

## 74LS641, LS642, 74LS641-1, LS642-1 Transceivers

Octal Bus Transceiver (Open Collector)  
Product Specification

### Logic Products

#### FEATURES

- Octal bidirectional bus interface
- Open Collector Outputs
  - 'LS641, non-inverting
  - 'LS642, inverting
- PNP inputs for reduced loading
- Hysteresis on all Data inputs
- 48mA sink capability ('LS641-1, LS642-1)

#### FUNCTION TABLE, 'LS641

INPUTS		INPUTS/OUTPUTS	
$\overline{CE}$	S/R	A <sub>n</sub>	B <sub>n</sub>
L	L	A = B	Inputs
L	H	Inputs	B = A
H	X	(Z)	(Z)

#### FUNCTION TABLE, 'LS642

INPUTS		INPUTS/OUTPUTS	
$\overline{CE}$	S/R	A <sub>n</sub>	B <sub>n</sub>
L	L	A = $\overline{B}$	Inputs
L	H	Inputs	B = $\overline{A}$
H	X	(Z)	(Z)

H = HIGH voltage level  
L = LOW voltage level  
X = Don't care  
(Z) = HIGH impedance "off" state

TYPE	TYPICAL PROPAGATION DELAY (A to B)	TYPICAL SUPPLY CURRENT (TOTAL)
74LS641 & -1	17ns	58mA
74LS642 & -1	17ns	58mA

#### ORDERING CODE

PACKAGES	COMMERCIAL RANGE V <sub>CC</sub> = 5V ± 5%; T <sub>A</sub> = 0°C to +70°C
Plastic DIP	N74LS641N N74LS641-1N N74LS642N N74LS642-1N

#### NOTE:

For information regarding devices processed to Military Specifications, see the Signetics Military Products Data Manual.

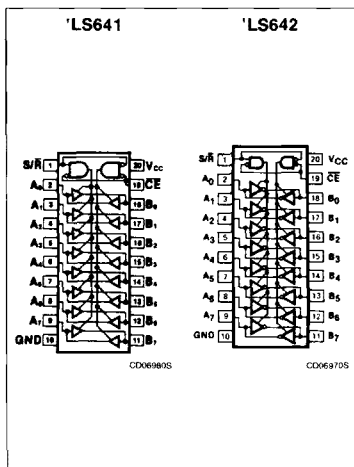
#### INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74LS & -1
All	Inputs	1LSul
All	Outputs	30LSul

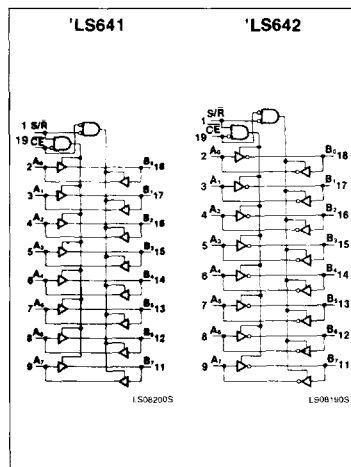
#### NOTE:

A 74LS unit load (LSul) is 20μA I<sub>HI</sub> and -0.4mA I<sub>LI</sub>.

