PMEG2010AET

20 V, 1 A very low VF Schottky barrier rectifier

13 June 2023 **Product data sheet**

1. General description

Planar Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a small SOT23 Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Forward current: $I_F \leq 1$ A
- Reverse voltage: $V_R \leq 20$ V
- Very low forward voltage
- Small SMD plastic packages
- AEC-Q101 qualified

3. Applications

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

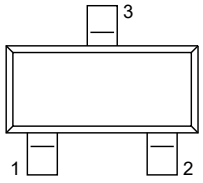
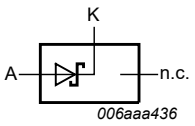
4. Quick reference data

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			-	-	20	V
V_F	forward voltage	$I_F = 1$ A; pulsed; $t_p \leq 300$ µs; $\delta \leq 0.02$; $T_{amb} = 25$ °C		-	380	430	mV

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 SOT23	
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMEG2010AET	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
PMEG2010AET	%AX

[1] % = placeholder for manufacturing site code

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			-	20	V
I_F	forward current	$T_{sp} \leq 55$ °C		-	1	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	$t_p = 8$ µs; square wave		-	9	A
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	280	mW
			[2]	-	420	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 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 1cm^2.

9. Thermal characteristics

Table 6. Thermal characteristics

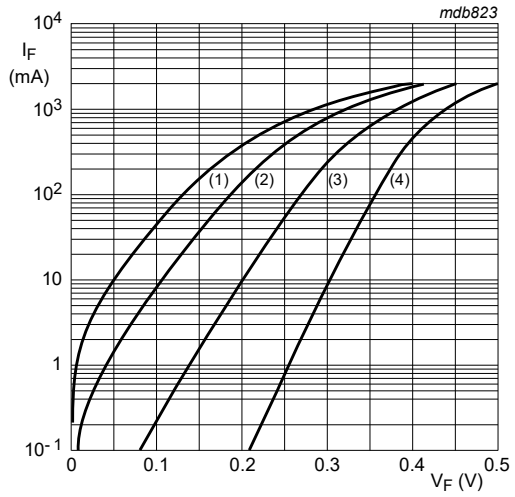
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] [2]	-	-	440	K/W
			[1] [3]	-	-	300	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[4]	-	-	120	K/W

[1] 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.
[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.

10. Characteristics

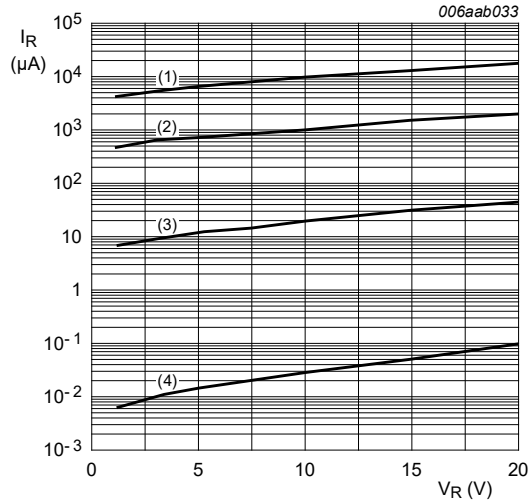
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 10 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	200	220	mV
		I_F = 100 mA; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	265	290	mV
		I_F = 1 A; pulsed; $t_p \leq$ 300 µs; $\delta \leq$ 0.02; T_{amb} = 25 °C		-	380	430	mV
I_R	reverse current	V_R = 5 V; T_{amb} = 25 °C		-	15	50	µA
		V_R = 10 V; T_{amb} = 25 °C		-	20	80	µA
		V_R = 20 V; T_{amb} = 25 °C		-	50	200	µA
C_d	diode capacitance	V_R = 5 V; f = 1 MHz; T_{amb} = 25 °C		-	55	70	pF



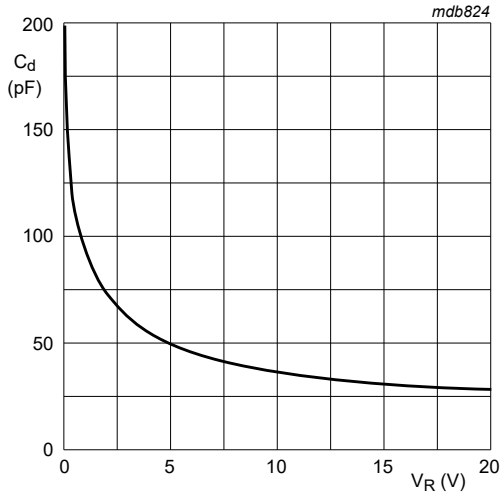
(1) T_{amb} = 125 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C
(4) T_{amb} = -40 °C

