



BAW56QB

Dual common anode high-speed switching diode

11 October 2024

Product data sheet

1. General description

Dual common anode high-speed switching diode encapsulated in a leadless ultra small DFN1110D-3 (SOT8015) Surface-Mounted Device (SMD) plastic package with visible and solderable side pads.

2. Features and benefits

- High switching speed: $t_{rr} \leq 4$ ns
- Low leakage current
- Reverse voltage $V_R \leq 90$ V
- Low capacitance $C_d \leq 2$ pF
- Ultra small SMD plastic package
- Low package height of 0.37 mm
- Suitable for Automatic Optical Inspection (AOI) of solder joint

3. Applications

- High-speed switching
- General-purpose switching

4. Quick reference data

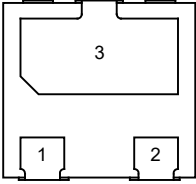
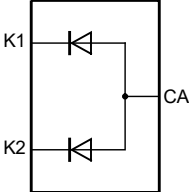
Table 1. Quick reference data

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|-----------|-----------------------|---|-----|-----|-----|------|------|
| Per diode | | | | | | | |
| I_F | forward current | single diode loaded; $T_{amb} = 25$ °C | [1] | - | - | 310 | mA |
| V_R | reverse voltage | $T_j = 25$ °C | | - | - | 90 | V |
| V_F | forward voltage | $I_F = 150$ mA; $T_j = 25$ °C | | - | - | 1.25 | V |
| I_R | reverse current | $V_R = 80$ V; $T_j = 25$ °C | | - | - | 0.5 | µA |
| 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 | | - | - | 4 | ns |

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

5. Pinning information

Table 2. Pinning information

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------------|--|---|
| 1 | K1 | cathode (diode 1) |  <p>Transparent top view DFN1110D-3 (SOT8015)</p> |  <p>aaa-020726</p> |
| 2 | K2 | cathode (diode 2) | | |
| 3 | CA | common anode | | |

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|-------------------------|------------|--|-------------------------|
| | Name | Description | Version |
| BAW56QB | 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

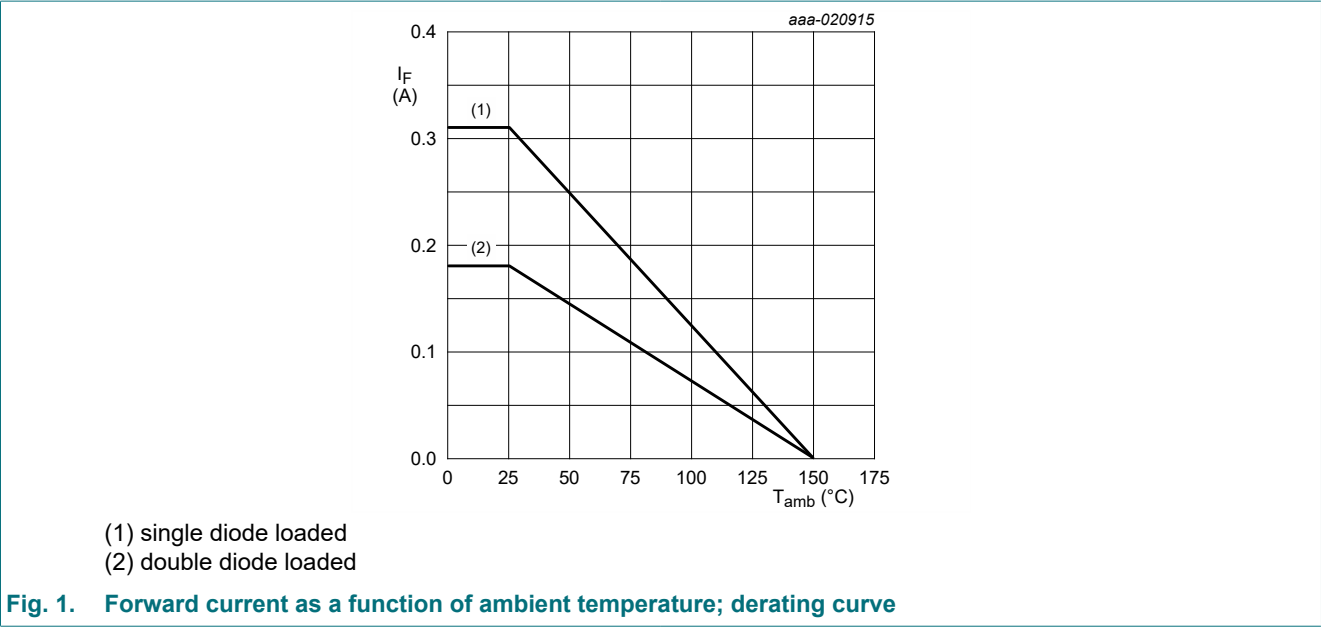
| Type number | Marking code |
|-------------|--------------|
| BAW56QB | G7 |