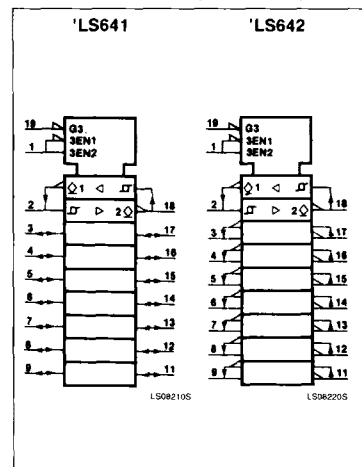
#### PIN CONFIGURATION



#### LOGIC SYMBOL



#### LOGIC SYMBOL (IEEE/IEC)



# Transceivers

# 74LS641, LS642, 74LS641-1, LS642-1

### ABSOLUTE MAXIMUM RATINGS (Over operating free-air temperature range unless otherwise noted.)

PARAMETER		74LS & -1	UNIT
V <sub>CC</sub>	Supply voltage	7.0	V
V <sub>IN</sub>	Input voltage	-0.5 to +7.0	V
I <sub>IN</sub>	Input current	-30 to +1	mA
V <sub>OUT</sub>	Voltage applied to output in HIGH output state	-0.5 to +V <sub>CC</sub>	V
T <sub>A</sub>	Operating free-air temperature range	0 to 70	°C

### RECOMMENDED OPERATING CONDITIONS

PARAMETER		74LS & -1			UNIT
		Min	Nom	Max	
V <sub>CC</sub>	Supply voltage	4.75	5.0	5.25	V
V <sub>IH</sub>	HIGH-level input voltage	2.0			V
V <sub>IL</sub>	LOW-level input voltage			+0.6	V
I <sub>IK</sub>	Input clamp current			-18	mA
V <sub>OH</sub>	HIGH-level output voltage			5.5	V
I <sub>OL</sub>	LOW-level output current			24	mA
		74LS-1 only		48	mA
T <sub>A</sub>	Operating free-air temperature	0		70	°C

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### DC ELECTRICAL CHARACTERISTICS (Over recommended operating free-air temperature range unless otherwise noted.)

PARAMETER	TEST CONDITIONS <sup>1</sup>	74LS641			74LS641-1			UNIT		
		Min	Typ <sup>2</sup>	Max	Min	Typ <sup>2</sup>	Max			
ΔV <sub>T</sub>	Hysteresis (V <sub>T+</sub> - V <sub>T-</sub> )	V <sub>CC</sub> = MIN, A or B input		0.2	0.4		0.2	0.4	V	
I <sub>OH</sub>	HIGH-level output current	V <sub>CC</sub> = MIN, V <sub>IH</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>OH</sub> = 5.5V				100			100	μA
V <sub>OL</sub>	LOW-level output voltage	V <sub>CC</sub> = MIN, V <sub>IH</sub> = MIN, V <sub>IL</sub> = MAX	I <sub>OL</sub> = 12mA		0.25	0.4	0.25	0.4	V	
			I <sub>OL</sub> = 24mA (74LS)		0.35	0.5	0.35	0.5	V	
			I <sub>OL</sub> = 48mA (74LS-1)				0.4	0.5	V	
V <sub>IK</sub>	Input clamp voltage	V <sub>CC</sub> = MIN, I <sub>I</sub> = I <sub>IK</sub>			-1.5			-1.5	V	
I <sub>I</sub>	Input current at maximum input voltage	V <sub>CC</sub> = MAX	V <sub>I</sub> = 5.5V A or B input			0.1		0.1	mA	
			V <sub>I</sub> = 7.0V S/ $\bar{R}$ or $\bar{CE}$ input			0.1		0.1	mA	
I <sub>IH</sub>	HIGH-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7V			20		20	μA		
I <sub>IL</sub>	LOW-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4V			-0.4		-0.4	mA		
I <sub>CC</sub>	Supply current <sup>3</sup> (total)	V <sub>CC</sub> = MAX	I <sub>CC</sub> H Outputs HIGH		48	70	48	70	mA	
			I <sub>CC</sub> L Outputs LOW		62	90	62	90	mA	
			I <sub>CC</sub> Z Outputs OFF		64	95	64	95	mA	

**NOTES**

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.
- Measure I<sub>CC</sub> with outputs open.

