

Data sheet acquired from Harris Semiconductor SCHS144C

CD54HC126, CD74HC126, CD54HCT126

High-Speed CMOS Logic Quad Buffer, Three-State

November 1997 - Revised September 2003

Features

- Three-State Outputs
- Separate Output Enable Inputs
- Fanout (Over Temperature Range)
- Bus Driver Outputs 15 LSTTL Loads
- Wide Operating Temperature Range . . . -55°C to 125°C
- Balanced Propagation Delay and Transition Times
- Significant Power Reduction Compared to LSTTL Logic ICs
- HC Types
 - 2V to 6V Operation
 - High Noise Immunity: N_{IL} = 30%, N_{IH} = 30% of V_{CC} at V_{CC} = 5V
- HCT Types
 - 4.5V to 5.5V Operation
 - Direct LSTTL Input Logic Compatibility,
 V_{IL}= 0.8V (Max), V_{IH} = 2V (Min)
 - CMOS Input Compatibility, I $_I \leq 1 \mu \text{A}$ at $\text{V}_{\mbox{OL}}, \, \text{V}_{\mbox{OH}}$

Description

The 'HC126 and 'HCT126 contain four independent threestate buffers, each having its own output enable input, which when "low" puts the output in the high-impedance state.

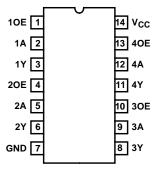
Ordering Information

PART NUMBER	TEMP. RANGE (°C)	PACKAGE
CD54HC126F3A	-55 to 125	14 Ld CERDIP
CD54HCT126F3A	-55 to 125	14 Ld CERDIP
CD74HC126E	-55 to 125	14 Ld PDIP
CD74HC126M	-55 to 125	14 Ld SOIC
CD74HC126MT	-55 to 125	14 Ld SOIC
CD74HC126M96	-55 to 125	14 Ld SOIC
CD74HCT126E	-55 to 125	14 Ld PDIP
CD74HCT126M	-55 to 125	14 Ld SOIC
CD74HCT126MT	-55 to 125	14 Ld SOIC
CD74HCT126M96	-55 to 125	14 Ld SOIC

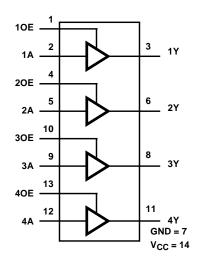
NOTE: When ordering, use the entire part number. The suffix 96 denotes tape and reel. The suffix T denotes a small-quantity reel of 250

Pinout

CD54HC126, CD54HC126 (CERDIP) CD74HC126, CD74HC126 (PDIP, SOIC) TOP VIEW



Functional Diagram



TRUTH TABLE

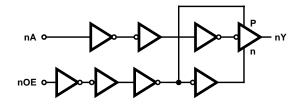
INP	INPUTS					
nA	nOE	nY				
Н	Н	Н				
L	Н	L				
Х	L	Z				

H= High Voltage Level

L= Low Voltage Level X= Don't Care

Z= High Impedance, OFF State

Logic Diagram



CD54HC126, CD74HC126, CD54HCT126, CD74HCT126

Absolute Maximum Ratings

DC Supply Voltage, VCC ... -0.5V to 7V DC Input Diode Current, I $_{\rm IK}$ For V $_{\rm I}$ < -0.5V or V $_{\rm I}$ > V $_{\rm CC}$ + 0.5V ... ± 20 mA DC Output Diode Current, I $_{\rm OK}$ For V $_{\rm O}$ < -0.5V or V $_{\rm O}$ > V $_{\rm CC}$ + 0.5V ... ± 20 mA DC Drain Current, per Output, I $_{\rm O}$ For -0.5V < V $_{\rm O}$ < V $_{\rm CC}$ + 0.5V ... ± 35 mA DC Output Source or Sink Current per Output Pin, I $_{\rm O}$ For V $_{\rm O}$ > -0.5V or V $_{\rm O}$ < V $_{\rm CC}$ + 0.5V ... ± 25 mA DC V $_{\rm CC}$ or Ground Current, I $_{\rm CC}$... ± 25 mA

