Low-power buffer/line driver; 3-state Rev. 2 — 18 April 2018

Product data sheet

1 General description

The 74AXP1G125 is a single buffer/line driver with 3-state output.

Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times.

This device ensures very low static and dynamic power consumption across the entire V_{CC} range from 0.7 V to 2.75 V. It is fully specified for partial power down applications using I_{OFF} . The I_{OFF} circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

2 Features and benefits

- Wide supply voltage range from 0.7 V to 2.75 V
- Low input capacitance; C_I = 0.5 pF (typical)
- Low output capacitance; C_O = 1.0 pF (typical)
- Low dynamic power consumption; C_{PD} = 2.5 pF at V_{CC} = 1.2 V (typical)
- Low static power consumption; I_{CC} = 0.6 μA (85 °C maximum)
- · High noise immunity
- Complies with JEDEC standard:
 - JESD8-12A.01 (1.1 V to 1.3 V)
 - JESD8-11A.01 (1.4 V to 1.6 V)
 - JESD8-7A (1.65 V to 1.95 V)
 - JESD8-5A.01 (2.3 V to 2.7 V)
- ESD protection:
 - HBM ANSI/ESDA/JEDEC JS-001 Class 2 exceeds 2 kV
 - CDM JESD22-C101E exceeds 1000 V
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 2.75 V
- Low noise overshoot and undershoot < 10 % of V_{CC}
- I_{OFF} circuitry provides partial Power-down mode operation
- Multiple package options
- Specified from -40 °C to +85 °C

ne<mark>x</mark>peria

3 Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74AXP1G125GM	-40 °C to +85 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm	SOT886
74AXP1G125GN	-40 °C to +85 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 x 1.0 x 0.35 mm	SOT1115
74AXP1G125GS	-40 °C to +85 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 x 1.0 x 0.35 mm	SOT1202
74AXP1G125GX	-40 °C to +85 °C	X2SON5	plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.35 mm	SOT1226

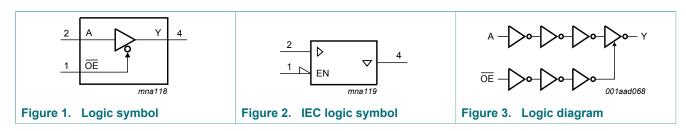
4 Marking

Table 2.	Marking

Type number	Marking code ^[1]
74AXP1G125GM	rM
74AXP1G125GN	rM
74AXP1G125GS	rM
74AXP1G125GX	rM

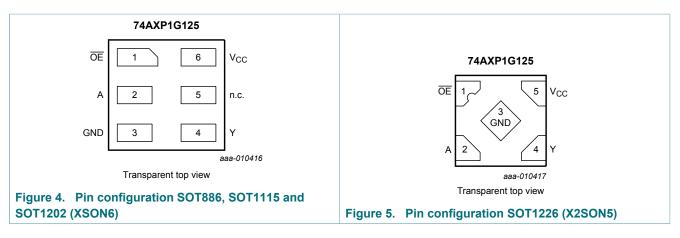
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

5 Functional diagram



6 Pinning information

6.1 Pinning



6.2 Pin description

Table 3. Pin description					
Symbol	Pin	Description			
	X2SON5	XSON6			
ŌĒ	1	1	output enable input		
A	2	2	data input		
GND	3	3	ground (0 V)		
Y	4	4	data output		
n.c.	-	5	not connected		
V _{CC}	5	6	supply voltage		

7 Functional description

Table 4. Function table

H = HIGH voltage level; L = LOW voltage level; X = Don't care; Z = high-impedance OFF-state.

Input		Output
ŌE	A	Y
L	L	L
L	Н	Н
Н	X	Z

74AXP1G125 Product data sheet

8 Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Max	Unit
V _{CC}	supply voltage		-0.5	+3.3	V
I _{IK}	input clamping current	V _I < 0 V	-50	-	mA
VI	input voltage	[1]	-0.5	+3.3	V
I _{OK}	output clamping current	V _O < 0 V	-50	-	mA
Vo	output voltage	[1]	-0.5	+3.3	V
I _O	output current	$V_{O} = 0 V$ to V_{CC}	-	±20	mA
I _{CC}	supply current		-	50	mA
I _{GND}	ground current		-50	-	mA
T _{stg}	storage temperature		-65	+150	°C
P _{tot}	total power dissipation	T _{amb} = -40 °C to +85 °C	-	250	mW

[1] The minimum input and output voltage ratings may be exceeded if the input and output current ratings are observed.

