



RB520CS3002L-Q

200 mA low VF Schottky barrier rectifier

10 April 2025

Product data sheet

1. General description

Planar Schottky barrier rectifier with an integrated guard ring for stress protection, encapsulated in DFN1006-2 (SOD882) leadless ultra small Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Average forward current: $I_{F(AV)} \leq 200$ mA
- Reverse voltage: $V_R \leq 30$ V
- Low forward voltage: $V_F \leq 450$ mV
- Low reverse current: $I_R \leq 0.5$ μ A
- Leadless ultra small SMD plastic package
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- Low current rectification
- High efficiency DC-to-DC conversion
- Switch mode power supply
- Reverse polarity protection
- Low power consumption applications

4. Quick reference data



Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20$ kHz; square wave; $T_{amb} \leq 115$ °C	-	-	200	mA
		$\delta = 0.5$; $f = 20$ kHz; square wave; $T_{sp} \leq 135$ °C	-	-	200	mA
V_R	reverse voltage		-	-	30	V
V_F	forward voltage	$I_F = 10$ mA; $t_p \leq 300$ μ s; $\delta \leq 0.02$; $T_j = 25$ °C; pulsed	-	330	450	mV
I_R	reverse current	$V_R = 10$ V; $T_j = 25$ °C	-	0.14	0.5	μ A

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm².

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode[1]	 Transparent top view DFN1006-2 (SOD882)	 <i>sym001</i>
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
RB520CS3002L-Q	DFN1006-2	plastic, leadless ultra small package; 2 terminals; 0.65 mm pitch; 1 mm x 0.6 mm x 0.48 mm body	SOD882

7. Marking

Table 4. Marking codes

Type number	Marking code
RB520CS3002L-Q	ZA

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			-	30	V
$I_{F(AV)}$	average forward current	$\delta = 0.5$; $f = 20\text{ kHz}$; square wave; $T_{amb} \leq 115\text{ }^{\circ}\text{C}$	[1]	-	200	mA
		$\delta = 0.5$; $f = 20\text{ kHz}$; square wave; $T_{sp} \leq 135\text{ }^{\circ}\text{C}$		-	200	mA
I_{FSM}	non-repetitive peak forward current	$t_p = 8.3\text{ ms}$; half sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$		-	3	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	[2]	-	315	mW
			[1]	-	565	mW
			[3]	-	865	mW
T_j	junction temperature			-	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature			-55	150	$^{\circ}\text{C}$
T_{stg}	storage temperature			-65	150	$^{\circ}\text{C}$

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 1 cm².

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

[3] Device mounted on a ceramic PCB, Al₂O₃, 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]	-	-	395	K/W
			[1] [3]	-	-	220	K/W
			[1] [4]	-	-	145	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] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
- [3] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm².
- [4] Device mounted on a ceramic PCB, Al₂O₃, standard footprint.
- [5] Soldering point of cathode tab.