Thermal Information

Thermal Resistance (Typical, Note 1)	θ_{JA} (oC/W)
E (PDIP) Package	. 80
M (SOIC) Package	. 86
Maximum Junction Temperature	
Maximum Storage Temperature Range	-65°C to 150°C
Maximum Lead Temperature (Soldering 10s)	300°C
(SOIC - Lead Tips Only)	

Operating Conditions

Temperature Range (T _A)55°C to 125°C Supply Voltage Range, V _{CC}
HC Types
• •
HCT Types
DC Input or Output Voltage, V _I , V _O
Input Rise and Fall Time
2V
4.5V 500ns (Max)
6V

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

1. The package thermal impedance is calculated in accordance with JESD 51-7.

DC Electrical Specifications

			ST ITIONS			25°C		-40°C T	O 85°C	-55°C T	O 125 ⁰ C					
PARAMETER	SYMBOL	V _I (V)	I _O (mA)	V _{CC} (V)	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNITS				
HC TYPES																
High Level Input	V _{IH}	-	-	2	1.5	-	-	1.5	-	1.5	-	V				
Voltage				4.5	3.15	-	-	3.15	-	3.15	-	V				
				6	4.2	-	-	4.2	-	4.2	-	V				
Low Level Input	V _{IL}	-	-	2	-	-	0.5	-	0.5	-	0.5	V				
Voltage				4.5	-	-	1.35	-	1.35	-	1.35	V				
				6	-	-	1.8	-	1.8	-	1.8	V				
High Level Output	V _{OH}	V _{IH} or	-0.02	2	1.9	-	-	1.9	-	1.9	-	V				
Voltage CMOS Loads		V_{IL}	VIL	-0.02	4.5	4.4	-	-	4.4	-	4.4	-	V			
			-0.02	6	5.9	-	-	5.9	-	5.9	-	V				
High Level Output	1						-6	4.5	3.98	-	-	3.84	-	3.7	-	V
Voltage TTL Loads			-7.8	6	5.48	-	-	5.34	-	5.2	-	V				
Low Level Output	V _{OL}	V _{IH} or	0.02	2	-	-	0.1	-	0.1	-	0.1	V				
Voltage CMOS Loads		V_{IL}	0.02	4.5	-	-	0.1	-	0.1	-	0.1	V				
			0.02	6	-	-	0.1	-	0.1	-	0.1	V				
Low Level Output			6	4.5	-	-	0.26	-	0.33	-	0.4	V				
Voltage TTL Loads			7.8	6	-	-	0.26	-	0.33	-	0.4	V				
Input Leakage Current	l _Ι	V _{CC} or GND	-	6	-	-	±0.1	-	±1	-	±1	μА				

CD54HC126, CD74HC126, CD54HCT126, CD74HCT126

DC Electrical Specifications (Continued)

