PMEGxx05EH/EJ series

0.5 A very low V_F MEGA Schottky barrier rectifiers

Rev. 02 — 13 January 2010 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 small SMD package.

Table 1. Product overview

Type number	Package		Configuration
	NXP	JEITA	
PMEG2005EH	SOD123F	-	single diode
PMEG3005EH			
PMEG4005EH			
PMEG2005EJ	SOD323F	SC-90	single diode
PMEG3005EJ			
PMEG4005EJ			

1.2 Features

- Forward current: 0.5 A
- Very low forward voltage
- 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

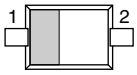
Table 2. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
I_F	forward current	$T_{sp} \leq 55$ °C		-	-	0.5	A
V_R	reverse voltage						
	PMEG2005EH, PMEG2005EJ			-	-	20	V
	PMEG3005EH, PMEG3005EJ			-	-	30	V
	PMEG4005EH, PMEG4005EJ			-	-	40	V
V_F	forward voltage	I_F = 500 mA	[1]				
	PMEG2005EH, PMEG2005EJ			-	355	390	mV
	PMEG3005EH, PMEG3005EJ			-	380	430	mV
	PMEG4005EH, PMEG4005EJ			-	420	470	mV

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

2. Pinning information

Table 3. Pinning

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

[1] The marking bar indicates the cathode.

3. Ordering information

Table 4. Ordering information

Type number	Package		
	Name	Description	Version
PMEG2005EH	-	plastic surface mounted package; 2 leads	SOD123F
PMEG3005EH			
PMEG4005EH			
PMEG2005EJ	SC-90	plastic surface mounted package; 2 leads	SOD323F
PMEG3005EJ			
PMEG4005EJ			

4. Marking

Table 5. Marking codes

Type number	Marking code
PMEG2005EH	A3
PMEG3005EH	A4
PMEG4005EH	A5
PMEG2005EJ	CC
PMEG3005EJ	CD
PMEG4005EJ	CE

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					
	PMEG2005EH, PMEG2005EJ			-	20	V
	PMEG3005EH, PMEG3005EJ			-	30	V
	PMEG4005EH, PMEG4005EJ			-	40	V
I_F	forward current	$T_{sp} \leq 55$ °C		-	0.5	A
I_{FRM}	repetitive peak forward current	$t_p \leq 1$ ms; $\delta \leq 0.25$		-	7	A
I_{FSM}	non-repetitive peak forward current	t = 8 ms square wave		-	10	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C				
	SOD123F		[1]	-	375	mW
			[2]	-	830	mW
	SOD323F		[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	[1][2]				
	SOD123F			-	-	330	K/W
	SOD323F			-	-	350	K/W
			[1][3]	-	-	150	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point						
	SOD123F			-	-	60	K/W
	SOD323F			-	-	55	K/W

[1] 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.

