



# PMEG4010EJ-Q

40 V, 1 A very low VF Schottky barrier rectifier

1 October 2022

Product data sheet

## 1. General description

Planar Schottky barrier rectifiers with an integrated guard ring for stress protection, encapsulated in a SOD323F (SC-90) small Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Forward current:  $I_F \leq 1$  A
- Reverse voltage:  $V_R \leq 40$  V
- Very low forward voltage
- 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	$T_{sp} \leq 55$ °C	-	-	1	A
$V_R$	reverse voltage		-	-	40	V
$V_F$	forward voltage	$I_F = 1$ A; $t_p \leq 300$ $\mu$ s; $\delta \leq 0.02$ ; $T_{amb} = 25$ °C	-	540	640	mV
$I_R$	reverse current	$V_R = 40$ V; $T_{amb} = 25$ °C	-	30	100	$\mu$ A

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 SC-90 (SOD323F)	 sym001
2	A	anode		

## 6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">PMEG4010EJ-Q</a>	SC-90	plastic, surface-mounted package; 2 leads; 1.7 mm x 1.25 mm x 0.7 mm body	<a href="#">SOD323F</a>

## 7. Marking

Table 4. Marking codes

Type number	Marking code
PMEG4010EJ-Q	AL

## 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			-	40	V
$I_F$	forward current	$T_{sp} \leq 55\text{ °C}$		-	1	A
$I_{FRM}$	repetitive peak forward current	$t_p \leq 1\text{ ms}$ ; $\delta \leq 0.25$		-	7	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8\text{ ms}$ ; square wave		-	9	A
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	[1] [2]	-	350	mW
			[3] [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] Reflow soldering is the only recommended soldering method.

[3] 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	[1] [2] [3]	-	-	350	K/W
		[4] [2] [3]	-	-	150	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point	[5]	-	-	55	K/W

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

[2] Reflow soldering is the only recommended soldering method.

[3] 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.

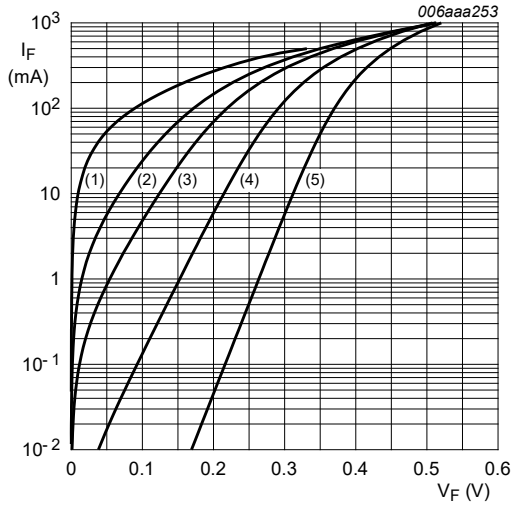
[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.

[5] Soldering point of cathode tab.

## 10. Characteristics

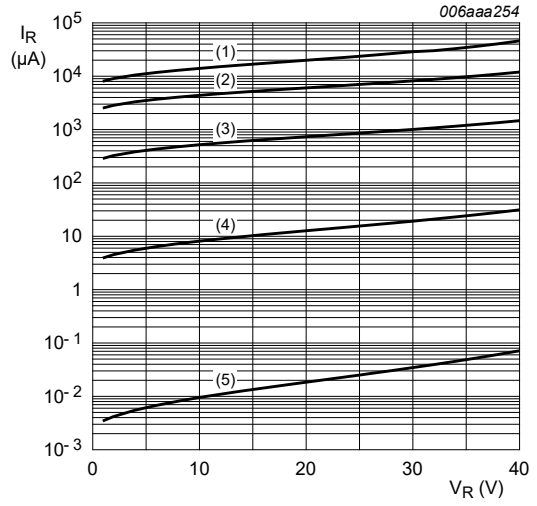
Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 0.1 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ } ^\circ\text{C}$	-	95	130	mV
		$I_F = 1 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ } ^\circ\text{C}$	-	155	210	mV
		$I_F = 10 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ } ^\circ\text{C}$	-	220	270	mV
		$I_F = 100 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ } ^\circ\text{C}$	-	295	350	mV
		$I_F = 500 \text{ mA}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ } ^\circ\text{C}$	-	420	470	mV
		$I_F = 1 \text{ A}$ ; $t_p \leq 300 \text{ } \mu\text{s}$ ; $\delta \leq 0.02$ ; $T_{amb} = 25 \text{ } ^\circ\text{C}$	-	540	640	mV
$I_R$	reverse current	$V_R = 10 \text{ V}$ ; $T_{amb} = 25 \text{ } ^\circ\text{C}$	-	7	20	$\mu\text{A}$
		$V_R = 40 \text{ V}$ ; $T_{amb} = 25 \text{ } ^\circ\text{C}$	-	30	100	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}$ ; $f = 1 \text{ MHz}$ ; $T_{amb} = 25 \text{ } ^\circ\text{C}$	-	43	50	pF



