
$V_F$	forward voltage	$I_F = 200$ mA; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_j = 25$ °C	-	405	470	mV
$I_R$	reverse current	$V_R = 30$ V; $T_j = 25$ °C; pulsed	-	20	80	$\mu$ A

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 <p>Transparent top view</p> <p><b>DSN0603-2 (SOD962-2)</b></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
PMEG3005AESF	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
PMEG3005AESF	8

## 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	$T_j = 25\text{ }^{\circ}\text{C}$		-	30	V
$I_F$	forward current	$T_{sp} \leq 135\text{ }^{\circ}\text{C}$ ; $\delta = 1$		-	0.7	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20\text{ kHz}$ ; $T_{amb} \leq 105\text{ }^{\circ}\text{C}$ ; square wave	[1]	-	0.5	A
		$\delta = 0.5$ ; $f = 20\text{ kHz}$ ; $T_{sp} \leq 140\text{ }^{\circ}\text{C}$ ; square wave		-	0.5	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1\text{ ms}$ ; $\delta \leq 0.25$		-	1.5	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8\text{ ms}$ ; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$ ; square wave		-	4	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	[2]	-	405	mW
			[3]	-	660	mW

Symbol	Parameter	Conditions		Min	Max	Unit
			[1]	-	1200	mW
T <sub>j</sub>	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-55	150	°C
T <sub>stg</sub>	storage temperature			-65	150	°C

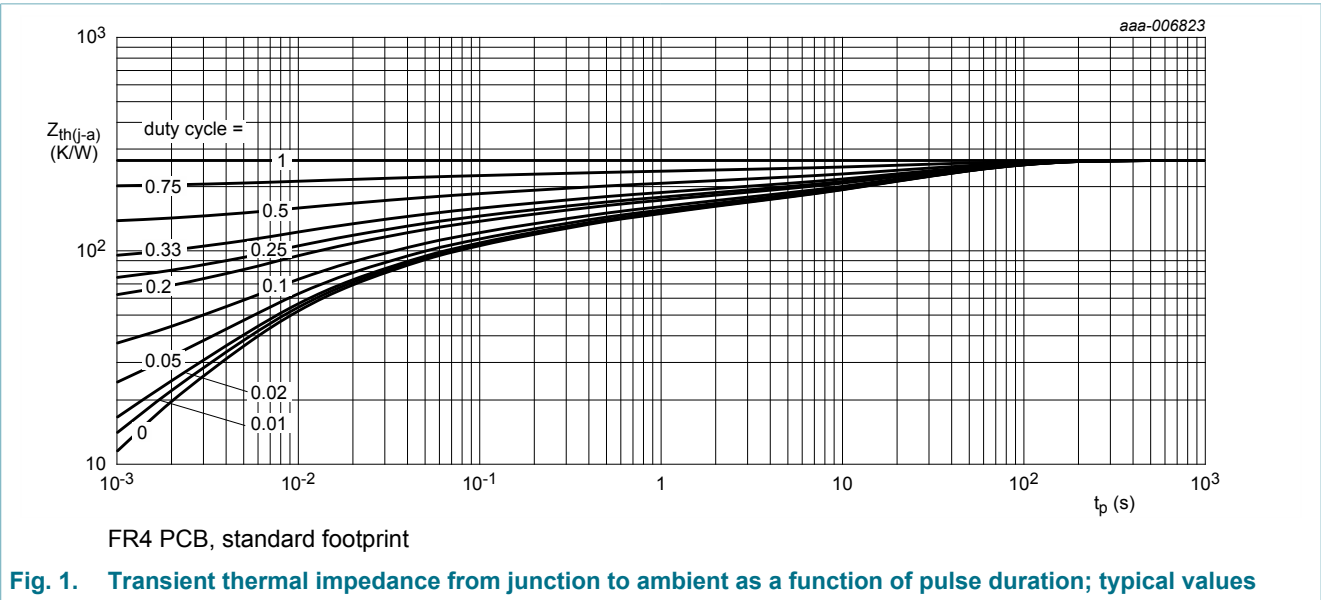
- [1] Device mounted on a ceramic Printed-Circuit Board (PCB), Al<sub>2</sub>O<sub>3</sub>, standard footprint.
- [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for anode and cathode 1 cm<sup>2</sup> each.