9 Recommended operating conditions

Table 6. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Max	Unit
V _{CC}	supply voltage		0.7	2.75	V
VI	input voltage		0	2.75	V
Vo	output voltage	Active mode	0	V _{CC}	V
		Power-down mode; V_{CC} = 0 V	0	2.75	V
T _{amb}	ambient temperature		-40	+85	°C
Δt/ΔV	input transition rise and fall rate	V_{CC} = 0.7 V to 2.75 V	0	200	ns/V

10 Static characteristics

Table 7. Static characteristics

At recommended operating conditions, unless otherwise specified; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions		T _{amb} = -40 °	°C to +85 °C		Unit
			Min	Typ 25 °C	Max 25 °C	Max 85 °C	
V _{IH}	HIGH-level input	V _{CC} = 0.75 V to 0.85 V	0.75V _{CC}	-	-	-	V
	voltage	V _{CC} = 1.1 V to 1.95 V	0.65V _{CC}	-	-	-	V
		V_{CC} = 2.3 V to 2.7 V	1.6	-	-	-	V
V _{IL}	LOW-level input	V _{CC} = 0.75 V to 0.85 V	-	-	0.25V _{CC}	0.25V _{CC}	V
	voltage	V _{CC} = 1.1 V to 1.95 V	-	-	0.35V _{CC}	0.35V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V	-	-	0.7	0.7	V
V _{OH}	HIGH-level	I_{O} = -20 µA; V_{CC} = 0.7 V	-	0.69	-	-	V
	output voltage	I_{O} = -100 µA; V_{CC} = 0.75 V	0.65	-	-	-	V
		I _O = -2 mA; V _{CC} = 1.1 V	0.825	-	-	-	V
		I _O = -3 mA; V _{CC} = 1.4 V	1.05	-	-	-	V
		I _O = -4.5 mA; V _{CC} = 1.65 V	1.2	-	-	-	V
		I _O = -8 mA; V _{CC} = 2.3 V	1.7	-	-	-	V
V _{OL}	LOW-level	I_{O} = 20 µA; V_{CC} = 0.7 V	-	0.01	-	-	V
	output voltage	I_{O} = 100 µA; V_{CC} = 0.75 V	-	-	0.1	0.1	V
		I _O = 2 mA; V _{CC} = 1.1 V	-	-	0.275	0.275	V
		I _O = 3 mA; V _{CC} = 1.4 V	-	-	0.35	0.35	V
		I _O = 4.5 mA; V _{CC} = 1.65 V	-	-	0.45	0.45	V
		I _O = 8 mA; V _{CC} = 2.3 V	-	-	0.7	0.7	V
l _l	input leakage current	$V_{I} = 0 V \text{ to } 2.75 V;$ [1 $V_{CC} = 0 V \text{ to } 2.75 V$] _	0.001	±0.1	±0.5	μA
I _{OZ}	OFF-state output current	$V_{I} = V_{IH} \text{ or } V_{IL}; V_{O} = 0 \text{ V to } 2.75 \text{ V}^{-1}$] _	0.02	±0.1	±0.5	μA
I _{OFF}	power-off leakage current	$V_{I} \text{ or } V_{O} = 0 \text{ V to } 2.75 \text{ V};$ [1 $V_{CC} = 0 \text{ V}$] _	0.01	±0.1	±0.5	μA
ΔI _{OFF}	additional power-off leakage current	$V_{I} \text{ or } V_{O} = 0 \text{ V or } 2.75 \text{ V};$ $V_{CC} = 0 \text{ V to } 0.1 \text{ V}$ [1]] _	0.02	±0.1	±0.5	μA
I _{CC}	supply current	$V_{\rm I} = 0 \text{ V or } V_{\rm CC}; I_{\rm O} = 0 \text{ A}$ ^[1]	¹ -	0.01	0.3	0.6	μA
ΔI _{CC}	additional supply current	$V_{I} = V_{CC} - 0.5 V; I_{O} = 0 A;$ $V_{CC} = 2.5 V$	-	2	100	150	μA

[1] All typical values are measured at V_{CC} = 1.2 V.

