



# PMEG3020EH-Q

30 V, 2 A ultra low VF Schottky barrier rectifier

11 July 2022

Product data sheet

## 1. General description

Planar Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a small SOD123F Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Forward current: 2 A
- Reverse voltage: 30 V
- Ultra low forward voltage
- Small and flat lead SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

## 3. Applications

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

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current	$T_{sp} \leq 55^\circ\text{C}$	-	-	2	A
$V_R$	reverse voltage		-	-	30	V
$V_F$	forward voltage	$I_F = 2 \text{ A}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; \text{pulsed}; T_{amb} = 25^\circ\text{C}$	-	510	620	mV

## 5. Pinning information

**Table 2. Pinning information**

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]		 sym001
2	A	anode	<b>SOD123F</b>	

[1] The marking bar indicates the cathode.

## 6. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
<a href="#">PMEG3020EH-Q</a>	SOD123F	plastic, surface-mounted package; 2 leads; 2.6 mm x 1.6 mm x 1.1 mm body	<a href="#">SOD123F</a>

## 7. Marking

**Table 4. Marking codes**

Type number	Marking code
PMEG3020EH-Q	A7

## 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			-	30	V
$I_F$	forward current	$T_{sp} \leq 55^\circ\text{C}$		-	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	$t_p = 8 \text{ ms}; \text{square wave}$	[1]	-	9	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25^\circ\text{C}$	[1]	-	375	mW
			[2]	-	830	mW
$T_j$	junction temperature			-	150	°C
$T_{amb}$	ambient temperature			-65	150	°C
$T_{stg}$	storage temperature			-65	150	°C

[1] Device mounted on an FR4 Printed-Circuit Board (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<sup>2</sup>.

## 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]	-	-	330	K/W
			[1] [3]	-	-	150	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point			-	-	60	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.

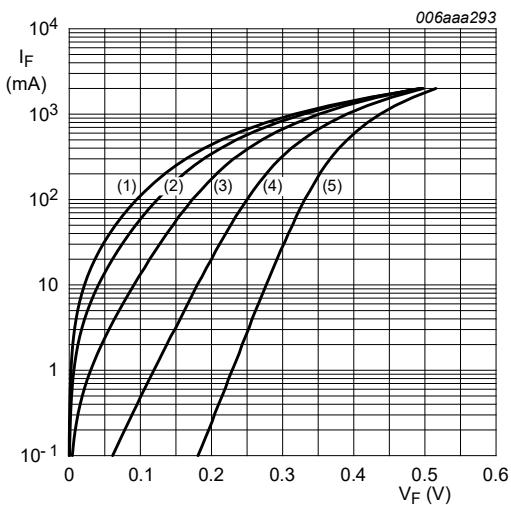
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

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

## 10. Characteristics

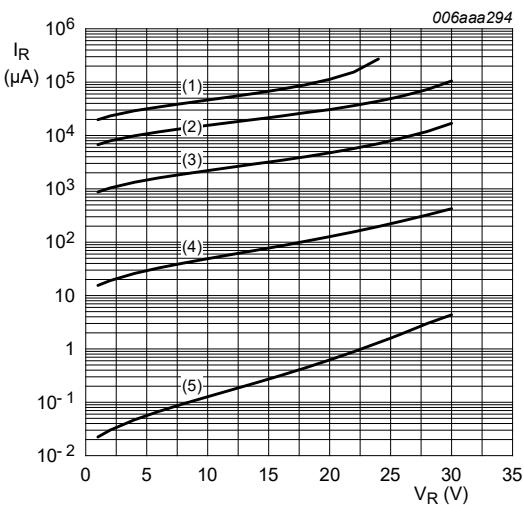
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 1 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; \text{pulsed}; T_{amb} = 25^\circ\text{C}$		-	125	160	mV
		$I_F = 10 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; \text{pulsed}; T_{amb} = 25^\circ\text{C}$		-	185	220	mV
		$I_F = 100 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; \text{pulsed}; T_{amb} = 25^\circ\text{C}$		-	255	290	mV
		$I_F = 500 \text{ mA}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; \text{pulsed}; T_{amb} = 25^\circ\text{C}$		-	330	380	mV
		$I_F = 1 \text{ A}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; \text{pulsed}; T_{amb} = 25^\circ\text{C}$		-	400	480	mV
		$I_F = 2 \text{ A}; t_p \leq 300 \mu\text{s}; \delta \leq 0.02; \text{pulsed}; T_{amb} = 25^\circ\text{C}$		-	510	620	mV
$I_R$	reverse current	$V_R = 10 \text{ V}; T_{amb} = 25^\circ\text{C}$		-	60	150	$\mu\text{A}$
		$V_R = 30 \text{ V}; T_{amb} = 25^\circ\text{C}$		-	400	1000	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}; f = 1 \text{ MHz}; T_{amb} = 25^\circ\text{C}$		-	60	72	pF



