



BAT54QB-Q

Schottky barrier diode

5 May 2021

Product data sheet

1. General description

Planar Schottky barrier diode encapsulated in an ultra small DFN1110D-3 (SOT8015, JEDEC MO340-BA) 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
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

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

4. Quick reference data

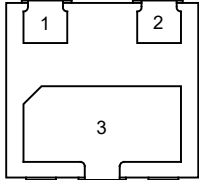
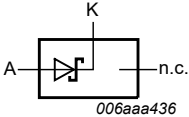
Table 1. Quick reference data

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

[1] Pulse test: $t_p \leq 300 \text{ } \mu\text{s}$; $\delta \leq 0.02$

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|---------------|---|---|
| 1 | A | anode |  <p>DFN1110D-3 (SOT8015)</p> |  |
| 2 | n.c. | not connected | | |
| 3 | K | cathode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------|------------|--|---------|
| | Name | Description | Version |
| BAT54QB-Q | DFN1110D-3 | plastic, leadless extremely thin small outline package with side-wettable flanks (SWF); 3 terminals; 0.65 mm pitch; 1.1 mm x 1 mm x 0.48 mm body | SOT8015 |

7. Marking

Table 4. Marking codes

| Type number | Marking code |
|-------------|--------------|
| BAT54QB-Q | B7 |

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 | $T_{amb} \leq 25\text{ °C}$ | | - | 200 | mA |
| I_{FRM} | repetitive peak forward current | $t_p \leq 1\text{ s}$; $\delta \leq 0.5$; $T_{amb} = 25\text{ °C}$ | | - | 300 | mA |
| I_{FSM} | non-repetitive peak forward current | square-wave pulse; $t_p \leq 10\text{ ms}$; $T_{j(init)} = 25\text{ °C}$ | | - | 600 | mA |
| P_{tot} | total power dissipation | $T_{amb} \leq 25\text{ °C}$ | [1] | - | 400 | mW |
| T_j | junction temperature | | | - | 150 | °C |
| T_{amb} | ambient temperature | | | -55 | 150 | °C |
| T_{stg} | storage temperature | | | -65 | 150 | °C |

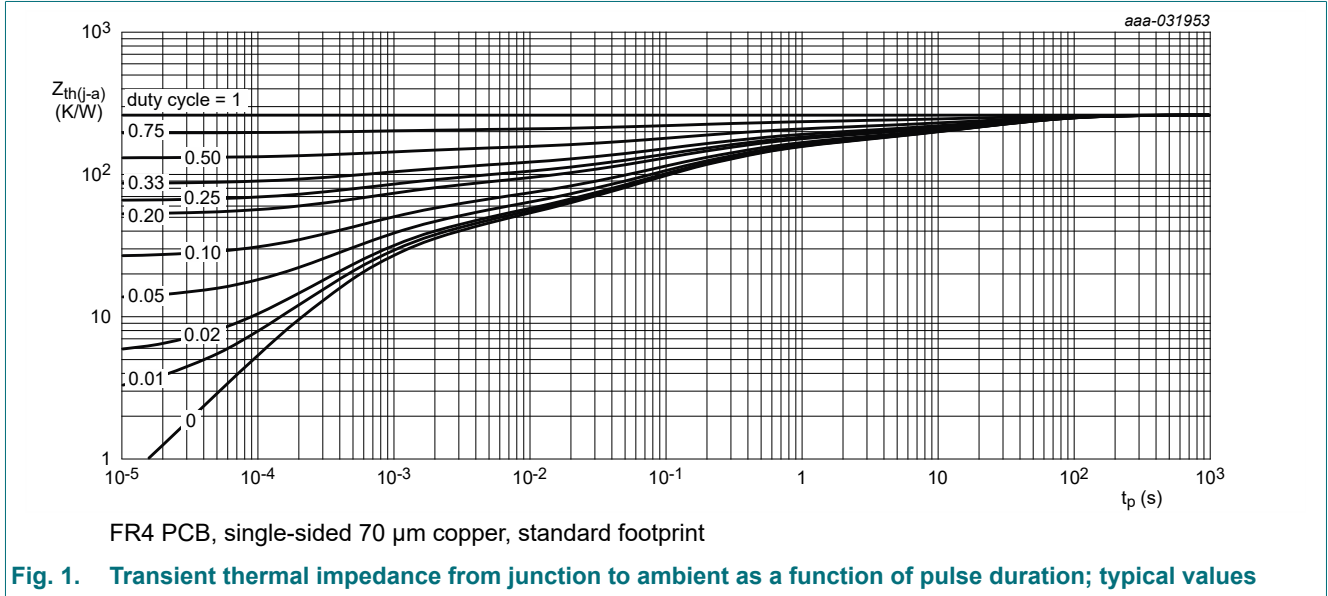
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided 70 μm copper, tin-plated and standard footprint.

