SZMM5Z series

Voltage regulator diodes

Rev. 1 — 10 December 2020 Product data sheet

1. General description

General-purpose Zener diodes in an SOD523 (SC-79) ultra small flat lead Surface-Mounted Device (SMD) plastic package.

2. Features and benefits

- Non-repetitive peak reverse power disspation: ≤ 40 W
- Total power dissipation: ≤ 300 mW
- Tolerance series: ± 2 %
- Wide working voltage range: nominal 2.4 V to 36 V
- Low differential resistance
- AEC-Q101 qualified

3. Applications

- General regulation functions

4. Quick reference data

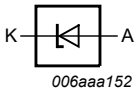
Table 1. Quick reference data

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: $t_p \leq 300\ \mu s$; $\delta \leq 0.02$
[2] t_p = 100 µs; 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]		
2	A	anode		

[1] The marking bar indicates the cathode.

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
SZMM5Z2V4T5G to SZMM5Z36VT5G[1]	SC-79	plastic surface-mounted package; 2 leads	SOD523

[1] The series consists of 29 types with nominal working voltages from 2.4 V to 36 V.

7. Marking

Table 4. Marking Codes

Type number	Marking Code	Type number	Marking Code
SZMM5Z2V4T5G	C1	SZMM5Z10VT5G	E6
SZMM5Z2V7T5G	C2	SZMM5Z11VT5G	E7
SZMM5Z3V0T5G	C3	SZMM5Z12VT5G	E8
SZMM5Z3V3T5G	C4	SZMM5Z13VT5G	E9
SZMM5Z3V6T5G	C5	SZMM5Z15VT5G	E0
SZMM5Z3V9T5G	C6	SZMM5Z16VT5G	EA
SZMM5Z4V3T5G	C7	SZMM5Z18VT5G	EB
SZMM5Z4V7T5G	C8	SZMM5Z20VT5G	EC
SZMM5Z5V1T5G	C9	SZMM5Z22VT5G	ED
SZMM5Z5V6T5G	C0	SZMM5Z24VT5G	EE
SZMM5Z6V2T5G	E1	SZMM5Z27VT5G	EF
SZMM5Z6V8T5G	E2	SZMM5Z30VT5G	EG
SZMM5Z7V5T5G	E3	SZMM5Z33VT5G	EH
SZMM5Z8V2T5G	E4	SZMM5Z36VT5G	EK
SZMM5Z9V1T5G	E5	-	-

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) with aproximately 35 mm^2 Cu area at cathode tab

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]	-	-	350	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[2]	-	-	65	K/W

[1] Device mounted on an FR4 Printed-Circuit Board (PCB) with aproximately 35 mm^2 Cu area at cathode tab
[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: $t_p \leq 300$ µs; $\delta \leq 0.02$

Table 8. Electrical characteristics per type: SZMM5Z2V4T5G to SZMM5Z24VT5G

T_j = 25 °C unless otherwise specified.

SZMM5ZxxxT5G	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 = 1 mA	I_Z = 5 mA	I_Z = 5 mA		
	Min	Max	Max	V_R (V)	Max	Max	Min	Max	Max
2V4	2.35	2.45	50.0	1.0	400	100	-3.5	0	450
2V7	2.65	2.75	20.0	1.0	450	100	-3.5	0	440
3V0	2.94	3.06	10.0	1.0	500	95	-3.5	0	425
3V3	3.23	3.37	5.0	1.0	500	95	-3.5	0	410
3V6	3.53	3.67	5.0	1.0	500	90	-3.5	0	390
3V9	3.82	3.98	3.0	1.0	500	90	-3.5	0	370
4V3	4.21	4.39	3.0	1.0	600	90	-3.5	0	350
4V7	4.61	4.79	3.0	2.0	500	80	-3.5	0.2	325
5V1	5.00	5.20	2.0	2.0	480	60	-2.7	1.2	300
5V6	5.49	5.71	1.0	2.0	400	40	-2.0	2.5	275
6V2	6.08	6.32	3.0	4.0	150	10	0.4	3.7	250
6V8	6.66	6.94	2.0	4.0	80	15	1.2	4.5	215
7V5	7.35	7.65	1.0	5.0	80	10	2.5	5.3	170
8V2	8.04	8.36	0.7	5.0	80	10	3.2	6.2	150
9V1	8.92	9.28	0.5	6.0	100	10	3.8	7.0	120
10V	9.80	10.20	0.2	7.0	150	10	4.5	8.0	110
11V	10.78	11.22	0.1	8.0	150	10	5.4	9.0	110
12V	11.76	12.24	0.1	8.0	150	10	6.0	10.0	105
13V	12.74	13.26	0.1	8.0	170	10	7.0	11.0	105
15V	14.70	15.30	0.05	10.5	200	15	9.2	13.0	100
16V	15.68	16.32	0.05	11.2	200	40	10.4	14.0	90
18V	17.64	18.36	0.05	12.6	225	45	12.4	16.0	80
20V	19.60	20.40	0.05	14.0	225	55	14.4	18.0	70
22V	21.56	22.44	0.05	15.4	250	55	16.4	20.0	60
24V	23.52	24.48	0.05	16.8	250	70	18.4	22.0	55

