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Kind regards,

Team Nexperia



# PMEG2010EPK

20 V, 1 A low VF MEGA Schottky barrier rectifier

Rev. 2 — 14 March 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 (DFN1608D-2) 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

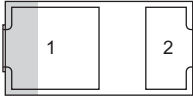

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	square wave; $\delta = 0.5$ ; $f = 20$ kHz; $T_{amb} \leq 110$ °C	-	-	1	A
		square wave; $\delta = 0.5$ ; $f = 20$ kHz; $T_{sp} \leq 135$ °C	-	-	1	A
$V_R$	reverse voltage	$T_j = 25$ °C	-	-	20	V
$V_F$	forward voltage	$I_F = 1$ A; pulsed; $t_p \leq 300$ $\mu$ 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	$\mu$ A
$t_{rr}$	reverse recovery time	$I_R = 0.5$ A; $I_F = 0.5$ A; $I_{R(meas)} = 0.1$ A; $T_j = 25$ °C	-	4	-	ns

[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 <sup>[1]</sup>	 <p>Transparent top view</p> <p>SOD1608 (DFN1608D-2)</p>	 <p>sym001</p>
2	A	anode		

[1] The marking bar indicates the cathode.

3. Ordering information

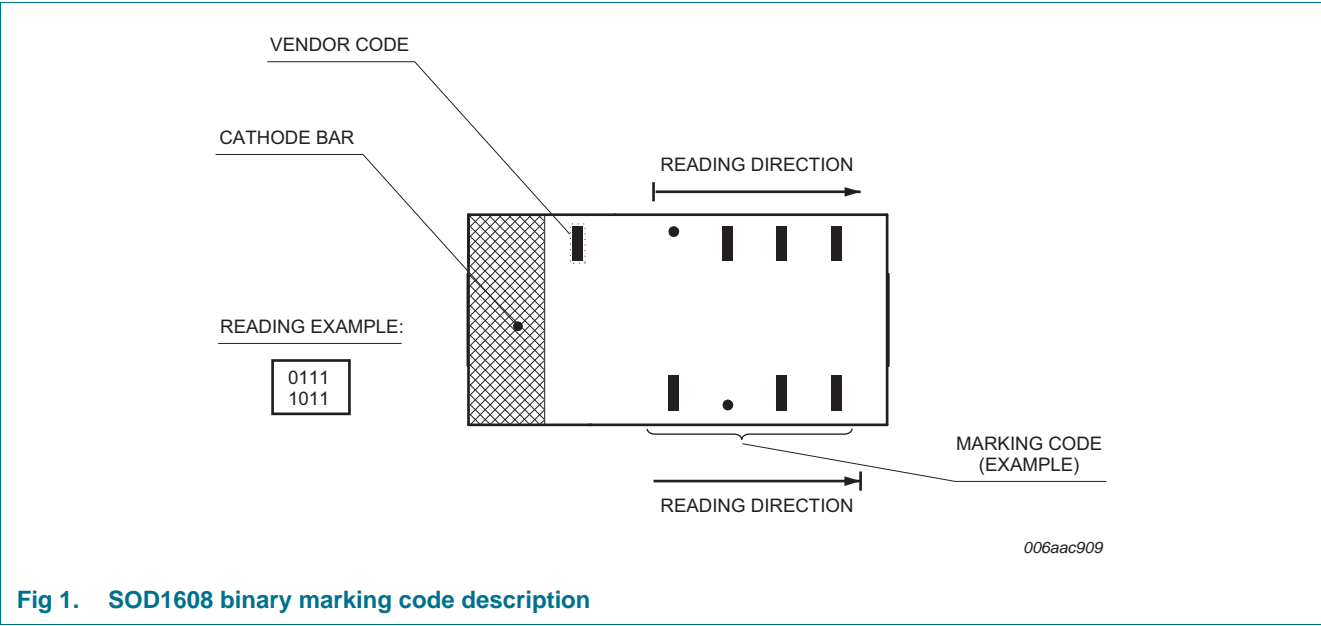
Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG2010EPK	DFN1608D-2	Leadless ultra small plastic package; 2 terminals	SOD1608

4. Marking

Table 4. Marking codes

Type number	Marking code
PMEG2010EPK	0100 0000



## 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	$T_{sp} \leq 130\text{ °C}$	-	1.4	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	$t_p \leq 1\text{ ms}$ ; $\delta \leq 0.25$	-	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]	410	mW
			[3]	860	mW
			[1]	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] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1\text{ cm}^2$ .

