



PZU84-Q series

Voltage regulator diodes

Rev. 1 — 28 May 2024

Product data sheet

1. General description

General-purpose Zener diodes in a small SOT23 Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Two tolerance series: $\pm 2\%$ and approximately $\pm 5\%$
- Wide working voltage range: nominal 2.4 V to 36 V (E24 range)
- PZU84-B5V1-Q to -B10-Q: Very low dynamic impedances at low currents, very low leakage current, hard breakdown knee
- PZU84-B11-Q to -C36-Q: Intentional minor rise of leakage current for optimized fast switching and noise reduction [Ref. [AN90031](#)]
- Qualified according to AEC-Q101 and recommended for use in automotive applications

3. Applications

- General regulation functions

4. Quick reference data

Table 1. Quick reference data

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_F	forward voltage	$I_F = 10\text{ mA}$ [1]	-	-	0.9	V
P_{tot}	total power dissipation	[2]	-	-	250	mW
P_{ZSM}	non-repetitive peak reverse power dissipation	[3]	-	-	40	W

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

[2] Device mounted on a FR4 PCB, single-sided 70 μm copper, tin-plated and standard footprint.

[3] $t_p = 100\text{ }\mu\text{s}$; square wave; $T_j = 25\text{ }^{\circ}\text{C}$ prior to surge.

5. Pinning information

Table 2. Pinning

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode		
2	n.c.	not connected		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PZU84-Q series [1]	SOT23	plastic, surface-mounted package; 3 terminals; 1.9 mm pitch; 2.9 mm x 1.3 mm x 1 mm body	SOT23

[1] The series includes 30 breakdown voltages with nominal working voltages from 2.4 V to 36 V and $\pm 2\%$ and approximately $\pm 5\%$ tolerances.

7. Marking

Table 4. Marking Codes

Type number	Marking code	Type number	Marking code	Type number	Marking code	Type number	Marking code
PZU84-B2V7-Q	%RC	PZU84-B15-Q	%RY	PZU84-C2V4-Q	H4%	PZU84-C15-Q	%LU
PZU84-B3V0-Q	%RD	PZU84-B16-Q	%RZ	PZU84-C2V7-Q	H5%	PZU84-C16-Q	%LV
PZU84-B3V3-Q	%RE	PZU84-B18-Q	S4%	PZU84-C3V0-Q	H6%	PZU84-C18-Q	%LX
PZU84-B3V6-Q	%RF	PZU84-B20-Q	S5%	PZU84-C3V3-Q	%HV	PZU84-C20-Q	%LY
PZU84-B3V9-Q	%RG	PZU84-B22-Q	%SJ	PZU84-C3V6-Q	%HX	PZU84-C22-Q	%LZ
PZU84-B4V3-Q	%RH	PZU84-B24-Q	%SK	PZU84-C3V9-Q	%HY	PZU84-C24-Q	%M2
PZU84-B4V7-Q	%RJ	PZU84-B27-Q	%SL	PZU84-C4V3-Q	%HZ	PZU84-C27-Q	%MM
PZU84-B5V1-Q	%RK	PZU84-B30-Q	%SM	PZU84-C4V7-Q	%JJ	PZU84-C30-Q	%MQ
PZU84-B5V6-Q	%RL	PZU84-B33-Q	%SN	PZU84-C5V1-Q	%JQ	PZU84-C33-Q	N4%
PZU84-B6V2-Q	%RM	PZU84-B36-Q	%SP	PZU84-C5V6-Q	%JS	PZU84-C36-Q	NB%
PZU84-B6V8-Q	%RN	-	-	PZU84-C6V2-Q	%JT	-	-
PZU84-B7V5-Q	%RP	-	-	PZU84-C6V8-Q	%KQ	-	-
PZU84-B8V2-Q	%RQ	-	-	PZU84-C7V5-Q	%KU	-	-
PZU84-B9V1-Q	%RR	-	-	PZU84-C8V2-Q	%KV	-	-
PZU84-B10-Q	%RS	-	-	PZU84-C9V1-Q	%KY	-	-
PZU84-B11-Q	%RT	-	-	PZU84-C10-Q	%LJ	-	-
PZU84-B12-Q	%RU	-	-	PZU84-C11-Q	%LQ	-	-
PZU84-B13-Q	%RV	-	-	PZU84-C12-Q	%LS	-	-
PZU84-B14-Q	%RX	-	-	PZU84-C13-Q	%LT	-	-

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_{tot}	total power dissipation	$T_{amb} = 25\text{ °C}$	[1]	-	250	mW
P_{ZSM}	non-repetitive peak reverse power dissipation		[2]	-	40	W
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			-55	+150	°C
T_{stg}	storage temperature			-65	+150	°C

[1] Device mounted on a FR4 PCB, single-sided 70 µm copper, tin-plated and standard footprint.

