RB521CS30L

100 mA low V_F MEGA Schottky barrier rectifier

Rev. 1 — 24 January 2011 **Product data sheet**

1. Product profile

1.1 General description

Planar Maximum Efficiency General Application (MEGA) Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in a SOD882 leadless ultra small Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- Average forward current: $I_{F(AV)} \leq 100$ mA
- Reverse voltage: $V_R \leq 30$ V
- Low forward voltage: $V_F \leq 350$ mV
- Low reverse current: $I_R \leq 10$ µA
- AEC-Q101 qualified
- Leadless ultra small SMD plastic package

1.3 Applications

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

1.4 Quick reference data

Table 1. Quick reference data

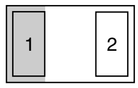
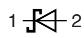
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	square wave; $\delta = 0.5$; f = 20 kHz					
		$T_{amb} \leq 135$ °C	[1]	-	-	100	mA
		$T_{sp} \leq 145$ °C		-	-	100	mA
I_R	reverse current	$V_R = 10$ V		-	2	10	µA
V_R	reverse voltage			-	-	30	V
V_F	forward voltage	$I_F = 10$ mA	[2]	-	280	350	mV

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

[2] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	cathode [1]	 Transparent top view	 sym001
2	anode		

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
RB521CS30L	-	leadless ultra small plastic package; 2 terminal; body 1.0 × 0.6 × 0.5 mm	SOD882

4. Marking

Table 4. Marking codes

Type number	Marking code
RB521CS30L	AR

5. 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		-	30	V
$I_{F(AV)}$	average forward current	square wave; $\delta = 0.5$; f = 20 kHz			
		$T_{amb} \leq 135$ °C [1]	-	100	mA
		$T_{sp} \leq 145$ °C	-	100	mA
I_{FSM}	non-repetitive peak forward current	half sine wave; $t_p \leq 8.3$ ms [2]	-	3	A

Table 5. Limiting values *...continued*

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions		Min	Max	Unit
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[4][3]	-	315	mW
			[4][1]	-	565	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, 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.

6. 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]	-	-	395	K/W
			[4]	-	-	220	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[5]	-	-	70	K/W

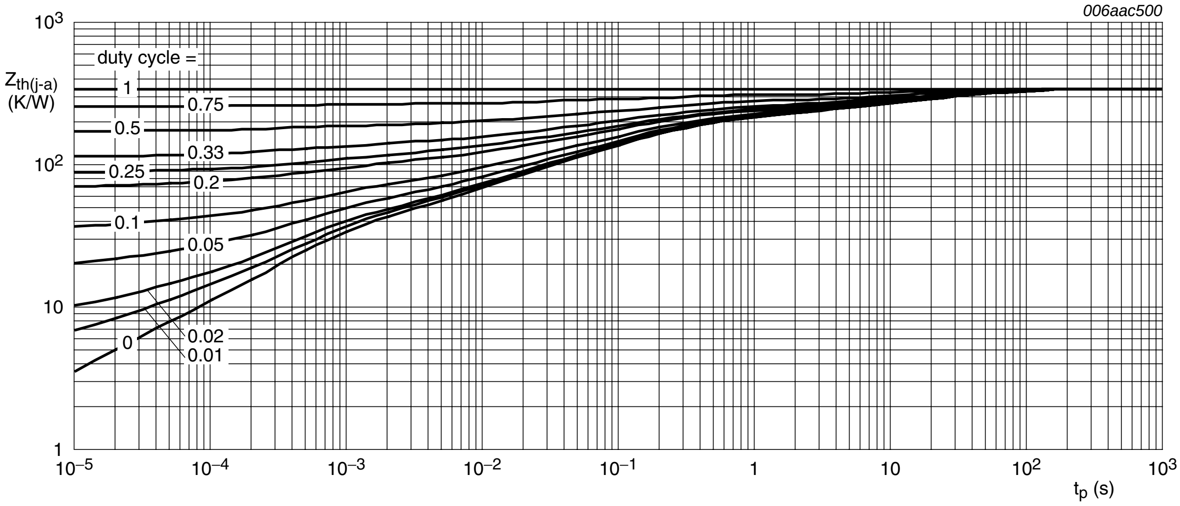
[1] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses P_R are a significant part of the total power losses.