## 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]	-	305	K/W
			[1][3]	-	145	K/W
			[1][4]	-	80	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[5]	-	20	K/W

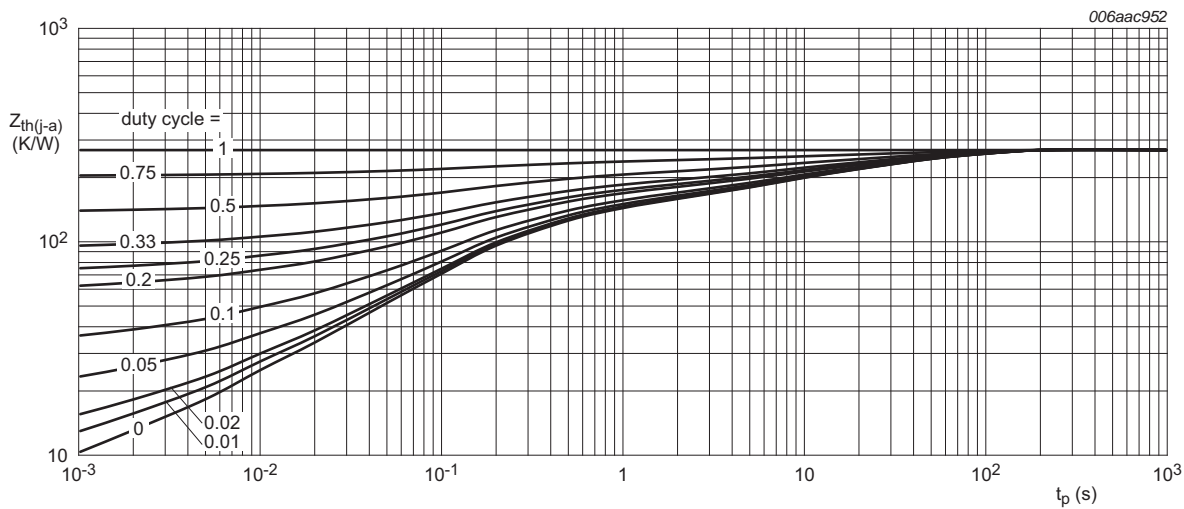
[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1\text{ cm}^2$ .

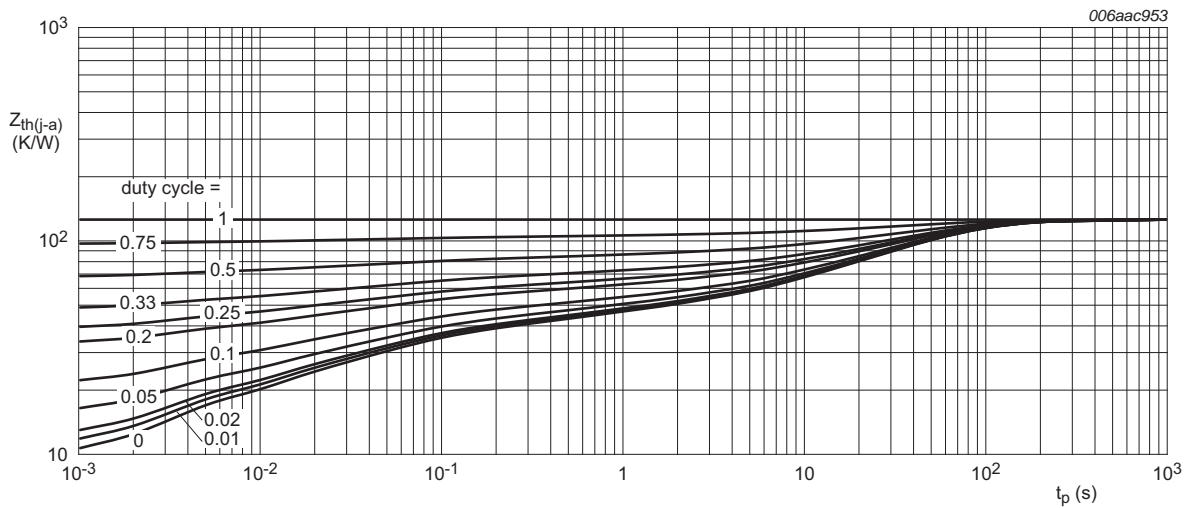
[4] Device mounted on a ceramic PCB,  $Al_2O_3$ , standard footprint.

