BAT54QC

Schottky barrier diode

27 November 2020 **Product data sheet**

1. General description

Planar Schottky barrier diode encapsulated in an ultra small DFN1412D-3 (SOT8009, JEDEC MO340-CA) leadless Surface-Mounted Device (SMD) plastic package with side-wettable flanks.

2. Features and benefits

- Low forward voltage
- Low capacitance
- Leadless ultra small SMD plastic package
- Low package height of 0.5 mm
- Suitable for Automatic Optical Inspection (AOI) of solder joint
- AEC-Q101 qualified

3. Applications

- Ultra high-speed switching
- Voltage clamping
- Protection circuits

4. Quick reference data

Table 1. Quick reference data

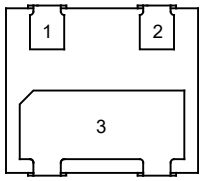
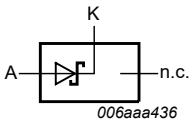
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_R	reverse voltage			-	-	30	V
V_F	forward voltage	I_F = 100 mA; T_{amb} = 25 °C	[1]	-	-	800	mV
I_R	reverse current	V_R = 25 V; T_{amb} = 25 °C	[1]	-	-	2	µA

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

nexperia

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 Bottom view **DFN1412D-3 (SOT8009)**	
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BAT54QC	DFN1412D-3	plastic, leadless extremely thin 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
BAT54QC	9B

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	forward current	$T_{amb} \leq 25$ °C		-	200	mA
I_{FRM}	repetitive peak forward current	$t_p \leq 1$ s; $\delta \leq 0.5$; $T_{amb} = 25$ °C		-	300	mA
I_{FSM}	non-repetitive peak forward current	square-wave pulse; $t_p \leq 10$ ms; $T_{j(init)} = 25$ °C		-	600	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[1]	-	415	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	150	°C
T_{stg}	storage temperature			-65	150	°C

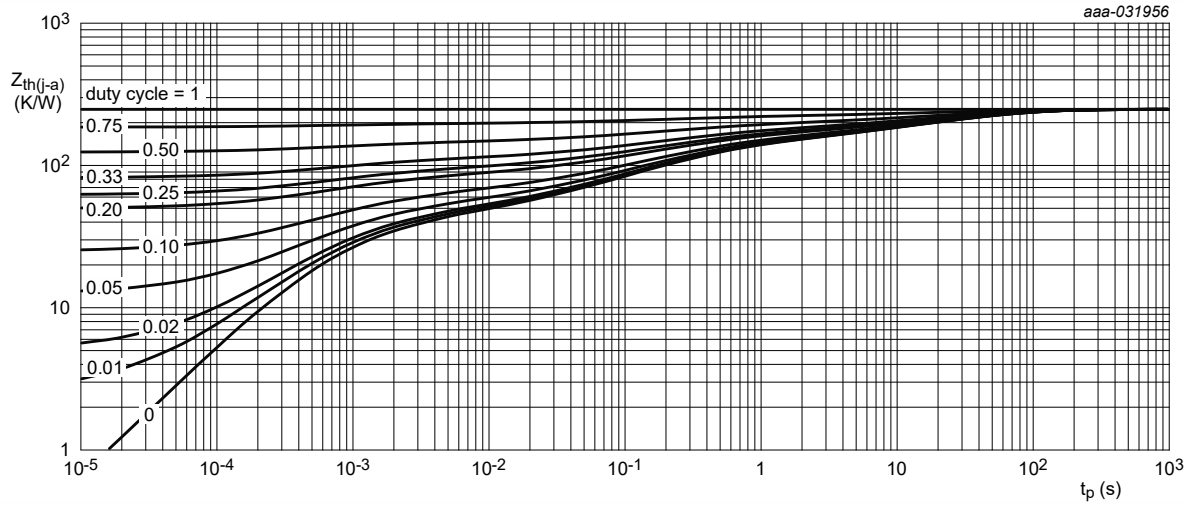
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 70 µm copper, tin-plated and standard footprint.

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]	-	-	290	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 70 µm copper, tin-plated and standard footprint.
[2] For Schottky barrier diodes thermal runaway has to be considered, as in some applications the reverse power losses PR are a significant part of the total power losses.



