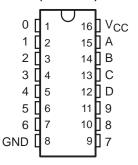
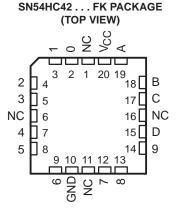
- Wide Operating Voltage Range of 2 V to 6 V
- Outputs Can Drive Up To 10 LSTTL Loads
- Low Power Consumption, 80-μA Max I_{CC}
- Typical t_{pd} = 14 ns
- ±4-mA Output Drive at 5 V

SN54HC42...J OR W PACKAGE SN74HC42...D, N, OR NS PACKAGE (TOP VIEW)



- Low Input Current of 1 μA Max
- Full Decoding of Input Logic
- All Outputs Are High for Invalid BCD Conditions
- Also for Applications as 3-Line to 8-Line Decoders



NC - No internal connection

description/ordering information

These decimal decoders consist of eight inverters and ten 4-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 inputs remain off for all invalid input conditions.

ORDERING INFORMATION

TA	PACKA	GE [†]	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – N	Tube of 25	SN74HC42N	SN74HC42N
		Tube of 40	SN74HC42D	
-40°C to 85°C	SOIC - D	Reel of 2500	SN74HC42DR	HC42
		Reel of 250	SN74HC42DT	
	SOP - NS	Reel of 2000	SN74HC42NSR	HC42
	CDIP – J	Tube of 25	SNJ54HC42J	SNJ54HC42J
–55°C to 125°C	CFP – W	Tube of 150	SNJ54HC42W	SNJ54HC42W
00 0 10 120 0	LCCC – FK	Tube of 55	SNJ54HC42FK	SNJ54HC42FK

[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.



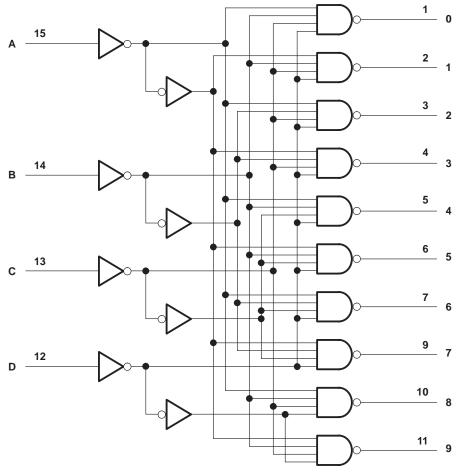
SN54HC42, SN74HC42 4-LINE TO 10-LINE DECODERS (1 of 10)

SCLS091D - DECEMBER 1982 - REVISED SEPTEMBER 2003

FUNCTION TABLE

NO		INP	UTS						OUTI	PUTS				
NO.	D	С	В	Α	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н
1	L	L	L	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н
2	L	L	Н	L	Н	Н	L	Н	Н	Н	Н	Н	Н	Н
3	L	L	Н	Н	Н	Н	Н	L	Н	Н	Н	Н	Н	Н
4	L	Н	L	L	Н	Н	Н	Н	L	Н	Н	Н	Н	Н
5	L	Н	L	Н	Н	Н	Н	Н	Н	L	Н	Н	Н	Н
6	L	Н	Н	L	Н	Н	Н	Н	Н	Н	L	Н	Н	Н
7	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L	Н	Н
8	Н	L	L	L	Н	Н	Н	Н	Н	Н	Н	Н	L	Н
9	Н	L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L
	Н	L	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
Invalid	Н	Н	L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
invalid	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
	Н	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н

logic diagram (positive logic)



Pin numbers shown are for the D, J, N, NS, and W packages.

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

Supply voltage range, V _{CC}		0.5 V to 7 V
Input clamp current, I _{IK} (V _I < 0 or V _I > V _{CC}) (see	ee Note 1)	±20 mA
Output clamp current, IOK (VO < 0 or VO > VCO	C) (see Note 1)	±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})		±25 mA
Continuous current through V _{CC} or GND		±50 mA
Package thermal impedance, θ _{JA} (see Note 2)	: D package	
•	N package	67°C/W
	NS package	64°C/W
Storage temperature range, T _{sta}		–65°C to 150°C

[†] Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

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



recommended operating conditions (see Note 3)

			S	N54HC4	2	S	N74HC4	2	
			MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Vcc	Supply voltage		2	5	6	2	5	6	V
		V _{CC} = 2 V	1.5			1.5			
ViH	High-level input voltage	V _{CC} = 4.5 V	3.15			3.15			V
		V _{CC} = 6 V	4.2			4.2			
		V _{CC} = 2 V			0.5			0.5	
VIL	Low-level input voltage	V _{CC} = 4.5 V			1.35			1.35	V
		VCC = 6 V			1.8			1.8	
VI	Input voltage		0		VCC	0		VCC	V
VO	Output voltage		0		VCC	0		VCC	V
		V _{CC} = 2 V			1000			1000	
Δt/Δν	Input transition rise/fall time	V _{CC} = 4.5 V			500			500	ns
		VCC = 6 V			400			400	
TA	Operating free-air temperature	·	-55		125	-40		85	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

