

DN74LS139

Dual 2-line to 4-line Decoders / Demultiplexers

Description

DN74LS139 contains two 2-bit binary to quaternary decoder/demultiplexer circuits, each with independent enable input terminals.

Features

- Enable inputs
- Both circuits completely independent
- Wide operating temperature range ($T_a = -20$ to $+75^\circ\text{C}$)

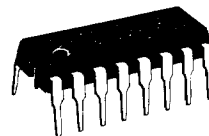
Truth tables

Inputs			Outputs			
Enable	Select					
G	B	A	Y_0	Y_1	Y_2	Y_3
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	L	H	H	L	H	H
L	H	L	H	H	L	H
L	H	H	H	H	H	L

Notes

1. H: HIGH voltage level.
2. L: LOW voltage level.
3. X: Either HIGH or LOW; doesn't matter.

P-2



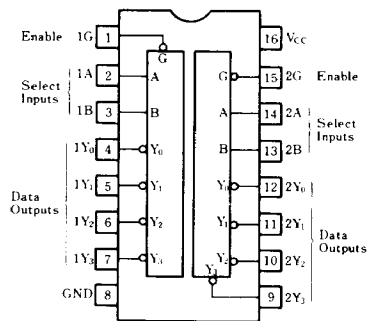
16-pin plastic DIL package

P-5



16-pin Panafiat package (SO-16D)

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	T_{opr}	-20	25	75	$^\circ\text{C}$

■ DC characteristics ($T_a = -20 \sim +75^\circ\text{C}$)

Parameter	Sym	Test conditions	Min	Typ*	Max	Unit
Input voltage	V_{IH}		2.0			V
	V_{IL}				0.8	V
Output voltage	V_{OH}	$V_{CC} = 4.75\text{V}$, $V_{IH} = 2\text{V}$ $V_{IL} = 0.8\text{V}$, $I_{OH} = -400\mu\text{A}$	2.7	3.4		V
	V_{OL1}	$V_{CC} = 4.75\text{V}$ $V_{IH} = 2\text{V}$, $I_{OL} = 4\text{mA}$		0.25	0.4	V
	V_{OL2}	$V_{CC} = 4.75\text{V}$ $V_{IH} = 2\text{V}$, $I_{OL} = 8\text{mA}$		0.35	0.5	V
Input current	I_{IH}	$V_{CC} = 5.25\text{V}$ $V_I = 2.7\text{V}$			20	μA
	I_{IL}	$V_{CC} = 5.25\text{V}$ $V_I = 0.4\text{V}$			-0.4	mA
	I_I	$V_{CC} = 5.25\text{V}$ $V_I = 7\text{V}$			0.1	mA
Output short circuit current**	I_{OS}	$V_{CC} = 5.25\text{V}$, $V_O = 0\text{V}$	-15		-100	mA
Input clamp voltage	V_{IK}	$V_{CC} = 4.75\text{V}$ $I_I = -18\text{mA}$			-1.5	V
Supply current***	I_{CC}	$I_{CC} = 5.25\text{V}$		6.8	11	mA

* When constant at $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$.

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

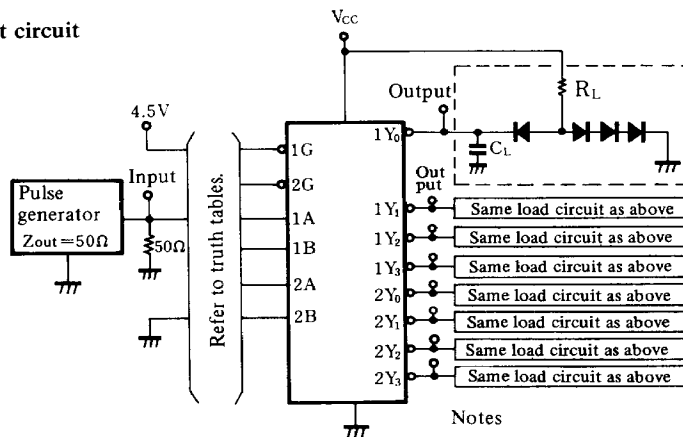
*** Measured with all outputs open and all inputs grounded.

■ Switching characteristics ($V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$)

Parameter	Sym	Inputs	Outputs	Delay level	Test conditions	Min	Typ	Max	Unit	
Propagation delay time	t _{PLH}	Binary select 1A, 1B 2A, 2B	1Y ₀ ~ 1Y ₃	2	C _L = 15pF R _L = 2kΩ		13	20	ns	
	t _{PHL}						22	33	ns	
	t _{PLH}		2Y ₀ ~ 2Y ₃	3			18	29	ns	
	t _{PHL}						25	38	ns	
	t _{PLH}	Enable 1G, 2G	1Y ₀ ~ 1Y ₃	2			16	24	ns	
	t _{PHL}						21	32	ns	

※ Switching parameter measurement information

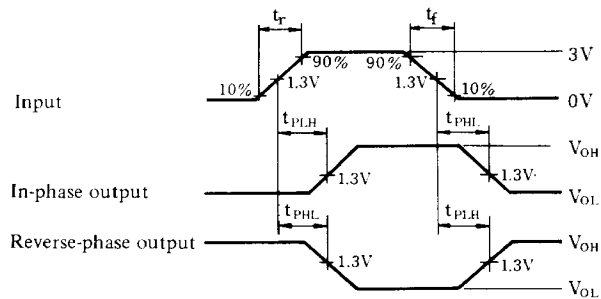
1. Measurement circuit



Notes

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

2. Waveforms



Notes

1. Input waveform: $t_r \leq 15\text{ns}$, $t_f \leq 6\text{ns}$, $\text{PRR} = 1\text{MHz}$,
duty cycle = 50%.

■ Logic diagram

