



PMBD914-Q

High-speed switching diode

8 November 2022

Product data sheet

1. General description

High-speed switching diode, fabricated in planar technology, and encapsulated in a small SOT23 (TO-236AB) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- High switching speed: $t_{rr} \leq 4$ ns
- Low capacitance: $C_d \leq 1.5$ pF
- Low leakage current
- Reverse voltage: $V_R \leq 100$ V
- Repetitive peak reverse voltage: $V_{RRM} \leq 100$ V
- Small SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- High-speed switching

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_F	forward current	[1]	-	-	215	mA
V_R	reverse voltage		-	-	100	V
t_{rr}	reverse recovery time	$I_F = 10$ mA; $I_R = 10$ mA; $R_L = 100$ Ω ; $I_{R(meas)} = 1$ mA; $T_{amb} = 25$ °C	-	-	4	ns

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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	SOT23	006aaa764
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PMBD914-Q	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]
PMBD914-Q	%5D

[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_{RRM}	repetitive peak reverse voltage			-	100	V
V_R	reverse voltage			-	100	V
I_F	forward current		[1]	-	215	mA
I_{FSM}	non-repetitive peak forward current	$t_p = 1 \mu s$; $T_j = 25^\circ C$; prior to surge		-	4	A
		$t_p = 1 ms$; $T_j = 25^\circ C$; prior to surge		-	1	A
		$t_p = 1 s$; $T_j = 25^\circ C$; prior to surge		-	0.5	A
I_{FRM}	repetitive peak forward current			-	500	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25^\circ C$	[1] [2]	-	250	mW
T_j	junction temperature			-	150	$^\circ C$
T_{amb}	ambient temperature			-55	150	$^\circ C$
T_{stg}	storage temperature			-65	150	$^\circ C$

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

[2] Soldering point of cathode tab.

9. Thermal characteristics

Table 6. Thermal characteristics

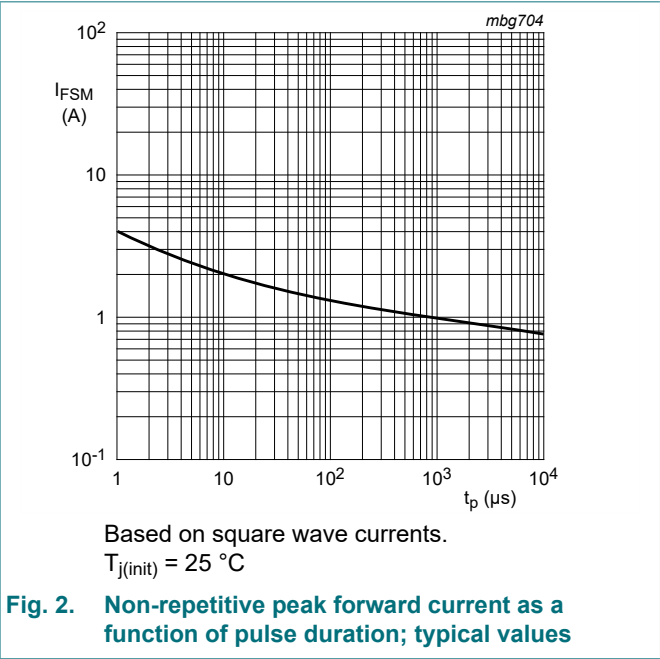
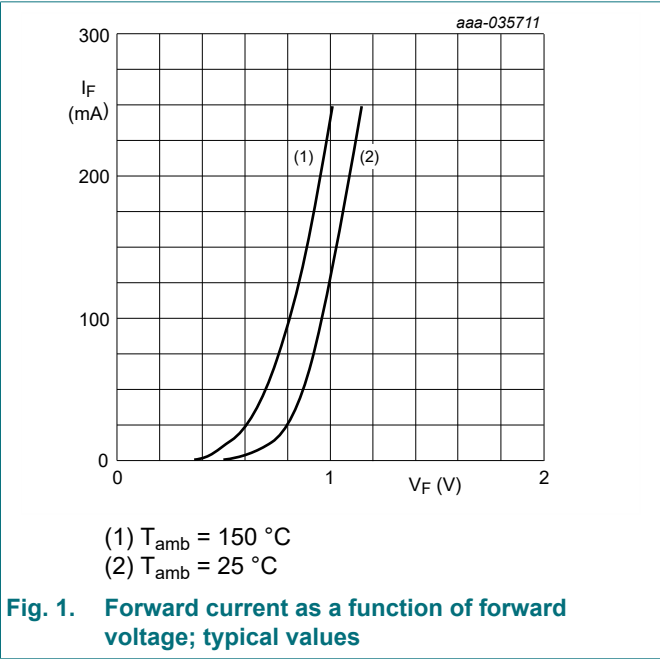
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[2]	-	-	330	K/W

- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	$I_F = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	715	mV
		$I_F = 10\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	855	mV
		$I_F = 50\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	1	V
		$I_F = 150\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	1.25	V
I_R	reverse current	$V_R = 25\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	25	nA
		$V_R = 75\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	1	μA
		$V_R = 25\text{ V}; T_j = 150\text{ }^{\circ}\text{C}$		-	-	30	μA
		$V_R = 75\text{ V}; T_j = 150\text{ }^{\circ}\text{C}$		-	-	50	μA
C_d	diode capacitance	$V_R = 0\text{ V}; f = 1\text{ MHz}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	1.5	pF
t_{rr}	reverse recovery time	$I_F = 10\text{ mA}; I_R = 10\text{ mA}; R_L = 100\text{ }\Omega;$ $I_{R(meas)} = 1\text{ mA}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	4	ns
V_{FRM}	peak forward recovery voltage	$I_F = 10\text{ mA}; t_r = 20\text{ ns}; T_{amb} = 25\text{ }^{\circ}\text{C}$		-	-	1.75	V



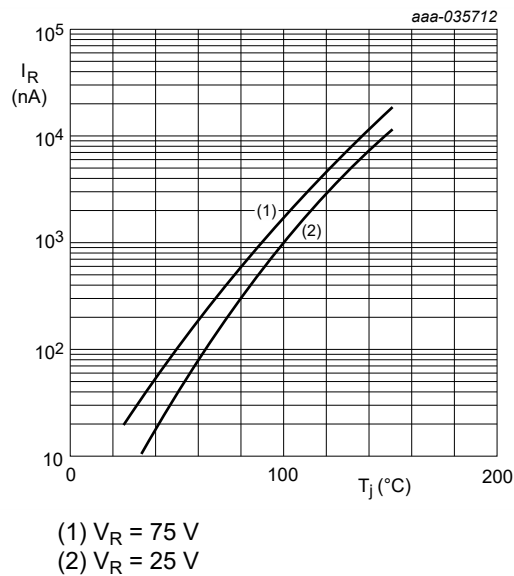


Fig. 3. Reverse current as a function of junction temperature; typical values

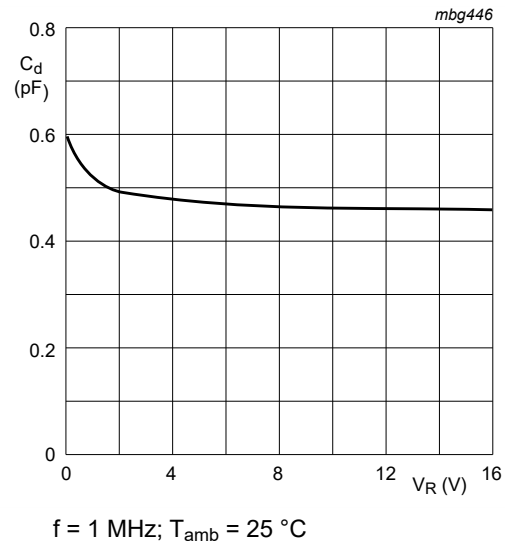


Fig. 4. Diode capacitance as a function of reverse voltage; typical values

