



PMEG2010EPK

20 V, 1 A low VF MEGA Schottky barrier rectifier

Rev. 1 — 20 January 2012

Product data sheet

1. Product profile

1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a leadless ultra small SOD1608 Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

1.2 Features and benefits

- Average forward current: $I_{F(AV)} \leq 1$ A
- Reverse voltage: $V_R \leq 20$ V
- Low forward voltage $V_F \leq 415$ mV
- Low reverse current
- AEC-Q101 qualified
- Solderable side pads
- Package height typ. 0.37 mm
- Ultra small and leadless SMD plastic package

1.3 Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- LED backlight for mobile application
- Low power consumption applications
- Ultra high-speed switching
- Reverse polarity protection

1.4 Quick reference data

Table 1. Quick reference data

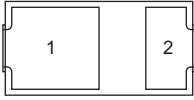

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	square wave; $\delta = 0.5$; $f = 20$ kHz; $T_{amb} \leq 110$ °C	-	-	1	A
		square wave; $\delta = 0.5$; $f = 20$ kHz; $T_{sp} \leq 135$ °C	-	-	1	A
V_R	reverse voltage	$T_j = 25$ °C	-	-	20	V
V_F	forward voltage	$I_F = 1$ A; pulsed; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °C	-	370	415	mV
I_R	reverse current	$V_R = 10$ V; $T_j = 25$ °C	-	50	250	μ A

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



2. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode ^[1]	 <p>Transparent top view SOD1608</p>	 <i>sym001</i>
2	A	anode		

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG2010EPK	-	Leadless ultra small plastic package; 2 terminals	SOD1608