[2] $t_p = 100\text{ µs}$; square wave; $T_j = 25\text{ °C}$ prior to surge.

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]	-	-	500	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point	[2]	-	-	330	K/W

[1] Device mounted on a FR4 PCB, single-sided 70 µm copper, tin-plated and standard footprint.

[2] Soldering point of cathode tab.

10. Characteristics

Table 7. Characteristics

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

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

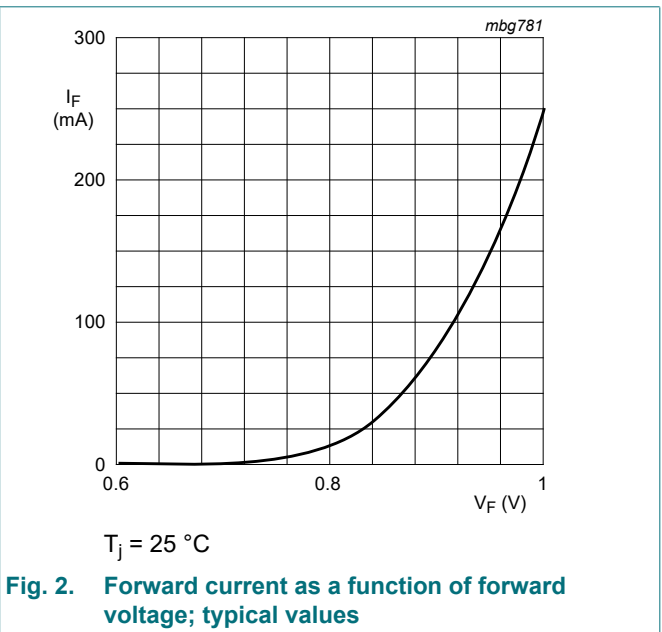
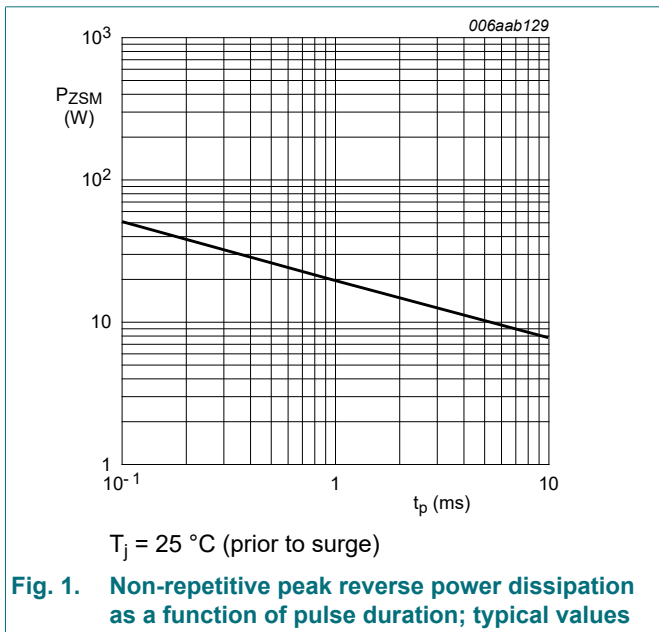
[1] Pulse test: $t_p \leq 300\text{ µs}$; $\delta \leq 0.02$.

