

Quad Two-Input AND Gates

*Product Specification*

Military Logic Products

### FUNCTION TABLE

INPUTS		OUTPUT
A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

H = High voltage level  
L = Low voltage level

### ORDERING INFORMATION

DESCRIPTION	ORDER CODE
Ceramic DIP	54LS08/BCA, 54S08/BCA
Ceramic Flat Pack	54LS08/BDA, 54S08/BDA
Ceramic LLCC	54LS08/B2A, 54S08/B2A

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

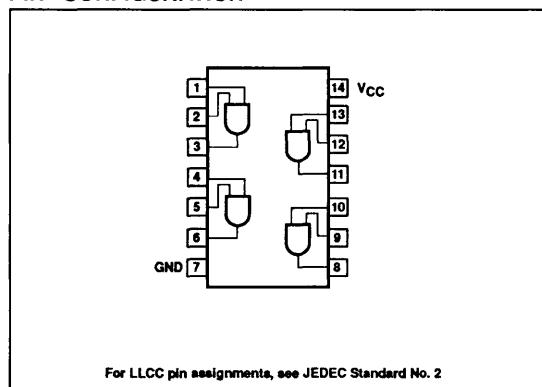
PINS	DESCRIPTION	54S	54LS
A, B	Inputs	1SUL	1LSUL
Y	Output	10SUL	10LSUL

NOTE: Where a 54S Unit Load (SUL) is 50 $\mu$ A  $I_{IH}$  and -2.0mA  $I_{IL}$ , and a 54LS Unit Load (LSUL) is 20 $\mu$ A  $I_{IH}$  and -0.4mA  $I_{IL}$ .

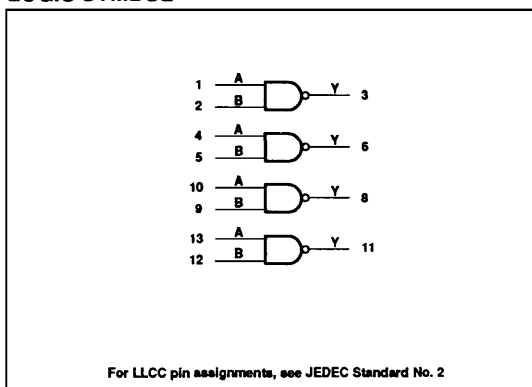
### ABSOLUTE MAXIMUM RATINGS (Over operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	54LS	54S	UNIT
$V_{CC}$	Supply voltage	7.0	7.0	V
$V_I$	Input voltage range	-0.5 to +7.0	-0.5 to +6.5	V
$I_I$	Input current range	-30 to +1	-30 to +5	mA
$V_O$	Voltage applied to output in High output state range	-0.5 to + $V_{CC}$	-0.5 to + $V_{CC}$	V
$T_{STG}$	Storage temperature range	-65 to +150	-65 to +150	$^{\circ}$ C

### PIN CONFIGURATION



### LOGIC SYMBOL



## Gates

## 54LS08, 54S08

## RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	54LS			54S			UNIT
		Min	Nom	Max	Min	Nom	Max	
V <sub>CC</sub>	Supply voltage	4.5	5.0	5.5	4.5	5.0	5.5	V
V <sub>IH</sub>	High-level input voltage	2.0			2.0			V
V <sub>IL</sub>	Low-level input voltage			+0.7			+0.8	V
I <sub>IK</sub>	Input clamp current			-18			-18	mA
I <sub>OH</sub>	High-level output current			-400			-1000	μA
I <sub>OL</sub>	Low-level output current			4			20	mA
T <sub>A</sub>	Operating free-air temperature range	-55		+125	-55		+125	°C