[5] 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 cm<sup>2</sup>

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

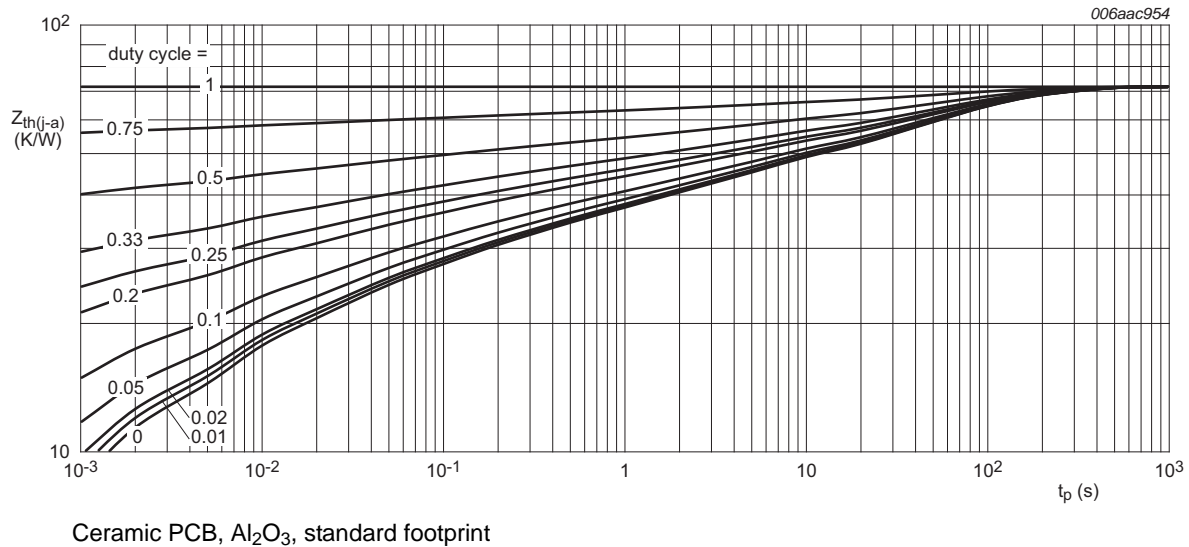


Fig 4. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 7. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 100 \text{ mA}$ ; pulsed; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25^\circ\text{C}$	-	240	280	mV
		$I_F = 500 \text{ mA}$ ; pulsed; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25^\circ\text{C}$	-	310	350	mV
		$I_F = 700 \text{ mA}$ ; pulsed; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25^\circ\text{C}$	-	330	390	mV
		$I_F = 1 \text{ A}$ ; pulsed; $t_p \leq 300 \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25^\circ\text{C}$	-	370	415	mV
$I_R$	reverse current	$V_R = 10 \text{ V}$ ; $T_j = 25^\circ\text{C}$	-	50	250	$\mu\text{A}$
		$V_R = 20 \text{ V}$ ; $T_j = 25^\circ\text{C}$	-	150	600	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25^\circ\text{C}$	-	65	-	pF
		$V_R = 10 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25^\circ\text{C}$	-	25	-	pF
$t_{rr}$	reverse recovery time	$I_F = 0.5 \text{ A}$ ; $I_R = 0.5 \text{ A}$ ; $I_{R(\text{meas})} = 0.1 \text{ A}$ ; $T_j = 25^\circ\text{C}$	-	4	-	ns
$V_{FRM}$	peak forward recovery voltage	$I_F = 0.5 \text{ A}$ ; $dI_F/dt = 20 \text{ A}/\mu\text{s}$ ; $T_j = 25^\circ\text{C}$	-	335	-	mV

