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: $I_{F(AV)} \leq 0.2$ A
- Reverse voltage: $V_R \leq 30$ V
- Low reverse current: $I_R \leq 30$ 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 V		-	2.5	30	µA
V_R	reverse voltage	T_j = 25 °C		-	-	30	V

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 SC-79 (SOD523)	 sym001
2	A	anode		

[1] The marking bar indicates the cathode.

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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	SOD523

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

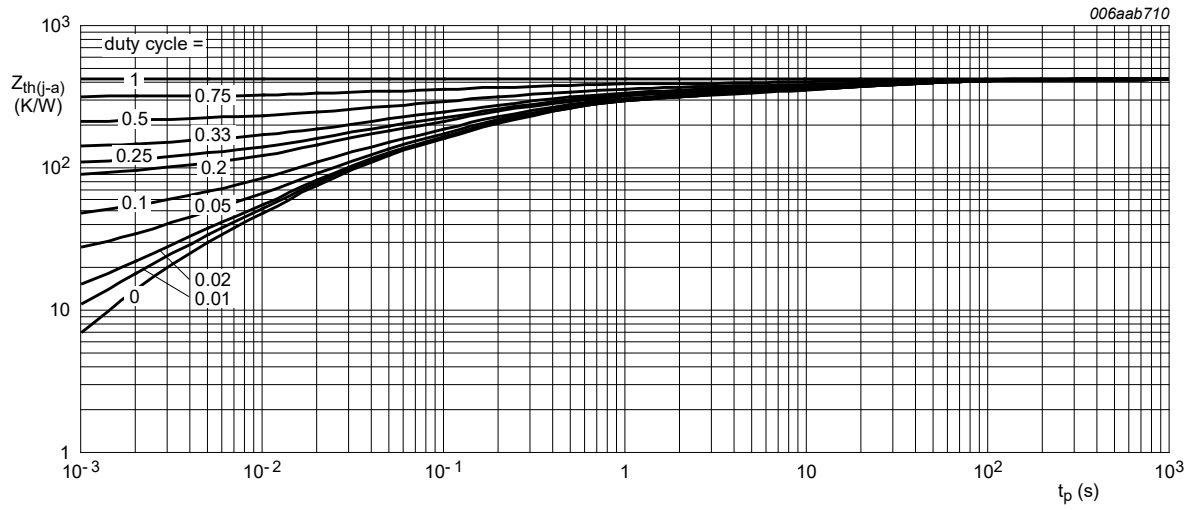
[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.
[2] T_j = 25 °C Prior to surge
[3] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[4] Reflow soldering is the only recommended soldering method.
[5] Device mounted on a ceramic PCB, Al_2O_3, 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^2.
[5] Device mounted on a ceramic PCB, Al_2O_3, standard footprint.
[6] Soldering point of cathode tab.