11 Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit, see Figure 13.

Symbol	Parameter	Conditions		Tai	_{mb} = 25	°C	T _{amb} = -40 °	C to +85 °C	Unit
				Min	Typ ^[1]	Max	Min	Мах	
t _{pd}	propagation	A to Y; see <u>Figure 6</u>	[2] [3]						
	delay	V_{CC} = 0.75 V to 0.85 V		3	11	38	2	132	ns
		V _{CC} = 1.1 V to 1.3 V		2.0	4.3	7.0	1.8	7.3	ns
		V _{CC} = 1.4 V to 1.6 V		1.6	3.2	4.7	1.5	5.0	ns
		V _{CC} = 1.65 V to 1.95 V		1.4	2.7	3.8	1.2	4.1	ns
		$V_{\rm CC}$ = 2.3 V to 2.7 V		1.1	2.1	2.8	1.0	3.1	ns
t _{en}	enable time	OE to Y; see Figure 7	[2] [3]						
		V_{CC} = 0.75 V to 0.85 V		5	15	45	4	160	ns
		V _{CC} = 1.1 V to 1.3 V		2.7	5.6	8.7	2.5	9.1	ns
		V _{CC} = 1.4 V to 1.6 V		2.1	4.1	5.8	1.9	6.2	ns
		V _{CC} = 1.65 V to 1.95 V		1.7	3.4	4.8	1.5	5.2	ns
		V_{CC} = 2.3 V to 2.7 V		1.4	2.6	3.6	1.2	3.9	ns
t _{dis}	disable time	OE to Y; see Figure 7	[2]						
		V_{CC} = 0.75 V to 0.85 V		4	14	42	1	152	ns
		V _{CC} = 1.1 V to 1.3 V		2.9	5.9	9.5	2.7	9.9	ns
		V _{CC} = 1.4 V to 1.6 V		2.3	4.4	6.6	2.0	7.1	ns
		V _{CC} = 1.65 V to 1.95 V		2.4	4.5	6.6	2.1	7.1	ns
		V_{CC} = 2.3 V to 2.7 V		1.7	3.3	4.7	1.5	5.1	ns
t _t	transition time	V _{CC} = 2.7 V; see <u>Figure 6</u>	[2]	-	-	-	1.0	-	ns
CI	input capacitance	V_{I} = 0 V or V_{CC} ; V_{CC} = 0 V to 2.75 V		-	0.5	-	-	-	pF
C _O	output capacitance	V _O = 0 V; V _{CC} = 0 V		-	1	-	-	-	pF
C _{PD}		$f_i = 1 \text{ MHz}; V_i = 0 \text{ V to } V_{CC}$	[4]						
	capacitance	V _{CC} = 0.75 V to 0.85 V		-	2.4	-	-	-	pF
		V _{CC} = 1.1 V to 1.3 V		-	2.5	-	-	-	pF
		V _{CC} = 1.4 V to 1.6 V		-	2.6	-	-	-	pF
		V _{CC} = 1.65 V to 1.95 V		-	2.6	-	-	-	pF
		V_{CC} = 2.3 V to 2.7 V		-	3.0	-	-	-	pF

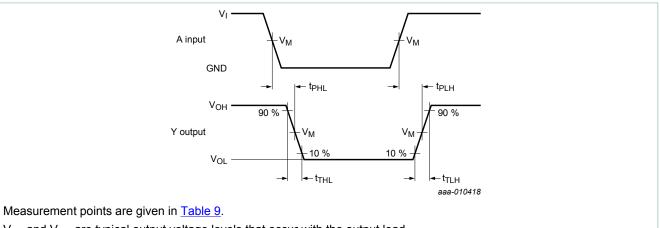
[1] All typical values are measured at nominal V_{CC}. [2] t_{pd} is the same as t_{PLH} and t_{PHL} ; t_{en} is the same as t_{PZH} and t_{PZL} ; t_{dis} is the same as t_{PHZ} and t_{PLZ} ; t_t is the same as t_{THL} and t_{TLH} . [3] For additional propagation delays and enable times values at different load capacitances see Figure 8 to Figure 12.

