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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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HD74LS156

Dual 2-line-to-4-line Decoders / Demultiplexers (with open collector outputs)

REJ03D0441-0300

Rev.3.00

Jul.13.2005

This circuit features dual 1-line-to-4-line demultiplexer with individual strobes and common binary-address input. When both sections are enabled by the strobes, the common binary-address inputs sequentially select and route associated input data to the appropriate output of each section. The individual strobes permit activating or inhibiting each of the 4-bit sections as desired. Data applied to input 1C is inverted through its outputs. The inverter following the 1C data input permits use as a 3-to-8-line decoder or 1-to-8-line demultiplexer without external gating.

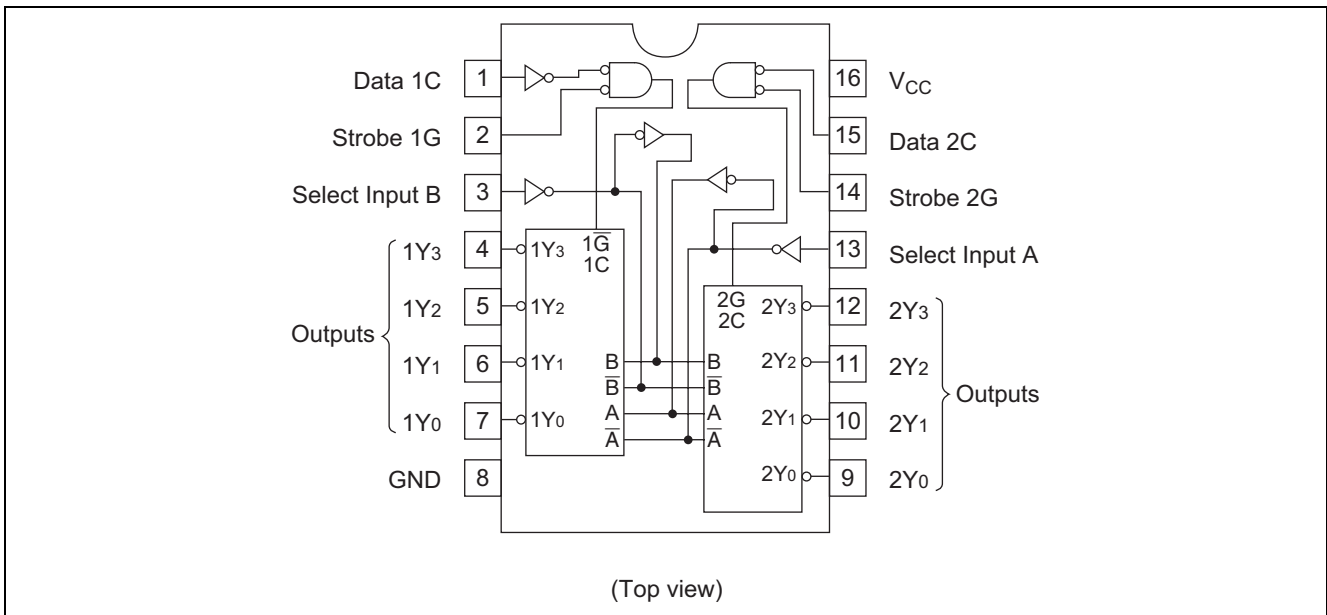
Features

- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LS156P	DILP-16 pin	PRDP0016AE-B (DP-16FV)	P	—
HD74LS156RPEL	SOP-16 pin (JEDEC)	PRSP0016DG-A (FP-16DNV)	FP	EL (2,500 pcs/reel)

Note: Please consult the sales office for the above package availability.

Pin Arrangement



Function Table

• 2-to-4-line Decoder / 1-to-4-line Demultiplexer

Inputs				Outputs			
Select		Strobe	Data	1Y ₀	1Y ₁	1Y ₂	1Y ₃
B	A	1G	1C				
X	X	H	X	H	H	H	H
L	L	L	H	L	H	H	H
L	H	L	H	H	L	H	H
H	L	L	H	H	H	L	H
H	H	L	H	H	H	H	L
X	X	X	L	H	H	H	H

