



# PMEG6010CEGW

60 V, 1 A Low VF MEGA Schottky barrier rectifier

24 November 2016

Product data sheet

## 1. General description

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

## 2. Features and benefits

- Forward current:  $I_F \leq 1$  A
- Reverse voltage  $V_R \leq 60$  V
- Low forward voltage, typ.  $V_F = 570$  mV
- Low reverse current, typ.  $I_R = 11$   $\mu$ A
- 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	Typ	Max	Unit
$I_F$	forward current	$T_{sp} \leq 55$ °C		-	-	1	A
$V_R$	reverse voltage	$T_j = 25$ °C		-	-	60	V
$V_F$	forward voltage	$I_F = 1$ A; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_j = 25$ °C		-	570	660	mV
$I_R$	reverse current	$V_R = 60$ V; pulsed; $T_j = 25$ °C	[1]	-	11	50	$\mu$ A

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode <sup>[1]</sup>	 SOD123	 <i>sym001</i>
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG6010CEGW	SOD123	Plastic surface-mounted package; 2 leads	SOD123

7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG6010CEGW	G7

## 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	$T_j = 25\text{ }^{\circ}\text{C}$		-	60	V
$I_F$	forward current	$T_{sp} \leq 55\text{ }^{\circ}\text{C}$		-	1	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20\text{ kHz}$ ; $T_{amb} \leq 70\text{ }^{\circ}\text{C}$ ; square wave	[1]	-	1	A
		$\delta = 0.5$ ; $f = 20\text{ kHz}$ ; $T_{sp} \leq 135\text{ }^{\circ}\text{C}$ ; square wave		-	1	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1\text{ ms}$ ; $\delta \leq 0.25$		-	7	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8\text{ ms}$ ; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$ ; square wave		-	9	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	[2]	-	410	mW
			[1]	-	675	mW
$T_j$	junction temperature			-	150	$^{\circ}\text{C}$
$T_{amb}$	ambient temperature			-55	150	$^{\circ}\text{C}$
$T_{stg}$	storage temperature			-65	150	$^{\circ}\text{C}$

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

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

## 9. Thermal characteristics

**Table 6. Thermal characteristics**

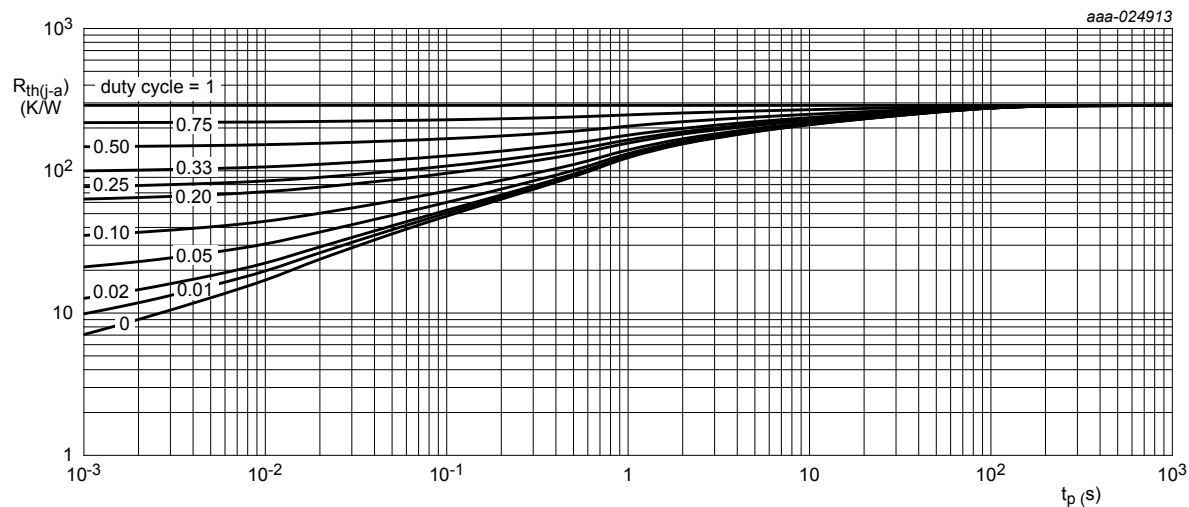
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	305	K/W
			[1] [3]	-	-	185	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	21	K/W

[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.