[4] C_{PD} is used to determine the dynamic power dissipation (P_D in μ W).

 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + C_L \times V_{CC}^2 \times f_o$ where:

fi = input frequency in MHz; fo = output frequency in MHz; CL = output load capacitance in pF; VCC = supply voltage in V; N = number of inputs switching.

11.1 Waveforms and test circuit



 V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Figure 6. The data input (A) to output (Y) propagation delays

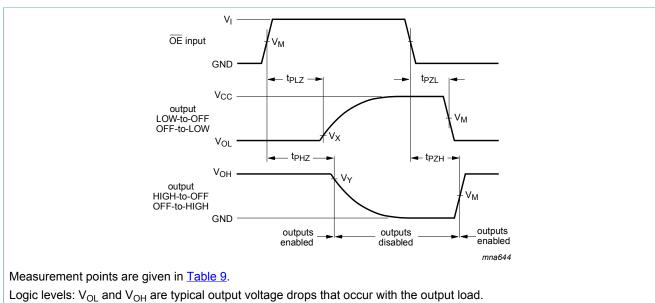


Figure 7. Enable and disable times

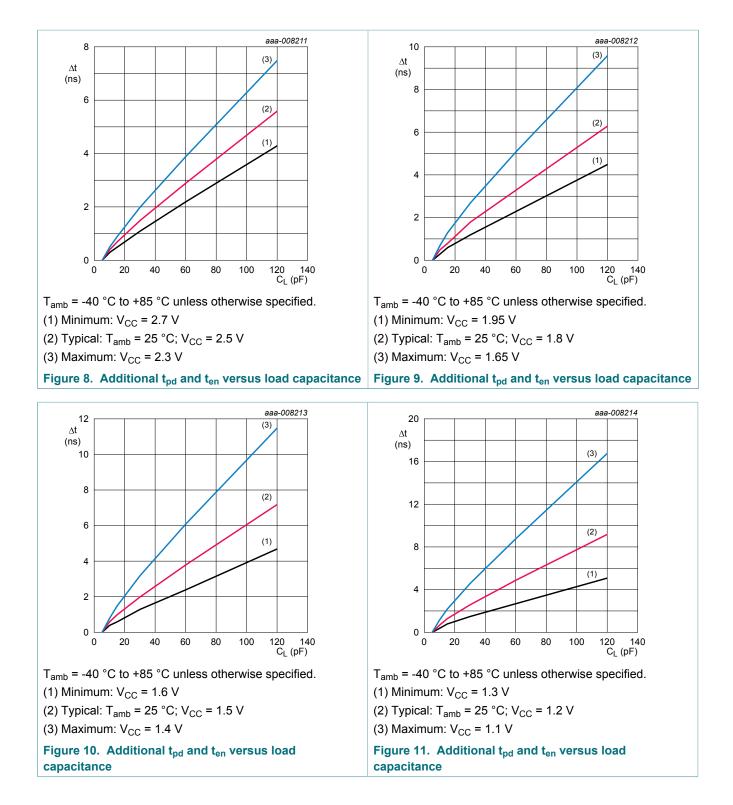
Table 9. Measurement points						
Supply voltage	tage Input Output					
V _{cc}	V _M	VI	t _r = t _f	V _M	V _X	V _Y
0.75 V to 1.6 V	0.5V _{CC}	V _{CC}	≤ 3.0 ns	0.5V _{CC}	V _{OL} + 0.1 V	V _{OH} - 0.1 V
1.65 V to 2.7 V	0.5V _{CC}	V _{CC}	≤ 3.0 ns	0.5V _{CC}	V _{OL} + 0.15 V	V _{OH} - 0.15 V

