

# PMEG1020EH; PMEG1020EJ

10 V, 2 A ultra low  $V_F$  MEGA Schottky barrier rectifiers

Rev. 03 — 14 April 2005

Product data sheet

## 1. Product profile

### 1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifiers with an integrated guard ring for stress protection, encapsulated in small and flat lead plastic SMD packages.

Table 1: Product overview

Type number	Package		Configuration
	Philips	JEITA	
PMEG1020EH	SOD123F	-	single diode
PMEG1020EJ	SOD323F	SC-90	single diode

### 1.2 Features

- Forward current:  $\leq 2$  A
- Reverse voltage:  $\leq 10$  V
- Ultra low forward voltage
- Small and flat lead SMD plastic packages

### 1.3 Applications

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

### 1.4 Quick reference data

Table 2: Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_F$	forward current	$T_{sp} \leq 55$ °C	-	-	2	A
$V_R$	reverse voltage		-	-	10	V
$V_F$	forward voltage	$I_F = 2$ A	[1] -	350	460	mV

[1] Pulse test:  $t_p \leq 300$   $\mu$ s;  $\delta \leq 0.02$ .

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## 2. Pinning information

**Table 3: Pinning**

Pin	Description	Simplified outline	Symbol
1	cathode	<p>001aab540</p>	<p>sym001</p>
2	anode		

[1] The marking bar indicates the cathode.

## 3. Ordering information

**Table 4: Ordering information**

Type number	Package		
	Name	Description	Version
PMEG1020EH	-	plastic surface mounted package; 2 leads	SOD123F
PMEG1020EJ	SC-90	plastic surface mounted package; 2 leads	SOD323F

## 4. Marking

**Table 5: Marking codes**

Type number	Marking code
PMEG1020EH	A8
PMEG1020EJ	CB

## 5. Limiting values

**Table 6: Limiting values**

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

Symbol	Parameter	Conditions	Min	Max	Unit	
$V_R$	reverse voltage		-	10	V	
$I_F$	forward current	$T_{sp} \leq 55 \text{ }^\circ\text{C}$	-	2	A	
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1 \text{ ms}; \delta \leq 0.5$	-	7	A	
$I_{FSM}$	non-repetitive peak forward current	square wave; $t_p = 8 \text{ ms}$	-	9	A	
$P_{tot}$	total power dissipation	$T_{amb} \leq 25 \text{ }^\circ\text{C}$	[1]	-	375	mW
			[2]	-	830	mW
			[1]	-	360	mW
			[2]	-	830	mW
$T_j$	junction temperature		-	150	$^\circ\text{C}$	

**Table 6:** Limiting values ...continued

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

Symbol	Parameter	Conditions	Min	Max	Unit
$T_{amb}$	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>.

## 6. Thermal characteristics

**Table 7:** Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air						
			PMEG1020EH	[1] [2]	-	-	330	K/W
				[2] [3]	-	-	150	K/W
			PMEG1020EJ	[1] [2]	-	-	350	K/W
			[2] [3]	-	-	150	K/W	
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]					
		PMEG1020EH		-	-	60	K/W	
		PMEG1020EJ		-	-	55	K/W	

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

[2] For Schottky barrier rectifiers thermal run-away has to be considered, as in some applications the reverse power losses  $P_R$  are a significant part of the total power losses. Nomograms for determining the reverse power losses  $P_R$  and  $I_{F(AV)}$  rating are available on request.

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

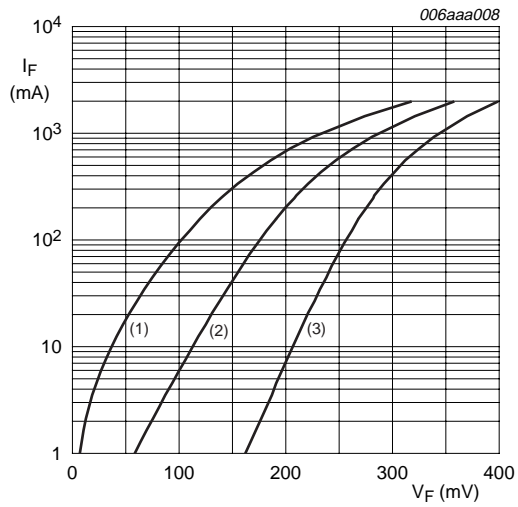
[4] Soldering point of cathode tab.

