



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 ± 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


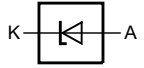
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|---|--------------------|-----|-----|-----|------|
| V_F | forward voltage | $I_F = 100$ mA [1] | - | - | 1.1 | V |
| P_{ZSM} | non-repetitive peak reverse power dissipation | [2] | - | - | 40 | W |

[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 μs; square wave; T _{amb} = 25 °C; prior to surge | - | - | 40 | W |
| P _{tot} | total power dissipation | T _{amb} = 25 °C | [1] | - | 300 | 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.

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 °C unless otherwise specified.

| Symbol | Parameter | Conditions | | Max | Unit |
|----------------|-----------------|-------------------------|-----|-----|------|
| V _F | forward voltage | I _F = 10 mA | [1] | 0.9 | V |
| | | I _F = 100 mA | [1] | 1.1 | V |

[1] Pulse test: t_p ≤ 300 μs; δ ≤ 0.02

Table 8. Electrical characteristics per type: SZMM3Z2V4T1G to SZMM3Z24VT1G

T_j = 25 °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 mA | | | | I _Z = 0.5 mA | I _Z = 5 mA | I _Z = 5 mA | | |
| | Min | Max | Max | V _R (V) | Max | Max | Min | Max | 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 MHz; V_R = 0 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 mA | | | | I _Z = 0.5 mA | I _Z = 2 mA | I _Z = 2 mA | | |
| | Min | Max | Max | V _R (V) | Max | Max | Min | Max | 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] $f = 1\text{ MHz}$; $V_R = 0\text{ V}$

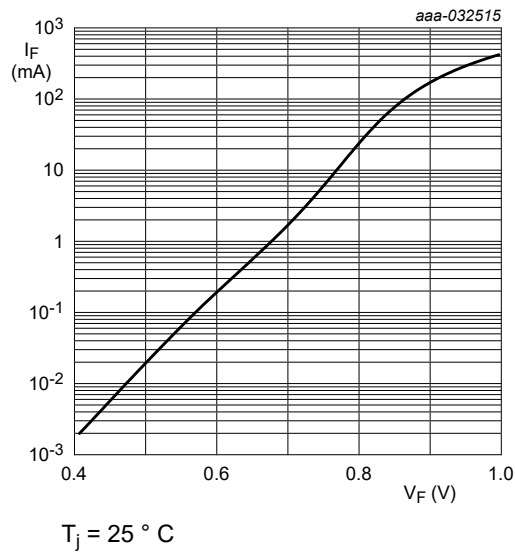


Fig. 1. Forward current as a function of forward voltage; typical values (SZMM3Z2V4T1G)

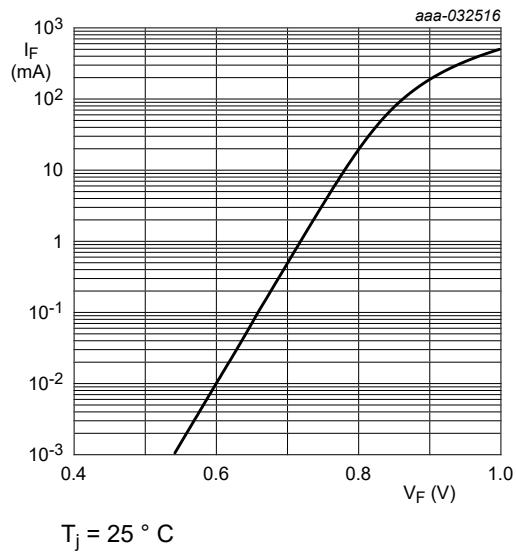


Fig. 2. Forward current as a function of forward voltage; typical values (SZMM3Z6V8T1G)

