

HD74LVC139

Dual 2-to-4-line Decoders / Demultiplexers

HITACHI

ADE-205-069B(Z)

Rev.2

September 1995

Description

The HD74LVC139 has two independent two-to-four-line decoders each with a single active low enable input in a 16 pin package. Data on the select inputs cause one of the four normally high outputs to go low. Low voltage and high speed operation is suitable at the battery drive product (note type personal computer) and low power consumption extends the life of a battery for long time operation.

Features

- $V_{CC} = 2.0\text{ V to }5.5\text{ V}$
- All inputs $V_{IH}(\text{Max.}) = 5.5\text{ V} (@V_{CC} = 0\text{ V to }5.5\text{ V})$
- Typical V_{OL} ground bounce $< 0.8\text{ V} (@V_{CC} = 3.3\text{ V}, T_a = 25^\circ\text{C})$
- Typical V_{OH} undershoot $> 2.0\text{ V} (@V_{CC} = 3.3\text{ V}, T_a = 25^\circ\text{C})$
- High output current $\pm 24\text{ mA} (@V_{CC} = 3.0\text{ V to }5.5\text{ V})$

Function Table

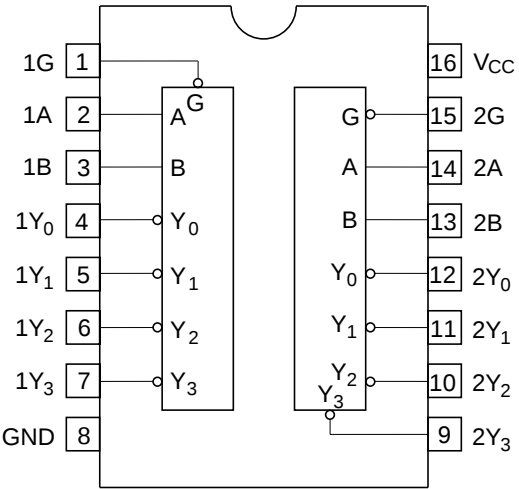
Input						
Enable	Select				Outputs	
G	B	A	Y_0	Y_1	Y_2	Y_3
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	L	H	H	L	H	H
L	H	L	H	H	L	H
L	H	H	H	H	H	L

H : High level

L : Low level

X : Immaterial

Pin Arrangement



(Top view)

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	-0.5 to 6.0	V	
Input diode current	I_{IK}	-50	mA	$V_I = -0.5\text{ V}$
Input voltage	V_I	-0.5 to 6.0	V	
Output diode current	I_{OK}	-50	mA	$V_O = -0.5\text{ V}$
		50	mA	$V_O = V_{CC} + 0.5\text{ V}$
Output voltage	V_O	-0.5 to $V_{CC} + 0.5\text{ V}$		
Output current	I_O	± 50	mA	
V_{CC} , GND current / pin	I_{CC} or I_{GND}	100	mA	
Storage temperature	T_{stg}	-65 to 150	$^{\circ}\text{C}$	

Note: The absolute maximum ratings are values which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V_{CC}	1.5 to 5.5	V	Data retention
		2.0 to 5.5	V	At operation
Input / output voltage	V_I	0 to 5.5	V	G, A, B
	V_O	0 to V_{CC}	V	Y_0 to Y_3
Operating temperature	T_a	-40 to 85	°C	
Output current	I_{OH}	-12	mA	$V_{CC} = 2.7$ V
		-24 ^{*2}	mA	$V_{CC} = 3.0$ V to 5.5 V
	I_{OL}	12	mA	$V_{CC} = 2.7$ V
		24 ^{*2}	mA	$V_{CC} = 3.0$ V to 5.5 V
Input rise / fall time ^{*1}	t_r, t_f	10	ns/V	

Notes: 1. This item guarantees maximum limit when one input switches.

Waveform : Refer to test circuit of switching characteristics.