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 | | - | 90 | V |
| I _F | forward current | single diode loaded; T _{amb} = 25 °C | [1] | - | 310 | mA |
| | | double diode loaded; T _{amb} = 25 °C | [1] | - | 180 | mA |
| I _{FRM} | repetitive peak forward current | t _p ≤ 0.5 ms; δ ≤ 0.25; T _j = 25 °C | | - | 1.5 | A |
| I _{FSM} | non-repetitive peak forward current | t _p = 100 μs; square wave; T _{j(init)} = 25 °C | | - | 5 | A |
| | | t _p = 1 ms; square wave; T _{j(init)} = 25 °C | | - | 3 | A |
| | | t _p = 10 ms; square wave; T _{j(init)} = 25 °C | | - | 1 | A |
| Per device; one diode loaded | | | | | | |
| P _{tot} | total power dissipation | T _{amb} ≤ 25 °C | [1] | - | 435 | mW |
| | | | [2] | - | 735 | 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 cm².



9. Thermal characteristics

Table 6. Thermal characteristics

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|----------------|--|------------|-----|-----|-----|-----|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | | [1] | - | - | 285 | K/W |
| | | | [2] | - | - | 170 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | | [3] | - | - | 40 | 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 cm².
[3] Soldering point of cathode tab.

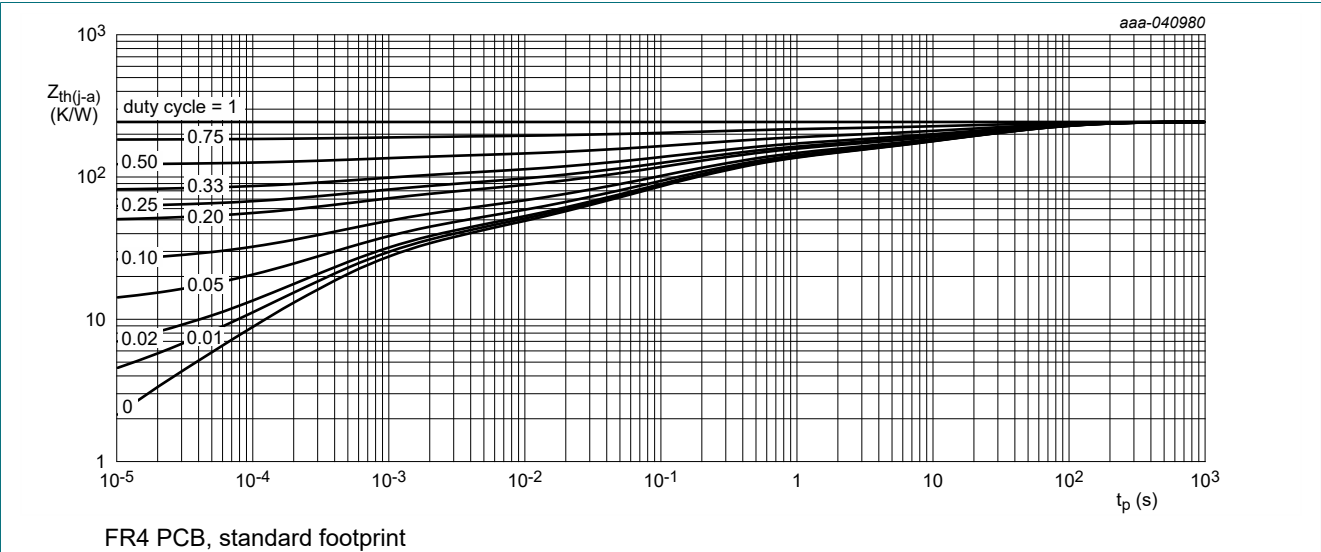


Fig. 2. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

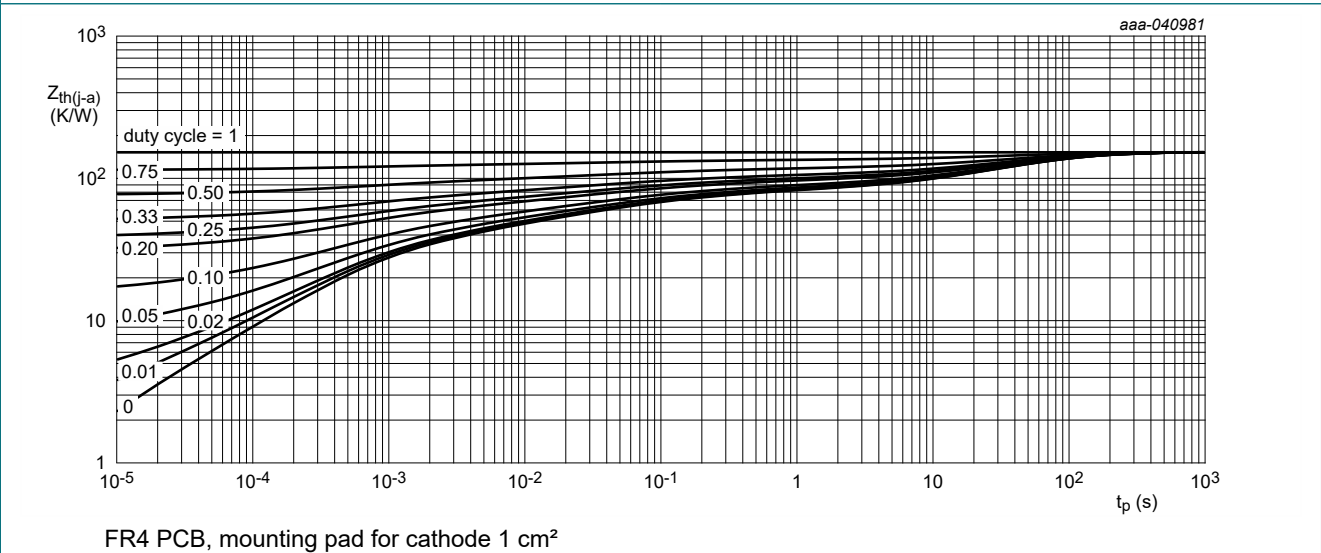


Fig. 3. Transient thermal impedance from junction to ambient as a function of pulse duration; typical values

