M74HC126
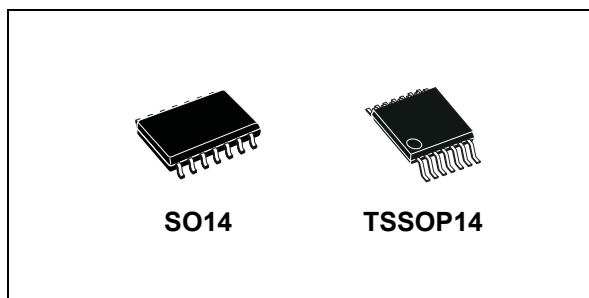
Quad bus buffer (3-state)

SO14   **TSSOP14**

- Balanced propagation delays:
  $t_{PLH} \cong t_{PHL}$
- Wide operating voltage range:
  V_{CC} (opr) = 2 V to 6 V
- Pin and function compatible with 74 series 126
- ESD performance
  - CDM: 1 kV
  - HBM: 2 kV
  - MM: 200 V

Features

- High-speed:
  t_{PD} = 8 ns (typ.) at V_{CC} = 6 V
- Low power dissipation:
  I_{CC} = 4 µA (max.) at T_A = 25 °C
- High noise immunity:
  V_{NIH} = V_{NIL} = 28 % V_{CC} (min)
- Symmetrical output impedance:
  $|I_{OH}|$ = I_{OL} = 6 mA (min.)

Description

The M74HC126 is a high-speed CMOS quad buffer (3-state) fabricated with silicon gate C^2MOS technology.

The device requires the 3-state control input, G, to be set high to place the output into high impedance state.

All inputs are equipped with protection circuits against static discharge and transient excess voltage.

Table 1. Device summary

Order code	Temp. range	Package	Packaging	Marking
M74HC126RM13TR	-55 °C to 125 °C	S014	Tape and reel	74HC126
M74HC126YRM13TR[1]	-40 °C to 125 °C	SO14 (automotive grade)		74HC126Y
M74HC126TTR	-55 °C to 125 °C	TSSOP14		HC126
M74HC126YTTR[1]	-40 °C to 125 °C	TSSOP14 (automotive grade)		HC126Y

1. Qualification and characterization according to AEC Q100 and Q003 or equivalent, advanced screening according to AEC Q001 and Q002 or equivalent.

Contents

1   Pin information

Figure 1. Pin connection and IED logic symbols

GAMS1212131410CB
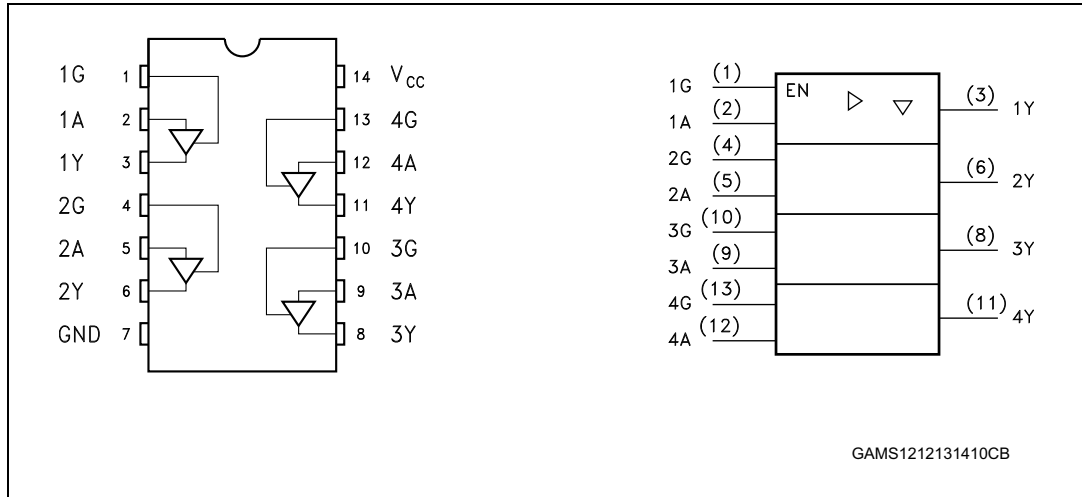
Table 2. Pin description

