



# PMEG2002AESFB

20 V, 0.2 A low VF MEGA Schottky barrier rectifier

17 August 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 DSN0603B-2 (SOD962B) 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
- Low leakage current
- Ultra small and leadless SMD package
- Package height typ. 0.2 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
- Smartcard-embedded applications

## 4. Quick reference data

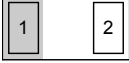

Table 1. Quick reference data

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
$V_R$	reverse voltage	$T_j = 25$ °C		-	-	20	V
$V_F$	forward voltage	$I_F = 200$ mA; $T_j = 25$ °C; pulsed	[1]	-	375	420	mV
$I_R$	reverse current	$V_R = 10$ V; $T_j = 25$ °C; pulsed	[1]	-	5	25	$\mu$ A
		$V_R = 20$ V; $T_j = 25$ °C; pulsed	[1]	-	10	45	$\mu$ A

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

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 <p>Transparent top view <b>DSN0603B-2 (SOD962B)</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
PMEG2002AESFB	DSN0603B-2	silicon, leadless ultra small package; 2 terminals; 0.4 mm pitch; 0.6 x 0.3 x 0.2 mm body	SOD962B

## 7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG2002AESFB	A

## 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	$T_{sp} \leq 120\text{ °C}; \delta = 1$		-	0.28	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20\text{ kHz}; T_{amb} \leq 115\text{ °C};$ square wave		-	0.2	A
		$\delta = 0.5$ ; $f = 20\text{ kHz}; T_{sp} \leq 125\text{ °C};$ square wave		-	0.2	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1\text{ ms}; \delta \leq 0.25$		-	1.7	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	$T_{amb} \leq 25\text{ °C}$	[1]	-	325	mW
			[2]	-	525	mW
$T_j$	junction temperature			-	125	°C
$T_{amb}$	ambient temperature			-40	125	°C
$T_{stg}$	storage temperature			-40	125	°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<sup>2</sup> 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
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	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<sup>2</sup> each.

[4] Soldering point of anode tab.

