



**THE DATASHEET OF
SZMM3Z5V1T1GX**





SZMM3Z series

Voltage regulator diodes

Rev. 4 — 9 October 2024

Product data sheet

1. General description

General-purpose Zener diodes in a very small SOD323 (SC-76) Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Non-repetitive peak reverse power dissipation: ≤ 40 W
- Total power dissipation: ≤ 300 mW
- Tolerance series: Approximately $\pm 5\%$
- Wide working voltage range: nominal 2.4 V to 75 V
- Low differential resistance
- AEC-Q101 qualified

3. Applications

- General regulation functions

4. Quick reference data

Table 1. Quick reference data


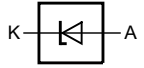
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|---|--------------------|-----|-----|-----|------|
| V_F | forward voltage | $I_F = 100$ mA [1] | - | - | 1.1 | V |
| P_{ZSM} | non-repetitive peak reverse power dissipation | [2] | - | - | 40 | W |

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

[2] $t_p = 100$ μ s; square wave; $T_j = 25$ °C before surge

5. Pinning information

Table 2. Pinning

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|-----|--------|-------------|--|--|
| 1 | K | cathode[1] |  |  006aaa152 |
| 2 | A | anode | | |

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

| Type number | Package | | |
|---|---------|--|---------|
| | Name | Description | Version |
| SZMM3Z2V4T1G to SZMM3Z75VT1G ^[1] | SOD323 | plastic, surface-mounted package; 2 leads; 1.3 mm pitch; 1.7 mm x 1.25 mm x 0.95 mm body | SOD323 |

[1] The series consists of 36 types with nominal working voltages from 2.4 V to 75 V.

7. Marking

Table 4. Marking Codes

| Type number | Marking Code | Type number | Marking Code |
|--------------|--------------|--------------|--------------|
| SZMM3Z2V4T1G | X8 | SZMM3Z15VT1G | VV |
| SZMM3Z2V7T1G | X9 | SZMM3Z16VT1G | VZ |
| SZMM3Z3V0T1G | XT | SZMM3Z20VT1G | XC |
| SZMM3Z3V3T1G | XW | SZMM3Z22VT1G | XG |
| SZMM3Z3V6T1G | XZ | SZMM3Z24VT1G | XM |
| SZMM3Z3V9T1G | ME | SZMM3Z27VT1G | DK |
| SZMM3Z4V3T1G | MM | SZMM3Z30VT1G | DL |
| SZMM3Z4V7T1G | MS | SZMM3Z33VT1G | DM |
| SZMM3Z5V1T1G | MW | SZMM3Z36VT1G | DN |
| SZMM3Z5V6T1G | LF | SZMM3Z39VT1G | DP |
| SZMM3Z6V2T1G | LL | SZMM3Z43VT1G | DR |
| SZMM3Z6V8T1G | LR | SZMM3Z47VT1G | DS |
| SZMM3Z7V5T1G | LV | SZMM3Z51VT1G | DT |
| SZMM3Z8V2T1G | LZ | SZMM3Z56VT1G | DU |
| SZMM3Z9V1T1G | CU | SZMM3Z62VT1G | DV |
| SZMM3Z10VT1G | VA | SZMM3Z68VT1G | DW |
| SZMM3Z11VT1G | VE | SZMM3Z75VT1G | DX |
| SZMM3Z12VT1G | VK | - | - |
| SZMM3Z13VT1G | VP | - | - |

8. Limiting values

Table 5. Limiting values

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

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|---|--|-----|------|------------------|
| I_F | forward current | | - | 200 | mA |
| P_{ZSM} | non-repetitive peak reverse power dissipation | $t_p = 100 \mu\text{s}$; square wave; $T_{amb} = 25 \text{ }^\circ\text{C}$; prior to surge | - | 40 | W |
| P_{tot} | total power dissipation | $T_{amb} = 25 \text{ }^\circ\text{C}$ | [1] | 300 | 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 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] | - | - | 415 | K/W |
| $R_{th(j-sp)}$ | thermal resistance from junction to solder point | [2] | - | - | 110 | K/W |