Pin no	Symbol	Name and function
1, 4, 10, 13	1G to 4G	Output enable input
2, 5, 9, 12	1A to 4A	Data inputs
3, 6, 8, 11	1Y to 4Y	Data outputs
7	GND	Ground (0 V)
14	V_{CC}	Positive supply voltage

2 Functional description

Table 3. Truth table

A	G	Y
X	L	Z
L	H	L
H	H	H

Figure 2. Input and output equivalent circuit
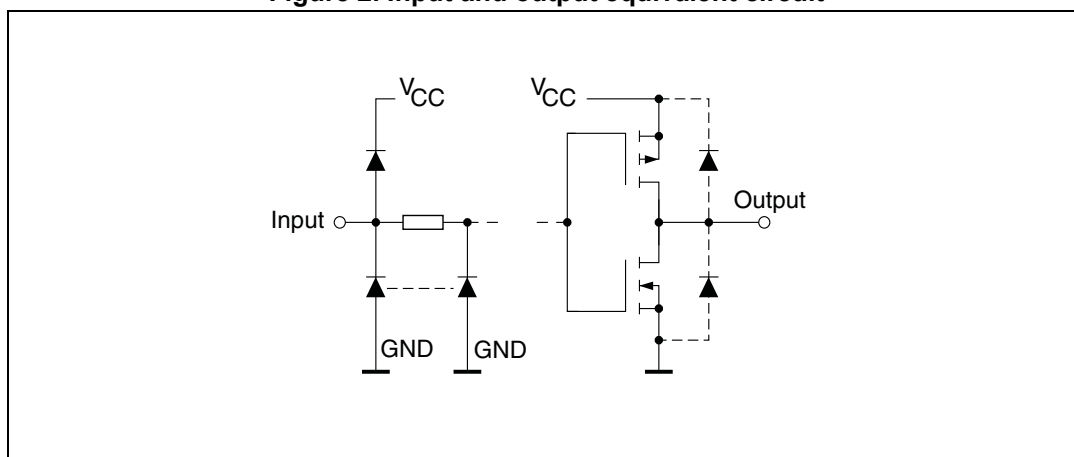
3 Electrical characteristics

"Absolute maximum ratings" are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

Table 4. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply voltage	-0.5 to +7	V
V_I	DC input voltage	-0.5 to V_{CC} + 0.5	
V_O	DC output voltage		
I_{IK}	DC input diode current	±20	mA
I_{OK}	DC output diode current		
I_O	DC output current	±35	
I_{CC} or I_{GND}	DC V_{CC} or ground current	±70	
P_D	Power dissipation	500[1]	mW
T_{stg}	Storage temperature	-65 to +150	°C
T_L	Lead temperature (10 sec)	300	

1. 500 mW at 65 °C; derate to 300 mW by 10 mW/°C from 65 °C to 85 °C

Table 5. Recommended operating conditions

Symbol	Parameter		Value	Unit
V_{CC}	Supply voltage		2 to 6	V
V_I	Input voltage		0 to V_{CC}	
V_O	Output voltage			
T_{op}	Operating temperature		-55 to 125	°C
t_r, t_f	Input rise and fall time	V_{CC} = 2.0 V	0 to 1000	ns
		V_{CC} = 4.5V	0 to 500	
		V_{CC} = 6.0 V	0 to 400	

Table 6. DC specifications

Symbol	Parameter	Test condition		Value							Unit
		V_{CC} (V)		T_A = 25 °C			-40 to 85 °C		-55 to 125 °C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
V_{IH}	High level input voltage	2.0		1.5			1.5		1.5		V
		4.5		3.15			3.15		3.15		
		6.0		4.2			4.2		4.2		
V_{IL}	Low level input voltage	2.0				0.5		0.5		0.5	V
		4.5				1.35		1.35		1.35	
		6.0				1.8		1.8		1.8	
V_{OH}	High level output voltage	2.0	I_O = -20 µA	1.9	2.0		1.9		1.9		V
		4.5	I_O = -20 µA	4.4	4.5		4.4		4.4		
		6.0	I_O = -20 µA	5.9	6.0		5.9		5.9		
		4.5	I_O = -6.0 mA	4.18	4.31		4.13		4.10		
		6.0	I_O = -7.8 mA	5.68	5.8		5.63		5.60		
V_{OL}	Low level output voltage	2.0	I_O = 20 µA		0.0	0.1		0.1		0.1	V
		4.5	I_O = 20 µA		0.0	0.1		0.1		0.1	
		6.0	I_O = 20 µA		0.0	0.1		0.1		0.1	
		4.5	I_O = 6.0 mA		0.17	0.26		0.33		0.40	
		6.0	I_O = 7.8 mA		0.18	0.26		0.33		0.40	
I_I	Input leakage current	6.0	V_I = V_{CC} or GND			±0.1		±1		±1	µA
I_{OZ}	High impedance output leakage current	6.0	V_I = V_{IH} or V_{IL} V_O = V_{CC} or GND			±0.5		±5		±10	µA
I_{CC}	Quiescent supply current	6.0	V_I = V_{CC} or GND			4		40		80	µA

