BAV199QC

Low-leakage double diode

1 March 2024 **Product data sheet**

1. General description

Epitaxial, medium-speed switching, double diode in an ultra small DFN1412D-3 (SOT8009) leadless Surface-Mounted Device (SMD) plastic package with side-wettable flanks.

2. Features and benefits

- Switching time: t_{rr} = 0.8 µs
- Maximum leakage current: I_R = 5 nA
- Repetitive peak reverse voltage V_{RRM} ≤ 85 V
- Low capacitance C_d = 2 pF
- Ultra small SMD plastic package
- Low package height of 0.5 mm
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- Smaller footprint compared to conventional leaded SMD packages

3. Applications

- Low-leakage current applications
- 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	single diode loaded; T_{amb} = 25 °C		-	-	215	mA
V_R	reverse voltage	T_j = 25 °C		-	-	75	V
I_R	reverse current	V_R = 75 V; T_j = 25 °C		-	-	5	nA
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; $I_{R(meas)}$ = 1 mA; R_L = 100 Ω; T_{amb} = 25 °C		-	0.8	3	µs

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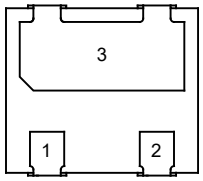
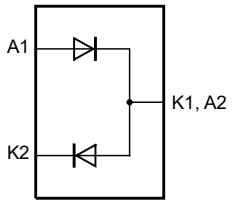
5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A1	anode (diode 1)	 Transparent top view **DFN1412D-3 (SOT8009)**	 *aaa-022858*
2	K2	cathode (diode 2)		
3	K1, A2	cathode (diode 1) and anode (diode 2)		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAV199QC	DFN1412D-3	plastic, leadless ultra small outline package with side-wettable flanks (SWF); 3 terminals; 0.8 mm pitch; 1.4 mm x 1.2 mm x 0.48 mm body	SOT8009

7. Marking

Table 4. Marking codes

Type number	Marking code
BAV199QC	G4

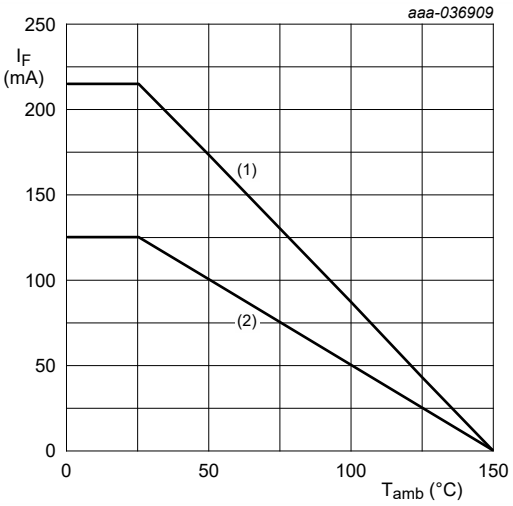
8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
V_R	reverse voltage	T_j = 25 °C		-	75	V
V_{RRM}	repetitive peak reverse voltage			-	85	V
I_F	forward current	single diode loaded; T_{amb} = 25 °C		-	215	mA
		double diode loaded; T_{amb} = 25 °C		-	125	mA
I_{FRM}	repetitive peak forward current	$t_p \leq$ 0.5 ms; $\delta \leq$ 0.25; T_j = 25 °C		-	1.5	A
I_{FSM}	non-repetitive peak forward current	t_p = 50 µs; square wave; $T_{j(init)}$ = 25 °C		-	9.1	A
		t_p = 10 ms; square wave; $T_{j(init)}$ = 25 °C		-	1.8	A
Per device; one diode loaded						
P_{tot}	total power dissipation	$T_{amb} \leq$ 25 °C	[1]	-	335	mW
			[2]	-	595	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 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.



Device mounted on an FR4 printed-circuit board.
(1) Single diode loaded
(2) Double diode loaded

