
Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
 - Class Q Military
 - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
 - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

TYPES SN5442A THRU SN5444A, SN54L42 THRU SN54L44, SN54LS42, SN7442A THRU SN7444A, SN74LS42 4-LINE TO 10-LINE DECODERS (1-OF-10)

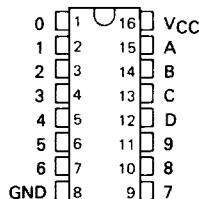
MARCH 1974 — REVISED APRIL 1985

'42A, 'L42, 'LS42 ... BCD-TO-DECIMAL
'43A, 'L43 ... EXCESS-3-TO-DECIMAL
'44A, 'L44 ... GRAY-TO-DECIMAL

- All Outputs Are High for Invalid Input Conditions
- Also for Application as
4-Line-to-16-Line Decoders
3-Line-to-8-Line Decoders
- Diode-Clamped Inputs

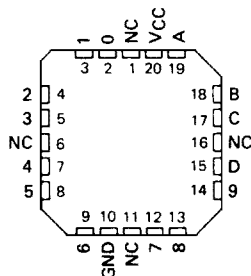
SN5442A THRU SN5444A, SN54LS42 ... J OR W PACKAGE
SN54L42 THRU SN54L44 ... J PACKAGE
SN7442A THRU SN7444A ... J OR N PACKAGE
SN74LS42 ... D, J OR N PACKAGE

(TOP VIEW)



SN54LS42 ... FK PACKAGE
SN74LS42 ... FN PACKAGE

(TOP VIEW)



NC - No internal connection

Description

These monolithic decimal decoders consist of eight inverters and ten four-input NAND gates. The inverters are connected in pairs to make BCD input data available for decoding by the NAND gates. Full decoding of valid input logic ensures that all outputs remain off for all invalid input conditions.

The '42A, 'L42, and 'LS42 BCD-to-decimal decoders, the '43A and 'L43 excess-3-to-decimal decoders, and the '44A and 'L44 gray-to-decimal decoders feature inputs and outputs that are compatible for use with most TTL and other saturated low-level logic circuits. DC noise margins are typically one volt.

Series 54, 54L, and 54LS circuits are characterized for operation over the full military temperature range of -55°C to 125°C ; Series 74, and 74LS circuits are characterized for operation from 0°C to 70°C .

PRODUCTION DATA

This document contains information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

TEXAS
INSTRUMENTS

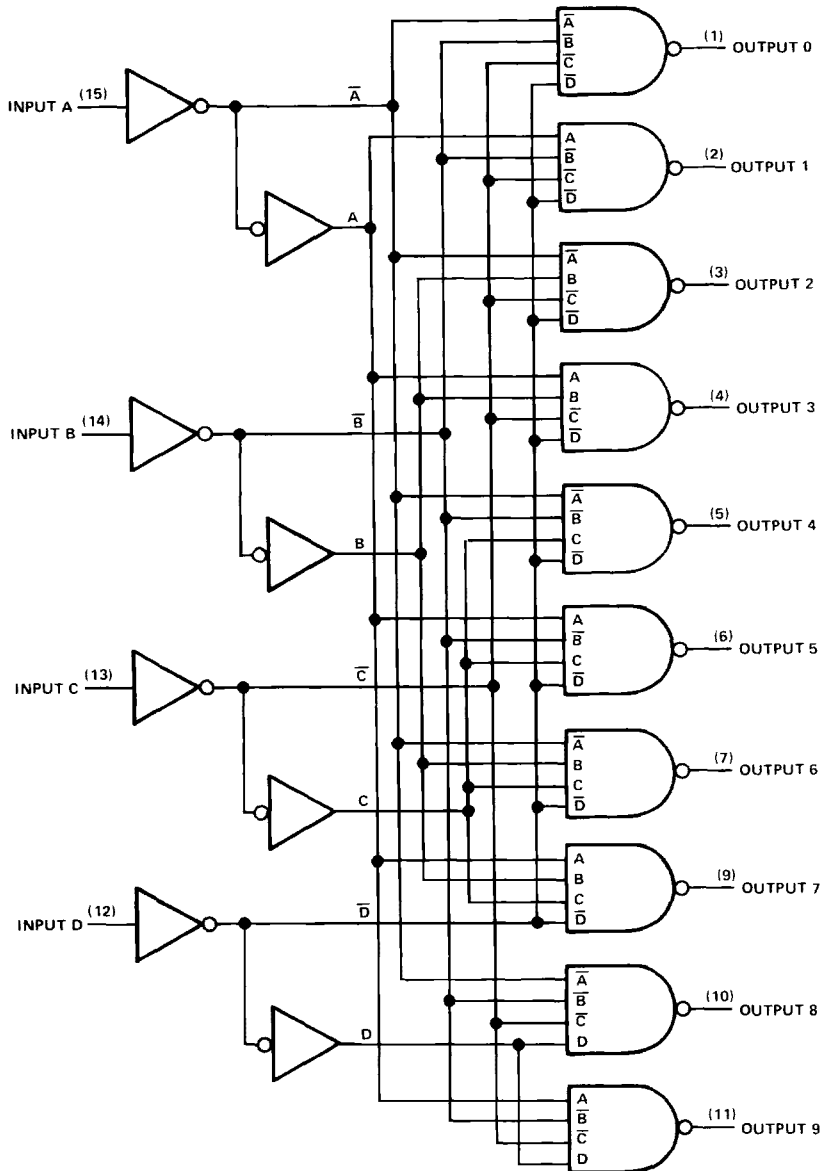
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TTL DEVICES