Table 7. AC electrical characteristics
(Input $t_r = t_f = 6$ ns)

Symbol	Parameter	Test condition			Value							Unit
		V_{CC} (V)	C_L (pF)		$T_A = 25$ °C			-40 to 85 °C		-55 to 125 °C		
					Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t_{TLH}, t_{THL}	Output transition time	2.0	50			20	60		75		90	ns
		4.5				6	12		15		18	
		6.0				5	10		13		15	
t_{PLH}, t_{PHL}	Propagation delay time	2.0	50			36	75		95		110	ns
		4.5				9	15		19		22	
		6.0				8	13		16		19	
		2.0	150			52	105		130		160	ns
		4.5				13	21		26		32	
		6.0				11	18		22		27	
t_{PZL}, t_{PZH}	High impedance output enable time	2.0	50	$R_L = 1$ kΩ		36	75		95		110	ns
		4.5				9	15		19		22	
		6.0				8	13		16		19	
		2.0	150			52	105		130		160	ns
		4.5				13	21		26		32	
		6.0				11	18		22		27	
t_{PLZ}, t_{PHZ}	High impedance output disable time	2.0	50	$R_L = 1$ kΩ		48	80		100		120	ns
		4.5				12	16		20		24	
		6.0				10	14		17		20	

Table 8. Capacitive characteristics

Sym	Parameter	Test condition	Value							Unit
		V_{CC} (V)	$T_A = 25$°C			-40 to 85 °C		-55 to 125 °C		
			Min	Typ	Max	Min	Max	Min	Max	
C_{IN}	Input capacitance	5.0	-	5	10	-	10	-	10	pF
C_{PD}	Power dissipation capacitance[1]			35						

1. C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load (refer to test circuit). Average operating current can be obtained by the following equation: $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/4$ (per buffer).