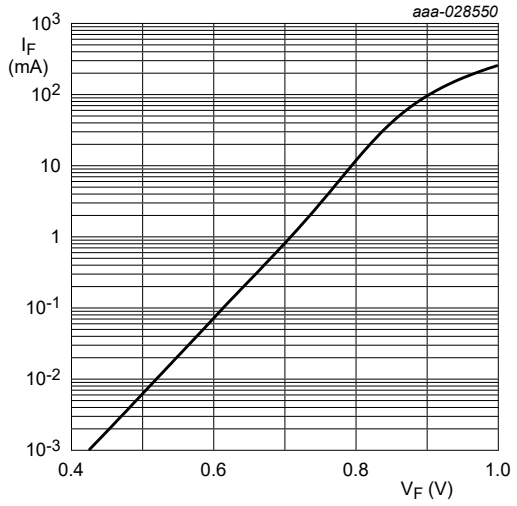
[1] f = 1 MHz; V_R = 0 V

Table 9. Electrical characteristics per type: SZMM5Z27VT5G to SZMM5Z36VT5G

T_j = 25 °C unless otherwise specified.

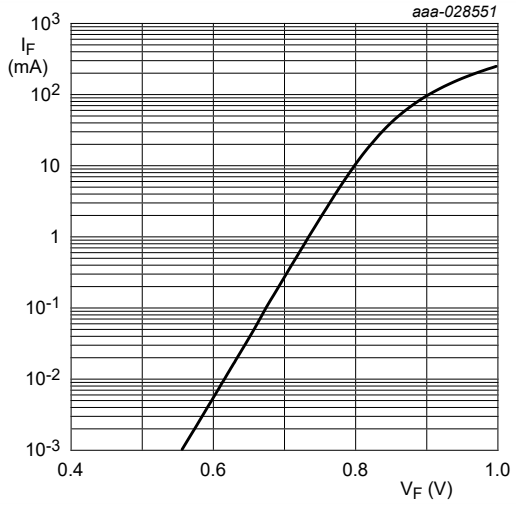
SZMM5ZxxxT5G	Working voltage V_Z (V)		Reverse current I_R (μA)		Differential resistance r_{diff} (Ω)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)[1]
	I_Z =2 mA				I_Z = 0.5 mA	I_Z = 2 mA	I_Z = 2 mA		
	Min	Max	Max	V_R (V)	Max	Max	Min	Max	Max
27V	26.46	27.54	0.05	18.9	300	80	21.4	25.3	50
30V	29.40	30.60	0.05	21.0	300	80	24.4	29.4	50
33V	32.34	33.66	0.05	23.1	325	80	27.4	33.4	45
36V	35.28	36.72	0.05	25.2	350	90	30.4	37.4	45

[1] f = 1 MHz; V_R = 0 V



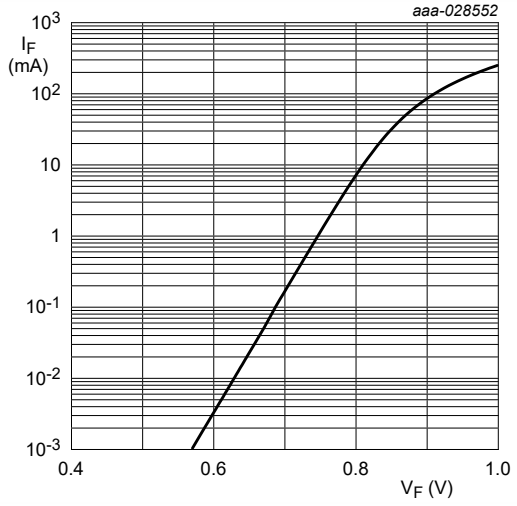
T_j = 25 ° C

Fig. 1. Forward current as a function of forward voltage; typical values (SZMM5Z2V4T5G)