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TYPES SN5442A, SN54L42, SN54LS42, SN7442A, SN74LS42
4-LINE TO 10-LINE DECODERS (1-OF-10)

logic diagrams



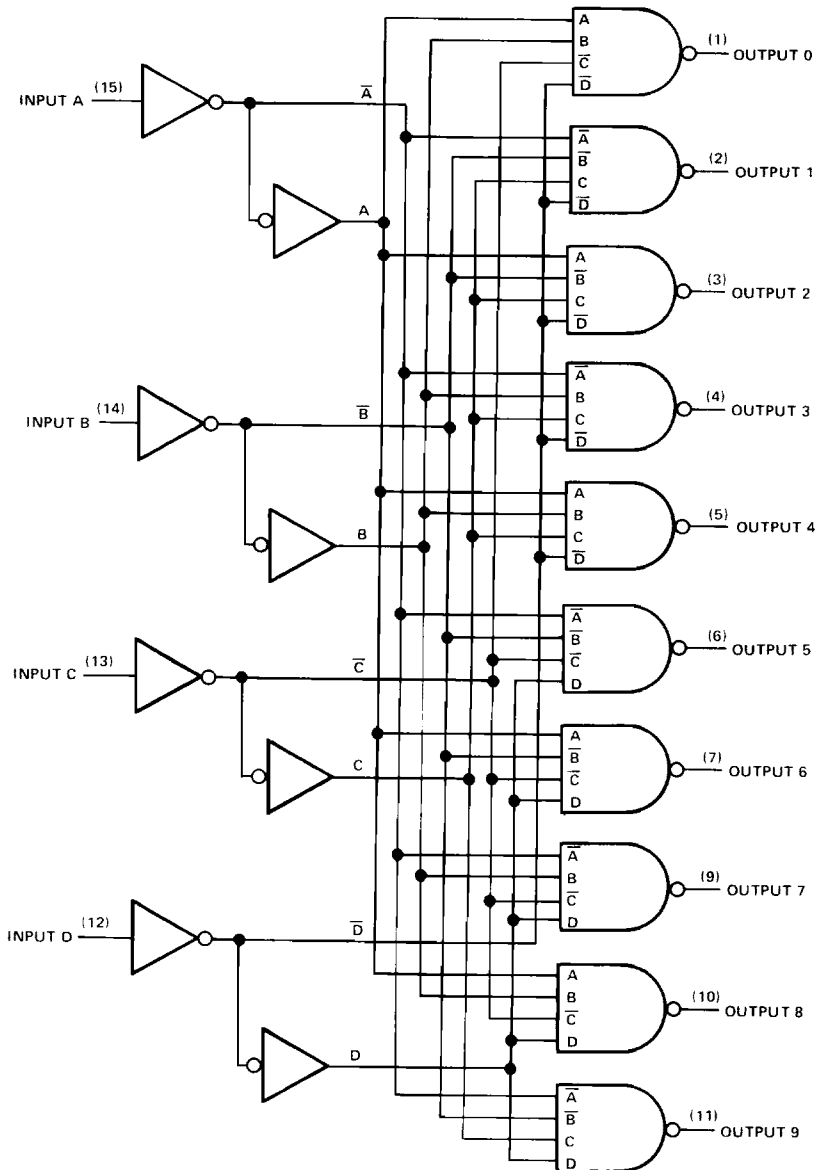
Pin numbers shown on logic notation are for D, J or N packages.