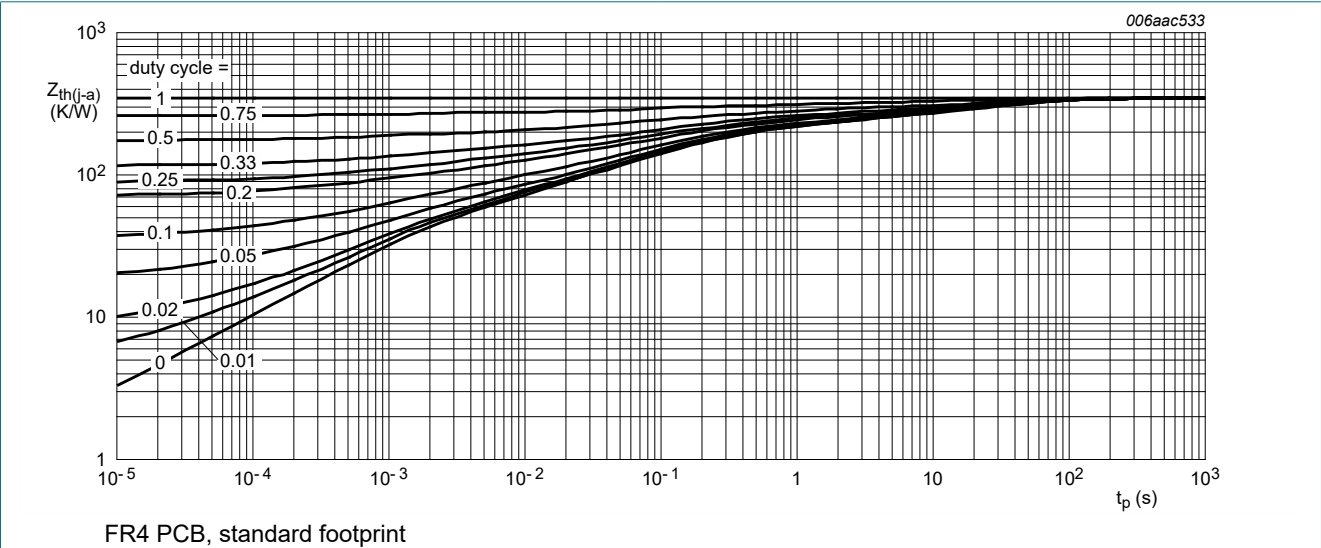


Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