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

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

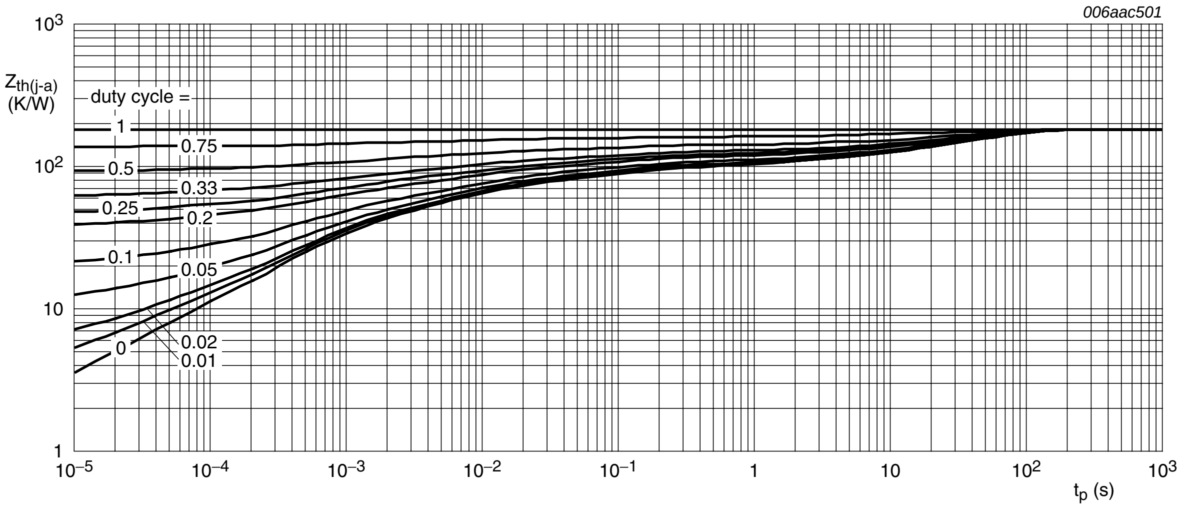
[4] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.

[5] 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



FR4 PCB, mounting pad for cathode 1 cm^2

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

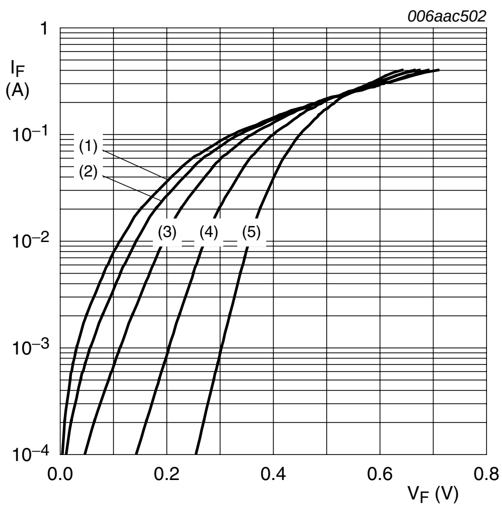
7. Characteristics

Table 7. Characteristics

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

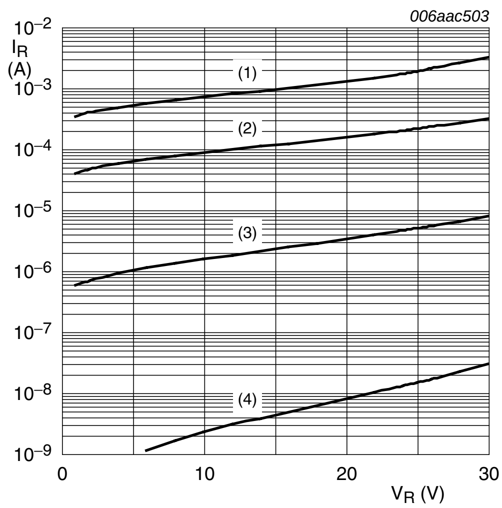
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	[1]				
		I_F = 0.1 mA	-	145	-	mV
		I_F = 1 mA	-	210	-	mV
		I_F = 10 mA	-	280	350	mV
		I_F = 100 mA	-	405	-	mV
I_R	reverse current	V_R = 10 V	-	2	10	µA
C_d	diode capacitance	V_R = 1 V; f = 1 MHz	-	8	-	pF

