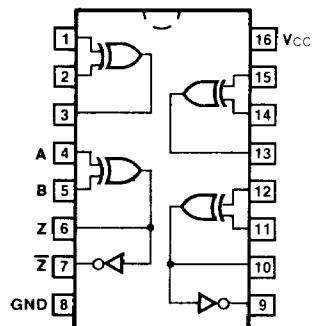


**9014** 011077

## QUAD EXCLUSIVE-OR GATE

**DESCRIPTION** — The 9014 consists of four Exclusive-OR gates, useful in a large number of code conversion, parity generation/checking, and comparison applications. The Exclusive-OR gate produces an output when the inputs are complementary. Two gates have an additional inverted output which provides directly a compare capability. The Boolean expressions for the gates are:  $Z = AB + \bar{A}\bar{B}$ ;  $\bar{Z} = AB + \bar{A}\bar{B}$ .

### CONNECTION DIAGRAM PINOUT A



V<sub>CC</sub> = Pin 16  
GND = Pin 8

**ORDERING CODE:** See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE	MILITARY GRADE	PKG TYPE
		V <sub>CC</sub> = +5.0 V ±5%, T <sub>A</sub> = 0°C to +75°C	V <sub>CC</sub> = +5.0 V ±10%, T <sub>A</sub> = -55°C to +125°C	
Ceramic DIP (D)	A	9014DC	9014DM	6B
Flatpak (F)	A	9014FC	9014FM	4L

**INPUT LOADING/FAN-OUT:** See Section 3 for U.L. definitions

PINS	9XXX Series HIGH/LOW
Inputs	2.25/1.5
Outputs Pins 3, 7, 9, 13	30/8.8 (33)/(8.5)
Pins 6, 10	28.5/7.9 (30)/(7.75)

### TRUTH TABLE

INPUTS		OUTPUTS	
A	B	Z	$\bar{Z}$
L	L	L	H
L	H	H	L
H	L	H	L
H	H	L	H

H = HIGH Voltage Level  
L = LOW Voltage Level

**DC AND AC CHARACTERISTICS OVER COMMERCIAL TEMPERATURE RANGE:** V<sub>CC</sub> = +5.0 V ±5%

SYMBOL	PARAMETER	0°C		25°C		75°C		UNITS	CONDITIONS
		Min	Max	Min	Max	Min	Max		
V <sub>IH</sub>	Input HIGH Voltage	1.9		1.8		1.6		V	Guaranteed Input HIGH Threshold
V <sub>IL</sub>	Input LOW Voltage		0.85		0.85		0.85	V	Guaranteed Input LOW Threshold
V <sub>OL</sub>	Output LOW Voltage		0.45		0.45		0.45	V	V <sub>CC</sub> = 5.25 V, I <sub>OL</sub> = 16 mA I <sub>OL</sub> = 14.4 mA (Pins 6 & 10) Inputs = 5.25 V or 0 V per Truth Table

# 9XXX Series

## DC AND AC CHARACTERISTICS OVER COMMERCIAL TEMPERATURE RANGE: $V_{CC} = +5.0\text{ V} \pm 5\%$

SYMBOL	PARAMETER		0°C		25°C		75°C		UNITS	CONDITIONS
			Min	Max	Min	Max	Min	Max		
VOL	Output LOW Voltage		0.45		0.45		0.45		V	$V_{CC} = 4.75\text{ V}$ , $I_{OL} = 14.1\text{ mA}$ $I_{OL} = 12.7\text{ mA}$ (Pins 6 & 10) Inputs = 5.25 V or 0 V per Truth Table
IIL	Input LOW Current		-2.4		-2.4		-2.4		mA	$V_{CC} = 5.25\text{ V}$ , $V_{IN} = .45\text{ V}$ Other Inputs = 5.25 V
			-2.1		-2.1		-2.1			$V_{CC} = 4.75\text{ V}$ , $V_{IN} = .45\text{ V}$ Other Inputs = 5.25 V
ICC	Power Supply Current, each gate	ON	4.5		4.5		4.5		mA	One Input = 5.5 V, One Input = Gnd
		OFF	8.7		8.7		8.7			Inputs = Gnd
	Power Supply Current Per Inverter	ON	7.6		7.6		7.6		mA	Inputs = 5.5 V
		OFF	6.1		6.1		6.1			Input Node HIGH
		OFF	1.7		1.7		1.7		Input Node LOW	
tPLH 1 tPHL 1 tPHH 1 tPLL 1	Switching Tests				3.0	13			ns	$C_L = 15\text{ pF}$ , $V_{IN1} = 5.0\text{ V}$ Fig. a, Fig. b
					3.0	15				
					6.0	28				
					6.0	28				
tPHH 2 tPLL 2 tPLH 2 tPHL 2	Switching Tests				7.0	17			ns	$C_L = 15\text{ pF}$ , $V_{IN1} = 0\text{ V}$ Fig. a, Fig. c
					7.0	19				
					10	32				
					10	32				

