PMEG2020EH; PMEG2020EJ

20 V, 2 A very low V_F MEGA Schottky barrier rectifiers

Rev. 03 — 10 August 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 Surface Mounted Device (SMD) plastic packages.

Table 1: Product overview

Type number	Package		Configuration
	Philips	JEITA	
PMEG2020EH	SOD123F	-	single diode
PMEG2020EJ	SOD323F	SC-90	single diode

1.2 Features

- Forward current: 2 A
- Reverse voltage: 20 V
- Very low forward voltage
- Small and flat lead SMD plastic 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 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			-	-	20	V
V_F	forward voltage	$I_F = 2$ A	[1]	-	450	525	mV

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

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2. Pinning information

Table 3: Pinning

Pin	Description	Simplified outline	Symbol
1	cathode [1]		
2	anode	001aab540	sym001

[1] The marking bar indicates the cathode.

3. Ordering information

Table 4: Ordering information

Type number	Package		
	Name	Description	Version
PMEG2020EH	-	plastic surface mounted package; 2 leads	SOD123F
PMEG2020EJ	SC-90	plastic surface mounted package; 2 leads	SOD323F

4. Marking

Table 5: Marking codes

Type number	Marking code
PMEG2020EH	A6
PMEG2020EJ	CA

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			-	20	V
I_F	forward current	$T_{sp} \leq 55$ °C		-	2	A
I_{FRM}	repetitive peak forward current	$t_p \leq 1$ ms; $\delta \leq 0.5$		-	7	A
I_{FSM}	non-repetitive peak forward current	$t_p = 8$ ms; square wave		-	9	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C				
	PMEG2020EH		[1]	-	375	mW
			[2]	-	830	mW
	PMEG2020EJ		[1]	-	360	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^2.

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					
	PMEG2020EH		[1] [2]	-	-	330	K/W
			[1] [3]	-	-	150	K/W
	PMEG2020EJ		[1] [2]	-	-	350	K/W
			[1] [3]	-	-	150	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]				
	PMEG2020EH			-	-	60	K/W
	PMEG2020EJ			-	-	55	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 determining 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 cm^2.

[4] Soldering point of cathode tab.

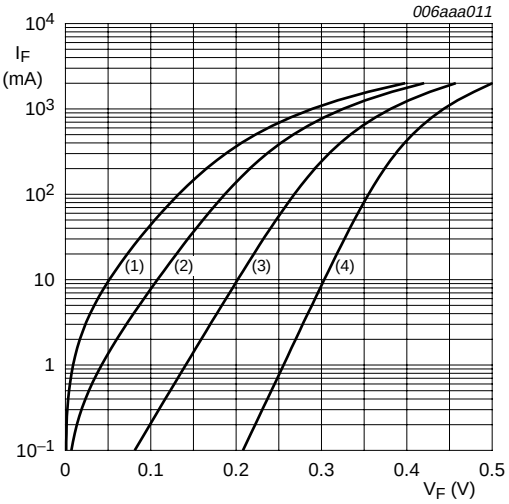
7. Characteristics

Table 8: Characteristics

T_{amb} = 25 °C unless otherwise specified.

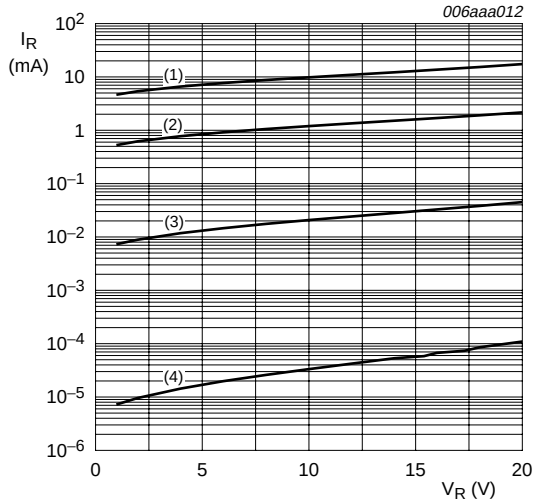
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage		[1]				
		I_F = 0.01 A		-	200	220	mV
		I_F = 0.1 A		-	260	290	mV
		I_F = 1 A		-	370	430	mV
		I_F = 2 A		-	450	525	mV
I_R	reverse current						
		V_R = 5 V		-	15	50	µA
		V_R = 10 V		-	20	80	µA
		V_R = 20 V		-	45	200	µA
C_d	diode capacitance	V_R = 5 V; f = 1 MHz		-	50	60	pF

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



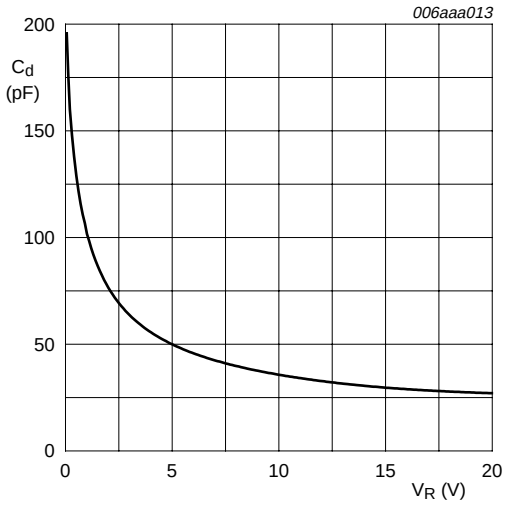
(1) T_{amb} = 125 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = –40 °C