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TTL DEVICES

TYPES SN5443A, SN54L43, SN7443A
4-LINE TO 10-LINE DECODERS (1-OF-10)

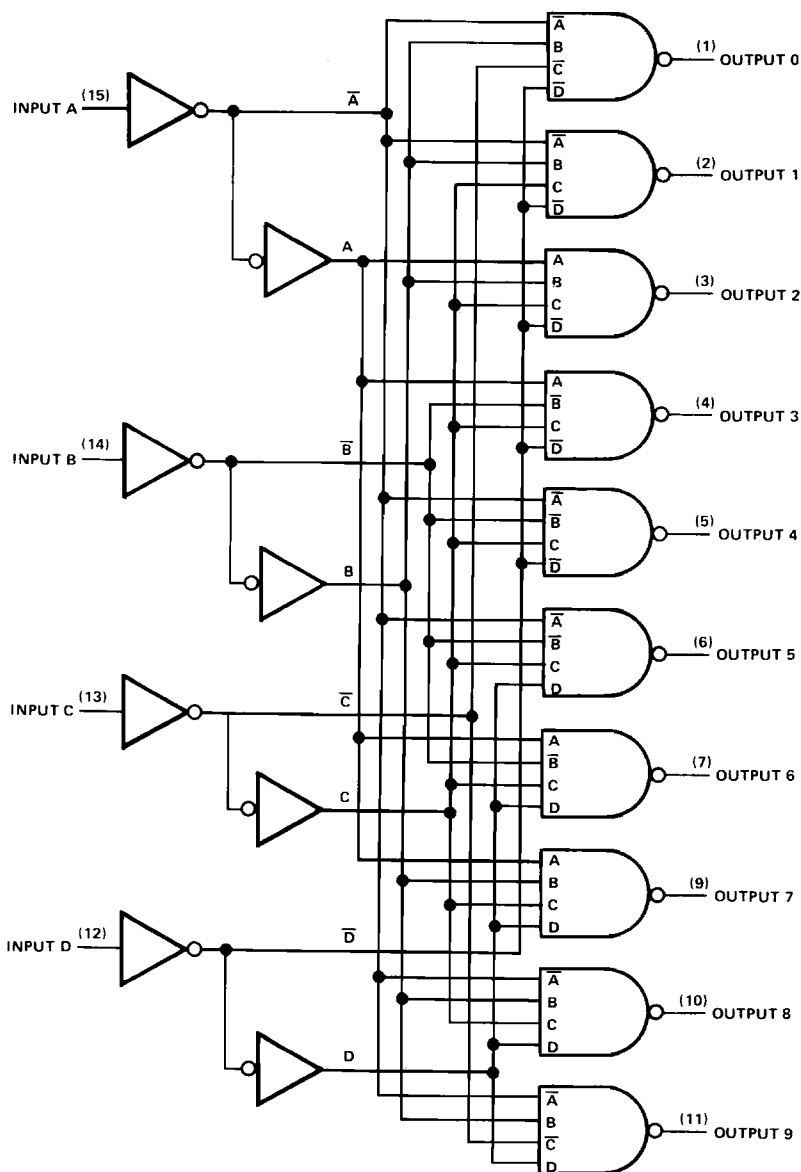
logic diagrams (continued)



Pin numbers shown on logic notation are for D, J or N packages.

