

40 V, 0.5 A low VF MEGA Schottky barrier rectifier 5 December 2016 Produ

**Product data sheet** 

### 1. General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection encapsulated in small SOD123 Surface-Mounted Device (SMD) plastic package.

### 2. Features and benefits

- Forward current:  $I_F \le 0.5 A$
- Reverse voltage: V<sub>R</sub> ≤ 40 V
- Low forward voltage typ. V<sub>F</sub> = 420 mV
- Low reverse current typ. I<sub>R</sub> = 30 μA
- Small SMD plastic package
- AEC-Q101 qualified

### 3. Applications

- Low voltage rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse polarity protection
- Low power consumption applications
- Automotive applications

### 4. Quick reference data

Table 1. Quick reference data							
Symbol	Parameter	Conditions		Min	Тур	Max	Unit
I <sub>F</sub>	forward current	T <sub>sp</sub> ≤ 55 °C		-	-	0.5	А
V <sub>R</sub>	reverse voltage	T <sub>j</sub> = 25 °C		-	-	40	V
V <sub>F</sub>	forward voltage	$I_{F}$ = 500 mA; $t_{p}$ $\leq~$ 300 $\mu s;$ $\delta \leq~0.02~;$ $T_{j}$ = 25 $^{\circ}C$		-	420	470	mV
I <sub>R</sub>	reverse current	$V_R$ = 40 V; pulsed; T <sub>j</sub> = 25 °C	[1]	-	30	100	μA

[1] Very short test pulse to prevent junction self-heating.

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### 5. Pinning information

Т	Table 2. Pinning information							
I	Pin	Symbol	Description	Simplified outline	Graphic symbol			
•	1	К	cathode <sup>[1]</sup>	1 2	1 🕂 2			
	2	A	anode	SOD123	sym001			

[1] The marking bar indicates the cathode.

### 6. Ordering information

#### Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG4005EGW	SOD123	Plastic surface-mounted package; 2 leads	SOD123

### 7. Marking

Table 4. Marking codes
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Type number	Marking code
PMEG4005EGW	G4

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### 8. Limiting values

#### Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Мах	Unit
V <sub>R</sub>	reverse voltage	T <sub>j</sub> = 25 °C		-	40	V
l <sub>F</sub>	forward current	T <sub>sp</sub> ≤ 55 °C		-	0.5	А
I <sub>F(AV)</sub>	average forward current	δ = 0.5 ; f = 20 kHz; T <sub>amb</sub> ≤ 120 °C; square wave	[1]	-	0.5	A
		$\delta$ = 0.5 $~;$ f = 20 kHz; $T_{sp} \leq ~$ 145 °C; square wave		-	0.5	A
I <sub>FRM</sub>	repetitive peak forward current	$t_p \le 1 \text{ ms}; \delta \le 0.25$		-	7	A
I <sub>FSM</sub>	non-repetitive peak forward current	$t_p$ = 8 ms; $T_{j(init)}$ = 25 °C; square wave		-	10	A
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[2]	-	400	mW
			[1]	-	660	mW
Tj	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 an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

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

### 9. Thermal characteristics

#### **Table 6. Thermal characteristics**

Symbol	Parameter	Conditions		Min	Тур	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
R <sub>th(j-sp)</sub>	thermal resistance from junction to solder point		[4]	-	-	29	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.

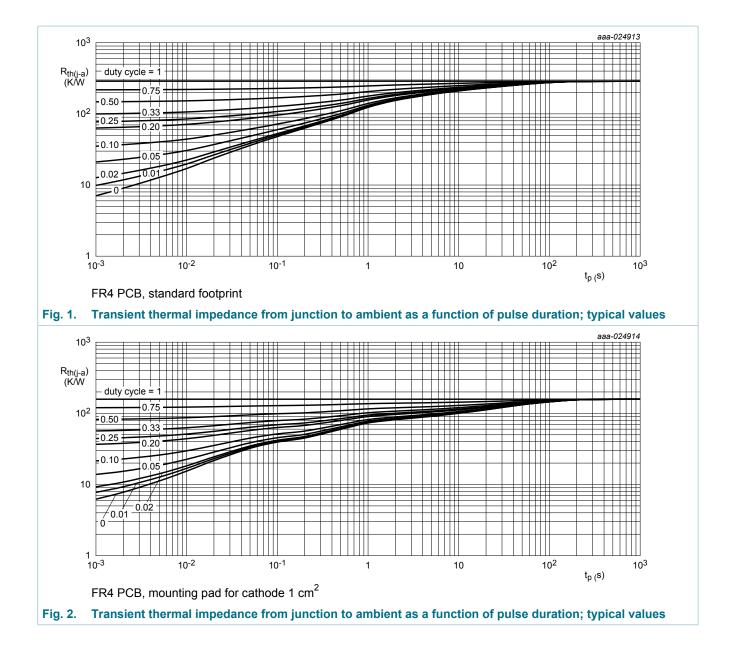
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