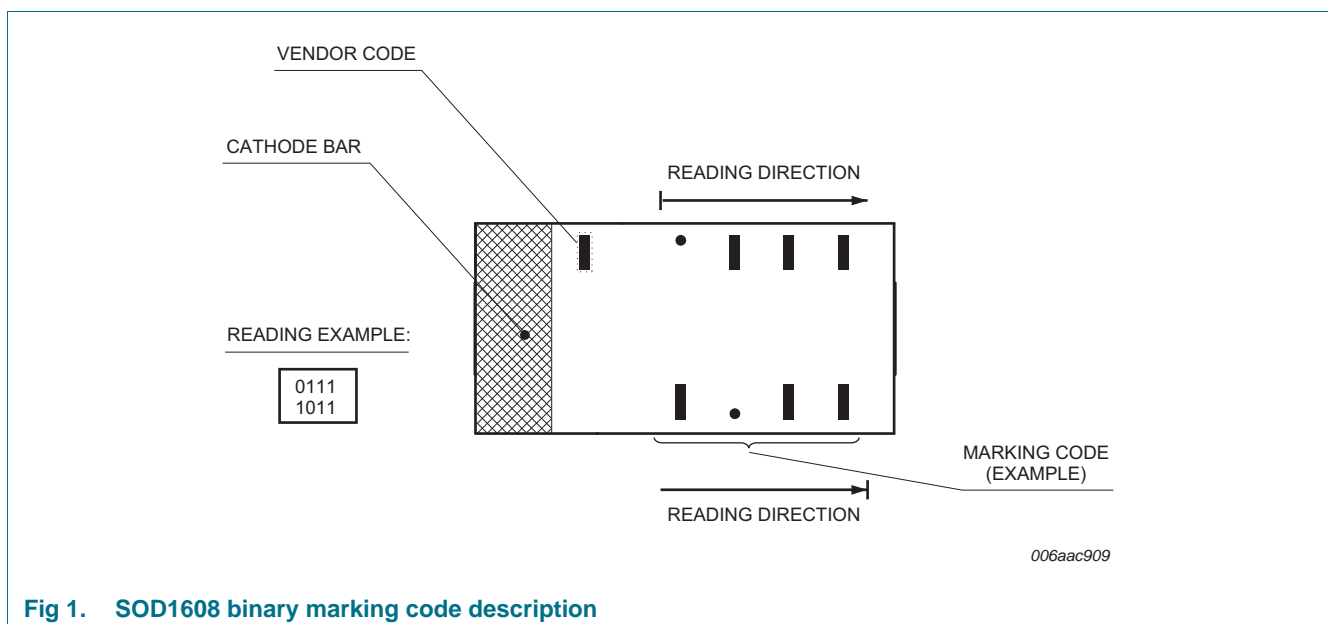
4. Marking

Table 4. Marking codes

Type number	Marking code ^[1]
PMEG2010EPK	0100 0000

[1] For SOD1608 binary marking code description, see [Figure 1](#).

4.1 Binary marking code description



5. 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	$T_{sp} \leq 140\text{ °C}$	-	1	A
$I_{F(AV)}$	average forward current	square wave; $\delta = 0.5$; $f = 20\text{ kHz}$; $T_{amb} \leq 110\text{ °C}$	[1]	1	A
		square wave; $\delta = 0.5$; $f = 20\text{ kHz}$; $T_{sp} \leq 135\text{ °C}$	-	1	A
I_{FRM}	repetitive peak forward current	$t_p \leq 1\text{ ms}$; $\delta \leq 0.5$	-	3	A
I_{FSM}	non-repetitive peak forward current	square wave; $t_p = 8\text{ ms}$; $T_{j(init)} = 25\text{ °C}$	-	5	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[2][3]	410	mW
			[4][3]	860	mW
			[1][3]	1565	mW
T_j	junction temperature		-	150	°C
T_{amb}	ambient temperature		-55	150	°C
T_{stg}	storage temperature		-65	150	°C

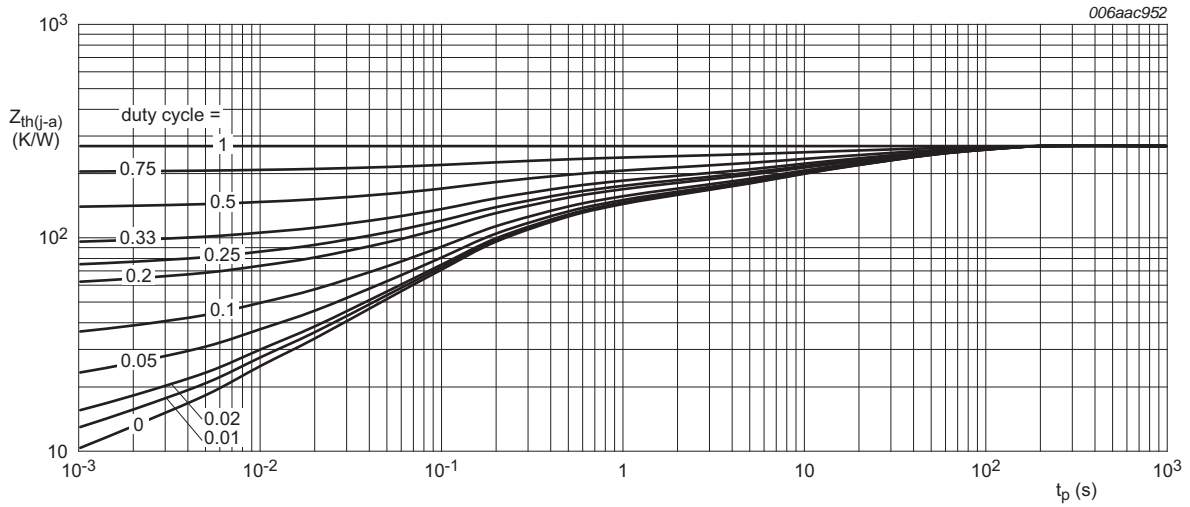
- [1] Device mounted on a ceramic Printed-Circuit Board (PCB), Al_2O_3 , standard footprint.
 [2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
 [3] Reflow soldering is the only recommended soldering method.
 [4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².

