

PZUxDB2 series

Dual Zener diodes

Rev. 01 — 31 March 2008 Product data sheet

1. Product profile

1.1 General description

Dual isolated general-purpose Zener diodes in SOT353 (SC-88A) very small Surface-Mounted Device (SMD) standard plastic and dark-green plastic packages.

1.2 Features

- Non-repetitive peak reverse power dissipation: P_{ZSM} = 40 W
- Total power dissipation: $P_{tot} \leq 250$ mW
- Tolerance series: B2: approximately ±2 %
- Wide working voltage range: nominal 2.7 V to 24 V
- Dual isolated diodes configuration
- Small standard plastic package suitable for surface-mounted design
- Small dark-green, halogen-free plastic package suitable for surface-mounted design
- 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
Per diode							
V_F	forward voltage	I_F = 100 mA	[1]	-	-	1.1	V
P_{ZSM}	non-repetitive peak reverse power dissipation		[2]	-	-	40	W

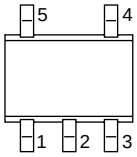
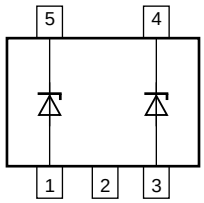
[1] Pulse test: $t_p \leq 300$ µs; $\delta \leq 0.02$.

[2] t_p = 100 µs; square wave; T_j = 25 °C prior to surge

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2. Pinning information

Table 2. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	anode (diode 1)		
2	not connected		
3	anode (diode 2)		
4	cathode (diode 2)		
5	cathode (diode 1)		

006aab219

3. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
PZU2.7DB2 to PZU24DB2[1]	SC-88A	plastic surface-mounted package; 5 leads	SOT353
PZU2.7DB2/DG to PZU24DB2/DG[1][2]			

[1] The series consists of 25 types with nominal working voltages from 2.7 V to 24 V.

[2] /DG: halogen-free plastic package

4. Marking

Table 4. Marking codes

Type number	Marking code[1]	Type number[2]	Marking code[1]
PZU2.7DB2	T1*	PZU2.7DB2/DG	U1*
PZU3.0DB2	T2*	PZU3.0DB2/DG	U2*
PZU3.3DB2	T3*	PZU3.3DB2/DG	U3*
PZU3.6DB2	T4*	PZU3.6DB2/DG	U4*
PZU3.9DB2	T5*	PZU3.9DB2/DG	U5*
PZU4.3DB2	T6*	PZU4.3DB2/DG	U6*
PZU4.7DB2	T7*	PZU4.7DB2/DG	U7*
PZU5.1DB2	T8*	PZU5.1DB2/DG	U8*
PZU5.6DB2	T9*	PZU5.6DB2/DG	U9*
PZU6.2DB2	TA*	PZU6.2DB2/DG	UA*
PZU6.8DB2	TB*	PZU6.8DB2/DG	UB*
PZU7.5DB2	TC*	PZU7.5DB2/DG	UC*
PZU8.2DB2	TD*	PZU8.2DB2/DG	UD*
PZU9.1DB2	TE*	PZU9.1DB2/DG	UE*

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Table 4. Marking codes *…continued*

Type number	Marking code[1]	Type number[2]	Marking code[1]
PZU10DB2	TF*	PZU10DB2/DG	UF*
PZU11DB2	TG*	PZU11DB2/DG	UG*
PZU12DB2	TH*	PZU12DB2/DG	UH*
PZU13DB2	TK*	PZU13DB2/DG	UK*
PZU14DB2	TL*	PZU14DB2/DG	UL*
PZU15DB2	TM*	PZU15DB2/DG	UM*
PZU16DB2	TN*	PZU16DB2/DG	UN*
PZU18DB2	TP*	PZU18DB2/DG	UP*
PZU20DB2	TR*	PZU20DB2/DG	UR*
PZU22DB2	TS*	PZU22DB2/DG	US*
PZU24DB2	TT*	PZU24DB2/DG	UT*

[1] * = -: made in Hong Kong
* = p: made in Hong Kong
* = t: made in Malaysia
* = W: made in China

[2] /DG: halogen-free plastic package

5. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
Per diode						
I_F	forward current			-	200	mA
I_{ZSM}	non-repetitive peak reverse current		[1]	-	see Table 8	
P_{ZSM}	non-repetitive peak reverse power dissipation		[1]	-	40	W
Per device						
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	[2]	-	250	mW
			[3]	-	275	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 prior to surge

[2] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.

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

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6. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Per device							
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1]	-	-	500	K/W
			[2]	-	-	455	K/W
$R_{th(j-sp)}$	thermal resistance from junction to solder point		[3]	-	-	200	K/W

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

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

[3] Soldering points at pin 4 and pin 5.

