

PMEG2020EH

20 V, 2 A very low V_F MEGA Schottky barrier rectifier in SOD123F package

Rev. 02 — 23 May 2005

Product data sheet

1. Product profile

1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection encapsulated in a SOD123F small SMD plastic package.

1.2 Features

- Forward current: 2 A
- Reverse voltage: 20 V
- Very low forward voltage
- Small and flat lead SMD package

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 1: Quick reference data



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_F	forward current	$T_{sp} \leq 55\text{ °C}$	-	-	2	A
V_R	reverse voltage		-	-	20	V
V_F	forward voltage	$I_F = 2\text{ A}$	[1]	450	525	mV

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

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2. Pinning information

Table 2: Pinning

Pin	Description	Simplified outline	Symbol
1	cathode	[1]	 1  2 <i>sym001</i>
2	anode		

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3: Ordering information

Type number	Package		
	Name	Description	Version
PMEG2020EH	-	plastic surface mounted package; 2 leads	SOD123F

4. Marking

Table 4: Marking codes

Type number	Marking code
PMEG2020EH	A6

5. 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		-	20	V	
I_F	forward current	$T_{sp} \leq 55\text{ °C}$	-	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	$t = 8\text{ ms}$; square wave	-	9	A	
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[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 cm².

6. 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 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 determination of the reverse power losses P_R and $I_{F(AV)}$ rating will be available on request.
- [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 cm².

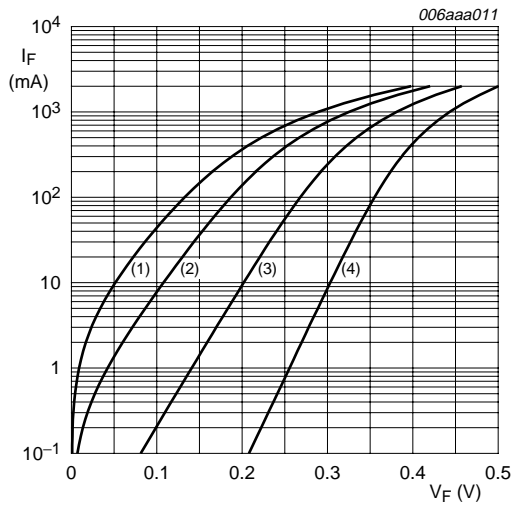
7. Characteristics

Table 7: Characteristics

$T_{amb} = 25^\circ\text{C}$ unless otherwise specified.

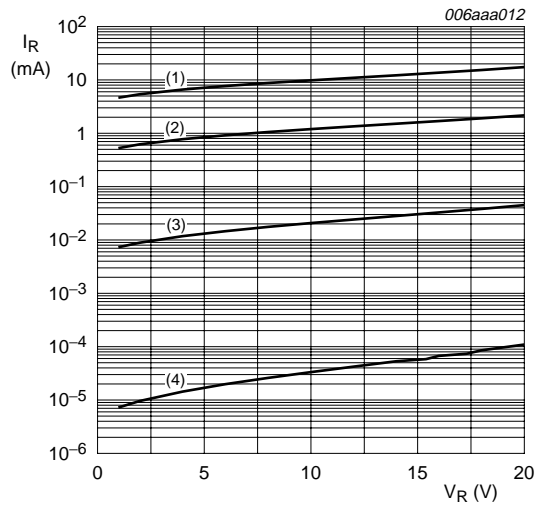
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage		[1]			
		$I_F = 0.01\text{ A}$	-	200	220	mV
		$I_F = 0.1\text{ A}$	-	260	290	mV
		$I_F = 1\text{ A}$	-	370	430	mV
I_R	reverse current		[2]			
		$V_R = 5\text{ V}$	-	15	50	μA
		$V_R = 10\text{ V}$	-	20	80	μA
		$V_R = 20\text{ V}$	-	45	200	μA
C_d	diode capacitance	$V_R = 5\text{ V}; f = 1\text{ MHz}$	-	50	60	pF

- [1] Pulse test: $t_p \leq 300\ \mu\text{s}; \delta \leq 0.02$.
- [2] For Schottky barrier diodes 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 determination of the reverse power losses P_R and $I_{F(AV)}$ rating will be available on request.



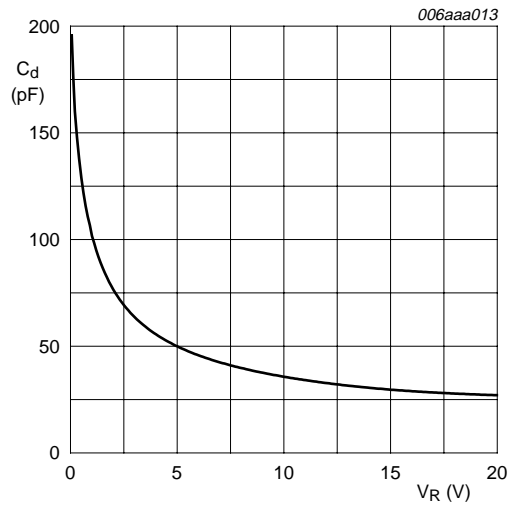
- (1) $T_{amb} = 125\text{ }^{\circ}\text{C}$
- (2) $T_{amb} = 85\text{ }^{\circ}\text{C}$
- (3) $T_{amb} = 25\text{ }^{\circ}\text{C}$
- (4) $T_{amb} = -40\text{ }^{\circ}\text{C}$

