

Table 3-11 Characteristics of gates in TTL families.

Description	Symbol	Family				
		74S	74LS	74AS	74ALS	74F
Maximum propagation delay (ns)		3	9	1.7	4	3
Power consumption per gate (mW)		19	2	8	1.2	4
Speed-power product (pJ)		57	18	13.6	4.8	12
LOW-level input voltage (V)	V_{ILmax}	0.8	0.8	0.8	0.8	0.8
LOW-level output voltage (V)	V_{OLmax}	0.5	0.5	0.5	0.5	0.5
HIGH-level input voltage (V)	V_{IHmin}	2.0	2.0	2.0	2.0	2.0
HIGH-level output voltage (V)	V_{OHmin}	2.7	2.7	2.7	2.7	2.7
LOW-level input current (mA)	I_{ILmax}	-2.0	-0.4	-0.5	-0.2	-0.6
LOW-level output current (mA)	I_{OLmax}	20	8	20	8	20
HIGH-level input current (μ A)	I_{IHmax}	50	20	20	20	20
HIGH-level output current (μ A)	I_{OHmax}	-1000	-400	-2000	-400	-1000

74ALS (Advanced Low-

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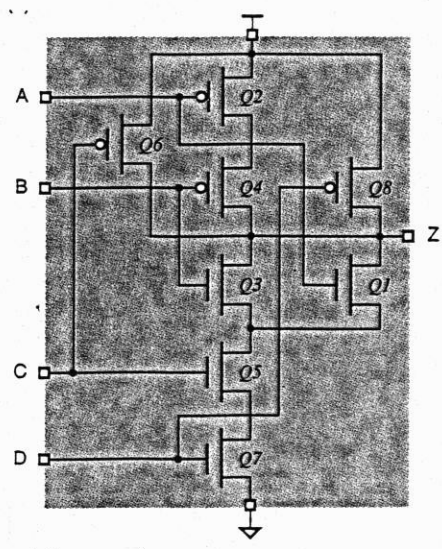
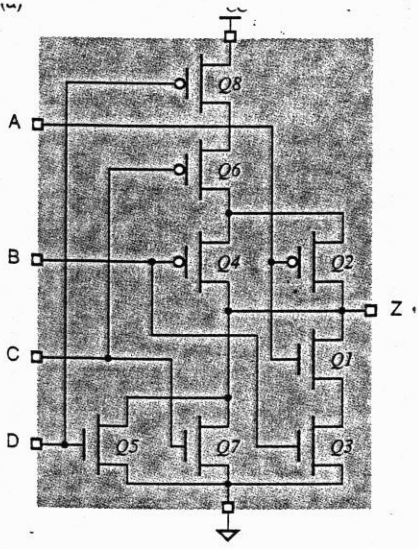


Figure A3.1

Table 3-12 Typical manufacturer's data sheet for the 74LS00.

RECOMMENDED OPERATING CONDITIONS									
Parameter	Description	SN54LS00			SN74LS00			Unit	
		Min.	Nom.	Max.	Min.	Nom.	Max.		
V_{CC}	Supply voltage	4.5	5.0	5.5	4.75	5.0	5.25	V	
V_{IH}	High-level input voltage	2.0			2.0			V	
V_{IL}	Low-level input voltage			0.7			0.8	V	
I_{OH}	High-level output current			-0.4			-0.4	mA	
I_{OL}	Low-level output current			4			8	mA	
T_A	Operating free-air temperature	-55		125	0		70	°C	
ELECTRICAL CHARACTERISTICS OVER RECOMMENDED FREE-AIR TEMPERATURE RANGE									
Parameter	Test Conditions ⁽¹⁾	SN54LS00			SN74LS00			Unit	
		Min.	Typ. ⁽²⁾	Max.	Min.	Typ. ⁽²⁾	Max.		
V_{IK}	$V_{CC} = \text{Min.}, I_N = -18 \text{ mA}$			-1.5			-1.5	V	
V_{OH}	$V_{CC} = \text{Min.}, V_{IL} = \text{Max.}, I_{OH} = -0.4 \text{ mA}$	2.5	3.4		2.7	3.4		V	
V_{OL}	$V_{CC} = \text{Min.}, V_{IH} = 2.0 \text{ V}, I_{OL} = 4 \text{ mA}$		0.25	0.4		0.25	0.4	V	
	$V_{CC} = \text{Min.}, V_{IH} = 2.0 \text{ V}, I_{OL} = 8 \text{ mA}$					0.35	0.5	V	
I_I	$V_{CC} = \text{Max.}, V_I = 7.0 \text{ V}$			0.1			0.1	mA	
I_{IH}	$V_{CC} = \text{Max.}, V_I = 2.7 \text{ V}$			20			20	μA	
I_{IL}	$V_{CC} = \text{Max.}, V_I = 0.4 \text{ V}$			-0.4			-0.4	mA	
$I_{OS}^{(3)}$	$V_{CC} = \text{Max.}$	-20		-100	-20		-100	mA	
I_{CCH}	$V_{CC} = \text{Max.}, V_I = 0 \text{ V}$		0.8	1.6		0.8	1.6	mA	
I_{CCL}	$V_{CC} = \text{Max.}, V_I = 4.5 \text{ V}$		2.4	4.4		2.4	4.4	mA	
SWITCHING CHARACTERISTICS, $V_{CC} = 5.0 \text{ V}, T_A = 25^\circ\text{C}$									
Parameter	From (Input)	To (Output)	Test Conditions			Min.	Typ.	Max.	Unit
t_{PLH}	A or B	Y	$R_L = 2 \text{ k}\Omega, C_L = 15 \text{ pF}$				9	15	ns
t_{PHL}							10	15	ns

