
# PTVS22VZ1USK

## Transient voltage suppressor in DSN1608-2 for mobile applications

**25 May 2017** **Product data sheet**

## 1. General description

Unidirectional Transient Voltage Suppressor (TVS) in a very small leadless DSN1608-2 (SOD964) package.

## 2. Features and benefits

- Average measured peak pulse current: $I_{PPM}$ = 43.5 A (8/20 µs pulse)
- Rated peak pulse current: $I_{PPM}$ = 37 A (8/20 µs pulse)
- Rated peak pulse power: $P_{PPM}$ = 200 W (10/1000 µs pulse)
- Dynamic resistance $R_{dyn}$ = 0.17 Ω
- Very low package height: 0.29 mm

## 3. Applications

- Power supply protection
- Power management
- Industrial application

## 4. Quick reference data

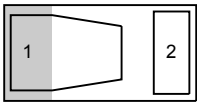
**Table 1. Quick reference data**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $I_{PPM}$ | rated peak pulse current | $t_p$ = 8/20 µs | [1] [2] | - | - | 37 | A |
| | | $t_p$ = 10/1000 µs | [3] [2] | - | - | 5.3 | A |
| $V_{RWM}$ | reverse standoff voltage | $T_{amb}$ = 25 °C | | - | - | 22 | V |

[1] In accordance with IEC 61000-4-5 (8/20 µs current waveform).
[2] Measured from pin 1 to pin 2.
[3] In accordance with IEC 61643-321 (10/1000 µs current waveform).

# 5. Pinning information

**Table 2. Pinning information**

| Pin | Symbol | Description | Simplified outline | Graphic symbol |
|---|---|---|---|---|
| 1 | K | cathode |  Transparent top view **DSN1608-2 (SOD964)** |  *sym035* |
| 2 | A | anode | | |

# 6. Ordering information

**Table 3. Ordering information**

| Type number | Package | | |
|---|---|---|---|
| | Name | Description | Version |
| PTVS22VZ1USK | DSN1608-2 | leadless very small package; 2 terminals; body 1.6 x 0.8 x 0.29 mm | SOD964 |

# 7. Marking

**Table 4. Marking codes**

| Type number | Marking code |
|---|---|
| PTVS22VZ1USK | Y2 |

# 8. Limiting values

**Table 5. Limiting values**

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

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $P_{PPM}$ | rated peak pulse power | $t_p$ = 8/20 µs | [1] [2] | - | 1900 | W |
| | | $t_p$ = 10/1000 µs | [3] [2] | - | 200 | W |
| $I_{PPM}$ | rated peak pulse current | $t_p$ = 8/20 µs | [1] [2] | - | 37 | A |
| | | $t_p$ = 10/1000 µs | [3] [2] | - | 5.3 | A |
| $T_j$ | junction temperature | | | - | 150 | °C |
| $T_{amb}$ | ambient temperature | | | -40 | 125 | °C |
| $T_{stg}$ | storage temperature | | | -65 | 150 | °C |
| **ESD maximum ratings** | | | | | | |
| $V_{ESD}$ | electrostatic discharge voltage | IEC 61000-4-2; contact discharge | [4] [2] | - | 30 | kV |
| | | IEC 61000-4-2; air discharge | [4] [2] | - | 30 | kV |

[1] In accordance with IEC 61000-4-5 (8/20 µs current waveform).
[2] Measured from pin 1 to pin 2.
[3] In accordance with IEC 61643-321 (10/1000 µs current waveform).

[4] Device stressed with ten non-repetitive ESD pulses.