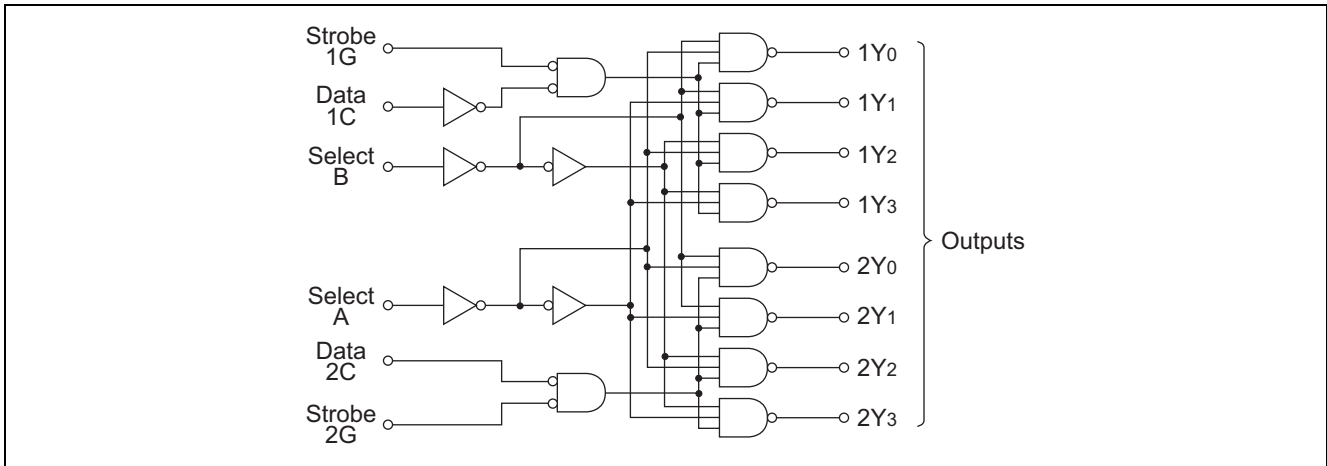
Inputs				Outputs			
Select		Strobe	Data	2Y ₀	2Y ₁	2Y ₂	2Y ₃
B	A	2G	2C				
X	X	H	X	H	H	H	H
L	L	L	L	L	H	H	H
L	H	L	L	H	L	H	H
H	L	L	L	H	H	L	H
H	H	L	L	H	H	H	L
X	X	X	H	H	H	H	H

• 3-to-8-line Decoder / 1-to-8-line Demultiplexer

Inputs				Outputs							
Select			Strobe or Data	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
C ^{*1}	B	A	G ^{*2}	2Y ₀	2Y ₁	2Y ₂	2Y ₃	1Y ₀	1Y ₁	1Y ₂	1Y ₃
X	X	X	H	H	H	H	H	H	H	H	H
L	L	L	L	L	H	H	H	H	H	H	H
L	L	H	L	H	L	H	H	H	H	H	H
L	H	L	L	H	H	L	H	H	H	H	H
L	H	H	L	H	H	H	L	H	H	H	H
H	L	L	L	H	H	H	H	L	H	H	H
H	L	H	L	H	H	H	H	H	L	H	H
H	H	L	L	H	H	H	H	H	H	L	H
H	H	H	L	H	H	H	H	H	H	H	L

- Notes: 1. C; input 1C and 2C connected together
 2. G; inputs 1G and 2G connected together
 3. H; high level, L; low level, X; irrelevant

Block Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}	7	V
Input voltage	V_{IN}	7	V
Power dissipation	P_T	400	mW
Storage temperature	T_{stg}	-65 to +150	°C

Note: Voltage value, unless otherwise noted, are with respect to network ground terminal.

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	V_{CC}	4.75	5.00	5.25	V
High level output voltage	V_{OH}	—	—	5.5	V
Low level output current	I_{OL}	—	—	8	mA
Operating temperature	T_{opr}	-20	25	75	°C

Electrical Characteristics

($T_a = -20$ to $+75$ °C)

Item	Symbol	min.	typ.*	max.	Unit	Condition
Input voltage	V_{IH}	2.0	—	—	V	
	V_{IL}	—	—	0.8	V	
Output current	I_{OH}	—	—	100	μA	$V_{CC} = 4.75$ V, $V_{IH} = 2$ V, $V_{IL} = 0.8$ V, $V_{OH} = 5.5$ V
Output voltage	V_{OL}	—	—	0.4	V	$V_{CC} = 4.75$ V, $V_{IH} = 2$ V, $V_{IL} = 0.8$ V
		—	—	0.5		
Input current	I_{IH}	—	—	20	μA	$V_{CC} = 5.25$ V, $V_I = 2.7$ V
	I_{IL}	—	—	-0.4	mA	$V_{CC} = 5.25$ V, $V_I = 0.4$ V
	I_I	—	—	0.1	mA	$V_{CC} = 5.25$ V, $V_I = 7$ V
Supply current**	I_{CC}	—	6.1	10	mA	$V_{CC} = 5.25$ V
Input clamp voltage	V_{IK}	—	—	-1.5	V	$V_{CC} = 4.75$ V, $I_{IN} = -18$ mA