7. Characteristics

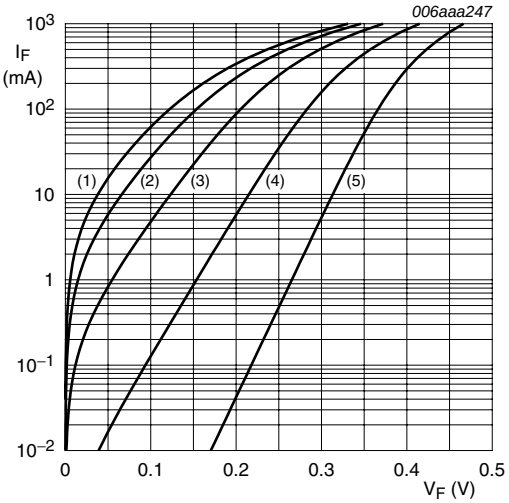
Table 8. Characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage		[1]				
	PMEG2005EH, PMEG2005EJ	I_F = 0.1 mA		-	90	130	mV
		I_F = 1 mA		-	150	190	mV
		I_F = 10 mA		-	210	240	mV
		I_F = 100 mA		-	280	330	mV
		I_F = 500 mA		-	355	390	mV
	PMEG3005EH, PMEG3005EJ	I_F = 0.1 mA		-	90	130	mV
		I_F = 1 mA		-	150	200	mV
		I_F = 10 mA		-	215	250	mV
		I_F = 100 mA		-	285	340	mV
		I_F = 500 mA		-	380	430	mV
	PMEG4005EH, PMEG4005EJ	I_F = 0.1 mA		-	95	130	mV
		I_F = 1 mA		-	155	210	mV
		I_F = 10 mA		-	220	270	mV
		I_F = 100 mA		-	295	350	mV
		I_F = 500 mA		-	420	470	mV
I_R	reverse current		[1][2]				
	PMEG2005EH, PMEG2005EJ	V_R = 10 V		-	15	40	µA
		V_R = 20 V		-	40	200	µA
	PMEG3005EH, PMEG3005EJ	V_R = 10 V		-	12	30	µA
		V_R = 30 V		-	40	150	µA
	PMEG4005EH, PMEG4005EJ	V_R = 10 V		-	7	20	µA
		V_R = 40 V		-	30	100	µA
C_d	diode capacitance	V_R = 1 V; f = 1 MHz					
	PMEG2005EH, PMEG2005EJ			-	66	80	pF
	PMEG3005EH, PMEG3005EJ			-	55	70	pF
	PMEG4005EH, PMEG4005EJ			-	43	50	pF

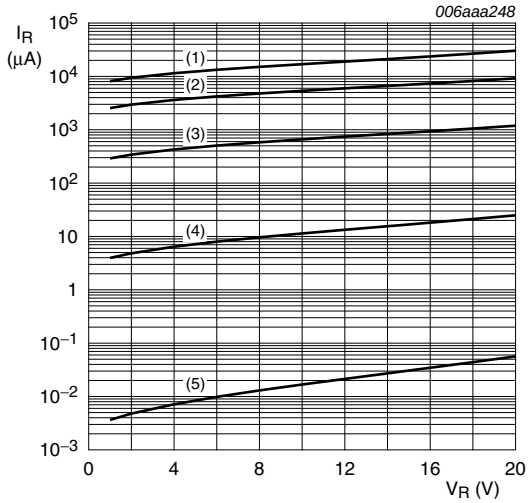
[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

[2] Schottky barrier rectifier 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.



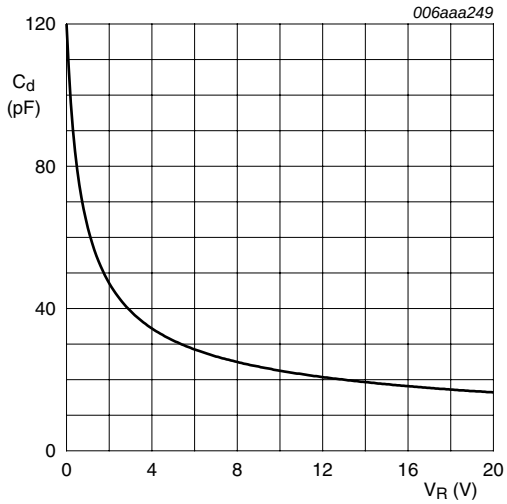
(1) T_{amb} = 150 °C
(2) T_{amb} = 125 °C
(3) T_{amb} = 85 °C
(4) T_{amb} = 25 °C
(5) T_{amb} = –40 °C

Fig 1. PMEG2005EH, PMEG2005EJ: Forward current as a function of forward voltage; typical values