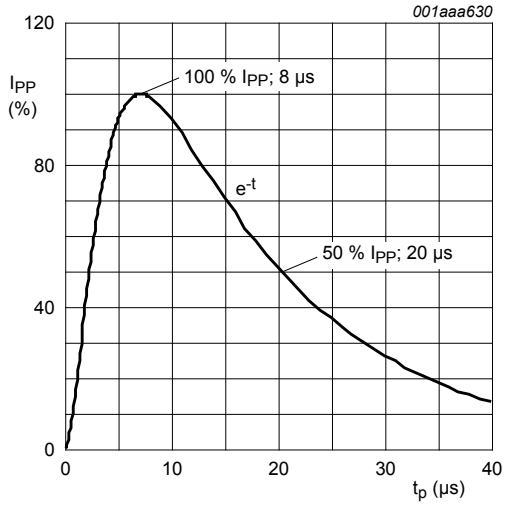



**Fig. 1. 8/20 µs pulse waveform according to IEC 61000-4-5**

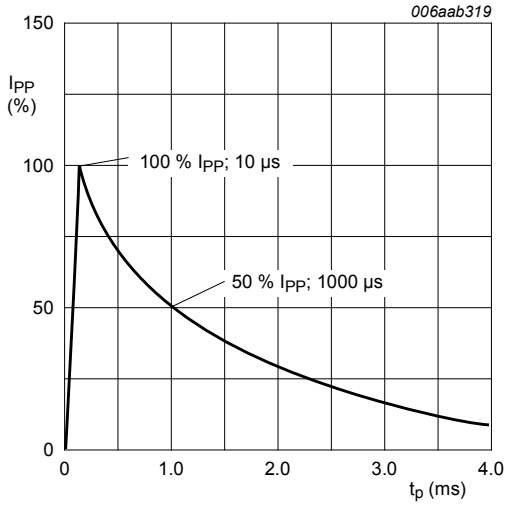



**Fig. 2. 10/1000 µs pulse waveform according to IEC 61643-321**

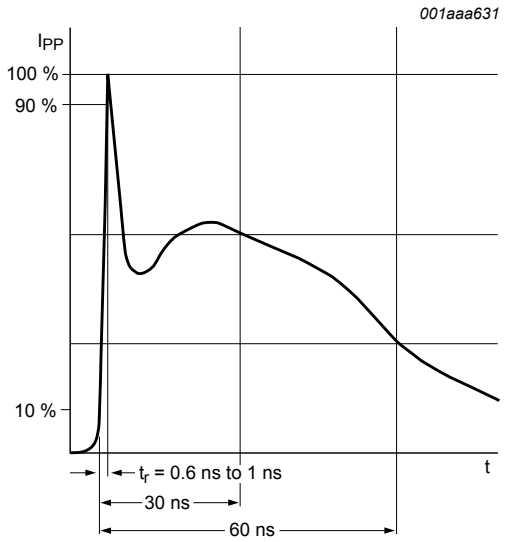



**Fig. 3. ESD pulse waveform according to IEC 61000-4-2**

# 9. Characteristics

**Table 6. Characteristics**

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $V_{RWM}$ | reverse standoff voltage | $T_{amb}$ = 25 °C | | - | - | 22 | V |
| $V_{BR}$ | breakdown voltage | $I_R$ = 10 mA; $T_{amb}$ = 25 °C | [1] | 24.4 | 25.7 | 26.9 | V |
| $I_{RM}$ | reverse leakage current | $V_R$ = 22 V; $T_{amb}$ = 25 °C | [1] | - | 0.1 | 200 | nA |
| $C_d$ | diode capacitance | f = 1 MHz; $V_R$ = 0 V; $T_{amb}$ = 25 °C | | - | 247 | - | pF |
| $V_{CL}$ | clamping voltage | $I_{PPM}$ = 37 A; $t_p$ = 8/20 µs; $T_{amb}$ = 25 °C | [2] [1] | - | 43.5 | 52 | V |
| | | $I_{PPM}$ = 5.3 A; $t_p$ = 10/1000 µs; $T_{amb}$ = 25 °C | [3] [1] | - | 33 | 39.5 | V |
| $R_{dyn}$ | dynamic resistance | $I_R$ = 10 A; $T_{amb}$ = 25 °C | [4] | - | 0.17 | - | Ω |

[1] Measured from pin 1 to 2.
[2] In accordance with IEC 61000-4-5 (8/20 µs current waveform).
[3] In accordance with IEC 61643-321 (10/1000 µs current waveform).
[4] Non-repetitive current pulse, Transmission Line Pulse (TLP) $t_p$ = 100 ns; square pulse; ANSI / ESD STM5.5.1-2008.

