



# RB521S30

200 mA low Vf MEGA Schottky barrier rectifier

8 October 2024

Product data sheet

## 1. General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOD523 (SC-79) ultra small and flat lead Surface-Mounted Device (SMD) plastic package.

## 2. Features and benefits

- Average forward current:  $I_{F(AV)} \leq 0.2 \text{ A}$
- Reverse voltage:  $V_R \leq 30 \text{ V}$
- Low reverse current:  $I_R \leq 30 \text{ uA}$
- Ultra small and flat lead SMD plastic package

## 3. Applications

- Low current rectification
- High efficiency DC-to-DC conversion
- Switch Mode Power Supply (SMPS)
- Reverse polarity protection
- Low power consumption applications

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_R$	reverse current	$V_R = 10 \text{ V}$	-	2.5	30	$\mu\text{A}$
$V_R$	reverse voltage	$T_j = 25 \text{ }^\circ\text{C}$	-	-	30	V

## 5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode <sup>[1]</sup>		
2	A	anode		

[1] The marking bar indicates the cathode.

## 6. Ordering information

**Table 3. Ordering information**

Type number	Package		
	Name	Description	Version
RB521S30	SC-79	plastic, surface-mounted package; 2 leads; 1.2 mm x 0.8 mm x 0.6 mm body	<a href="#">SOD523</a>

## 7. Marking

**Table 4. Marking codes**

Type number	Marking code
RB521S30	ZB

## 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	$T_j = 25^\circ\text{C}$		-	30	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$ ; $f = 20$ kHz; square wave; $T_{\text{amb}} \leq 120^\circ\text{C}$	[1]	-	0.2	A
		$\delta = 0.5$ ; $f = 20$ kHz; square wave; $T_{\text{sp}} \leq 140^\circ\text{C}$		-	0.2	A
$I_{FSM}$	non-repetitive peak forward current	$t_p = 8.3$ ms; half sine wave; JEDEC method; $T_{j(\text{init})} = 25^\circ\text{C}$	[2]	-	1	A
$P_{\text{tot}}$	total power dissipation	$T_{\text{amb}} \leq 25^\circ\text{C}$	[3] [4]	-	275	mW
			[1] [4]	-	420	mW
			[5] [4]	-	500	mW
$T_j$	junction temperature			-	150	°C
$T_{\text{amb}}$	ambient temperature			-55	150	°C
$T_{\text{stg}}$	storage temperature			-65	150	°C

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

[2]  $T_j = 25^\circ\text{C}$  Prior to surge

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

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

[5] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.

## 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] [3]	-	-	455	K/W
			[1] [4] [3]	-	-	300	K/W
			[1] [5] [3]	-	-	250	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[6]	-	-	90	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] Reflow soldering is the only recommended soldering method.
- [4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm<sup>2</sup>.
- [5] Device mounted on a ceramic PCB, Al<sub>2</sub>O<sub>3</sub>, standard footprint.
- [6] Soldering point of cathode tab.