Figure 3. Test circuit

GAMS1212131502CB
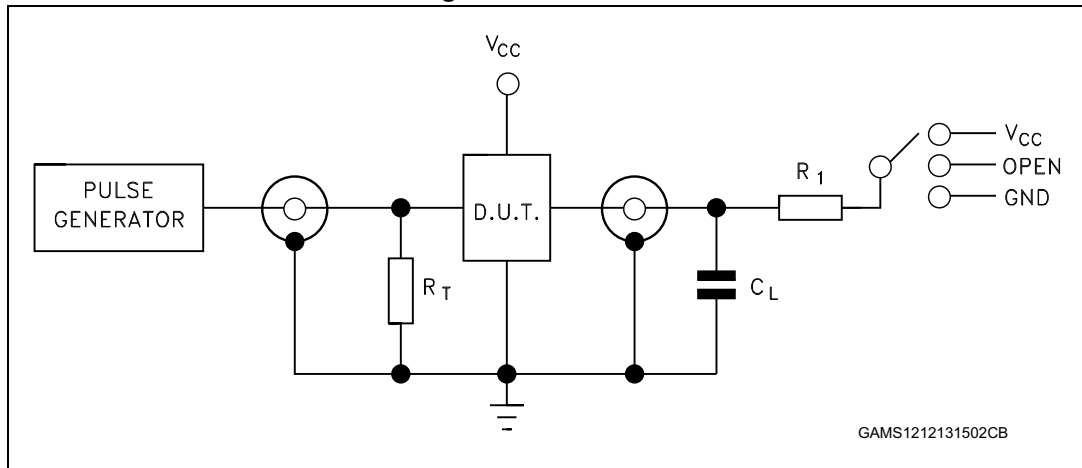
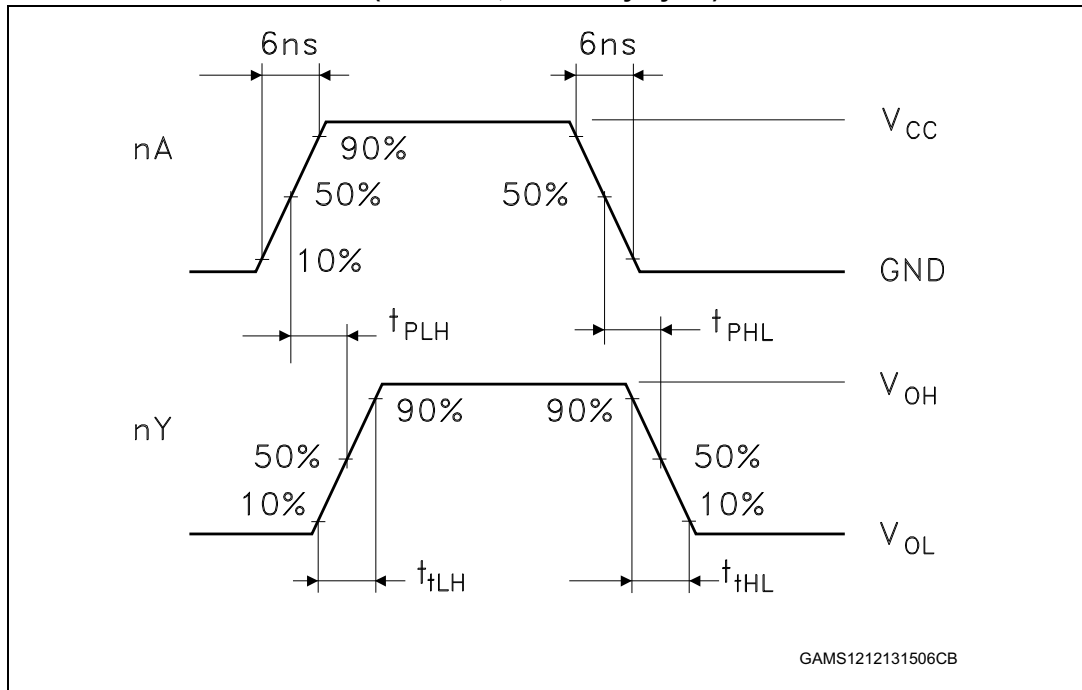1. Legend:
   C_L = 50 pF/150 pF or equivalent (includes jig and probe capacitance).
   R_1 = 1 kΩor equivalent.
   R_T = Z_{OUT} of pulse generator (typically 50 Ω).
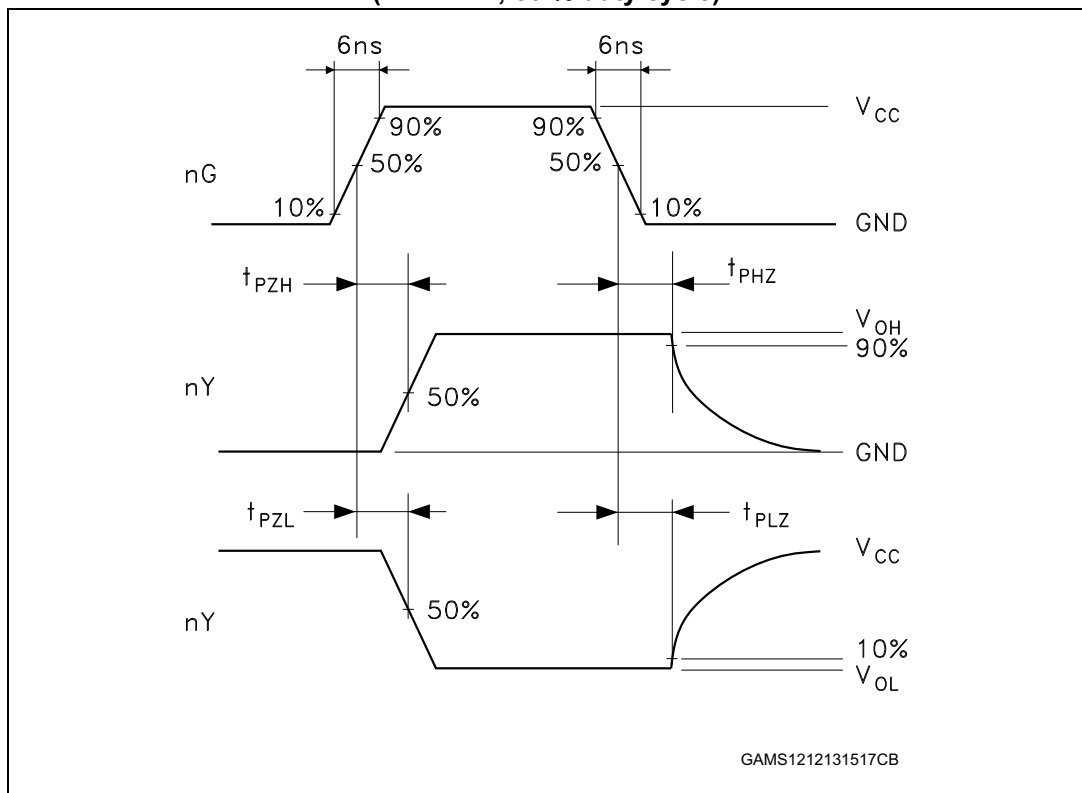
Table 9. Propagation delay time configuration