NOTES:

- For conditions shown as Max. or Min., use appropriate value specified under Recommended Operating Conditions.
- All typical values are at $V_{CC} = 5.0 \text{ V}, T_A = 25^\circ\text{C}$.
- Not more than one output should be shorted at a time; duration of short-circuit should not exceed one second.

SN74LS157

Quad 2-Input Multiplexer

The LS TTL/MSI SN74LS157 is a high speed Quad 2-Input Multiplexer. Four bits of data from two sources can be selected using the common Select and Enable inputs. The four buffered outputs present the selected data in the true (non-inverted) form. The LS157 can also be used to generate any four of the 16 different functions of two variables. The LS157 is fabricated with the Schottky barrier diode process for high speed and is completely compatible with all ON Semiconductor TTL families.

- Schottky Process for High Speed
- Multifunction Capability
- Non-Inverting Outputs
- Input Clamp Diodes Limit High Speed Termination Effects
- Special Circuitry Ensures Glitch Free Multiplexing
- ESD > 3500 Volts

GUARANTEED OPERATING RANGES

Symbol	Parameter	Min	Typ	Max	Unit
V _{CC}	Supply Voltage	4.75	5.0	5.25	V
T _A	Operating Ambient Temperature Range	0	25	70	°C
I _{OH}	Output Current – High			-0.4	mA
I _{OL}	Output Current – Low			8.0	mA



ON Semiconductor
<http://onsemi.com>

LOW POWER SCHOTTKY



PLASTIC N SUFFIX CASE 648



SOIC D SUFFIX CASE 751B



SOEIAJ M SUFFIX CASE 966

ORDERING INFORMATION

Device	Package	Shipping
SN74LS157N	16 Pin DIP	2000 Units/Box
SN74LS157D	SOIC-16	38 Units/Rail
SN74LS157DR2	SOIC-16	2500/Tape & Reel
SN74LS157M	SOEIAJ-16	See Note 1
SN74LS157MEL	SOEIAJ-16	See Note 1

1. For ordering information on the EIAJ version of the SOIC package, please contact your local ON Semiconductor representative.

SN74LS157

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter	Limits			Unit	Test Conditions
		Min	Typ	Max		
V _{IH}	Input HIGH Voltage	2.0			V	Guaranteed Input HIGH Voltage for All Inputs
V _{IL}	Input LOW Voltage			0.8	V	Guaranteed Input LOW Voltage for All Inputs
V _{IK}	Input Clamp Diode Voltage		-0.65	-1.5	V	V _{CC} = MIN, I _{IK} = -18 mA
V _{OH}	Output HIGH Voltage	2.7	3.5		V	V _{CC} = MIN, I _{OH} = MAX, V _{IN} = V _{IH} or V _{IL} per Truth Table
V _{OL}	Output LOW Voltage		0.25	0.4	V	V _{CC} = V _{CC} MIN, V _{IN} = V _{IL} or V _{IH} per Truth Table
			0.35	0.5	V	I _{OL} = 4.0 mA I _{OL} = 8.0 mA
I _{IH}	Input HIGH Current I _{IH} , I _I E, S			20	µA	V _{CC} = MAX, V _{IN} = 7.0 V
				40	µA	
I _{IL}	Input LOW Current I _{IL} , I _I E, S			0.1	mA	V _{CC} = MAX, V _{IN} = 2.7 V
				0.2	mA	
I _{OS}	Short Circuit Current (Note 2)			-0.4	mA	V _{CC} = MAX, V _{IN} = 0.4 V
				-0.8	mA	
I _{CC}	Power Supply Current			-100	mA	V _{CC} = MAX
				16	mA	V _{CC} = MAX

2. Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS (T_A = 25°C)

Symbol	Parameter	Limits			Unit	Test Conditions
		Min	Typ	Max		
t _{PLH} t _{PHL}	Propagation Delay Data to Output		9.0	14	ns	Figure 2
t _{PLH} t _{PHL}	Propagation Delay Enable to Output		13	20	ns	Figure 1
t _{PLH} t _{PHL}	Propagation Delay Select to Output		15	23	ns	Figure 2

AC WAVEFORMS

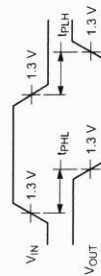


Figure 1.

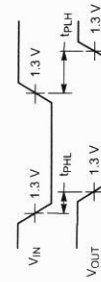


Figure 2.