FR4 PCB, single-sided 70 µm copper, standard footprint

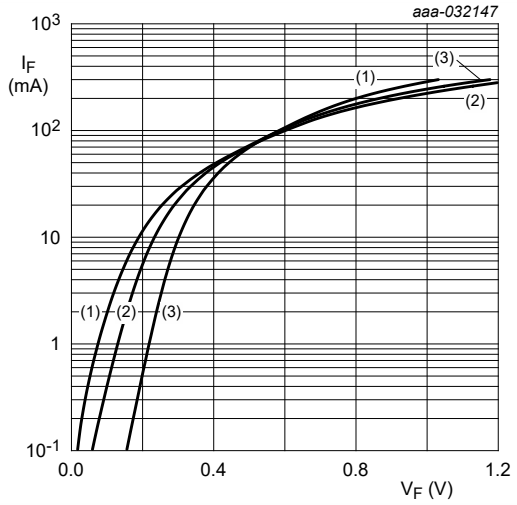
Fig. 1. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

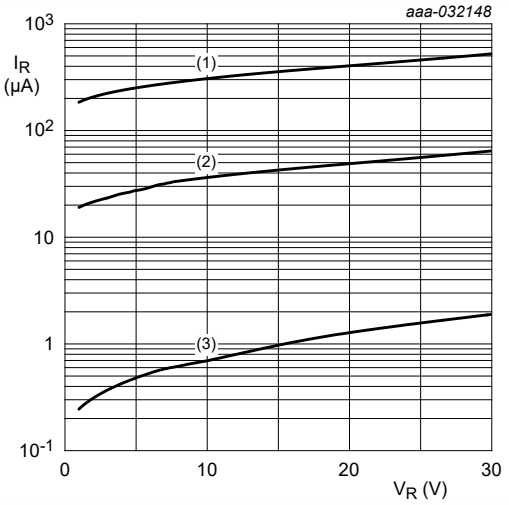
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 0.1 mA; T_{amb} = 25 °C	[1]	-	-	240	mV
		I_F = 1 mA; T_{amb} = 25 °C	[1]	-	-	320	mV
		I_F = 10 mA; T_{amb} = 25 °C	[1]	-	-	400	mV
		I_F = 30 mA; T_{amb} = 25 °C	[1]	-	-	500	mV
		I_F = 100 mA; T_{amb} = 25 °C	[1]	-	-	800	mV
I_R	reverse current	V_R = 25 V; T_{amb} = 25 °C	[1]	-	-	2	µA
C_d	diode capacitance	V_R = 1 V; f = 1 MHz; T_{amb} = 25 °C		-	-	10	pF
t_{rr}	reverse recovery time	I_F = 10 mA; I_R = 10 mA; R_L = 100 Ω; $I_{R(meas)}$ = 1 mA; T_{amb} = 25 °C		-	-	5	ns

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



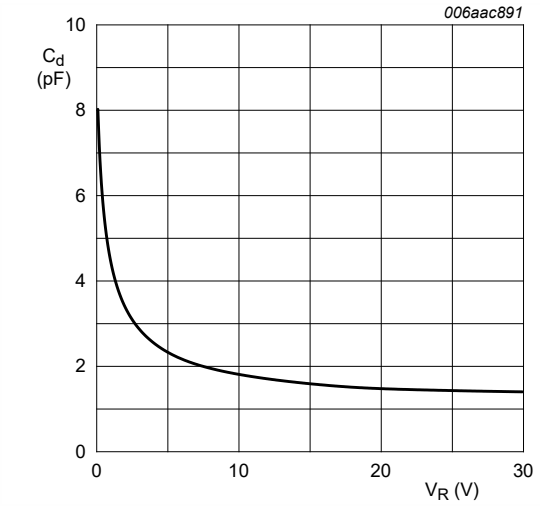
Pulsed condition
(1) T_{amb} = 125 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C

Fig. 2. Forward current as a function of forward voltage; typical values



Pulsed condition
(1) T_{amb} = 125 °C
(2) T_{amb} = 85 °C
(3) T_{amb} = 25 °C

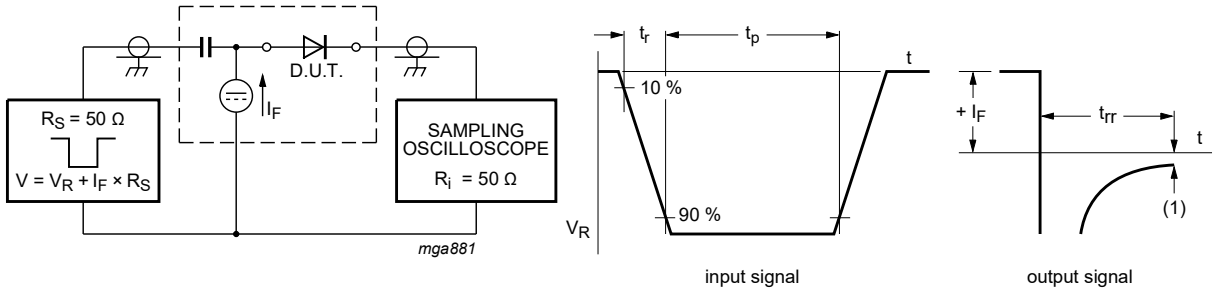
Fig. 3. Reverse current as a function of reverse voltage; typical values