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



(1) T_j = 125 °C
(2) T_j = 85 °C
(3) T_j = 25 °C
(4) T_j = −40 °C

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



f = 1 MHz; T_{amb} = 25 °C

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

11. Test information

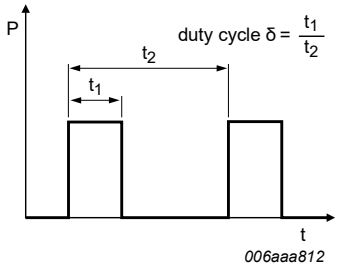


Fig. 4. Duty cycle definition

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

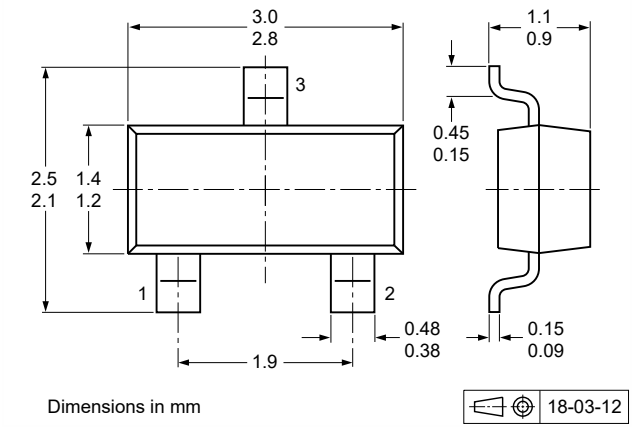


Fig. 5. Package outline SOT23

13. Soldering

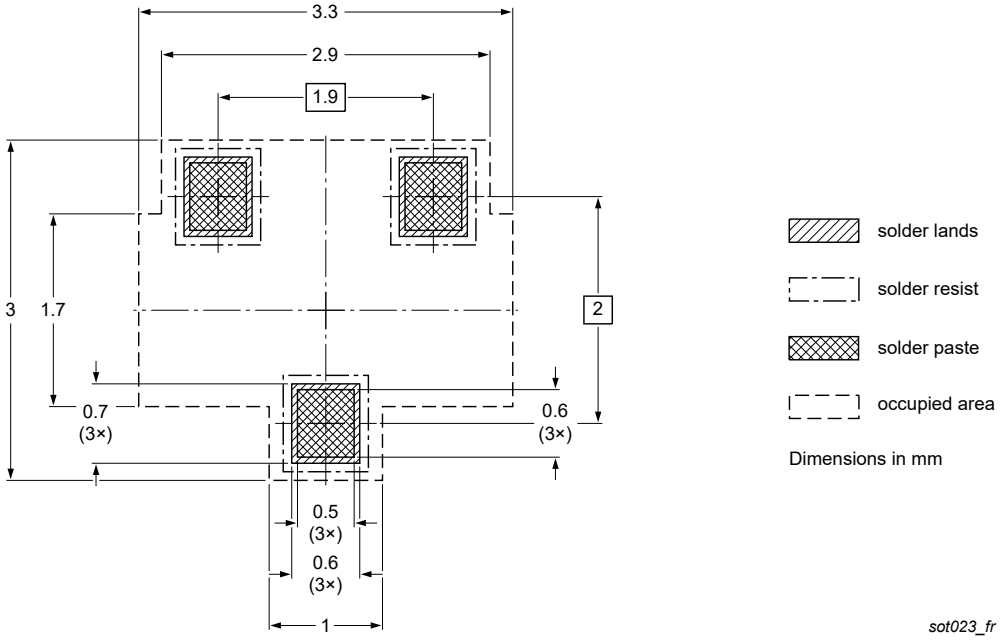


Fig. 6. Reflow soldering footprint for SOT23

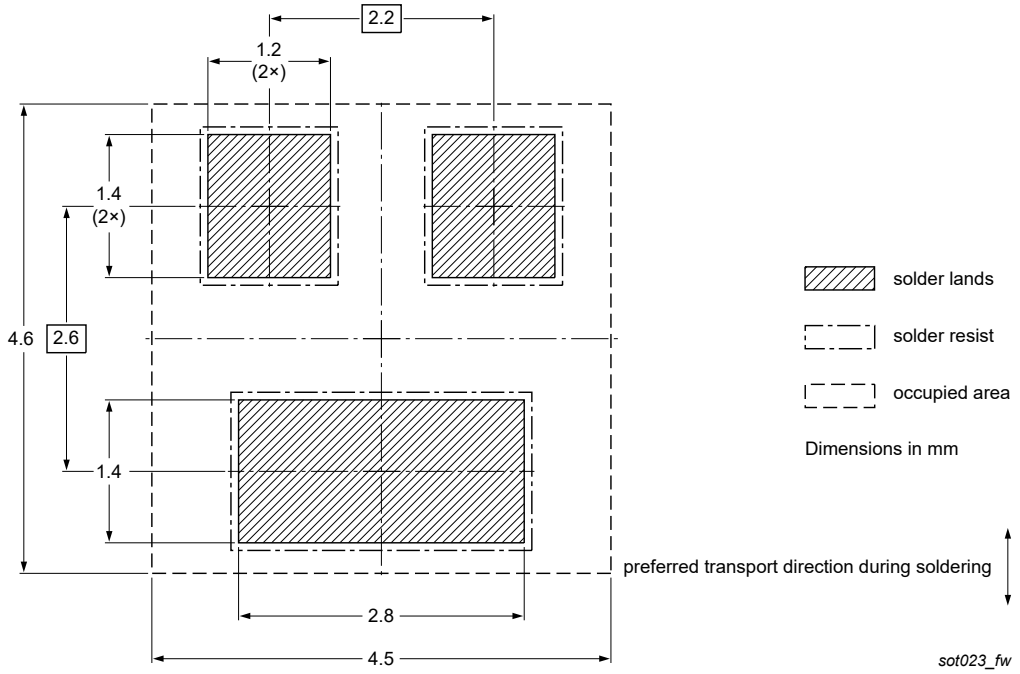


Fig. 7. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMEG2010AET v.4	20230613	Product data sheet	-	PMEG2010AEH_PMEG2010AET_3
Modifications:	• Family data sheet splitted to single type data sheets. • Section "Packing information" removed.			
PMEG2010AEH_PMEG2010AET_3	20070328	Product data sheet	-	PMEG2010AEH_2
PMEG2010AEH_2	20050526	Product data sheet	-	PMEG2010AEH_1
PMEG2010AEH_1	20050406	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.

[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".
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