

TDZxJ series

Single Zener diodes

Rev. 2 — 29 July 2011 Product data sheet

1. Product profile

1.1 General description

General-purpose Zener diodes in a SOD323F (SC-90) very small and flat lead Surface-Mounted Device (SMD) plastic package.

1.2 Features and benefits

- Non-repetitive peak reverse power dissipation: ≤ 180 W
- Total power dissipation: ≤ 500 mW
- Very small plastic package suitable for surface-mounted design
- Low differential resistance
- AEC-Q101 qualified

1.3 Applications

- General regulation functions

1.4 Quick reference data

Table 1. Quick reference data

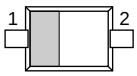
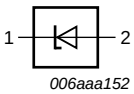
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage	I_F = 100 mA	[1]	-	-	1.1	V
P_{tot}	total power dissipation	T_{amb} ≤ 25 °C	[2]	-	-	500	mW

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

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated, mounting pad for cathode 16 mm^2.

2. Pinning information

Table 2. Pinning

Pin	Description		Simplified outline	Graphic symbol
1	cathode	[1]		 006aaa152
2	anode			

[1] The marking bar indicates the cathode.

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
TDZxJ series	SC-90	plastic surface-mounted package; 2 leads	SOD323F

4. Marking

Table 4. Marking codes

Type number	Marking code	Type number	Marking code
TDZ2V4J	3A	TDZ9V1J	3Q
TDZ2V7J	3B	TDZ10J	3R
TDZ3V0J	3C	TDZ11J	3S
TDZ3V3J	3D	TDZ12J	3T
TDZ3V6J	3E	TDZ13J	3U
TDZ3V9J	3F	TDZ15J	3V
TDZ4V3J	3G	TDZ16J	3W
TDZ4V7J	3H	TDZ18J	3Y
TDZ5V1J	3J	TDZ20J	3Z
TDZ5V6J	JQ	TDZ22J	4A
TDZ6V2J	3K	TDZ24J	4B
TDZ6V8J	3L	TDZ27J	4C
TDZ7V5J	3N	TDZ30J	4D
TDZ8V2J	3P	-	-

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5. 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			-	250	mA
I_{ZSM}	non-repetitive peak reverse current		[1]	-	see Table 8 and 10	
P_{ZSM}	non-repetitive peak reverse power dissipation		[1]			
	TDZ2V4J to TDZ5V6J			-	180	W
	TDZ6V2J to TDZ6V8J			-	100	W
	TDZ7V5J to TDZ30J			-	40	W
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	500	mW
T_j	junction temperature			-	150	°C
T_{amb}	ambient temperature			−55	+150	°C
T_{stg}	storage temperature			−65	+150	°C

[1] $t_p = 100$ μs; square wave; $T_j = 25$ °C before surge.

[2] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 16 mm^2.

6. 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]	-	-	250	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[2]	-	-	25	K/W

[1] Device mounted on an FR4 PCB, single-sided copper, tin-plated, mounting pad for cathode 16 mm^2.

[2] Soldering point of cathode tab.

7. Characteristics

Table 7. Characteristics

$T_j = 25$ °C unless otherwise specified.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_F	forward voltage		[1]				
		$I_F = 10$ mA		-	-	0.9	V
		$I_F = 100$ mA		-	-	1.1	V

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

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Table 8. Characteristics per type; Zener TDZ2V4J to Zener TDZ24J

T_j = 25 °C unless otherwise specified.

