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## NTE74LS156 Integrated Circuit TTL – Dual 2–Line–to–1–Line Decoder/Demultiplexer

### **Description:**

The NTE74LS156 is a monolithic TTL circuit featuring dual 1–line–to–4–line demultiplexers with individual strobes and common binary–address inputs in a 16–Lead plastic DIP type package. 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 at its outputs and data applied at  $2\bar{C}$  is not 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. Input clamping diodes are provided on all of the circuits to minimize transmission–line effects and simplify system design.

### **Features:**

- Individual Strobes Simplify Cascading for Decoding or Demultiplexing Larger Words
- Input Clamping Diodes Simplify System Design
- Open Collector Outputs

### **Applications:**

- Dual 2–to–4–Line Decoder
- Dual 1–to–4–Line Demultiplexer
- 3–to–8–Line Decoder
- 1–to–8–Line Demultiplexer

### **Absolute Maximum Ratings:** (Note 1)

Supply Voltage, $V_{CC}$ .....	7V
DC Input Voltage, $V_{IN}$ .....	7V
Off–State Voltage .....	7V
Power Dissipation, $P_D$ .....	31mW
Operating Temperature Range, $T_A$ .....	0°C to +70°C
Storage Temperature Range, $T_{stg}$ .....	–65°C to +150°C

Note 1. Unless otherwise specified, all voltages are referenced to GND.

### **Recommended Operating Conditions:**

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	$V_{CC}$	4.75	5.0	5.25	V
High–Level Output Voltage	$V_{OH}$	–	–	5.5	V
Low–Level Output Current	$I_{OL}$	–	–	8	mA
Operating Temperature Range	$T_A$	0	–	+70	°C

**Electrical Characteristics:** (Note 2, Note 3)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit	
High Level Input Voltage	$V_{IH}$		2	-	-	V	
Low Level Input Voltage	$V_{IL}$		-	-	0.8	V	
Input Clamp Voltage	$V_{IK}$	$V_{CC} = \text{MIN}, I_I = -18\text{mA}$	-	-	-1.5	V	
High Level Output Current	$I_{OH}$	$V_{CC} = \text{MIN}, V_{IH} = 2\text{V}, V_{IL} = \text{MAX}, V_{OH} = 5.5\text{V}$	-	-	100	$\mu\text{A}$	
Low Level Output Voltage	$V_{OL}$	$V_{CC} = \text{MIN}, V_{IH} = 2\text{V}, V_{IL} = \text{MAX}$	$I_{OL} = 4\text{mA}$	-	0.25	0.4	V
			$I_{OL} = 8\text{mA}$	-	0.35	0.5	V
Input Current	$I_I$	$V_{CC} = \text{MAX}, V_I = 7\text{V}$	-	-	0.1	mA	
High Level Input Current	$I_{IH}$	$V_{CC} = \text{MAX}, V_I = 2.7\text{V}$	-	-	20	$\mu\text{A}$	
Low Level Input Current	$I_{IL}$	$V_{CC} = \text{MAX}, V_I = 0.4\text{V}$	-	-	-0.4	mA	
Supply Current	$I_{CC}$	$V_{CC} = \text{MAX}, \text{Note 4}$	-	6.1	10	mA	

Note 2. For conditions shown as MIN or MAX, use the appropriate value specified under "Recommended Operation Conditions".

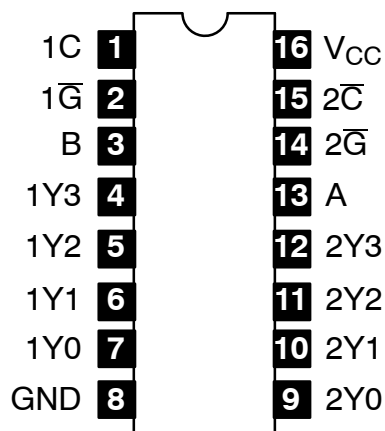
Note 3. All typical values are at  $V_{CC} = 5\text{V}, T_A = +25^\circ\text{C}$ .

Note 4.  $I_{CC}$  is measured with the outputs open, A, B, and 1C inputs at 4.5V, and 2C, 1G, and 2G inputs grounded.

**Switching Characteristics:** ( $V_{CC} = 5\text{V}, T_A = +25^\circ\text{C}$  unless otherwise specified)

Parameter	Symbol	Levels of Logic	Test Conditions	Min	Typ	Max	Unit
Propagation Delay Time (From A, B, 2C, 1G or 2G Input to Y Output)	$t_{PLH}$	2	$R_L = 2\text{k}\Omega,$ $C_L = 15\text{pF}$	-	25	40	ns
	$t_{PHL}$	2		-	34	51	ns
Propagation Delay Time (From A or B Input to Y Output)	$t_{PLH}$	3		-	31	46	ns
	$t_{PHL}$	3		-	34	51	ns
Propagation Delay Time (From 1C Input to Y Output)	$t_{PLH}$	3		-	32	48	ns
	$t_{PHL}$	3		-	32	48	ns

**Pin Connection Diagram**



**Function Tables:**

2-Line-to-4-Line Decoder  
or 1-Line-to-4-Line Demultiplexer

Inputs				Outputs			
Select		Strobe	Data	1Y0	1Y1	1Y2	1Y3
B	A	$\overline{G}$	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	2Y0	2Y1	2Y2	2Y3
B	A	$2\overline{G}$	$2\overline{C}$				
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

**Function Table:**

3-Line-to-8-Line Decoder  
or 1-Line-to-8-Line Demultiplexer

Inputs				Outputs							
Select			Strobe or Data	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
C *	B	A	$\overline{G}$ **	2Y0	2Y1	2Y2	2Y3	1Y0	1Y1	1Y2	1Y3
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

\* C = Inputs 1C and  $2\overline{C}$  connected together

\*\*  $\overline{G}$  = Inputs  $1\overline{G}$  and  $2\overline{G}$  connected together

H = HIGH Level

L = LOW Level

X = Don't Care