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

SYMBOL	PARAMETER	TEST CONDITIONS <sup>1</sup>	54LS08			54S08			UNIT	
			Min	Typ <sup>2</sup>	Max	Min	Typ <sup>2</sup>	Max		
V <sub>OH</sub>	High-level output voltage	V <sub>CC</sub> = Min, V <sub>IH</sub> = Min, I <sub>OH</sub> = Max	2.5	3.4		2.4	3.4		V	
V <sub>OL</sub>	Low-level output voltage	V <sub>CC</sub> = Min, V <sub>IL</sub> = Max, I <sub>OL</sub> = Max		0.25	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			-1.2	V	
I <sub>IH2</sub>	Input current at maximum input voltage	V <sub>CC</sub> = Max	V <sub>I</sub> = 5.5V					1.0	mA	
			V <sub>I</sub> = 7.0V				0.1			mA
I <sub>IH1</sub>	High-level input current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V			20			50	μA	
I <sub>IL</sub>	Low-level input current	V <sub>CC</sub> = Max	V <sub>I</sub> = 0.4V						mA	
			V <sub>I</sub> = 0.5V						-2.0	mA
I <sub>OS</sub>	Short-circuit output current <sup>3</sup>	V <sub>CC</sub> = Max	-20		-110	-40		-100	mA	
I <sub>CC</sub>	Supply current (total)	V <sub>CC</sub> = Max	I <sub>CC</sub> H Outputs High		2.4	4.8		18	32	mA
			I <sub>CC</sub> L Outputs Low		4.4	8.8		32	57	mA

AC ELECTRICAL CHARACTERISTICS T<sub>A</sub> = 25°C, V<sub>CC</sub> = 5.0V

SYMBOL	PARAMETER	TEST CONDITIONS	54LS <sup>4</sup>		54S		UNIT
			C <sub>L</sub> = 15pF		C <sub>L</sub> = 15pF		
			Min	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay	Waveform 1		15 20		7.0 7.5	ns ns

AC ELECTRICAL CHARACTERISTICS T<sub>A</sub> = 25°C, V<sub>CC</sub> = 5.0V

SYMBOL	PARAMETER	TEST CONDITIONS	54LS <sup>4</sup>		54S <sup>4</sup>		UNIT
			C <sub>L</sub> = 50pF		C <sub>L</sub> = 50pF		
			Min	Max	Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay	Waveform 1		20 25		9.0 11.0	ns ns

# Gates

# 54LS08, 54S08

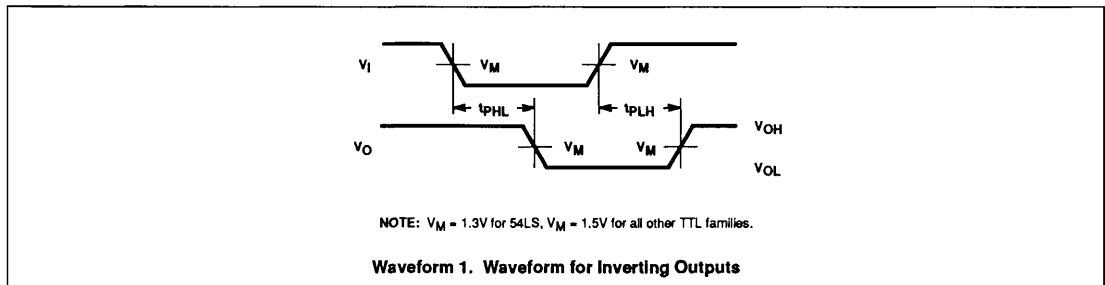
## AC ELECTRICAL CHARACTERISTICS $T_A = -55^\circ\text{C}$ and $+125^\circ\text{C}$ , $V_{CC} = 5.0\text{V}^4$

SYMBOL	PARAMETER	TEST CONDITIONS	54LS		54S		UNIT
			$C_L = 50\text{pF}$				
			Min	Max	Min	Max	
$t_{PLH}$ $t_{PHL}$	Propagation delay	Waveform 1		26 33	12 14	ns ns	

**NOTES:**

- For conditions shown as Min or Max, use the appropriate value specified under recommended operating conditions for the applicable type and function table operating mode.
- All typical values are at  $V_{CC} = 5\text{V}$ ,  $T_A = 25^\circ\text{C}$ .
- Not more than one output should be shorted at a time and duration of the short circuit should not exceed one second.
- These parameters are guaranteed, but not tested.

## AC WAVEFORM



## TEST CIRCUIT AND WAVEFORM