FR4 PCB, standard footprint

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

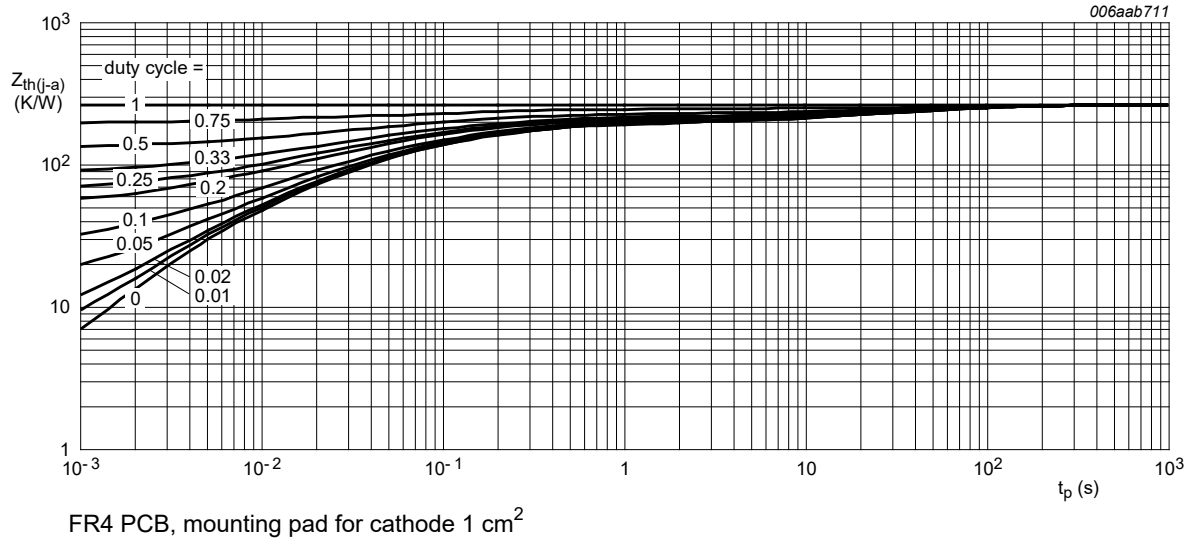


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

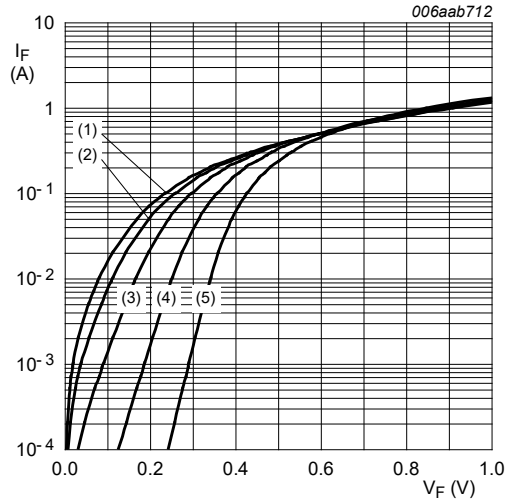
10. Characteristics

Table 7. Characteristics

T_{amb} = 25 °C unless otherwise specified.

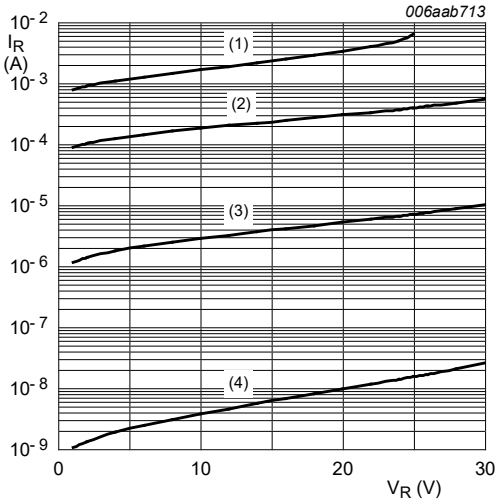
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 0.1 mA	[1]	-	130	190	mV
		I_F = 1 mA	[1]	-	190	250	mV
		I_F = 10 mA	[1]	-	255	300	mV
		I_F = 100 mA	[1]	-	355	410	mV
		I_F = 200 mA	[1]	-	420	500	mV
I_R	reverse current	V_R = 10 V		-	2.5	30	µA
C_d	diode capacitance	V_R = 1 V; f =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

[1] Pulsed test: $t_p \leq 300$ µs; $\delta \leq 0.02$



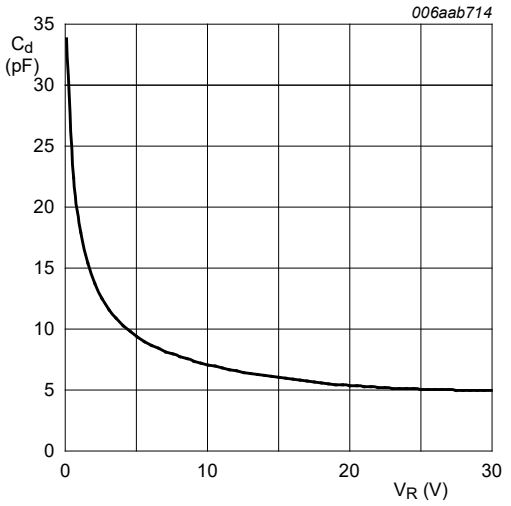
(1) T_j = 150 °C
(2) T_j = 125 °C
(3) T_j = 85 °C
(4) T_j = 25 °C
(5) T_j = -40 °C