10. Characteristics

Table 7. Characteristics

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|-------------------------------|--|-----|-----|------|---------------|
| Per diode | | | | | | |
| V_F | forward voltage | $I_F = 1\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$ | - | - | 715 | mV |
| | | $I_F = 10\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$ | - | - | 855 | mV |
| | | $I_F = 50\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$ | - | - | 1 | V |
| | | $I_F = 150\text{ mA}; T_j = 25\text{ }^{\circ}\text{C}$ | - | - | 1.25 | V |
| I_R | reverse current | $V_R = 25\text{ V}; T_j = 25\text{ }^{\circ}\text{C}$ | - | - | 30 | nA |
| | | $V_R = 80\text{ V}; T_j = 25\text{ }^{\circ}\text{C}$ | - | - | 0.5 | μA |
| | | $V_R = 25\text{ V}; T_j = 150\text{ }^{\circ}\text{C}$ | - | - | 30 | μA |
| | | $V_R = 80\text{ V}; T_j = 150\text{ }^{\circ}\text{C}$ | - | 90 | - | μA |
| C_d | diode capacitance | $V_R = 0\text{ V}; f = 1\text{ MHz}; T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$ | - | - | 2 | pF |
| t_{rr} | reverse recovery time | $I_F = 10\text{ mA}; I_R = 10\text{ mA}; I_{R(\text{meas})} = 1\text{ mA}; R_L = 100\text{ }\Omega; T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$ | - | - | 4 | ns |
| V_{FRM} | peak forward recovery voltage | $I_F = 10\text{ mA}; t_r = 20\text{ ns}; T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$ | - | - | 1.75 | V |