TDZxxxJ	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
	I_Z = 5 mA		I_Z = 1 mA	I_Z = 5 mA			I_Z = 5 mA			
	Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max	Max
2V4	2.35	2.45	400	100	50	1.0	–3.5	0	450	15
2V7	2.65	2.75	450	100	20	1.0	–3.5	0	440	15
3V0	2.94	3.06	500	95	10	1.0	–3.5	0	425	15
3V3	3.23	3.37	500	95	5	1.0	–3.5	0	410	15
3V6	3.53	3.67	500	90	5	1.0	–3.5	0	390	15
3V9	3.82	3.98	500	90	3	1.0	–3.5	0	370	15
4V3	4.21	4.39	600	90	3	1.0	–3.5	0	350	15
4V7	4.61	4.79	500	80	3	2.0	–3.5	0.2	325	15
5V1	5.00	5.20	480	60	2	2.0	–2.7	1.2	300	15
5V6	5.49	5.71	400	40	10	2.5	–2	2.5	275	15
6V2	6.08	6.32	150	10	3	4.0	0.4	3.7	250	12
6V8	6.66	6.94	80	15	2	4.0	1.2	4.5	215	12
7V5	7.5	7.65	80	10	1	5.0	2.5	5.3	170	4.0
8V2	8.04	8.36	80	10	0.70	5.0	3.2	6.2	150	4.0
9V1	8.92	9.28	100	10	0.50	6.0	3.8	7.0	120	3.0
10	9.80	10.20	150	10	0.20	7.0	4.5	8.0	110	3.0
11	10.80	11.20	150	10	0.10	8.0	5.4	9.0	108	2.5
12	11.80	12.20	150	10	0.10	8.0	6.0	10	105	2.5
13	12.70	13.30	170	10	0.10	8.0	7.0	11	103	2.5
15	14.70	15.30	200	15	0.05	10.5	9.2	13	99	2.0
16	15.70	16.30	200	20	0.05	11.2	10.4	14	97	1.5
18	17.6	18.4	225	20	0.05	12.6	12.4	16	93	1.5
20	19.6	20.4	225	20	0.05	14.0	14.4	18	88	1.5
22	21.6	22.4	250	25	0.05	15.4	16.4	20	84	1.25
24	23.5	24.5	250	30	0.05	16.8	18.4	22	80	1.25

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

[2] t_p = 100 μs; square wave; T_j = 25 °C before surge.

Table 9. Characteristics per type; Zener TDZ5V6J

T_j = 25 °C unless otherwise specified.

TDZxxxJ	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Temperature coefficient S_Z (mV/K)	
	I_Z = 10 mA		I_Z = 0.5 mA	I_Z = 10 mA	I_Z = 5 mA	
	Min	Max	Max	Max	Min	Max
5V6	5.20	6.00	500	7	–1.7	2.8

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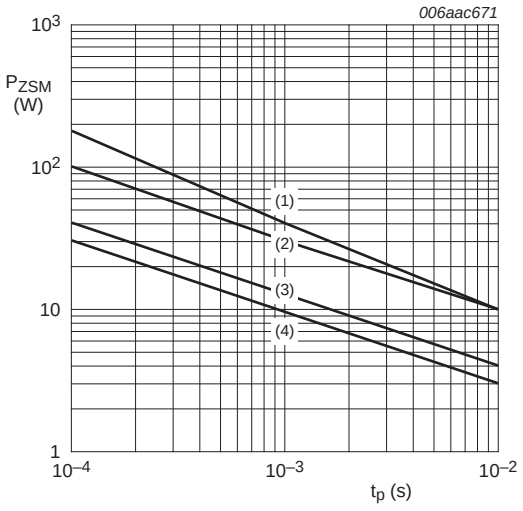
Table 10. Characteristics per type; Zener TDZ27J to Zener TDZ30J

T_j = 25 °C unless otherwise specified.

TDZxxxJ	Working voltage V_Z (V)		Differential resistance r_{dif} (Ω)		Reverse current I_R (μA)		Temperature coefficient S_Z (mV/K)		Diode capacitance C_d (pF)[1]	Non-repetitive peak reverse current I_{ZSM} (A)[2]
	I_Z = 2 mA		I_Z = 0.5 mA	I_Z = 2 mA			I_Z = 2 mA			
	Min	Max	Max	Max	Max	V_R (V)	Min	Max	Max	Max
27	26.5	27.5	250	40	0.05	18.9	21.4	25.3	73	1
30	29.4	30.6	250	40	0.05	21	24.4	29.4	66	1

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

[2] t_p = 100 μs; square wave; T_j = 25 °C before surge.



