



PMEG3020EGW

30 V, 2 A low VF MEGA Schottky barrier rectifier

24 November 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: $I_F \leq 2 \text{ A}$
- Reverse voltage: $V_R \leq 30 \text{ V}$
- Low forward voltage typ. $V_F = 510 \text{ mV}$
- Low reverse current typ. $I_R = 400 \mu\text{A}$
- 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	$T_{sp} \leq 55 \text{ }^\circ\text{C}$	-	-	2	A
V_R	reverse voltage	$T_j = 25 \text{ }^\circ\text{C}$	-	-	30	V
V_F	forward voltage	$I_F = 2 \text{ A}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$	-	510	620	mV
I_R	reverse current	$V_R = 30 \text{ V}; \text{ pulsed}; T_j = 25 \text{ }^\circ\text{C}$	[1]	400	1000	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	 <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
PMEG3020EGW	SOD123	Plastic surface-mounted package; 2 leads	SOD123

7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG3020EGW	G3

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	$T_j = 25\text{ °C}$		-	30	V
I_F	forward current	$T_{sp} \leq 55\text{ °C}$		-	2	A
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20\text{ kHz}$; $T_{sp} \leq 115\text{ °C}$; square wave		-	2	A
I_{FRM}	repetitive peak forward current	$t_p \leq 1\text{ ms}$; $\delta \leq 0.25$		-	4.5	A
I_{FSM}	non-repetitive peak forward current	$t_p = 8\text{ ms}$; $T_{j(\text{init})} = 25\text{ °C}$; square wave		-	9	A
P_{tot}	total power dissipation	$T_{\text{amb}} \leq 25\text{ °C}$	[1]	-	400	mW
			[2]	-	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 and standard footprint.