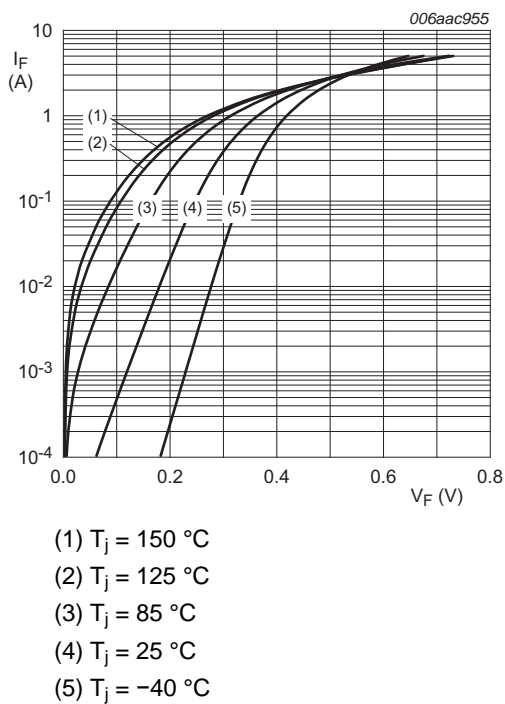


Fig 5. Forward current as a function of forward voltage; typical values

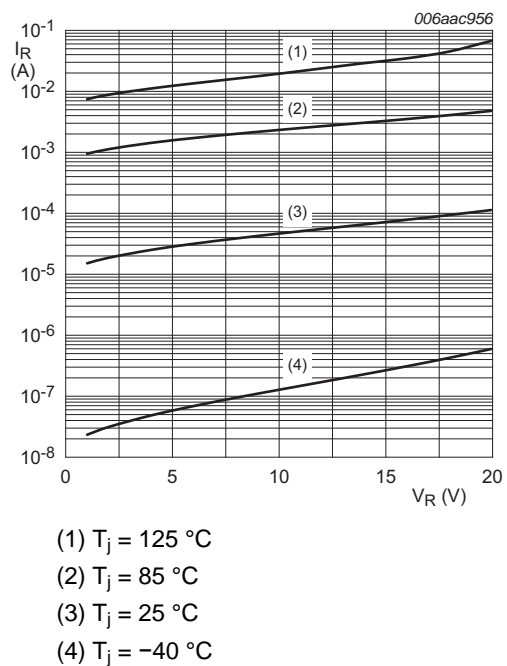


Fig 6. Reverse current as a function of reverse voltage; typical values

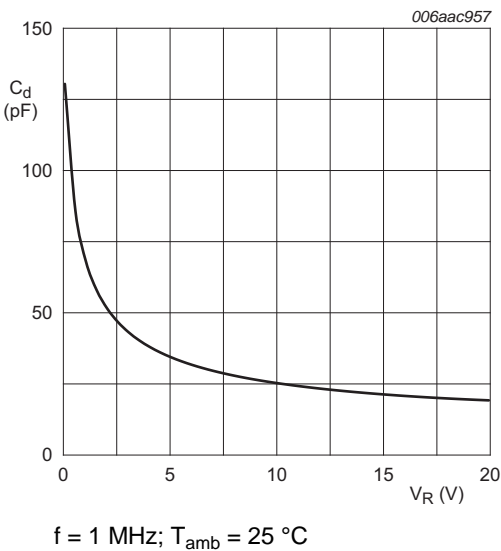


