



## QUAD 2-INPUT AND GATE

### DESCRIPTION

The T54LS09/T74LS09 is a high speed QUAD 2-INPUT AND GATE (WITH OPEN COLLECTOR OUTPUT) fabricated in LOW POWER SCHOTTKY technology.

**B1**  
Plastic Package

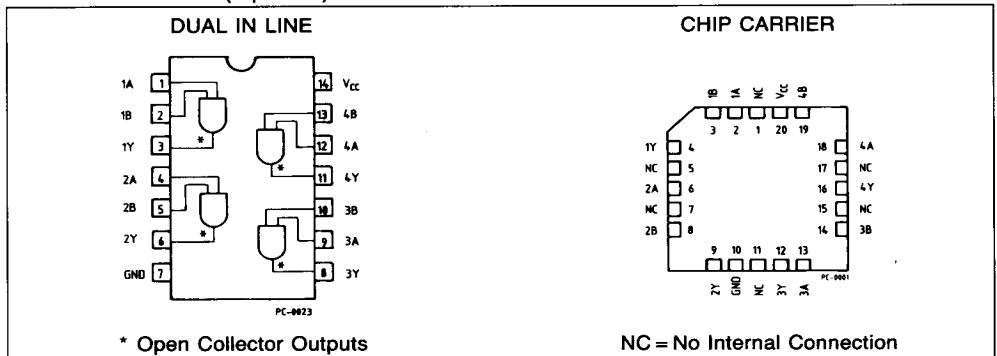
**D1/D2**  
Ceramic Package

**M1**  
Micro Package

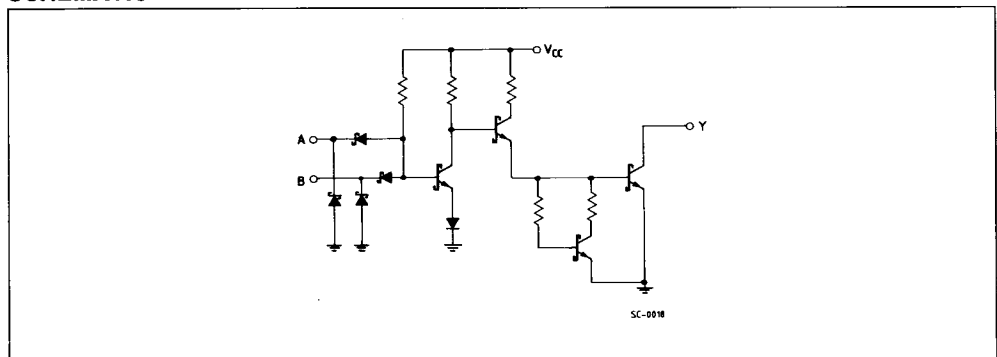
**C1**  
Plastic Chip Carrier

ORDERING NUMBERS:  
 T54LS09 D2      T74LS09 C1  
 T74LS09 D1      T74LS09 M1  
 T74LS09 B1

### PIN CONNECTION (top view)



### SCHEMATIC





## LOGIC DIAGRAM AND TRUTH TABLE



A	B	Y
L	X	L
X	L	L
H	H	H

L = LOW Voltage Level  
 H = HIGH Voltage Level  
 X = Don't Care

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}$	Supply Voltage	-0.5 to 7	V
$V_I$	Input Voltage, Applied to Input	-0.5 to 15	V
$V_O$	Output Voltage, Applied to Output	-0.5 to 10	V
$I_I$	Input Current, Into Inputs	-30 to 5	mA
$I_O$	Output Current, Into Outputs	60	mA

Stresses in excess of those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions in excess of those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## GUARANTEED OPERATING RANGES

Part Numbers	Supply Voltage			Temperature
	Min	Typ	Max	
T54LS09D2	4.5 V	5.0 V	5.5 V	-55°C to +125°C
T74LS09XX	4.75 V	5.0 V	5.25 V	0°C to +70°C

XX = package type.



### DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE

Symbol	Parameter		Limits			Test Conditions (Note 1)	Units
			Min.	Typ.	Max.		
V <sub>IH</sub>	Input HIGH Voltage		2.0			Guaranteed input HIGH Voltage	V
V <sub>IL</sub>	Input LOW Voltage	54			0.7	Guaranteed input LOW Voltage	V
		74			0.8		
V <sub>CD</sub>	Input Clamp Diode Voltage			-0.65	-1.5	V <sub>CC</sub> = MIN, I <sub>IN</sub> = -18mA	V
I <sub>OH</sub>	Output HIGH Current				100	V <sub>CC</sub> = MIN, V <sub>OH</sub> = 5.5V, V <sub>IN</sub> = V <sub>IH</sub>	μA
V <sub>OL</sub>	Output LOW Voltage	54,74		0.25	0.4	V <sub>CC</sub> = MIN, V <sub>IN</sub> = V <sub>IL</sub>	V
		74		0.35	0.5		
I <sub>IH</sub>	Input HIGH Current			1.0	20	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 2.7V	μA mA
					0.1	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 7.0V	
I <sub>IL</sub>	Input LOW Current				-0.4	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0.4V	mA
I <sub>CCH</sub>	Supply Current HIGH			2.4	4.8	V <sub>CC</sub> = MAX, Inputs Open	mA
I <sub>CCL</sub>	Supply Current LOW			4.4	8.8	V <sub>CC</sub> = MAX, V <sub>IN</sub> = 0V	mA

### AC CHARACTERISTICS: T<sub>A</sub> = 25°C (See page 576 for AC test circuit and waveforms)

Symbol	Parameter		Limits			Test Conditions	Units
			Min.	Typ.	Max.		
t <sub>PLH</sub>	Turn Off Delay, Input to Output			20	35	V <sub>CC</sub> = 5.0V C <sub>L</sub> = 15pF, R <sub>L</sub> = 2.0kΩ	ns
t <sub>PHL</sub>	Turn On Delay, Input to Output			17	35		ns

**Notes:**

- 1) For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.
- 2) Typical values are at V<sub>CC</sub> = 5.0V, T<sub>A</sub> = 25°C.