



# 1PS302-Q

Dual high-speed switching diode

26 July 2024

Product data sheet

## 1. General description

Dual high-speed switching diode, encapsulated in a very small SOT323 (SC-70) Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- High switching speed:  $t_{rr} \leq 4$  ns
- Repetitive peak reverse voltage:  $V_{RRM} \leq 85$  V
- Reverse voltage:  $V_R \leq 80$  V
- Low capacitance:  $C_d \leq 1.5$  pF
- Repetitive peak forward current:  $I_{FRM} \leq 500$  mA
- Very small SMD plastic package
- AEC-Q101 qualified

## 3. Applications

- High-speed switching
- General-purpose switching

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
$I_F$	forward current		[1] [2]	-	-	200	mA
			[1] [3]	-	-	170	mA
$I_R$	reverse current	$V_R = 80$ V; $T_{amb} = 25$ °C		-	-	0.5	µA
$V_R$	reverse voltage			-	-	80	V
$t_{rr}$	reverse recovery time	$I_F = 10$ mA; $I_R = 10$ mA; $I_{R(meas)} = 1$ mA; $R_L = 100$ Ω		-	-	4	ns

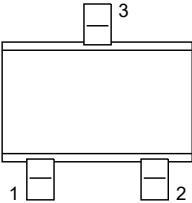
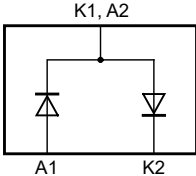
[1] Device mounted on an FR4 Printed-Circuit-Board (PCB), single-sided copper, tin-plated and standard footprint.

[2] Single diode loaded.

[3] Double diode loaded.

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 SC-70 (SOT323)	 006aaa763
2	K	cathode		
3	K1, A2	cathode (diode 1), anode (diode 2)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
<a href="#">1PS302-Q</a>	SC-70	plastic, surface-mounted package; 3 leads; 1.3 mm pitch; 2 mm x 1.25 mm x 0.95 mm body	<a href="#">SOT323</a>

7. Marking

Table 4. Marking codes

Type number	Marking code[1]
1PS302-Q	C%3

[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
Per diode						
V <sub>R</sub>	reverse voltage			-	80	V
V <sub>RRM</sub>	repetitive peak reverse voltage			-	85	V
I <sub>F</sub>	forward current		[1] [2]	-	200	mA
			[1] [3]	-	170	mA
I <sub>FRM</sub>	repetitive peak forward current	t <sub>p</sub> ≤ 0.5 μs; δ ≤ 0.25		-	500	mA
I <sub>FSM</sub>	non-repetitive peak forward current	t <sub>p</sub> = 1 μs; square wave, T <sub>j</sub> = 25 °C before surge.		-	4	A
		t <sub>p</sub> = 1 s; square wave, T <sub>j</sub> = 25 °C before surge.		-	0.5	A
Per device						
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	[1]	-	300	mW
T <sub>j</sub>	junction temperature			-	150	°C
T <sub>amb</sub>	ambient temperature			-55	150	°C
T <sub>stg</sub>	storage temperature			-65	150	°C

