

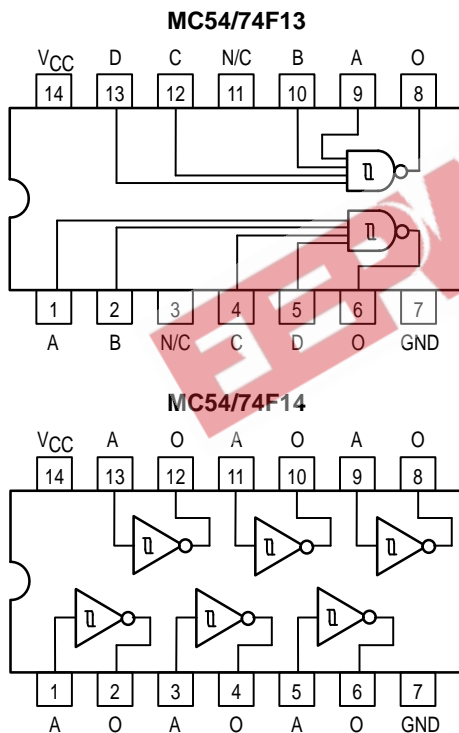


SCHMITT TRIGGERS DUAL 4-INPUT NAND/HEX INVERTERS

The MC54/74F13 and MC54/74F14 contain logic gates/inverters which accept standard TTL input signals and provide standard TTL output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. Additionally, they have greater noise margin than conventional inverters.

Each circuit contains a Schmitt trigger followed by a Darlington level shifter and a phase splitter driving a TTL totem pole output. The Schmitt trigger uses positive feedback to effectively speed up slow input transitions and provide different input threshold voltages for positive and negative-going transitions. This hysteresis between the positive-going and negative-going input thresholds (typically 800 mV) is determined internally by resistor ratios and is essentially insensitive to temperature and supply voltage variations.

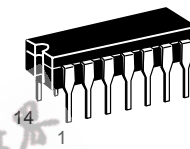
LOGIC AND CONNECTION DIAGRAMS



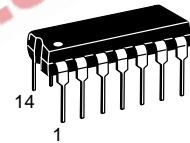
MC54/74F13
MC54/74F14

SCHMITT TRIGGERS
DUAL 4-INPUT
NAND/HEX INVERTERS

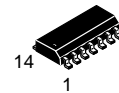
FAST™ SCHOTTKY TTL



J SUFFIX
CERAMIC
CASE 632-08



N SUFFIX
PLASTIC
CASE 646-06



D SUFFIX
SOIC
CASE 751A-02

ORDERING INFORMATION

MC54FXXJ Ceramic
MC74FXXN Plastic
MC74FXXD SOIC

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

MC54/74F13 • MC54/74F14

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter		Limits			Unit	Test Conditions	
			Min	Typ	Max			
V _{T+}	Positive-Going Threshold Voltage		1.5		2.0	V	V _{CC} = 5.0 V	
V _{T-}	Negative-Going Threshold Voltage		0.7		1.1	V	V _{CC} = 5.0 V	
V _{T+} -V _{T-}	Hysteresis		0.4	0.8		V	V _{CC} = 5.0 V	
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	V _{CC} = MIN, I _{IN} = -18 mA	
V _{OH}	Output HIGH Voltage	54, 74	2.5			V	I _{OH} = -1.0 mA	V _{CC} = 4.5
		74	2.7			V	I _{OH} = -1.0 mA	V _{CC} = 4.75
V _{OL}	Output LOW Voltage				0.5	V	I _{OL} = 20 mA	V _{CC} = MIN
I _{T+}	Input Current at Positive-Going Threshold			-0.14		mA	V _{CC} = 5.0 V, V _{IN} = V _{T+}	
I _{T-}	Input Current at Negative-Going Threshold			-0.18		mA	V _{CC} = 5.0 V, V _{IN} = V _{T-}	
I _{IH}	Input HIGH Current				20	μA	V _{CC} = MAX, V _{IN} = 2.7 V	
					0.1	mA	V _{CC} = MAX, V _{IN} = 7.0 V	
I _{IL}	Input LOW Current				-0.6	mA	V _{CC} = MAX, V _{IN} = 0.5 V	
I _{OS}	Output Short Circuit Current (Note 2)		-60		-150	mA	V _{CC} = MAX, V _{OUT} = 0 V	
I _{CCH}	Power Supply Current Total, Output HIGH	F13	4.5	8.5		mA	V _{CC} = MAX	
		F14	13	22				
I _{CCL}	Power Supply Current Total, Output LOW	F13	7.0	10				
		F14	23	32				

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.
- Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS (C_L = 50 pF)

Symbol	Parameter		54/74F		54F		74F		Unit
			T _A = +25°C		T _A = -55°C to +125°C		T _A = 0°C to 70°C		
			V _{CC} = +5.0 V		V _{CC} = 5.0 V ± 10%		V _{CC} = 5.0 V ± 10%		
		Min	Max	Min	Max	Min	Max		
t _{PLH}	Propagation Delay	F13	3.5	7.0	3.5	9.0	3.5	8.0	ns
t _{PHL}			3.0	8.0	3.0	9.5	3.0	8.5	
t _{PLH}	Propagation Delay	F14	3.5	7.0	3.5	9.0	3.5	8.0	ns
t _{PHL}			3.0	6.5	3.0	8.0	3.0	7.0	

MC54/74F13 • MC54/74F14

FUNCTION TABLE MC54/74F13

Inputs				Output
A	B	C	D	O
L	X	X	X	H
X	L	X	X	H
X	X	L	X	H
X	X	X	L	H
H	H	H	H	L

H = HIGH Voltage Level

L = LOW Voltage Level

X = Don't Care

FUNCTION TABLE MC54/74F14

Input	Output
A	O
L	H
H	L

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