

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: $P_{ZSM} = 40 \text{ W}$
- Total power dissipation: $P_{tot} \leq 250 \text{ mW}$
- Tolerance series:
B2: approximately $\pm 2 \%$
- 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

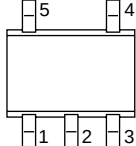
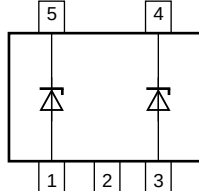
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Per diode						
V_F	forward voltage	$I_F = 100 \text{ mA}$	[1] -	-	1.1	V
P_{ZSM}	non-repetitive peak reverse power dissipation		[2] -	-	40	W

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

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

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*

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	$T_{amb} \leq 25\text{ °C}$	^[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] $t_p = 100\text{ }\mu\text{s}$; square wave; $T_j = 25\text{ °C}$ 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 .

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 cm².

[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 ≤ 300 μs; δ ≤ 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.

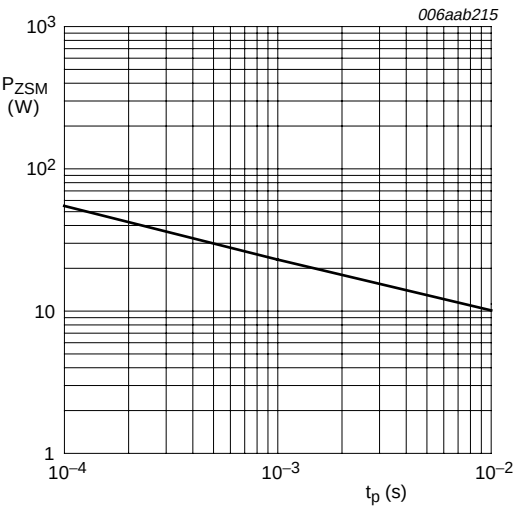
PZUxDB2 PZUxDB2/DG	Working voltage V _Z (V)		Differential resistance r _{dif} (Ω)		Reverse current I _R (μA)		Temperature coefficient S _Z (mV/K)	Diode capacitance C _d (pF) [1]	Non-repetitive peak reverse current I _{ZSM} (A) [2]
	I _Z = 5 mA		I _Z = 0.5 mA	I _Z = 5 mA			I _Z = 5 mA		
	Min	Max	Max	Max	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

Table 8. Characteristics per type; PZU2.7DB2 to PZU24DB2 and PZU2.7DB2/DG to PZU24DB2/DG ...continued
 $T_j = 25\text{ }^{\circ}\text{C}$ 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]
	$I_Z = 5\text{ mA}$		$I_Z = 0.5\text{ mA}$	$I_Z = 5\text{ mA}$			$I_Z = 5\text{ mA}$		
	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

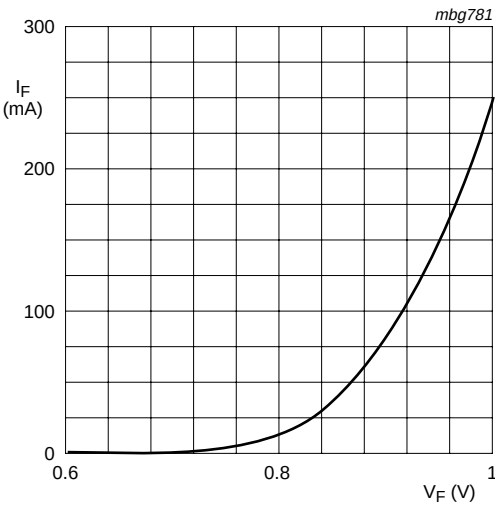
[1] $f = 1\text{ MHz}$; $V_R = 0\text{ V}$