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

9. Thermal characteristics

Table 6. Thermal characteristics

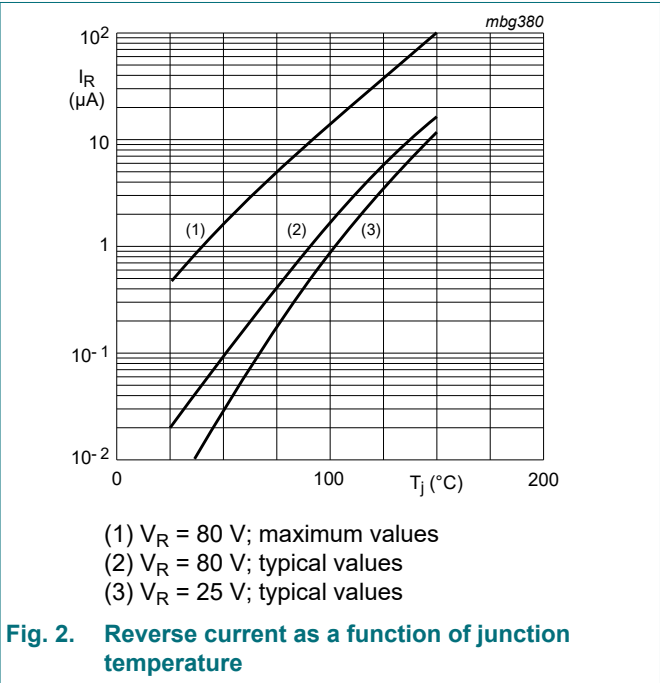
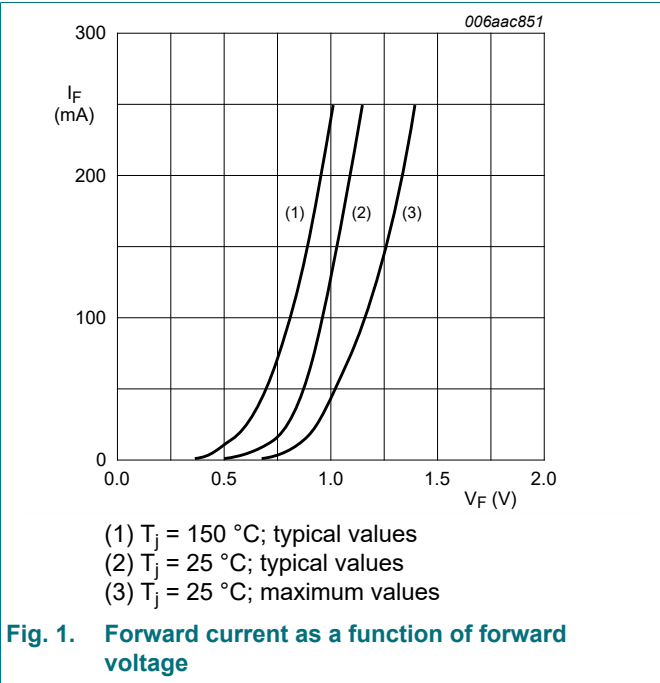
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per device							
R <sub>th(j-a)</sub>	thermal resistance from junction to ambient	in free air	[1]	-	-	415	K/W
R <sub>th(j-sp)</sub>	thermal resistance from junction to solder point			-	-	200	K/W

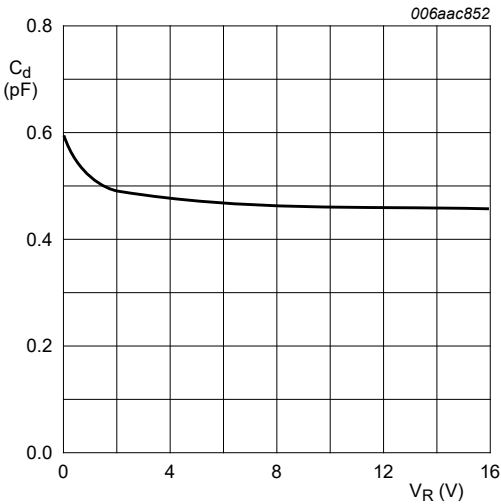
- [1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