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

[2] Soldering point of cathode tab

10. Characteristics

Table 7. Electrical characteristics

$T_j = 25 \text{ }^\circ\text{C}$ unless otherwise specified.

| Symbol | Parameter | Conditions | Max | Unit | |
|--------|-----------------|------------------------|-----|------|---|
| V_F | forward voltage | $I_F = 10 \text{ mA}$ | [1] | 0.9 | V |
| | | $I_F = 100 \text{ mA}$ | [1] | 1.1 | V |

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

Table 8. Electrical characteristics per type: SZMM3Z2V4T1G to SZMM3Z24VT1G

 $T_j = 25\text{ °C}$ unless otherwise specified.

| SZMM3ZxxxT1G | Working voltage V_Z (V) | | Reverse current I_R (μA) | | Differential resistance r_{diff} (Ω) | | Temperature coefficient S_Z (mV/K) | | Diode capacitance C_d (pF)[1] |
|--------------|------------------------------|-------|--|-----------|---|---------------------|---|------|------------------------------------|
| | $I_Z = 5\text{ mA}$ | | Max | V_R (V) | $I_Z = 0.5\text{ mA}$ | $I_Z = 5\text{ mA}$ | $I_Z = 5\text{ mA}$ | | |
| | Min | Max | | | Max | Max | Min | Max | |
| 2V4 | 2.30 | 2.60 | 50.0 | 1.0 | 1000 | 100 | -3.5 | 0 | 450 |
| 2V7 | 2.50 | 2.90 | 20.0 | 1.0 | 1000 | 100 | -3.5 | 0 | 440 |
| 3V0 | 2.80 | 3.20 | 10.0 | 1.0 | 1000 | 95 | -3.5 | 0 | 425 |
| 3V3 | 3.10 | 3.50 | 5.0 | 1.0 | 1000 | 95 | -3.5 | 0 | 410 |
| 3V6 | 3.40 | 3.80 | 5.0 | 1.0 | 1000 | 90 | -3.5 | 0 | 390 |
| 3V9 | 3.70 | 4.10 | 3.0 | 1.0 | 1000 | 90 | -3.5 | 0 | 370 |
| 4V3 | 4.01 | 4.48 | 3.0 | 1.0 | 1000 | 90 | -3.5 | 0 | 350 |
| 4V7 | 4.42 | 4.90 | 2.0 | 1.0 | 800 | 80 | -3.5 | 0.2 | 325 |
| 5V1 | 4.84 | 5.37 | 2.0 | 1.5 | 250 | 60 | -2.7 | 1.2 | 300 |
| 5V6 | 5.31 | 5.92 | 1.0 | 2.5 | 100 | 40 | -2.0 | 2.5 | 275 |
| 6V2 | 5.86 | 6.53 | 0.5 | 3.0 | 80 | 30 | 0.4 | 3.7 | 250 |
| 6V8 | 6.47 | 7.14 | 0.5 | 3.5 | 60 | 20 | 1.2 | 4.5 | 215 |
| 7V5 | 7.06 | 7.84 | 0.5 | 4.0 | 60 | 10 | 2.5 | 5.3 | 170 |
| 8V2 | 7.76 | 8.64 | 0.5 | 5.0 | 60 | 10 | 3.2 | 6.2 | 150 |
| 9V1 | 8.56 | 9.55 | 0.5 | 6.0 | 60 | 10 | 3.8 | 7.0 | 120 |
| 10V | 9.45 | 10.55 | 0.1 | 7.0 | 60 | 10 | 4.5 | 8.0 | 110 |
| 11V | 10.44 | 11.56 | 0.1 | 8.0 | 60 | 10 | 5.4 | 9.0 | 108 |
| 12V | 11.42 | 12.60 | 0.1 | 9.0 | 80 | 10 | 6.0 | 10.0 | 105 |
| 13V | 12.47 | 13.96 | 0.1 | 10.0 | 80 | 10 | 7.0 | 11.0 | 103 |
| 15V | 13.84 | 15.52 | 0.05 | 11.0 | 80 | 15 | 9.2 | 13.0 | 99 |
| 16V | 15.37 | 17.09 | 0.05 | 12.0 | 80 | 20 | 10.4 | 14.0 | 97 |
| 20V | 18.86 | 21.08 | 0.05 | 15.0 | 100 | 20 | 14.4 | 18.0 | 88 |
| 22V | 20.88 | 23.17 | 0.05 | 17.0 | 100 | 25 | 16.4 | 20.0 | 84 |
| 24V | 22.93 | 25.57 | 0.05 | 19.0 | 120 | 30 | 18.4 | 22.0 | 80 |

