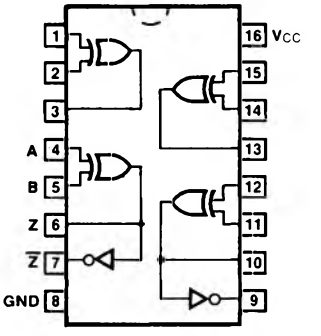
9014

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: $Z = A\overline{B} + \overline{A}B$; $\overline{Z} = AB + \overline{A}\overline{B}$.

CONNECTION DIAGRAM
PINOUT A



V_{CC} = Pin 16
GND = Pin 8

ORDERING CODE: See Section 9

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

TRUTH TABLE

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

H = HIGH Voltage Level
L = LOW Voltage Level

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)

DC AND AC CHARACTERISTICS OVER COMMERCIAL TEMPERATURE RANGE: V_{CC} = +5.0 V ±5%

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

DC AND AC CHARACTERISTICS OVER COMMERCIAL TEMPERATURE RANGE: V_{CC} = +5.0 V ±5%

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

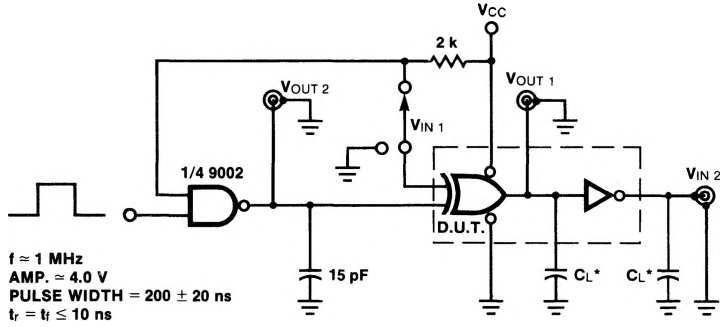
DC AND AC CHARACTERISTICS OVER MILITARY TEMPERATURE RANGE: V_{CC} = +5.0 V ±10%

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

DC AND AC CHARACTERISTICS OVER MILITARY TEMPERATURE RANGE: V_{CC} = +5.0 V ±10%

SYMBOL	PARAMETER		-55°C Min	-55°C Max	25°C Min	25°C Max	125°C Min	125°C Max	UNITS	CONDITIONS
I_{IL}	Input LOW Current			-2.4		-2.4		-2.4	mA	V_{CC} = 5.5 V, V_{IN} = 0.4 V Other Inputs = 5.5 V
				-1.86		-1.86		-1.86		V_{CC} = 4.5 V, V_{IN} = 0.4 V Other Inputs = 5.5 V
I_{CC}	Power Supply Current, each gate	ON		4.2		4.2		4.2	mA	One Input = 5.5 V One Input = Gnd
		OFF		8.1		8.1		8.1	mA	Inputs = Gnd
				7.2		7.2		7.2		Inputs = 5.5 V
	Power Supply Current Per Inverter	ON		5.5		5.5		5.5	mA	Input Node HIGH
		OFF		1.6		1.6		1.6		Input Node LOW
$t_{PLH\ 1}$ $t_{PHL\ 1}$ $t_{PHH\ 1}$ $t_{PLL\ 1}$	Switching Tests				3.0 3.0 6.0 6.0	10 12 22 22			ns	C_L = 15 pF, V_{IN1} = 5.0 V Fig. a, Fig. b
$t_{PHH\ 2}$ $t_{PLL\ 2}$ $t_{PLH\ 2}$ $t_{PHL\ 2}$	Switching Tests				7.0 7.0 10 10	14 16 26 26			ns	C_L = 15 pF, V_{IN1} = 0 V Fig. a, Fig. c

SWITCHING TEST CIRCUIT



*C_L includes probe and jig capacity

Fig. a

WAVEFORMS

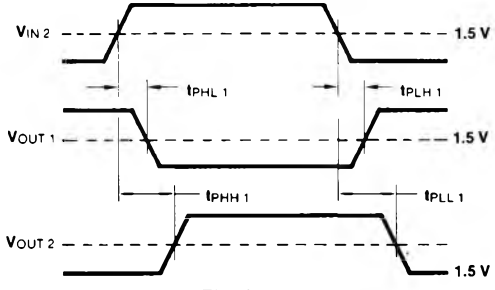


Fig. b

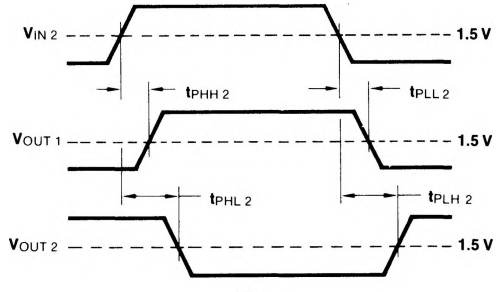


Fig. c