2. duty cycle $\leq 50\%$

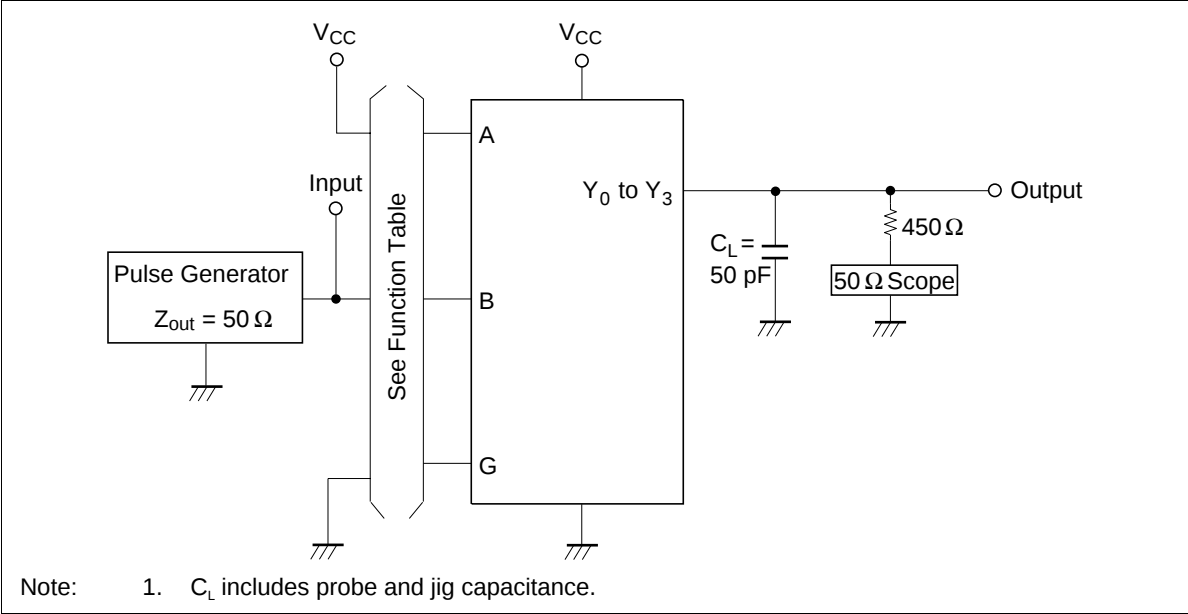
Electrical Characteristics

Item	Symbol	V_{CC} (V)	$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions
			Min	Max		
Input voltage	V_{IH}	2.7 to 3.6	2.0	—	V	
		4.5 to 5.5	$V_{CC} \times 0.7$	—	V	
	V_{IL}	2.7 to 3.6	—	0.8	V	
		4.5 to 5.5	—	$V_{CC} \times 0.3$	V	
Output voltage	V_{OH}	2.7 to 5.5	$V_{CC} - 0.2$	—	V	$I_{OH} = -100 \mu\text{A}$
		2.7	2.2	—	V	$I_{OH} = -12 \text{ mA}$
		3.0	2.4	—	V	
		3.0	2.0	—	V	$I_{OH} = -24 \text{ mA}$
	V_{OL}	4.5	3.8	—	V	
		2.7 to 5.5	—	0.2	V	$I_{OL} = 100 \mu\text{A}$
		2.7	—	0.4	V	$I_{OL} = 12 \text{ mA}$
		3.0	—	0.55	V	$I_{OL} = 24 \text{ mA}$
Input current	I_{IN}	0 to 5.5	—	± 5.0	μA	$V_{IN} = 5.5 \text{ V or GND}$
Quiescent supply current	I_{CC}	5.5	—	20	μA	$V_{IN} = V_{CC} \text{ or GND}$
	ΔI_{CC}	3.0 to 3.6	—	500	μA	$V_{IN} = \text{one input at } (V_{CC} - 0.6)\text{V, other inputs at } V_{CC} \text{ or GND}$