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



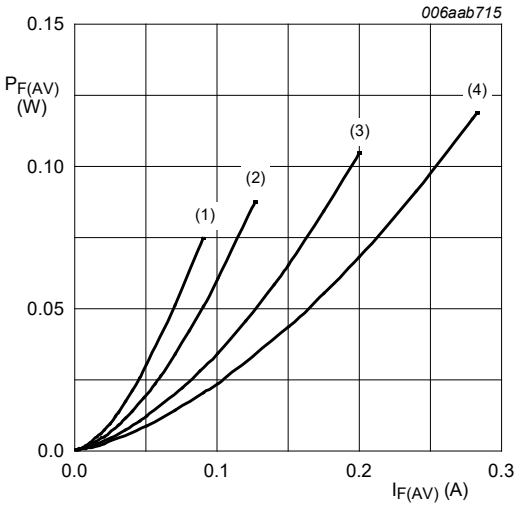
(1) T_j = 125 °C
(2) T_j = 85 °C
(3) T_j = 25 °C
(4) T_j = -40 °C

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



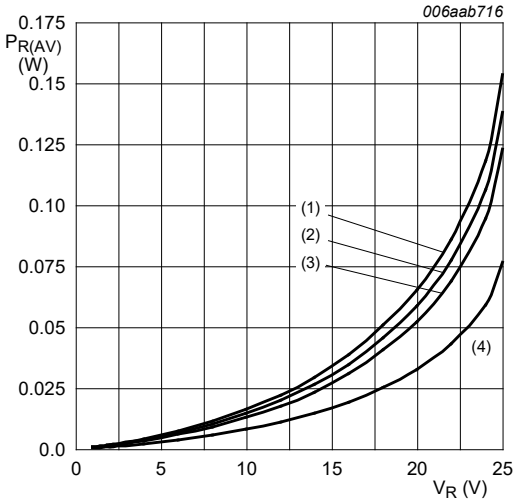
f = 1 MHz; T_{amb} = 25 °C

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



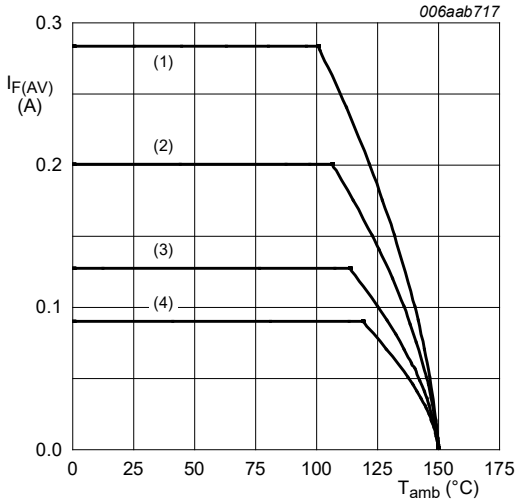
T_j = 150 °C
(1) δ = 0.1
(2) δ = 0.2
(3) δ = 0.5
(4) δ = 1

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



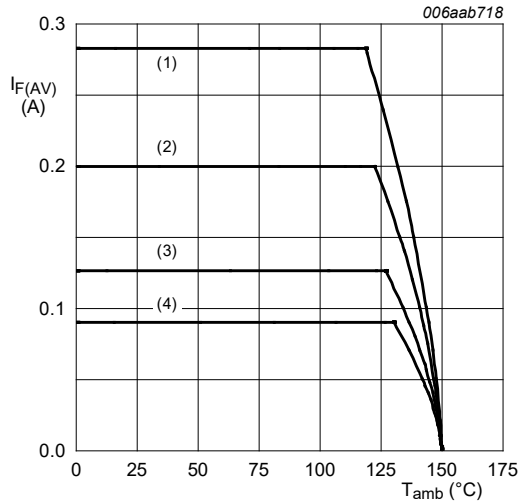
T_j = 125 °C
(1) δ = 1
(2) δ = 0.9
(3) δ = 0.8
(4) δ = 0.5