6. Thermal characteristics

Table 6. Thermal characteristics

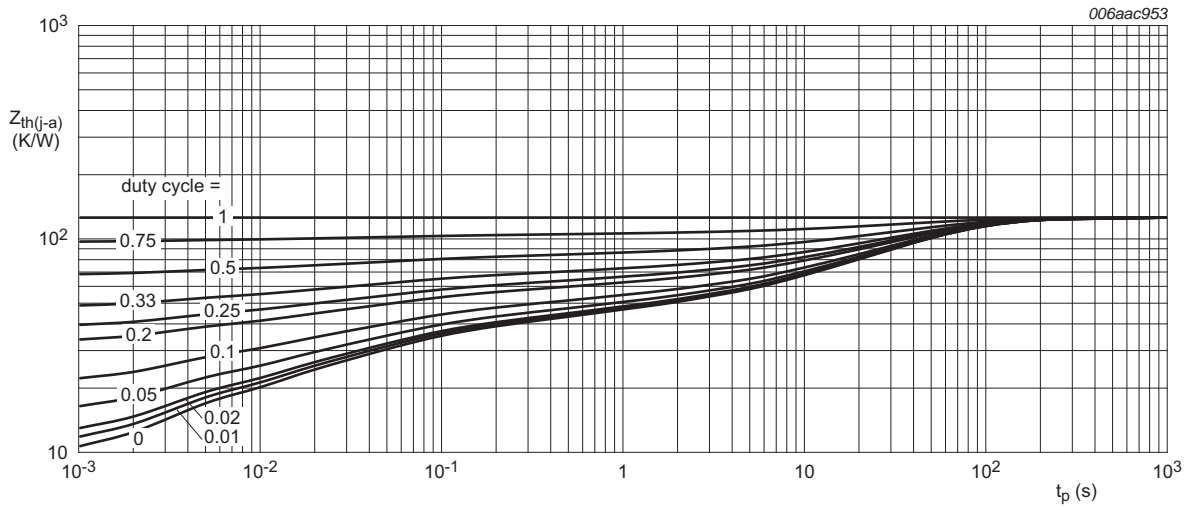
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1][2][3]	-	305	K/W
			[1][4][3]	-	145	K/W
			[1][5][3]	-	80	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[6]	-	20	K/W

- [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] Reflow soldering is the only recommended soldering method.
 [4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².
 [5] Device mounted on a ceramic PCB, Al_2O_3 , standard footprint.
 [6] Soldering point of cathode tab.