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



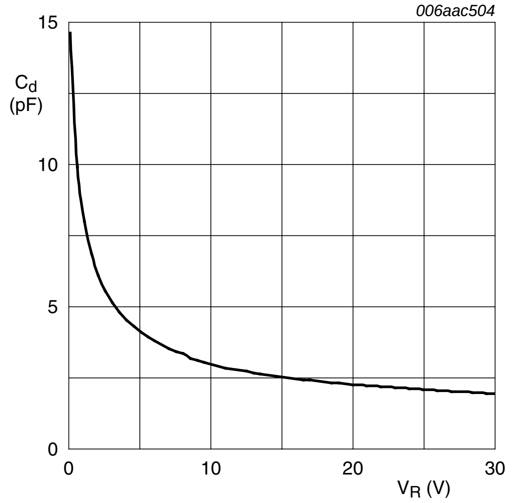
(1) T_j = 150 °C
(2) T_j = 125 °C
(3) T_j = 85 °C
(4) T_j = 25 °C
(5) T_j = −40 °C

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



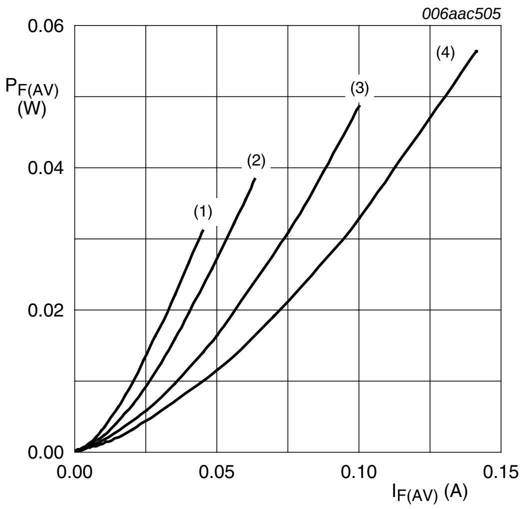
(1) T_j = 125 °C
(2) T_j = 85 °C
(3) T_j = 25 °C
(4) T_j = −40 °C