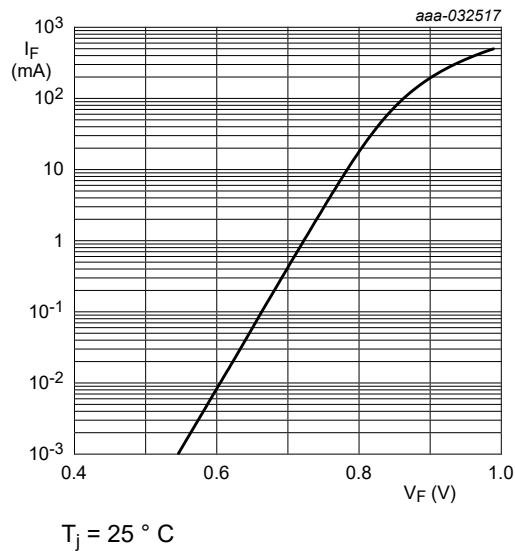


Fig. 3. Forward current as a function of forward voltage; typical values (SZMM3Z7V5T1G)

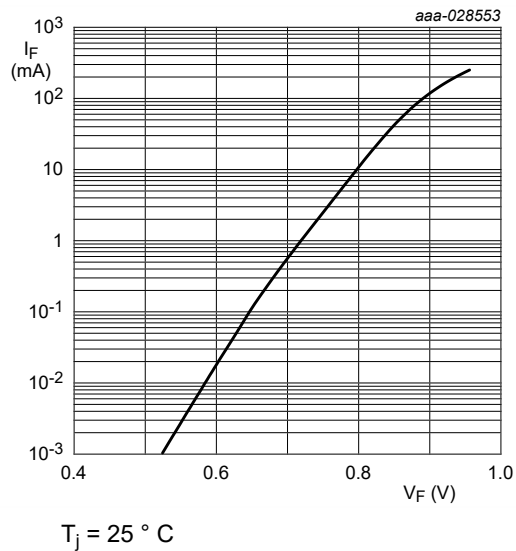


Fig. 4. Forward current as a function of forward voltage; typical values (SZMM3Z75VT1G)

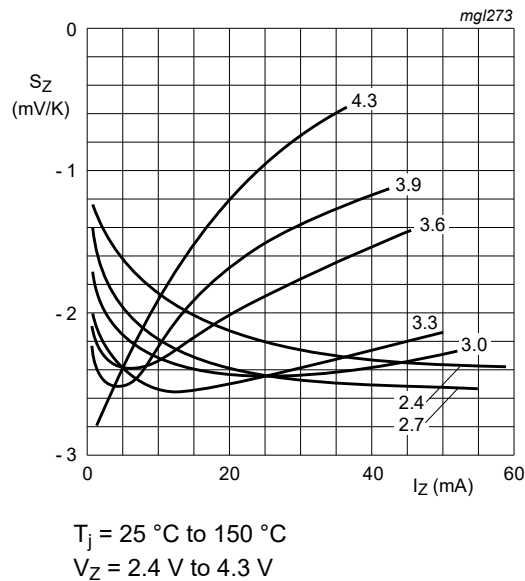


Fig. 5. Temperature coefficient as a function of working current; typical values (SZMM3Z2V4T1G to 4V3T1G)

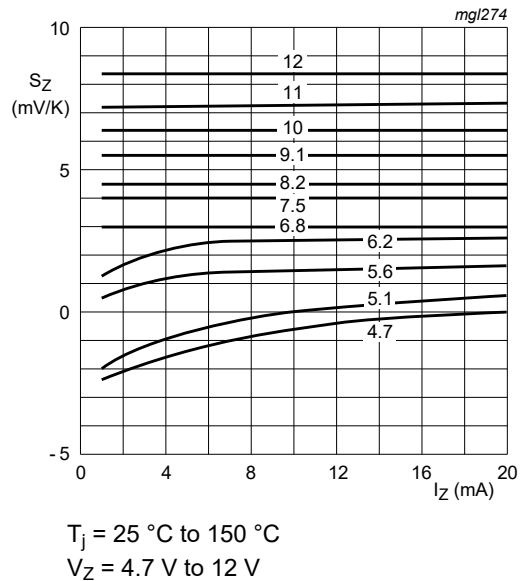


Fig. 6. Temperature coefficient as a function of working current; typical values (SZMM3Z4V7T1G to 12VT1G)