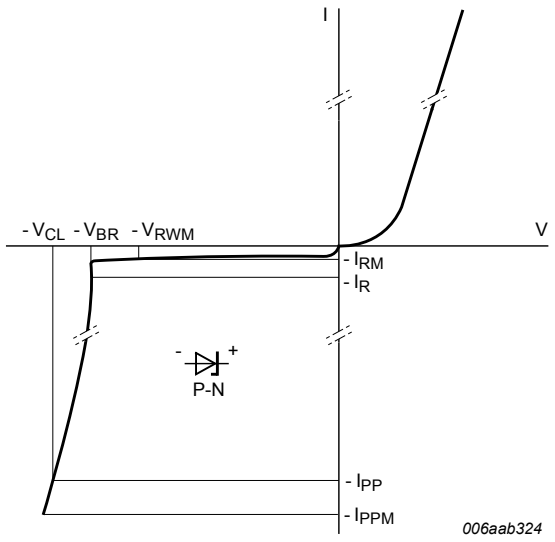
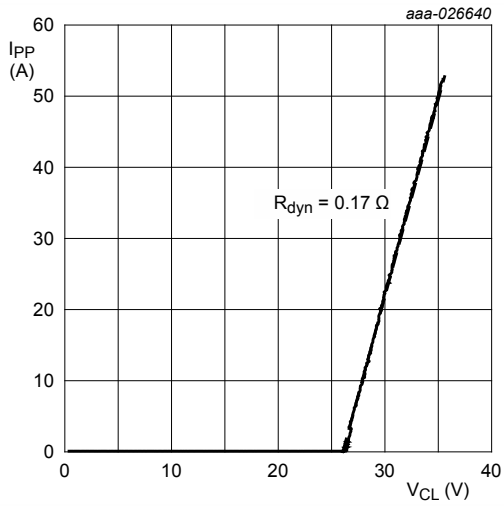
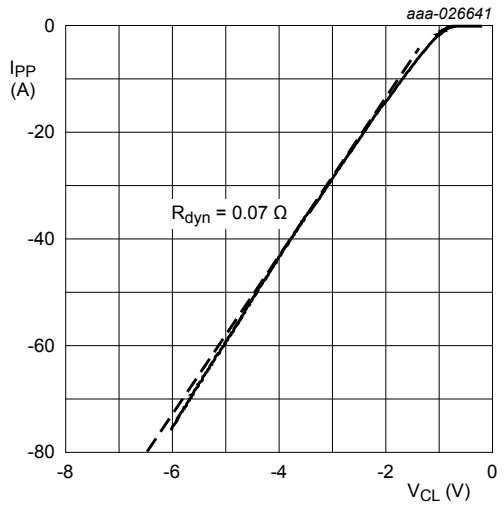



**Fig. 4. V-I characteristics for a unidirectional TVS protection diode**



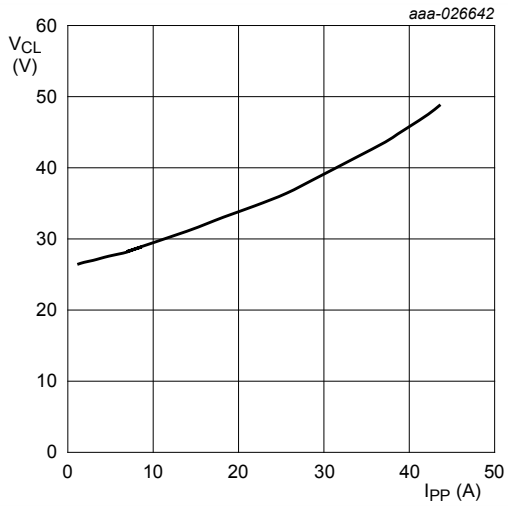

$t_p$ = 100 ns; Transmission Line Pulse (TLP)