## 7. Characteristics

**Table 8:** Characteristics $T_{amb} = 25^\circ\text{C}$  unless otherwise specified.

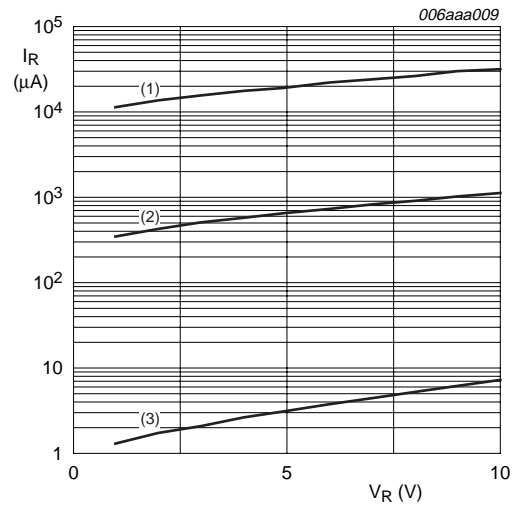
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_F$	forward voltage	$I_F = 0.01\text{ A}$	[1]	-	100	130	mV
		$I_F = 0.1\text{ A}$	[1]	-	170	200	mV
		$I_F = 1\text{ A}$	[1]	-	280	350	mV
		$I_F = 2\text{ A}$	[1]	-	350	460	mV
$I_R$	reverse current	$V_R = 5\text{ V}$	-	0.7	2	mA	
		$V_R = 8\text{ V}$	-	1	2.5	mA	
		$V_R = 10\text{ V}$	-	1.2	3	mA	
$C_d$	diode capacitance	$V_R = 5\text{ V}; f = 1\text{ MHz}$	-	40	50	pF	

[1] Pulse test:  $t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02$ .



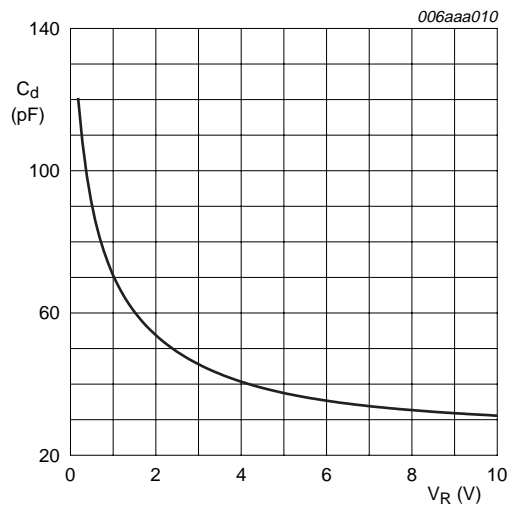
- (1)  $T_{amb} = 85\text{ °C}$
- (2)  $T_{amb} = 25\text{ °C}$
- (3)  $T_{amb} = -40\text{ °C}$

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



- (1)  $T_{amb} = 85\text{ °C}$
- (2)  $T_{amb} = 25\text{ °C}$
- (3)  $T_{amb} = -40\text{ °C}$

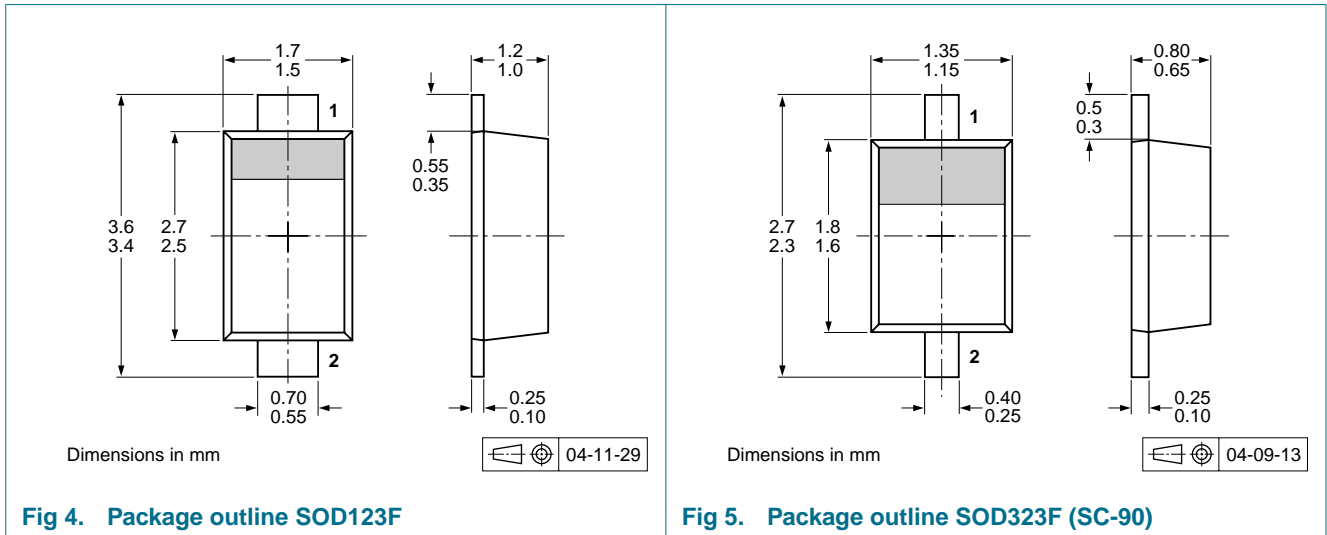
**Fig 2. Reverse current as a function of reverse voltage; typical values**