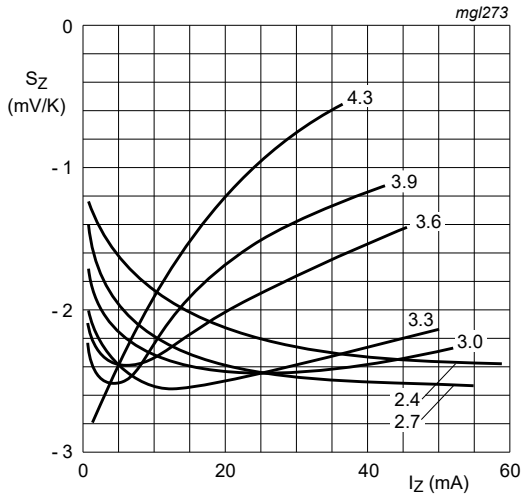
Table 8. Characteristics per type; PZU84-C2V4-Q to PZU84-C36-Q

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

PZU84-	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (μ A)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)
		$I_Z = 5\text{ mA}$		$I_Z = 0.5\text{ mA}$	$I_Z = 5\text{ mA}$	Max	V_R (V)	$I_Z = 5\text{ mA}$		$f = 1\text{ MHz}$ $V_R = 0\text{ V}$
		Min	Max	Max	Max			Min	Max	Max
2V4-Q	C	2.30	2.60	1000	100	50	1.0	-3.5	0.0	450
2V7-Q	B	2.65	2.90	1000	100	20	1.0	-3.5	0.0	440
	C	2.50	2.90							
3V0-Q	B	2.95	3.20	1000	95	10	1.0	-3.5	0.0	425
	C	2.80	3.20							
3V3-Q	B	3.25	3.50	1000	95	5	1.0	-3.5	0.0	410
	C	3.10	3.50							
3V6-Q	B	3.55	3.80	1000	90	5	1.0	-3.5	0.0	390
	C	3.40	3.80							
3V9-Q	B	3.87	4.10	1000	90	3	1.0	-3.5	0.0	370
	C	3.70	4.10							
4V3-Q	B	4.15	4.34	1000	90	3	1.0	-3.5	0.0	350
	C	4.01	4.48							
4V7-Q	B	4.55	4.75	800	80	2	1.0	-3.5	0.2	325
	C	4.42	4.90							
5V1-Q	B	4.98	5.20	250	60	2	1.5	-2.7	1.2	300
	C	4.80	5.40							
5V6-Q	B	5.49	5.73	100	40	1	2.5	-2.0	2.5	275
	C	5.31	5.92							
6V2-Q	B	6.06	6.33	80	30	3	0.5	0.4	3.7	250
	C	5.86	6.53							
6V8-Q	B	6.65	6.93	60	20	2	0.5	1.2	4.5	215
	C	6.47	7.14							
7V5-Q	B	7.28	7.60	60	10	1	0.5	2.5	5.3	170
	C	7.06	7.84							
8V2-Q	B	8.02	8.36	60	10	0.7	0.5	3.2	6.2	150
	C	7.76	8.64							
9V1-Q	B	8.85	9.23	60	10	0.5	0.5	3.8	7.0	120
	C	8.56	9.55							
10-Q	B	9.77	10.21	60	10	0.2	0.1	4.5	8.0	110
	C	9.45	10.55							
11-Q	B	10.76	11.22	60	10	0.1	0.1	5.4	9.0	108
	C	10.44	11.56							
12-Q	B	11.74	12.24	80	10	0.1	0.1	6.0	10.0	105
	C	11.42	12.60							
13-Q	B	12.91	13.49	80	10	0.1	0.1	7.0	11.0	103
	C	12.47	13.96							
14-Q	B	13.70	14.30	80	10	0.1	10	8.0	12.5	101