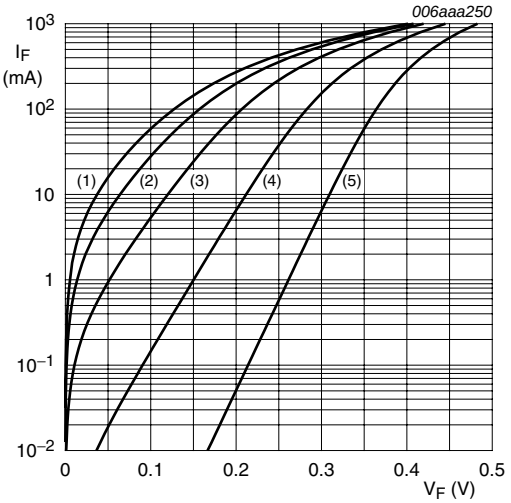
(1) T_{amb} = 150 °C
(2) T_{amb} = 125 °C
(3) T_{amb} = 85 °C
(4) T_{amb} = 25 °C
(5) T_{amb} = –40 °C

Fig 2. PMEG2005EH, PMEG2005EJ: Reverse current as a function of reverse voltage; typical values



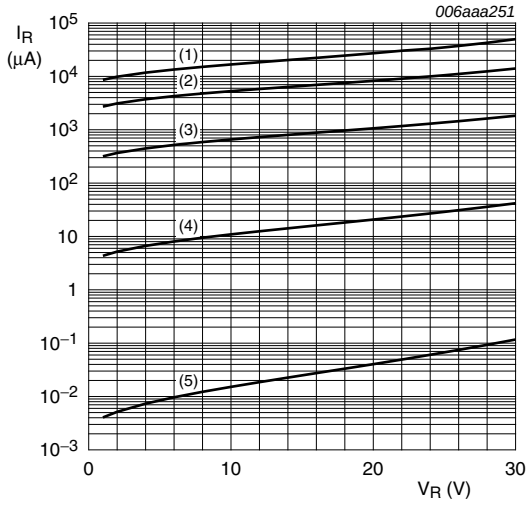
T_{amb} = 25 °C; f = 1 MHz

Fig 3. PMEG2005EH, PMEG2005EJ: Diode capacitance as a function of reverse voltage; typical values



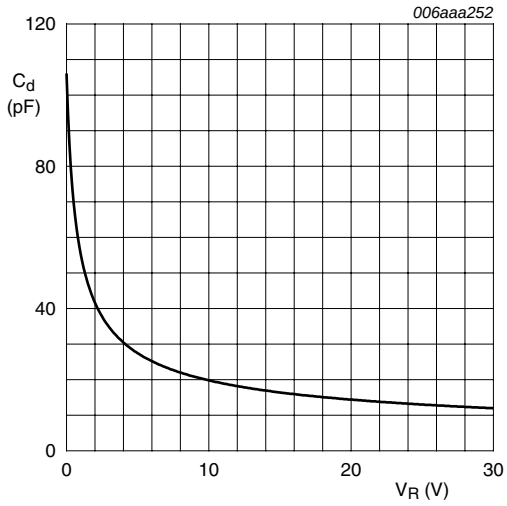
(1) T_{amb} = 150 °C
(2) T_{amb} = 125 °C
(3) T_{amb} = 85 °C
(4) T_{amb} = 25 °C
(5) T_{amb} = –40 °C

Fig 4. PMEG3005EH, PMEG3005EJ: Forward current as a function of forward voltage; typical values



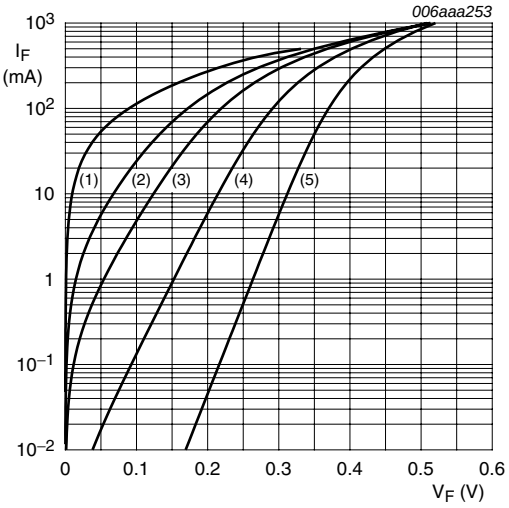
(1) T_{amb} = 150 °C
(2) T_{amb} = 125 °C
(3) T_{amb} = 85 °C
(4) T_{amb} = 25 °C
(5) T_{amb} = –40 °C