Fig 7. Diode capacitance as a function of reverse voltage; typical values

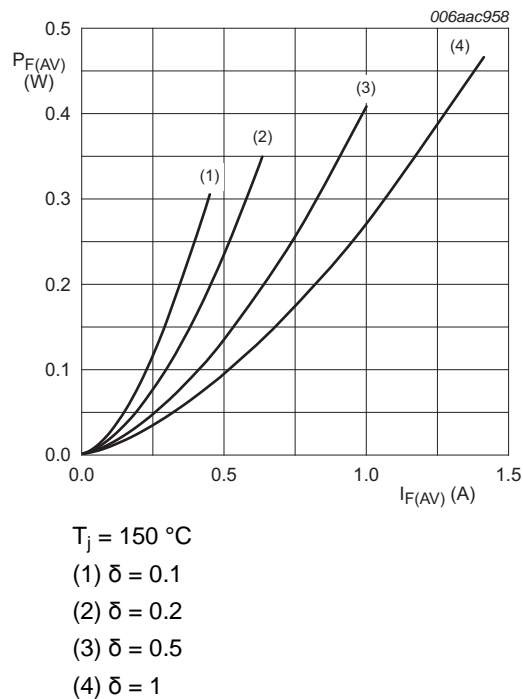
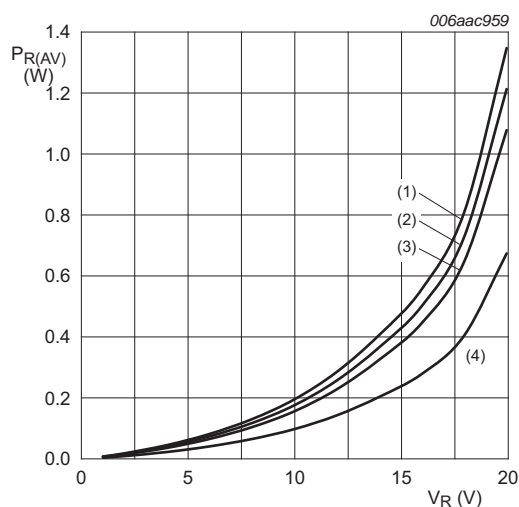


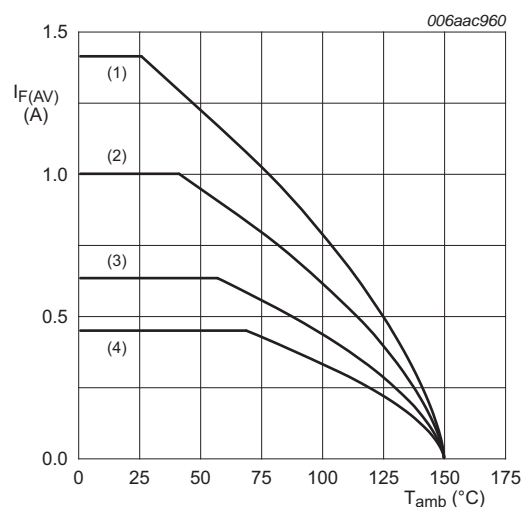
Fig 8. Average forward power dissipation as a function of average forward current; typical values



