

DN74LS42

BCD to Decimal Decoders

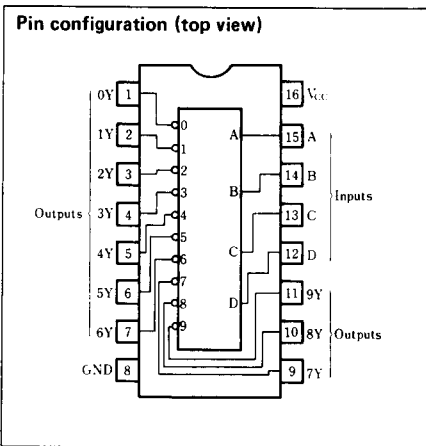
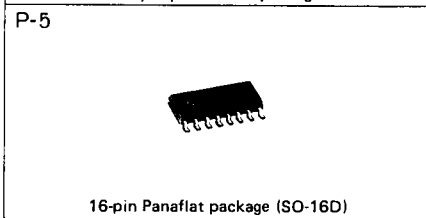
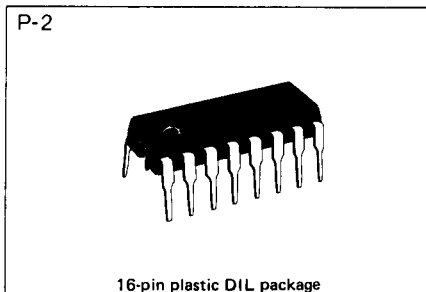
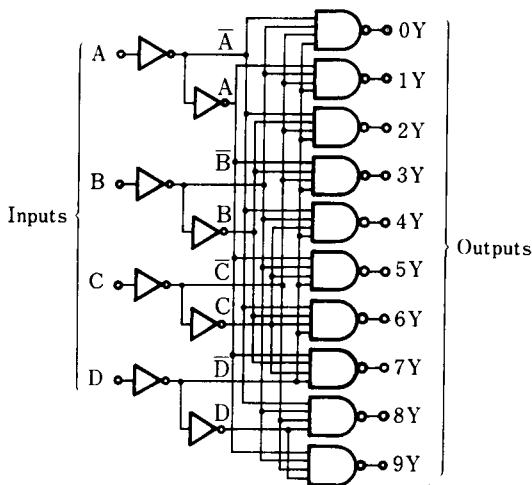
■ Description

DN74LS42 is a binary-coded decimal to decimal decoder.

■ Features

- During invalid input, all outputs become HIGH
- Also can be used as 3-bit binary to octal decoder
- Wide operating temperature range ($T_a = -20$ to $+75^\circ\text{C}$)

■ Logic diagram



■ Recommended operating conditions

Parameter	Sym	Min	Typ	Max	Unit
Supply voltage	V_{cc}	4.75	5.00	5.25	V
Output current	I_{OH}			-400	μA
	I_{OL}			8	mA
Operating temperature range	T_{opr}	-20	25	75	$^\circ\text{C}$

■ DC characteristics (Ta = -20 ~ +75°C)

Parameter	Sym	Test conditions	Min	Typ*	Max	Unit
Input voltage	V _{IH}		2.0			V
	V _{IL}				0.8	V
Output voltage	V _{OH}	V _{CC} = 4.75V, V _{IH} = 2V, V _{IL} = 0.8V, I _{OH} = -400 μA	2.7	3.4		V
	V _{OL1}	V _{CC} = 4.75V, V _{IH} = 2V, I _{OL} = 4mA		0.25	0.4	V
	V _{OL2}	V _{CC} = 4.75V, V _{IH} = 2V, V _{IL} = 0.8V, I _{OL} = 8mA		0.35	0.5	V
Input current	I _{IH}	V _{CC} = 5.25V, V _I = 2.7V			20	μA
	I _{IL}	V _{CC} = 5.25V, V _I = 0.4V			-0.4	mA
	I _I	V _{CC} = 5.25V, V _I = 7V			0.1	mA
Output short circuit current**	I _{OS}	V _{CC} = 5.25V, V _O = 0V	-15		-100	mA
Input clamp voltage	V _{IK}	V _{CC} = 4.75V, I _I = -18mA			-1.5	V
Supply current***	I _{CC}	I _{CC} = 5.25V		7	13	mA

* When constant at V_{CC} = 5V, Ta = 25°C.

** Only one output at a time short circuited to GND. Also, short circuit time to GND within 1 second.

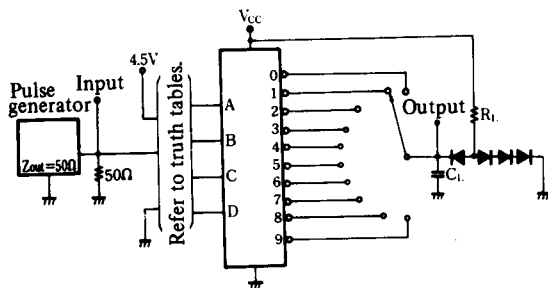
*** Measured with all outputs open and all inputs grounded.

■ Switching characteristics (V_{CC} = 5V, Ta = 25°C)

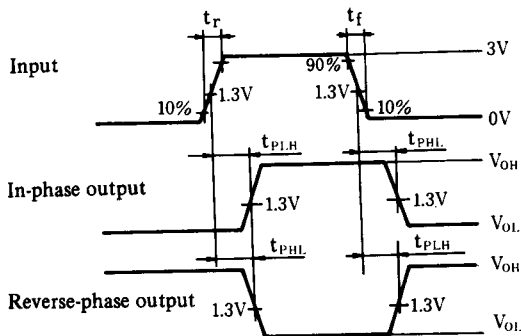
Parameter	Sym	Test conditions	Min	Typ	Max	Unit
Propagation delay time	2 stage	C _L = 15pF, R _L = 2kΩ		15	25	ns
	3 stage			20	30	ns
	2 stage			15	25	ns
	3 stage			20	30	ns

※ Switching parameter measurement information

1. Measurement circuit



2. Waveforms



Notes

- C_L includes probe and tool floating capacitance.
- Diodes are all MA161 or equivalent.

Notes

- Input waveform: tr ≤ 15ns, tf ≤ 6ns, PRR = 1MHz, duty cycle = 50%.

■ Truth tables

NO.	BCD Inputs				Decimal Outputs									
	D	C	B	A	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	L	L	L	H	H	L	H	H	H	H	H	H	H	H
2	L	L	H	L	H	H	L	H	H	H	H	H	H	H
3	L	L	H	H	H	H	H	L	H	H	H	H	H	H
4	L	H	L	L	H	H	H	H	L	H	H	H	H	H
5	L	H	L	H	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H
7	L	H	H	H	H	H	H	H	H	H	H	L	H	H
8	H	L	L	L	H	H	H	H	H	H	H	H	L	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
INVALID	H	L	H	L	H	H	H	H	H	H	H	H	H	H
	H	L	H	H	H	H	H	H	H	H	H	H	H	H
	H	H	L	L	H	H	H	H	H	H	H	H	H	H
	H	H	L	H	H	H	H	H	H	H	H	H	H	H
	H	H	H	L	H	H	H	H	H	H	H	H	H	H
	H	H	H	H	H	H	H	H	H	H	H	H	H	H

Notes

- 1. H: HIGH voltage level.
- 2. L: LOW voltage level.