T_{amb} = 25 °C; f = 1 MHz

Fig. 4. Diode capacitance as a function of reverse voltage; typical values

11. Test information



(1) I_R = 1 mA

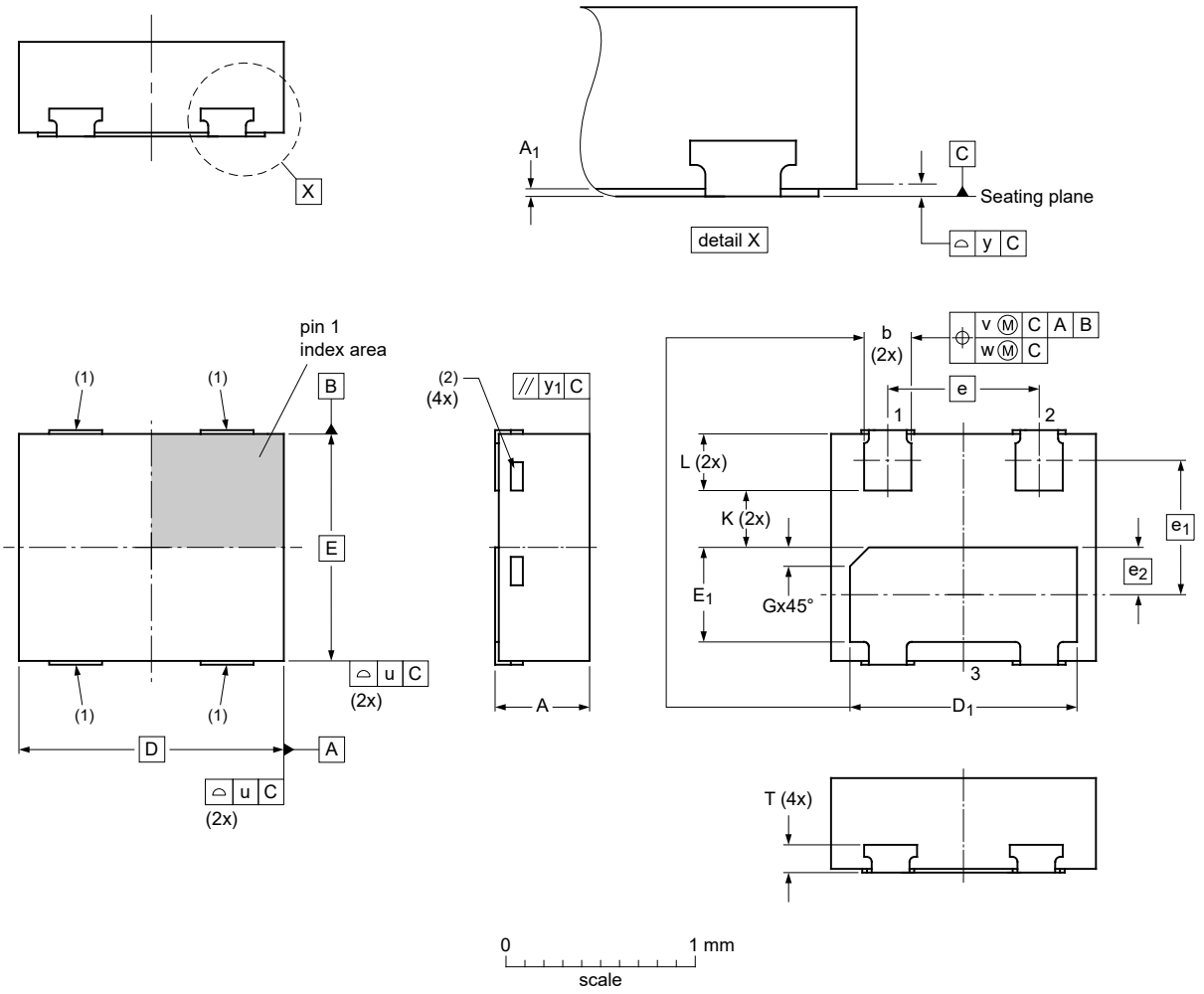
Fig. 5. Reverse recovery time test circuit and waveforms

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

DFN1412D-3: plastic, leadless extremely thin 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**



Dimensions (mm are the original dimensions)

Unit		A	A_1	b	D	D_1	E	E_1	e	e_1	e_2	G	K	L	T	u	v	w	y	y1
	max	0.50	0.04	0.30		1.25		0.55						0.35	0.22					
mm	nom	0.47		0.25	1.4	1.20	1.2	0.50	0.8	0.71	0.26	0.09 (ref)		0.30	0.16	0.05	0.1	0.05	0.05	0.05
	min	0.44		0.22		1.17		0.47					0.25	0.27	0.10					