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] | - | - | 305 | 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.

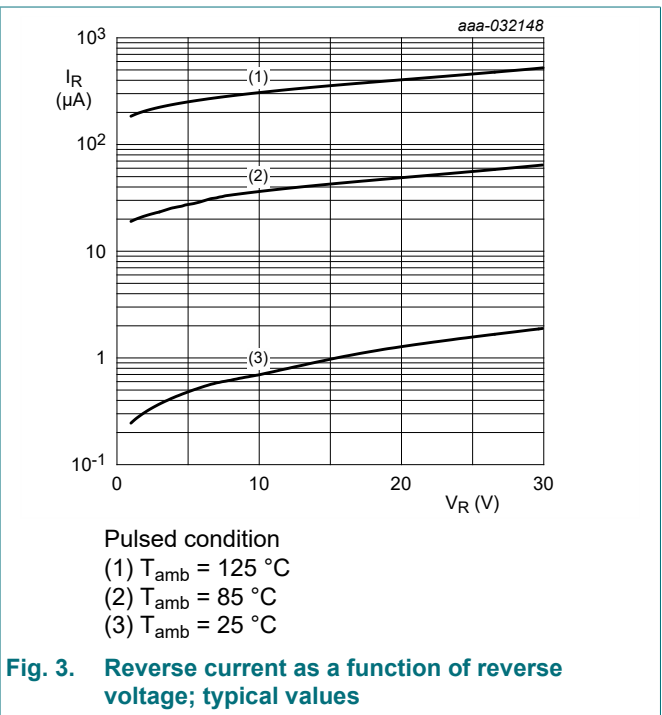
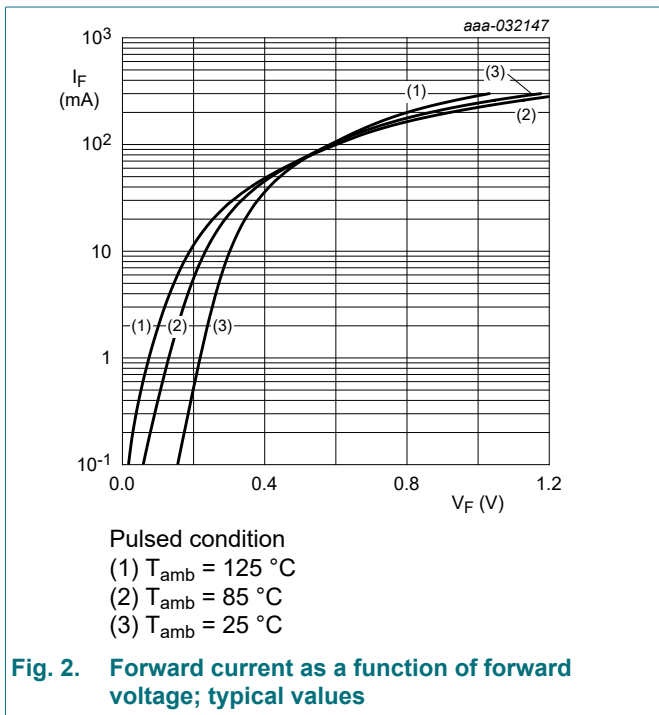