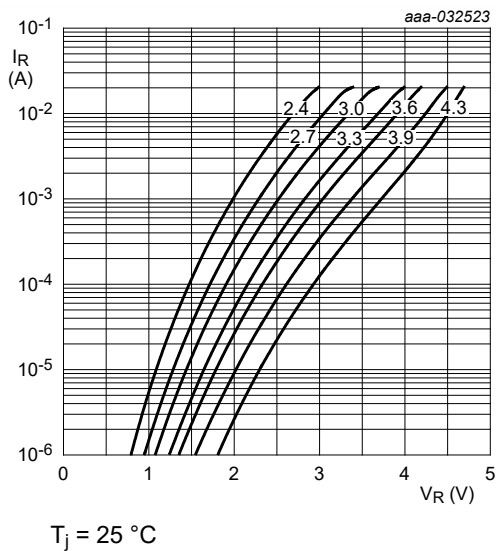


Fig. 7. Reverse current as a function of reverse voltage; typical values (SZMM3Z2V4T1G to 4V3T1G)

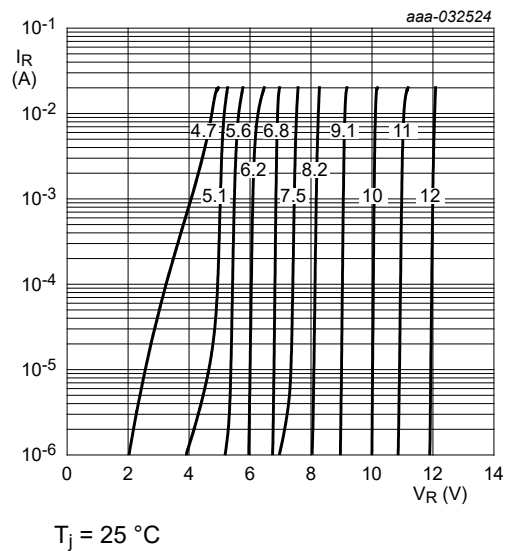


Fig. 8. Reverse current as a function of reverse voltage; typical values (SZMM3Z4V7T1G to 12VT1G)

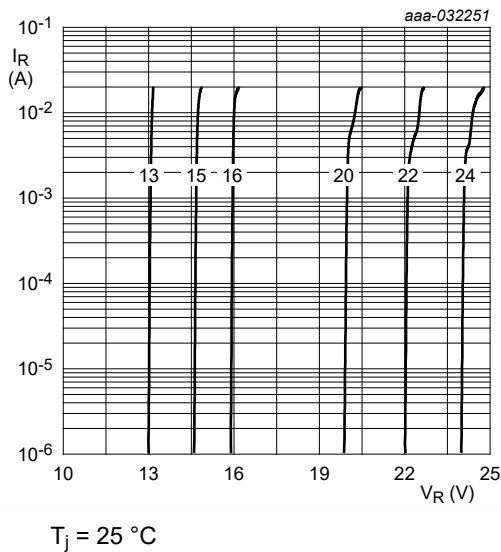


Fig. 9. Reverse current as a function of reverse voltage; typical values (SZMM3Z13VT1G to 24VT1G)

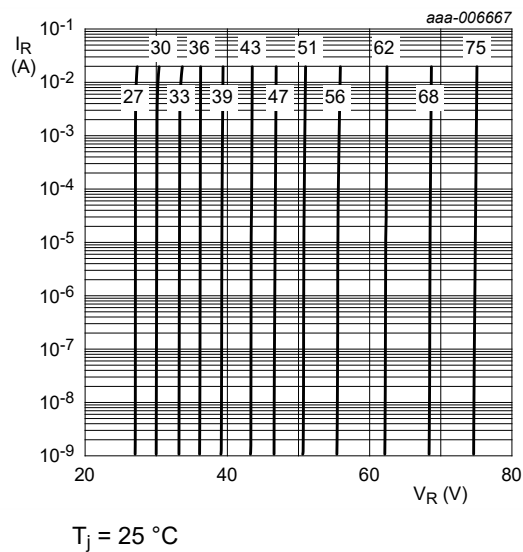


Fig. 10. Reverse current as a function of reverse voltage; typical values (SZMM3Z27VT1G to 75VT1G)