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
R <sub>th(j-a)</sub>	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 <sub>th(j-sp)</sub>	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<sub>R</sub> 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<sup>2</sup> each.
- [4] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.
- [5] Soldering point of anode tab.





Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$I_F = 100\text{ mA}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02\text{ ; } T_j = 25\text{ }^\circ\text{C}$	-	350	410	mV
		$I_F = 200\text{ mA}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02\text{ ; } T_j = 25\text{ }^\circ\text{C}$	-	405	470	mV
		$I_F = 500\text{ mA}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02\text{ ; } T_j = 25\text{ }^\circ\text{C}$	-	560	630	mV
$I_R$	reverse current	$V_R = 10\text{ V}; T_j = 25\text{ }^\circ\text{C}; \text{pulsed}$	-	4	30	$\mu\text{A}$
		$V_R = 30\text{ V}; T_j = 25\text{ }^\circ\text{C}; \text{pulsed}$	-	20	80	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1\text{ V}; f = 1\text{ MHz}; T_j = 25\text{ }^\circ\text{C}$	-	22	-	pF
		$V_R = 10\text{ V}; f = 1\text{ MHz}; T_j = 25\text{ }^\circ\text{C}$	-	8	-	pF
$t_{rr}$	reverse recovery time	$I_F = 500\text{ mA}; I_R = 500\text{ mA}; I_{R(\text{meas})} = 100\text{ mA}; T_j = 25\text{ }^\circ\text{C}$	-	1.37	-	ns

