MOTOROLA

MC54/74F352

DUAL 4-INPUT MULTIPLEXER

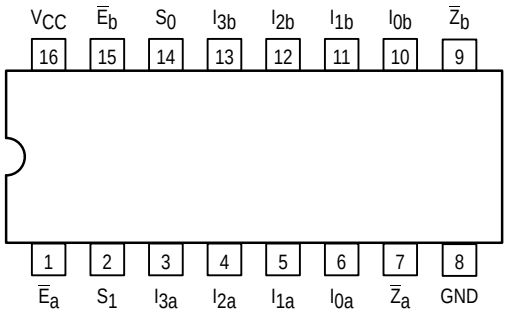
The MC54/74F352 is a very high speed dual 4-input multiplexer with common Select inputs and individual Enable inputs for each section. It can select two bits of data from four sources. The two buffered outputs present data in the inverted (complementary) form. The F352 is the functional equivalent of the F153 except with inverted outputs.

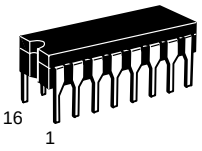
- Inverted Version of the F153
- Separate Enables for Each Multiplexer
- Input Clamp Diode Limits High-Speed Termination Effects

DUAL 4-INPUT MULTIPLEXER

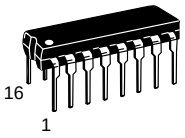
FAST™ SCHOTTKY TTL

CONNECTION DIAGRAM (TOP VIEW)

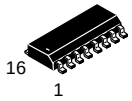




J SUFFIX
CERAMIC
CASE 620-09



N SUFFIX
PLASTIC
CASE 648-08

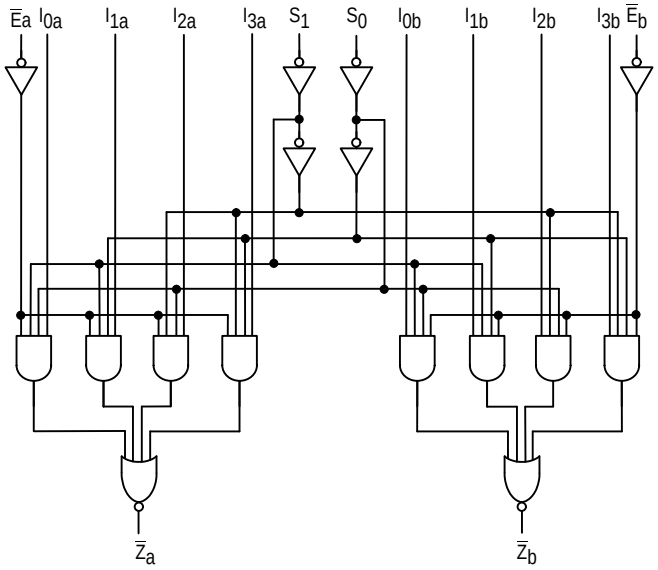


D SUFFIX
SOIC
CASE 751B-03

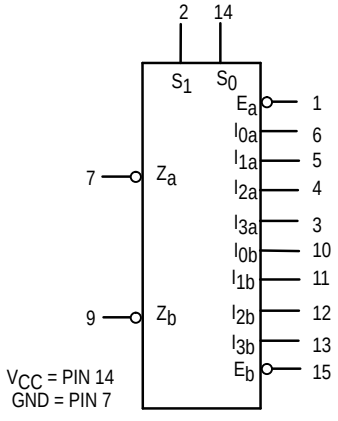
ORDERING INFORMATION

MC54FXXXJ	Ceramic
MC74FXXXN	Plastic
MC74FXXXD	SOIC

LOGIC DIAGRAM



LOGIC SYMBOL



GUARANTEED OPERATING RANGES

Symbol	Parameter		Min	Typ	Max	Unit
V_{CC}	Supply Voltage	54, 74	4.5	5.0	5.5	V
T_A	Operating Ambient Temperature Range	54	- 55	25	125	°C
		74	0	25	70	
I_{OH}	Output Current — High	54, 74			–1.0	mA
I_{OL}	Output Current — Low	54, 74			20	mA

FUNCTIONAL DESCRIPTION

The F352 is a dual 4-input multiplexer. It selects two bits of data from up to four sources under the control of the 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. When the Enables ($\overline{E}_a$, $\overline{E}_b$) are HIGH, the corresponding outputs ($\overline{Z}_a$, $\overline{Z}_b$) are forced HIGH.

