PMEG3010EGW

30 V, 1 A low VF MEGA Schottky barrier rectifier

5 December 2016 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: $I_F \leq 1$ A
- Reverse voltage: $V_R \leq 30$ V
- Low forward voltage typ. $V_F = 450$ mV
- Low reverse current typ. $I_R = 40$ 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

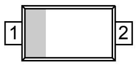
Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_F	forward current	$T_{sp} \leq 55$ °C		-	-	1	A
V_R	reverse voltage	$T_j = 25$ °C		-	-	30	V
V_F	forward voltage	$I_F = 1$ A; $t_p \leq 300$ µs; $\delta = 0.02$; $T_j = 25$ °C		-	450	560	mV
I_R	reverse current	$V_R = 30$ V; pulsed; $T_j = 25$ °C	[1]	-	40	150	µA

[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[1]	 SOD123	 sym001
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG3010EGW	SOD123	Plastic surface-mounted package; 2 leads	SOD123

7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG3010EGW	GD

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 °C		-	30	V
I_F	forward current	T_{sp} ≤ 55 °C		-	1	A
$I_{F(AV)}$	average forward current	δ = 0.5 ; f = 20 kHz; T_{amb} ≤ 70 °C; square wave	[1]	-	1	A
		δ = 0.5 ; f = 20 kHz; T_{sp} ≤ 135 °C; square wave		-	1	A
I_{FRM}	repetitive peak forward current	t_p ≤ 1 ms; δ ≤ 0.25		-	7	A
I_{FSM}	non-repetitive peak forward current	t_p = 8 ms; $T_{j(init)}$ = 25 °C; square wave		-	9	A
P_{tot}	total power dissipation	T_{amb} ≤ 25 °C	[2]	-	400	mW
			[1]	-	660	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C

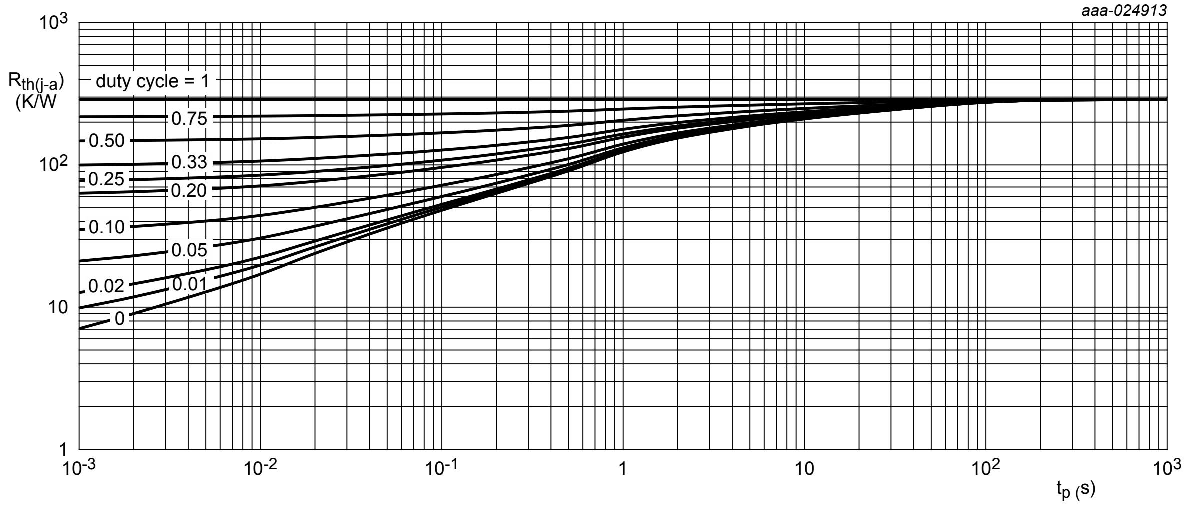
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