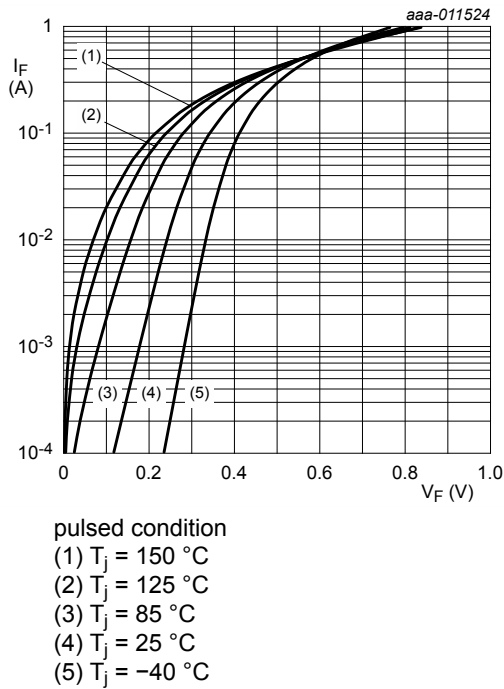


Fig. 4. Forward current as a function of forward voltage; typical values

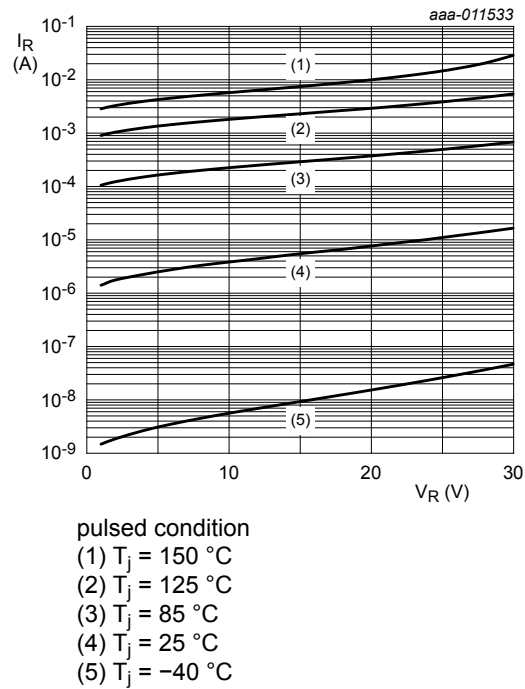
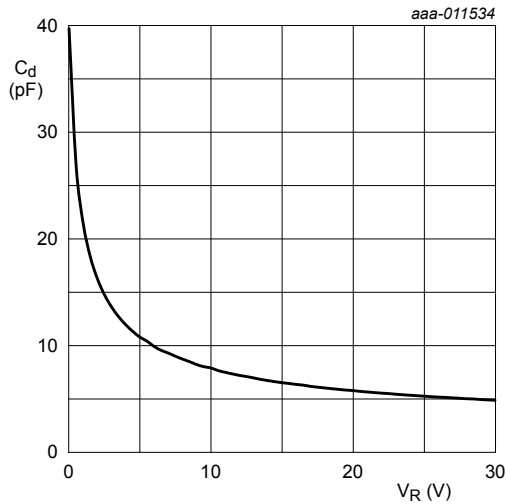
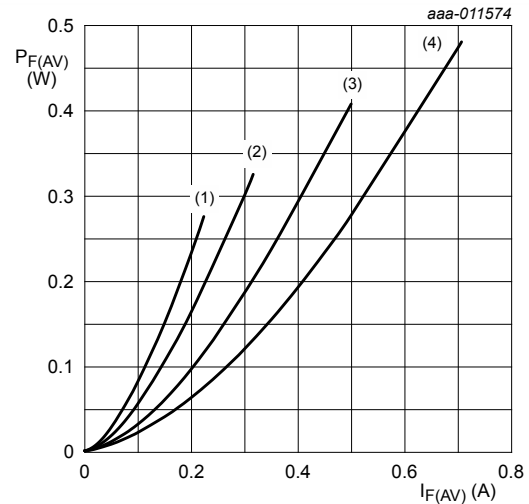


Fig. 5. Reverse current as a function of reverse voltage; typical values



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

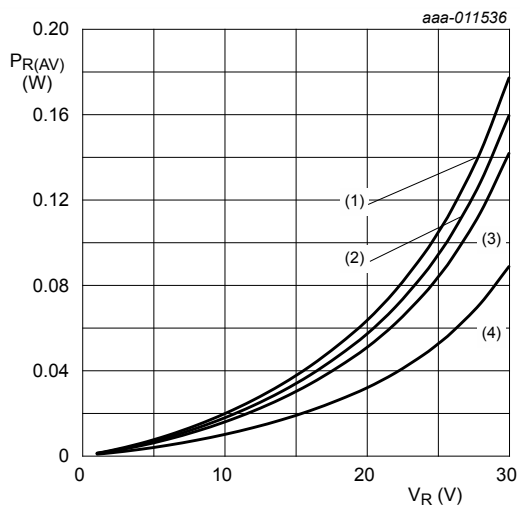
**Fig. 6.** Diode capacitance as a function of reverse voltage; typical values



$T_j = 150^\circ\text{C}$

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

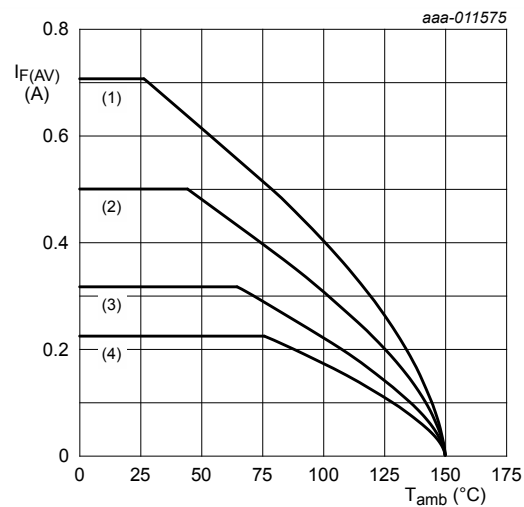
**Fig. 7.** Average forward power dissipation as a function of average forward current; typical values