7. Characteristics

Table 7. Characteristics

T_j = 25 °C unless otherwise specified.

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

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

Table 8. Characteristics per type; PZU2.7DB2 to PZU24DB2 and PZU2.7DB2/DG to PZU24DB2/DG

T_j = 25 °C unless otherwise specified.

PZUxDB2 PZUxDB2/DG	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 = 0.5 mA	I_Z = 5 mA			I_Z = 5 mA		
	Min	Max	Max	Max	Max	V_R (V)	Typ	Max	Max
2.7	2.65	2.9	1000	100	20	1	–2.0	440	8
3.0	2.95	3.2	1000	95	10	1	–2.1	425	8
3.3	3.25	3.5	1000	95	5	1	–2.4	410	8
3.6	3.55	3.8	1000	90	5	1	–2.4	390	8
3.9	3.87	4.1	1000	90	3	1	–2.5	370	8
4.3	4.15	4.34	1000	90	3	1	–2.5	350	8
4.7	4.55	4.75	800	80	2	1	–1.4	325	8
5.1	4.98	5.2	250	60	2	1.5	0.3	300	5.5
5.6	5.49	5.73	100	40	1	2.5	1.9	275	5.5
6.2	6.06	6.33	80	30	0.5	3	2.7	250	5.5
6.8	6.65	6.93	60	20	0.5	3.5	3.4	215	5.5
7.5	7.28	7.6	60	10	0.5	4	4.0	170	3.5

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Table 8. Characteristics per type; PZU2.7DB2 to PZU24DB2 and PZU2.7DB2/DG to PZU24DB2/DG *...continued*

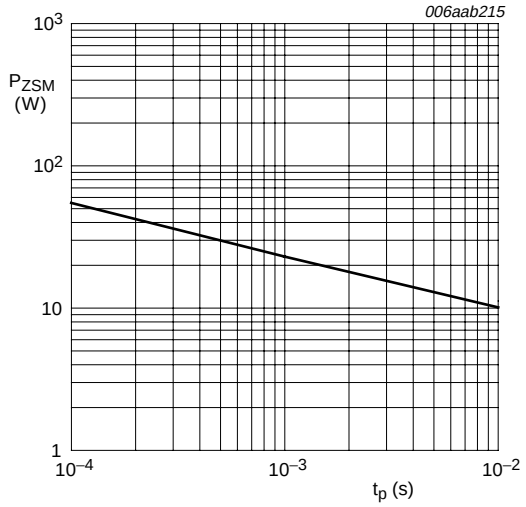
T_j = 25 °C unless otherwise specified.

PZUxDB2 PZUxDB2/DG	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 = 0.5 mA	I_Z = 5 mA			I_Z = 5 mA		
	Min	Max	Max	Max	Max	V_R (V)	Typ	Max	Max
8.2	8.02	8.36	60	10	0.5	5	4.6	150	3.5
9.1	8.85	9.23	60	10	0.5	6	5.5	120	3.5
10	9.77	10.21	60	10	0.1	7	6.4	110	3.5
11	10.76	11.22	60	10	0.1	8	7.4	108	3
12	11.74	12.24	80	10	0.1	9	8.4	105	3
13	12.91	13.49	80	10	0.1	10	9.4	103	2.5
14	13.7	14.3	80	10	0.1	11	10.4	101	2
15	14.34	14.98	80	15	0.05	11	11.4	99	2
16	15.85	16.51	80	20	0.05	12	12.4	97	1.5
18	17.56	18.35	80	20	0.05	13	14.4	93	1.5
20	19.52	20.39	100	20	0.05	15	16.4	88	1.5
22	21.54	22.47	100	25	0.05	17	18.4	84	1.3
24	23.72	24.78	120	30	0.05	19	20.4	80	1.3

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

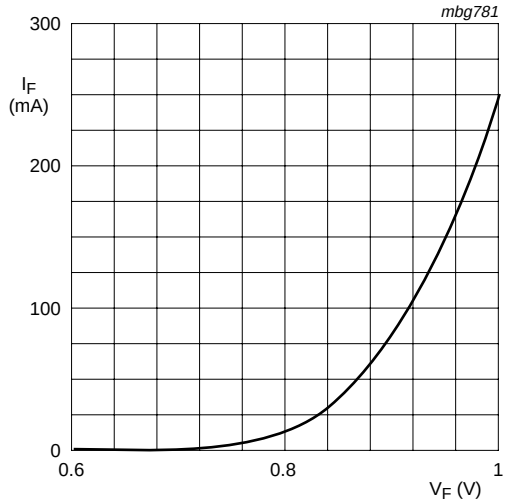
[2] t_p = 100 μs; square wave; T_j = 25 °C prior to surge