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



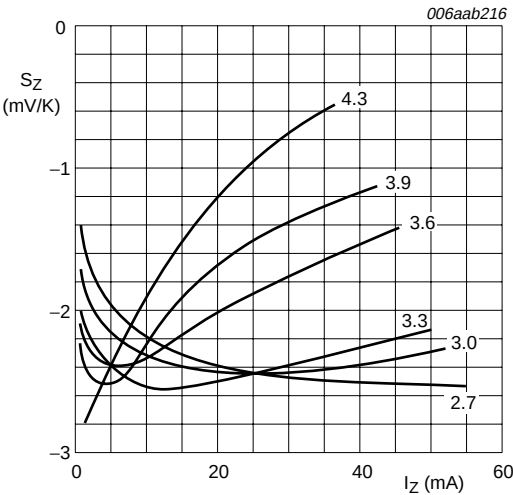
$T_j = 25\text{ }^{\circ}\text{C}$ (prior to surge)

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



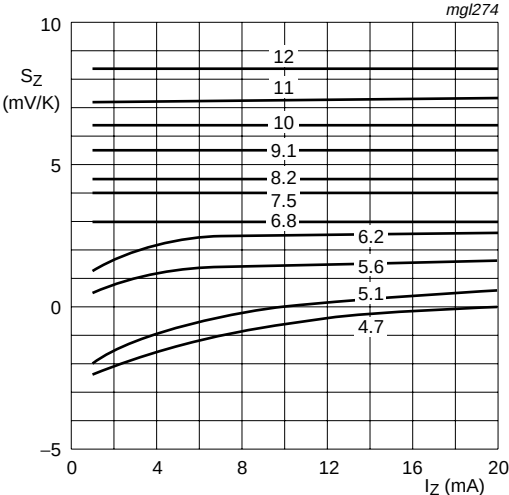
$T_j = 25\text{ }^{\circ}\text{C}$

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



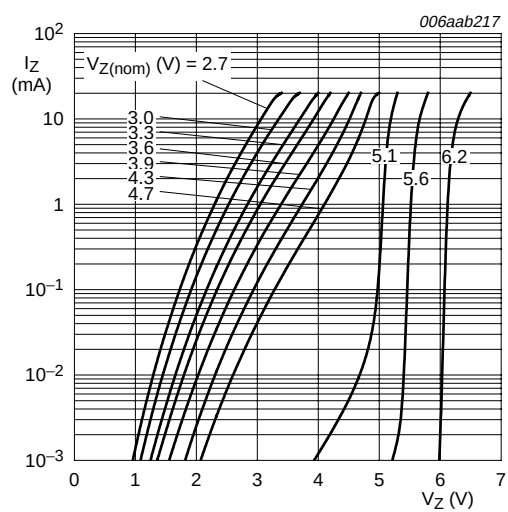
$T_j = 25\text{ }^{\circ}\text{C}$ to $150\text{ }^{\circ}\text{C}$
PZU2.7DB2 to PZU4.3DB2
PZU2.7DB2/DG to PZU4.3DB2/DG

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



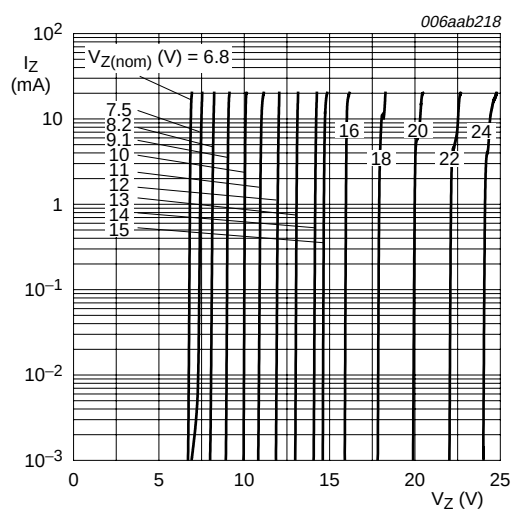
$T_j = 25\text{ }^{\circ}\text{C}$ to $150\text{ }^{\circ}\text{C}$
PZU4.7DB2 to PZU12DB2
PZU4.7DB2/DG to PZU12DB2/DG

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



$T_j = 25\text{ }^{\circ}\text{C}$
PZU2.7DB2 to PZU6.2DB2
PZU2.7DB2/DG to PZU6.2DB2/DG

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



$T_j = 25\text{ }^{\circ}\text{C}$
PZU6.8DB2 to PZU24DB2
PZU6.8DB2/DG to PZU24DB2/DG