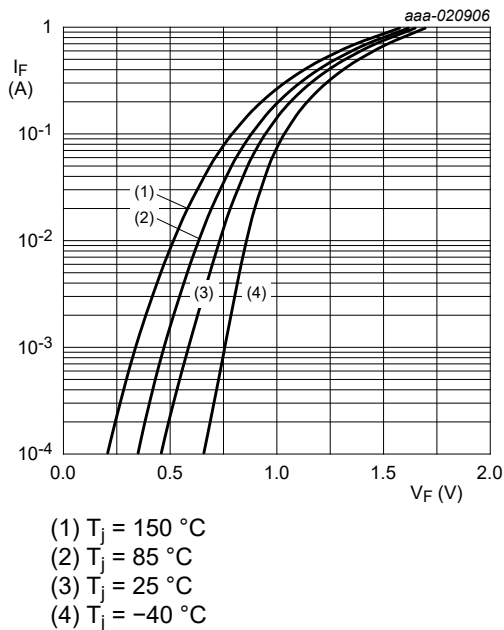


Fig. 4. Forward current as a function of forward voltage; typical values

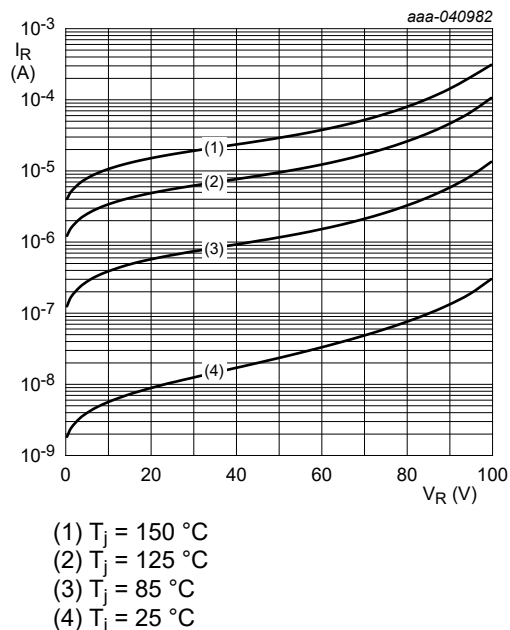
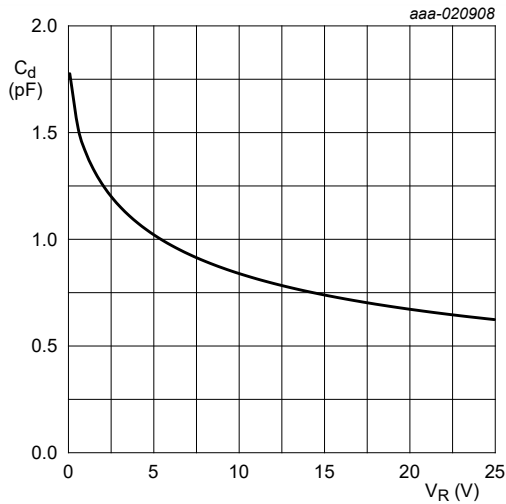
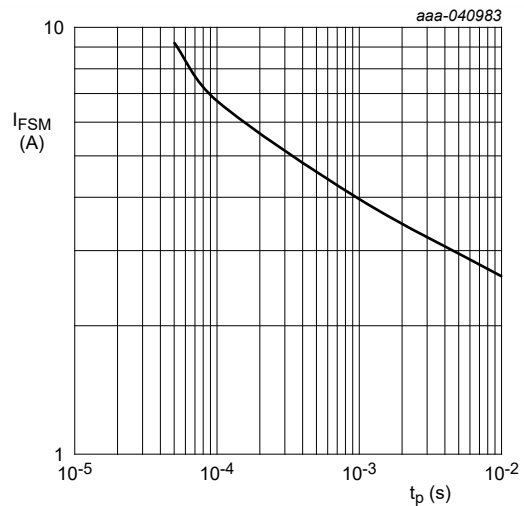