9. Thermal characteristics

Table 6. Thermal characteristics

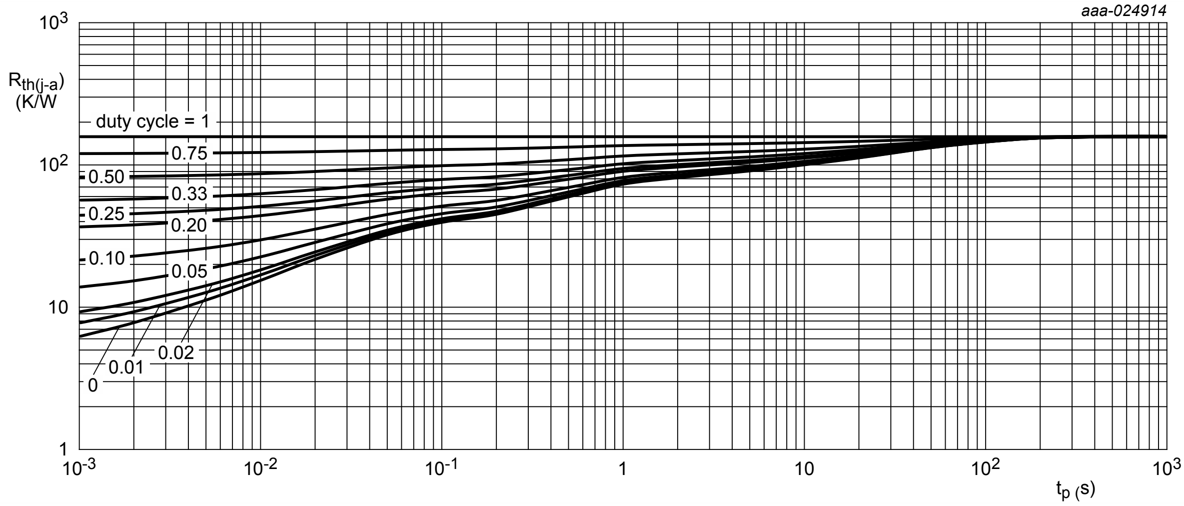
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	310	K/W
			[1] [3]	-	-	190	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	29	K/W

[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses P_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 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 cm^2

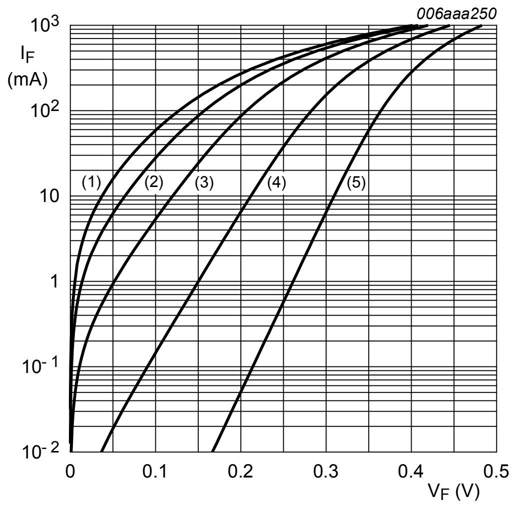
Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

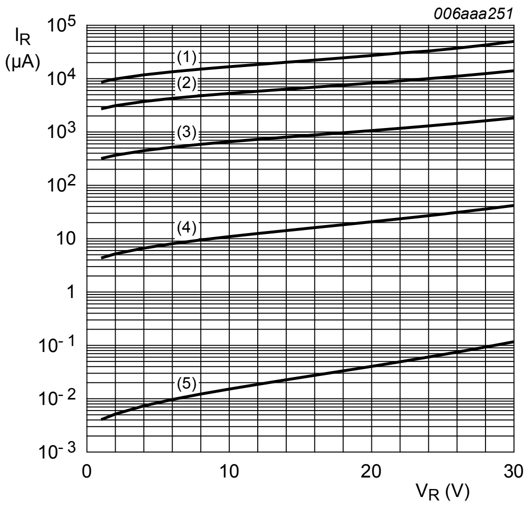
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	I_R = 1 mA; $t_p \leq$ 300 μs; $\delta \leq$ 0.02 ; T_j = 25 °C		30	-	-	V
V_F	forward voltage	I_F = 0.1 mA; $t_p \leq$ 300 μs; $\delta \leq$ 0.02 ; T_j = 25 °C		-	90	130	mV
		I_F = 1 mA; $t_p \leq$ 300 μs; $\delta \leq$ 0.02 ; T_j = 25 °C		-	150	200	mV
		I_F = 10 mA; $t_p \leq$ 300 μs; $\delta \leq$ 0.02 ; T_j = 25 °C		-	215	250	mV
		I_F = 100 mA; $t_p \leq$ 300 μs; $\delta \leq$ 0.02 ; T_j = 25 °C		-	285	340	mV
		I_F = 500 mA; $t_p \leq$ 300 μs; $\delta \leq$ 0.02 ; T_j = 25 °C		-	380	430	mV
		I_F = 1 A; $t_p \leq$ 300 μs; δ = 0.02 ; T_j = 25 °C		-	450	560	mV
I_R	reverse current	V_R = 10 V; pulsed; T_j = 25 °C	[1]	-	12	30	μA
		V_R = 30 V; pulsed; T_j = 25 °C	[1]	-	40	150	μA
C_d	diode capacitance	V_R = 1 V; f = 1 MHz; T_j = 25 °C		-	55	70	pF