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

9. Thermal characteristics

Table 6. Thermal characteristics

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

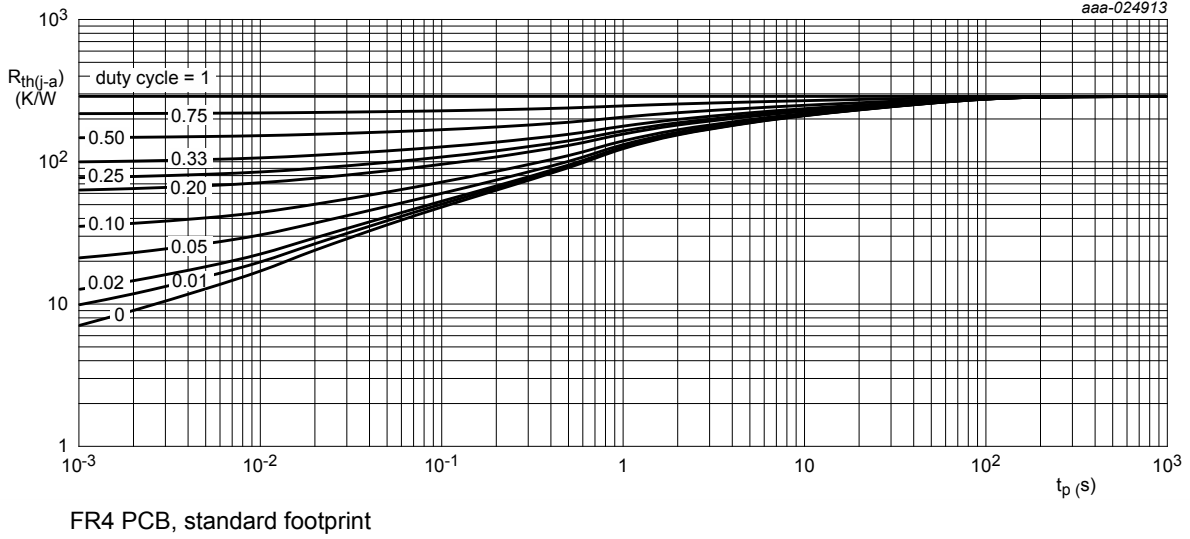


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

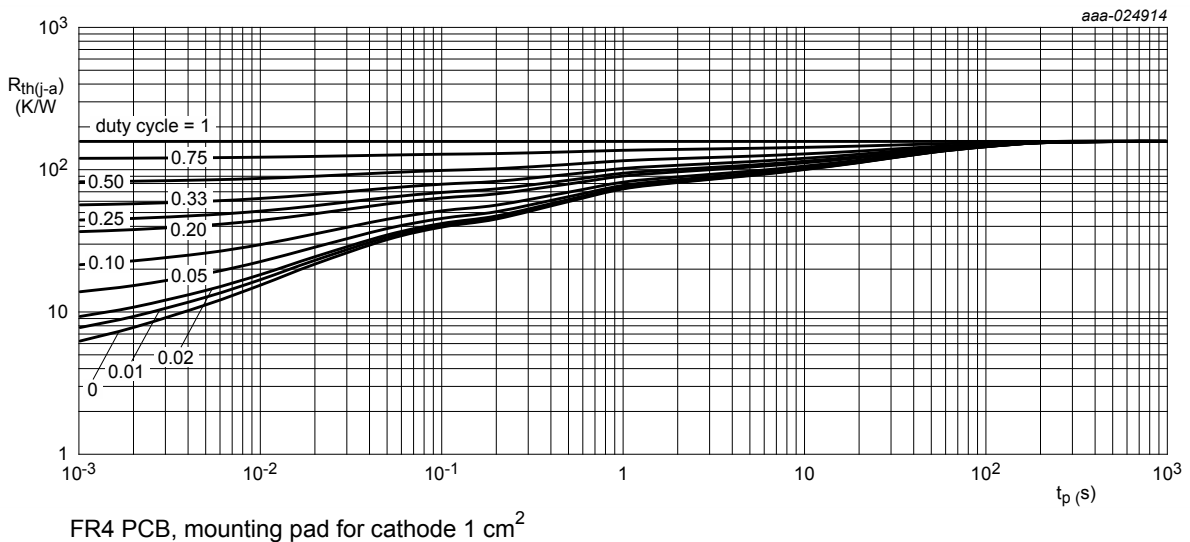


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

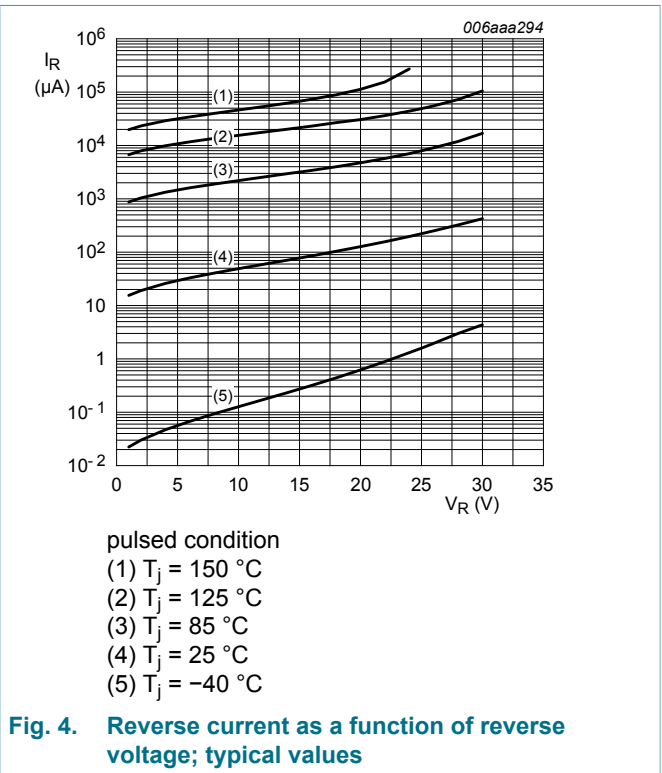
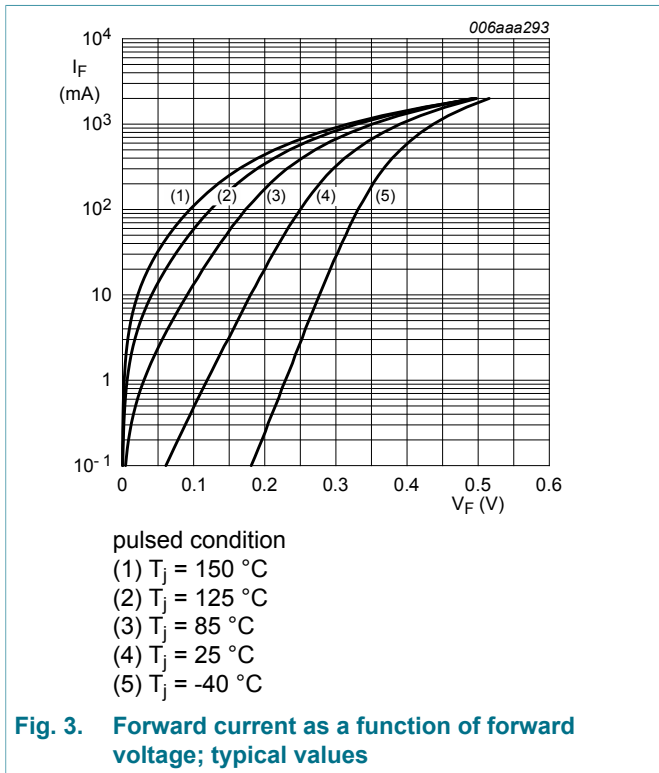
10. Characteristics