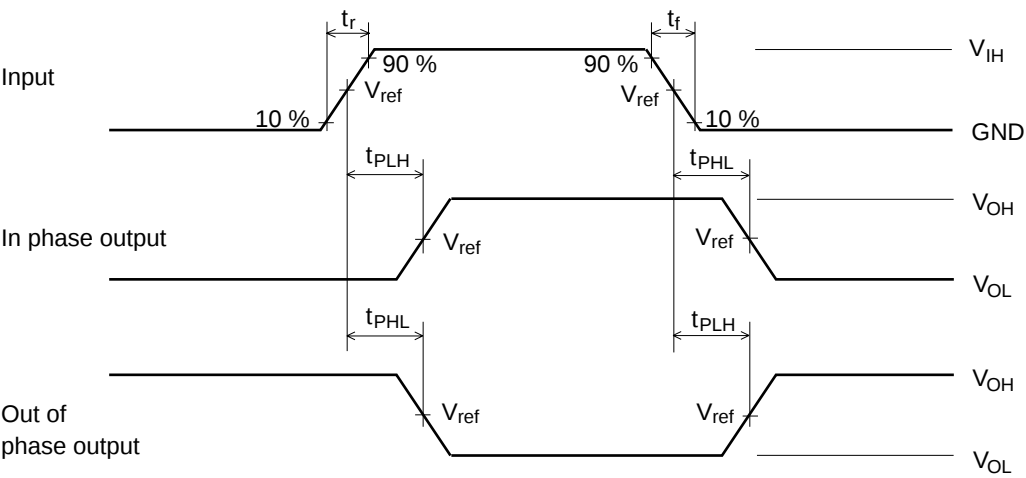
Switching Characteristics

Item	Symbol	V _{CC} (V)	Ta = -40 to 85°C				From (Input)	To (Output)
			Min	Typ	Max	Unit		
Propagation delay time	t _{PLH}	2.7	—	7.0	10.0	ns	G, A, B	Y ₀ to Y ₃
	t _{PHL}	3.3±0.3	1.5	5.0	9.0	ns		
		5.0±0.5	—	3.5	7.5	ns		
Input capacitance	C _{IN}	2.7	—	3.0	—	pF		
Output capacitance	C _O	2.7	—	15.0	—	pF		

Test Circuit

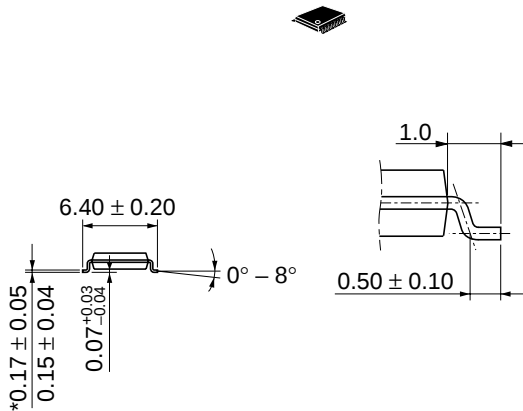
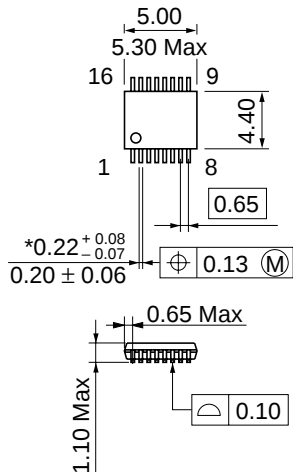


Waveforms



Symbol	$V_{CC} = 2.7\text{ V}, 3.3\pm0.3\text{ V}$	$V_{CC} = 5.0\pm0.5\text{ V}$
V_{IH}	2.7 V	V_{CC}
V_{ref}	1.5 V	50% V_{CC}

- Notes:
- 1. $t_r = 2.5\text{ ns}, t_f = 2.5\text{ ns}$
 - 2. Input waveform : PRR = 10 MHz, duty cycle 50%



*Dimension including the plating thickness
Base material dimension

Hitachi Code	TTP-16DA
JEDEC	—
EIAJ	—
Weight (reference value)	0.05 g

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