**Fig. 5. Dynamic resistance with positive clamping voltage**



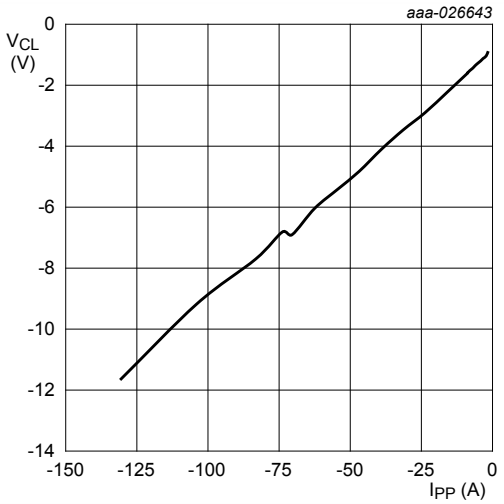

$t_p$ = 100 ns; Transmission Line Pulse (TLP)

**Fig. 6. Dynamic resistance with negative clamping voltage**




$t_p$ = 8/20 µs; according to IEC 61000-4-5

**Fig. 7. Positive clamping voltage (8/20 µs pulse); typical values**




$t_p$ = 8/20 µs; according to IEC 61000-4-5

**Fig. 8. Negative clamping voltage (8/20 µs pulse); typical values**

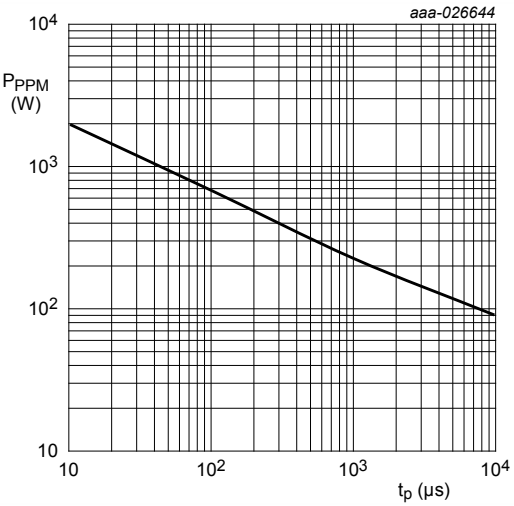