## DC AND AC CHARACTERISTICS OVER MILITARY TEMPERATURE RANGE: $V_{CC} = +5.0\text{ V} \pm 10\%$

SYMBOL	PARAMETER		-55°C		25°C		125°C		UNITS	CONDITIONS
			Min	Max	Min	Max	Min	Max		
V <sub>IH</sub>	Input HIGH Voltage		2.0		1.7		1.4		V	Guaranteed Input HIGH Threshold
V <sub>IL</sub>	Input LOW Voltage		0.8		0.9		0.8		V	Guaranteed Input LOW Threshold
VOL	Output LOW Voltage		0.4		0.4		0.4		V	$V_{CC} = 5.5\text{ V}$ , $I_{OL} = 17.6\text{ mA}$ $I_{OL} = 16\text{ mA}$ (Pins 6 & 10) Inputs = 5.5 V or 0 V per Truth Table
			0.4		0.4		0.4			$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 13.6\text{ mA}$ $I_{OL} = 12.4\text{ mA}$ (Pins 6 & 10) Inputs = 5.5 V or 0 V per Truth Table

# 9XXX Series

**DC AND AC CHARACTERISTICS OVER MILITARY TEMPERATURE RANGE:  $V_{CC} = +5.0 \text{ V} \pm 10\%$**

SYMBOL	PARAMETER	-55°C		25°C		125°C		UNITS	CONDITIONS			
		Min	Max	Min	Max	Min	Max					
$I_{IL}$	Input LOW Current	-2.4	-1.86	-2.4	-1.86	-2.4	-1.86	mA	$V_{CC} = 5.5 \text{ V}, V_{IN} = 0.4 \text{ V}$ Other Inputs = 5.5 V $V_{CC} = 4.5 \text{ V}, V_{IN} = 0.4 \text{ V}$ Other Inputs = 5.5 V			
$I_{CC}$	Power Supply Current, each gate	ON	4.2	4.2	4.2	4.2	4.2	mA	One Input = 5.5 V One Input = Gnd			
		OFF	8.1	7.2	8.1	7.2	8.1	7.2	mA	Inputs = Gnd Inputs = 5.5 V		
	Power Supply Current Per Inverter	ON	5.5	1.6	5.5	1.6	5.5	1.6	mA	Input Node HIGH		
		OFF	1.6	1.6	1.6	1.6	1.6	1.6	mA	Input Node LOW		
$t_{PLH 1}$ $t_{PHL 1}$ $t_{PHH 1}$ $t_{PLL 1}$	Switching Tests			3.0	10			ns	$C_L = 15 \text{ pF}, V_{IN1} = 5.0 \text{ V}$ Fig. a, Fig. b			
$t_{PHH 2}$ $t_{PLL 2}$ $t_{PLH 2}$ $t_{PHL 2}$				7.0	14					ns	$C_L = 15 \text{ pF}, V_{IN1} = 0 \text{ V}$ Fig. a, Fig. c	
					3.0	12						
					6.0	22						
				6.0	22							

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### SWITCHING TEST CIRCUIT

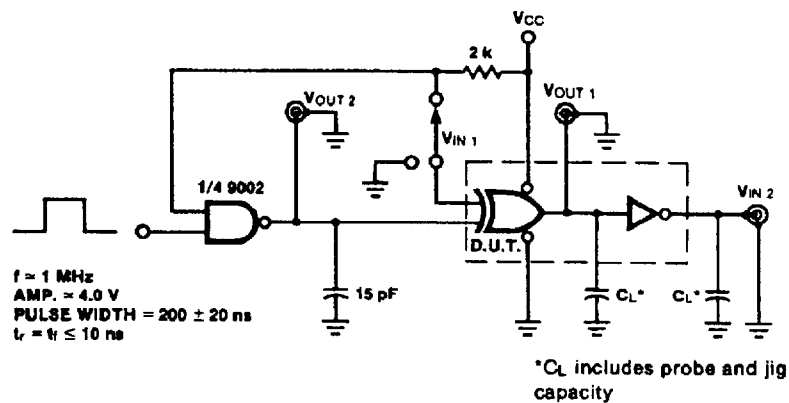


Fig. a

### WAVEFORMS