TYPES SN5444A, SN54L44, SN7444A
4-LINE TO 10-LINE DECODERS (1-OF-10)

logic diagrams (continued)

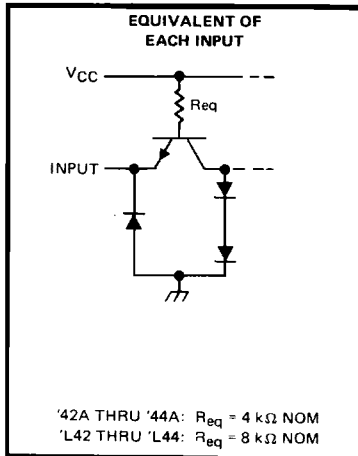


Pin numbers shown on logic notation are for D, J or N packages.

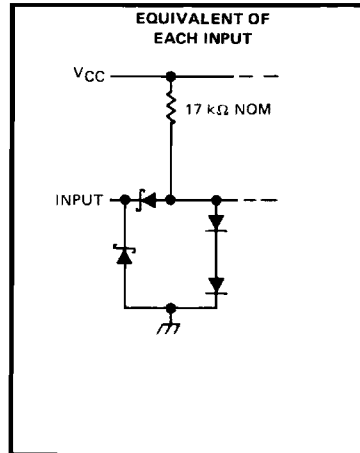
**TYPES SN5442A THRU SN5444A, SN54L42 THRU SN54L44,
SN54LS42, SN7442A THRU SN7444A, SN74LS42
4-LINE TO 10-LINE DECODERS (1-OF-10)**

schematics of inputs and outputs

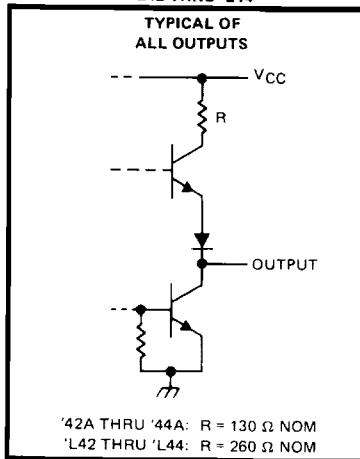
**'42A THRU '44A
'L42 THRU 'L44**



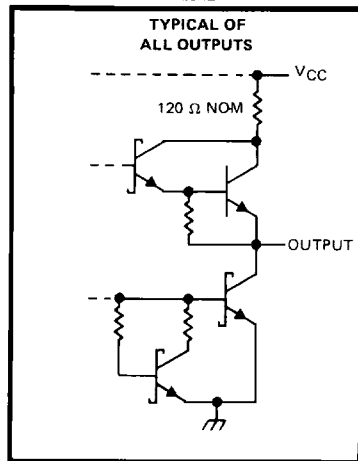
'LS42



**'42A THRU '44A
'L42 THRU 'L44**



'LS42



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TTL DEVICES

**TYPES SN5442A THRU SN5444A, SN54L42 THRU SN54L44,
SN54LS42, SN7442A THRU SN7444A, SN74LS42
4-LINE TO 10-LINE DECODERS (1-OF-10)**

FUNCTION TABLE

NO.	'42A, 'L42, 'LS42				'43A, 'L43				'44A, 'L44				ALL TYPES									
	BCD INPUT				EXCESS-3-INPUT				GRAY INPUT				DECIMAL OUTPUT									
	D	C	B	A	D	C	B	A	D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	L	H	H	L	L	H	L	L	H	H	H	H	H	H	H	H	H
1	L	L	L	H	L	H	L	L	L	H	H	L	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	L	H	L	H	L	H	H	H	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	L	H	H	L	L	H	L	H	H	H	H	L	H	H	H	H	H	H
4	L	H	L	L	L	H	H	H	L	H	L	L	H	H	H	H	L	H	H	H	H	H
5	L	H	L	H	H	L	L	L	L	H	H	L	L	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	L	L	H	H	H	L	H	H	H	H	H	H	L	H	H	H	H
7	L	H	H	H	H	L	H	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H
8	H	L	L	L	H	L	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H
9	H	L	L	H	H	H	L	L	L	H	L	H	L	H	H	H	H	H	H	H	L	L
INVALID	H	L	H	L	H	H	L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H
	H	L	H	H	H	H	H	L	H	L	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	L	H	H	H	H	H	L	L	L	H	H	H	H	H	H	H	H	H	H
	H	H	L	H	L	L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H
	H	H	H	L	L	L	L	H	L	L	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	H	L	L	H	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H