10. Characteristics

Table 7. Characteristics

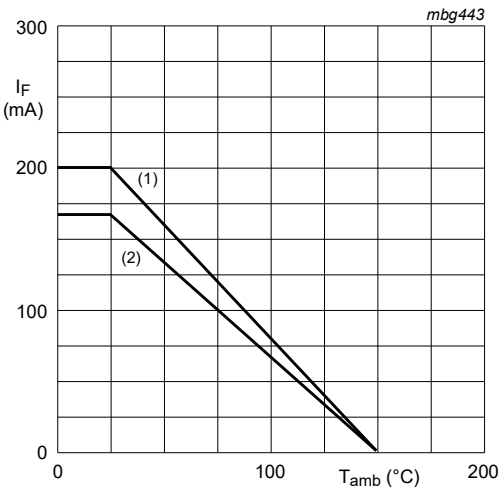
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V <sub>F</sub>	forward voltage	I <sub>F</sub> = 1 mA; T <sub>amb</sub> = 25 °C	-	610	-	mV
		I <sub>F</sub> = 10 mA; T <sub>amb</sub> = 25 °C	-	740	-	mV
		I <sub>F</sub> = 50 mA; T <sub>amb</sub> = 25 °C	-	-	1	V
		I <sub>F</sub> = 100 mA; T <sub>amb</sub> = 25 °C	-	-	1.2	V
I <sub>R</sub>	reverse current	V <sub>R</sub> = 25 V; T <sub>amb</sub> = 25 °C	-	-	30	nA
		V <sub>R</sub> = 80 V; T <sub>amb</sub> = 25 °C	-	-	0.5	μA
		V <sub>R</sub> = 25 V; T <sub>j</sub> = 150 °C	-	-	30	μA
		V <sub>R</sub> = 80 V; T <sub>j</sub> = 150 °C	-	-	100	μA
C <sub>d</sub>	diode capacitance	V <sub>R</sub> = 0 V; f = 1 MHz; T <sub>amb</sub> = 25 °C	-	-	1.5	pF
t <sub>rr</sub>	reverse recovery time	I <sub>F</sub> = 10 mA; I <sub>R</sub> = 10 mA; I <sub>R(meas)</sub> = 1 mA; R <sub>L</sub> = 100 Ω	-	-	4	ns
V <sub>FRM</sub>	peak forward recovery voltage	I <sub>F</sub> = 10 mA; t <sub>r</sub> = 20 ns	-	-	1.75	V





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

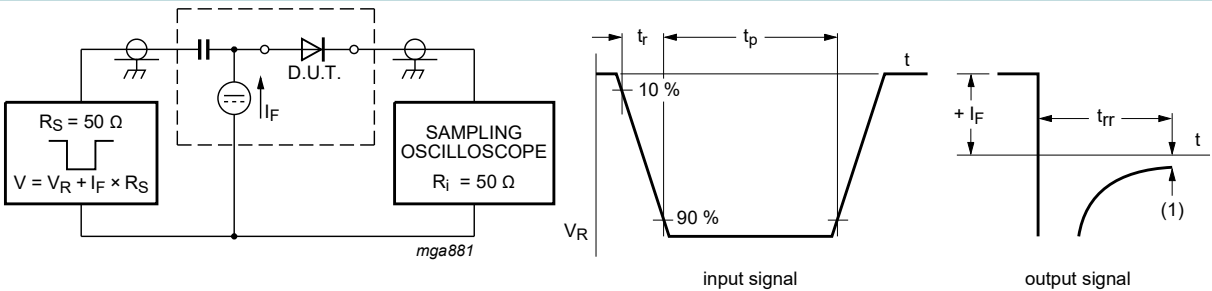
Fig. 3. Diode capacitance as a function of reverse voltage; typical values



FR4 PCB, standard footprint  
(1) single diode loaded  
(2) double diode loaded

Fig. 4. Forward current as a function of ambient temperature; derating curves

11. Test information



(1)  $I_R = 1\text{ mA}$   
Input signal: reverse pulse rise time  $t_r = 0.6\text{ ns}$ ; reverse voltage pulse duration  $t_p = 100\text{ ns}$ ; duty cycle  $\delta = 0.05$   
Oscilloscope rise time  $t_r = 0.35\text{ ns}$