Note
1. Side Wettable Flank, protrusion max. 0.02 mm.
2. Visible depend upon used manufacturing technology.
Dimension A and T are including plating thickness.

sot8009_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT8009		MO-340CA				~~19-12-04~~ 19-12-06

Fig. 6. Package outline DFN1412D-3 (SOT8009)

13. Soldering

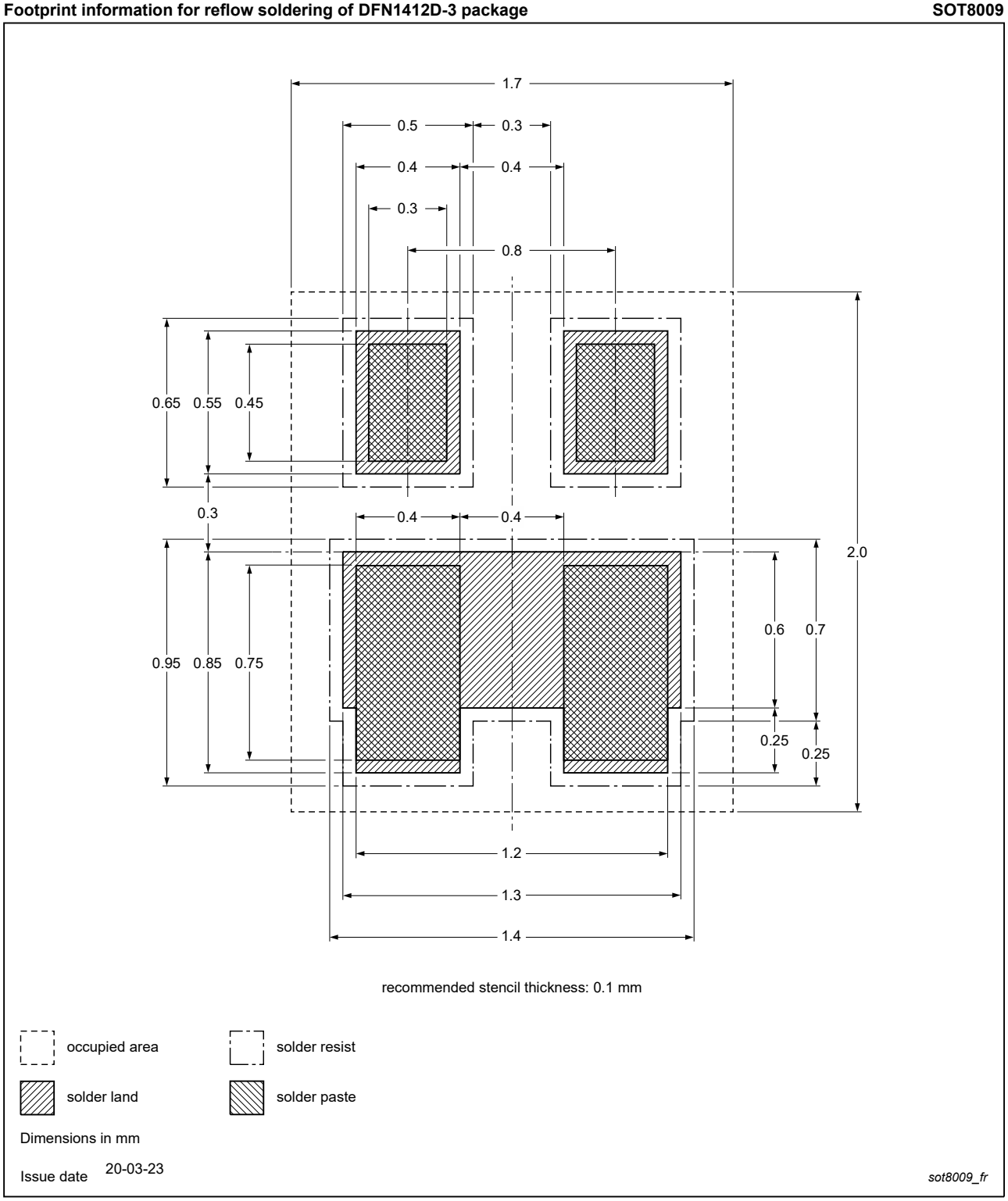


Fig. 7. Reflow soldering footprint for DFN1412D-3 (SOT8009)

14. Revision history

Table 8. Revision history

Data sheet ID	Release date	Data sheet status	Change notice	Supersedes
BAT54QC v.1	20201127	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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