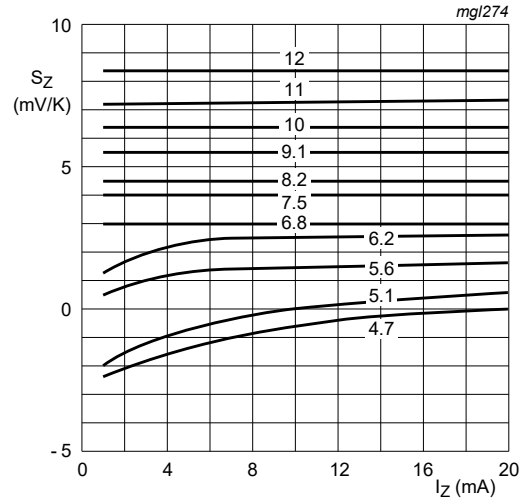
PZU84-	Sel	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (μ A)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)
		$I_Z = 5$ mA		$I_Z = 0.5$ mA	$I_Z = 5$ mA	Max	V_R (V)	$I_Z = 5$ mA		$f = 1$ MHz $V_R = 0$ V
		Min	Max	Max	Max			Min	Max	Max
15-Q	B	14.34	14.98	80	15	0.1	11	9.2	13.0	99
	C	13.84	15.52							
16-Q	B	15.85	16.51	80	20	0.05	12	10.4	14.0	97
	C	15.37	17.09							
18-Q	B	17.56	18.35	80	20	0.05	13	12.4	16.0	93
	C	16.94	19.03							
20-Q	B	19.52	20.39	100	20	0.05	15	14.4	18.0	88
	C	18.86	21.08							
22-Q	B	21.54	22.47	100	25	0.05	17	16.4	20.0	84
	C	20.88	23.17							
24-Q	B	23.72	24.78	120	30	0.05	19	18.4	22.0	80
	C	22.93	25.57							
27-Q	B	26.50	27.50	150	40	0.05	21	21.4	25.3	73
	C	25.10	28.90							
30-Q	B	29.40	30.60	200	40	0.05	23	24.4	29.4	66
	C	28.00	32.00							
33-Q	B	32.34	33.66	250	40	0.05	25	27.4	33.4	60
	C	31.00	35.00							
36-Q	B	35.30	36.70	300	60	0.05	27	30.4	37.4	59
	C	34.00	38.00							





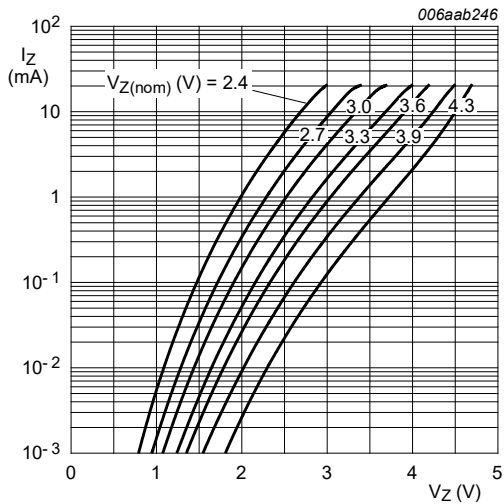
$T_j = 25\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$
 $V_Z = 2.4\text{ V}$ to 4.3 V

Fig. 3. Temperature coefficient as a function of working current; typical values



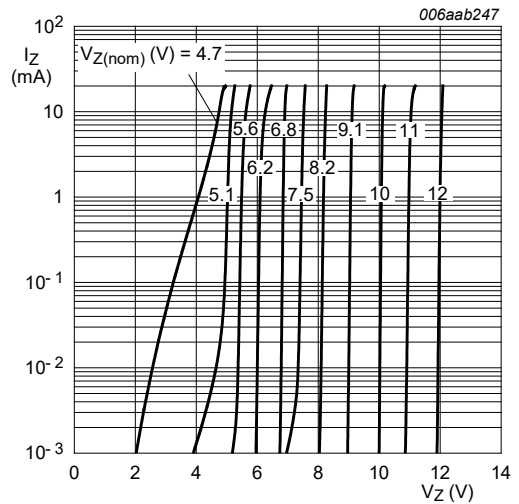
$T_j = 25\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$
 $V_Z = 4.7\text{ V}$ to 12 V

Fig. 4. Temperature coefficient as a function of working current; typical values



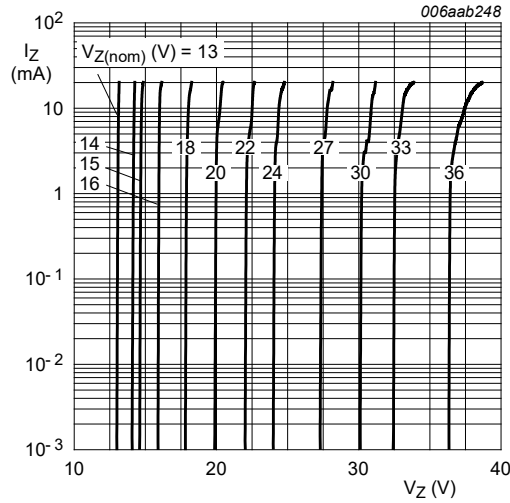
$T_j = 25\text{ }^\circ\text{C}$
 $V_Z = 2.4\text{ V}$ to 4.3 V