[4] Soldering point of cathode tab.

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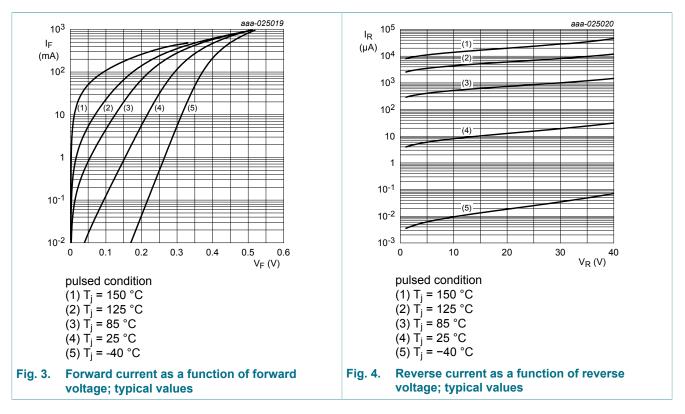
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### **10. Characteristics**

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
V <sub>(BR)R</sub>	reverse breakdown voltage	$I_{R}$ = 1 mA; $t_{p}$ $\leq~300~\mu s;  \delta \leq~0.02~;$ $T_{j}$ = 25 $^{\circ}C$		40	-	-	V
V <sub>F</sub>	forward voltage	$I_{F}$ = 0.1 mA; $t_{p}$ $\leq ~300~\mu s;  \delta \leq ~0.02$ ; $T_{j}$ = 25 °C		-	95	130	mV
		$I_{F}$ = 1 mA; $t_{p}$ $\leq~$ 300 $\mu$ s; $\delta$ $\leq~$ 0.02 $\ ;$ $T_{j}$ = 25 $^{\circ}C$		-	155	210	mV
		$I_{\text{F}}$ = 10 mA; $t_{\text{p}}$ $\leq$ 300 $\mu\text{s};$ $\delta$ $\leq$ 0.02 ; $T_{\text{j}}$ = 25 °C		-	220	270	mV
		$I_{\text{F}}$ = 100 mA; $t_{\text{p}}$ $\leq$ 300 $\mu\text{s};$ $\delta$ $\leq$ 0.02 ; $T_{\text{j}}$ = 25 °C		-	295	350	mV
		$I_{F}$ = 500 mA; $t_{p}$ $\leq~$ 300 $\mu$ s; $\delta$ $\leq~$ 0.02 $\ ;$ $T_{j}$ = 25 $^{\circ}C$		-	420	470	mV
I <sub>R</sub>	reverse current	$V_R$ = 10 V; pulsed; $T_j$ = 25 °C	[1]	-	7	20	μA
		$V_R$ = 40 V; pulsed; T <sub>j</sub> = 25 °C	[1]	-	30	100	μA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 1 V; f = 1 MHz; T <sub>i</sub> = 25 °C		-	43	50	pF

[1] Very short test pulse to prevent junction self-heating.