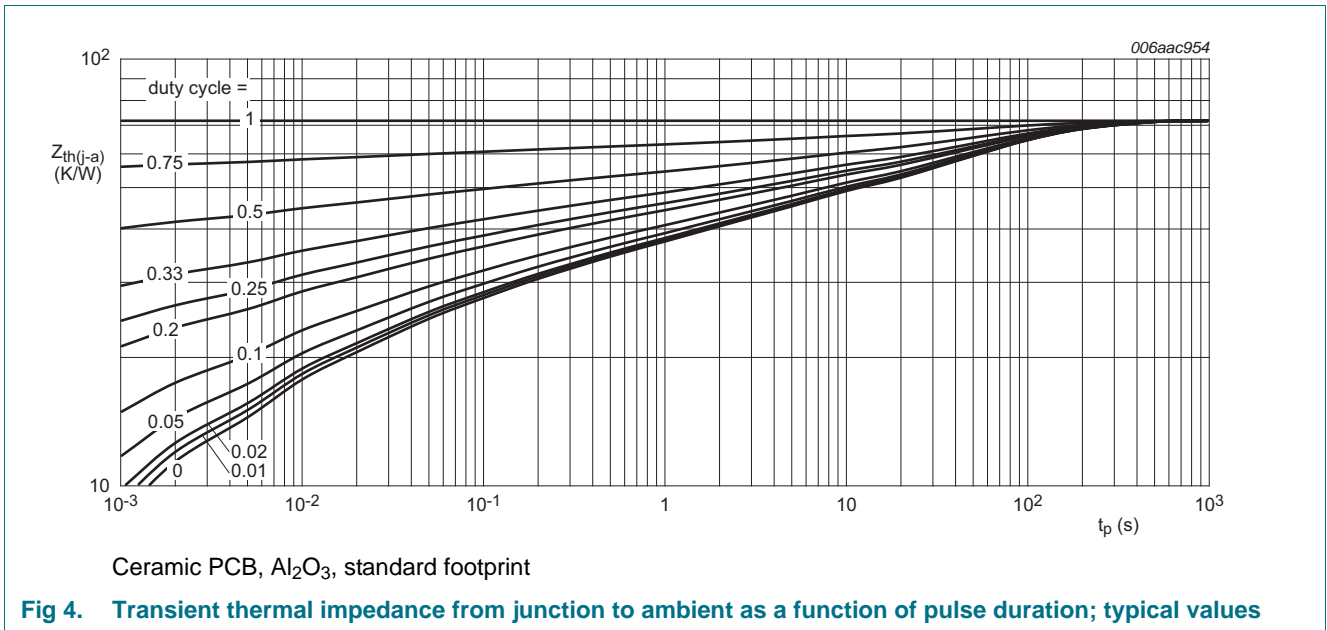
FR4 PCB, standard footprint

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



FR4 PCB, mounting pad for cathode 1 cm²

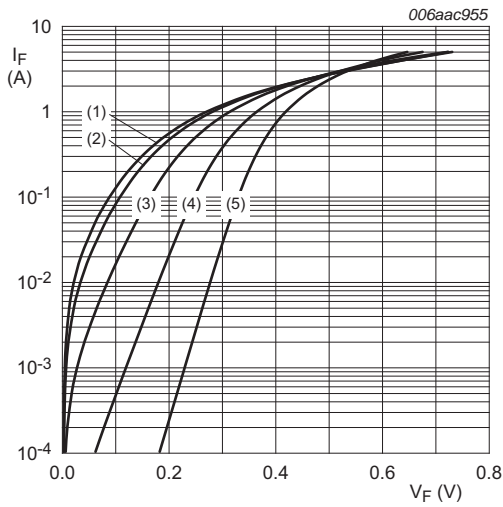
Fig 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



7. Characteristics

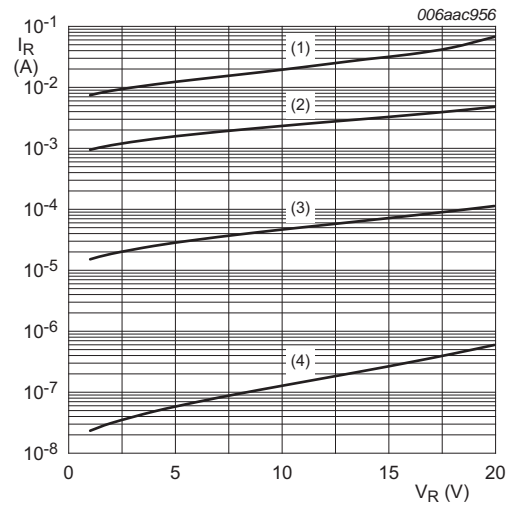
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _F	forward voltage	I _F = 100 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C	-	240	280	mV
		I _F = 500 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C	-	310	350	mV
		I _F = 700 mA; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C	-	330	390	mV
		I _F = 1 A; pulsed; t _p ≤ 300 μs; δ ≤ 0.02; T _j = 25 °C	-	370	415	mV
I _R	reverse current	V _R = 10 V; T _j = 25 °C	-	50	250	μA
		V _R = 20 V; T _j = 25 °C	-	150	600	μA
C _d	diode capacitance	V _R = 1 V; f = 1 MHz; T _j = 25 °C	-	65	-	pF
		V _R = 10 V; f = 1 MHz; T _j = 25 °C	-	25	-	pF