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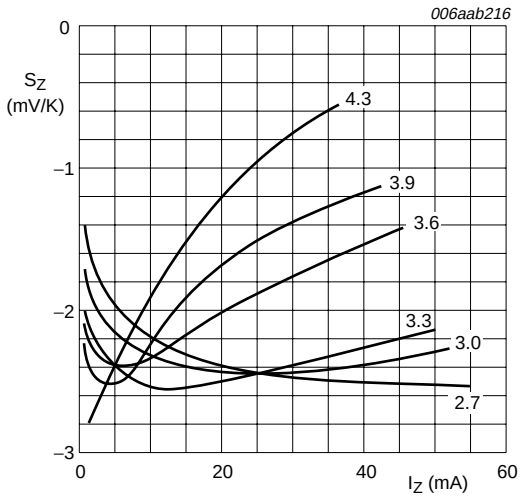
T_j = 25 °C (prior to surge)

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

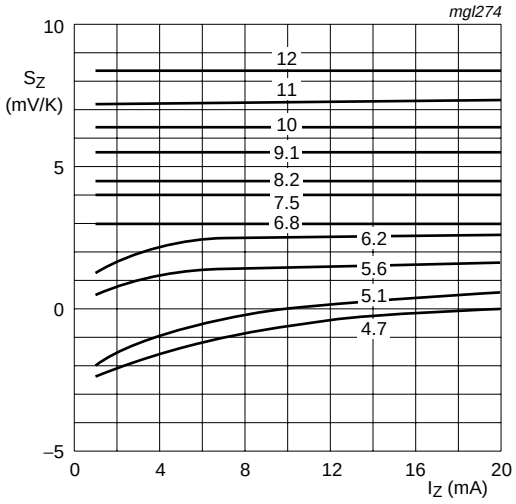


T_j = 25 °C to 150 °C

PZU2.7DB2 to PZU4.3DB2

PZU2.7DB2/DG to PZU4.3DB2/DG

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



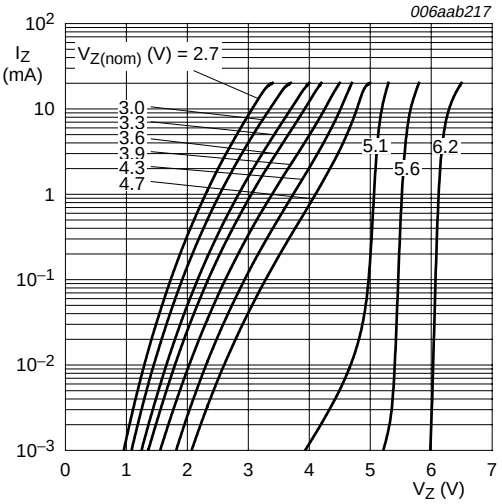
T_j = 25 °C to 150 °C

PZU4.7DB2 to PZU12DB2

PZU4.7DB2/DG to PZU12DB2/DG

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

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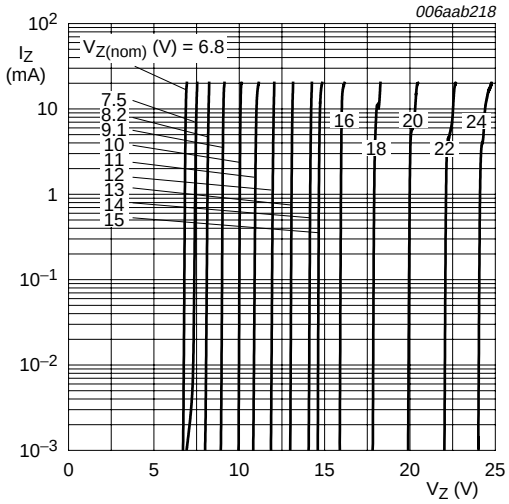


T_j = 25 °C

PZU2.7DB2 to PZU6.2DB2

PZU2.7DB2/DG to PZU6.2DB2/DG

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



T_j = 25 °C

PZU6.8DB2 to PZU24DB2

PZU6.8DB2/DG to PZU24DB2/DG

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

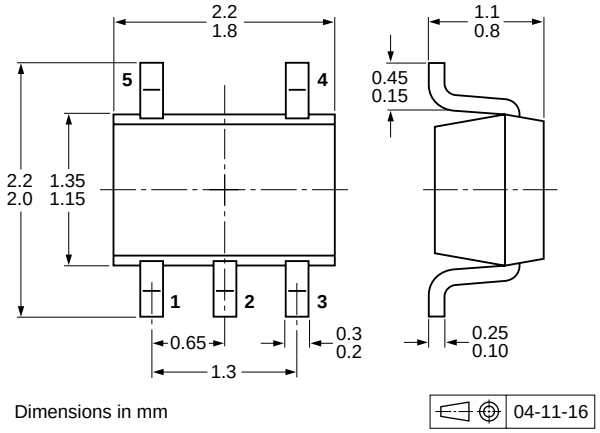


Fig 7. Package outline SOT353 (SC-88A)

10. Packing information

Table 9. Packing methods

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

Type number	Package	Description	Packing quantity	
			3000	10000
PZU2.7DB2 to PZU24DB2	SOT353	4 mm pitch, 8 mm tape and reel	-115	-135
PZU2.7DB2/DG to PZU24DB2/DG				

[1] For further information and the availability of packing methods, see Section 13.