$T_j = 125\text{ °C}$

- (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

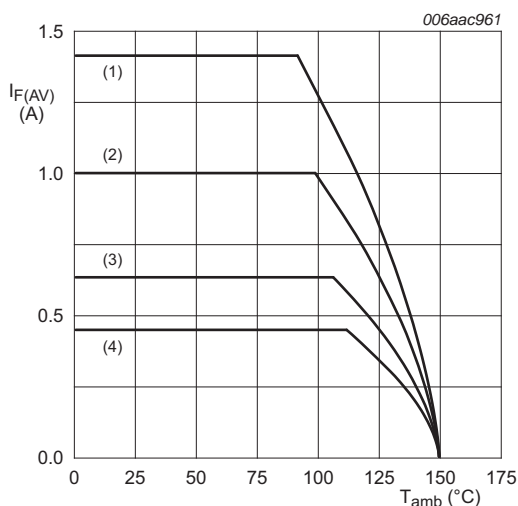


FR4 PCB, standard footprint

$T_j = 150\text{ °C}$

- (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

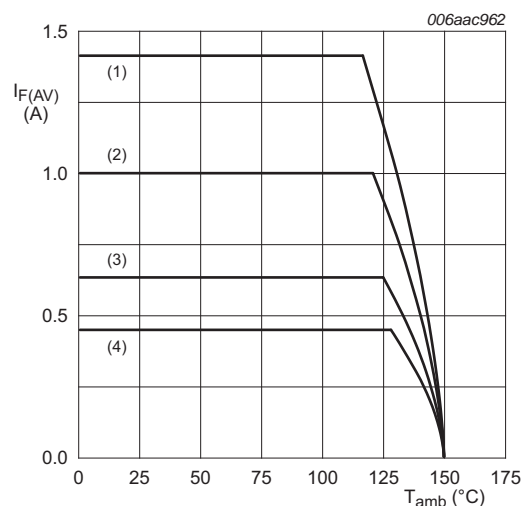


FR4 PCB, mounting pad for cathode  $1\text{ cm}^2$

$T_j = 150\text{ °C}$

- (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



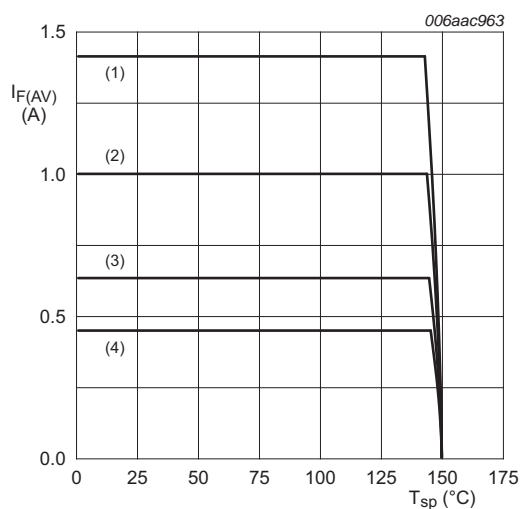
Ceramic PCB,  $\text{Al}_2\text{O}_3$ , standard footprint