74AXP1G125 Product data sheet

Nexperia

74AXP1G125

Low-power buffer/line driver; 3-state

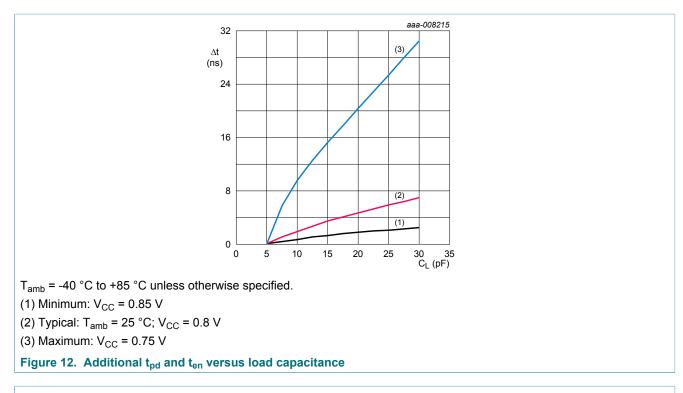


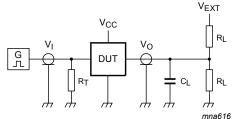
74AXP1G125 Product data sheet

Nexperia

74AXP1G125

Low-power buffer/line driver; 3-state





Test data is given in <u>Table 10</u>.

Definitions for test circuit:

R_L = Load resistance.

 C_L = Load capacitance including jig and probe capacitance.

 R_T = Termination resistance should be equal to the output impedance Z_o of the pulse generator.

V_{EXT} = External voltage for measuring switching times.

Figure 13. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Load		V _{EXT}			
Vcc	CL	RL	t _{PLH} , t _{PHL}	t _{PZH} , t _{PHZ}	t _{PZL} , t _{PLZ}	
0.75 V to 2.7 V	5 pF	10 kΩ	0 V	0 V	2 x V _{CC}	

Low-power buffer/line driver; 3-state

12 Package outline

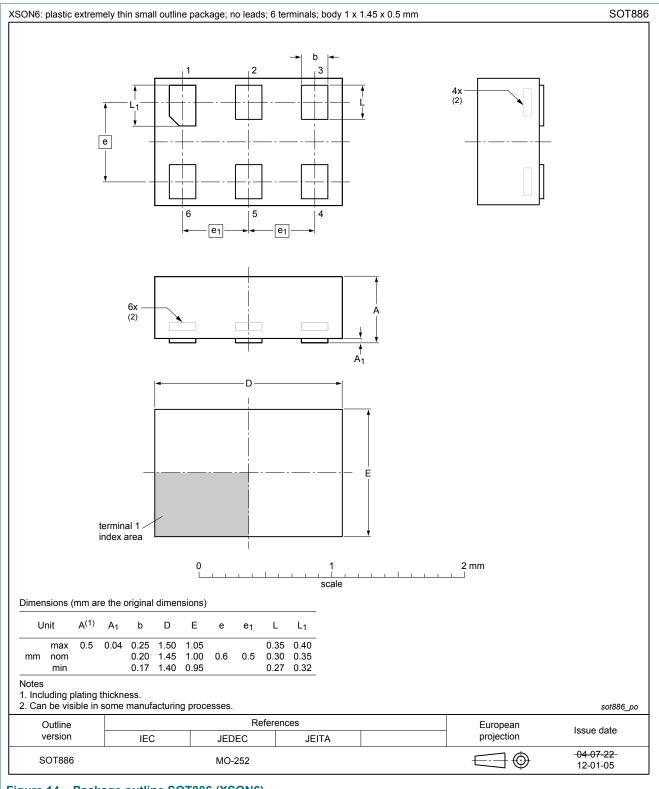
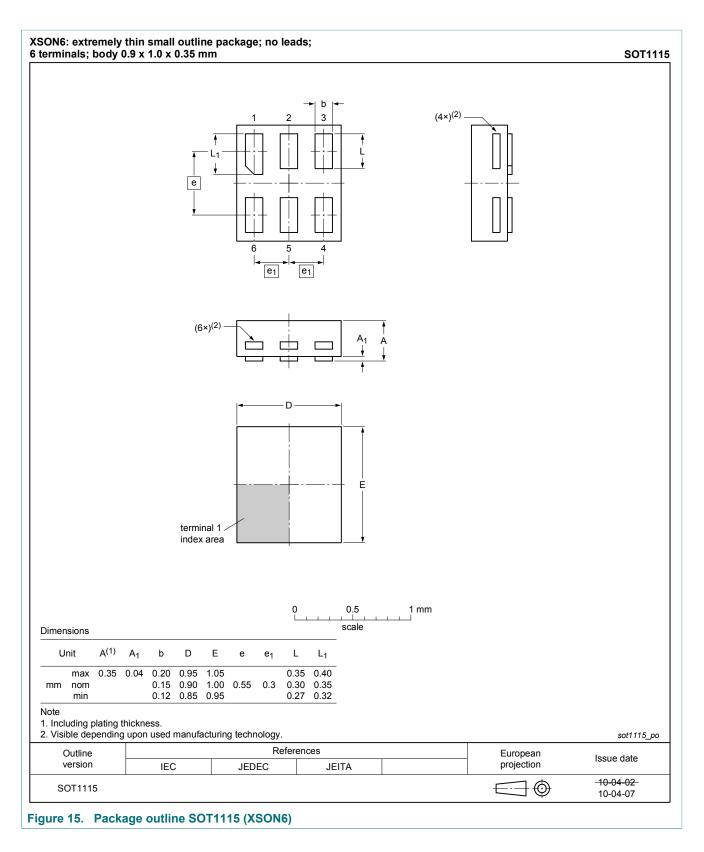