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11. Soldering

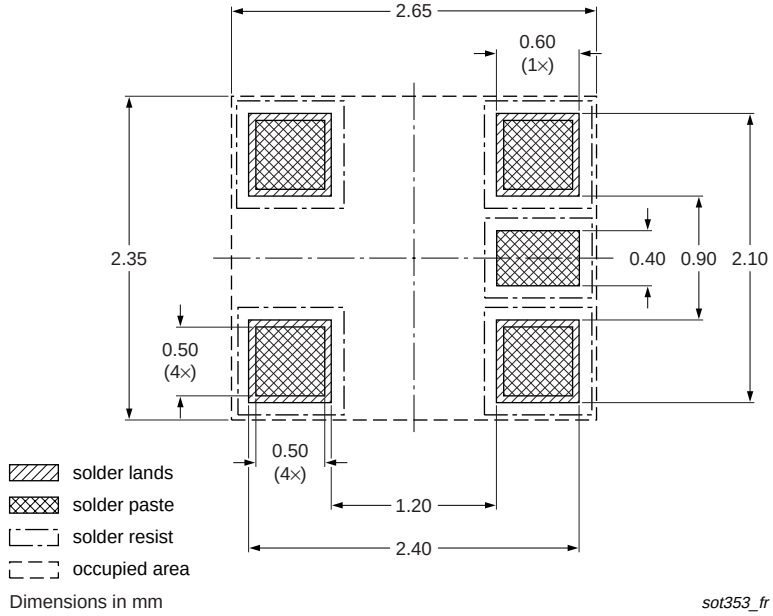


Fig 8. Reflow soldering footprint SOT353 (SC-88A)

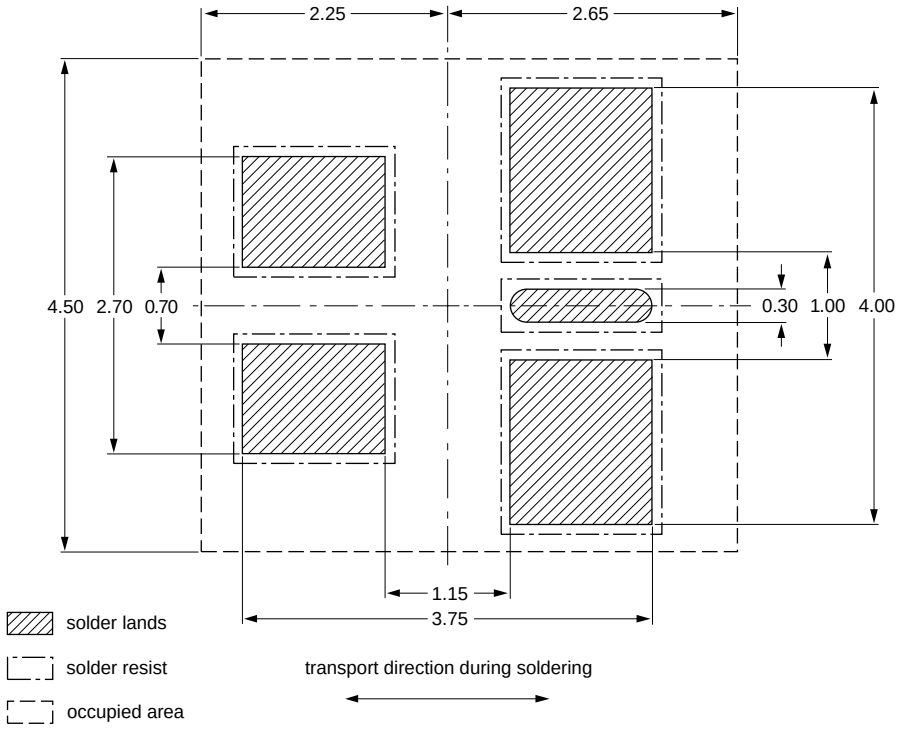


Fig 9. Wave soldering footprint SOT353 (SC-88A)

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12. Revision history

Table 10. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
PZUXDB2_SER_1	20080331	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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