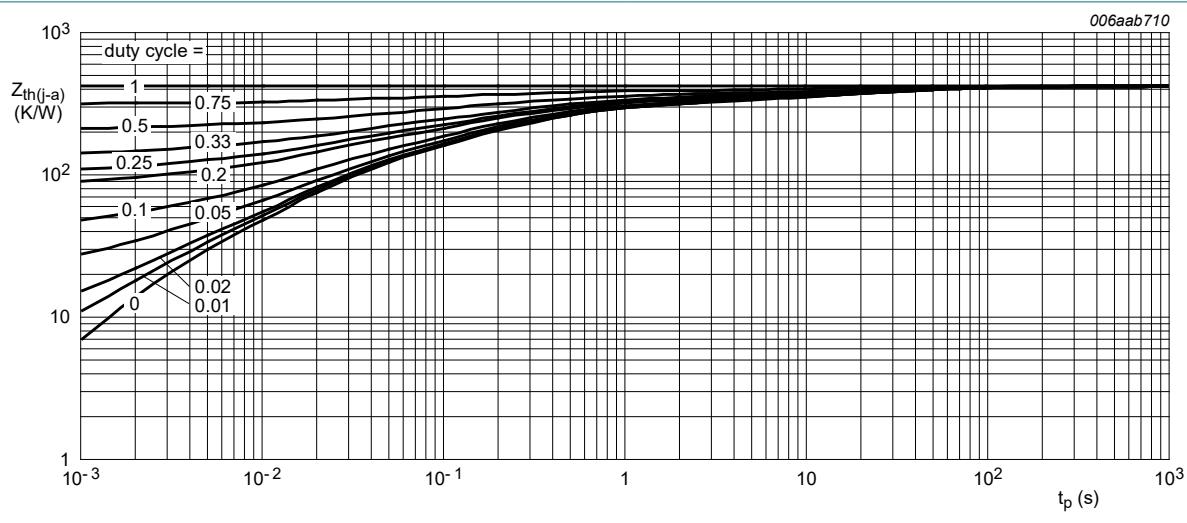
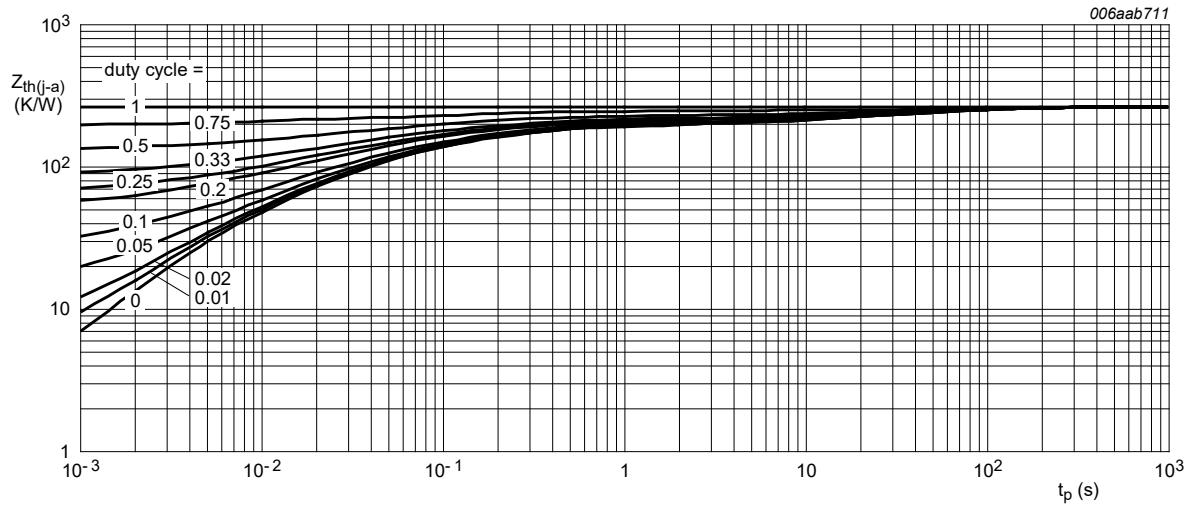


