DN74LS42

BCD to Decimal Decoders

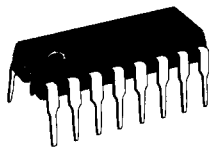
■ Description

DN74LS42 is a binary-coded decimal to decimal decoder.

■ Features

- During invalid input, all inputs become HIGH
- Also can be used as 3-bit binary to octal decoder
- Wide operating temperature range (Ta = −20 to +75°C)

P-2

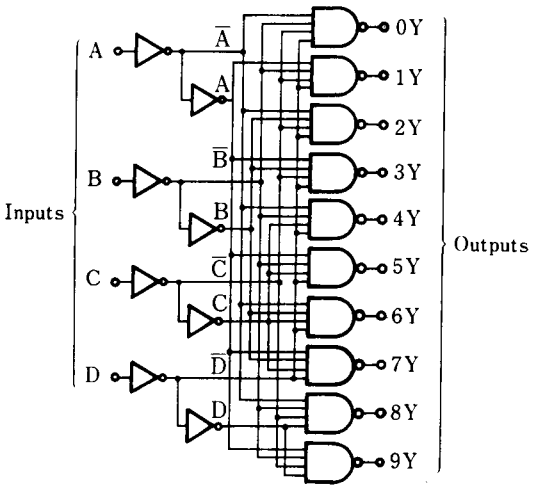


16-pin plastic DIL package

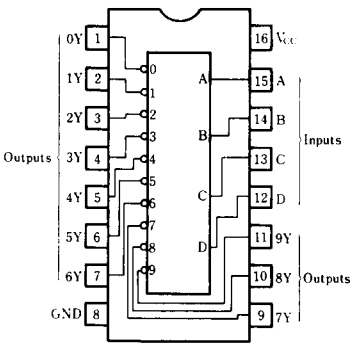
P-5

16-pin Panaflat package (SO-16D)

■ Logic diagram



Pin configuration (top view)



■ 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	Topr	−20	25	75	℃

■ DC characteristics ($Ta = -20 \sim +75℃$)

Parameter	Sym	Test conditions		Min	Typ*	Max	Unit
Input voltage	V_{IH}			2.0			V
	V_{IL}					0.8	V
Output voltage	V_{OH}	$V_{CC}=4.75V$ $V_{IH}=2V$ $V_{IL}=0.8V$, $I_{OH}=-400\mu A$		2.7	3.4		V
	V_{OL1}	$V_{CC}=4.75V$ $V_{IH}=2V$ $V_{IL}=0.8V$	$I_{OL}=4mA$		0.25	0.4	V
	V_{OL2}		$I_{OL}=8mA$		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

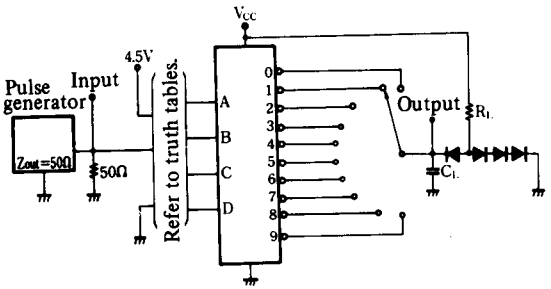
* When constant at V_{CC} = 5V, Ta = 25°C.
** Only one output at a time short circuited to GND. Also, short circuit time to GND within 1 second.
*** Measured with all outputs open and all inputs grounded.

■ Switching characteristics ($V_{CC}=5V$, $Ta=25℃$)

Parameter		Sym	Test conditions	Min	Typ	Max	Unit
Propagation delay time	2 stage	t_{PLH}	$C_L=15pF$ $R_L=2k\Omega$		15	25	ns
	3 stage				20	30	ns
	2 stage	t_{PHL}			15	25	ns
	3 stage				20	30	ns

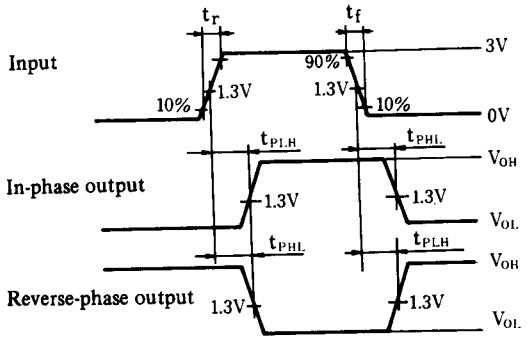
※ Switching parameter measurement information

1. Measurement circuit



Notes
1. C_L includes probe and tool floating capacitance.
2. Diodes are all MA161 or equivalent.

2. Waveforms



Notes
1. Input waveform: $t_r \leqq 15ns$, $t_f \leqq 6ns$, 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.