Figure 14. Package outline SOT886 (XSON6)

74AXP1G125 Product data sheet

All information provided in this document is subject to legal disclaimers Rev. 2 — 18 April 2018 © Nexperia B.V. 2018. All rights reserved.

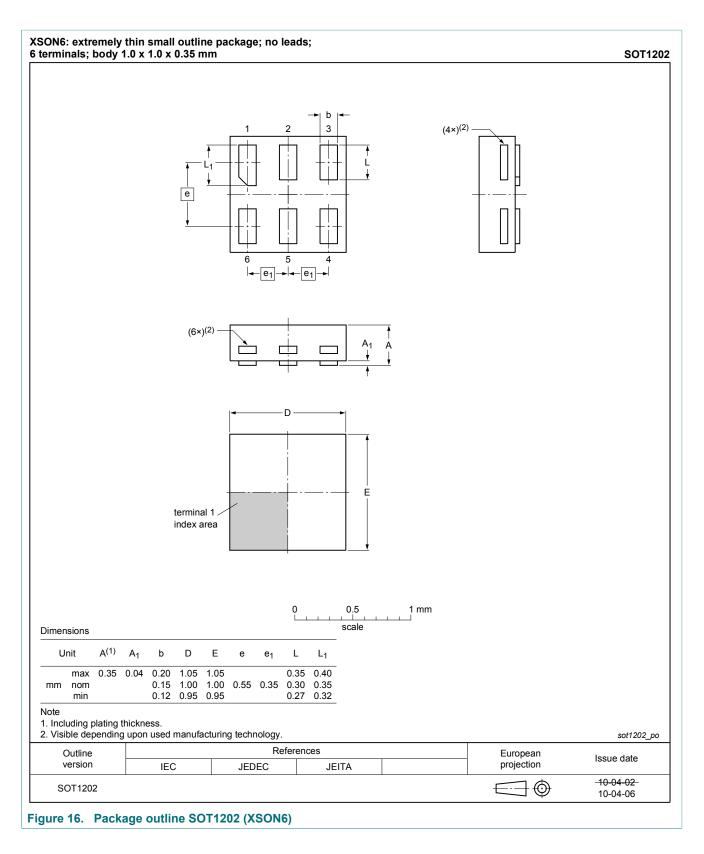
Low-power buffer/line driver; 3-state



74AXP1G125 Product data sheet

All information provided in this document is subject to legal disclaimers.