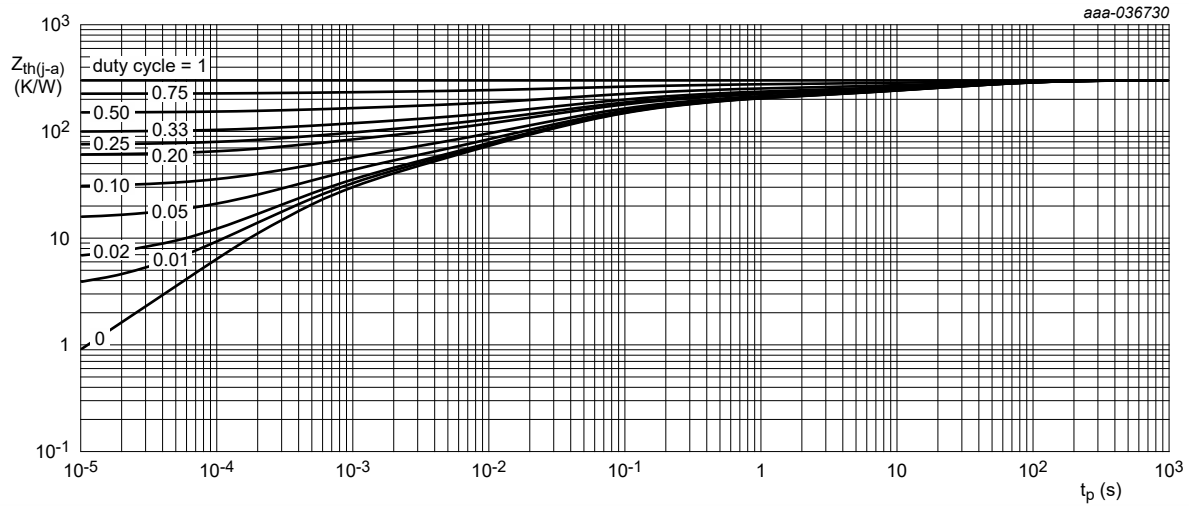
Fig. 1. Maximum permissible continuous forward current as a function of ambient temperature.

9. Thermal characteristics

Table 6. Thermal characteristics

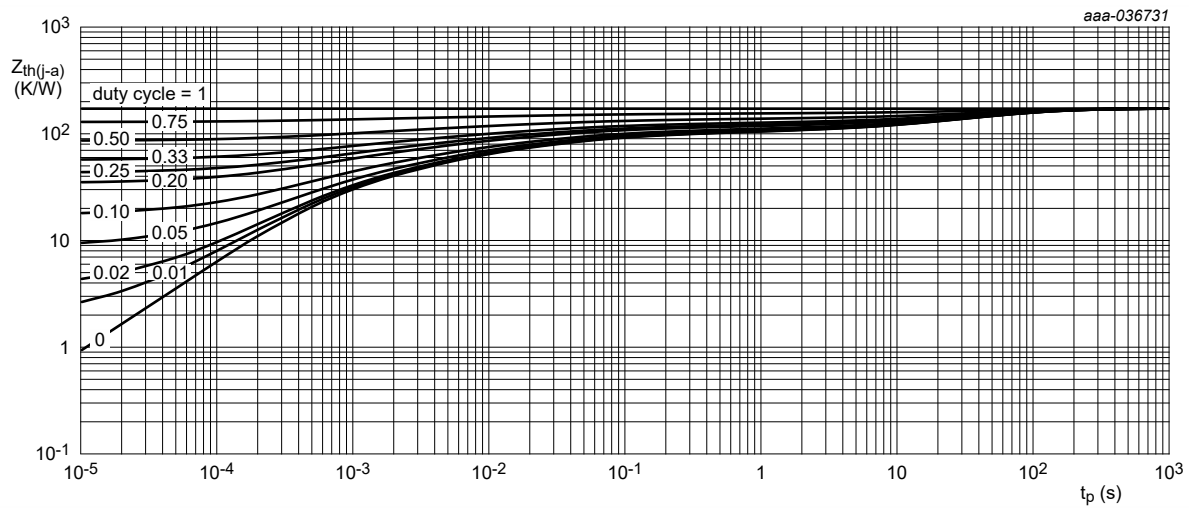
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	375	K/W
			[2]	-	-	210	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	50	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.
[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 1 cm^2.
[3] Soldering point of cathode tab.