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



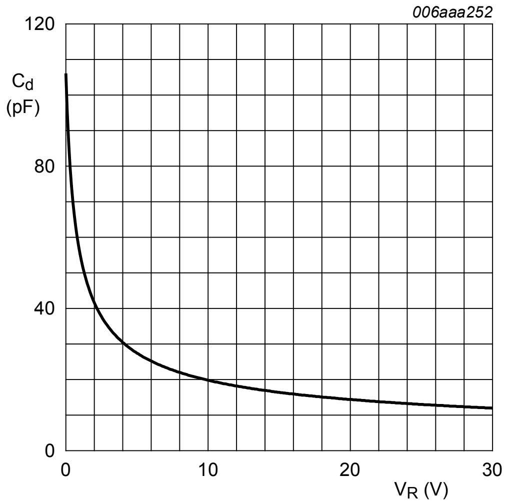
pulsed condition
(1) T_j = 150 °C
(2) T_j = 125 °C
(3) T_j = 85 °C
(4) T_j = 25 °C
(5) T_j = -40 °C

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



pulsed condition
(1) T_j = 150 °C
(2) T_j = 125 °C
(3) T_j = 85 °C
(4) T_j = 25 °C
(5) T_j = −40 °C

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



f = 1 MHz; T_{amb} = 25 °C

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

11. Test information

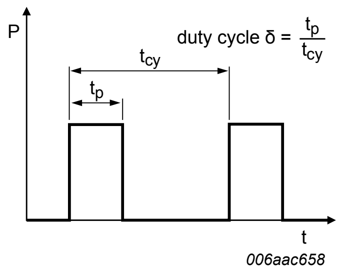


Fig. 6. Duty cycle definition

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.