**Fig. 9. Rated peak pulse power as a function of square pulse duration; typical values**

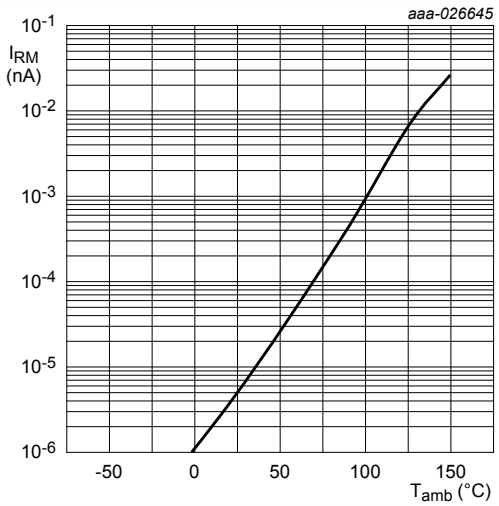



**Fig. 10. Relative variation of reverse leakage current as a function of ambient temperature; typical values**

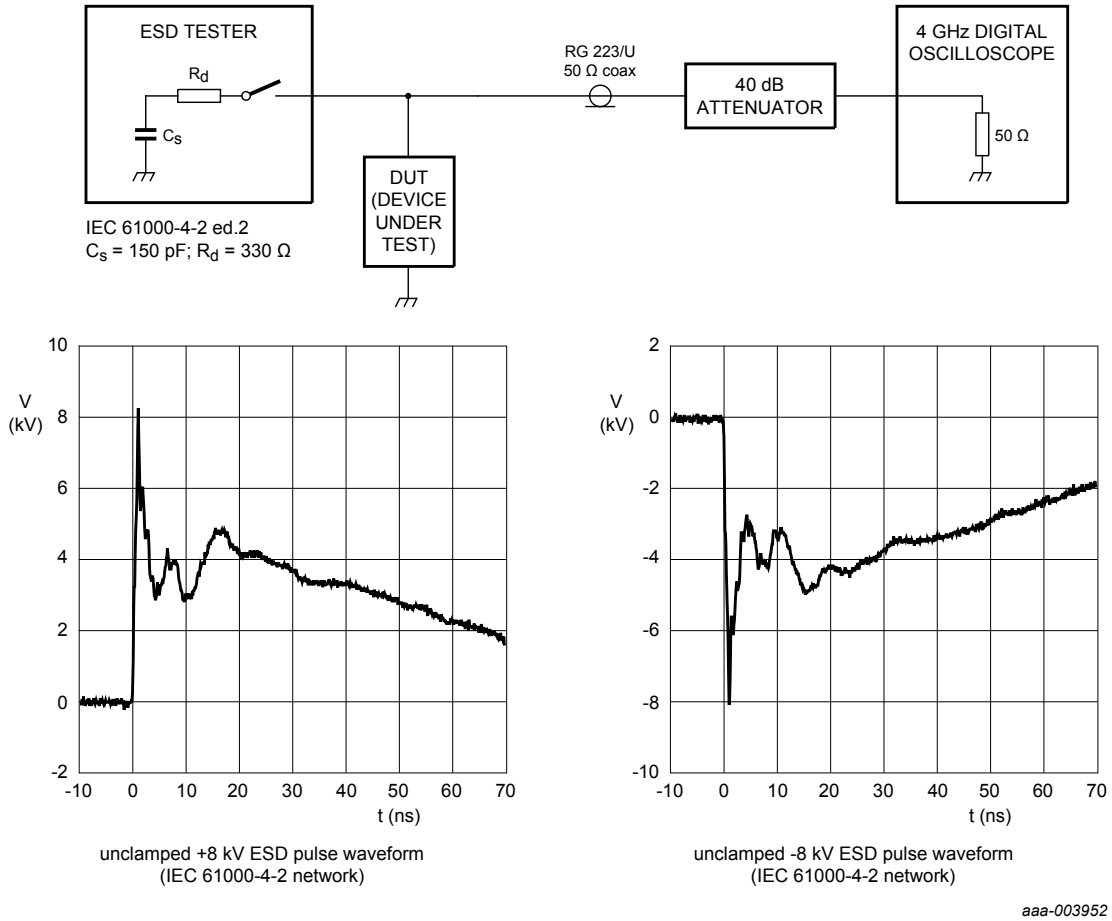



**Fig. 11. ESD clamping test setup and waveforms**

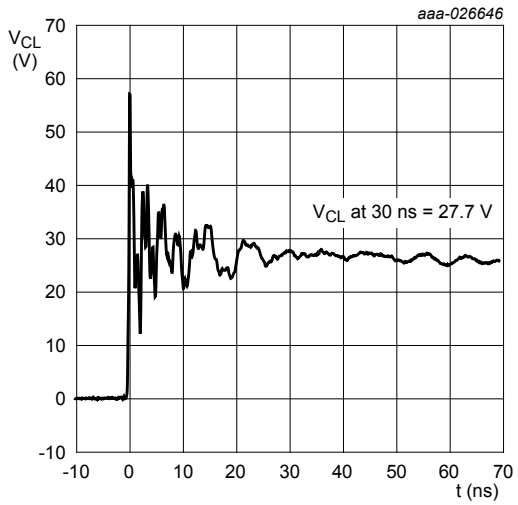



**Fig. 12. Clamped +8 kV pulse waveform (IEC61000-4-2 network)**

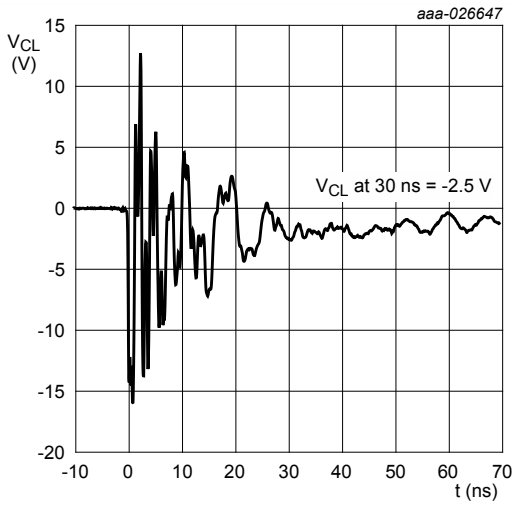
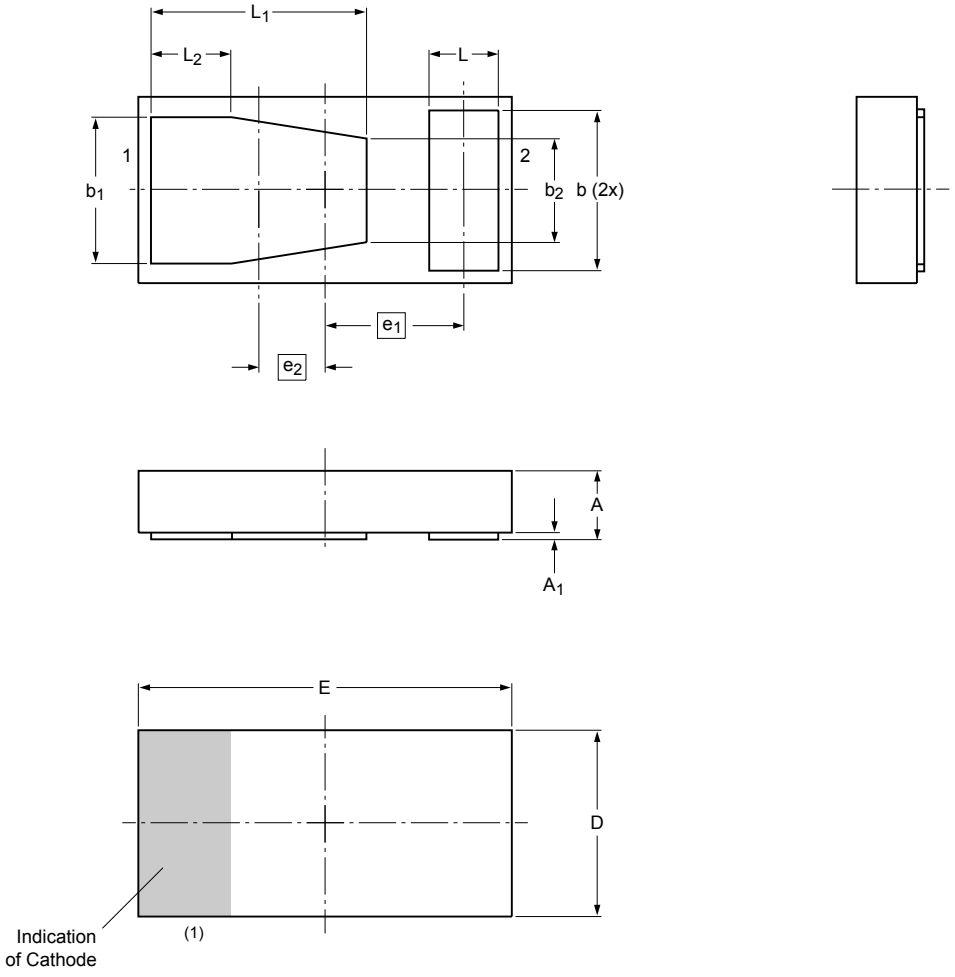



**Fig. 13. Clamped -8 kV pulse waveform (IEC61000-4-2 network)**

## 10. Package outline

**DSN1608-2, leadless very small package; 2 terminals; body 1.6 x 0.8 x 0.29 mm** **SOD964**




Dimensions (mm are the original dimensions)

| Unit | | A | $A_1$ | b | $b_1$ | $b_2$ | D | E | $e_1$ | $e_2$ | L | $L_1$ | $L_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | max | 0.31 | 0.03 | 0.71 | 0.645 | 0.46 | 0.85 | 1.65 | | | 0.31 | 0.94 | 0.36 |
| | nom | | | | | | | | 0.6 | 0.285 | | | |
| | min | 0.27 | | 0.69 | 0.625 | 0.44 | 0.75 | 1.55 | | | 0.29 | 0.92 | 0.34 |

Note
1. The marking bar indicates the cathode.