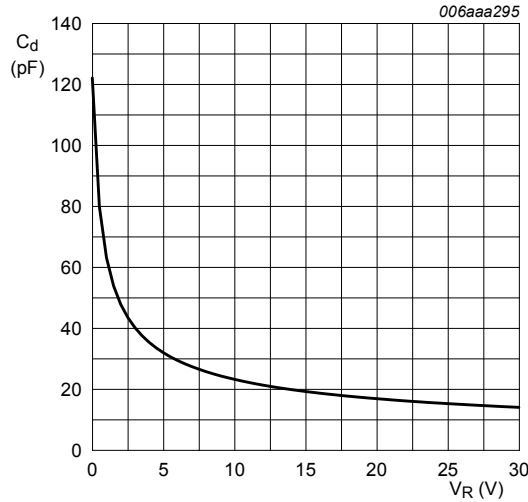
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{(BR)R}$	reverse breakdown voltage	$I_R = 1 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$	30	-	-	V
V_F	forward voltage	$I_F = 1 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$	-	125	160	mV
		$I_F = 10 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$	-	185	220	mV
		$I_F = 100 \text{ mA}$; $t_p \leq 300 \text{ }\mu\text{s}$; $\delta \leq 0.02$; $T_j = 25 \text{ }^\circ\text{C}$	-	255	290	mV

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$I_F = 500 \text{ mA}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ } ^\circ\text{C}$	-	330	380	mV
		$I_F = 1 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ } ^\circ\text{C}$	-	400	480	mV
		$I_F = 2 \text{ A}; t_p \leq 300 \text{ } \mu\text{s}; \delta \leq 0.02 ; T_j = 25 \text{ } ^\circ\text{C}$	-	510	620	mV
I_R	reverse current	$V_R = 10 \text{ V}; \text{ pulsed}; T_j = 25 \text{ } ^\circ\text{C}$ [1]	-	60	150	μA
		$V_R = 30 \text{ V}; \text{ pulsed}; T_j = 25 \text{ } ^\circ\text{C}$ [1]	-	400	1000	μA
C_d	diode capacitance	$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_j = 25 \text{ } ^\circ\text{C}$	-	60	72	pF