11. Package outline

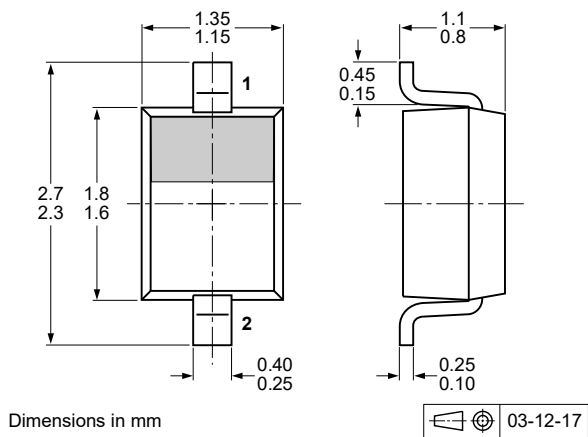


Fig. 11. Package outline SOD323

12. Soldering

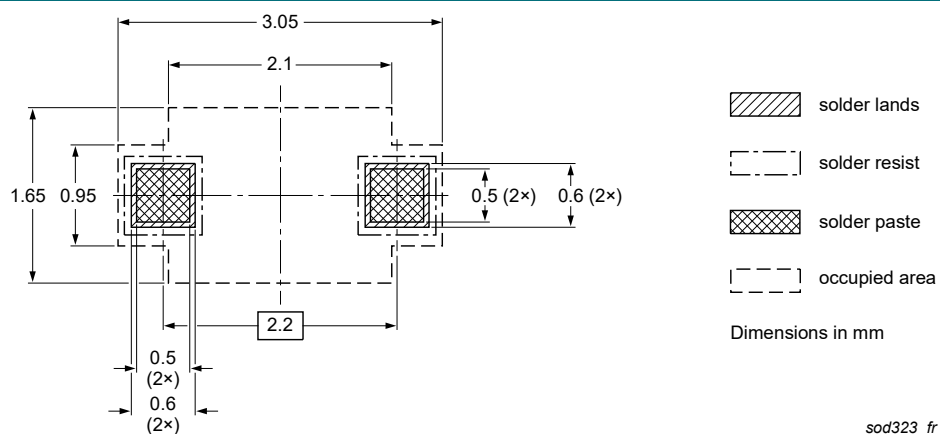


Fig. 12. Reflow soldering footprint for SOD323

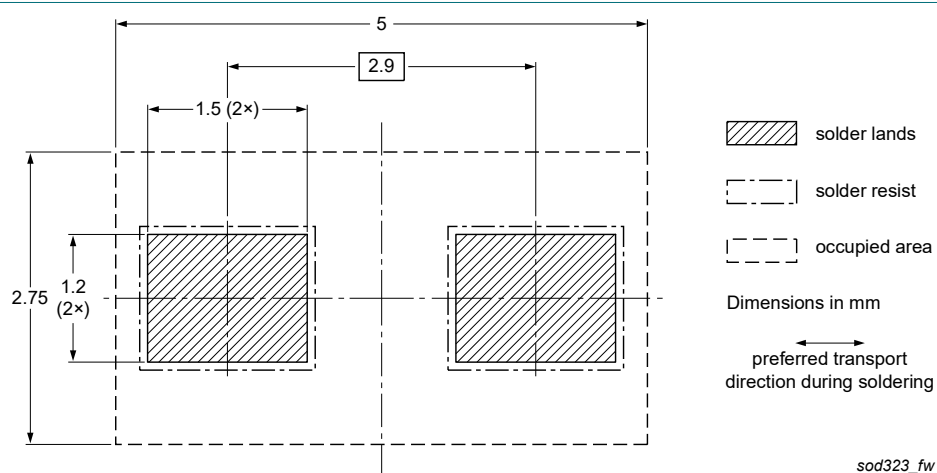


Fig. 13. Wave soldering footprint for SOD323

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

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| Document status [1][2] | Product status [3] | Definition |
|--------------------------------|--------------------|---|
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