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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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HD74LVC139

Dual 2-to-4-line Decoders / Demultiplexers

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

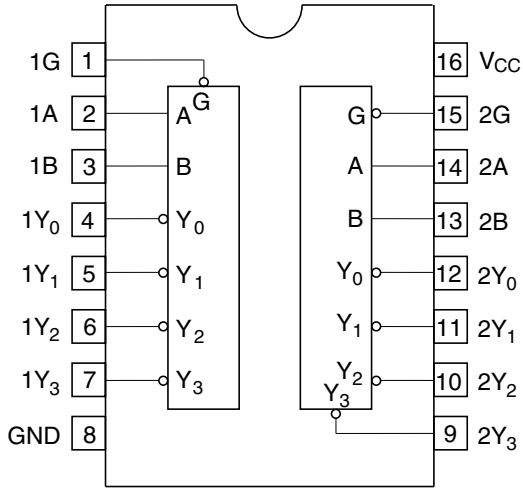
- V_{CC} = 2.0 V to 5.5 V
- All inputs V_{IH} (Max.) = 5.5 V (@V_{CC} = 0 V to 5.5 V)
- Typical V_{OL} ground bounce < 0.8 V (@V_{CC} = 3.3 V, Ta = 25°C)
- Typical V_{OH} undershoot > 2.0 V (@V_{CC} = 3.3 V, Ta = 25°C)
- High output current ±24 mA (@V_{CC} = 3.0 V to 5.5 V)

Function Table

Input			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

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 V
Input voltage	V_I	–0.5 to 6.0	V	
Output diode current	I_{OK}	–50	mA	V_O = –0.5 V
		50	mA	V_O = V_{CC} +0.5 V
Output voltage	V_O	–0.5 to V_{CC} +0.5	V	
Output current	I_O	±50	mA	
V_{CC}, GND current / pin	I_{CC} or I_{GND}	100	mA	
Storage temperature	Tstg	–65 to 150	°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	Ta	–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 ≤ 50%

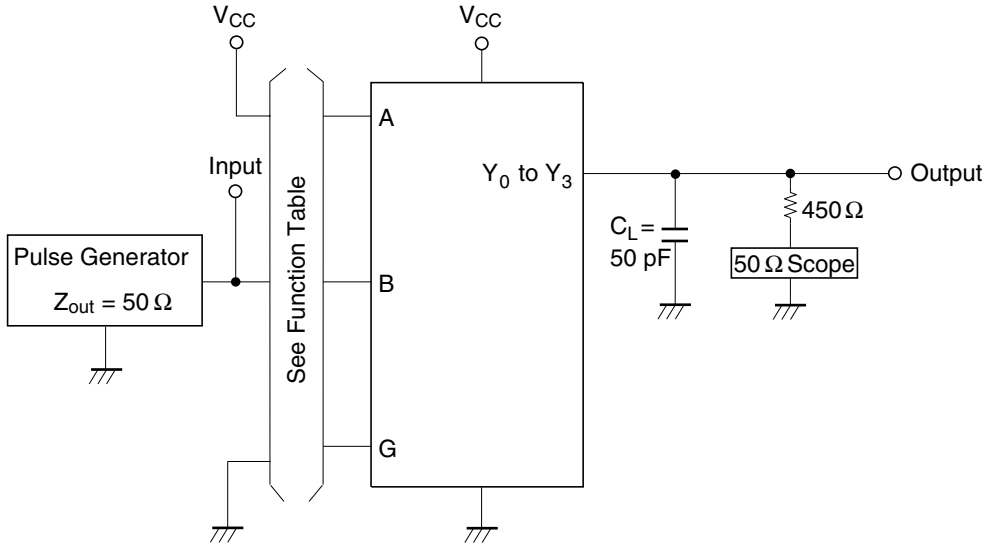
Electrical Characteristics

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

Switching Characteristics

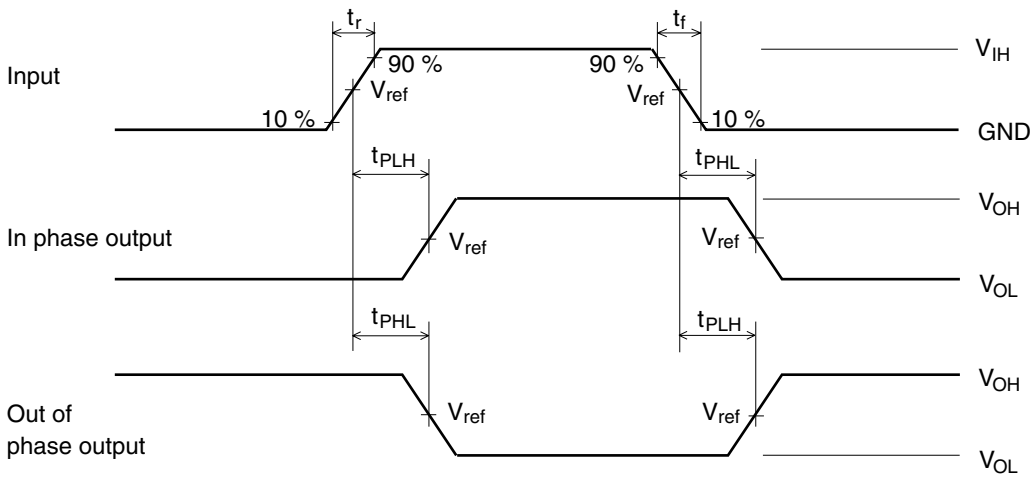
			Ta = –40 to 85°C					
Item	**Symbol**	**V_{cc} (V)**	**Min**	**Typ**	**Max**	**Unit**	**From (Input)**	**To (Output)**
Propagation delay time	t_{PLH}	2.7	—	7.0	10.0	ns	G, A, B	Y_0 to Y_3
	t_{PHL}	3.3±0.3	1.5	5.0	9.0	ns		
		5.0±0.5	—	3.5	7.5	ns		
Input capacitance	C_{IN}	2.7	—	3.0	—	pF		
Output capacitance	C_O	2.7	—	15.0	—	pF		

Test Circuit



Note: 1. C_L includes probe and jig capacitance.