			ST ITIONS			25°C		-40°C T	O 85°C	-55°C T	O 125°C	
PARAMETER	SYMBOL	V _I (V)	I _O (mA)	V _{CC} (V)	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNITS
Quiescent Device Current	Icc	V _{CC} or GND	0	6	-	-	8	-	80	-	160	μА
Three-State Leakage Current	l _{OZ}	V _{IL} or V _{IH}	-	6	-	-	±0.5	-	±5	-	±10	μА
HCT TYPES												•
High Level Input Voltage	V _{IH}	-	-	4.5 to 5.5	2	-	-	2	-	2	-	V
Low Level Input Voltage	V _{IL}	-	-	4.5 to 5.5	-	-	0.8	-	0.8	-	0.8	٧
High Level Output Voltage CMOS Loads	V _{ОН}	V _{IH} or V _{IL}	-0.02	4.5	4.4	-	-	4.4	-	4.4	-	V
High Level Output Voltage TTL Loads			-6	4.5	3.98	-	-	3.84	-	3.7	-	V
Low Level Output Voltage CMOS Loads	V _{OL}	V _{IH} or V _{IL}	0.02	4.5	-	-	0.1	-	0.1	-	0.1	V
Low Level Output Voltage TTL Loads			6	4.5	-	-	0.26	-	0.33	-	0.4	V
Input Leakage Current	II	V _{CC} to GND	0	5.5	-	-	±0.1	-	±1	-	±1	μА
Quiescent Device Current	I _{CC}	V _{CC} or GND	0	5.5	-	-	8	-	80	-	160	μА
Additional Quiescent Device Current Per Input Pin: 1 Unit Load	ΔI _{CC} (Note 2)	V _{CC} -2.1	-	4.5 to 5.5	-	100	360	-	450	-	490	μА
Three-State Leakage Current	loz	V _{IL} or V _{IH}	-	5.5	-	-	±0.5	-	±5	-	±10	μА

NOTE:

HCT Input Loading Table

INPUT	UNIT LOADS
nA, nOE	1

NOTE: Unit Load is ΔI_{CC} limit specified in DC Electrical Specifications table, e.g., 360 μ A max at 25 o C.

^{2.} For dual-supply systems theoretical worst case (V_I = 2.4V, V_{CC} = 5.5V) specification is 1.8mA.

CD54HC126, CD74HC126, CD54HCT126, CD74HCT126

Switching Specifications Input t_r , $t_f = 6ns$

		TEST		25°C		-40°C TO 85°C	-55°C TO 125°C	
PARAMETER	SYMBOL	CONDITIONS	V _{CC} (V)	TYP	MAX	MAX	MAX	UNIT
HC TYPES	<u>'</u>							
Propagation Delay Data	t _{PLH} , t _{PHL}	C _L = 50pF	2	-	100	125	150	ns
to Outputs			4.5	-	20	25	30	ns
		C _L = 15pF	5	8	-	-	-	ns
		CL = 50pF	6	-	17	21	36	ns
Enable Delay Time	t _{PZL} , t _{PZH}	C _L = 50pF	2	-	125	155	190	ns
			4.5	-	25	31	38	ns
		C _L = 15pF	5	10	-	-	-	ns
		CL = 50pF	6	-	21	26	32	ns
Disabling Delay Time	t _{PLZ} , t _{PHZ}	CL = 50pF	2	-	125	155	190	ns
		C _L = 50pF	4.5	-	25	31	38	ns
		C _L = 15pF	5	10	-	-	-	ns
		CL = 50pF	6	-	21	26	32	ns
Output Transition Times	t _{TLH} , t _{THL}	C _L = 50pF	2	-	60	75	90	ns
			4.5	-	12	15	18	ns
			6	-	10	13	15	ns
Input Capacitance	Cl	-	-	-	10	10	10	pF
Three-State Output Capacitance	CO	-	-	-	20	20	20	pF
Power Dissipation Capacitance (Notes 3, 4)	C _{PD}	-	5	30	-	-	-	pF
HCT TYPES								
Propagation Delay Time	t _{PLH} , t _{PHL}	C _L = 50pF	4.5	-	24	30	36	ns
to Outputs		C _L = 15pF	5	9	-	-	-	ns
Output Enable Time	t _{PZL} , t _{PZH}	C _L = 50pF	4.5	-	25	31	38	ns
		C _L = 15pF	5	10	-	-	-	ns
Output Disabling Time	t _{PLZ} , t _{PHZ}	C _L = 50pF	4.5	-	28	35	42	ns
		C _L = 15pF	5	11	-	-	-	ns
Output Transition Times	t _{TLH} , t _{THL}	C _L = 50pF	4.5	-	12	15	18	ns
Input Capacitance	CI	-	-	-	10	10	10	pF
Three-State Output Capacitance	CO	-	-	-	20	20	20	pF
Power Dissipation Capacitance (Notes 3, 4)	C _{PD}	-	5	36	-	-	-	pF

- 3. $C_{\mbox{\scriptsize PD}}$ is used to determine the dynamic power consumption, per multiplexer.
- 4. $P_D = V_{CC}^2 f_i (C_{PD} + C_L)$ where f_i = Input Frequency, C_L = Output Load Capacitance, V_{CC} = Supply Voltage.