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

- (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

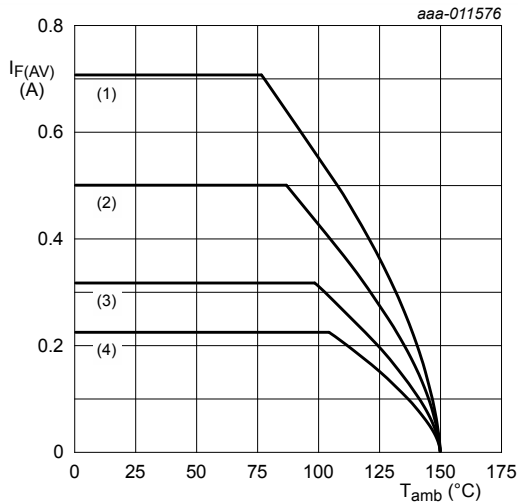


FR4 PCB, standard footprint

$T_j = 150^\circ\text{C}$

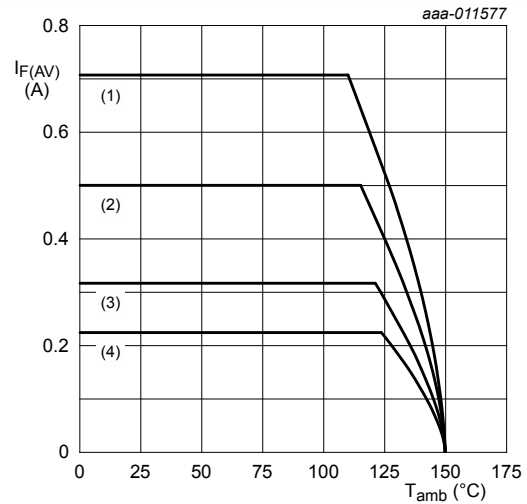
- (1)  $\delta = 1$ ; DC
- (2)  $\delta = 0.5$ ;  $f = 20 \text{ kHz}$
- (3)  $\delta = 0.2$ ;  $f = 20 \text{ kHz}$
- (4)  $\delta = 0.1$ ;  $f = 20 \text{ kHz}$

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



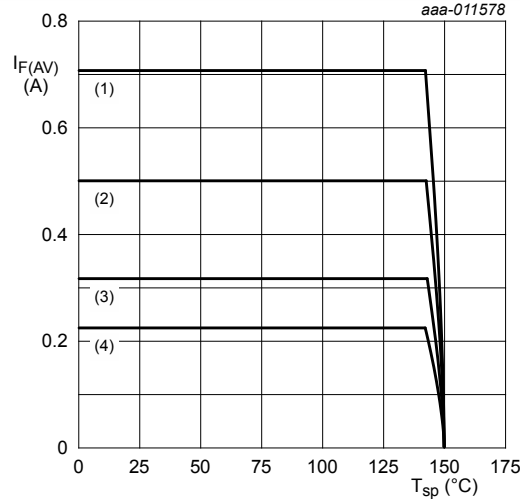
FR4 PCB, mounting pad for anode and cathode 1 cm<sup>2</sup> each  
 $T_j = 150$  °C  
 (1)  $\delta = 1$ ; DC  
 (2)  $\delta = 0.5$ ;  $f = 20$  kHz  
 (3)  $\delta = 0.2$ ;  $f = 20$  kHz  
 (4)  $\delta = 0.1$ ;  $f = 20$  kHz

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



Ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint  
 $T_j = 150$  °C  
 (1)  $\delta = 1$ ; DC  
 (2)  $\delta = 0.5$ ;  $f = 20$  kHz  
 (3)  $\delta = 0.2$ ;  $f = 20$  kHz  
 (4)  $\delta = 0.1$ ;  $f = 20$  kHz