Fig. 5. Working current as a function of working voltage; typical values



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

Fig. 6. Working current as a function of working voltage; typical values



$T_j = 25\text{ }^\circ\text{C}$
 $V_Z = 13\text{ V to }36\text{ V}$

Fig. 7. Working current as a function of working voltage; typical values

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

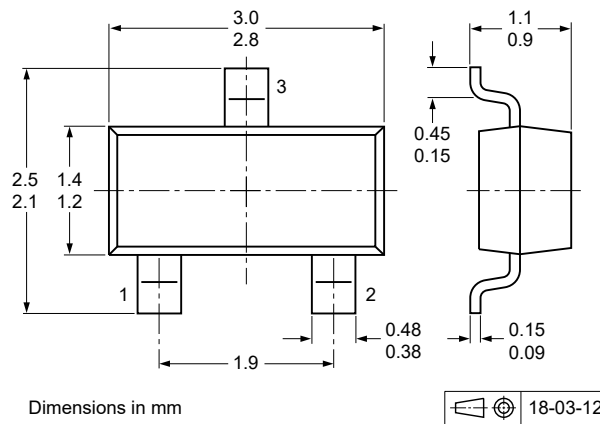
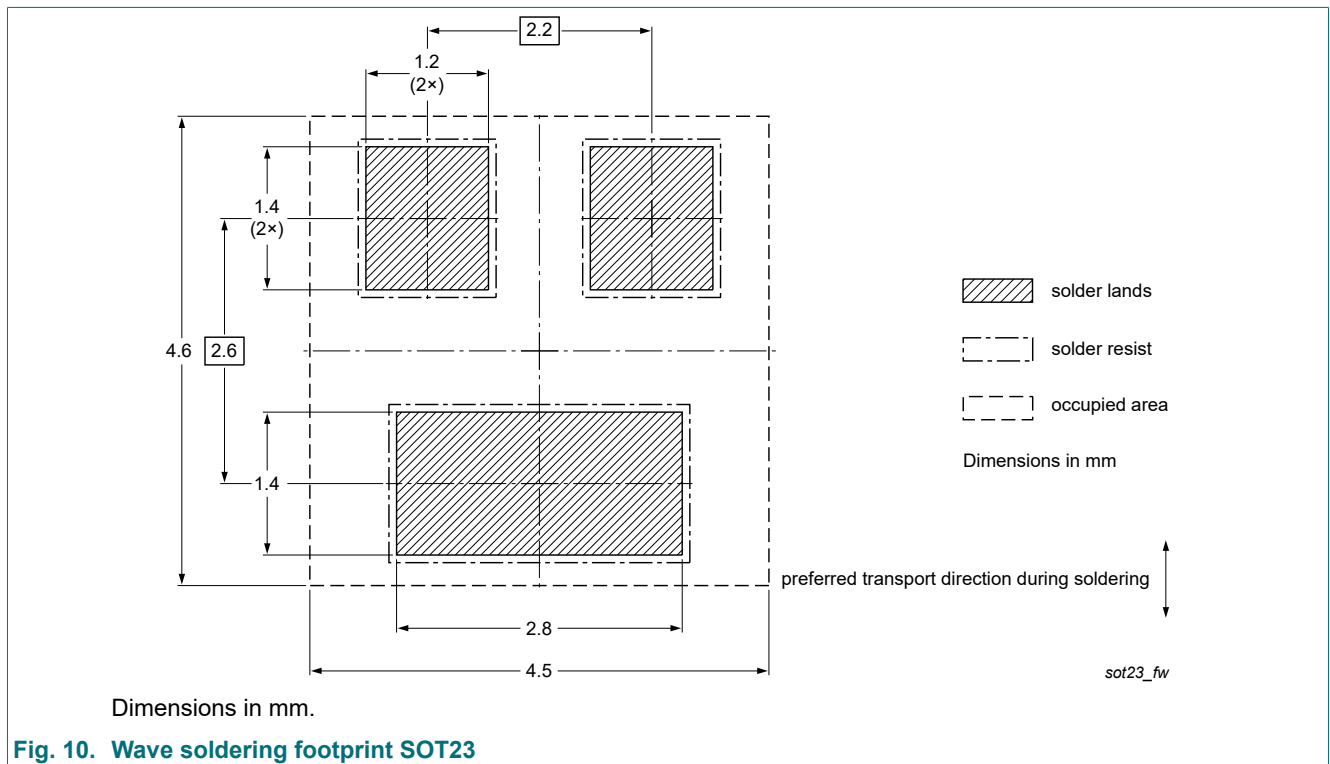
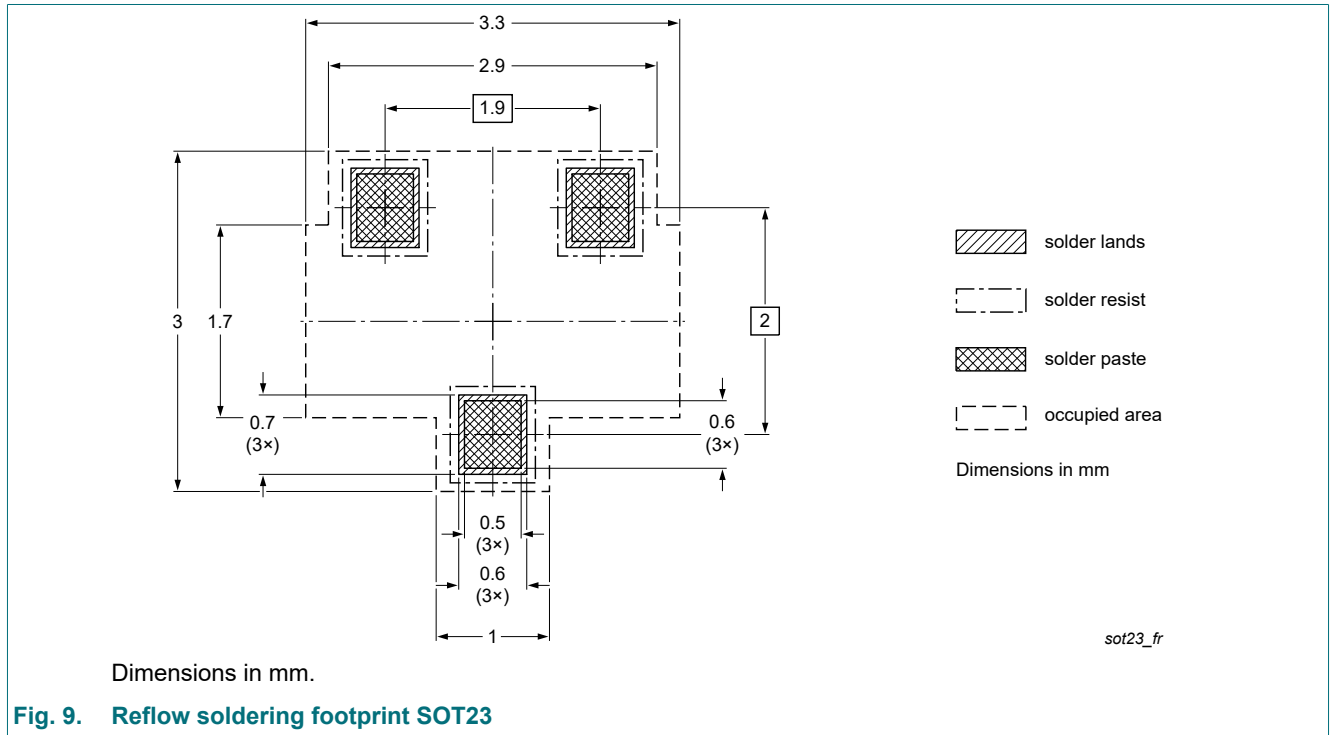


Fig. 8. Package outline SOT23

13. Soldering



14. Revision history

Table 9. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PZU84-Q_SER v.1	20240528	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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