FR4 PCB, standard footprint

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



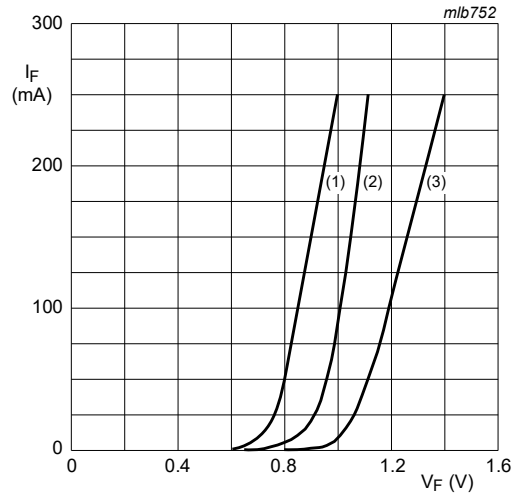
FR4 PCB, mounting pad for cathode 1 cm²

Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

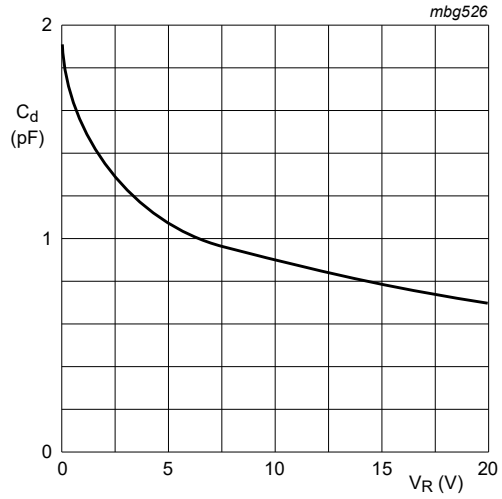
Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per diode							
V_F	forward voltage	I_F = 1 mA; T_j = 25 °C		-	-	0.9	V
		I_F = 10 mA; T_j = 25 °C		-	-	1	V
		I_F = 50 mA; T_j = 25 °C		-	-	1.1	V
		I_F = 150 mA; T_j = 25 °C		-	-	1.25	V
I_R	reverse current	V_R = 75 V; T_j = 25 °C		-	-	5	nA
		V_R = 75 V; T_j = 150 °C		-	-	80	nA
C_d	diode capacitance	V_R = 0 V; f = 1 MHz; T_j = 25 °C		-	2	-	pF
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; $I_{R(meas)}$ = 1 mA; R_L = 100 Ω; T_{amb} = 25 °C		-	0.8	3	µs



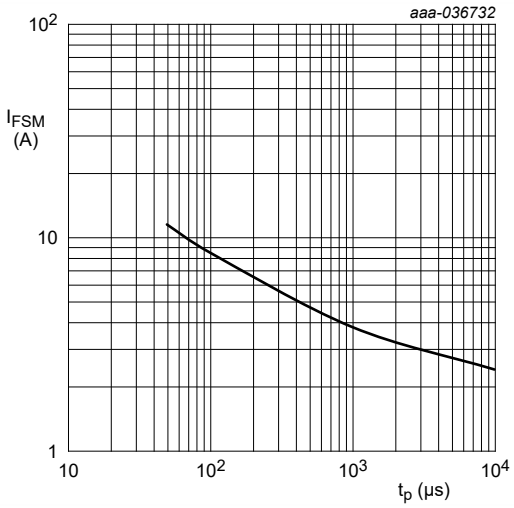
(1) T_{amb} = 150 °C; typical values
(2) T_{amb} = 25 °C; typical values
(3) T_{amb} = 25 °C; maximum values

Fig. 4. Forward current as a function of forward voltage; per diode



f = 1 MHz; T_{amb} = 25 °C

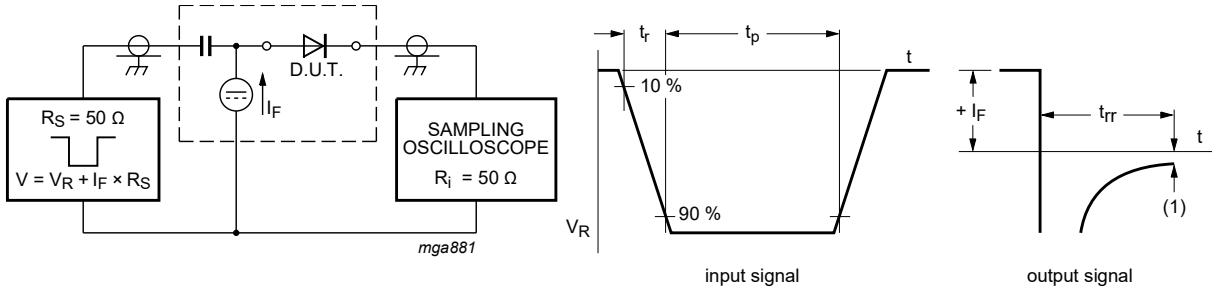
Fig. 5. Diode capacitance as a function of reverse voltage; typical values



Based on square wave currents.
$T_{j(init)}$ = 25 °C

Fig. 6. Non-repetitive peak forward current as a function of pulse duration; typical values