Fig. 5. Reverse recovery time: test circuit and waveforms

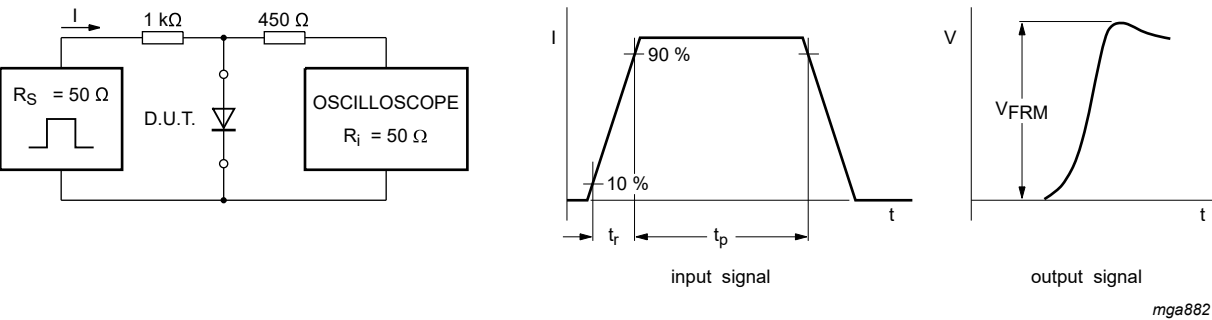


Fig. 6. Forward recovery voltage test circuit and waveforms  
Input signal: forward pulse rise time  $t_r = 20\text{ ns}$ ; forward current pulse duration  $t_p \geq 100\text{ ns}$ ; duty cycle  $\delta \leq 0.005$

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

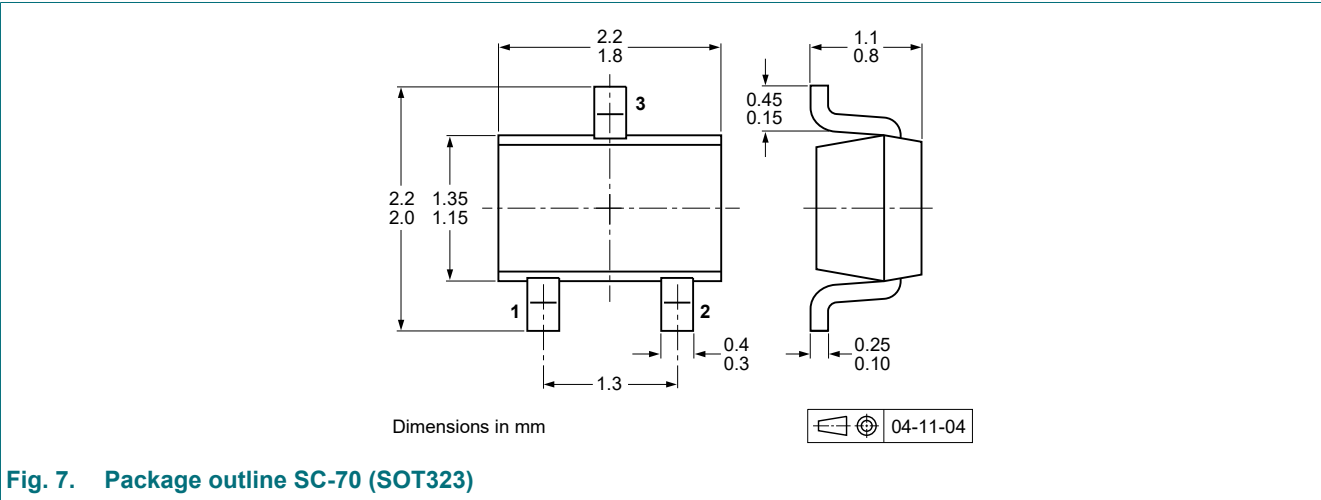


Fig. 7. Package outline SC-70 (SOT323)