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

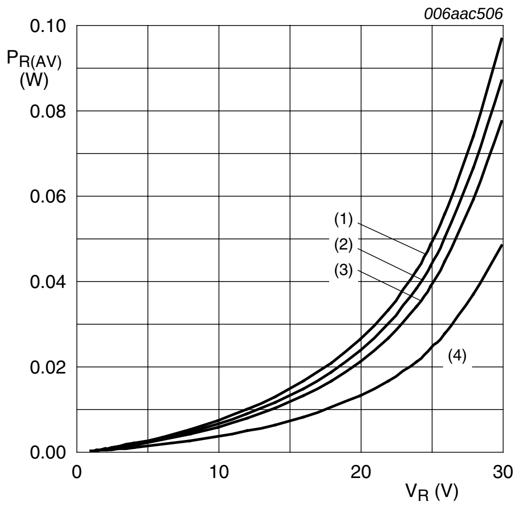
(1) δ = 0.1

(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

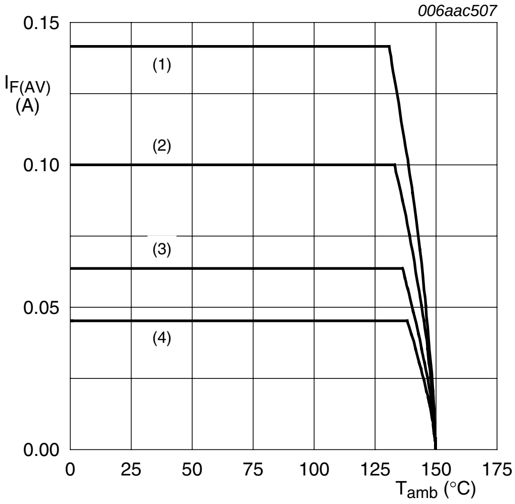
(1) δ = 1; DC

(2) δ = 0.9; f = 20 kHz

(3) δ = 0.8; f = 20 kHz

(4) δ = 0.5; f = 20 kHz

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



FR4 PCB, standard footprint

T_j = 150 °C

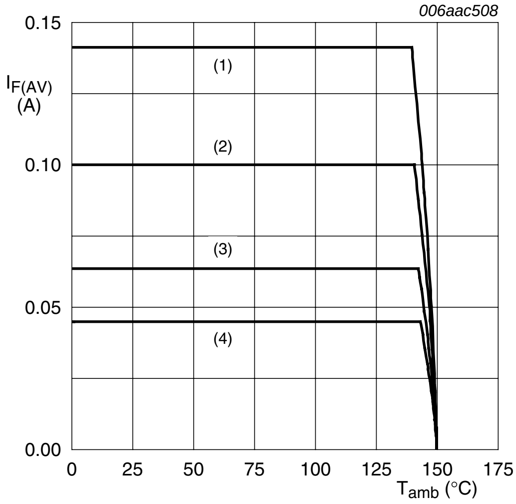
(1) δ = 1; DC

(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

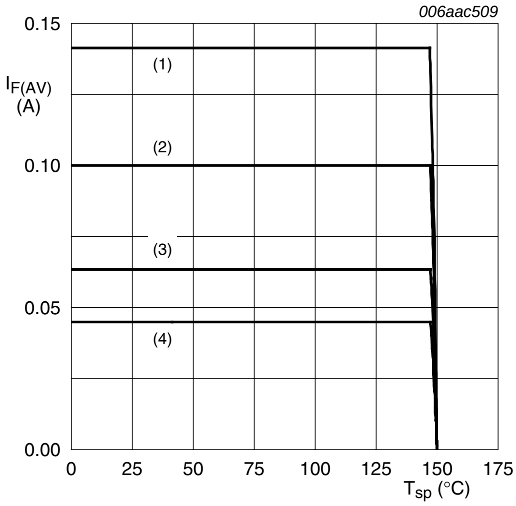
(1) δ = 1; DC

(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

8. Test information

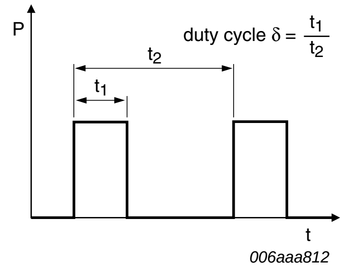


Fig 11. Duty cycle definition

The current ratings for the typical waveforms as shown in Figure 8, 9 and 10 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, and $I_{RMS} = I_M \times \sqrt{\delta}$ with I_{RMS} defined as RMS current.

8.1 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.

9. Package outline

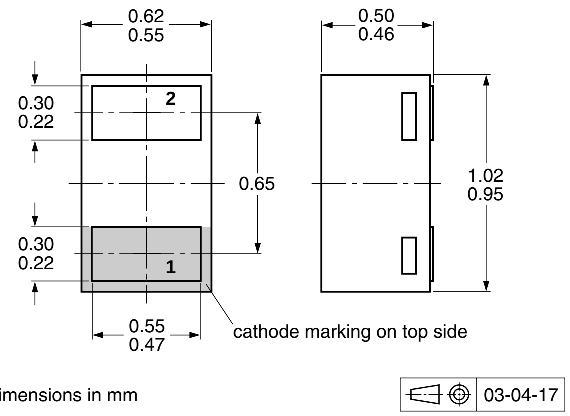


Fig 12. Package outline SOD882

10. Packing information

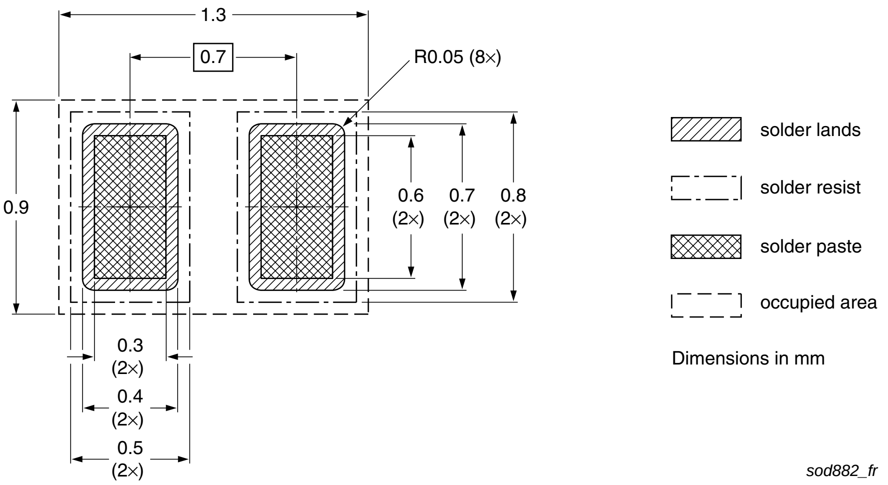
Table 8. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.[1]

Type number	Package	Description	Packing quantity
			10000
RB521CS30L	SOD882	2 mm pitch, 8 mm tape and reel	-315

[1] For further information and the availability of packing methods, see Section 14.

11. Soldering



Reflow soldering is the only recommended soldering method.

Fig 13. Reflow soldering footprint SOD882

12. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
RB521CS30L v.1	20110124	Product data sheet	-	-

13. Legal information

13.1 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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15. Contents

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