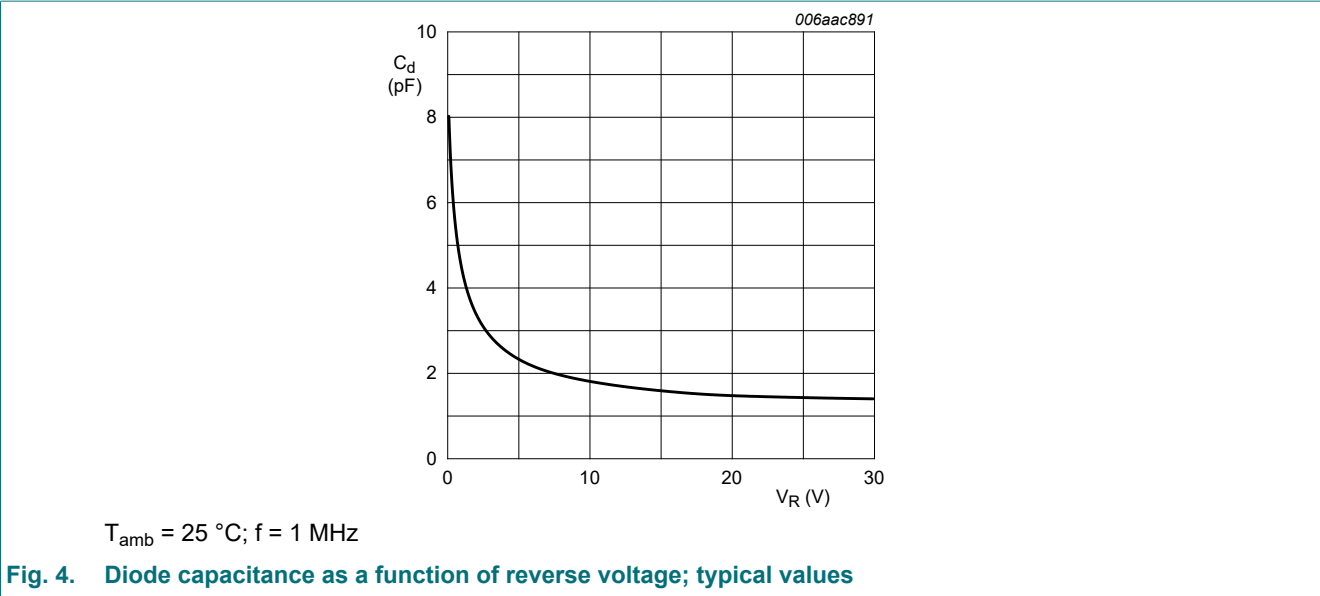
10. Characteristics

Table 7. Characteristics

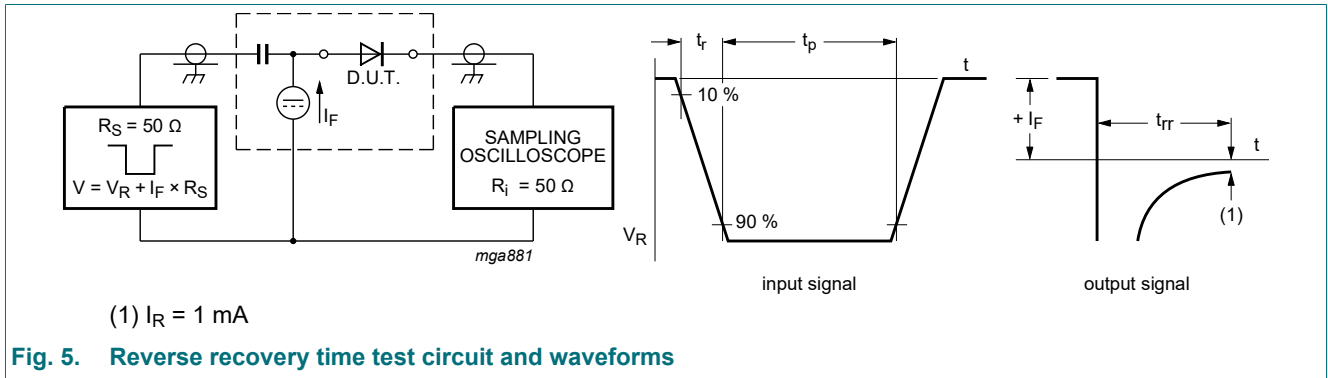
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit | |
|-----------------|-----------------------|--|-----|-----|-----|------|----|
| V _F | forward voltage | I _F = 0.1 mA; T _{amb} = 25 °C | [1] | - | - | 240 | mV |
| | | I _F = 1 mA; T _{amb} = 25 °C | [1] | - | - | 320 | mV |
| | | I _F = 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 ≤ 300 μs; δ ≤ 0.02