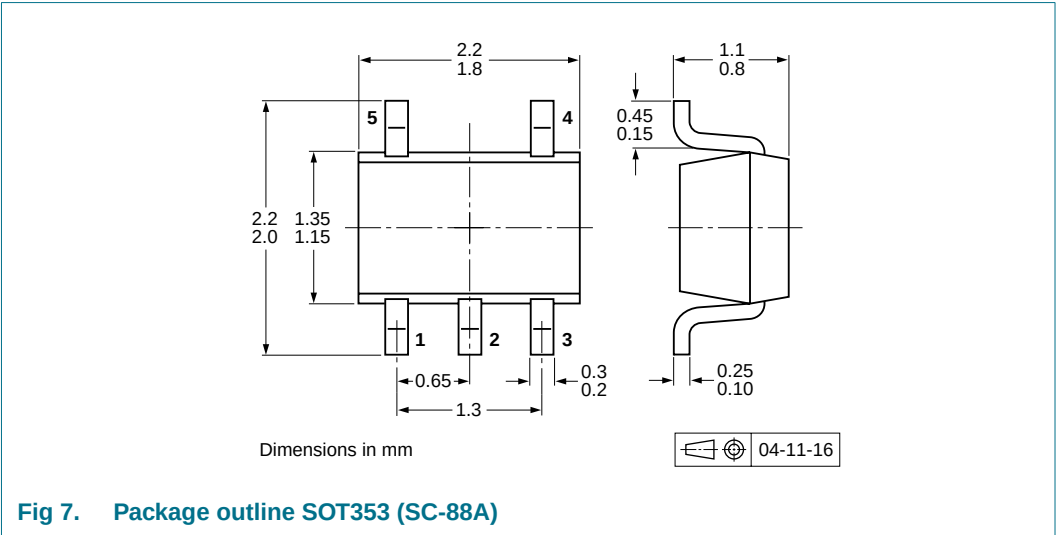
Fig 6. Working current as a function of working voltage; typical values

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.

9. Package outline



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](#).

11. Soldering

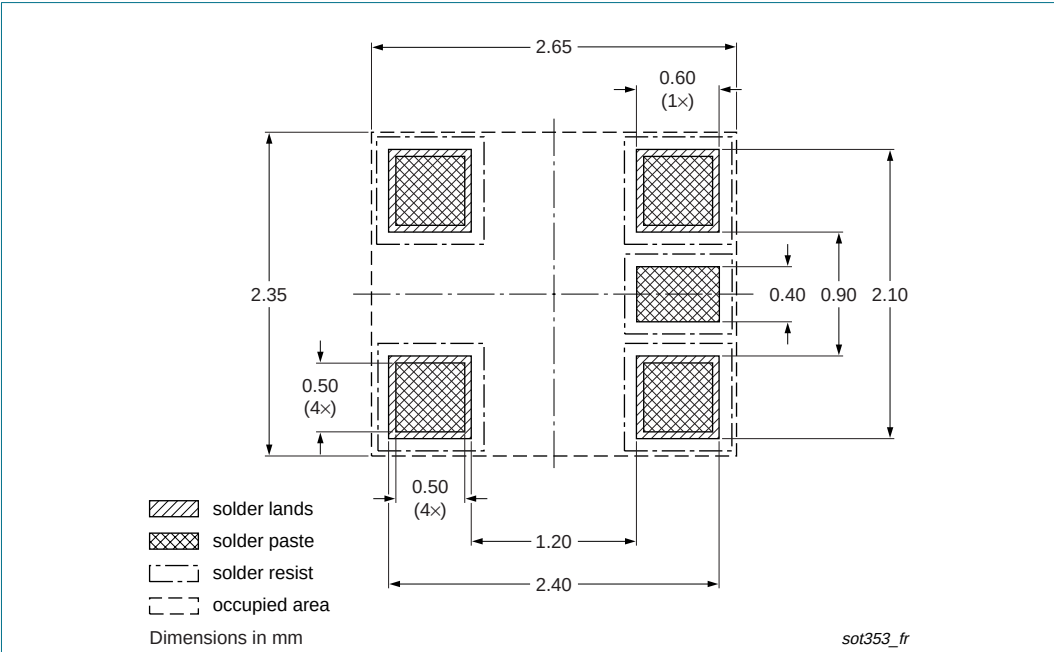


Fig 8. Reflow soldering footprint SOT353 (SC-88A)