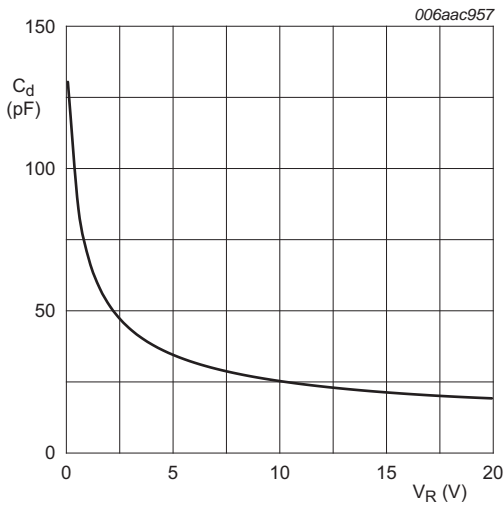
- (1) $T_j = 150^\circ\text{C}$
- (2) $T_j = 125^\circ\text{C}$
- (3) $T_j = 85^\circ\text{C}$
- (4) $T_j = 25^\circ\text{C}$
- (5) $T_j = -40^\circ\text{C}$

Fig 5. Forward current as a function of forward voltage; typical values



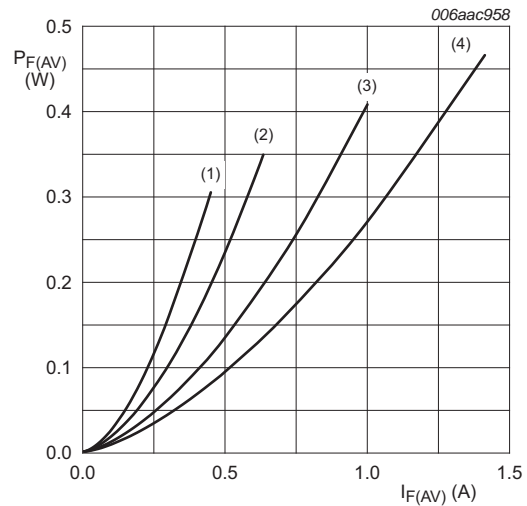
- (1) $T_j = 125^\circ\text{C}$
- (2) $T_j = 85^\circ\text{C}$
- (3) $T_j = 25^\circ\text{C}$
- (4) $T_j = -40^\circ\text{C}$

Fig 6. Reverse current as a function of reverse voltage; typical values



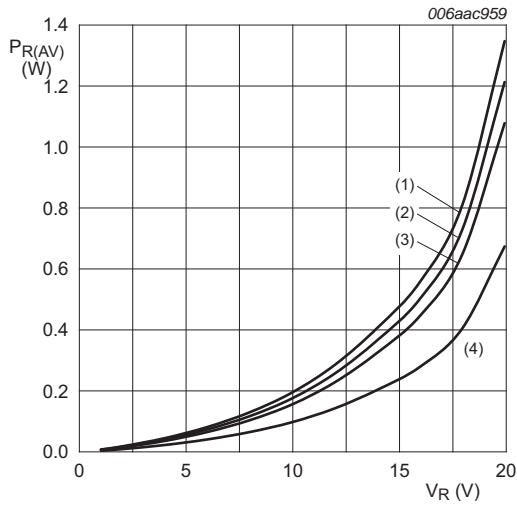
$f = 1\text{ MHz}; T_{\text{amb}} = 25^\circ\text{C}$