$T_j = 150\text{ °C}$

- (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





$T_j = 150\text{ °C}$

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

## 8. Test information

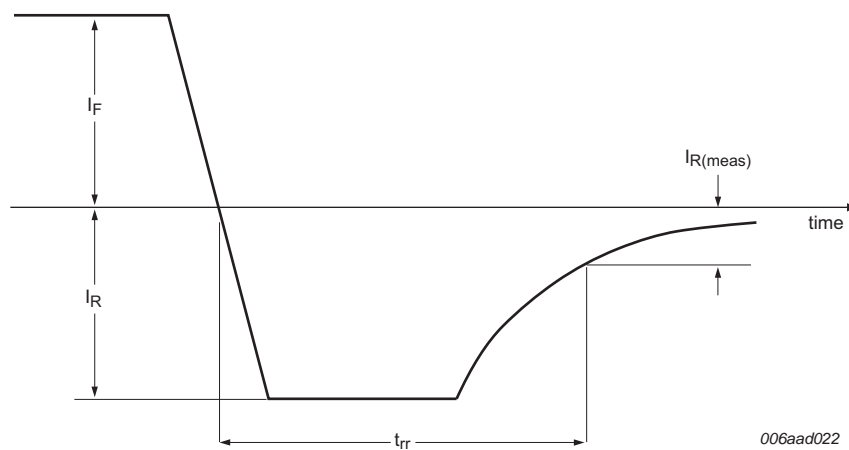


Fig 14. Reverse recovery definition

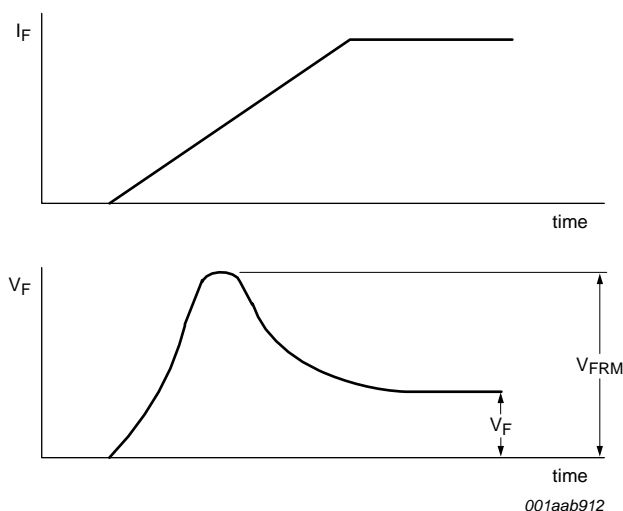


Fig 15. Forward recovery definition

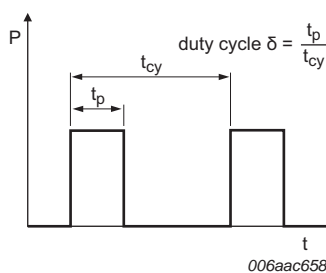


Fig 16. Duty cycle definition

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.

## 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

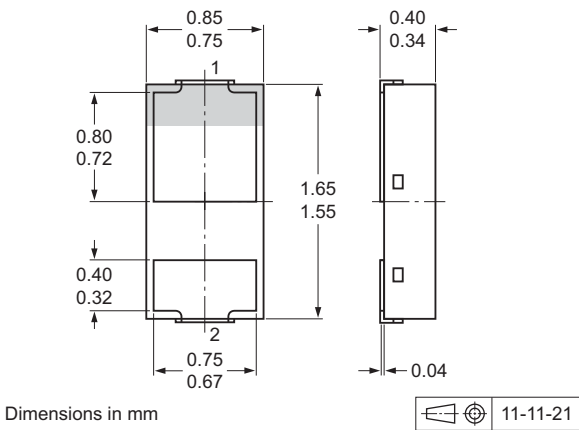


Fig 17. Package outline SOD1608 (DFN1608D-2)