Test Circuits and Waveforms

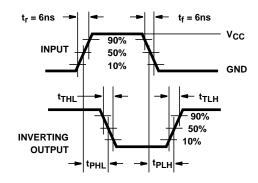


FIGURE 6. HC TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

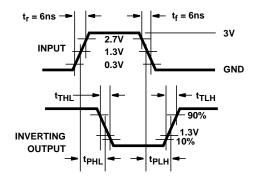


FIGURE 7. HCT TRANSITION TIMES AND PROPAGATION DELAY TIMES, COMBINATION LOGIC

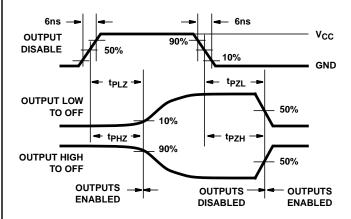


FIGURE 8. HC THREE-STATE PROPAGATION DELAY WAVEFORM

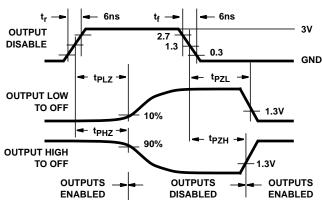
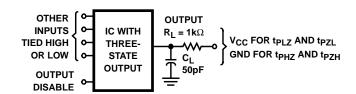


FIGURE 9. HCT THREE-STATE PROPAGATION DELAY WAVEFORM



NOTE: Open drain waveforms t_{PLZ} and t_{PZL} are the same as those for three-state shown on the left. The test circuit is Output $R_L = 1k\Omega$ to V_{CC} , $C_L = 50pF$.

FIGURE 10. HC AND HCT THREE-STATE PROPAGATION DELAY TEST CIRCUIT



PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	e Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
5962-9065101MCA	ACTIVE	CDIP	J	14	1	TBD	A42 SNPB	N / A for Pkg Type
CD54HC126F3A	ACTIVE	CDIP	J	14	1	TBD	A42 SNPB	N / A for Pkg Type
CD54HCT126F3A	ACTIVE	CDIP	J	14	1	TBD	A42 SNPB	N / A for Pkg Type
CD74HC126E	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
CD74HC126EE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
CD74HC126M	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC126M96	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC126M96E4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC126M96G4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC126ME4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC126MG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC126MT	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC126MTE4	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HC126MTG4	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT126E	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
CD74HCT126EE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
CD74HCT126M	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT126M96	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT126M96E4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT126M96G4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT126ME4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT126MG4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT126MT	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT126MTE4	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
CD74HCT126MTG4	ACTIVE	SOIC	D	14	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

⁽¹⁾ The marketing status values are defined as follows:



PACKAGE OPTION ADDENDUM

18-Sep-2008

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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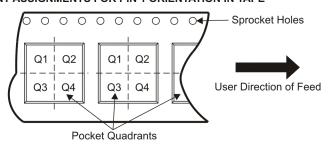
TAPE AND REEL INFORMATION





	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing			Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CD74HC126M96	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
CD74HCT126M96	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1





*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74HC126M96	SOIC	D	14	2500	346.0	346.0	33.0
CD74HCT126M96	SOIC	D	14	2500	346.0	346.0	33.0

14 LEADS SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package is hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
- E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
- Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
- E. Reference JEDEC MS-012 variation AB.



N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.



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