Fig 5. PMEG3005EH, PMEG3005EJ: Reverse current as a function of reverse voltage; typical values



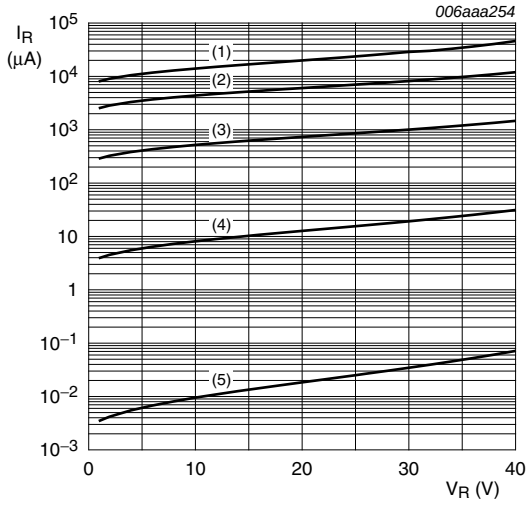
T_{amb} = 25 °C; f = 1 MHz

Fig 6. PMEG3005EH, PMEG3005EJ: Diode capacitance as a function of reverse voltage; typical values



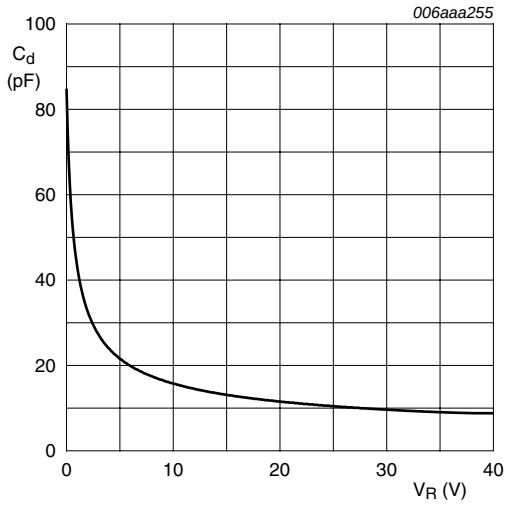
(1) T_{amb} = 150 °C
(2) T_{amb} = 125 °C
(3) T_{amb} = 85 °C
(4) T_{amb} = 25 °C
(5) T_{amb} = –40 °C

Fig 7. PMEG4005EH, PMEG4005EJ: Forward current as a function of forward voltage; typical values



(1) T_{amb} = 150 °C
(2) T_{amb} = 125 °C
(3) T_{amb} = 85 °C
(4) T_{amb} = 25 °C
(5) T_{amb} = –40 °C

Fig 8. PMEG4005EH, PMEG4005EJ: Reverse current as a function of reverse voltage; typical values



T_{amb} = 25 °C; f = 1 MHz

Fig 9. PMEG4005EH, PMEG4005EJ: Diode capacitance as a function of reverse voltage; typical values