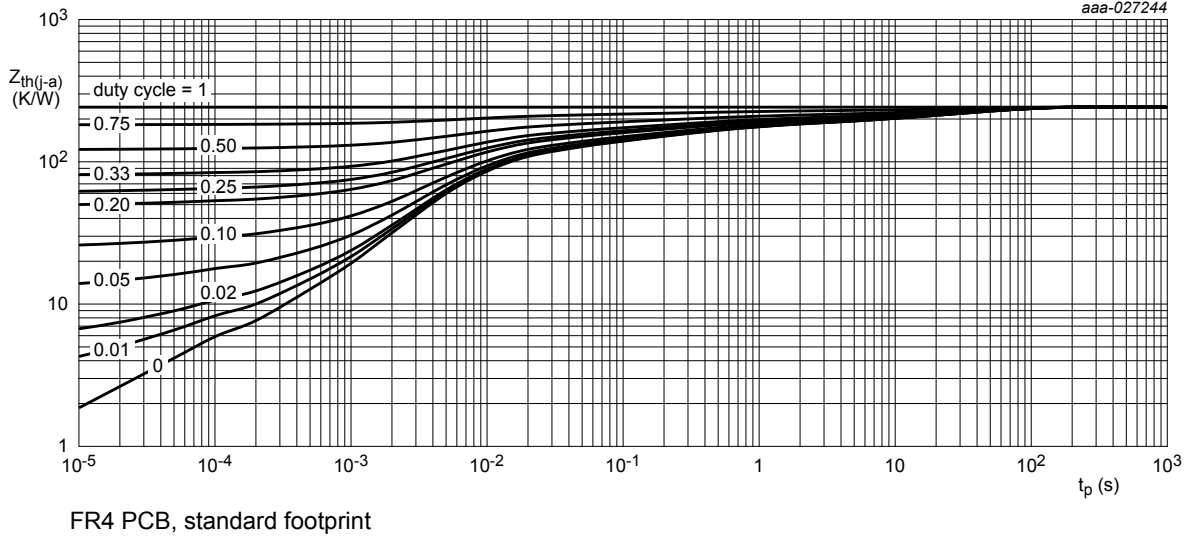


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

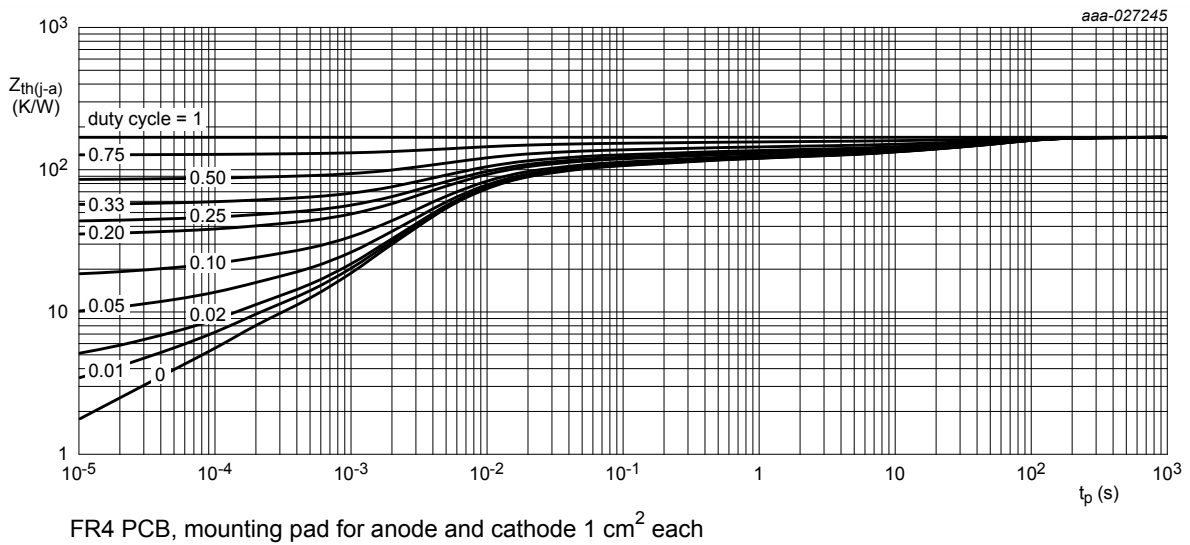


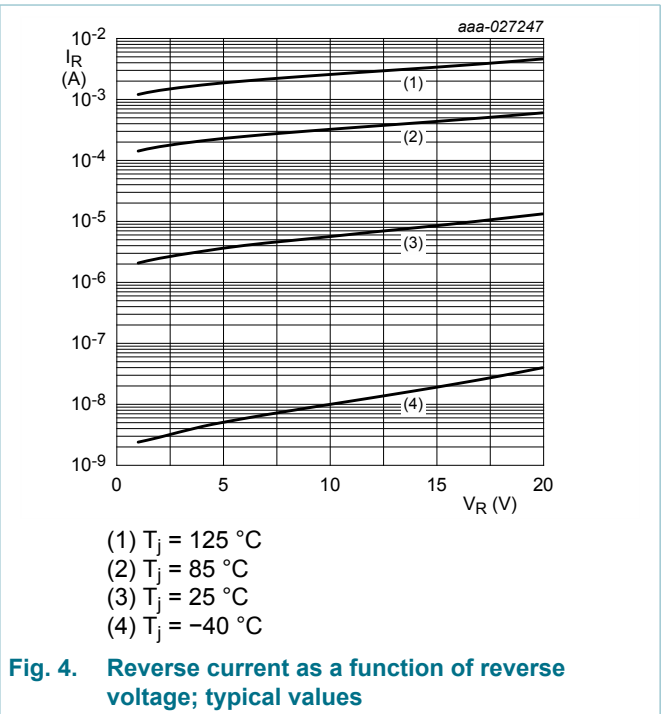
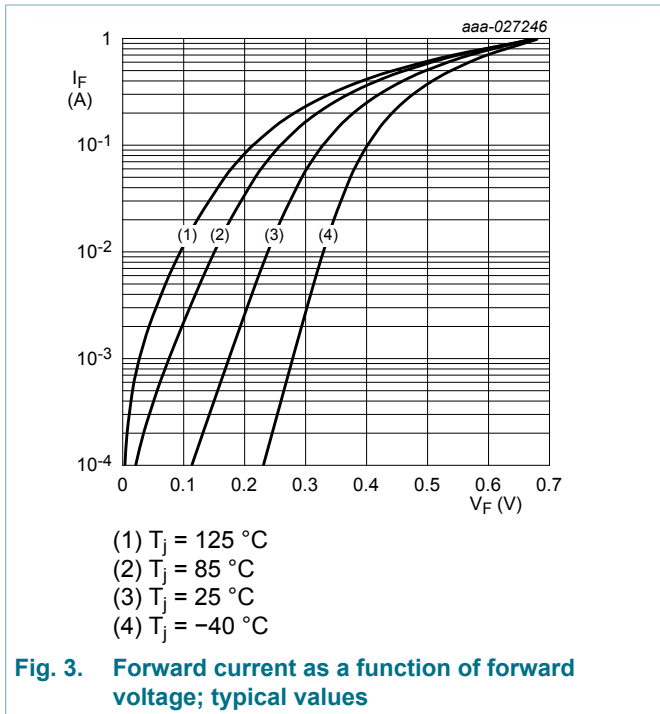
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