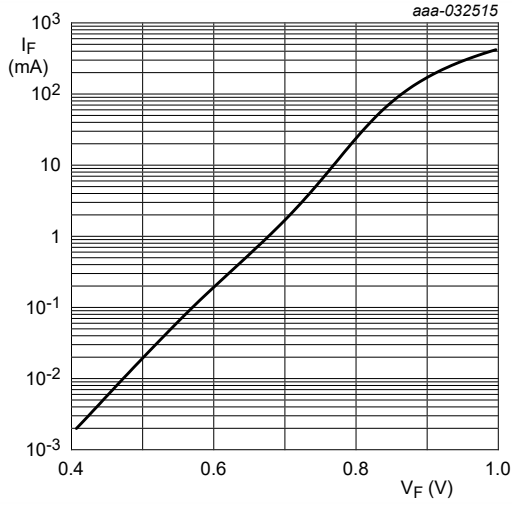
[1] $f = 1\text{ MHz}$; $V_R = 0\text{ V}$

Table 9. Electrical characteristics per type: SZMM3Z27VT1G to SZMM3Z75VT1G

 $T_j = 25\text{ °C}$ unless otherwise specified.

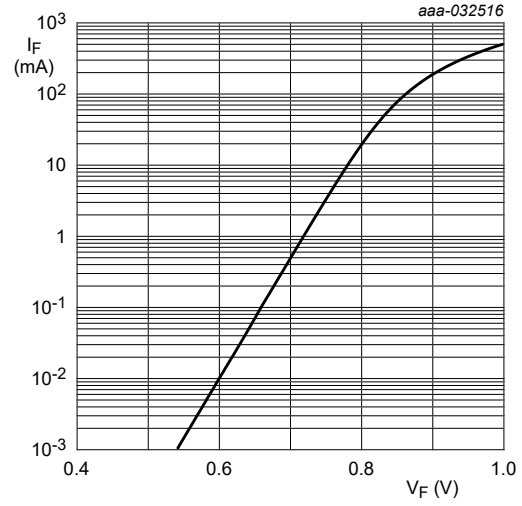
| SZMM3ZxxxT1G | Working voltage V_Z (V) | | Reverse current I_R (μA) | | Differential resistance r_{diff} (Ω) | | Temperature coefficient S_Z (mV/K) | | Diode capacitance C_d (pF)[1] |
|--------------|------------------------------|-------|--|-----------|---|---------------------|---|------|------------------------------------|
| | $I_Z = 2\text{ mA}$ | | Max | V_R (V) | $I_Z = 0.5\text{ mA}$ | $I_Z = 2\text{ mA}$ | $I_Z = 2\text{ mA}$ | | |
| | Min | Max | | | Max | Max | Min | Max | |
| 27V | 25.10 | 28.90 | 0.05 | 18.9 | 300 | 80 | 21.4 | 25.3 | 50 |
| 30V | 28.00 | 32.00 | 0.05 | 21.0 | 300 | 80 | 24.4 | 29.4 | 50 |
| 33V | 31.00 | 35.00 | 0.05 | 23.1 | 325 | 80 | 27.4 | 33.4 | 45 |
| 36V | 34.00 | 38.00 | 0.05 | 25.2 | 350 | 90 | 30.4 | 37.4 | 45 |
| 39V | 37.00 | 41.00 | 0.05 | 27.3 | 350 | 130 | 33.4 | 41.2 | 45 |
| 43V | 40.00 | 46.00 | 0.05 | 30.1 | 375 | 150 | 37.6 | 46.6 | 40 |
| 47V | 44.00 | 50.00 | 0.05 | 32.9 | 375 | 170 | 42.0 | 51.8 | 40 |
| 51V | 48.00 | 54.00 | 0.05 | 35.7 | 400 | 180 | 46.6 | 57.2 | 40 |
| 56V | 52.00 | 60.00 | 0.05 | 39.2 | 425 | 200 | 52.2 | 63.8 | 40 |
| 62V | 58.00 | 66.00 | 0.05 | 43.4 | 450 | 215 | 58.8 | 71.6 | 35 |
| 68V | 64.00 | 72.00 | 0.05 | 47.6 | 475 | 240 | 65.6 | 79.8 | 35 |
| 75V | 70.00 | 79.00 | 0.05 | 52.5 | 500 | 255 | 73.4 | 88.6 | 35 |