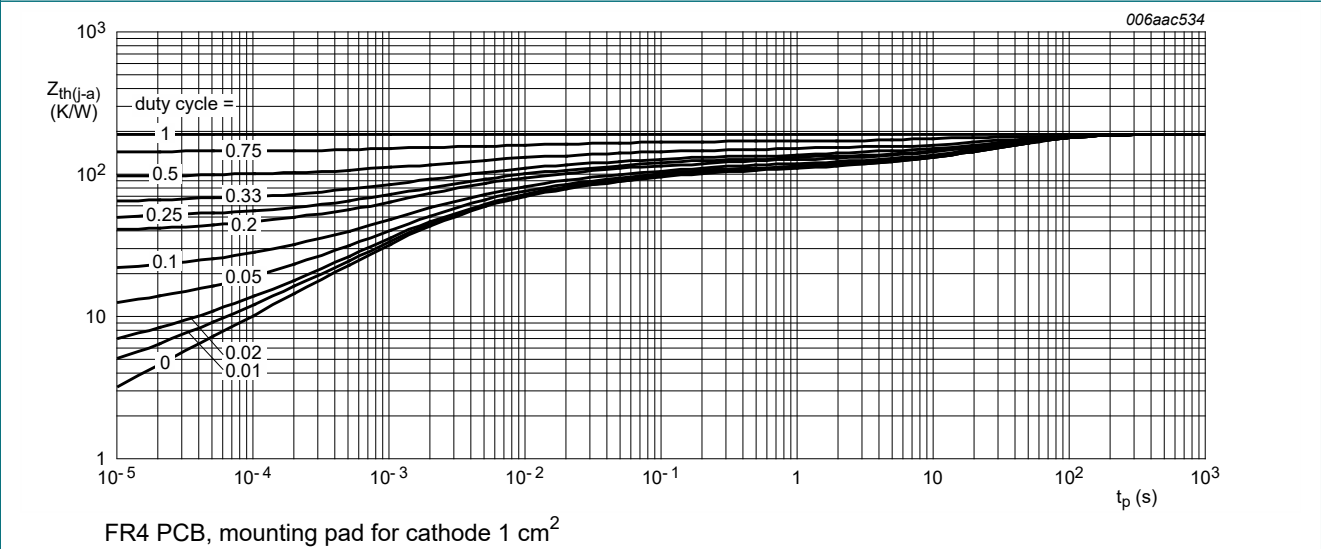
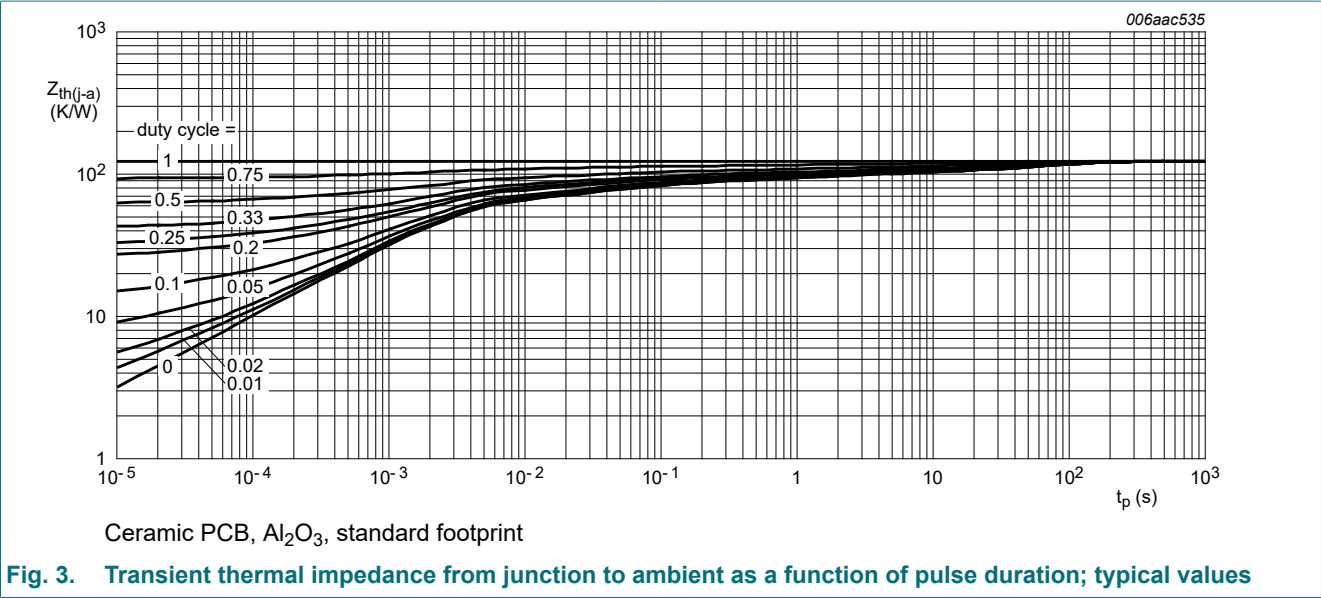