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



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

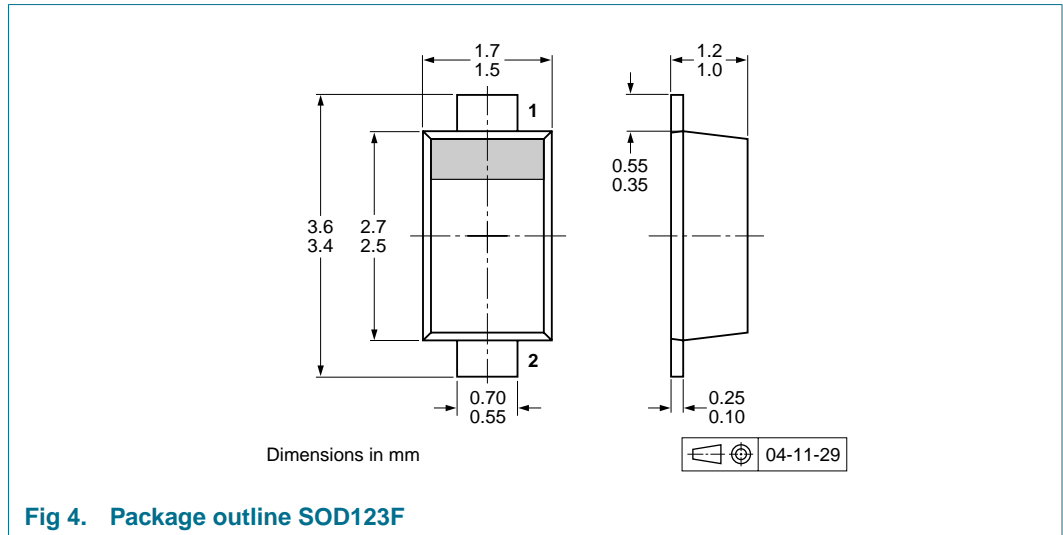
Fig 2. Reverse current as a function of reverse voltage; typical values



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

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

8. Package outline



9. Packing information

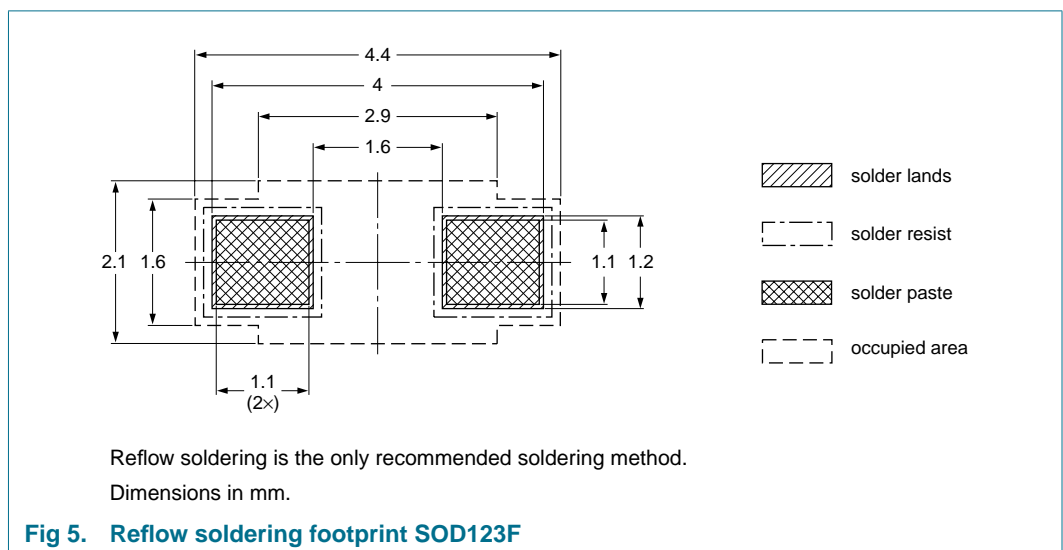
Table 8: Packing methods

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

Type number	Package	Description	Packing quantity
			3000
PMEG2020EH	SOD123F	4 mm pitch, 8 mm tape and reel	-115

[1] For further information and the availability of packing methods, see [Section 16](#).

10. Soldering



11. Revision history

Table 9: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
PMEG2020EH_2	20050523	Product data sheet	-	9397 750 15081	PMEG2020EH_1
Modifications:	• Table 5 "Limiting values" I_{FSM} value changed to 9 A				
PMEG2020EH_1	20050304	Preliminary data sheet	-	9397 750 14518	-

12. Data sheet status

Level	Data sheet status ^[1]	Product status ^{[2] [3]}	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.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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[1] Please consult the most recently issued data sheet before initiating or completing a design.

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

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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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