[1] $f = 1\text{ MHz}$; $V_R = 0\text{ V}$



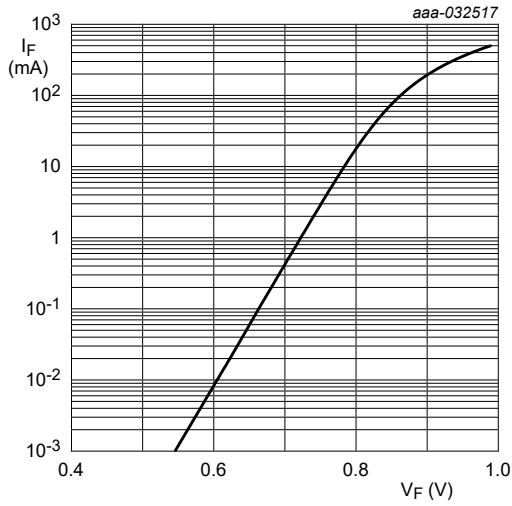
$T_j = 25\text{ }^\circ\text{C}$

Fig. 1. Forward current as a function of forward voltage; typical values (SZMM3Z2V4T1G)



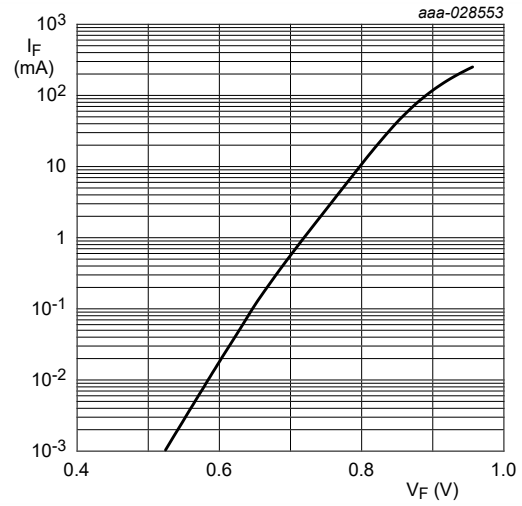
$T_j = 25\text{ }^\circ\text{C}$

Fig. 2. Forward current as a function of forward voltage; typical values (SZMM3Z6V8T1G)



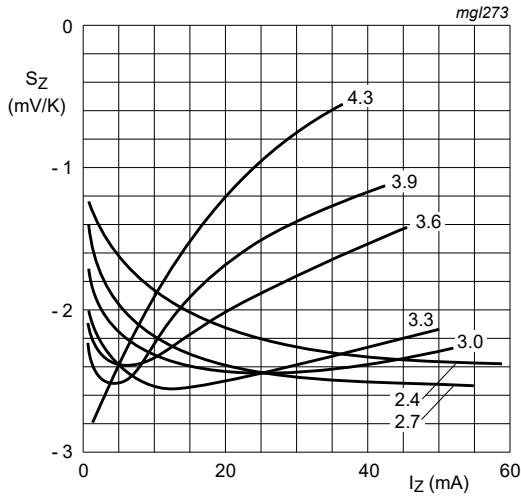
$T_j = 25\text{ }^\circ\text{C}$

Fig. 3. Forward current as a function of forward voltage; typical values (SZMM3Z7V5T1G)