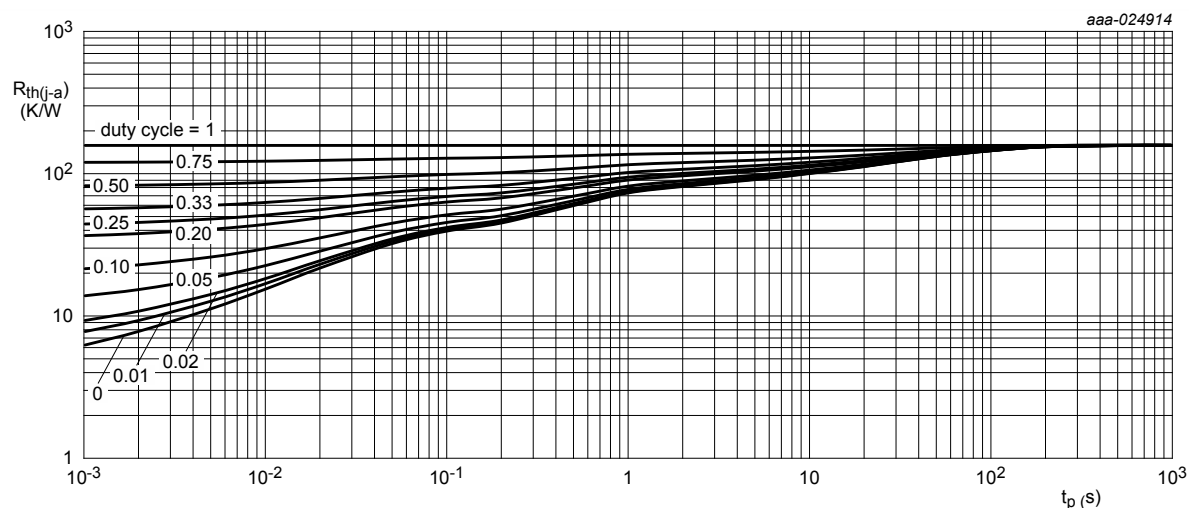
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode  $1\text{ cm}^2$ .

[4] Soldering point of cathode tab.



FR4 PCB, standard footprint

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



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

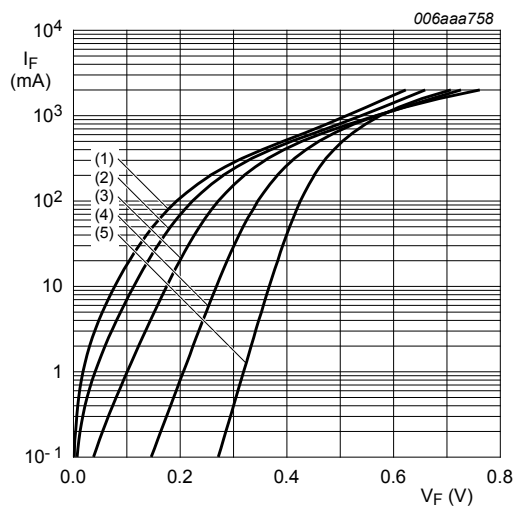
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