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values



10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	$I_F = 0.1\text{ mA}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed	-	210	-	mV
		$I_F = 1\text{ mA}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed	-	270	-	mV
		$I_F = 10\text{ mA}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed	-	330	450	mV
		$I_F = 100\text{ mA}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed	-	450	-	mV
		$I_F = 200\text{ mA}; t_p \leq 300\text{ }\mu\text{s}; \delta \leq 0.02;$ $T_j = 25\text{ }^\circ\text{C};$ pulsed	-	540	640	mV
I_R	reverse current	$V_R = 10\text{ V}; T_j = 25\text{ }^\circ\text{C}$	-	0.14	0.5	μA
C_d	diode capacitance	$V_R = 1\text{ V}; f = 1\text{ MHz}; T_j = 25\text{ }^\circ\text{C}$	-	10	-	pF

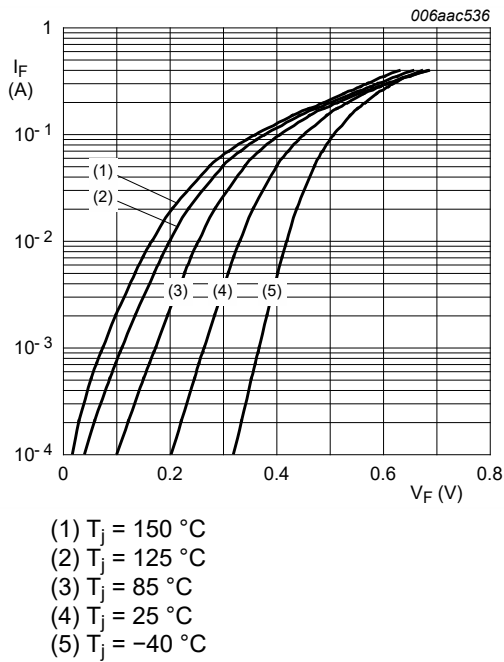


Fig. 4. Forward current as a function of forward voltage; typical values

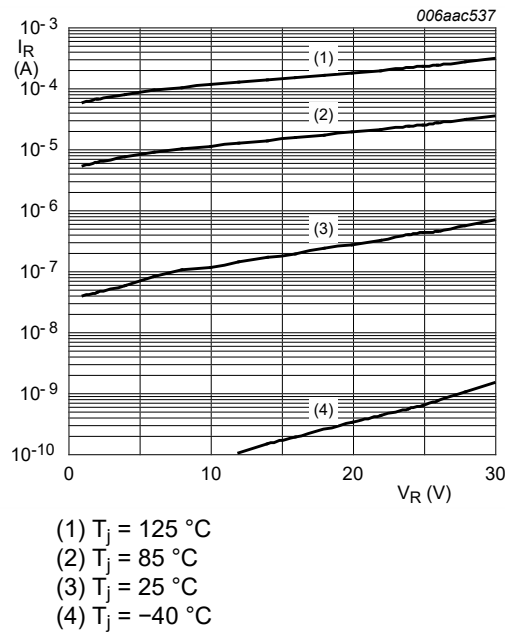


Fig. 5. Reverse current as a function of reverse voltage; typical values

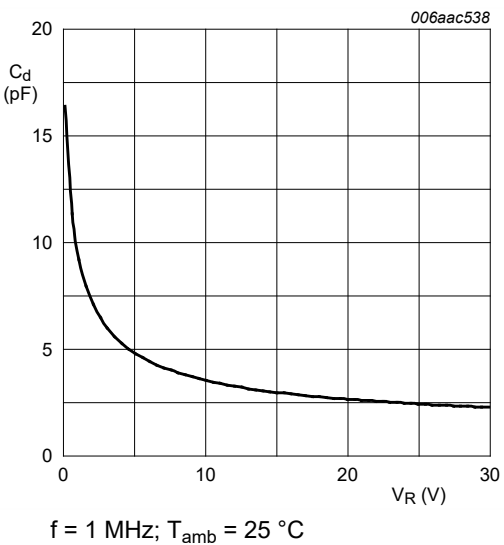


Fig. 6. Diode capacitance as a function of reverse voltage; typical values

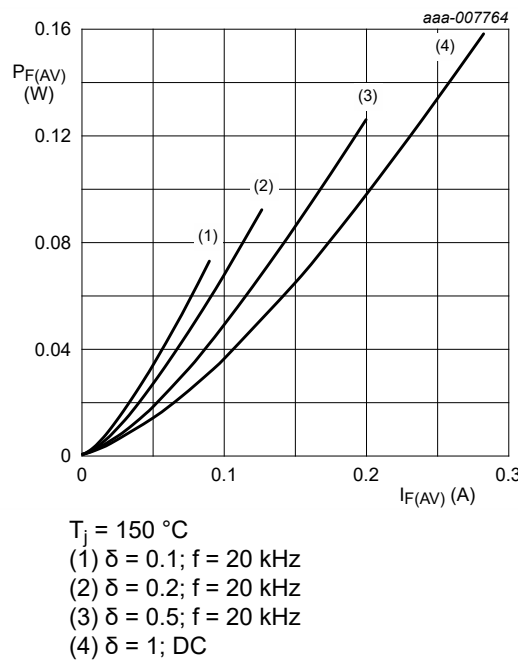
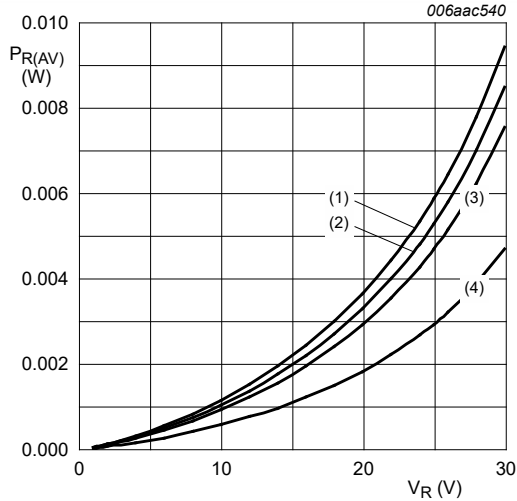
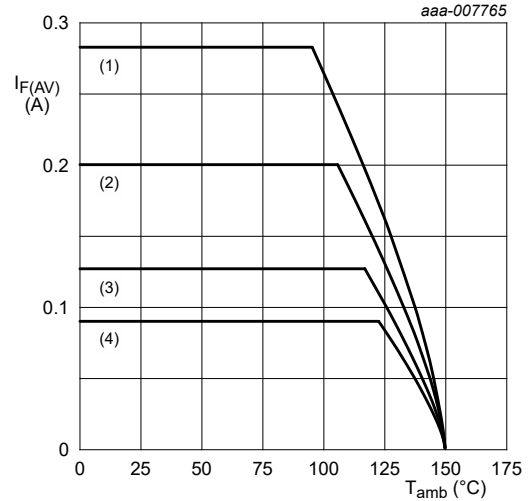


Fig. 7. Average forward power dissipation as a function of average forward current; typical values