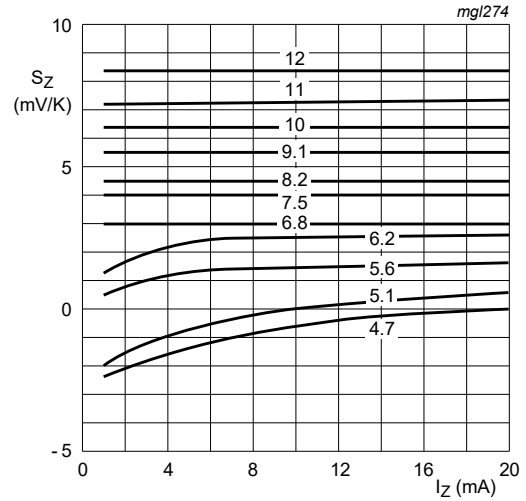
$T_j = 25\text{ }^\circ\text{C}$

Fig. 4. Forward current as a function of forward voltage; typical values (SZMM3Z75VT1G)



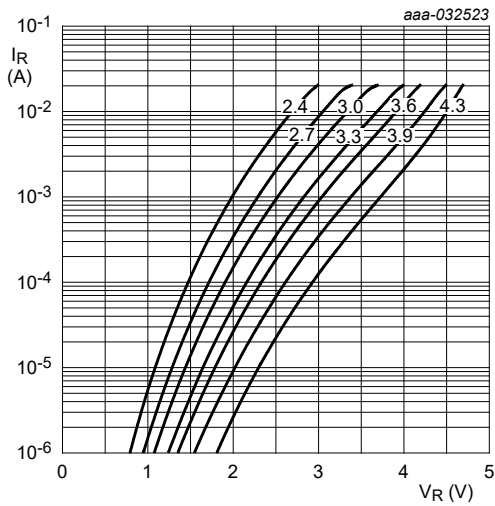
$T_j = 25\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$
 $V_Z = 2.4\text{ V}$ to 4.3 V

Fig. 5. Temperature coefficient as a function of working current; typical values (SZMM3Z2V4T1G to 4V3T1G)



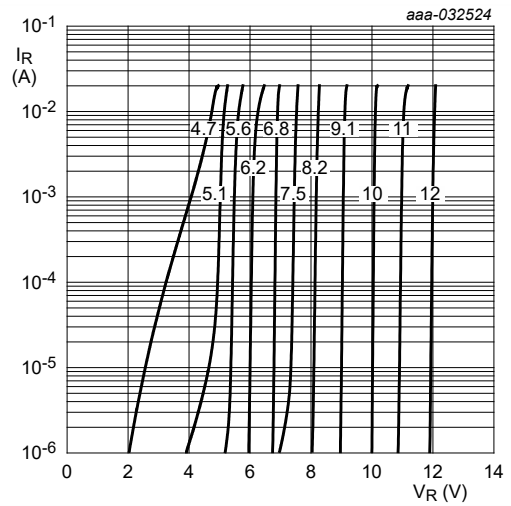
$T_j = 25\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$
 $V_Z = 4.7\text{ V}$ to 12 V

Fig. 6. Temperature coefficient as a function of working current; typical values (SZMM3Z4V7T1G to 12VT1G)



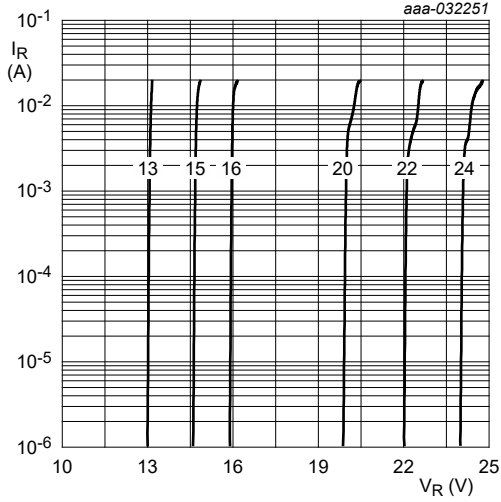
$T_j = 25\text{ }^\circ\text{C}$

Fig. 7. Reverse current as a function of reverse voltage; typical values (SZMM3Z2V4T1G to 4V3T1G)