Test	Switch
t_{PLH}, t_{PHL}	Open
t_{PZL}, t_{PLZ}	V_{CC}
t_{PZH}, t_{PHZ}	GND

**Figure 4. Waveform 1: propagation delay times
(f = 1 MHz; 50 % duty cycle)**

**Figure 5. Waveform 2: Output enable and disable times
(f = 1 MHz; 50 % duty cycle)**

4 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

4.1   SO14 package information
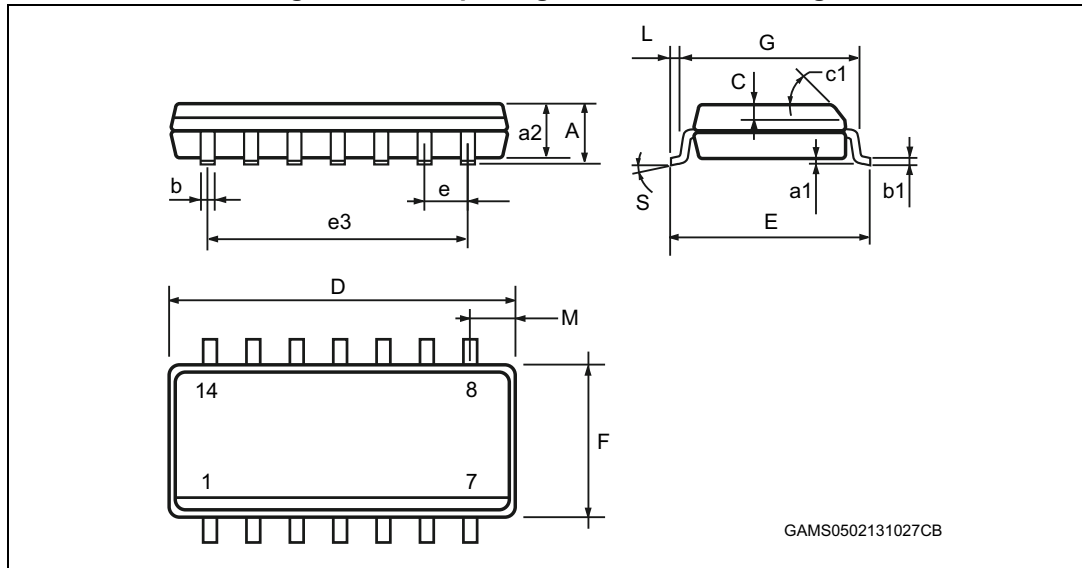
Figure 6. SO14 package mechanical drawing

GAMS0502131027CB

Table 10. SO14 package mechanical data

Ref	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.75			0.068
a1	0.1		0.2	0.003		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1		45 °			45 °	
D	8.55		8.75	0.336		0.344
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		7.62			0.300	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.68			0.026
S			8 °			8 °