## 10. Characteristics

Table 7. Characteristics

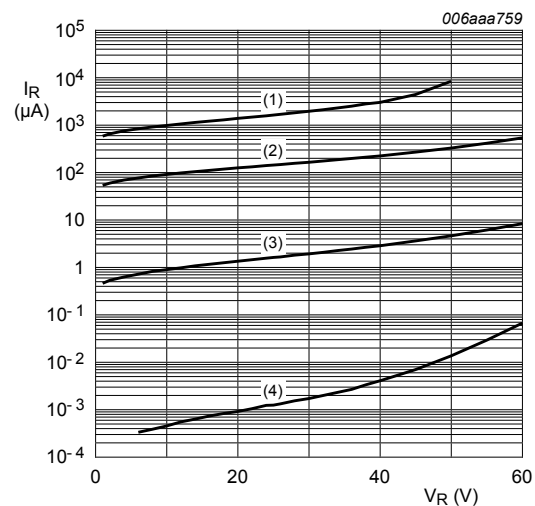
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 1 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$	60	-	-	V
$V_F$	forward voltage	$I_F = 1 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$	-	210	250	mV
		$I_F = 10 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$	-	270	310	mV
		$I_F = 100 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$	-	350	400	mV
		$I_F = 500 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$	-	460	530	mV
		$I_F = 700 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$	-	510	580	mV
		$I_F = 1 \text{ A}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_j = 25 \text{ } ^\circ\text{C}$	-	570	660	mV
$I_R$	reverse current	$V_R = 5 \text{ V}$ ; pulsed; $T_j = 25 \text{ } ^\circ\text{C}$	[1]	0.8	-	$\mu\text{A}$
		$V_R = 10 \text{ V}$ ; pulsed; $T_j = 25 \text{ } ^\circ\text{C}$	[1]	1.1	-	$\mu\text{A}$
		$V_R = 60 \text{ V}$ ; pulsed; $T_j = 25 \text{ } ^\circ\text{C}$	[1]	11	50	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_j = 25 \text{ } ^\circ\text{C}$	-	60	68	pF

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



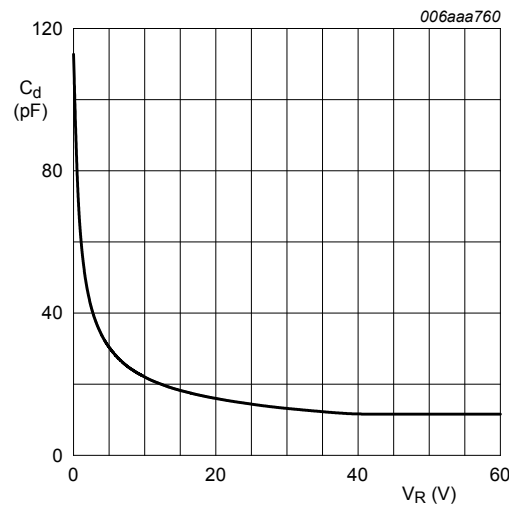
- (1)  $T_{\text{amb}} = 150 \text{ } ^\circ\text{C}$
- (2)  $T_{\text{amb}} = 125 \text{ } ^\circ\text{C}$
- (3)  $T_{\text{amb}} = 85 \text{ } ^\circ\text{C}$
- (4)  $T_{\text{amb}} = 25 \text{ } ^\circ\text{C}$
- (5)  $T_{\text{amb}} = -40 \text{ } ^\circ\text{C}$

**Fig. 3. Forward current as a function of forward voltage; typical values**



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

**Fig. 4. Reverse current as a function of reverse voltage; typical values**



f = 1 MHz; T<sub>amb</sub> = 25 °C

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

11. Test information

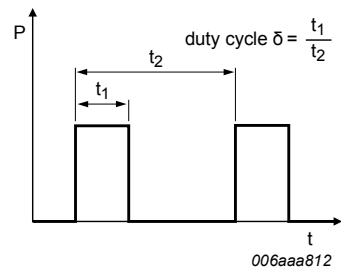


Fig. 6. Duty cycle definition

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.