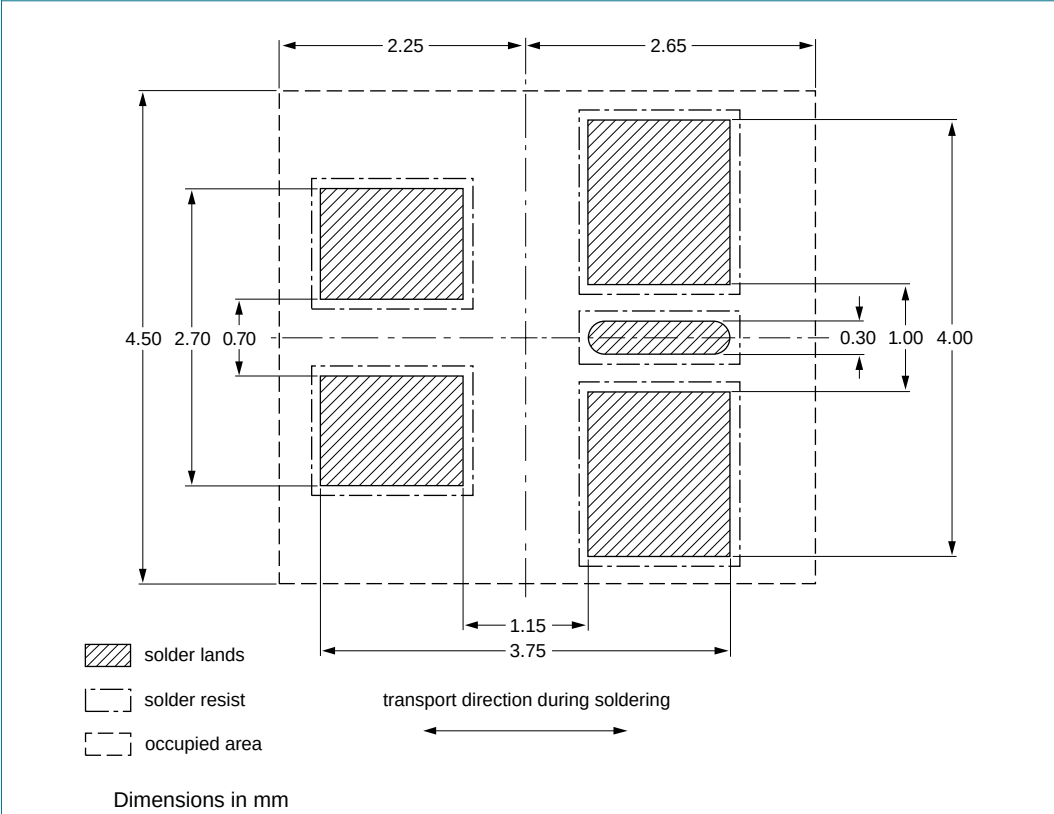


Fig 9. Wave soldering footprint SOT353 (SC-88A)

12. Revision history

Table 10. Revision history

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

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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

13.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

13.3 Disclaimers

General — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental

damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nxp.com/profile/terms>, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Quick reference data — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

13.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

14. Contact information

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

15. Contents

1	Product profile	1
1.1	General description.	1
1.2	Features	1
1.3	Applications	1
1.4	Quick reference data.	1
2	Pinning information	2
3	Ordering information	2
4	Marking	2
5	Limiting values	3
6	Thermal characteristics	4
7	Characteristics	4
8	Test information	7
8.1	Quality information	7
9	Package outline	8
10	Packing information	8
11	Soldering	9
12	Revision history	10
13	Legal information	11
13.1	Data sheet status	11
13.2	Definitions	11
13.3	Disclaimers	11
13.4	Trademarks	11
14	Contact information	11
15	Contents	12

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.

founded by

PHILIPS

© NXP B.V. 2008.

All rights reserved.

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 31 March 2008

Document identifier: PZUXDB2_SER_1