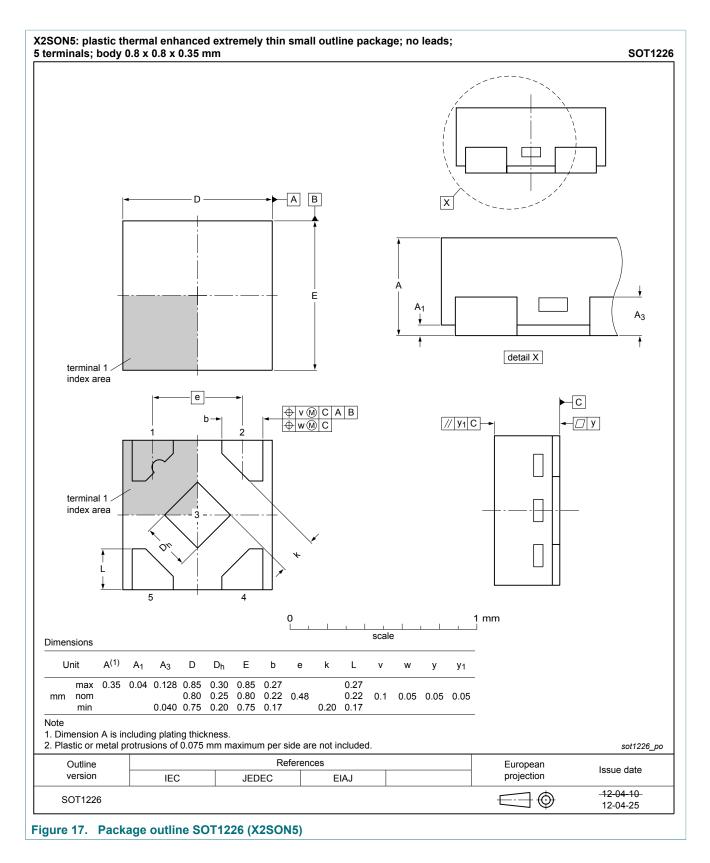
Low-power buffer/line driver; 3-state



74AXP1G125 Product data sheet

All information provided in this document is subject to legal disclaimers.

Low-power buffer/line driver; 3-state



74AXP1G125 Product data sheet

All information provided in this document is subject to legal disclaimers. Rev. 2 — 18 April 2018

13 Abbreviations

Table 11. Abbreviations			
Acronym	Description		
CDM	Charged Device Model		
DUT	Device Under Test		
ESD	ElectroStatic Discharge		
НВМ	Human Body Model		

14 Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes		
74AXP1G125 v.2	20180418	Product data sheet	-	74AXP1G125 v.1		
Modifications:	 The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. Legal texts have been adapted to the new company name where appropriate. 					
74AXP1G125 v.1	20140116	Product data sheet	-	-		

15 Legal information

15.1 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.

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

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

[2] [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.nexperia.com.

15.2 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. Nexperia 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 Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

15.3 Disclaimers

Limited warranty and liability - Information in this document is believed to be accurate and reliable. However, Nexperia 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. Nexperia takes no responsibility for the content in this document if provided by an information source outside of Nexperia. In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory. Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Nexperia

Right to make changes - Nexperia 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 - Nexperia products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Nexperia product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Nexperia and its suppliers accept no liability for inclusion and/or use of Nexperia 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. Nexperia makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification. Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products. Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale - Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nexperia.com/profile/terms, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by customer

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.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

74AXP1G125 **Product data sheet** All information provided in this document is subject to legal disclaimers. Rev. 2 - 18 April 2018

Low-power buffer/line driver; 3-state

Non-automotive qualified products — Unless this data sheet expressly states that this specific Nexperia product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Nexperia accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications. In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Nexperia's warranty of the product for such automotive applications, use and specifications beyond Nexperia's specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Nexperia for any liability, damages or failed product claims resulting from customer

design and use of the product for automotive applications beyond Nexperia's standard warranty and Nexperia's product specifications.

Translations — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

15.4 Trademarks

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

Nexperia

74AXP1G125

Low-power buffer/line driver; 3-state

Contents

1	General description	1
2	Features and benefits	1
3	Ordering information	2
4	Marking	2
5	Functional diagram	2
6	Pinning information	
6.1	Pinning	
6.2	Pin description	3
7	Functional description	3
8	Limiting values	4
9	Recommended operating conditions	4
10	Static characteristics	5
11	Dynamic characteristics	6
11.1	Waveforms and test circuit	7
12	Package outline	10
13	Abbreviations	14
14	Revision history	14
15	Legal information	

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

© Nexperia B.V. 2018.

All rights reserved.

For more information, please visit: http://www.nexperia.com For sales office addresses, please send an email to: salesaddresses@nexperia.com Date of release: 18 Ar

Date of release: 18 April 2018 Document identifier: 74AXP1G125



单击下面可查看定价,库存,交付和生命周期等信息

>>Nexperia(安世)