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



FR4 PCB, mounting pad for cathode 1 cm<sup>2</sup>

Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

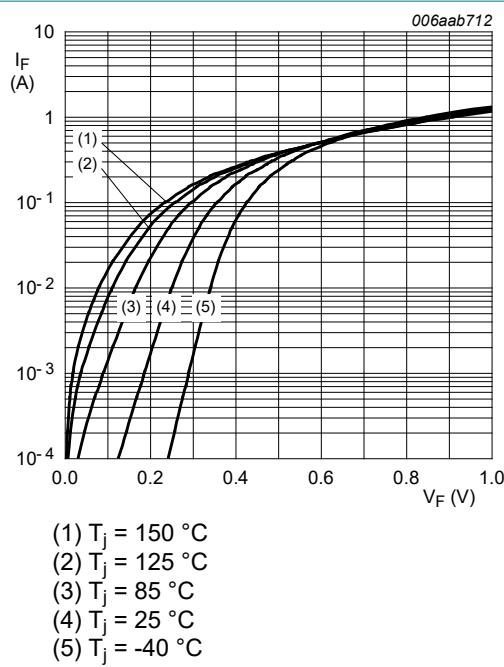
## 10. Characteristics

Table 7. Characteristics

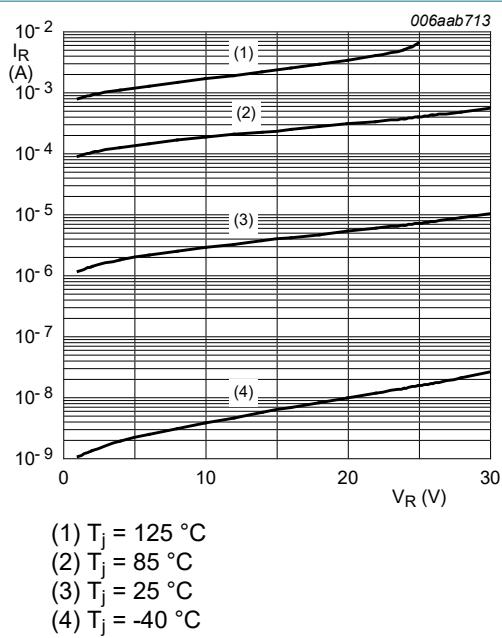
$T_{amb} = 25^\circ\text{C}$  unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_F$	forward voltage	$I_F = 0.1 \text{ mA}$	[1]	-	130	190	mV
		$I_F = 1 \text{ mA}$	[1]	-	190	250	mV
		$I_F = 10 \text{ mA}$	[1]	-	255	300	mV
		$I_F = 100 \text{ mA}$	[1]	-	355	410	mV
		$I_F = 200 \text{ mA}$	[1]	-	420	500	mV
$I_R$	reverse current	$V_R = 10 \text{ V}$		-	2.5	30	$\mu\text{A}$
$C_d$	diode capacitance	$V_R = 1 \text{ V}; f = 1 \text{ MHz}$		-	20	25	pF

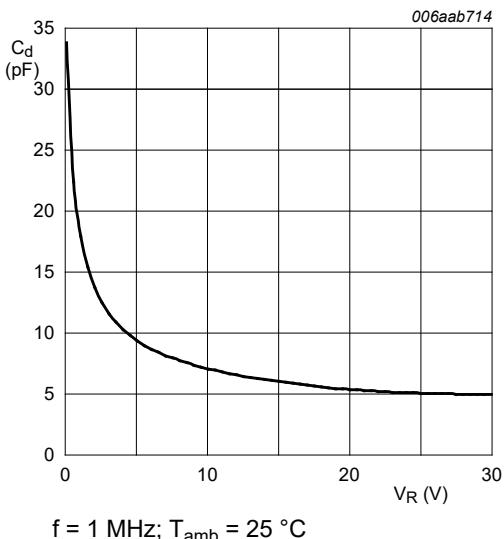
[1] Pulsed test:  $t_p \leq 300 \mu\text{s}$ ;  $\delta \leq 0.02$



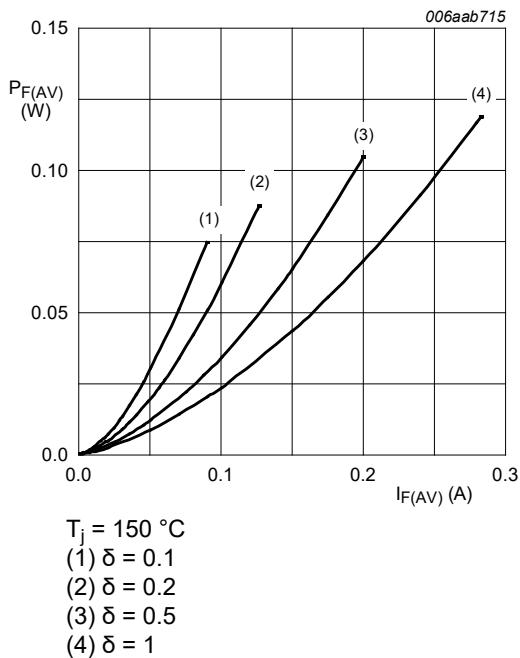
**Fig. 3. Forward current as a function of forward voltage; typical values**