H = high level, L = low level

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: '42A, '43A, '44A	5.5 V
'L42, 'L43, 'L44	5.5 V
'LS42	7 V
Operating free-air temperature: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

TYPES SN5442A, SN5443A, SN5444A, SN7442A, SN7443A, SN7444A

4-LINE TO 10-LINE DECODERS (1-OF-10)

recommended operating conditions

	SN5442A SN5443A SN5444A			SN7442A SN7443A SN7444A			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			-800			-800	μ A
Low-level output current, I_{OL}			16			16	mA
Operating free-air temperature, T_A	-55		125	0		70	$^{\circ}$ C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	SN5442A SN5443A SN5444A			SN7442A SN7443A SN7444A			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IH} High-level input voltage		2			2			V
V_{IL} Low-level input voltage				0.8			0.8	V
V_{IK} Input clamp voltage	$V_{CC} = \text{MIN.}$ $I_I = -12 \text{ mA}$			1.5			-1.5	V
V_{OH} High-level output voltage	$V_{CC} = \text{MIN.}$ $V_{IH} = 2 \text{ V.}$ $V_{IL} = 0.8 \text{ V.}$ $I_{OH} = -800 \mu\text{A}$	2.4	3.4		2.4	3.4		V
V_{OL} Low-level output voltage	$V_{CC} = \text{MIN.}$ $V_{IH} = 2 \text{ V.}$ $V_{IL} = 0.8 \text{ V.}$ $I_{OL} = 16 \text{ mA}$	0.2	0.4		0.2	0.4		V
I_I Input current at maximum input voltage	$V_{CC} = \text{MAX.}$ $V_I = 5.5 \text{ V}$		1			1		mA
I_{IH} High-level input current	$V_{CC} = \text{MAX.}$ $V_I = 2.4 \text{ V}$		40			40		μ A
I_{IL} Low-level input current	$V_{CC} = \text{MAX.}$ $V_I = 0.4 \text{ V}$		-1.6			-1.6		mA
I_{OS} Short-circuit output current	$V_{CC} = \text{MAX.}$	-20		-55	-18		-55	mA
I_{CC} Supply current	$V_{CC} = \text{MAX.}$ See Note 2	28	41		28	56		mA

† For conditions shown as MIN or MAX, use the appropriate values specified under recommended operating conditions.

‡ All typical values are at $V_{CC} = 5 \text{ V.}$ $T_A = 25^{\circ}\text{C.}$

§ Not more than one output should be shorted at a time.

NOTE 2: I_{CC} is measured with all outputs open and all inputs grounded.

switching characteristics, $V_{CC} = 5 \text{ V, } T_A = 25^{\circ}\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PHL} Propagation delay time, high-to-low-level output from A, B, C, or D through 2 levels of logic	$C_L = 15 \text{ pF,}$ $R_L = 400 \Omega,$ See Note 3	14	25		ns
t_{PHL} Propagation delay time, high-to-low-level output from A, B, C, or D through 3 levels of logic		17	30		ns
t_{PLH} Propagation delay time, low-to-high-level output from A, B, C, and D through 2 levels of logic		10	25		ns
t_{PLH} Propagation delay time, low-to-high-level output from A, B, C, and D through 3 levels of logic		17	30		ns

NOTE 3: See General Information Section for load circuits and voltage waveforms.