11. Test information



(1) I_R = 1 mA

Fig. 7. Reverse recovery time test circuit and waveforms

12. Package outline

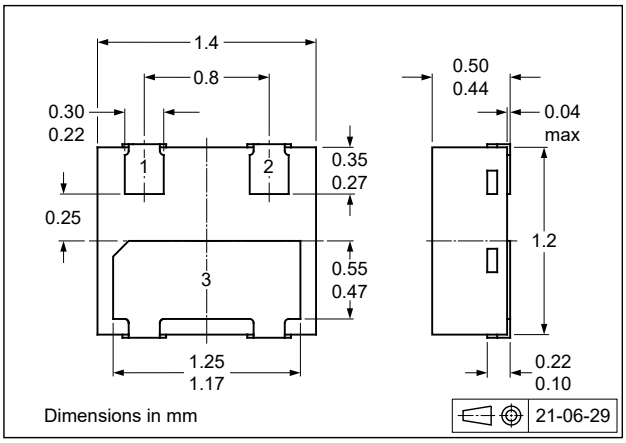


Fig. 8. Package outline DFN1412D-3 (SOT8009)

13. Soldering

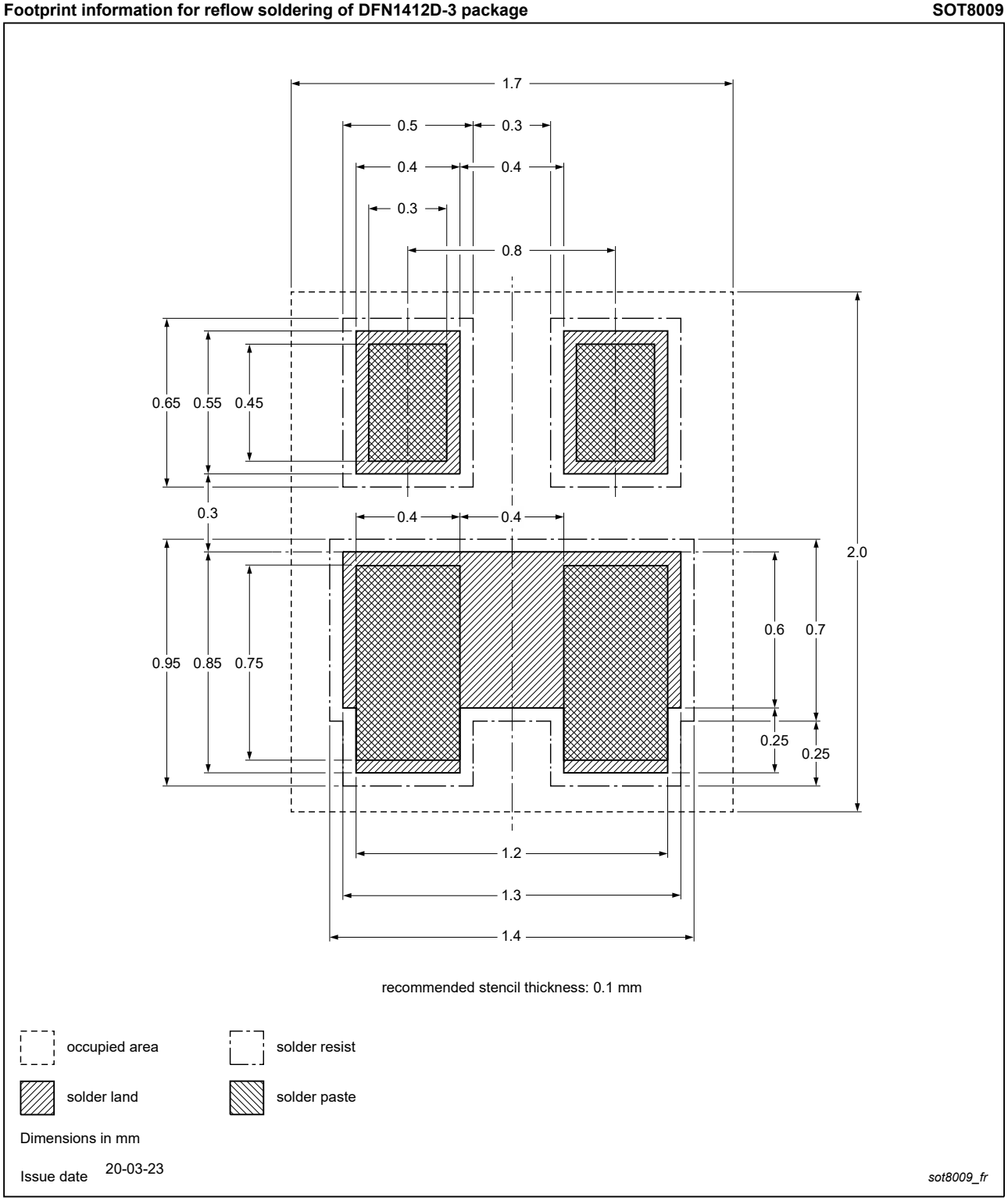


Fig. 9. Reflow soldering footprint for DFN1412D-3 (SOT8009)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAV199QC v.1	20230301	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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