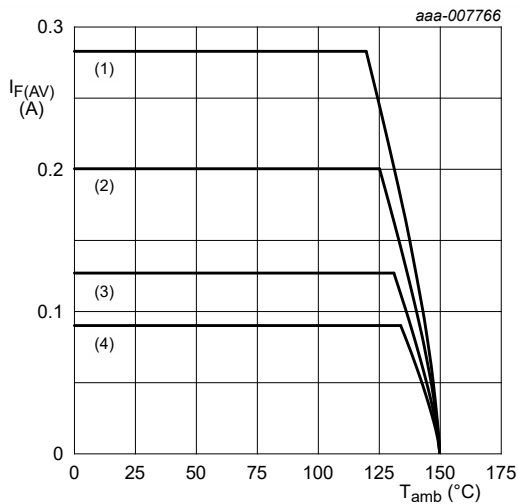
$T_j = 125\text{ }^{\circ}\text{C}$
 (1) $\delta = 1$; DC
 (2) $\delta = 0.9$; $f = 20\text{ kHz}$
 (3) $\delta = 0.8$; $f = 20\text{ kHz}$
 (4) $\delta = 0.5$; $f = 20\text{ kHz}$

Fig. 8. Average reverse power dissipation as a function of reverse voltage; typical values



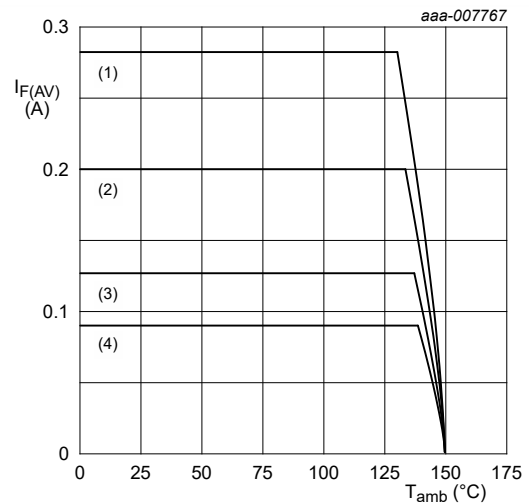
FR4 PCB, standard footprint
 $T_j = 150\text{ }^{\circ}\text{C}$
 (1) $\delta = 1$; DC
 (2) $\delta = 0.5$; $f = 20\text{ kHz}$
 (3) $\delta = 0.2$; $f = 20\text{ kHz}$
 (4) $\delta = 0.1$; $f = 20\text{ kHz}$

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



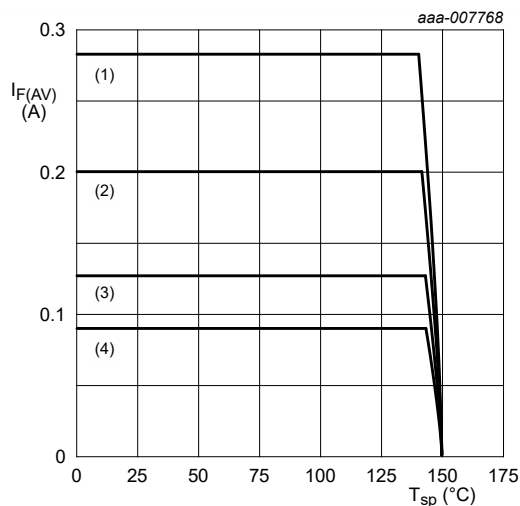
FR4 PCB, mounting pad for cathode 1 cm^2
 $T_j = 150\text{ }^{\circ}\text{C}$
 (1) $\delta = 1$; DC
 (2) $\delta = 0.5$; $f = 20\text{ kHz}$
 (3) $\delta = 0.2$; $f = 20\text{ kHz}$
 (4) $\delta = 0.1$; $f = 20\text{ kHz}$

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



Ceramic PCB, Al_2O_3 , standard footprint
 $T_j = 150\text{ }^{\circ}\text{C}$
 (1) $\delta = 1$; DC
 (2) $\delta = 0.5$; $f = 20\text{ kHz}$
 (3) $\delta = 0.2$; $f = 20\text{ kHz}$
 (4) $\delta = 0.1$; $f = 20\text{ kHz}$

Fig. 11. Average forward current as a function of ambient temperature; typical values



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

Fig. 12. Average forward current as a function of solder point temperature; typical values