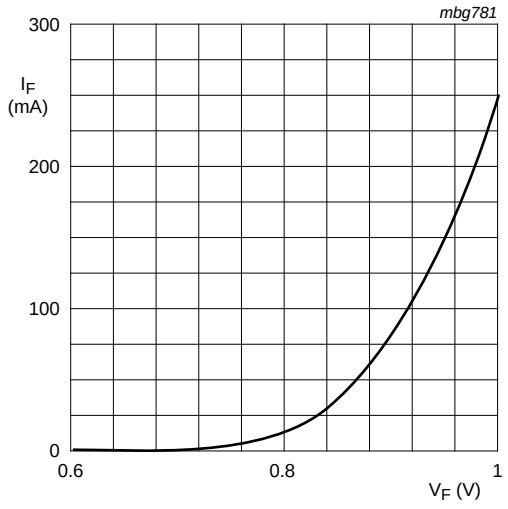
(1) TDZ2V4J to TDZ5V6J

(2) TDZ6V2J to TDZ6V8J

(3) TDZ7V5J to TDZ30J; T_j = 25 °C before surge

(4) TDZ7V5J to TDZ30J; T_j = 150 °C before surge

Fig 1. Non-repetitive peak reverse power dissipation as a function of pulse duration; maximum values

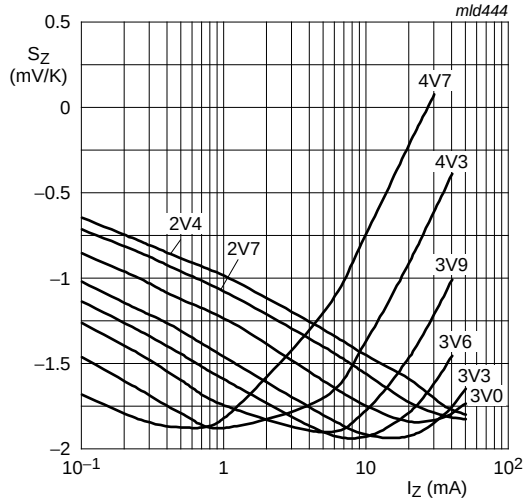


T_j = 25 °C

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

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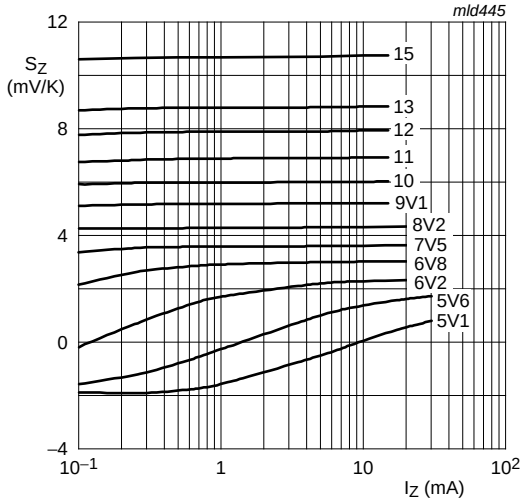
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TDZ2V4J to TDZ4V7J

T_j = 25 °C to 150 °C

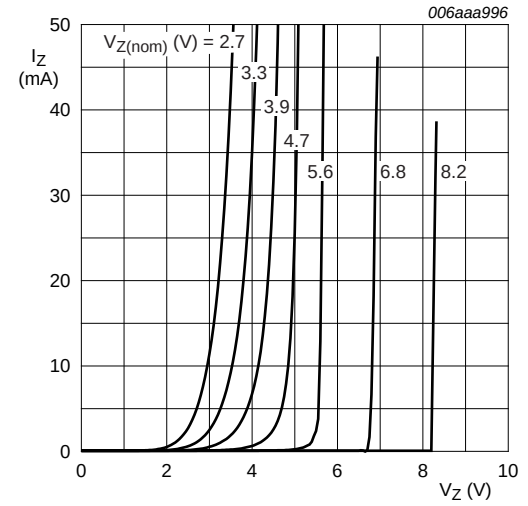
Fig 3. Temperature coefficient as a function of working current; typical values



TDZ5V1J to TDZ15J

T_j = 25 °C to 150 °C

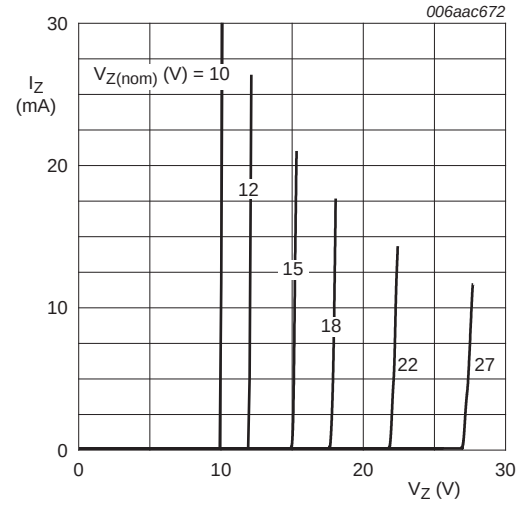
Fig 4. Temperature coefficient as a function of working current; typical values



TDZ2V7J to TDZ6V6J

T_j = 25 °C

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



TDZ10J to TDZ27J

T_j = 25 °C

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

8. Test information

8.1 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.