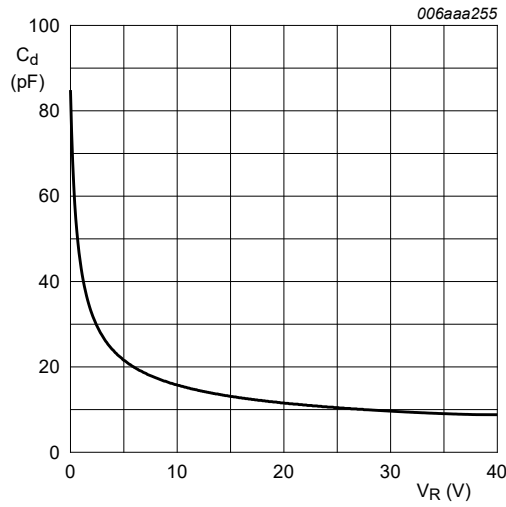
pulsed condition  
 (1)  $T_{amb} = 150\text{ }^{\circ}\text{C}$   
 (2)  $T_{amb} = 125\text{ }^{\circ}\text{C}$   
 (3)  $T_{amb} = 85\text{ }^{\circ}\text{C}$   
 (4)  $T_{amb} = 25\text{ }^{\circ}\text{C}$   
 (5)  $T_{amb} = -40\text{ }^{\circ}\text{C}$

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



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

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



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

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

### 11. Test information

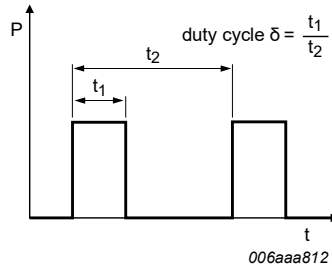


Fig. 4. Duty cycle definition

#### 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

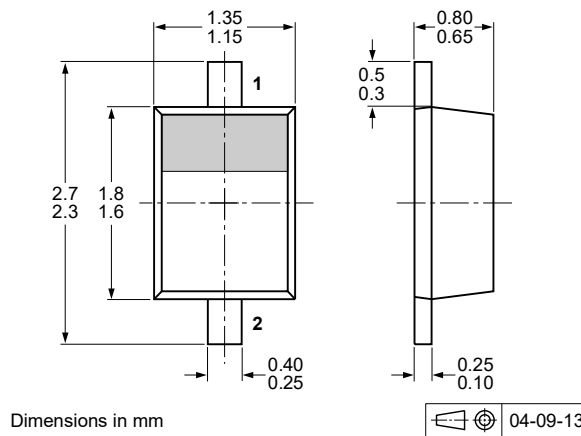


Fig. 5. Package outline SC-90 (SOD323F)

### 13. Soldering

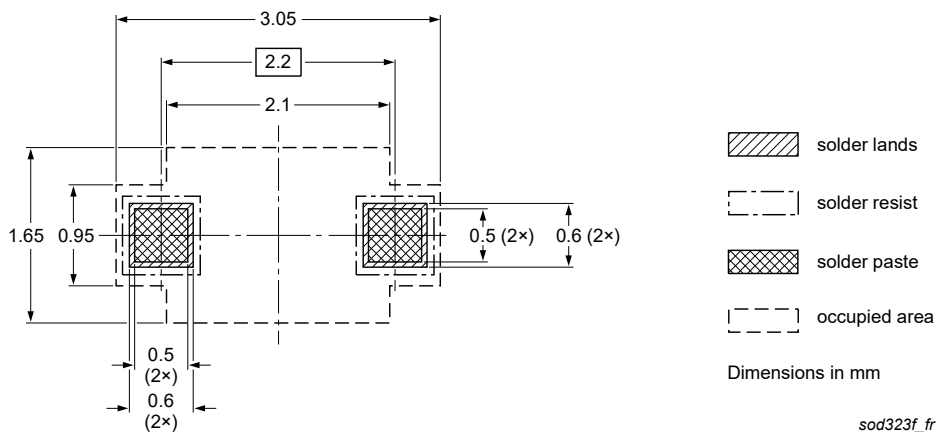


Fig. 6. Reflow soldering footprint for SC-90 (SOD323F)

## 14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG4010EJ-Q v.1	20221001	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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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