13. Soldering

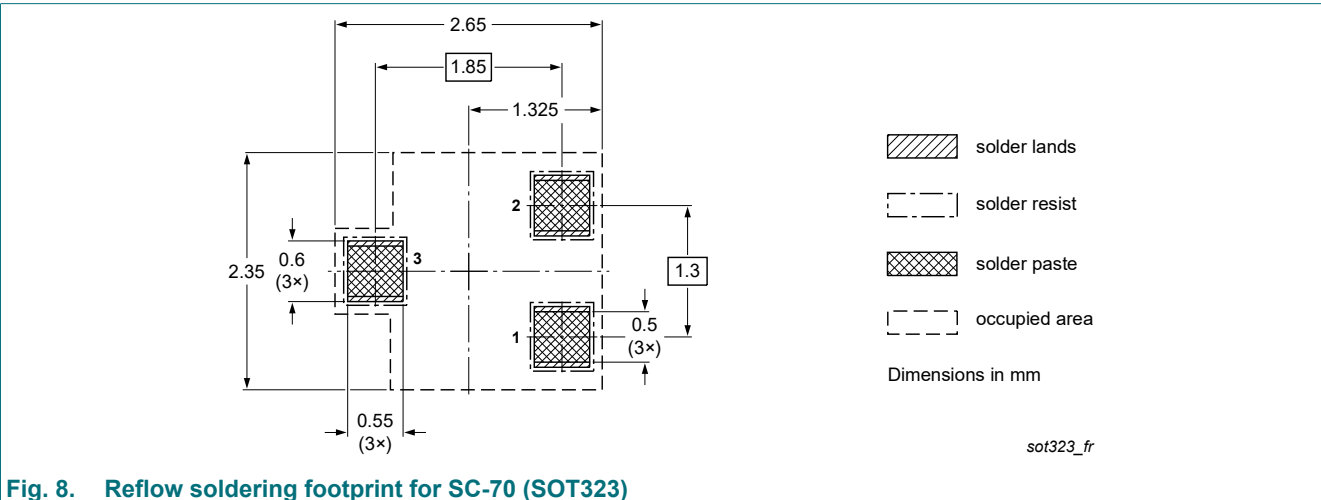


Fig. 8. Reflow soldering footprint for SC-70 (SOT323)

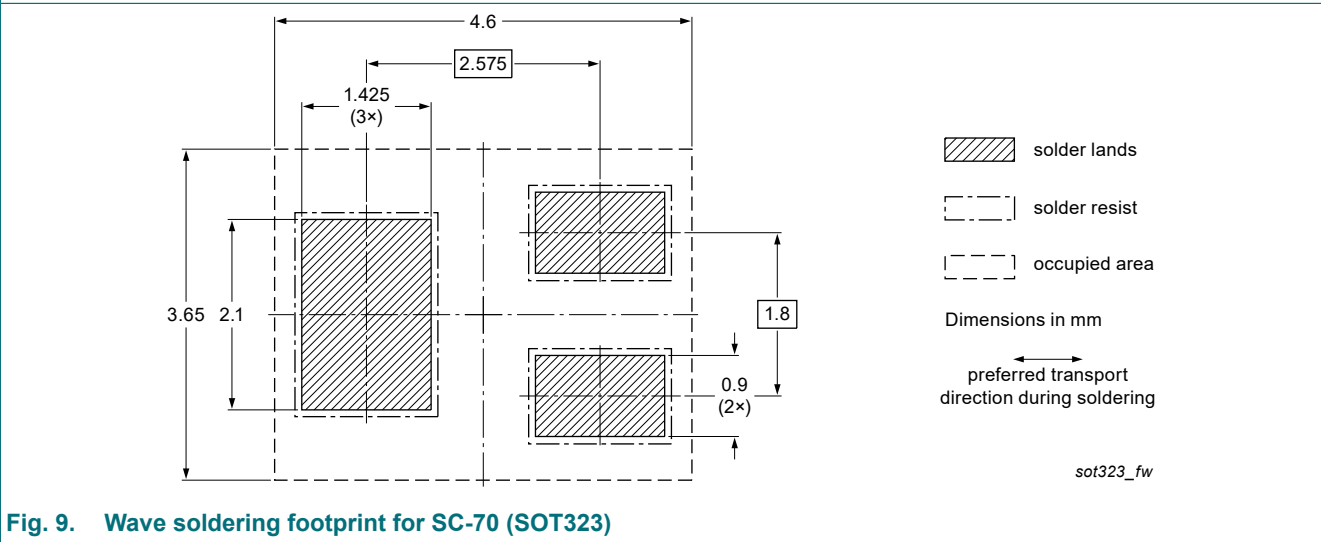


Fig. 9. Wave soldering footprint for SC-70 (SOT323)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
1PS302-Q v.1	20240724	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".
- [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 <https://www.nexperia.com>.

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Date of release: 26 July 2024