4.2   TSSOP14 package information

Figure 7. TSSOP14 package mechanical drawing

GAMS0708131512CB
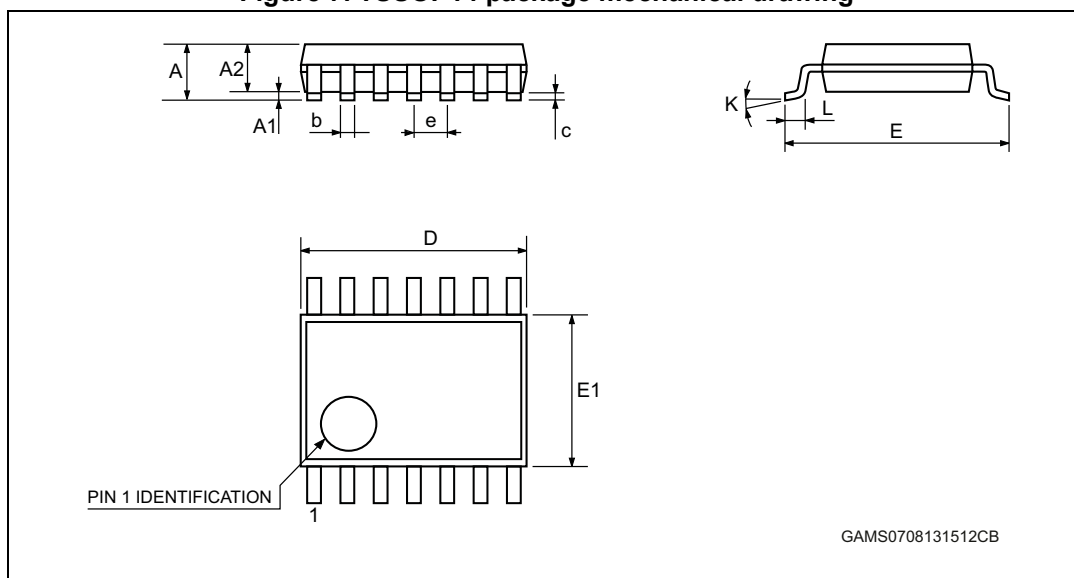
Table 11. TSSOP14 package mechanical data

Ref	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65			0.0256	
K	0 °		8 °	0 °		8 °
L	0.45	0.60	0.75	0.018	0.024	0.030

5 Ordering information

Table 12. Order codes

Order code	Temp. range	Package	Packaging	Marking
M74HC126RM13TR	-55 °C to 125 °C	S014	Tape and reel	74HC126
M74HC126YRM13TR[1]	-40 °C to 125 °C	SO14 (automotive grade)		74HC126Y
M74HC126TTR	-55 °C to 125 °C	TSSOP14		HC126
M74HC126YTTR[1]	-40 °C to 125 °C	TSSOP14 (automotive grade)		HC126Y

1. Qualification and characterization according to AEC Q100 and Q003 or equivalent, advanced screening according to AEC Q001 and Q002 or equivalent.

6 Revision history

Table 13. Document revision history

Date	Revision	Changes
Aug-2001	1	Initial release.
13-Dec-2013	3	Removed DIP14 package *Features*: added ESD information *Table 1: Device summary*: updated order codes, added automotive grade order codes, added temperature range and marking details. Added *Section 5: Ordering information*.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER'S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR "AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL" INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Buffers & Line Drivers *category:*

Click to view products by STMicroelectronics *manufacturer:*

Other Similar products are found below :

5962-9217601MSA 634810D 875140G HEF4022BP HEF4043BP NL17SG125DFT2G NL17SZ126P5T5G NLU1GT126CMUTCG NLU3G16AMX1TCG NLV27WZ125USG MC74HCT365ADTR2G BCM6306KMLG 54FCT240CTDB Le87401NQC Le87402MQC 028192B 042140C 051117G 070519XB 065312DB 091056E 098456D NL17SG07DFT2G NL17SG17DFT2G NL17SG34DFT2G NL17SZ07P5T5G NL17SZ125P5T5G NLU1GT126AMUTCG NLV27WZ16DFT2G 5962-8982101PA 5962-9052201PA 74LVC07ADR2G MC74VHC1G125DFT1G NL17SH17P5T5G NL17SZ125CMUTCG NLV17SZ07DFT2G NLV37WZ17USG NLVHCT244ADTR2G NC7WZ17FHX 74HCT126T14-13 NL17SH125P5T5G NLV14049UBDTR2G NLV37WZ07USG 74VHC541FT(BE) RHFAC244K1 74LVC1G17FW4-7 74LVC1G126FZ4-7 BCM6302KMLG 74LVC1G07FZ4-7 74LVC1G125FW4-7