Fig 7. Diode capacitance as a function of reverse voltage; typical values



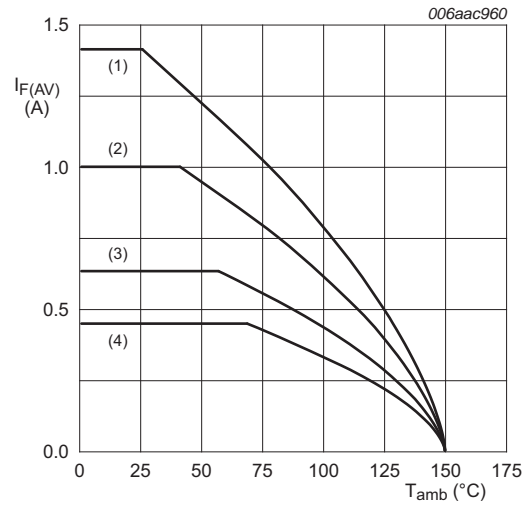
- $T_j = 150^\circ\text{C}$
- (1) $\delta = 0.1$
- (2) $\delta = 0.2$
- (3) $\delta = 0.5$
- (4) $\delta = 1$

Fig 8. Average forward power dissipation as a function of average forward current; typical values



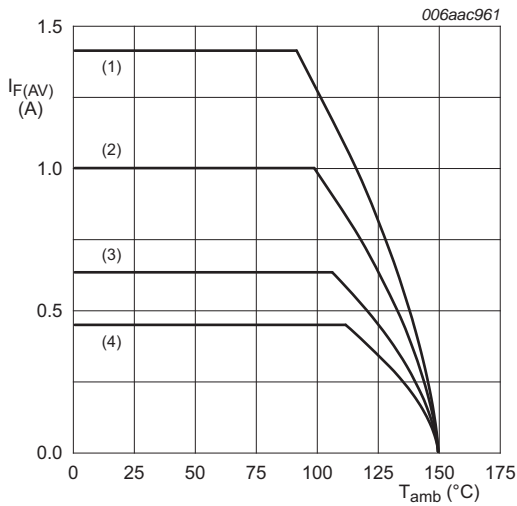
$T_j = 125\text{ °C}$
 (1) $\delta = 1$
 (2) $\delta = 0.9$
 (3) $\delta = 0.8$
 (4) $\delta = 0.5$

Fig 9. Average reverse power dissipation as a function of reverse voltage; typical values



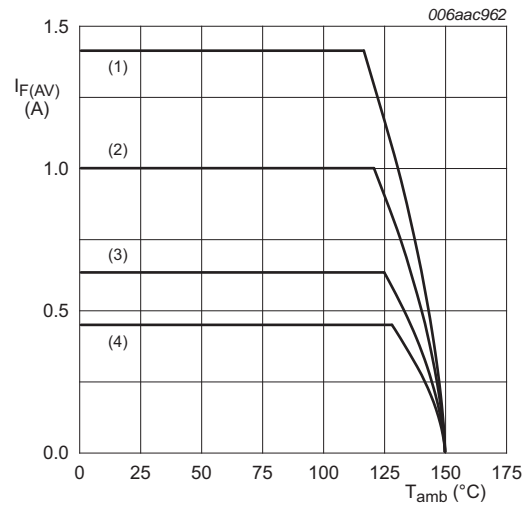
FR4 PCB, standard footprint
 $T_j = 150\text{ °C}$
 (1) $\delta = 1$ (DC)
 (2) $\delta = 0.5$; $f = 20\text{ kHz}$
 (3) $\delta = 0.2$; $f = 20\text{ kHz}$
 (4) $\delta = 0.1$; $f = 20\text{ kHz}$

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



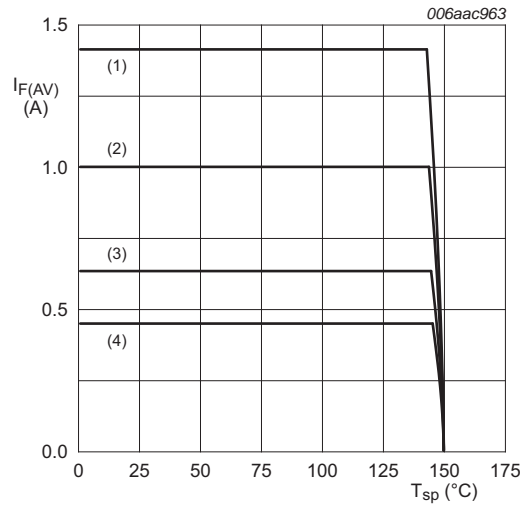
FR4 PCB, mounting pad for cathode 1 cm^2
 $T_j = 150\text{ °C}$
 (1) $\delta = 1$ (DC)
 (2) $\delta = 0.5$; $f = 20\text{ kHz}$
 (3) $\delta = 0.2$; $f = 20\text{ kHz}$
 (4) $\delta = 0.1$; $f = 20\text{ kHz}$