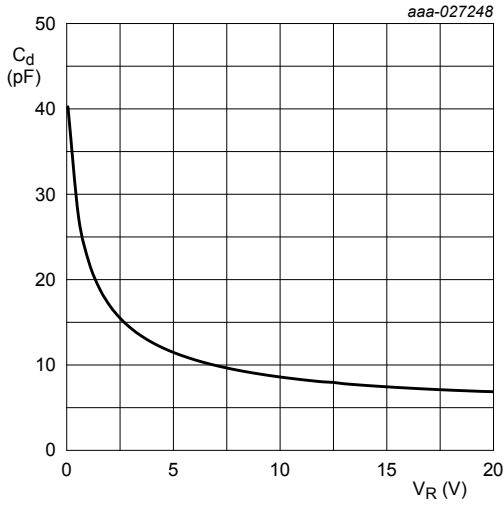
### 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 0.1 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	20	-	-	V
$V_F$	forward voltage	$I_F = 0.1 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	-	120	180	mV
		$I_F = 1 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	-	180	250	mV
		$I_F = 10 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	-	245	310	mV
		$I_F = 100 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	-	330	380	mV
		$I_F = 200 \text{ mA}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	-	375	420	mV
$I_R$	reverse current	$V_R = 6 \text{ V}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	-	3.2	20	$\mu\text{A}$
		$V_R = 10 \text{ V}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	-	5	25	$\mu\text{A}$
		$V_R = 20 \text{ V}$ ; $T_j = 25 \text{ }^\circ\text{C}$ ; pulsed	[1]	-	10	45	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25 \text{ }^\circ\text{C}$		-	25	-	pF
		$V_R = 10 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25 \text{ }^\circ\text{C}$		-	10	-	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

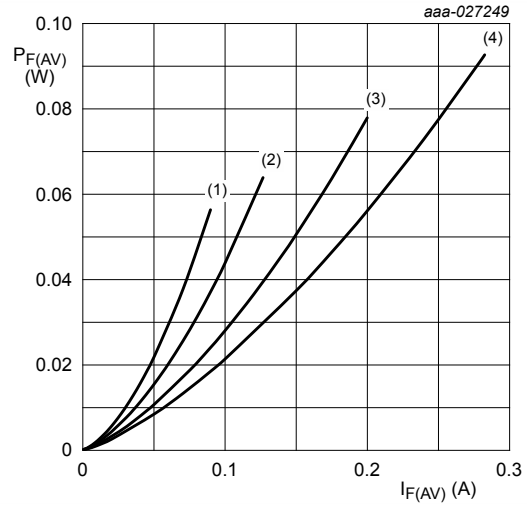
[1] Very short pulse, in order to maintain a stable junction temperature.





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

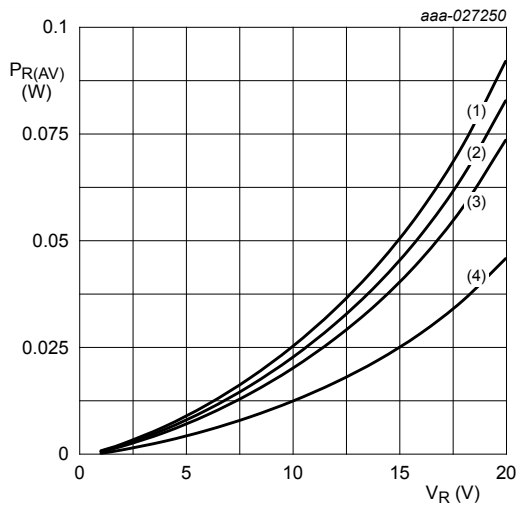
**Fig. 5. Diode capacitance as a function of reverse voltage; typical values**