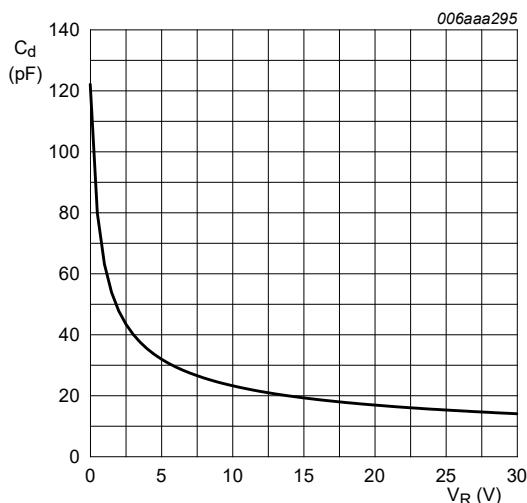
pulsed condition  
 (1)  $T_j = 150^\circ\text{C}$   
 (2)  $T_j = 125^\circ\text{C}$   
 (3)  $T_j = 85^\circ\text{C}$   
 (4)  $T_j = 25^\circ\text{C}$   
 (5)  $T_j = -40^\circ\text{C}$

Fig. 1. Forward current as a function of forward voltage; typical values



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

Fig. 2. Reverse current as a function of reverse voltage; typical values



$f = 1$  MHz;  $T_{amb} = 25$  °C

Fig. 3. Diode capacitance as a function of reverse voltage; typical values

## 11. Test information

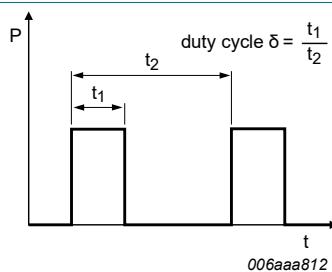


Fig. 4. Duty cycle definition

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  $I_{RMS} = I_M \times \sqrt{\delta}$  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

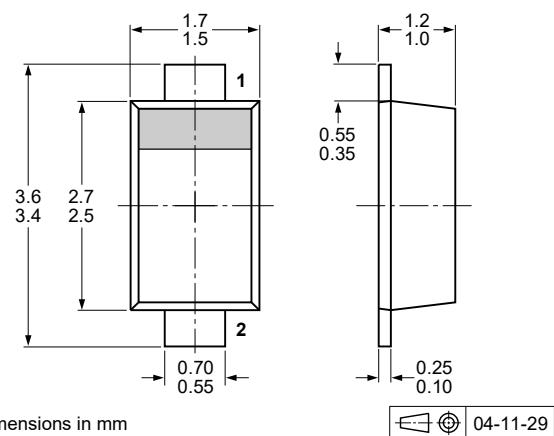


Fig. 5. Package outline SOD123F

## 13. Soldering

Footprint information for reflow soldering of plastic surface-mounted, 2 leads package

SOD123F

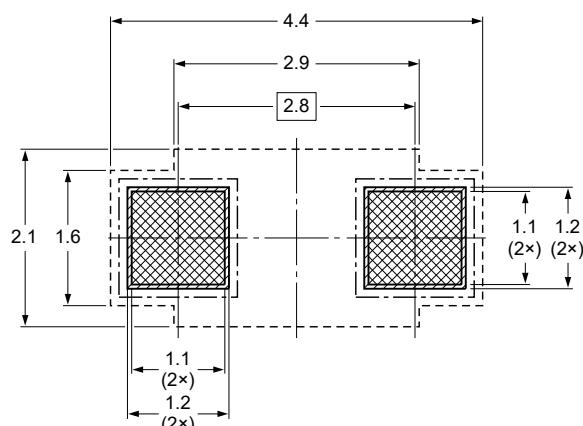


Fig. 6. Reflow soldering footprint for SOD123F

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG3020EH-Q v.1	20220711	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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