*sod964_po*

| Outline version | References | | | | European projection | Issue date |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOD964 | | | | | | ~~15-08-13~~ 16-01-03 |

**Fig. 14. Package outline DSN1608-2 (SOD964)**

## 11. Soldering

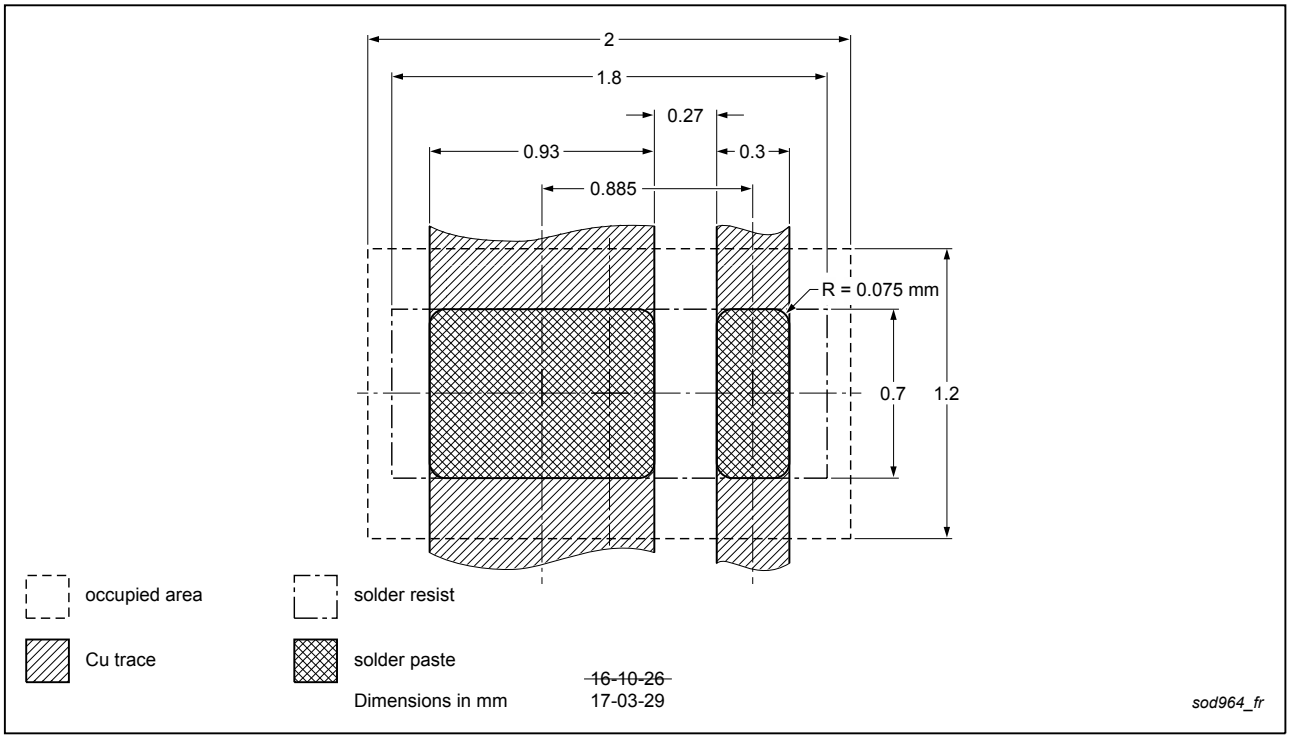



Fig. 15. Reflow soldering footprint for DSN1608-2 (SOD964)

# 12. Revision history

**Table 7. Revision history**

| Data sheet ID | Release date | Data sheet status | Change notice | Supersedes |
|---|---|---|---|---|
| PTVS22VZ1USK v.1 | 20170525 | Product data sheet | - | - |

# 13. 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. |
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