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

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

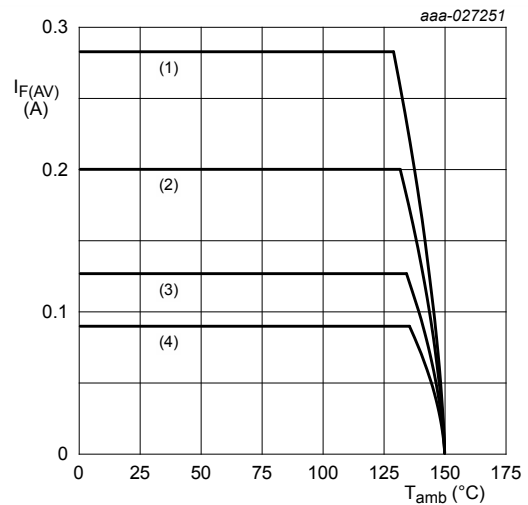
**Fig. 6. Average forward power dissipation as a function of average forward current; typical values**



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

- (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. 7. Average reverse power dissipation as a function of reverse voltage; typical values**

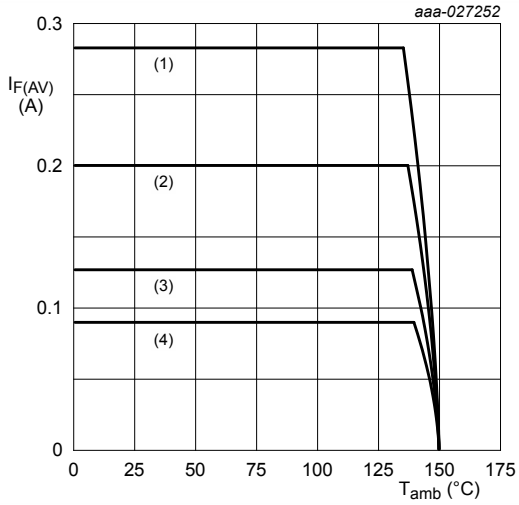


FR4 PCB, standard footprint

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

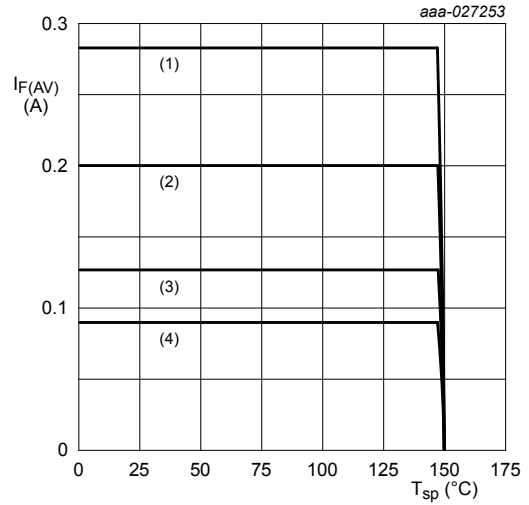
- (1)  $\delta = 1; \text{DC}$
- (2)  $\delta = 0.5; f = 20 \text{ kHz}$
- (3)  $\delta = 0.2; f = 20 \text{ kHz}$
- (4)  $\delta = 0.1; f = 20 \text{ kHz}$

**Fig. 8. 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  
 $T_j = 125$  °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. 9. Average forward current as a function of ambient temperature; typical values



$T_j = 125$  °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 solder point temperature; typical values