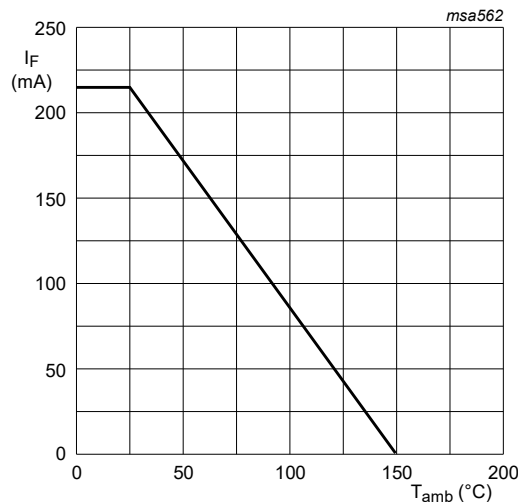


Fig. 5. Forward current as a function of ambient temperature; derating curve

11. Test information

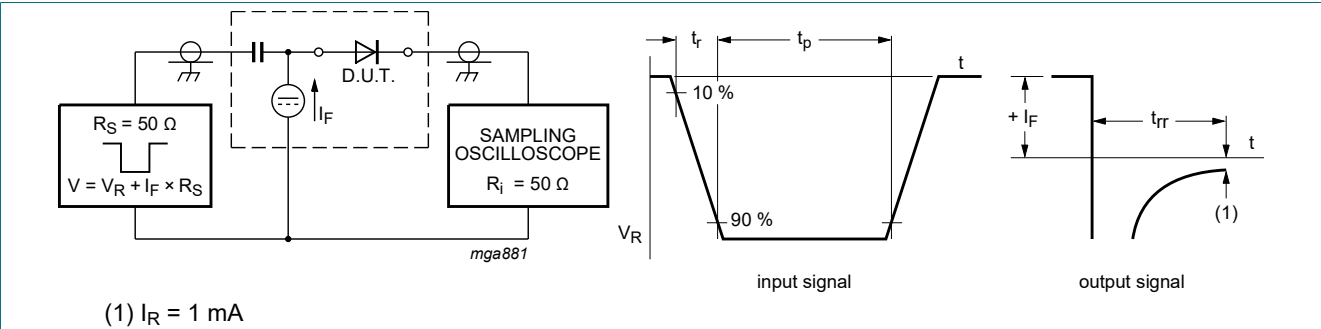


Fig. 6. Reverse recovery time test circuit and waveforms

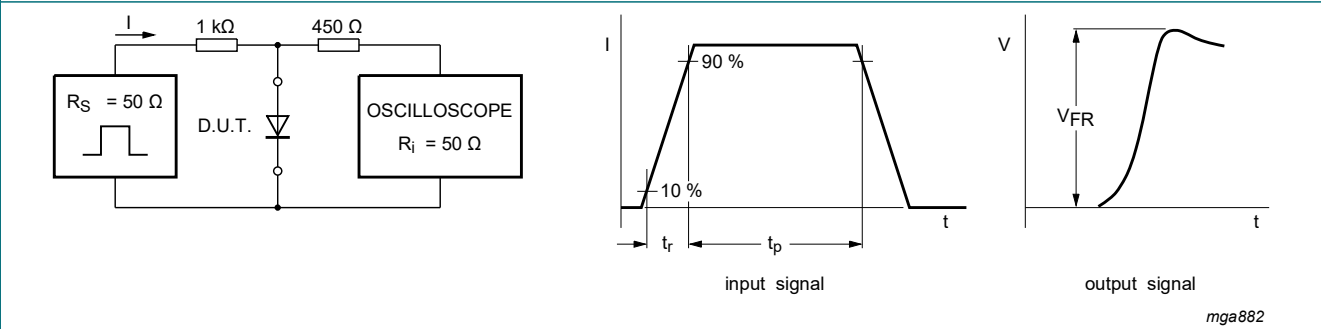


Fig. 7. Forward recovery voltage test circuit and waveforms

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

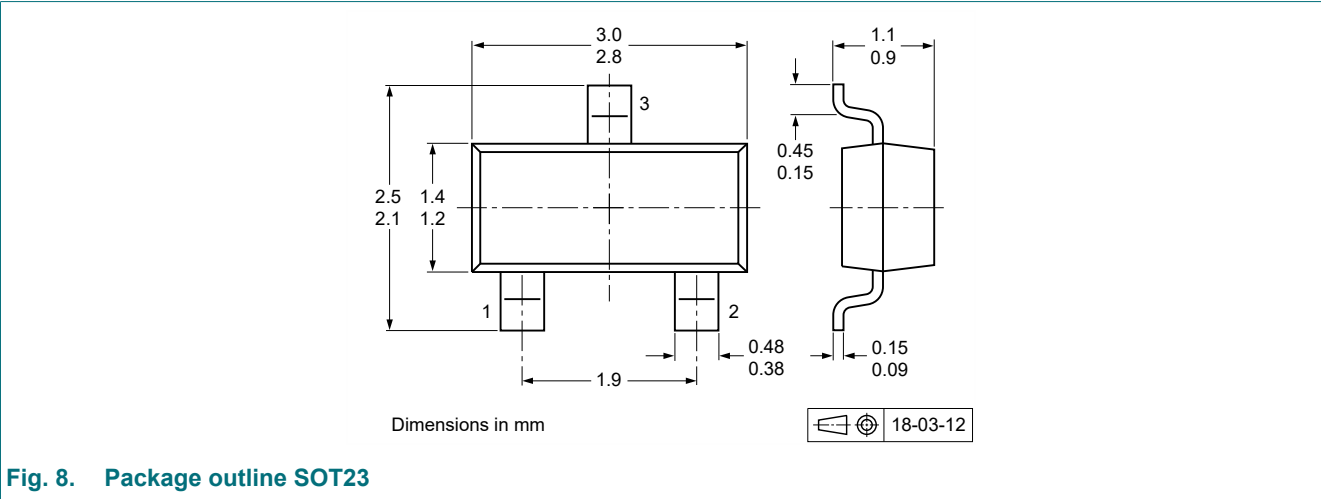


Fig. 8. Package outline SOT23

13. Soldering

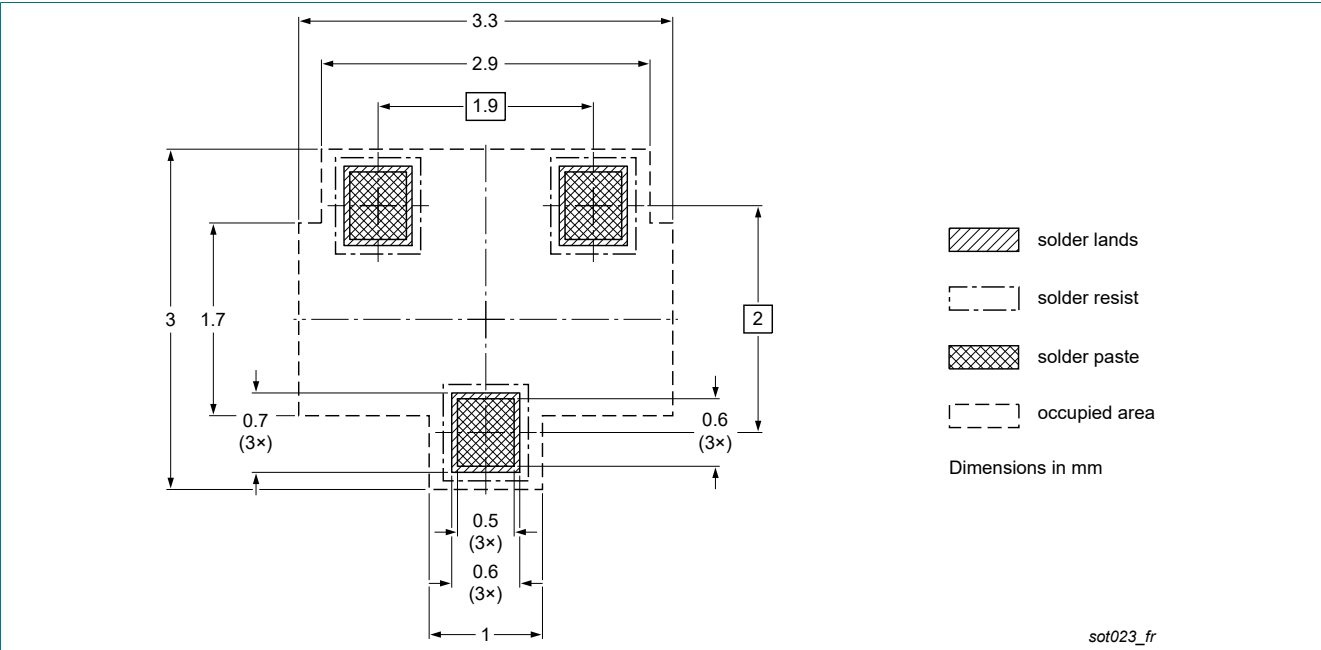


Fig. 9. Reflow soldering footprint for SOT23

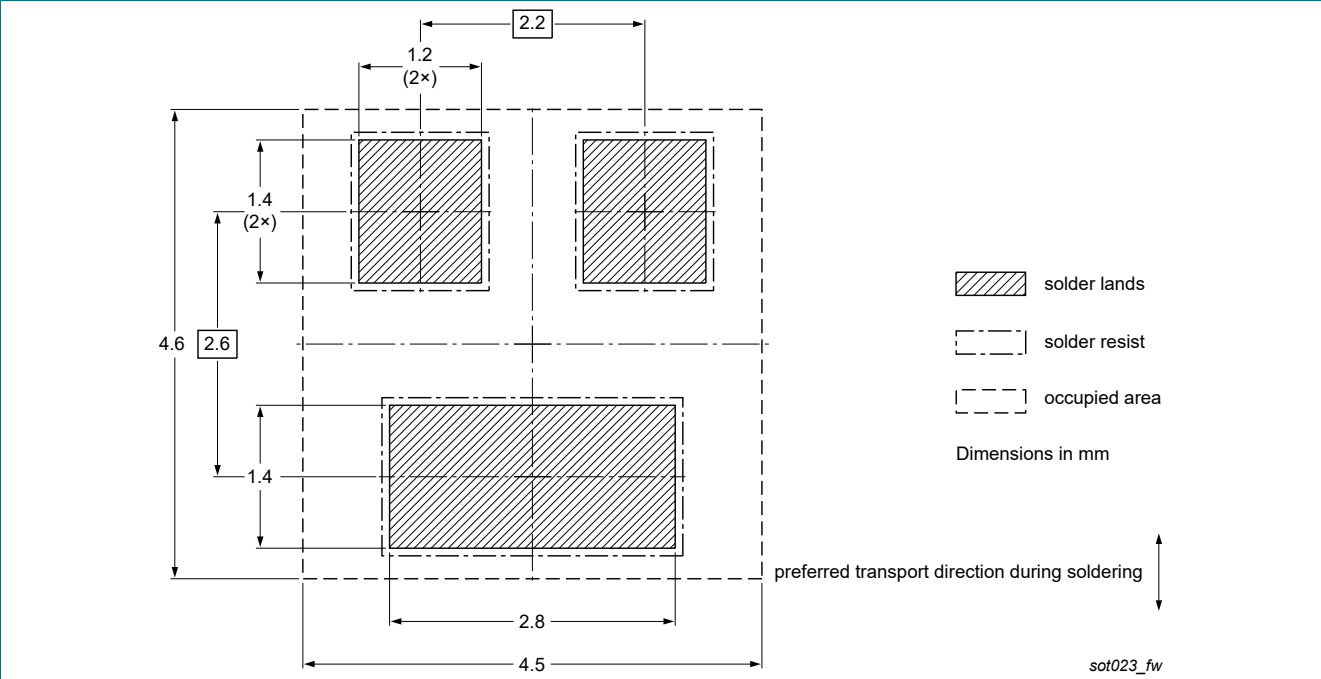


Fig. 10. Wave soldering footprint for SOT23

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
PMBD914-Q v.1	20221108	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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Contents

1. General description.....	1
2. Features and benefits.....	1
3. Applications.....	1
4. Quick reference data.....	1
5. Pinning information.....	1
6. Ordering information.....	2
7. Marking.....	2
8. Limiting values.....	2
9. Thermal characteristics.....	3
10. Characteristics.....	3
11. Test information.....	5
12. Package outline.....	5
13. Soldering.....	6
14. Revision history.....	7
15. Legal information.....	8

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