11. Test information



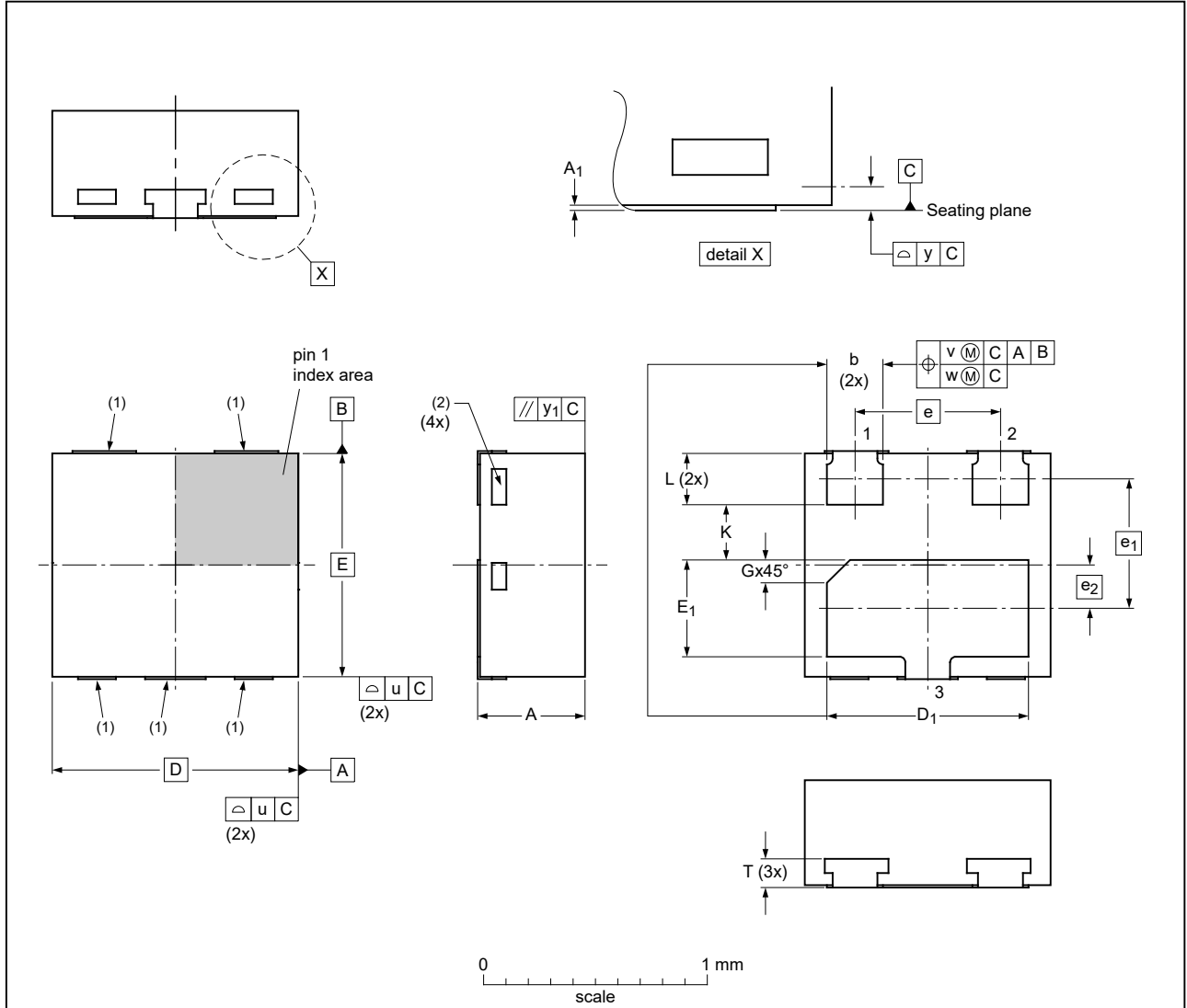
Quality information

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

DFN1110D-3: plastic, leadless extremely thin small outline package with side-wettable flanks (SWF); 3 terminals; 0.65 mm pitch; 1.1 mm x 1 mm x 0.48 mm body

SOT8015



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 | y ₁ |
|------|------|----------------|------|-----|----------------|---|----------------|------|----------------|----------------|------------|-----|------|------|------|-----|------|------|----------------|
| max | 0.50 | 0.040 | 0.30 | | 0.95 | | 0.48 | | | | | | 0.27 | 0.22 | | | | | |
| nom | 0.47 | 0.020 | 0.25 | 1.1 | 0.90 | 1 | 0.43 | 0.65 | 0.58 | 0.19 | 0.09 (ref) | | 0.23 | 0.16 | 0.05 | 0.1 | 0.05 | 0.05 | 0.05 |
| min | 0.44 | 0.005 | 0.22 | | 0.87 | | 0.40 | | | | | 0.2 | 0.20 | 0.10 | | | | | |

Note

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

sot8015_po

| Outline version | References | | | | European projection | Issue date |
|-----------------|------------|----------|-------|--|---------------------|----------------------|
| | IEC | JEDEC | JEITA | | | |
| SOT8015 | | MO-340BA | | | | 19-12-02 19-12-04 |