10. Soldering

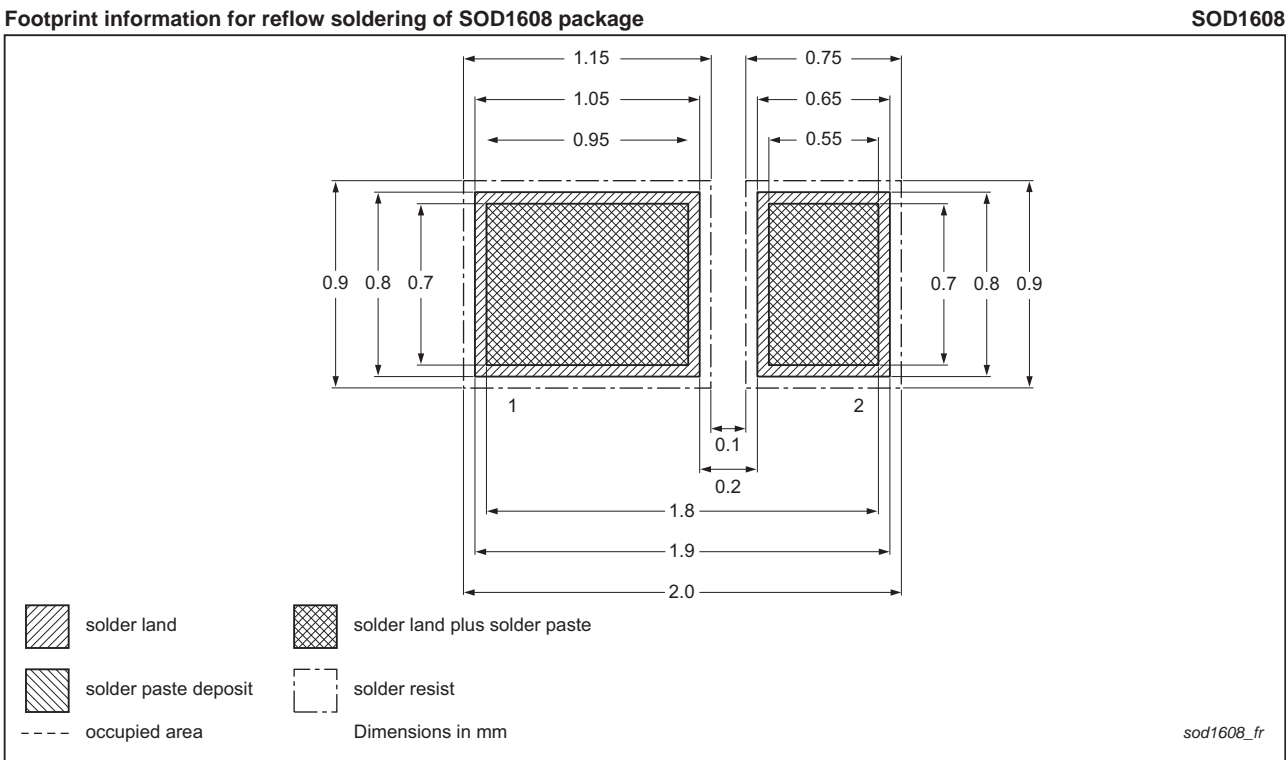


Fig 18. Reflow soldering footprint for SOD1608 (DFN1608D-2)

## 11. Revision history

Table 8. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PMEG2010EPK v.2	20120314	Product data sheet	-	PMEG2010EPK v.1
Modifications:	<ul style="list-style-type: none"><li>• <a href="#">5 "Limiting values"</a>: <math>I_F</math> corrected</li><li>• <a href="#">7 "Characteristics"</a>: <math>t_{rr}</math> and <math>V_{FRM}</math> added</li><li>• <a href="#">Fig 14.</a> and <a href="#">15</a>: added</li></ul>			
PMEG2010EPK v.1	20120120	Product data sheet	-	-

## 12. Legal information

### 12.1 Data sheet status

Document status <sup>[1] [2]</sup>	Product status <sup>[3]</sup>	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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## 14. Contents

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<b>1</b>	<b>Product profile</b> . . . . .	<b>1</b>
1.1	General description . . . . .	1
1.2	Features and benefits . . . . .	1
1.3	Applications . . . . .	1
1.4	Quick reference data . . . . .	1
<b>2</b>	<b>Pinning information</b> . . . . .	<b>2</b>
<b>3</b>	<b>Ordering information</b> . . . . .	<b>2</b>
<b>4</b>	<b>Marking</b> . . . . .	<b>2</b>
<b>5</b>	<b>Limiting values</b> . . . . .	<b>3</b>
<b>6</b>	<b>Thermal characteristics</b> . . . . .	<b>3</b>
<b>7</b>	<b>Characteristics</b> . . . . .	<b>5</b>
<b>8</b>	<b>Test information</b> . . . . .	<b>8</b>
8.1	Quality information . . . . .	9
<b>9</b>	<b>Package outline</b> . . . . .	<b>10</b>
<b>10</b>	<b>Soldering</b> . . . . .	<b>10</b>
<b>11</b>	<b>Revision history</b> . . . . .	<b>11</b>
<b>12</b>	<b>Legal information</b> . . . . .	<b>12</b>
12.1	Data sheet status . . . . .	12
12.2	Definitions . . . . .	12
12.3	Disclaimers . . . . .	12
12.4	Trademarks . . . . .	13
<b>13</b>	<b>Contact information</b> . . . . .	<b>13</b>

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Date of release: 14 March 2012

Document identifier: PMEG2010EPK



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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