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



$T_j = 150$  °C  
 (1)  $\delta = 1$ ; DC  
 (2)  $\delta = 0.5$ ;  $f = 20$  kHz  
 (3)  $\delta = 0.2$ ;  $f = 20$  kHz  
 (4)  $\delta = 0.1$ ;  $f = 20$  kHz

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

11. Test information

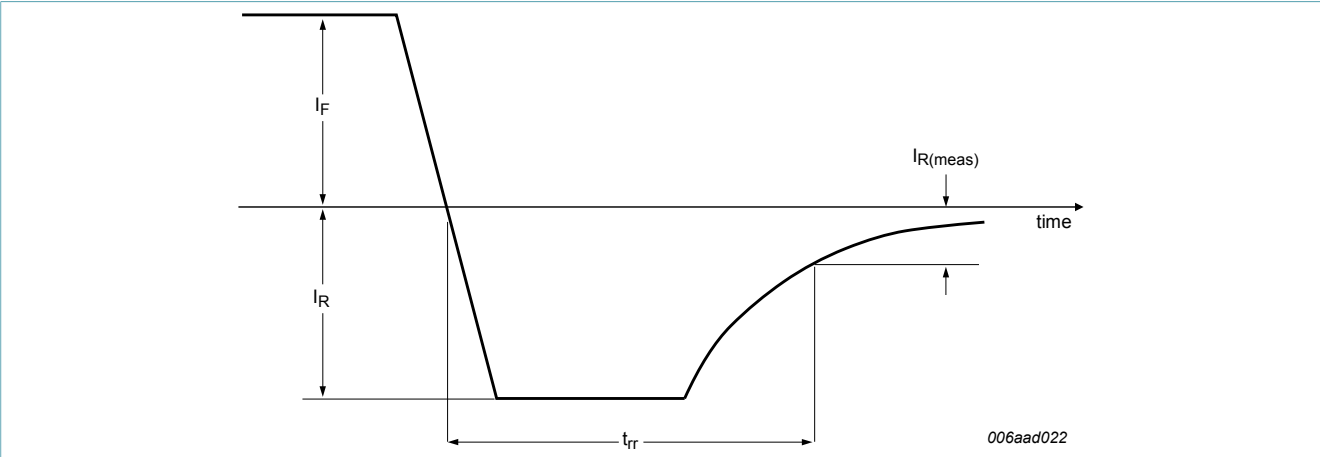


Fig. 13. Reverse recovery definition