Fig. 5. Reverse current as a function of reverse voltage; typical values



$f = 1\text{ MHz}$; $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$

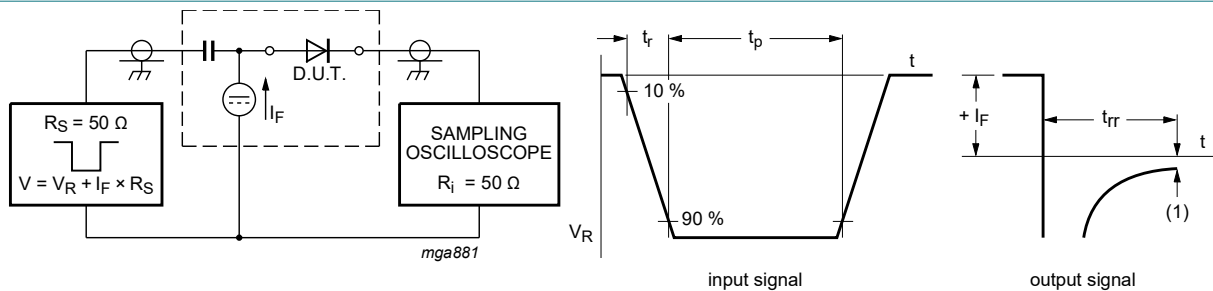
Fig. 6. Diode capacitance as a function of reverse voltage; typical values



Based on square wave currents
 $T_{\text{amb}} = 25\text{ }^{\circ}\text{C}$

Fig. 7. Non-repetitive forward current as a function of pulse duration; typical values

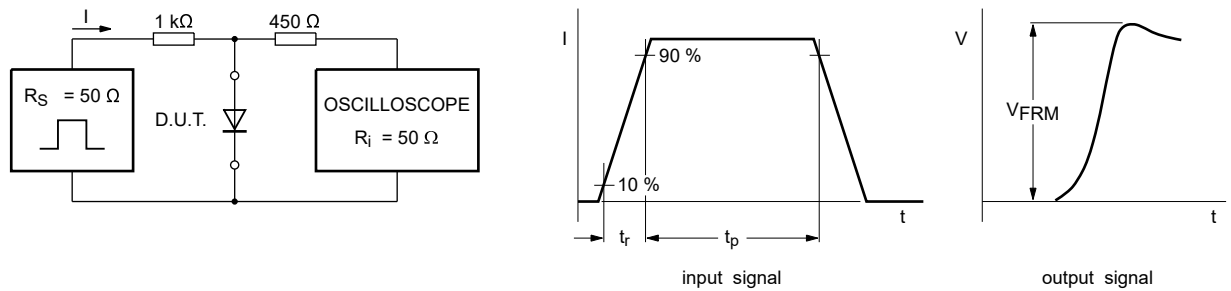
11. Test information



(1) $I_R = 1\text{ mA}$

Input signal: reverse pulse rise time $t_r = 0.6\text{ ns}$; reverse voltage pulse duration $t_p = 100\text{ ns}$; duty cycle $\delta = 0.05$
Oscilloscope: rise time $t_r = 0.35\text{ ns}$

Fig. 8. Reverse recovery time test circuit and waveforms



Input signal: forward pulse rise time $t_r = 20\text{ ns}$; forward current pulse duration $t_p \geq 100\text{ ns}$; duty cycle $\delta \leq 0.005$

Fig. 9. Forward recovery voltage test circuit and waveforms

12. Package outline

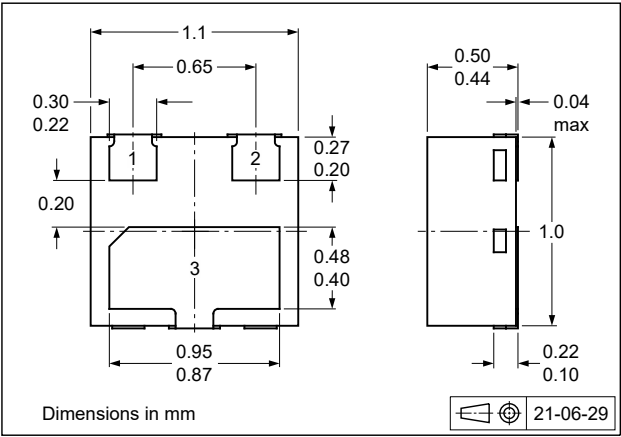


Fig. 10. Package outline DFN1110D-3 (SOT8015)