12. Package outline

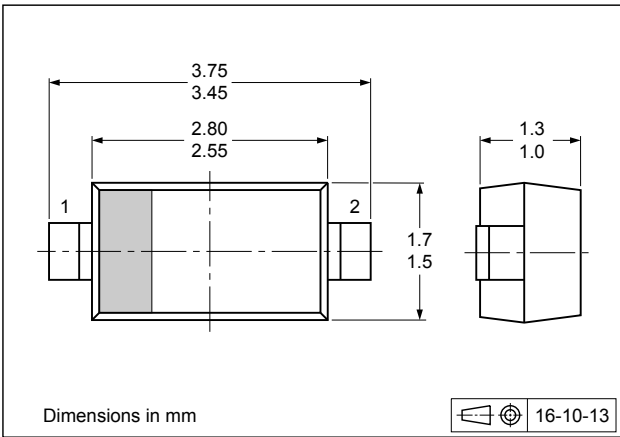


Fig. 7. Package outline SOD123

13. Soldering

SOD123

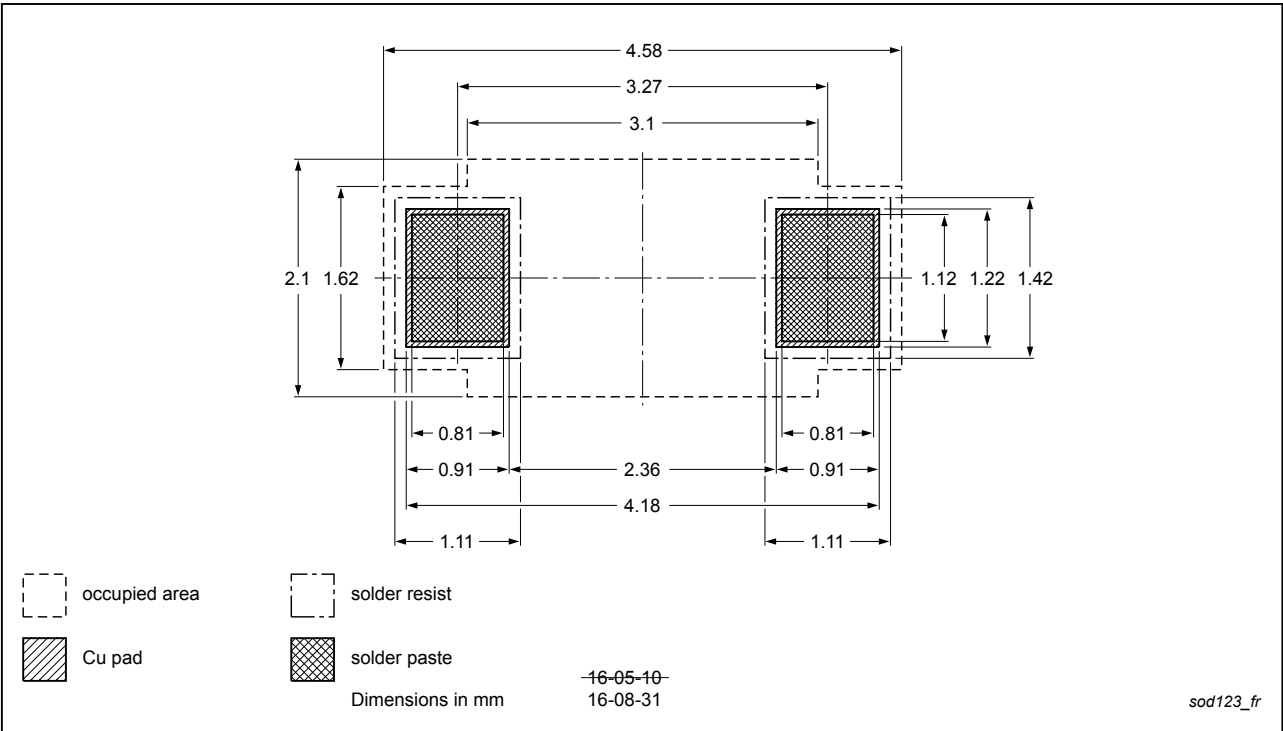


Fig. 8. Reflow soldering footprint for SOD123

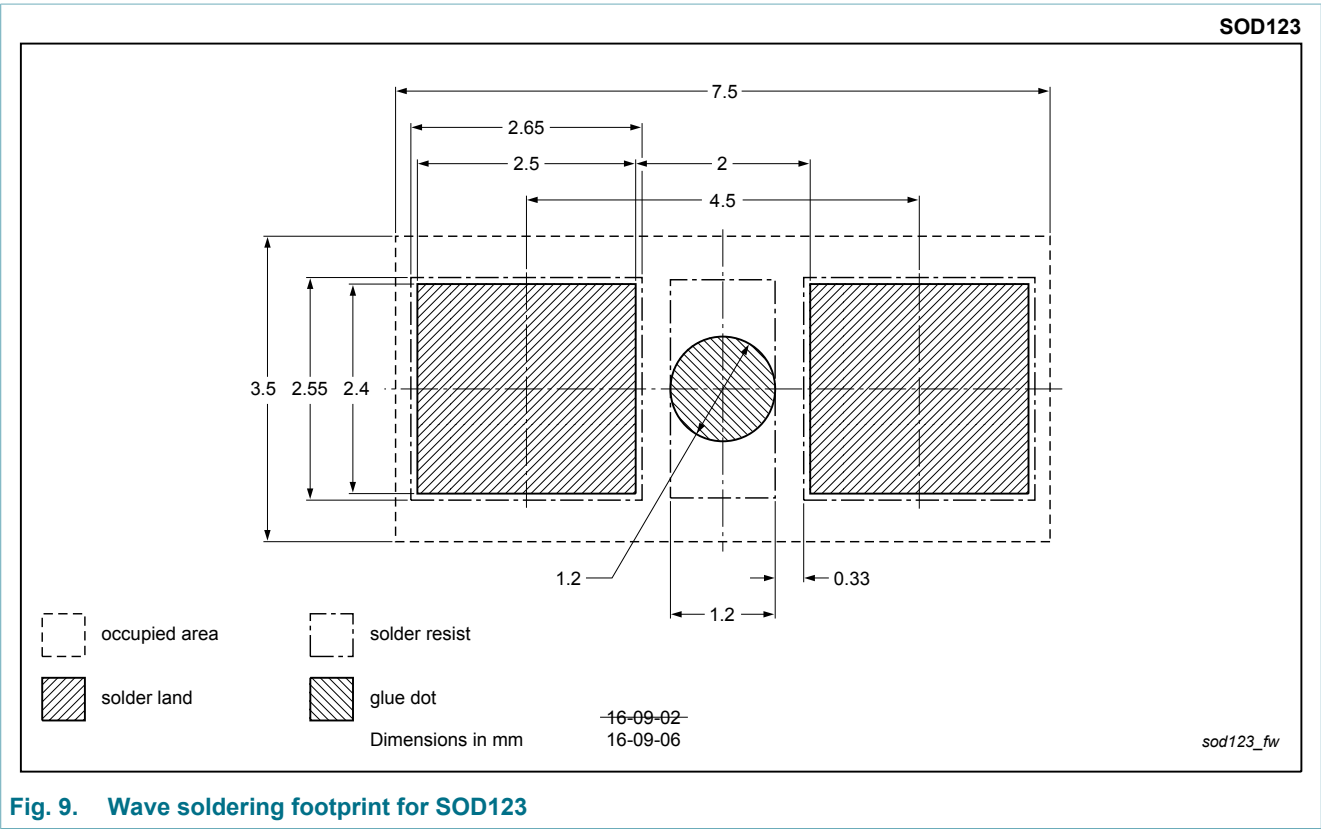


Fig. 9. Wave soldering footprint for SOD123



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG6010CEGW v.1	20161124	Product data sheet	-	-

## 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.
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