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



(1) T_{amb} = 125 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = –40 °C

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



T_{amb} = 25 °C; f = 1 MHz

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

8. Package outline

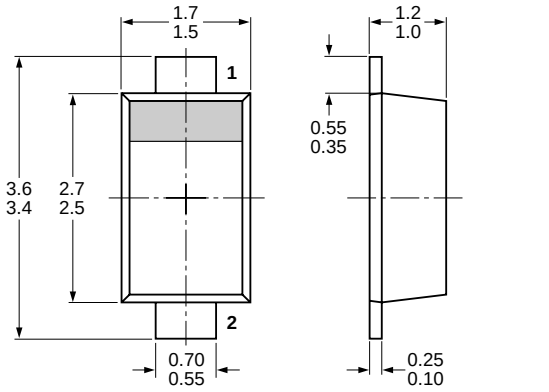


Fig 4. Package outline SOD123F

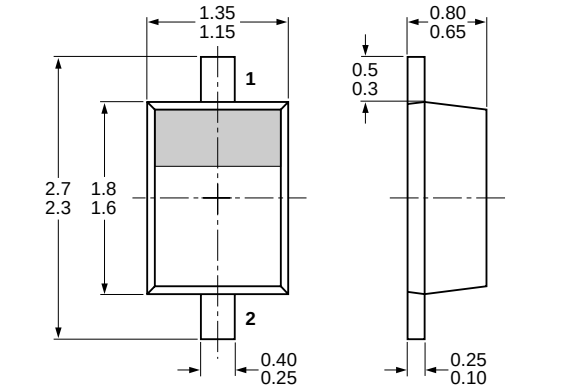


Fig 5. Package outline SOD323F (SC-90)

9. Packing information

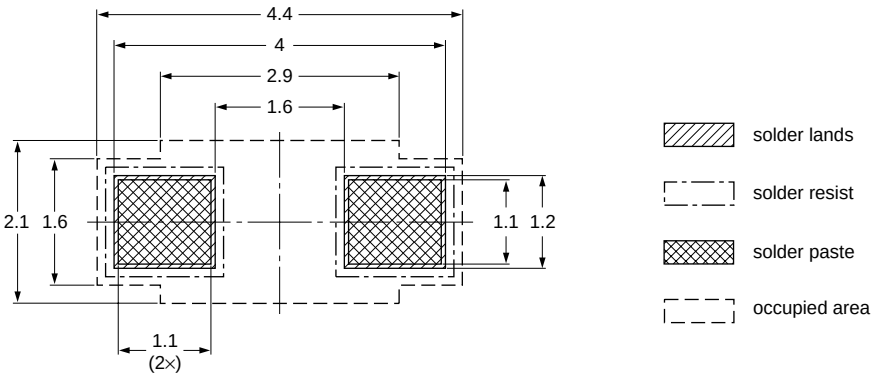
Table 9: Packing methods

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

Type number	Package	Description	Packing quantity	
			3000	10000
PMEG2020EH	SOD123F	4 mm pitch, 8 mm tape and reel	-115	-135
PMEG2020EJ	SOD323F			

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

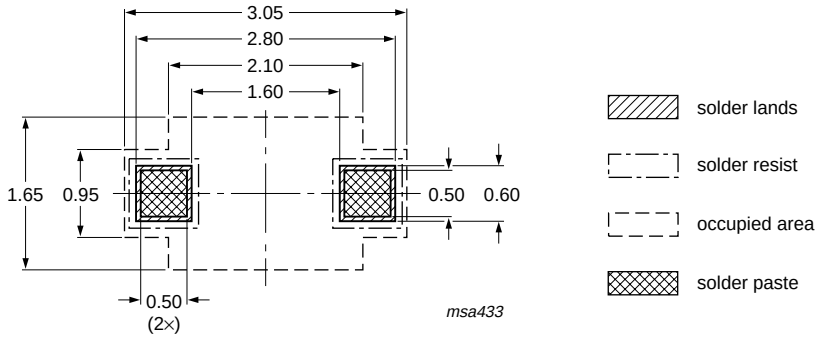
10. Soldering



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
PMEG2020EH_EJ_3	20050810	Product data sheet	-	-	PMEG2020EH_2 PMEG2020EJ_2
Modifications:	• This data sheet is a combination of data sheets PMEG2020EH_2 and PMEG2020EJ_2. • Table 6 “Limiting values”: amended value for I_{FSM} non-repetitive peak forward current • Table 6 “Limiting values”: added PMEG2020EJ values for P_{tot} total power dissipation • Table 7: added PMEG2020EJ values for $R_{th(j-a)}$ thermal resistance from junction to ambient				
PMEG2020EH_2	20050523	Product data sheet	-	9397 750 15081	PMEG2020EH_1
PMEG2020EH_1	20050304	Preliminary data sheet	-	9397 750 14518	-
PMEG2020EJ_2	20050131	Product data sheet	-	9397 750 14314	PMEG2020EJ_1
PMEG2020EJ_1	20040830	Preliminary data sheet	-	9397 750 13536	-

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.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[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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17. Contents

Date of release: 10 August 2005
Document number: PMEG2020EH_EJ_3

Published in The Netherlands