8. Package outline

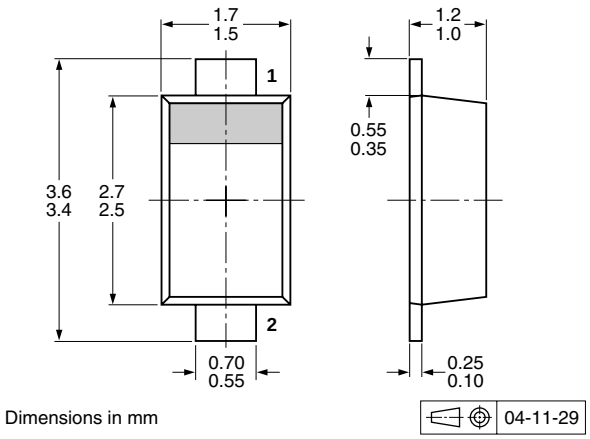


Fig 10. Package outline SOD123F

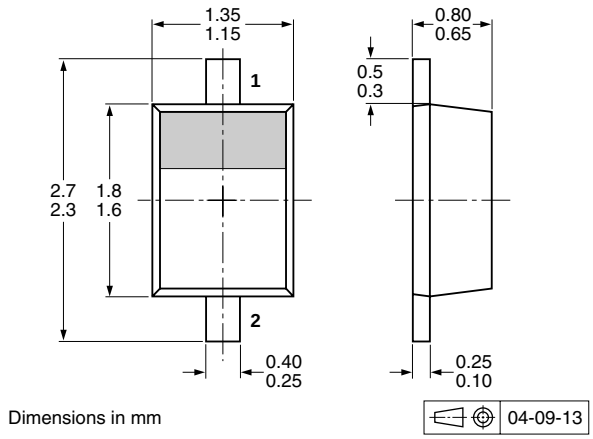


Fig 11. Package outline SOD323F (SC-90)

9. Packing information

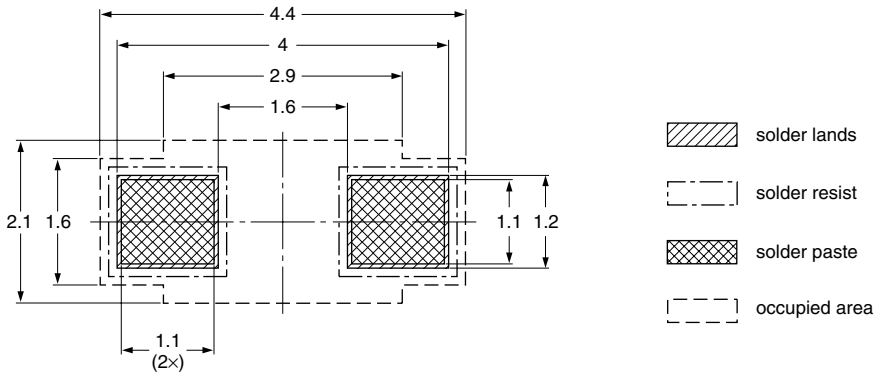
Table 9. Packing methods

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

Type number	Package	Description	Packing quantity	
			3000	10000
PMEG2005EH	SOD123F	4 mm pitch, 8 mm tape and reel	-115	-135
PMEG3005EH				
PMEG4005EH				
PMEG2005EJ	SOD323F	4 mm pitch, 8 mm tape and reel	-115	-135
PMEG3005EJ				
PMEG4005EJ				

[1] For further information and the availability of packing methods, see Section 13.

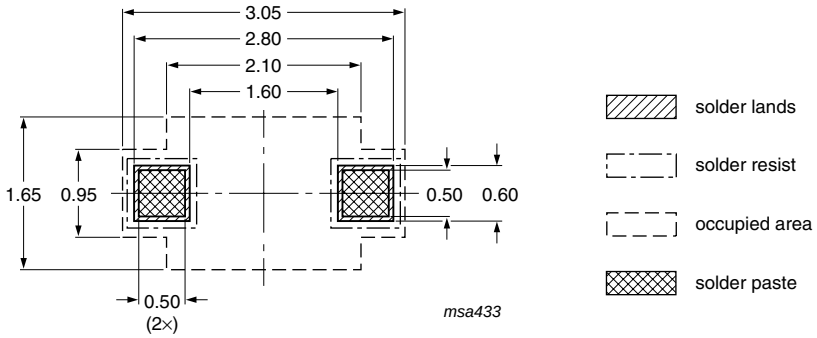
10. Soldering



Reflow soldering is the only recommended soldering method.

Dimensions in mm

Fig 12. Reflow soldering footprint SOD123F



Reflow soldering is the only recommended soldering method.

Dimensions in mm

Fig 13. Reflow soldering footprint SOD323F (SC-90)

11. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PMEGXX05EH_EJ_SER_2	20100113	Product data sheet	-	PMEGXX05EH_EJ_SER_1
Modifications:	• This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content.			
PMEGXX05EH_EJ_SER_1	20050412	Product data sheet	-	-

12. Legal information

12.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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14. Contents

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