Signetics

FAST 74F352
Multiplexer

FAST Products

Dual 4-Line to 1-Line Multiplexer

Product Specification

FEATURES
- **Inverting version of 'F153**
- **Separate enable for each multiplexer section**
- **Common select inputs**
- **See 'F353 for 3-state version**

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F352	5.5ns	10mA

DESCRIPTION

The 74F352 is a dual 4-input multiplexer that can select 2 bits of data from up to four sources selected by common Select inputs (S_0,S_1). The two 4-input multiplexer circuits have individual active-Low Enables ($\overline{E}_a$,$\overline{E}_b$) which can be used to strobe the outputs independently. Outputs ($\overline{Y}_a$, $\overline{Y}_b$) are forced High when the corresponding Enables ($\overline{E}_a$,$\overline{E}_b$) are High.

The 'F352 is the logic implementation of a 2-pole, 4-position switch; the position of the switch being determined by the logic levels supplied to the two common Select inputs.

ORDERING INFORMATION

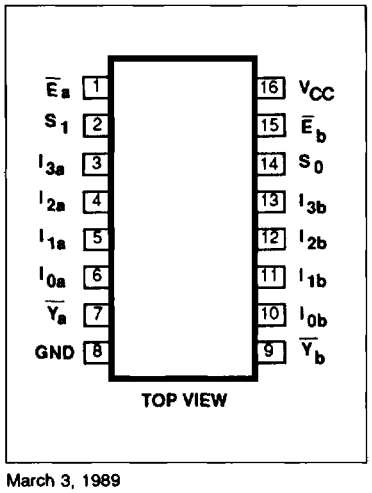
PACKAGES	COMMERCIAL RANGE V_{CC} = 5V±10%; T_A = 0°C to +70°C
16-Pin Plastic DIP	N74F352N
16-Pin Plastic SO	N74F352D

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

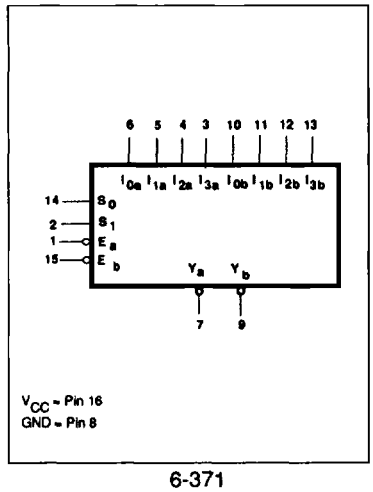
PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
I_{0a}- I_{3a}	Port A data inputs	1.0/1.0	20µA/0.6mA
I_{0b}- I_{3b}	Port B data inputs	1.0/1.0	20µA/0.6mA
S_0, S_1	Common Select inputs	1.0/1.0	20µA/0.6mA
$\overline{E}_a$	Port A Enable input (active Low)	1.0/1.0	20µA/0.6mA
$\overline{E}_b$	Port B Enable input (active Low)	1.0/1.0	20µA/0.6mA
$\overline{Y}_a$, $\overline{Y}_b$	Port A, B data outputs	50/33	1.0mA/20mA

NOTE:
One (1.0) FAST Unit Load is defined as: 20µA in the High state and 0.6mA in the Low state.