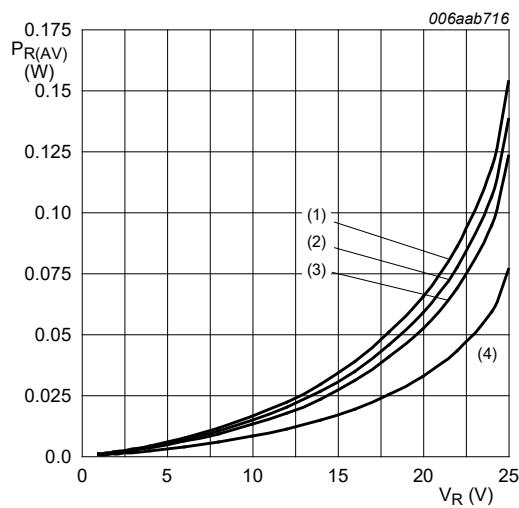
**Fig. 4. Reverse current as a function of reverse voltage; typical values**



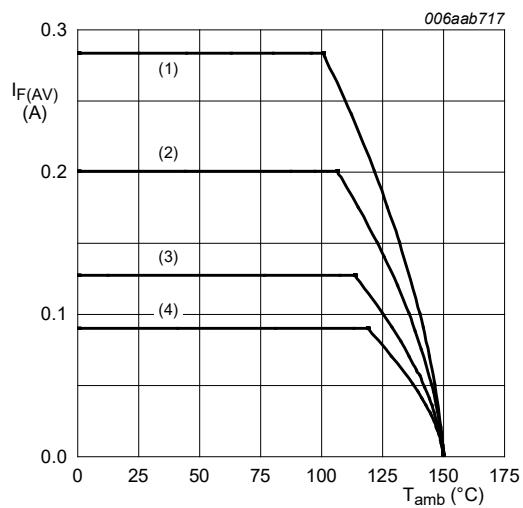
**Fig. 5. Diode capacitance as a function of reverse voltage; typical values**



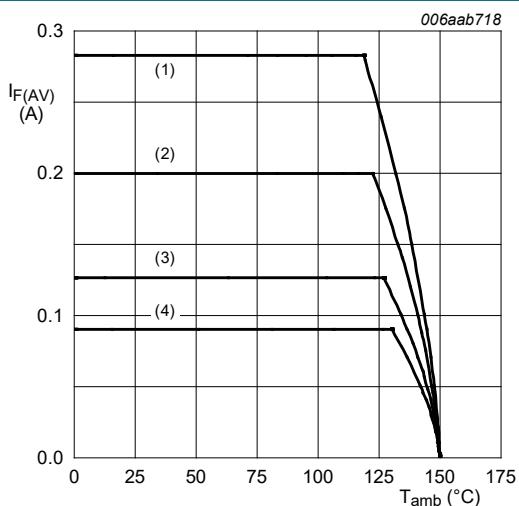
**Fig. 6. Average forward power dissipation as a function of average forward current; typical values**



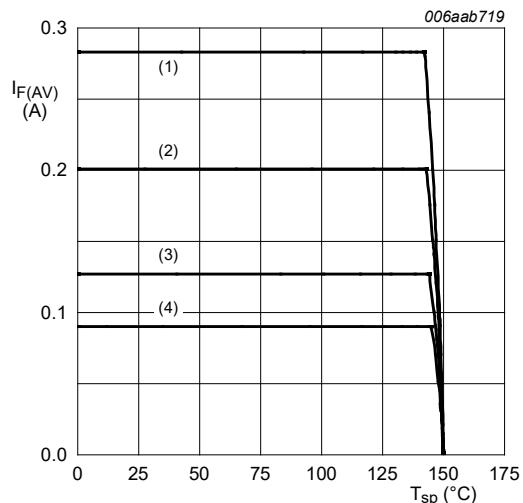
**Fig. 7. Average reverse power dissipation as a function of reverse voltage; typical values**



**Fig. 8. Average forward current as a function of ambient temperature; typical values**



**Fig. 9. Average forward current as a function of ambient temperature; typical values**



**Fig. 10. Average forward current as a function of solder point temperature; typical values**

## 11. Test information

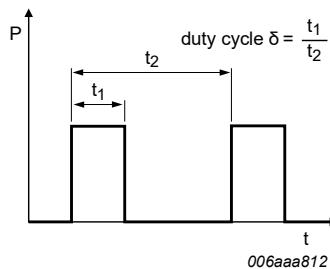


Fig. 11. Duty cycle definition

The current ratings for the typical waveforms are calculated according to the equations:

$$I_{F(AV)} = I_M \times \delta \text{ with } I_M \text{ defined as peak current}$$

$$I_{RMS} = I_{F(AV)} \text{ at DC}$$

$$I_{RMS} = I_M \times \sqrt{\delta} \text{ with } I_{RMS} \text{ defined as RMS current}$$