Notes: * $V_{CC} = 5$ V, $T_a = 25$ °C

** I_{CC} is measured with outputs open, A, B, and 1C inputs at 4.5 V, and 2C, 1G, and 2G inputs grounded.

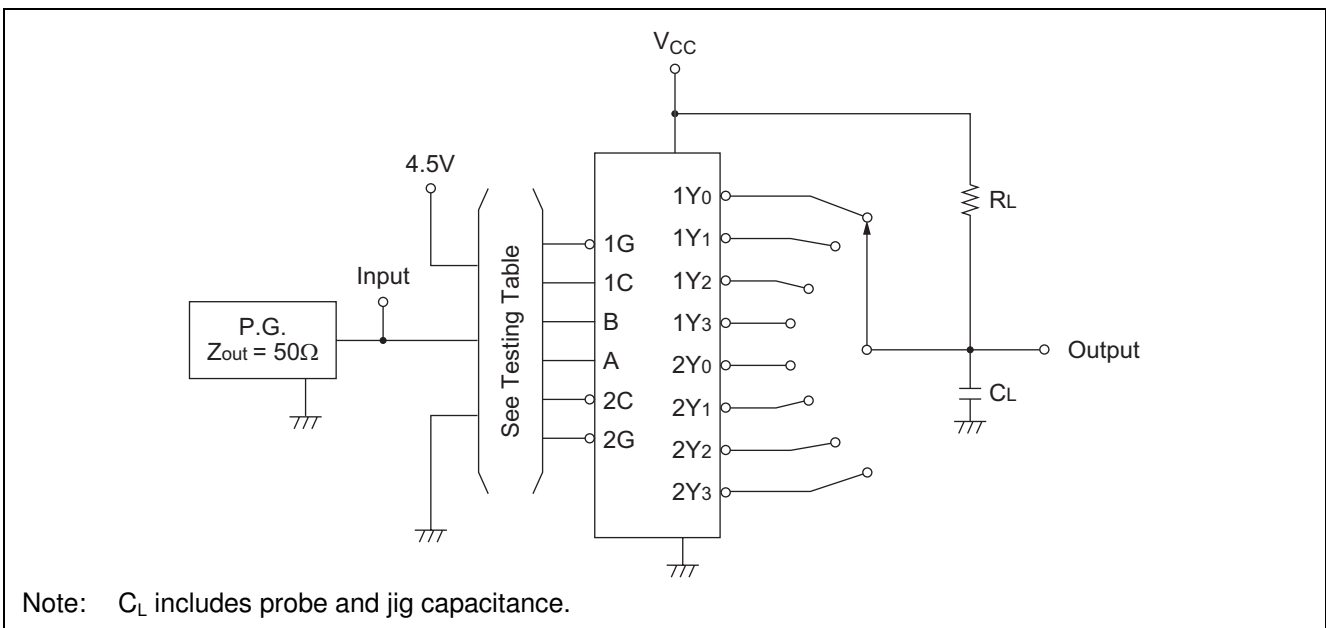
Switching Characteristics

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

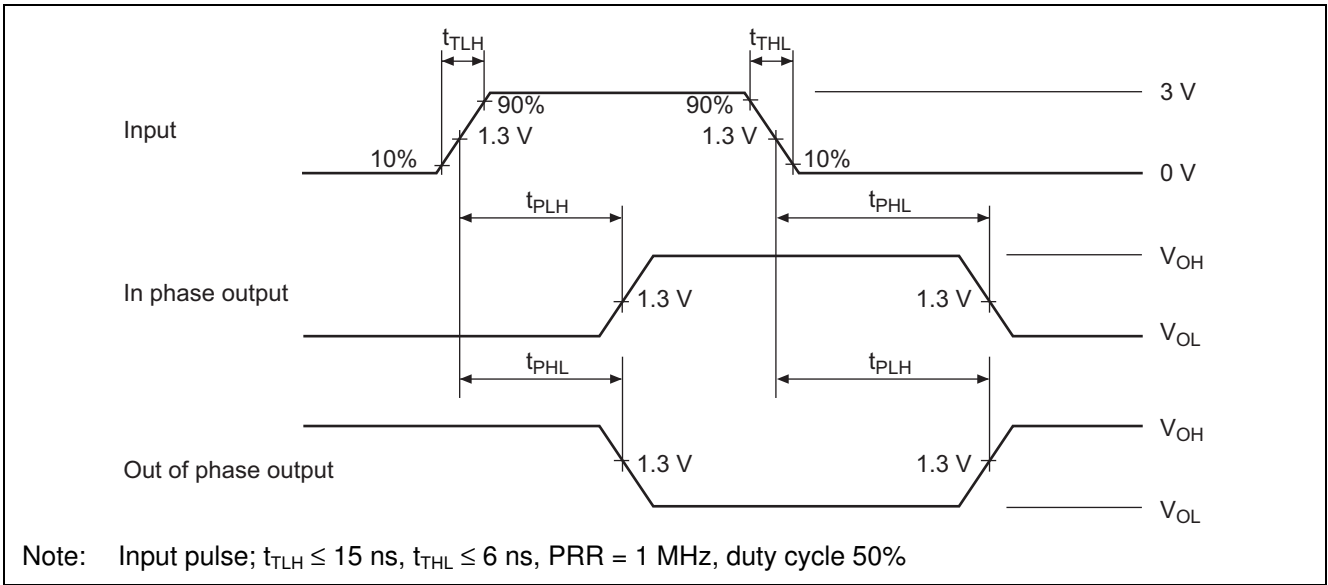
Item	Symbol	Inputs	Output	Level of logic	min.	typ.	max.	Unit	Condition
Propagation delay time	t_{PLH}	A, B, 2C, 1G or 2G	Y	2	—	25	40	ns	$C_L = 15\text{ pF}$, $R_L = 2\text{ k}\Omega$
	t_{PHL}	A, B, 2C, 1G or 2G	Y	2	—	34	51		
	t_{PLH}	A or B	Y	3	—	31	46		
	t_{PHL}	A or B	Y	3	—	34	51		
	t_{PLH}	1C	Y	3	—	32	48		
	t_{PHL}	1C	Y	3	—	32	48		