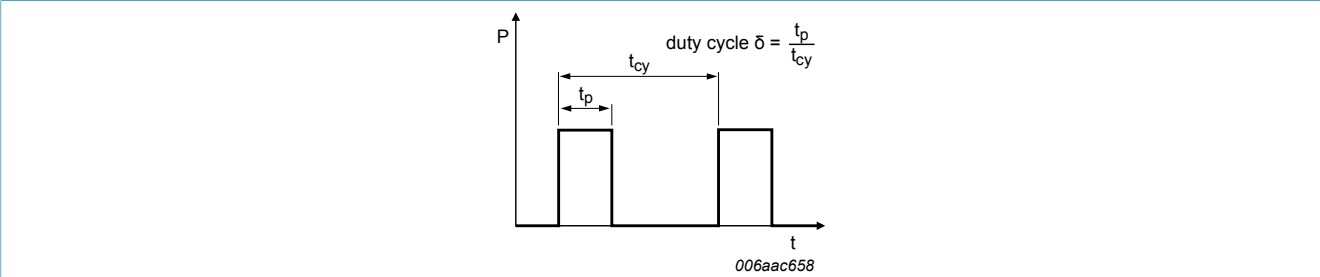


Fig. 14. Duty cycle definition

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

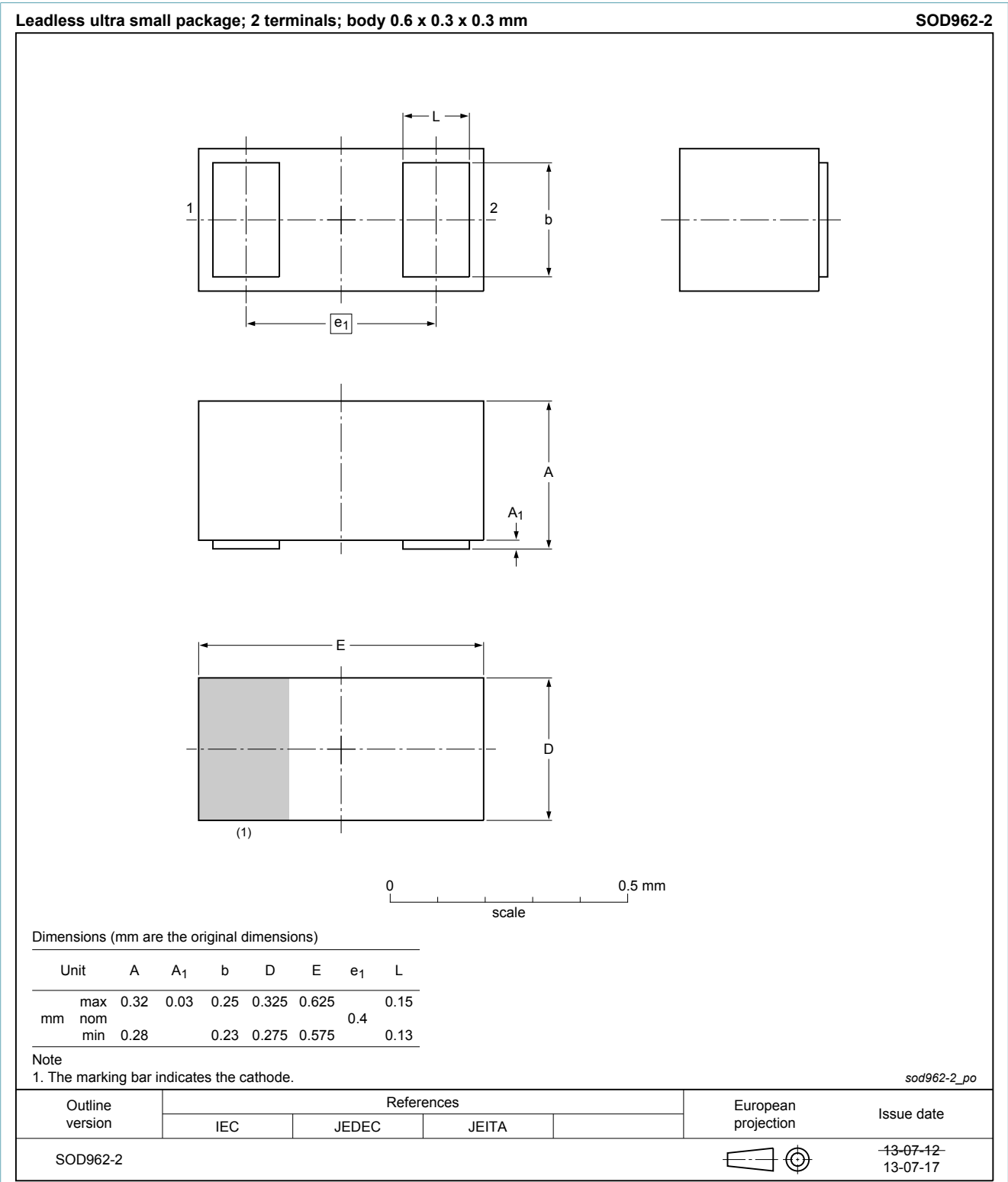


Fig. 15. Package outline DSN0603-2 (SOD962-2)



## 15. Legal information

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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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