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





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

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

11. Test information

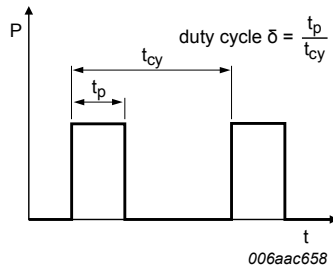


Fig. 6. Duty cycle definition

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

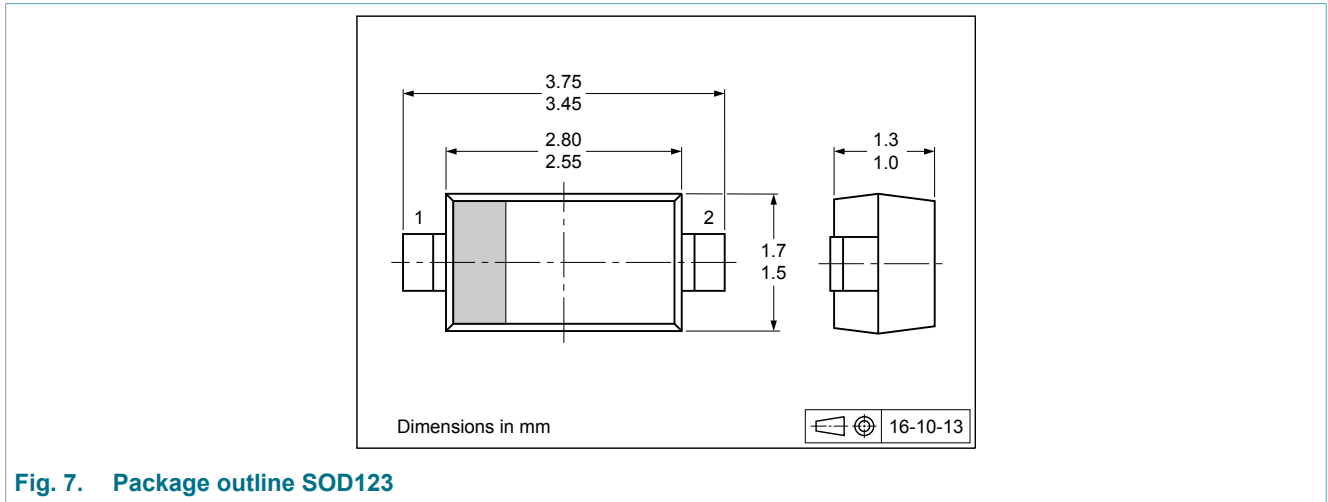


Fig. 7. Package outline SOD123

13. Soldering

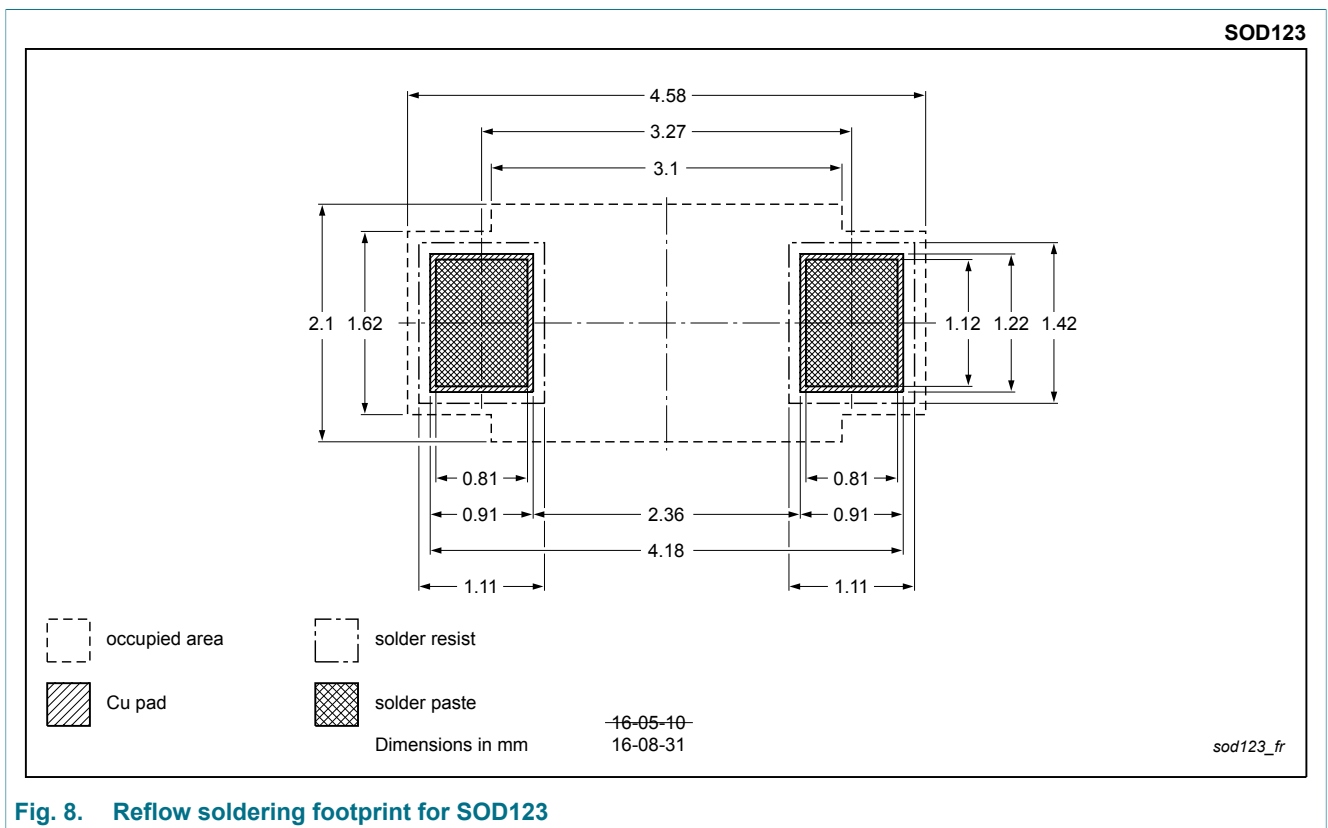


Fig. 8. Reflow soldering footprint for SOD123

SOD123

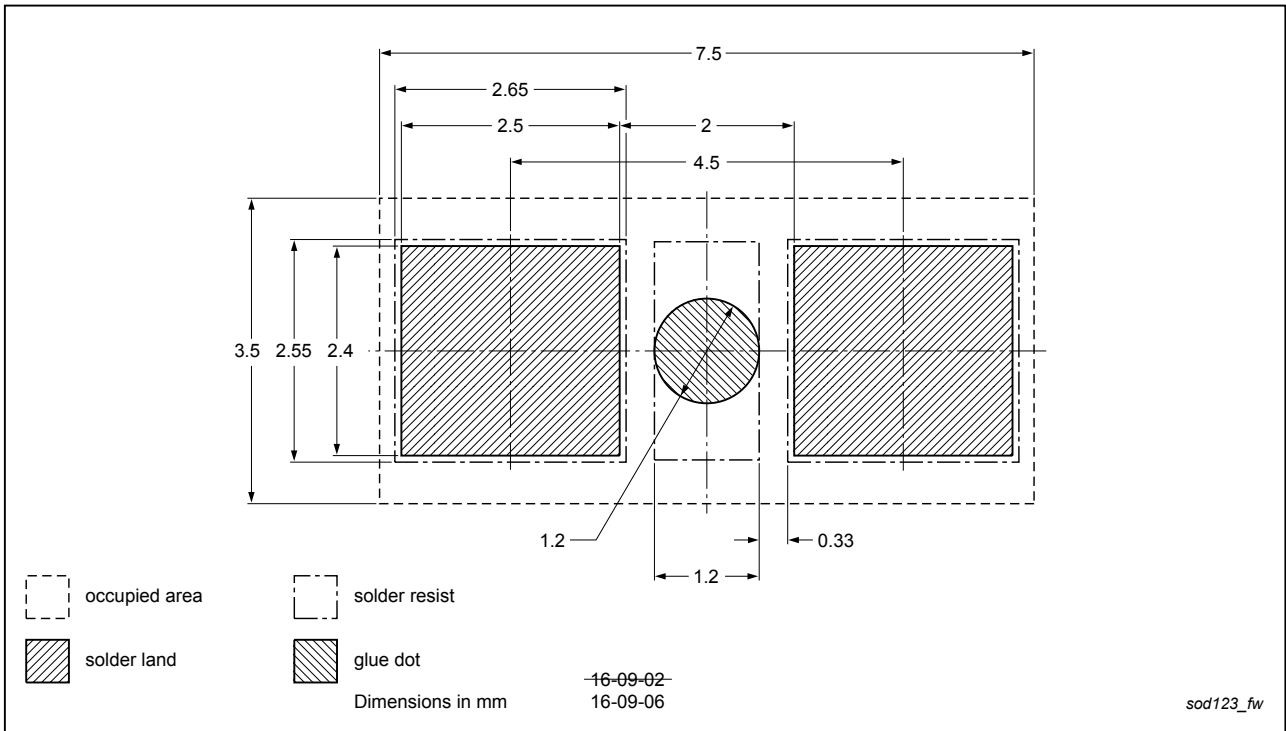


Fig. 9. Wave soldering footprint for SOD123

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG3020EGW v.1	20161124	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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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16. Contents

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	2
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	3
9. Thermal characteristics.....	3
10. Characteristics.....	4
11. Test information.....	6
12. Package outline.....	7
13. Soldering.....	7
14. Revision history.....	9
15. Legal information.....	10

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