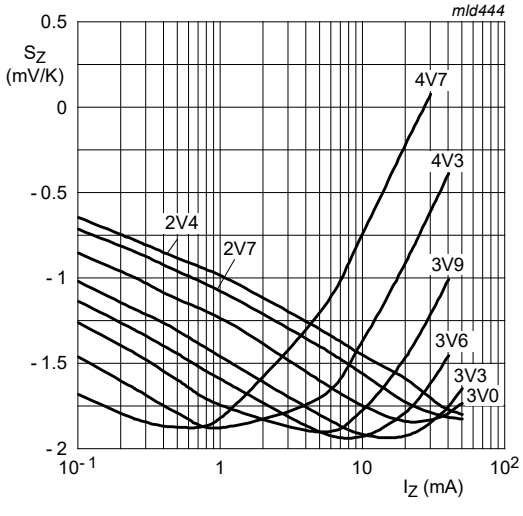
T_j = 25 ° C

Fig. 2. Forward current as a function of forward voltage; typical values (SZMM5Z6V8T5G)



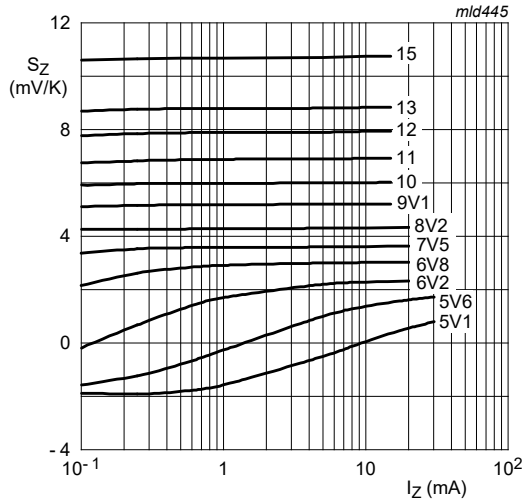
T_j = 25 ° C

Fig. 3. Forward current as a function of forward voltage; typical values (SZMM5Z7V5T5G)



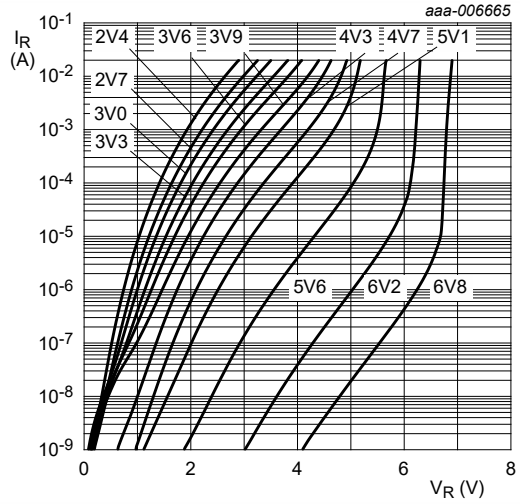
T_j = 25 °C to 150 °C

Fig. 4. Temperature coefficient as a function of working current; typical values (SZMM5Z2V4T5G to 4V7T5G)



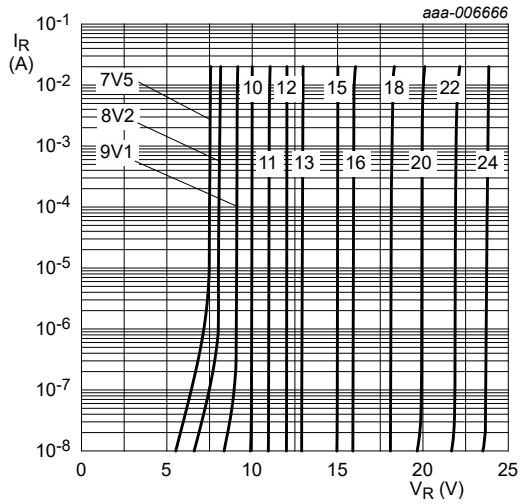
T_j = 25 °C to 150 °C

Fig. 5. Temperature coefficient as a function of working current; typical values (SZMM5Z5V1T5G to 15VT5G)