Testing Method

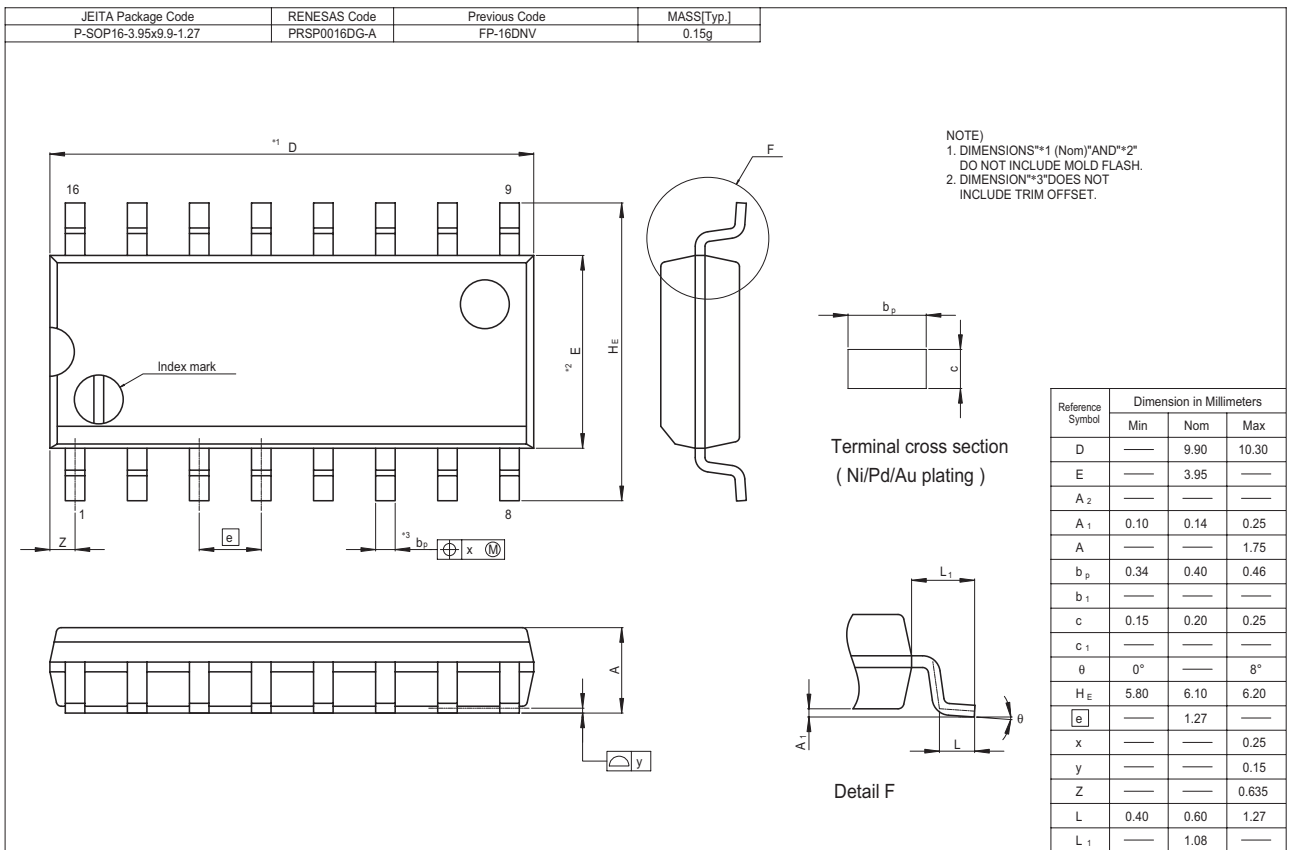
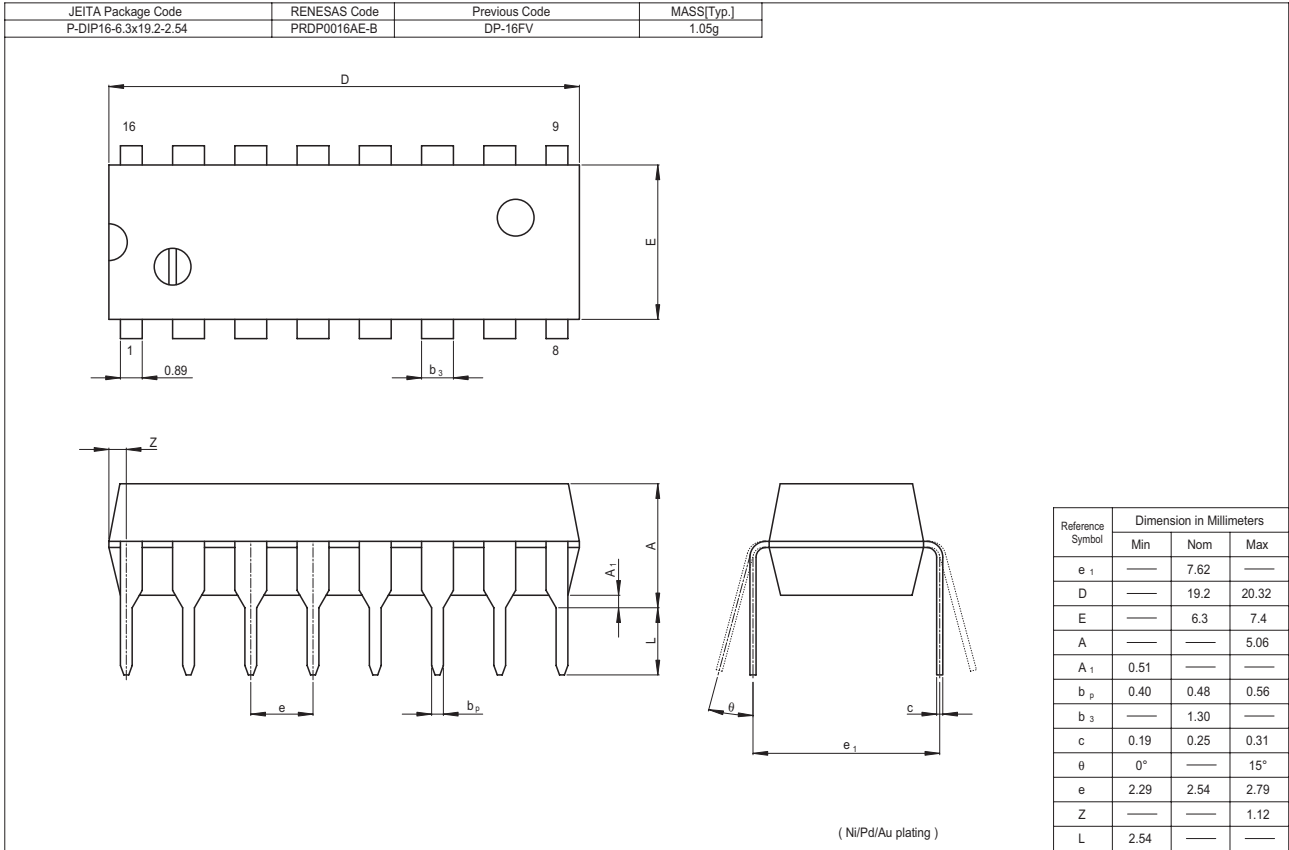
Test Circuit



Waveform



Package Dimensions



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