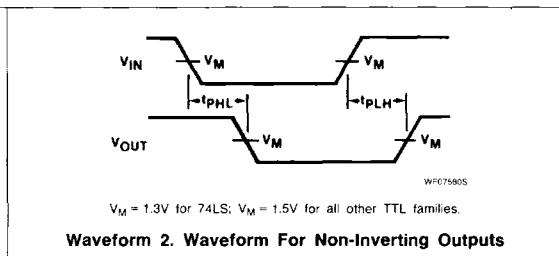
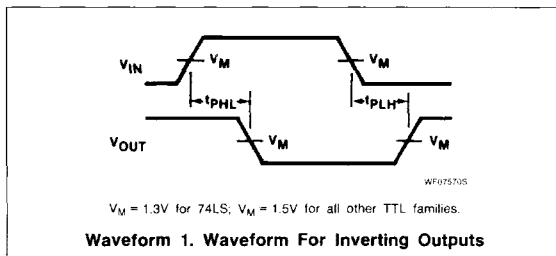
# Transceivers

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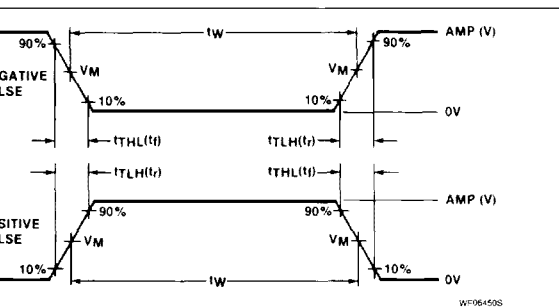
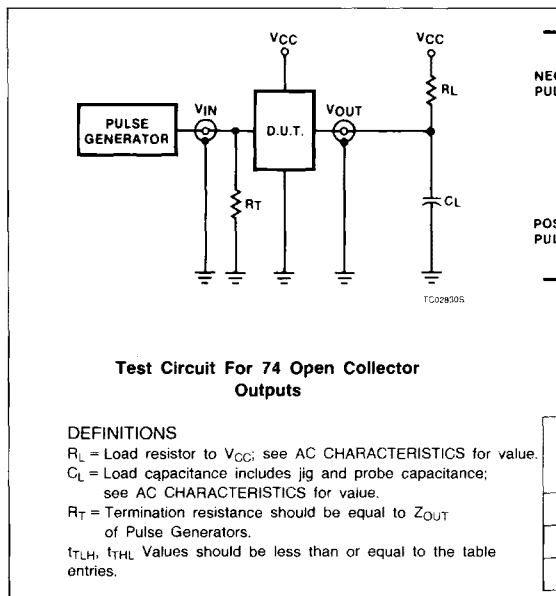
## AC ELECTRICAL CHARACTERISTICS $T_A = 25^\circ\text{C}$ , $V_{CC} = 5.0\text{V}$

PARAMETER	TEST CONDITIONS	$C_L = 45\text{pF}$ , $R_L = 667\Omega$		UNIT
		Min	Max	
$t_{PLH}$ $t_{PHL}$	Propagation delay A input to B output	Waveform 1		ns
$t_{PLH}$ $t_{PHL}$	Propagation delay B input to A output	Waveform 1		
$t_{PLH}$	Propagation delay $\overline{CE}$ , $S/\overline{R}$ inputs to A output	Waveform 1		ns
	$\overline{CE}$ input to B output	Waveform 1		
	$S/\overline{R}$ input to B output	Waveform 2		
$t_{PHL}$	Propagation delay $\overline{CE}$ , $S/\overline{R}$ inputs to A output	Waveform 2		ns
	$\overline{CE}$ input to B output	Waveform 2		
	$S/\overline{R}$ input to B output	Waveform 1		

## AC WAVEFORMS



## TEST CIRCUITS AND WAVEFORMS



$V_M = 1.3\text{V}$  for 74LS;  $V_M = 1.5\text{V}$  for all other TTL families.

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	Pulse Width	$t_{TLH}$	$t_{THL}$
74	3.0V	1MHz	500ns	7ns	7ns
74LS	3.0V	1MHz	500ns	15ns	6ns
74S	3.0V	1MHz	500ns	2.5ns	2.5ns