### 11. Test information

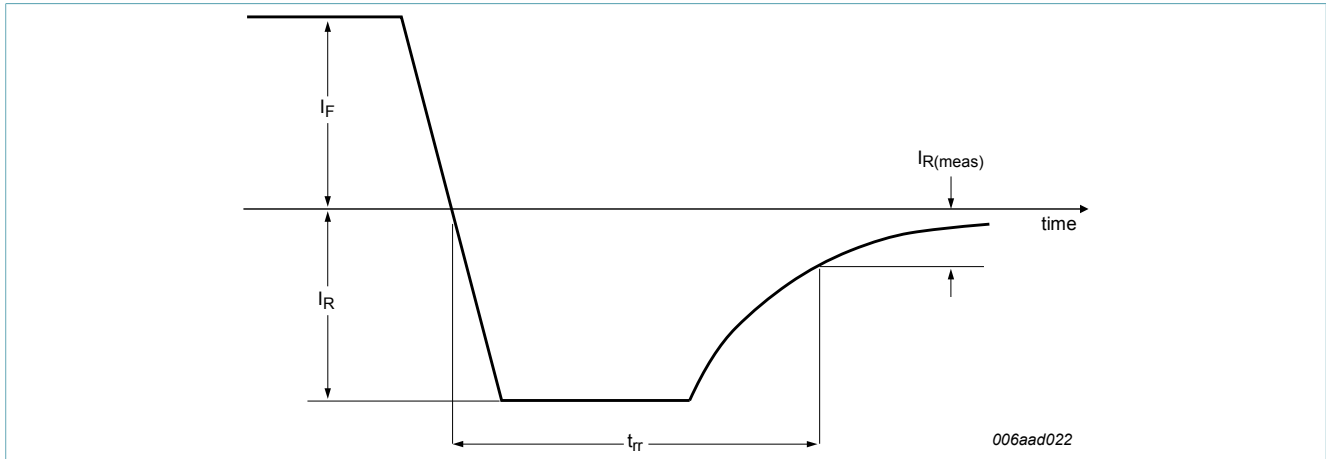


Fig. 11. Reverse recovery definition

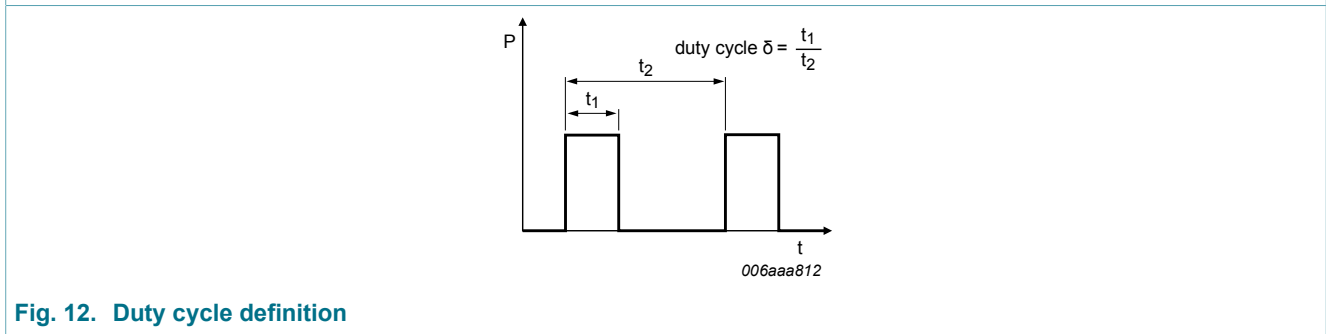


Fig. 12. Duty cycle definition

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

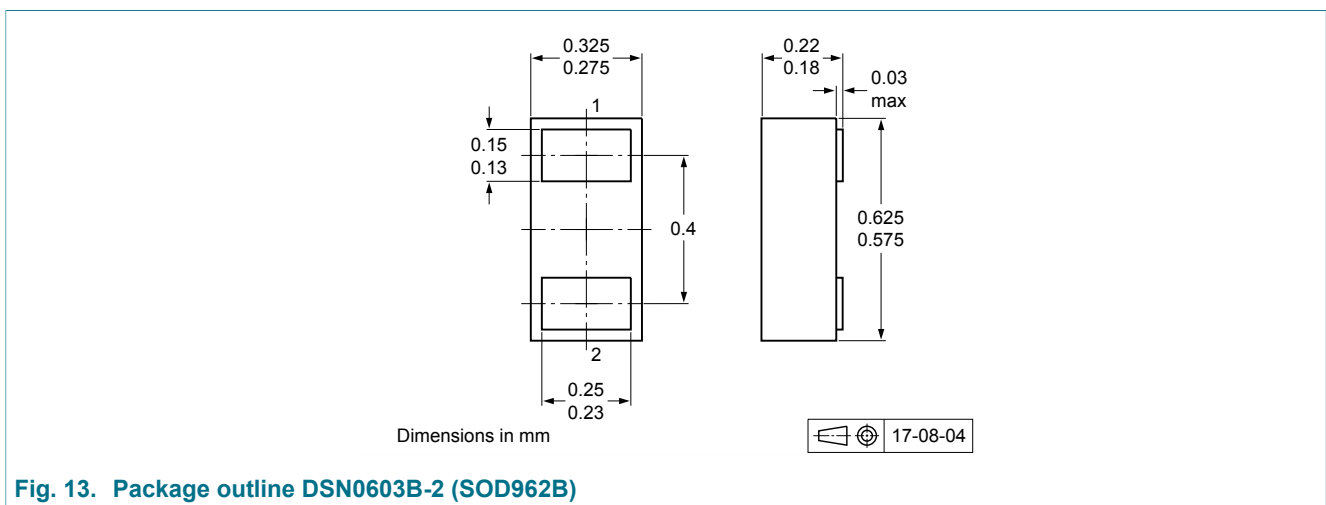


Fig. 13. Package outline DSN0603B-2 (SOD962B)