	7507.00	NIDITION O	.,	Т	A = 25°C	;	SN54H	HC42	SN74H	IC42	
PARAMETER	TEST CC	ONDITIONS	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
			2 V	1.9	1.998		1.9		1.9		
		$I_{OH} = -20 \mu A$	4.5 V	4.4	4.499		4.4		4.4		
∨он	VI = VIH or VIL		6 V	5.9	5.999		5.9		5.9		V
		$I_{OH} = -4 \text{ mA}$	4.5 V	3.98	4.3		3.7		3.84		
		$I_{OH} = -5.2 \text{ mA}$	6 V	5.48	5.8		5.2		5.34		
			2 V		0.002	0.1		0.1		0.1	
		I _{OL} = 20 μA	4.5 V		0.001	0.1		0.1		0.1	
VoL	$V_I = V_{IH}$ or V_{IL}		6 V		0.001	0.1		0.1		0.1	V
		I _{OL} = 4 mA	4.5 V		0.17	0.26		0.4		0.33	
		$I_{OL} = 5.2 \text{ mA}$	6 V		0.15	0.26		0.4		0.33	
lį	$V_I = V_{CC}$ or 0		6 V		±0.1	±100		±1000		±1000	nA
ICC	$V_I = V_{CC}$ or 0,	IO = 0	6 V			8		160		80	μΑ
Ci			2 V to 6 V		3	10		10		10	pF

VOLTAGE WAVEFORMS
PROPAGATION DELAY AND OUTPUT TRANSITION TIMES

switching characteristics over recommended operating free-air temperature range, $C_L = 50 \text{ pF}$ (unless otherwise noted) (see Figure 1)

DADAMETER	FROM	то	.,	T,	չ = 25°C	;	SN54I	HC42	SN74H	HC42	LINIT			
PARAMETER	(INPUT)	(OUTPUT)	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT			
			2 V		65	150		225		190				
t _{pd}	A, B, C, or D	0–9	4.5 V		18	30		45		38	ns			
·						6 V		14	26		38		32	
			2 V		28	75		110		95				
t _t		Any	4.5 V		8	15		22		19	ns			
			6 V		7	13		19		16				

operating characteristics, T_A = 25°C

	PARAMETER	TEST CONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance	No load	39	pF

PARAMETER MEASUREMENT INFORMATION

VCC From Output Test Input 50% 50% **Under Test Point** C_L = 50 pF ^tPHL tPLH -(see Note A) V_{OH} In-Phase 50% 10% -Output **LOAD CIRCUIT** VOL - tPHL VCC VOH Input 50% 90% **Out-of-Phase** 10% Output 10% 10% VOL

NOTES: A. C_L includes probe and test-fixture capacitance.

VOLTAGE WAVEFORM

INPUT RISE AND FALL TIMES

- B. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, $Z_O = 50~\Omega$, $t_f = 6$ ns, $t_f = 6$ ns.
- C. The outputs are measured one at a time with one input transition per measurement.
- D. tpLH and tpHL are the same as tpd.

Figure 1. Load Circuit and Voltage Waveforms





17-May-2014

PACKAGING INFORMATION

Orderable Device	Status	Package Type		Pins		Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)		(4/5)	
5962-86821012A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 86821012A SNJ54HC 42FK	Samples
5962-8682101EA	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-8682101EA SNJ54HC42J	Samples
SN54HC42J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	SN54HC42J	Samples
SN74HC42D	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC42	Samples
SN74HC42DE4	ACTIVE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC42DG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC42	Samples
SN74HC42DR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC42	Samples
SN74HC42DRE4	ACTIVE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC42DRG4	ACTIVE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC42DT	ACTIVE	SOIC	D	16	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC42	Samples
SN74HC42DTE4	ACTIVE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC42DTG4	ACTIVE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC42N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-40 to 85	SN74HC42N	Samples
SN74HC42NE4	ACTIVE	PDIP	N	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC42NSR	ACTIVE	so	NS	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC42	Samples
SN74HC42NSRE4	ACTIVE	so	NS	16		TBD	Call TI	Call TI	-40 to 85		Samples
SN74HC42NSRG4	ACTIVE	so	NS	16		TBD	Call TI	Call TI	-40 to 85		Samples
SNJ54HC42FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 86821012A	Samples



PACKAGE OPTION ADDENDUM

17-May-2014

Orderable Device	Status	Package Type	Package	Pins	Package	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Device Marking	Samples
	(1)		Drawing		Qty	(2)	(6)	(3)	_	(4/5)	_
										SNJ54HC	
										42FK	
SNJ54HC42J	ACTIVE	CDIP	J	16	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-8682101EA	Samples
										SNJ54HC42J	Samples

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

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.
- (4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.
- (5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.
- (6) Lead/Ball Finish Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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PACKAGE OPTION ADDENDUM

17-May-2014

OTHER QUALIFIED VERSIONS OF SN54HC42, SN74HC42:

Catalog: SN74HC42

www.ti.com

• Military: SN54HC42

NOTE: Qualified Version Definitions:

• Catalog - TI's standard catalog product

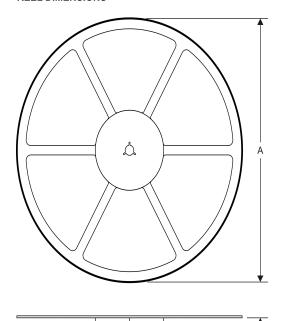
• Military - QML certified for Military and Defense Applications

PACKAGE MATERIALS INFORMATION

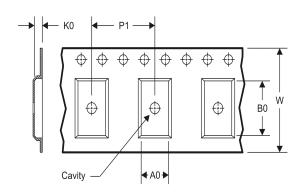
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TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
В0	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

TAPE AND REEL INFORMATION

*All dimensions are nominal

	Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
	SN74HC42DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
ſ	SN74HC42NSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1

PACKAGE MATERIALS INFORMATION

www.ti.com 14-Jul-2012



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HC42DR	SOIC	D	16	2500	333.2	345.9	28.6
SN74HC42NSR	SO	NS	16	2000	367.0	367.0	38.0

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.

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a metal lid.
- D. Falls within JEDEC MS-004



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.



D (R-PDS0-G16)

PLASTIC SMALL OUTLINE



- 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 0.006 (0,15) each side.
- Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
- E. Reference JEDEC MS-012 variation AC.



D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Publication IPC-7351 is recommended for alternate designs.
- D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
- E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



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