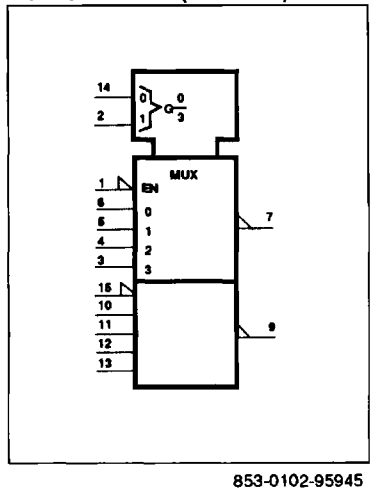
PIN CONFIGURATION



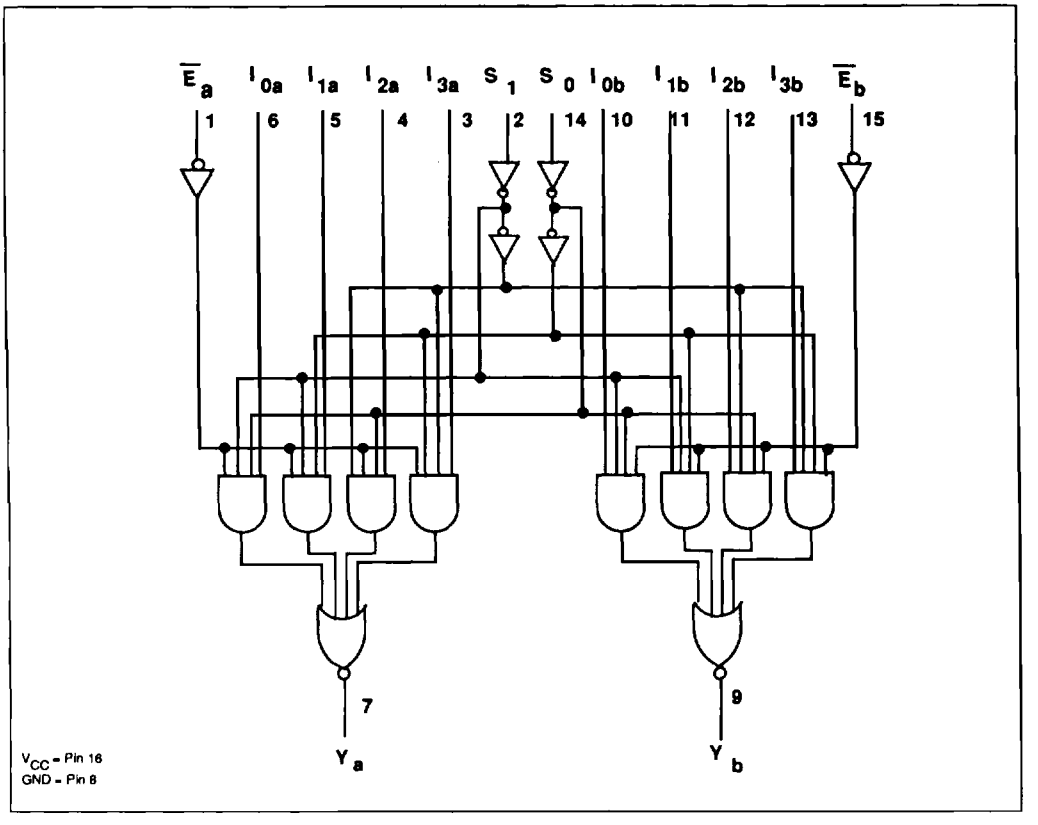
LOGIC SYMBOL



LOGIC SYMBOL(IEEE/IEC)



LOGIC DIAGRAM



FUNCTION TABLE

INPUTS							OUTPUT
S_0	S_1	$\overline{E}_n$	I_{0n}	I_{1n}	I_{2n}	I_{3n}	$\overline{Y}_n$
X	X	H	X	X	X	X	H
L	L	L	L	X	X	X	H
L	L	L	H	X	X	X	L
H	L	L	X	L	X	X	H
H	L	L	X	H	X	X	L
L	H	L	X	X	L	X	H
L	H	L	X	X	H	X	L
H	H	L	X	X	X	L	H
H	H	L	X	X	X	H	L

H = High voltage level
L = Low voltage level
X = Don't care

ABSOLUTE MAXIMUM RATINGS

(Operation beyond the limits set forth in this table may impair the useful life of the device. Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	-0.5 to +7.0	V
V_{IN}	Input voltage	-0.5 to +7.0	V
I_{IN}	Input current	-30 to +5	mA
V_{OUT}	Voltage applied to output in High output state	-0.5 to +V_{CC}	V
I_{OUT}	Current applied to output in Low output state	40	mA
T_A	Operating free-air temperature range	0 to +70	°C
T_{STG}	Storage temperature	-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Nom	Max	
V_{CC}	Supply voltage	4.5	5.0	5.5	V
V_{IH}	High-level input voltage	2.0			V
V_{IL}	Low-level input voltage			0.8	V
I_{IK}	Input clamp current			-18	mA
I_{OH}	High-level output current			-1	mA
I_{OL}	Low-level output current			20	mA
T_A	Operating free-air temperature range	0		70	°C

DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER		TEST CONDITIONS[1]		LIMITS			UNIT
					Min	Typ[2]	Max	
V_{OH}	High-level output voltage		V_{CC} = MIN, V_{IL} = MAX	±10%V_{CC}	2.5			V
			V_{IH} = MIN, I_{OH} = MAX	±5%V_{CC}	2.7	3.4		V
V_{OL}	Low-level output voltage		V_{CC} = MIN, V_{IL} = MAX	±10%V_{CC}		0.30	0.50	V
			V_{IH} = MIN, I_{OL} = MAX	±5%V_{CC}		0.30	0.50	V
V_{IK}	Input clamp voltage		V_{CC} = MIN, I_I = I_{IK}			-0.73	-1.2	V
I_I	Input current at maximum input voltage		V_{CC} = MAX, V_I = 7.0V				100	µA
I_{IH}	High-level input current		V_{CC} = MAX, V_I = 2.7V				20	µA
I_{IL}	Low-level input current		V_{CC} = MAX, V_I = 0.5V				-0.6	mA
I_{OS}	Short circuit output current[3]		V_{CC} = MAX		-60		-150	mA
I_{CC}	Supply current (total)	I_{CCH}	V_{CC} = MAX	$\overline{E}_n$=S_n=I_n=GND		8	14	mA
		I_{CCL}		$\overline{E}_n$=GND, S_n=I_n=4.5V		12	20	mA

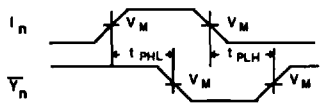
NOTES:

1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
2. All typical values are at V_{CC} = 5V, T_A = 25°C.
3. Not more than one output should be shorted at a time. For testing I_{OS}, the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

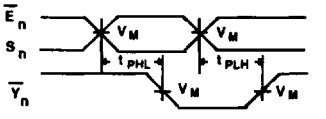
AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			T_A = +25°C, V_{CC} = 5V, C_L = 50pF, R_L = 500Ω			T_A = 0°C to +70°C, V_{CC} = 5V ±10%, C_L = 50pF, R_L = 500Ω		
			Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation delay I_n to $\overline{Y}_n$	Waveform 1	2.5 1.5	5.0 3.0	7.0 4.5	2.0 1.0	8.0 5.0	ns
t_{PLH} t_{PHL}	Propagation delay S_n to $\overline{Y}_n$	Waveform 2	4.5 4.0	6.5 6.0	11.0 8.5	4.0 3.5	12.5 9.5	ns
t_{PLH} t_{PHL}	Propagation delay $\overline{E}_n$ to $\overline{Y}_n$	Waveform 2	2.5 3.5	5.0 6.0	6.5 8.0	2.0 3.0	7.0 8.5	ns

AC WAVEFORMS



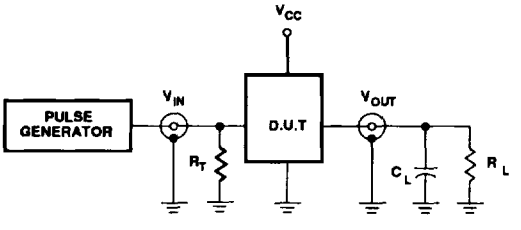
Waveform 1. Propagation Delay, Select to Output



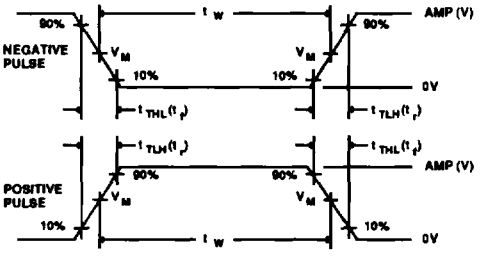
Waveform 2. Propagation Delay, Enable and Select to Output

NOTE: For all waveforms, V_M = 1.5V.

TEST CIRCUIT AND WAVEFORMS



Test Circuit For Totem-Pole Outputs



V_M = 1.5V

Input Pulse Definition

DEFINITIONS

R_L = Load resistor; see AC CHARACTERISTICS for value.

C_L = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.

R_T = Termination resistance should be equal to Z_{OUT} of pulse generators.

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	t_W	t_{TLH}	t_{THL}
74F	3.0V	1MHz	500ns	2.5ns	2.5ns