### 13. Soldering

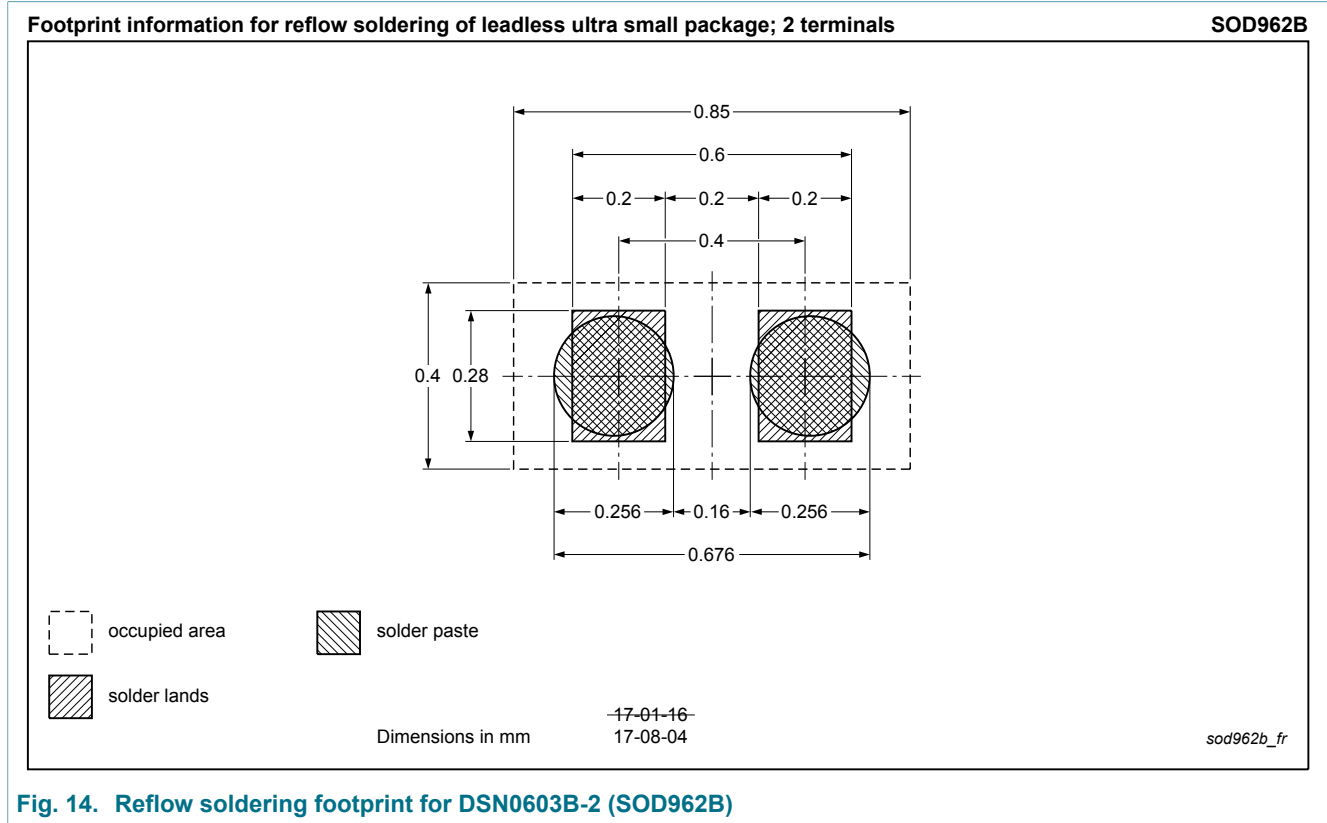


Fig. 14. Reflow soldering footprint for DSN0603B-2 (SOD962B)

### 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG2002AESFB v.1	20170817	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.
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