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9. Package outline

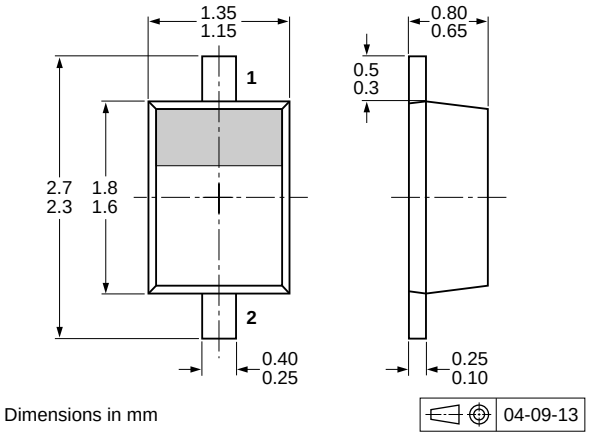


Fig 7. Package outline SOD323F (SC-90)

10. Packing information

Table 11. Packing methods

The indicated -xxx are the last three digits of the 12NC ordering code.[1]

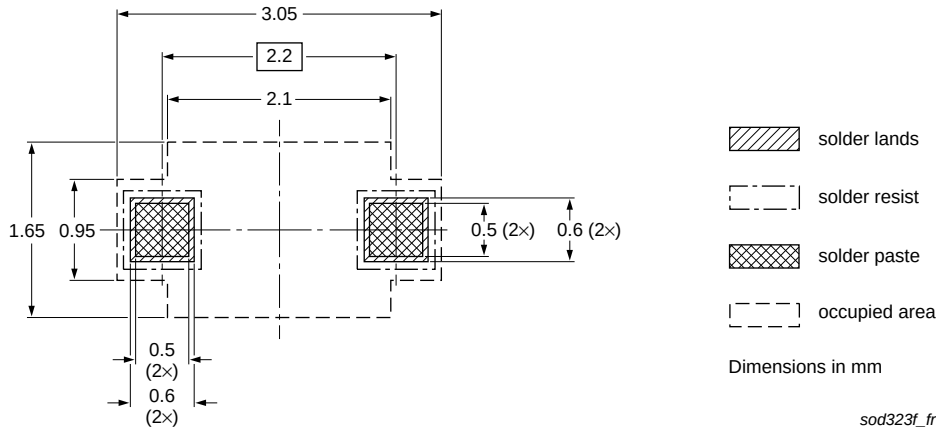
Type number	Package	Description	Packing quantity	
			3000	10000
TDZxJ series	SOD323F	4 mm pitch, 8 mm tape and reel	-115	-135

[1] For further information and the availability of packing methods, see Section 14.

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11. Soldering



Reflow soldering is the only recommended soldering method.

Fig 8. Reflow soldering footprint SOD323F (SC-90)

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12. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
TDZXJ_SER v.2	20110729	Product data sheet	-	TDZ5V6J v.1
Modifications:	• Added type numbers TDZ2V4J, TDZ2V7J, TDZ3V0J, TDZ3V3J, TDZ3V6J, TDZ3V9J, TDZ4V3J, TDZ4V7J, TDZ5V1J, TDZ6V2J, TDZ6V8J, TDZ7V5J, TDZ8V2J, TDZ9V1J, TDZ10J, TDZ11J, TDZ12J, TDZ13J, TDZ15J, TDZ16J, TDZ18J, TDZ20J, TDZ22J, TDZ24J, TDZ27J and TDZ30J. • Added Table 8 to 10. • Updated Figure 1 to 4 and added Figure 5 and 6.			
TDZ5V6J v.1	20100823	Product data sheet	-	-

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13. Legal information

13.1 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.

[2] The term 'short data sheet' is explained in section "Definitions".

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