13. Soldering

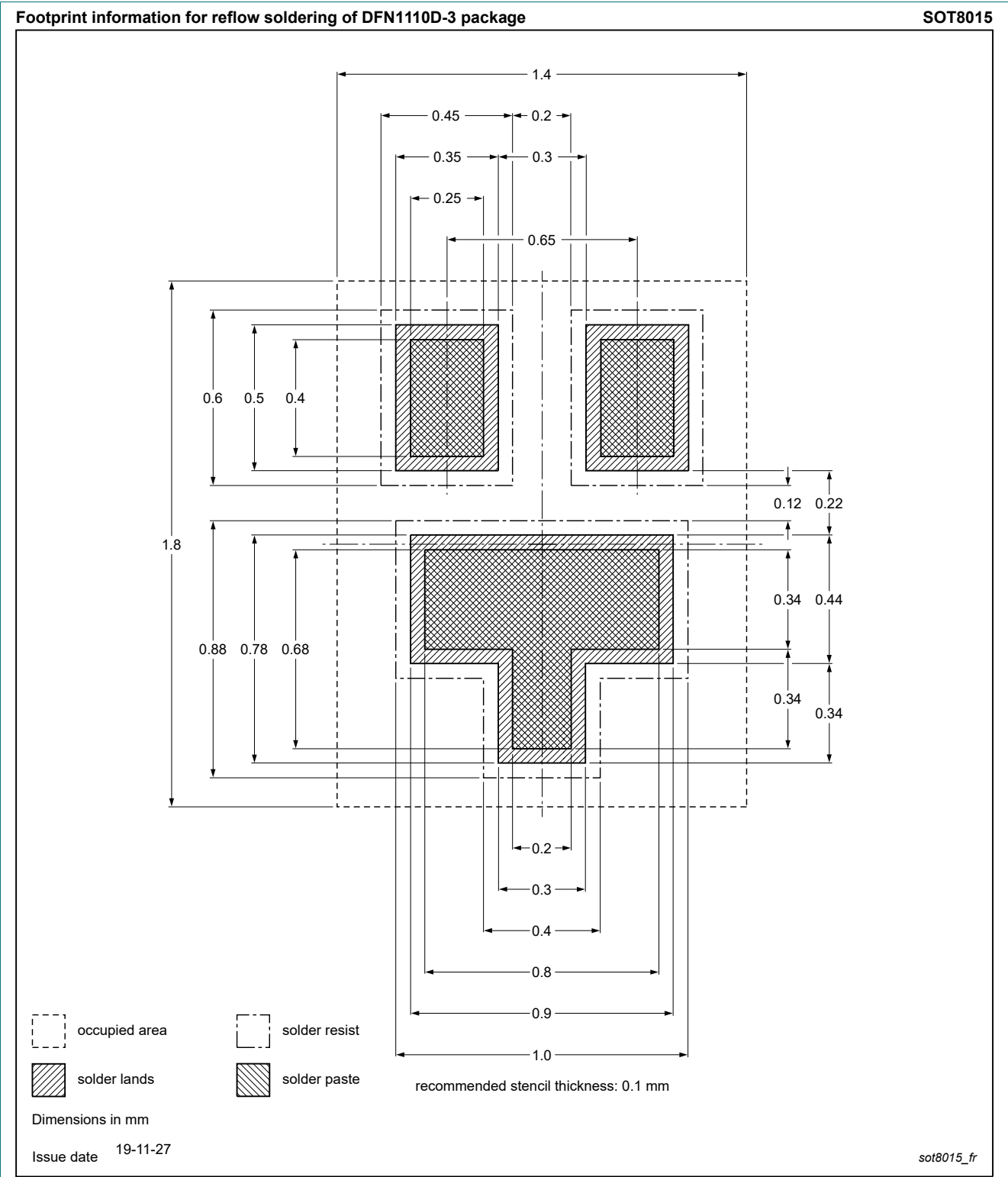


Fig. 11. Reflow soldering footprint for DFN1110D-3 (SOT8015)

14. Revision history

Table 8. Revision history

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------|--------------|--------------------|---------------|------------|
| BAW56QB v.1 | 20241011 | 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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