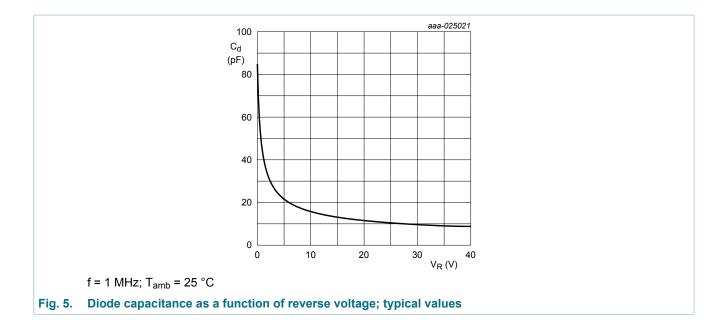
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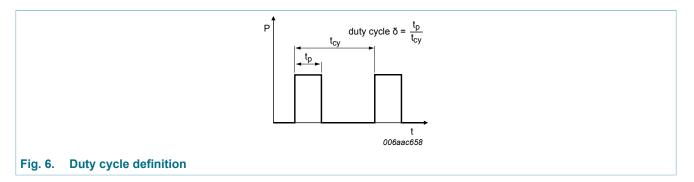
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### **11. Test information**



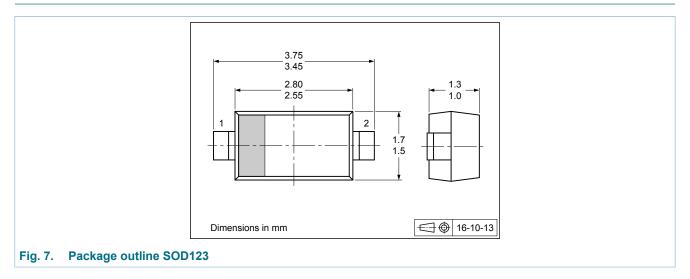
The current ratings for the typical waveforms are calculated according to the equations:  $I_{F(AV)} = I_M \times \delta$  with  $I_M$  defined as peak current,  $I_{RMS} = I_{F(AV)}$  at DC, and  $I_{RMS} = I_M \times \sqrt{\delta}$  with  $I_{RMS}$  defined as RMS current.

#### **Quality information**

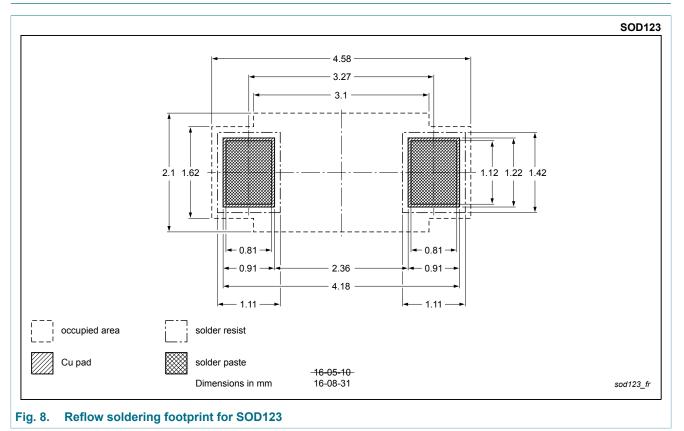
This product has been qualified in accordance with the Automotive Electronics Council (AEC) standard Q101 - Stress test qualification for discrete semiconductors, and is suitable for use in automotive applications.

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### 12. Package outline



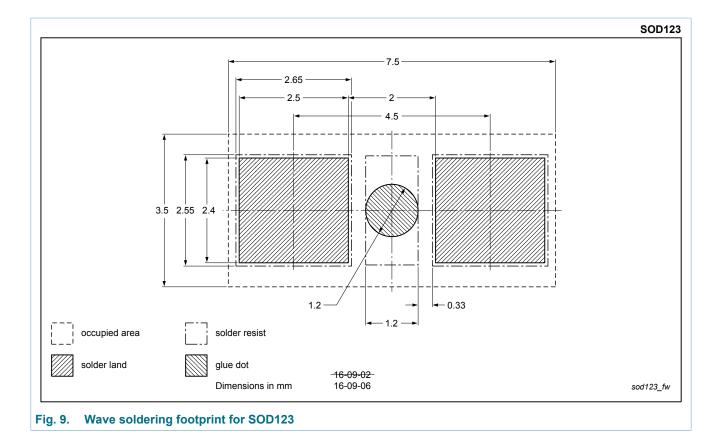
### 13. Soldering



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### 14. Revision history

Table 8. Revision histo	ory			
Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG4005EGW v.2	20161205	Product data sheet	-	PMEG4005EGW v.1
Modifications:	Product status chan			
PMEG4005EGW v.1	20161123	Preliminary data sheet	-	-

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### 15. Legal information

#### **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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