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TTL DEVICES

TYPES SN54L42, SN54L43, SN54L44

4-LINE TO 10-LINE DECODERS (1-OF-10)

recommended operating conditions

	SN54L42 SN54L43 SN54L44			UNIT
	MIN	NOM	MAX	
V_{CC} Supply voltage	4.5	5	5.5	V
V_{IH} High-level input voltage	2			V
V_{IL} Low-level input voltage			0.8	V
I_{OH} High-level output current			-0.4	mA
I_{OL} Low-level output current			8	mA
T_A Operating free-air temperature	-55		125	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	MIN	TYP	MAX	UNIT
V_{IK}	$V_{CC} = \text{MIN}, I_I = -12 \text{ mA}$			-1.5	V
V_{OH}	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OH} = -400 \mu\text{A}$	2.4	3.4		V
V_{OL}	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OL} = 8 \text{ mA}$		0.2	0.4	V
I_I	$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$			1	mA
I_{IH}	$V_{CC} = \text{MAX}, V_I = 2.4 \text{ V}$			20	μA
I_{IL}	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$			-0.8	mA
$I_{OS}§$	$V_{CC} = \text{MAX}$	-9		-28	mA
I_{CC}	$V_{CC} = \text{MAX},$ See Note 2		14	22	mA

† For conditions shown as MIN or MAX, use the appropriate values specified under recommended operating conditions.
All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

§ Not more than one output should be shorted at a time.

NOTE 2: I_{CC} is measured with all outputs open and inputs grounded.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PHL} Propagation delay time, high-to-low-level output from A, B, C, or D through 2 levels of logic	$C_L = 15 \text{ pF},$ $R_L = 800 \Omega,$ See Note 3	10	44	60	ns
t_{PHL} Propagation delay time, high-to-low-level output from A, B, C, or D through 3 levels of logic			46	70	ns
t_{PLH} Propagation delay time, low-to-high-level output from A, B, C, and D through 2 levels of logic		10	34	50	ns
t_{PLH} Propagation delay time, low-to-high-level output from A, B, C, and D through 3 levels of logic			52	70	ns

NOTE 3: See General Information Section for load circuits and voltage waveforms.

TYPES SN54LS42, SN74LS42

4-LINE TO 10-LINE DECODERS (1-OF-10)

recommended operating conditions

	SN54LS42			SN74LS42			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			-400			-400	μ A
Low-level output current, I_{OL}			4			8	mA
Operating free-air temperature, T_A	-55		125	0		70	$^{\circ}$ C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS†	SN54LS42			SN74LS42			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IH} High-level input voltage		2			2			V
V_{IL} Low-level input voltage				0.7			0.8	V
V_{IK} Input clamp voltage	$V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$			-1.5			-1.5	V
V_{OH} High-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = V_{IL} \text{ max}, I_{OH} = -400 \mu\text{A}$	2.5	3.5		2.7	3.5		V
V_{OL} Low-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, I_{OL} = 4 \text{ mA}$ $V_{IL} = V_{IL} \text{ max}, I_{OL} = 8 \text{ mA}$		0.25	0.4		0.25	0.4	V
I_I Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 7 \text{ V}$			0.1			0.1	mA
I_{IH} High-level input current	$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$			20			20	μ A
I_{IL} Low-level input current	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$			-0.4			-0.4	mA
I_{OS} Short-circuit output current§	$V_{CC} = \text{MAX}$	-20		-100	-20		-100	mA
I_{CC} Supply current	$V_{CC} = \text{MAX}, \text{ See Note 2}$		7	13		7	13	mA

†For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

‡All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$.

§Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

NOTE 2. I_{CC} is measured with all outputs open and inputs grounded.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^{\circ}\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PHL} Propagation delay time, high-to-low-level output from A, B, C, or D through 2 levels of logic	$C_L = 15 \text{ pF}, R_L = 2 \text{ k}\Omega, \text{ See Note 3}$		15	25	ns
t_{PHL} Propagation delay time, high-to-low-level output from A, B, C, or D through 3 levels of logic			20	30	ns
t_{PLH} Propagation delay time, low-to-high-level output from A, B, C, and D through 2 levels of logic			15	25	ns
t_{PLH} Propagation delay time, low-to-high-level output from A, B, C, and D through 3 levels of logic			20	30	ns

Note 3: See General Information Section for load circuits and voltage waveforms.

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