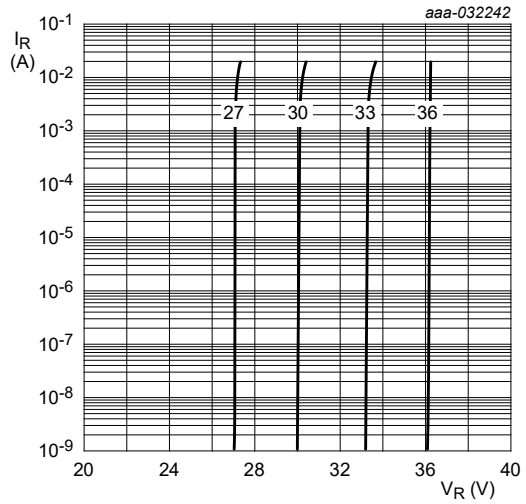
T_j = 25 °C

Fig. 6. Reverse current as a function of reverse voltage; typical values (SZMM5Z2V4T5G to 6V8T5G)



T_j = 25 °C

Fig. 7. Reverse current as a function of reverse voltage; typical values (SZMM5Z7V5T5G to 24VT5G)



T_j = 25 °C

Fig. 8. Reverse current as a function of reverse voltage; typical values (SZMM5Z27VT5G to 36VT5G)

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

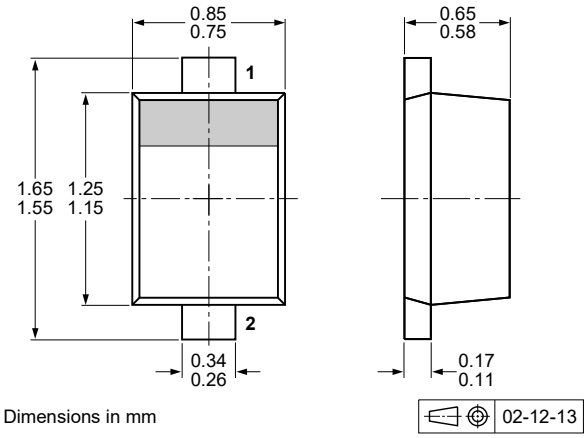


Fig. 9. Package outline SOD523 (SC-79)

13. Soldering

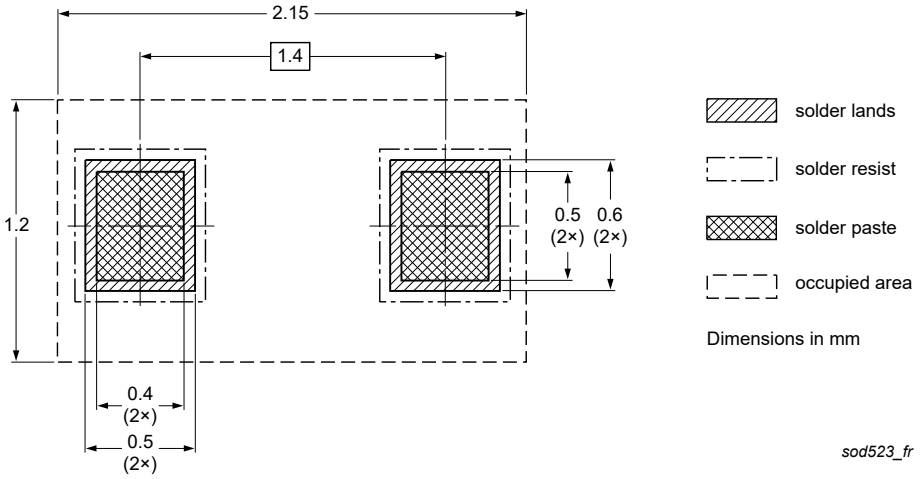


Fig. 10. Reflow soldering footprint SOD523 (SC-79)

14. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
SZMM5Z_SER v.1	20201210	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.

[1] Please consult the most recently issued document before initiating or completing a design.
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