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

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

## 8. Package outline



## 9. Packing information

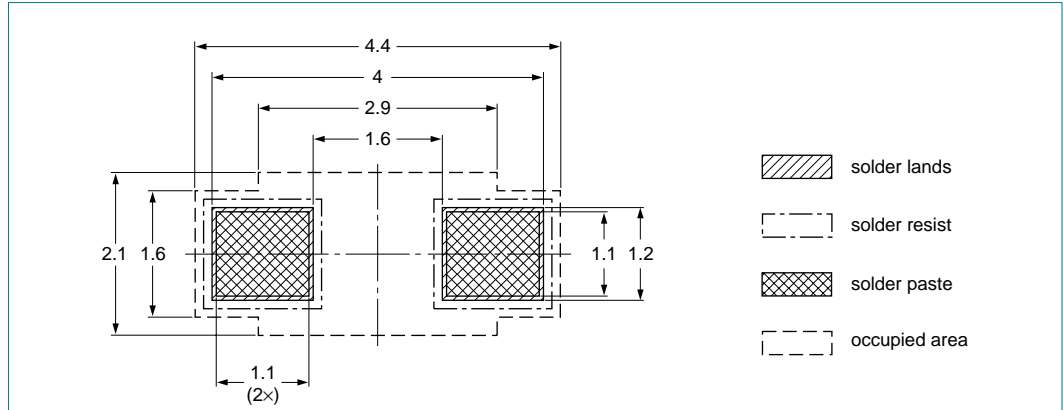
**Table 9: Packing methods**

The indicated -xxx are the last three digits of the 12NC ordering code. [1]

Type number	Package	Description	Packing quantity	
			3000	10000
PMEG1020EH	SOD123F	4 mm pitch, 8 mm tape and reel	-115	-135
PMEG1020EJ	SOD323F			

[1] For further information and the availability of packing methods, see [Section 15](#).

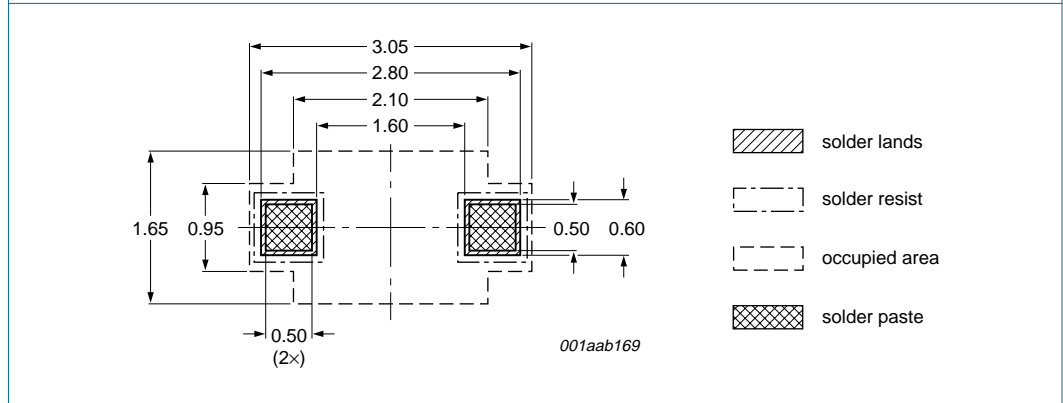
**10. Soldering**



Reflow soldering is the only recommended soldering method.

Dimensions in mm

**Fig 6. Reflow soldering footprint SOD123F**



Reflow soldering is the only recommended soldering method.

Dimensions in mm

**Fig 7. Reflow soldering footprint SOD323F (SC-90)**

## 11. Revision history

**Table 10: Revision history**

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
PMEG1020EH_EJ_3	20050414	Product data sheet	-	9397 750 14929	PMEG1020EJ_2; PMEG1020EH_1
Modifications:					
			<ul style="list-style-type: none"><li>• This data sheet is a combination of data sheets PMEG1020EJ_2 and PMEG1020EH_1.</li><li>• Product status for PMEG1020EH changed</li></ul>		
PMEG1020EJ_2	20041001	Product data sheet	-	9397 750 14013	PMEG1020EJ_1
PMEG1020EH_1	20050203	Objective data sheet	-	9397 750 14173	-

## 12. Data sheet status

Level	Data sheet status <sup>[1]</sup>	Product status <sup>[2] [3]</sup>	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## 13. Definitions

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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Date of release: 14 April 2005  
Document number: 9397 750 14929

Published in The Netherlands