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



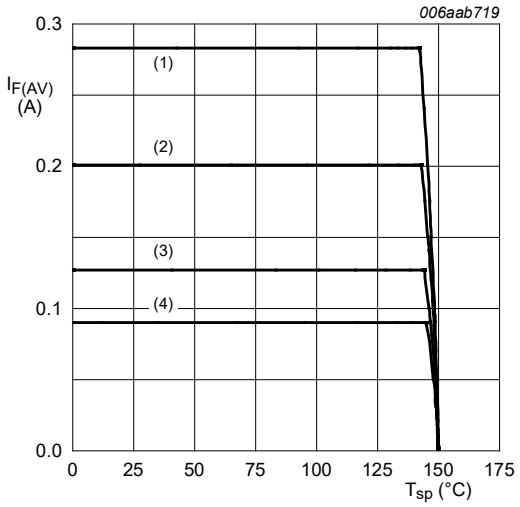
FR4 PCB, standard footprint
T_j = 150 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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



FR4 PCB, mounting pad for cathode 1 cm^2
T_j = 150 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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



T_j = 150 °C
(1) δ = 1; DC
(2) δ = 0.5; f = 20 kHz
(3) δ = 0.2; f = 20 kHz
(4) δ = 0.1; f = 20 kHz

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

11. Test information

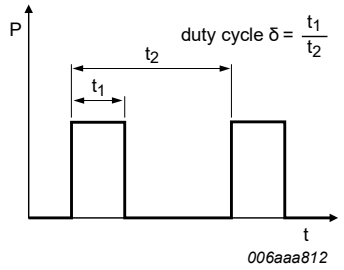


Fig. 11. Duty cycle definition

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

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

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

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

12. Package outline

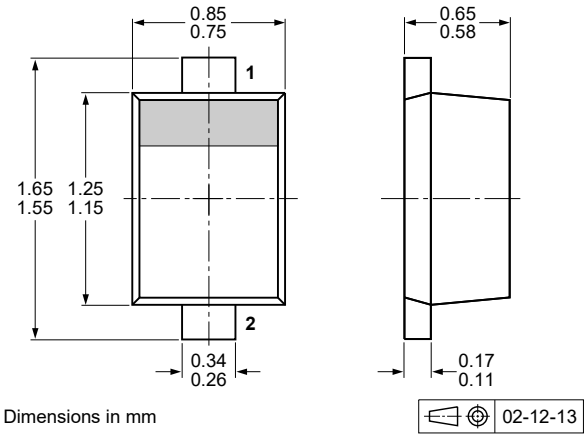


Fig. 12. Package outline SC-79 (SOD523)

13. Soldering

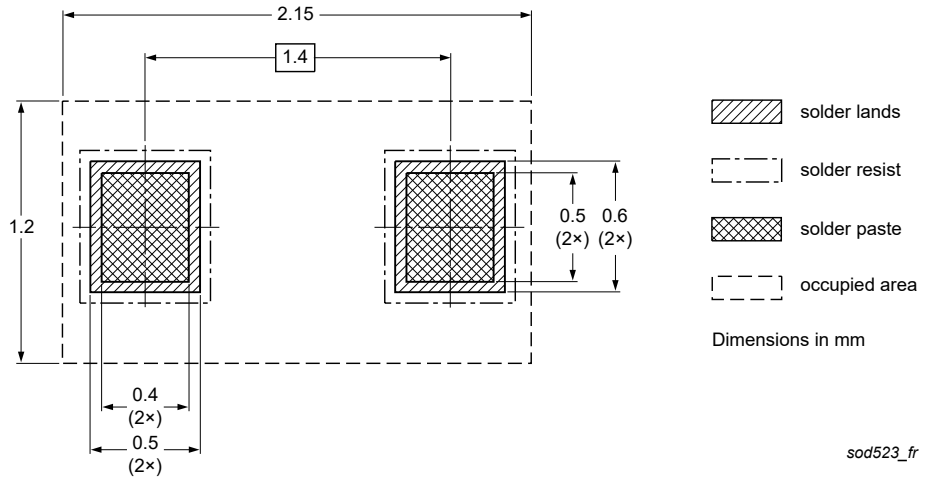


Fig. 13. Reflow soldering footprint for SC-79 (SOD523)

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:	• Product(s) changed to non-automotive qualification. Please refer to nexperia.com for automotive (-Q) product alternative(s).			
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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