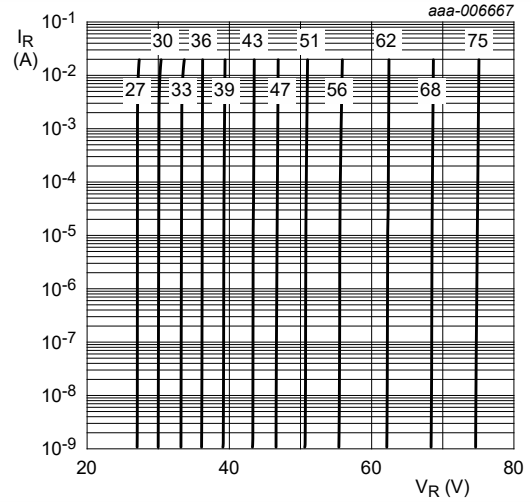
$T_j = 25\text{ }^\circ\text{C}$

Fig. 8. Reverse current as a function of reverse voltage; typical values (SZMM3Z4V7T1G to 12VT1G)



$T_j = 25\text{ }^\circ\text{C}$

Fig. 9. Reverse current as a function of reverse voltage; typical values (SZMM3Z13VT1G to 24VT1G)



$T_j = 25\text{ }^\circ\text{C}$

Fig. 10. Reverse current as a function of reverse voltage; typical values (SZMM3Z27VT1G to 75VT1G)