## 12. Package outline

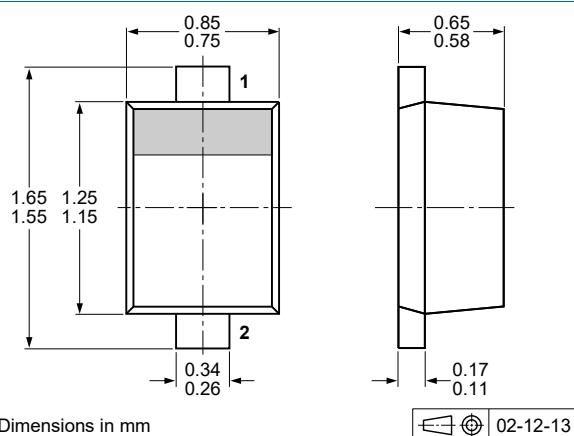


Fig. 12. Package outline SC-79 (SOD523)

## 13. Soldering

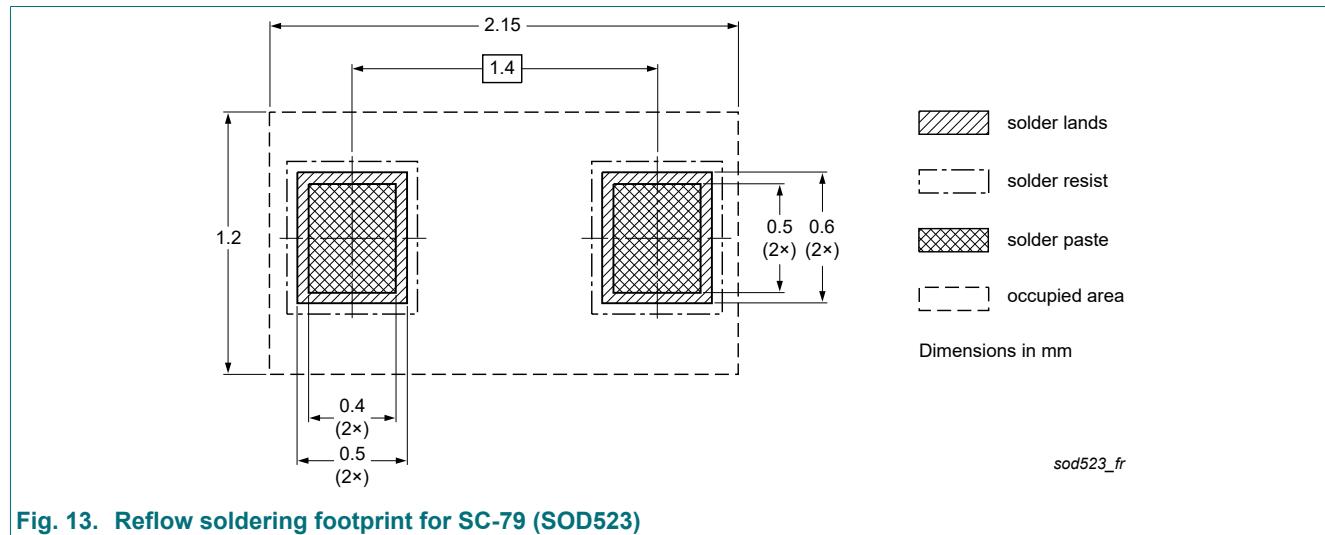


Fig. 13. Reflow soldering footprint for SC-79 (SOD523)

## 14. Revision history

**Table 8. Revision history**

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
RB521S30 v.3	20241008	Product data sheet	-	RB521S30 v.2
Modifications:	<ul style="list-style-type: none"><li>Product(s) changed to non-automotive qualification. Please refer to <a href="http://nexperia.com">nexperia.com</a> for automotive (-Q) product alternative(s).</li></ul>			
RB521S30 v.2	20210407	Product data sheet	-	RB521S30 v.1
RB521S30 v.1	20091006	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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