MOTOROLA

MC54/74F132

QUAD 2-INPUT NAND SCHMITT TRIGGER

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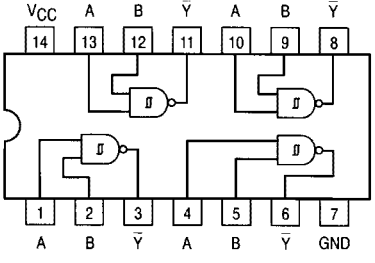
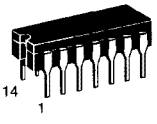
FAST™ SHOTTKY TTL

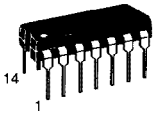
The MC54/74F132 contains four 2-input NAND gates which accept standard TTL input signals and provide standard TTL output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. In addition, they have greater noise margin than conventional NAND gates.

Each circuit contains a 2-input 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 threshold (typically 800 mV) is determined by resistor ratios and is essentially insensitive to temperature and supply voltage variations.





J SUFFIX
CERAMIC
CASE 632-08



N SUFFIX
PLASTIC
CASE 646-06

D SUFFIX
SOIC
CASE 751A-02

ORDERING INFORMATION

MC54FXXXJ	Ceramic
MC74FXXXN	Plastic
MC74FXXXD	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

FUNCTION TABLE

Inputs		Output
A	B	$\overline{Y}$
L	L	H
L	H	H
H	L	H
H	H	L

H = HIGH Voltage level
L= LOW voltage level

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter		Limits Min	Typ	Max	Unit	Test Conditions	
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} = 4.50 V
		74	2.7			V	I_{OH} = −1.0 mA	V_{CC} = 4.75 V
V_{OL}	Output LOW Voltage				0.5	V	I_{OL} = 20 mA	V_{CC} = MIN
I_{T+}	Input Current at Positive-Going Threshold			0		μA	V_{CC} = 5.0 V, V_{IN} = V_{T+}	
I_{T-}	Input Current at Negative-Going Threshold			−350		μA	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_{CC}	Total, Supply Current	I_{CCH}		8.5	12	mA	V_{IN} = GND	V_{CC} = MAX
		I_{CCL}		13	19.5		V_{IN} = 4.5 V	

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

AC ELECTRICAL 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} = 5.0V ± 10% C_L = 50 pF Min	Max	Unit
t_{PLH}	Propagation delay	3.5	5.5	7.0	3.5	9.0	3.5	8.0	ns
t_{PHL}	A, B to $\overline{Y}$	3.0	5.0	6.5	3.0	8.0	3.0	7.0	