11. Package outline

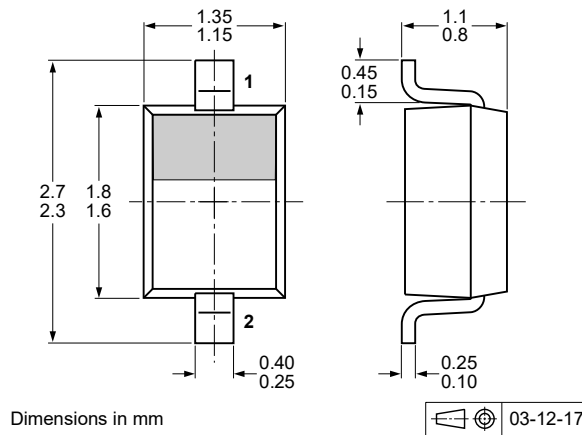


Fig. 11. Package outline SOD323

12. Soldering

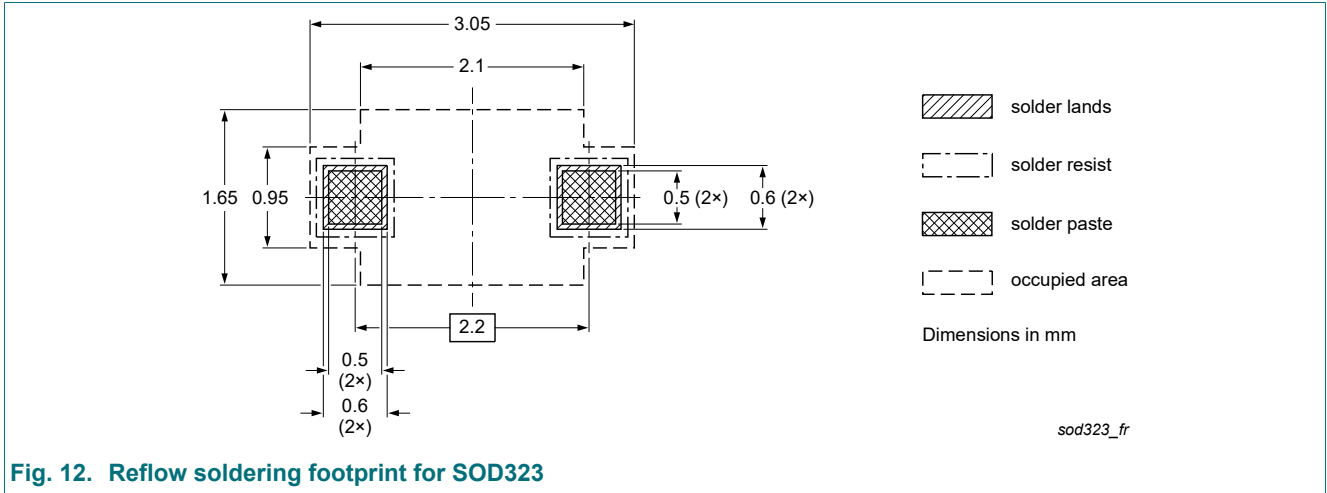


Fig. 12. Reflow soldering footprint for SOD323

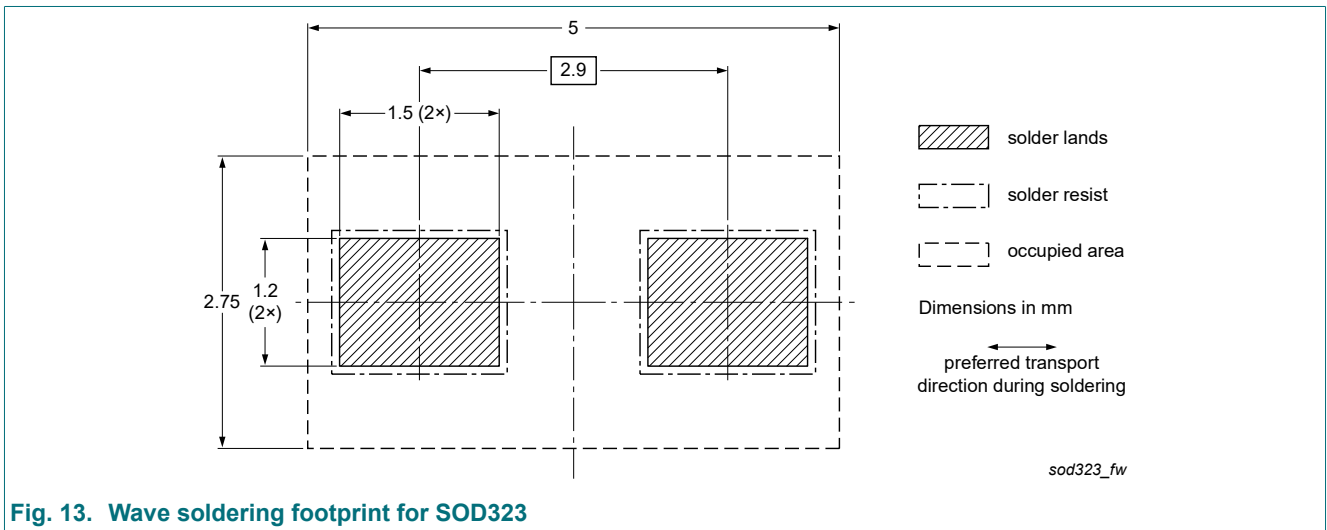


Fig. 13. Wave soldering footprint for SOD323

13. Revision history

Table 10. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|------------------------|--------------------|---------------|----------------|
| SZMM3Z_SER v.4 | 20241009 | Product data sheet | - | SZMM3Z_SER v.3 |
| Modifications: | • SZMM3Z18VT1G removed | | | |
| SZMM3Z_SER v.3 | 20230220 | Product data sheet | - | SZMM3Z_SER v.1 |
| SZMM3Z_SER v.2 | 20210330 | Product data sheet | - | SZMM3Z_SER v.1 |
| SZMM3Z_SER v.1 | 20201210 | Product data sheet | - | - |

14. Legal information

Data sheet status

| Document status [1][2] | Product status [3] | Definition |
|--------------------------------|--------------------|---|
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Date of release: 9 October 2024

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