11. Test information

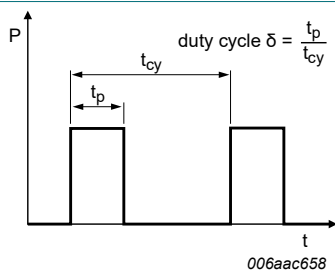


Fig. 13. Duty cycle definition

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

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

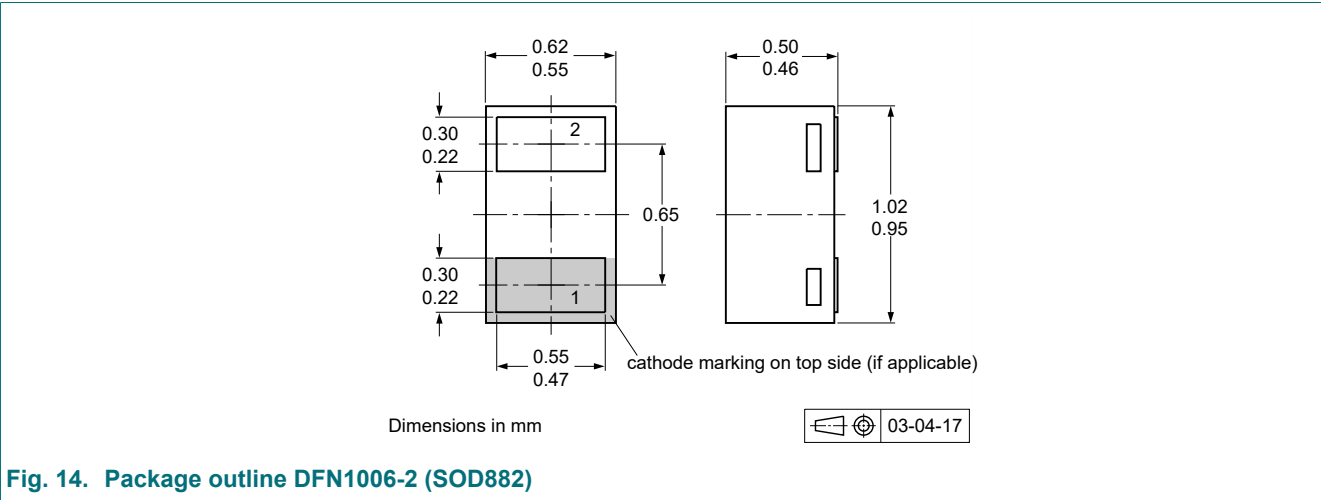
$$I_{RMS} = I_{F(AV)} \text{ at DC}$$

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

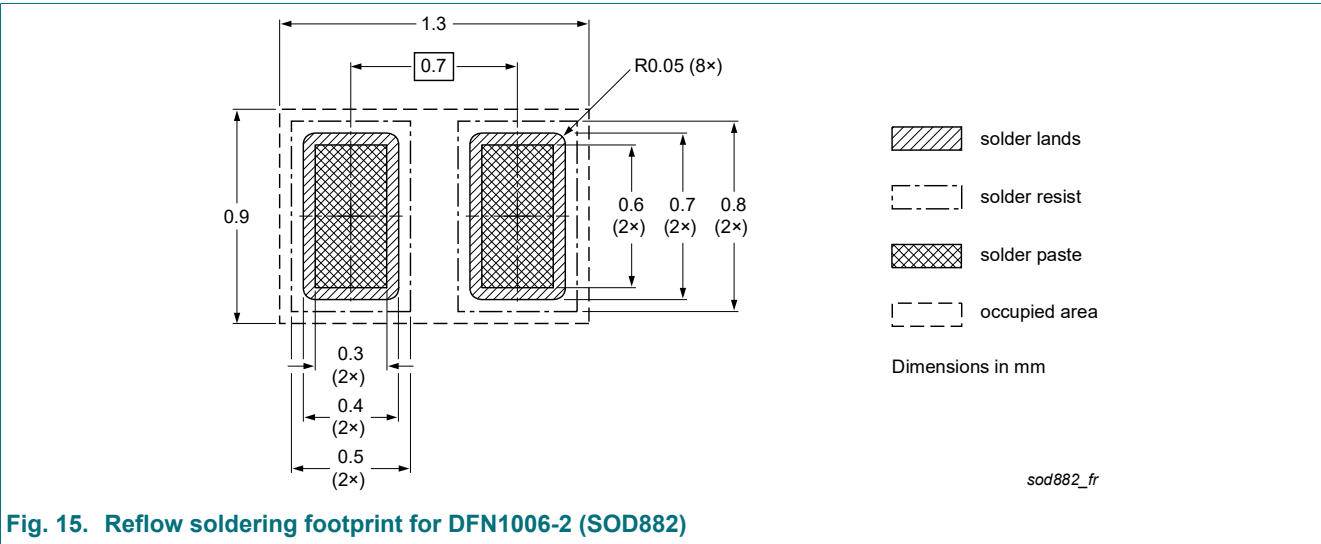
Quality information

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



13. Soldering



14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
RB520CS3002L-Q v.1	20250410	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.
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