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

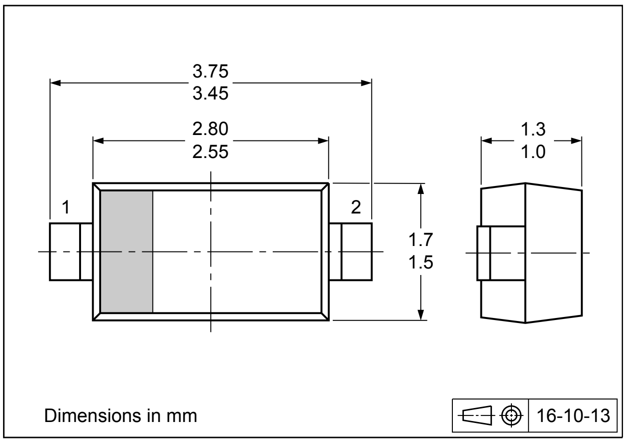


Fig. 7. Package outline SOD123

13. Soldering

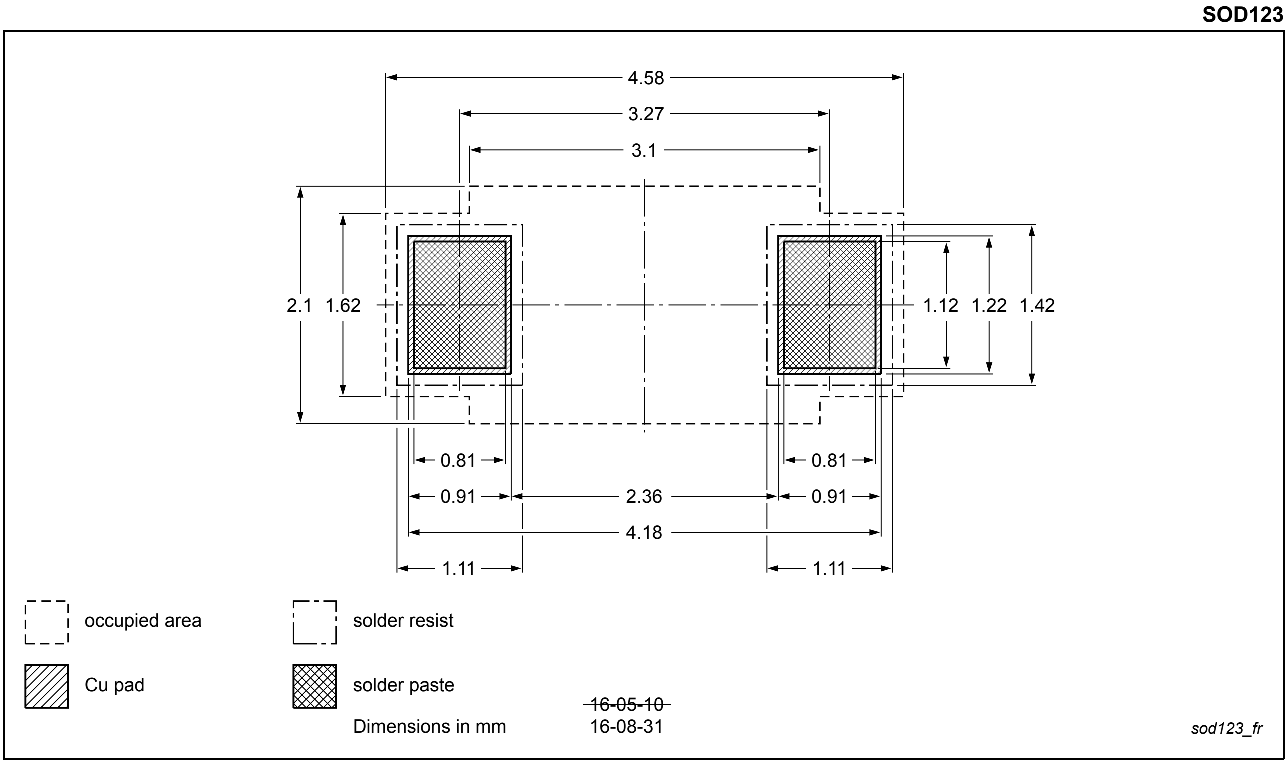


Fig. 8. Reflow soldering footprint for SOD123

SOD123

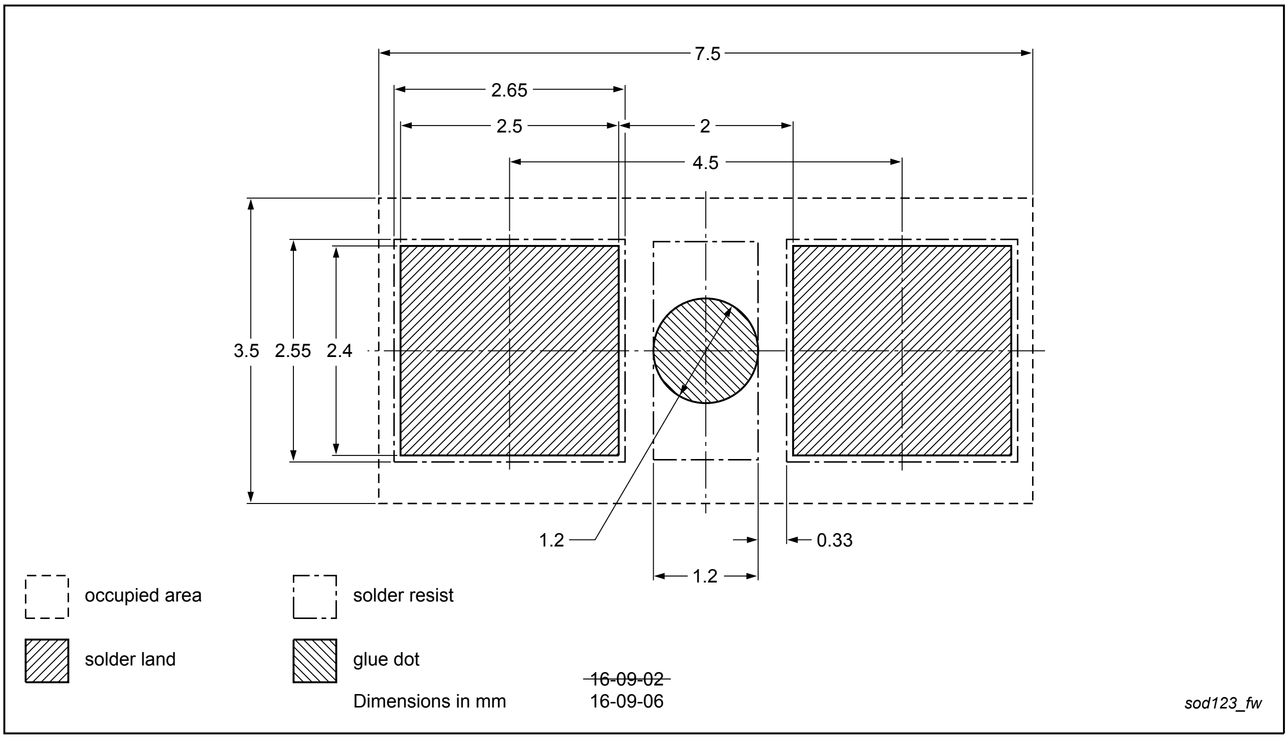


Fig. 9. Wave soldering footprint for SOD123

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG3010EGW v.1	20161205	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.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
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