The logic equations for the outputs are shown below:

$$\overline{Z}_a = \overline{E_a \bullet (I_{0a} \bullet \overline{S}_1 \bullet \overline{S}_0 + I_{1a} \bullet S_1 \bullet \overline{S}_0 + I_{2a} \bullet S_1 \bullet \overline{S}_0 + I_{3a} \bullet S_1 \bullet S_0)}$$

$$\overline{Z}_b = \overline{E_b \bullet (I_{0b} \bullet \overline{S}_1 \bullet \overline{S}_0 + I_{1b} \bullet \overline{S}_1 \bullet S_0 + I_{2b} \bullet S_1 \bullet \overline{S}_0 + I_{3b} \bullet S_1 \bullet S_0)}$$

The F352 can be 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 F352 can generate two functions of three variables. This is useful for implementing highly irregular random logic.

FUNCTION TABLE

Select Inputs		Inputs (a or b)					Output
S_0	S_1	$\overline{E}$	I_0	I_1	I_2	I_3	$\overline{Z}$
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

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter		Limits Min	Typ	Max	Unit	Test Conditions	
V_{IH}	Input HIGH Voltage		2.0			V	Guaranteed Input HIGH Voltage	
V_{IL}	Input LOW Voltage				0.8	V	Guaranteed Input LOW Voltage	
V_{IK}	Input Clamp Diode Voltage				–1.2	V	I_{IN} = –18 mA	V_{CC} = MIN
V_{OH}	Output HIGH Voltage	54, 74	2.5	3.4		V	I_{OH} = –1.0 mA	V_{CC} = 4.50 V
		74	2.7	3.4		V	I_{OH} = –1.0 mA	V_{CC} = 4.75 V
V_{OL}	Output LOW Voltage			0.35	0.5	V	I_{OL} = 20 mA	V_{CC} = MIN
I_{IH}	Input HIGH Current				20	µA	V_{IN} = 2.7 V	V_{CC} = MAX
					100		V_{IN} = 7.0 V	
I_{IL}	Input LOW Current				–0.6	mA	V_{IN} = 0.5 V	V_{CC} = MAX
I_{OS}	Output Short Circuit Current (Note 2)		–60		–150	mA	V_{OUT} = 0 V	V_{CC} = MAX
I_{CCH}	Power Supply Current			9.3	14	mA	V_{IN} = GND	V_{CC} = MAX
I_{CCL}				13.3	20		V_{IN} = HIGH	

NOTES:
1. For conditions shown as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.
2. Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS

Symbol	Parameter	54/74F T_A = +25°C V_{CC} = +5.0 V C_L = 50 pF Min	Typ	Max	54F T_A = 55°C to +125°C V_{CC} = 5.0 V ± 10% C_L = 50 pF Min	Max	74F T_A = 0°C to + 70°C V_{CC} = 5.0 V ± 10% C_L = 50 pF Min	Max	Unit
t_{PLH}	Propagation Delay	3.5	7.4	11	3.0	14	3.0	12.5	ns
t_{PHL}	S_n to $\overline{Z}_n$	3.0	7.0	8.5	2.5	11	2.5	9.5	
t_{PLH}	Propagation Delay	2.5	5.0	7.0	2.0	10	2.0	8.0	ns
t_{PHL}	$\overline{E}_n$ to $\overline{Z}_n$	3.0	5.0	7.0	2.5	9.0	2.5	8.0	
t_{PLH}	Propagation Delay	2.5	4.9	7.0	2.0	9.0	2.0	8.0	ns
t_{PHL}	I_n to $\overline{Z}_n$	1.5	3.0	3.5	1.0	5.0	1.0	4.0	