

9309 93L09

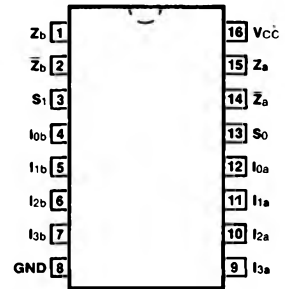
DUAL 4-INPUT MULTIPLEXER

DESCRIPTION — The '09 monolithic dual 4-input digital multiplexers consist of two multiplexing circuits with common input select logic. Each circuit contains four inputs and fully buffered complementary outputs. In addition to multiplexer operation, the '09 can generate any two function of three variables. Active pullups in the outputs ensure high drive and high speed performance. Because of its high speed performance and on-chip select decoding, the '09 may be cascaded to multiple levels so that any number of lines can be multiplexed onto a single output bus.

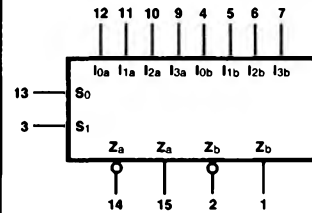
- **MULTIFUNCTION CAPABILITY**
- **ON-CHIP SELECT LOGIC DECODING**
- **FULLY BUFFERED COMPLEMENTARY OUTPUTS**

ORDERING CODE: See Section 9

CONNECTION DIAGRAM PINOUT A



LOGIC SYMBOL



Vcc = Pin 16
GND = Pin 8

PKGS	PIN OUT	COMMERCIAL GRADE	MILITARY GRADE	PKG TYPE
		VCC = +5.0 V ±5%, TA = 0°C to +70°C	VCC = +5.0 ±10%, TA = -55°C to +125°C	
Plastic DIP (P)	A	9309PC, 93L09PC		9B
Ceramic DIP (D)	A	9309DC, 93L09DC	9309DM, 93L09DM	6B
Flatpak (F)	A	9309FC, 93L09FC	9309FM, 93L09FM	4L

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

PIN NAMES	DESCRIPTION	93XX (U.L.) HIGH/LOW	93L (U.L.) HIGH/LOW
S0, S1	Common Select Inputs	1.0/1.0	0.5/0.25
I0a — I3a	Multiplexer A Inputs	1.0/1.0	0.5/0.25
Za	Multiplexer A Output	20/10	10/5.0 (3.0)
Za-bar	Complementary Multiplexer A Output	18/9.0	10/5.0 (3.0)
I0b — I3b	Multiplexer B Inputs	1.0/1.0	0.5/0.25
Zb	Multiplexer B Output	20/10	10/5.0 (3.0)
Zb-bar	Complementary Multiplexer B Output	18/9.0	10/5.0 (3.0)

FUNCTIONAL DESCRIPTION — The '09 dual 4-input multiplexers are able to select two bits of either HIGH or LOW data or control from up to four sources, in one package. The '09 is the logical implementation of two-pole, four-position switch, with the position of the switch being set by the logic levels supplied to the two select inputs. Both assertion and negation outputs are provided for both multiplexers. The logic equations for the outputs are shown below:

$$Z_a = I_{0a} \cdot \bar{S}_1 \cdot \bar{S}_0 + I_{1a} \cdot \bar{S}_1 \cdot S_0 + I_{2a} \cdot S_1 \cdot \bar{S}_0 + I_{3a} \cdot S_1 \cdot S_0$$

$$Z_b = I_{0b} \cdot \bar{S}_1 \cdot \bar{S}_0 + I_{1b} \cdot \bar{S}_1 \cdot S_0 + I_{2b} \cdot S_1 \cdot \bar{S}_0 + I_{3b} \cdot S_1 \cdot S_0$$

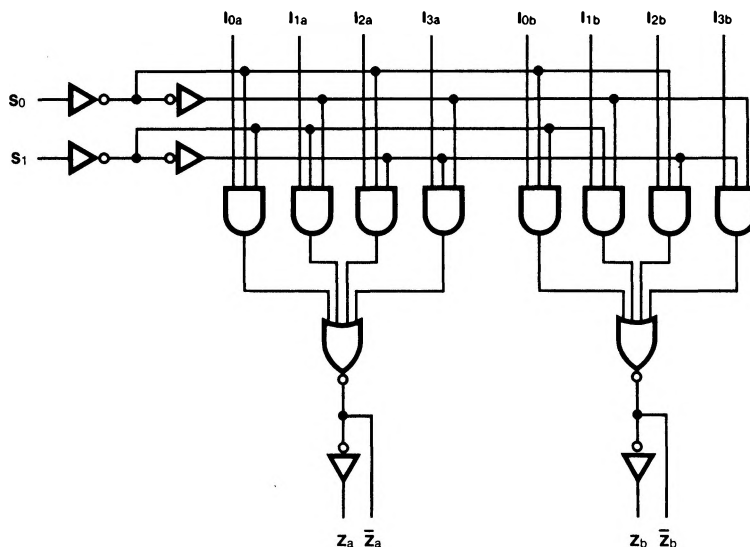
The '09 is frequently used to move data from a group of registers to a common output bus. The particular register from which the data came would be determined by the state of the select inputs. A less obvious application is as a function generator. The '09 can generate two functions of three variables. This is useful for implementing random gating functions.

TRUTH TABLE

SELECT INPUTS		INPUTS (a or b)				OUTPUTS (a or b)	
S ₀	S ₁	I ₀	I ₁	I ₂	I ₃	Z	\bar{Z}
L	L	L	X	X	X	L	H
L	L	H	X	X	X	H	L
H	L	X	L	X	X	L	H
H	L	X	H	X	X	H	L
L	H	X	X	L	X	L	H
L	H	X	X	H	X	H	L
H	H	X	X	X	L	L	H
H	H	X	X	X	H	H	L

H = HIGH Voltage Level
 L = LOW Voltage Level
 X = Immaterial

LOGIC DIAGRAM



DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER	93XX		93L		UNITS	CONDITIONS
		Min	Max	Min	Max		
I _{OS}	Output Short Circuit Current			-10	-40	mA	V _{CC} = Max, V _{OUT} = 0 V
I _{CC}	Power Supply Current	44		11.5		mA	V _{CC} = Max

AC CHARACTERISTICS: V_{CC} = +5.0 V, T_A = +25° C (See Section 3 for waveforms and load definitions)

SYMBOL	PARAMETER	93XX		93L		UNITS	CONDITIONS
		C _L = 15pF		C _L = 15pF			
		Min	Max	Min	Max		
t _{PLH} t _{PHL}	Propagation Delay S ₀ to Z _a	29 27		70 60		ns	Figs. 3-1, 3-5
t _{PLH} t _{PHL}	Propagation Delay S ₀ to Z _a -bar	21 21		55 50		ns	Figs. 3-1, 3-20
t _{PLH} t _{PHL}	Propagation Delay I _{0a} to Z _a -bar	12 13		40 60		ns	Figs. 3-1, 3-4
t _{PLH} t _{PHL}	Propagation Delay I _{0a} to Z _a	20 21		70 65		ns	Figs. 3-1, 3-5