Fig. 6. Package outline DFN1110D-3 (SOT8015)

13. Soldering

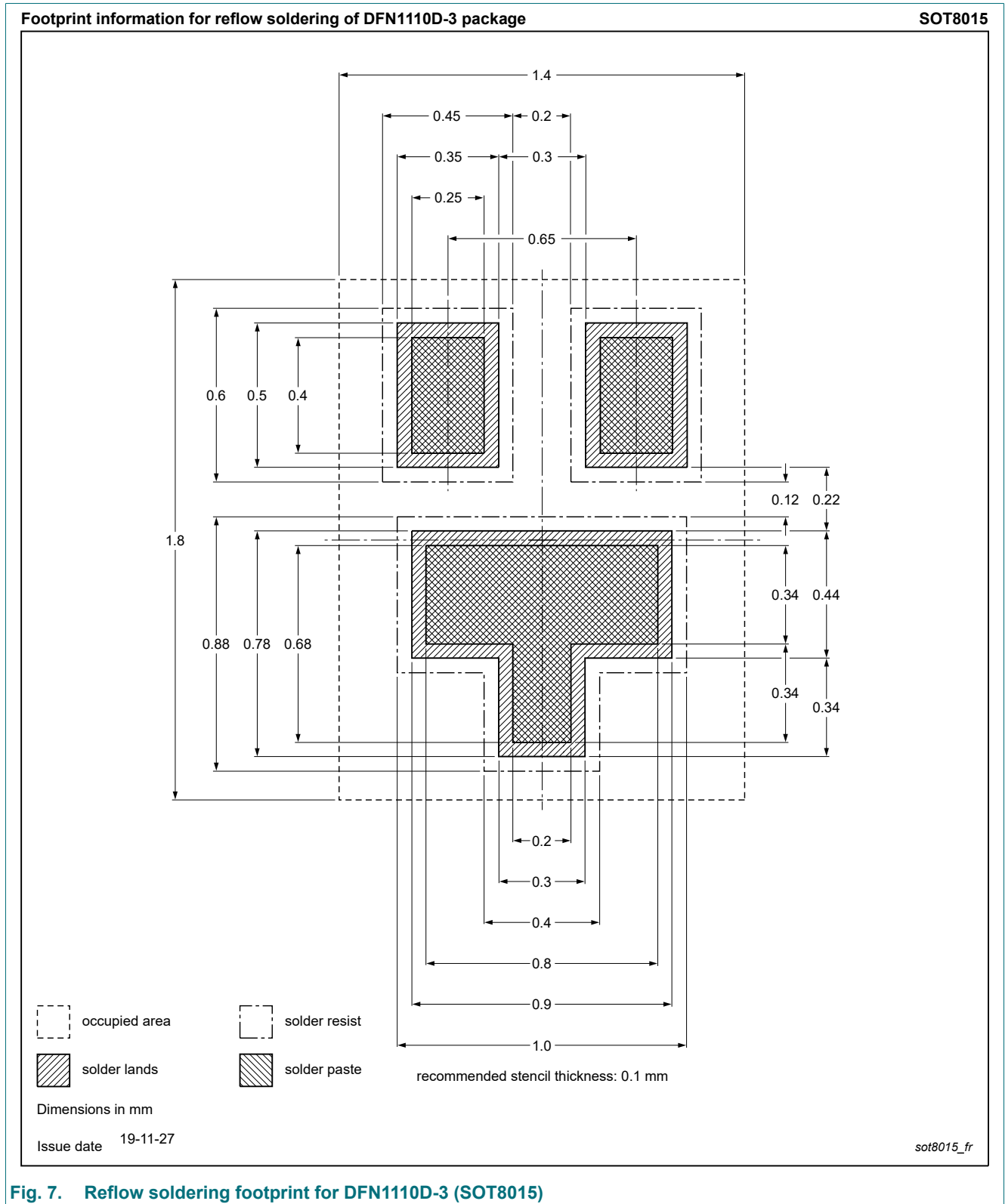


Fig. 7. Reflow soldering footprint for DFN1110D-3 (SOT8015)

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|--------------------|---------------|---------------|
| BAT54QB-Q v.2 | 20210505 | Product data sheet | - | BAT54QB-Q v.1 |
| Modifications: | • Features and benefits: added recommendation for automotive applications | | | |
| BAT54QB-Q v.1 | 20210331 | 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. |

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