Waveforms

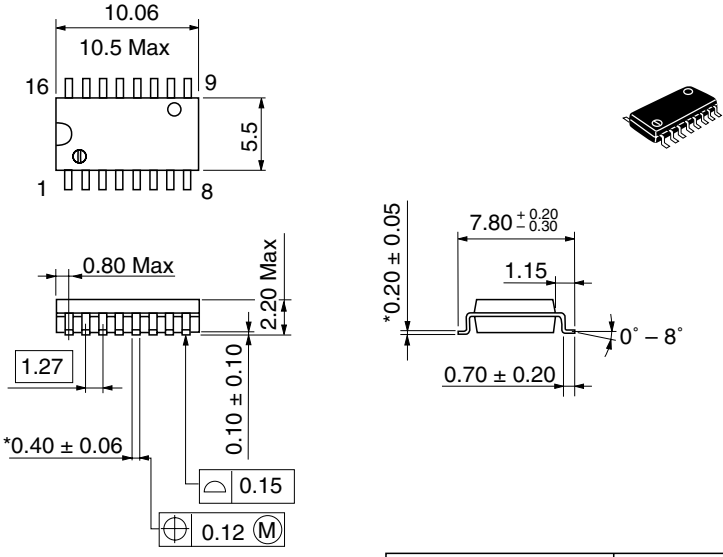


Symbol	V_{CC} = 2.7 V, 3.3±0.3 V	V_{CC} = 5.0±0.5 V
V_{IH}	2.7 V	V_{CC}
V_{ref}	1.5 V	50%V_{CC}

Notes: 1. t_r = 2.5 ns, t_f = 2.5 ns
2. Input waveform : PRR = 10 MHz, duty cycle 50%

Package Dimensions

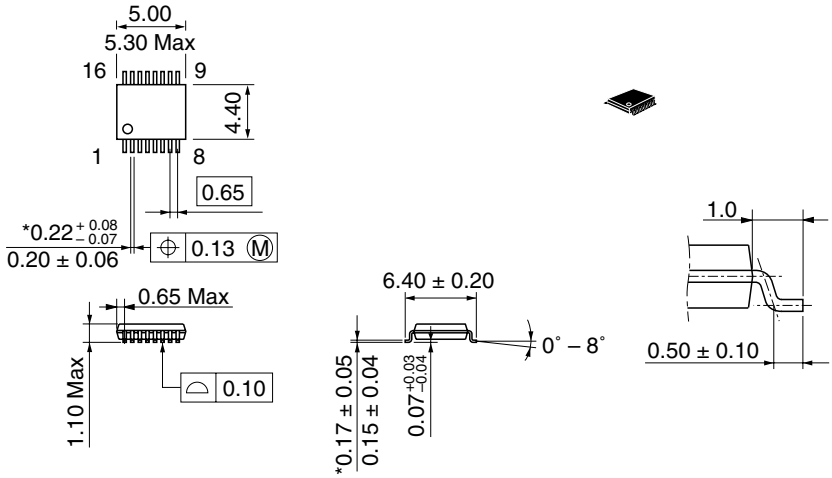
As of July, 2001
Unit: mm



Hitachi Code	FP-16DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.24 g

*Pd plating

As of July, 2001
Unit: mm



Hitachi Code	TTP-16DA
JEDEC	—
JEITA	—
Mass (reference value)	0.05 g

*Dimension including the plating thickness
Base material dimension

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Sales Offices

HITACHI

Hitachi, Ltd.
Semiconductor & Integrated Circuits.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan
Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL NorthAmerica : http://semiconductor.hitachi.com/
Europe : http://www.hitachi-eu.com/hel/ecg
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For further information write to:

Hitachi Semiconductor (America) Inc.
179 East Tasman Drive,
San Jose,CA 95134
Tel: <1> (408) 433-1990
Fax: <1>(408) 433-0223

Hitachi Europe GmbH
Electronic Components Group
Dornacher Stra§e 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.
Electronic Components Group.
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA, United Kingdom
Tel: <44> (1628) 585000
Fax: <44> (1628) 585160

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00,
Singapore 049318
Tel : <65>-538-6533/538-8577
Fax : <65>-538-6933/538-3877
URL : http://www.hitachi.com.sg

Hitachi Asia Ltd.
(Taipei Branch Office)
4/F, No. 167, Tun Hwa North Road,
Hung-Kuo Building,
Taipei (105), Taiwan
Tel : <886>-(2)-2718-3666
Fax : <886>-(2)-2718-8180
Telex : 23222 HAS-TP
URL : http://www.hitachi.com.tw

Hitachi Asia (Hong Kong) Ltd.
Group III (Electronic Components)
7/F., North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon,
Hong Kong
Tel : <852>-(2)-735-9218
Fax : <852>-(2)-730-0281
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