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



Ceramic PCB, Al_2O_3 , standard footprint
 $T_j = 150\text{ °C}$
 (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 ambient temperature; typical values



T_j = 150 °C

(1) δ = 1 (DC)

(2) δ = 0.5; f = 20 kHz

(3) δ = 0.2; f = 20 kHz

(4) δ = 0.1; f = 20 kHz

Fig 13. Average forward current as a function of solder point temperature; typical values

8. Test information

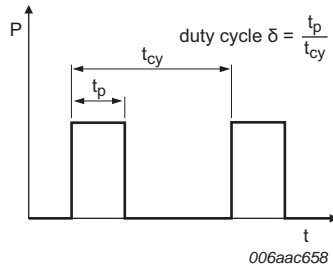


Fig 14. Duty cycle definition

The current ratings for the typical waveforms as shown in figures 10, 11, 12 and 13 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.

8.1 Quality information

This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

9. Package outline

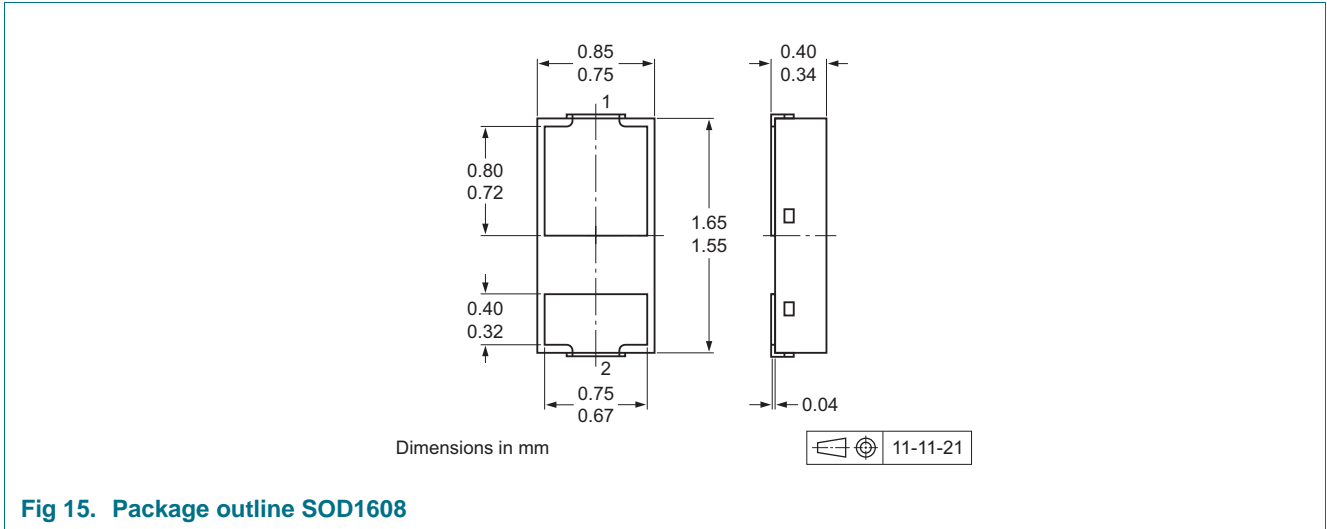
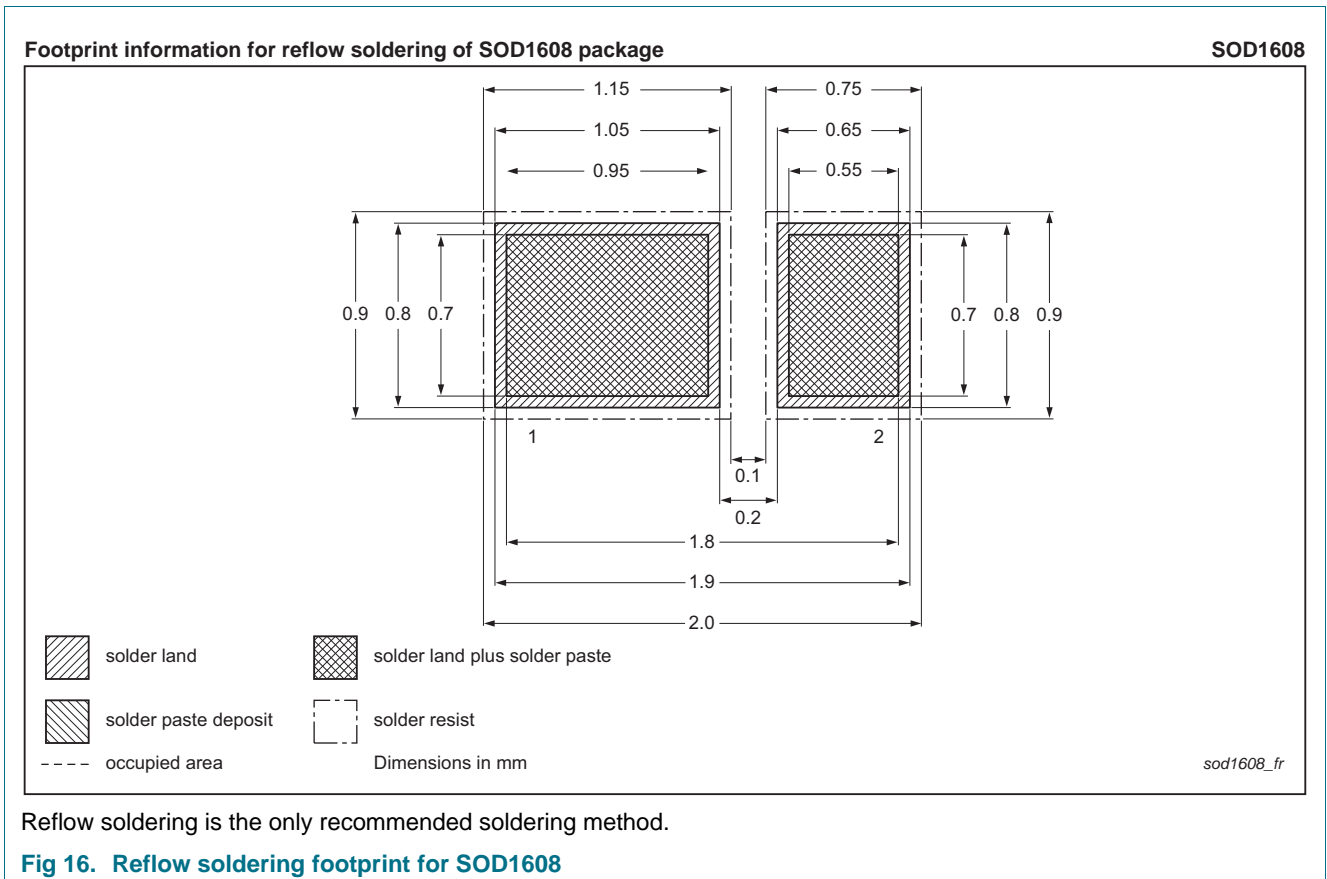


Fig 15. Package outline SOD1608

10. Soldering



Reflow soldering is the only recommended soldering method.

Fig 16. Reflow soldering footprint for SOD1608

11. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PMEG2010EPK v.1	20120120	Product data sheet	-	-

12. Legal information

12.1 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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