Quad two-input NAND buffer (Open-Collector) 54F38

ORDERING INFORMATION

DESCRIPTION	ORDER CODE	PACKAGE DESIGNATOR*
14-PIN Ceramic DIP	54F38/BCA	GDIP1-T14
14-PIN Ceramic Flat Pack	54F38/BDA	GDFP1-F14
20-PIN Ceramic LLCC	54F38/B2A	GDFP2-F20

* MIL-STD 1835 or Appendix A of 1995 Military Data Handbook

FUNCTION TABLE

INPUTS		OUTPUTS
A	B	$\overline{Y}$
L	L	H
L	H	H
H	L	H
H	H	L

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

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	54F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
A, B	Inputs	1.0/2.0	20µA/1.2mA
$\overline{Y}$	Outputs	OC*/80	OC*/48mA

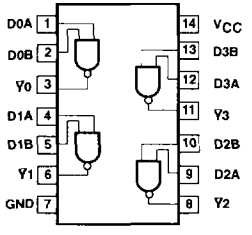
NOTE: One (1.0) FAST Unit Load (U.L.) is defined as: 20µA in the High State and 0.6mA in the Low state.
*OC = Open Collector

ABSOLUTE MAXIMUM RATINGS

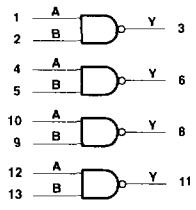
(Operation beyond the limits set forth in this table may impair the useful life of the device. Unless otherwise noted these limits are over the operating free-air temperature range.)

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage range	-0.5 to +7.0	V
V_I	Input voltage range	-0.5 to +7.0	V
I_I	Input current range	-30 to +5	mA
V_O	Voltage applied to output in High output state range	-0.5 to +V_{CC}	V
I_O	Current applied to output in Low output state	128	mA
T_{STG}	Storage temperature range	-65 to +150	°C

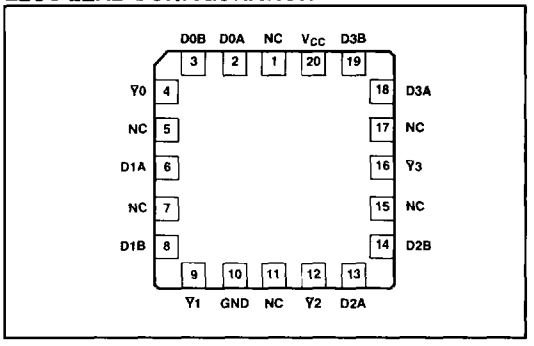
PIN CONFIGURATION



LOGIC SYMBOL



LLCC LEAD CONFIGURATION



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
V_{OH}	High-level output voltage			4.5	V
I_{OL}	Low-level output current			20	mA
T_A	Operating free-air temperature range	-55		+125	°C

DC ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER		TEST CONDITIONS[4]		LIMITS			UNIT
					MIN	TYP[5]	MAX	
I_{OH}	High-level output current		V_{CC} = Min, V_{IL} = Max, V_{IH} = Min, V_{OH} = Max				250	µA
V_{OL}	Low-level output voltage		V_{CC} = Min, V_{IL} = Max, V_{IH} = Min, I_{OL} = 48mA			0.35	0.50	V
V_{IK}	Input clamp voltage		V_{CC} = Min, I_I = I_{IK}			-0.73	-1.2	V
I_{IH2}	Input current at others maximum input voltage		V_{CC} = Max, V_I = 7.0V				100	µA
I_{IH1}	High-level input current		V_{CC} = Max, V_I = 2.7V			5	20	µA
I_{IL}	Low-level input current		V_{CC} = Max, V_I = 0.5V			-0.6	-1.2	mA
I_{CC}	Supply current (total)	I_{CCH}	V_{CC} = Max	V_I = GND		4	7	mA
		I_{CCL}		$V_I \geq 4.0V$		22	30	mA

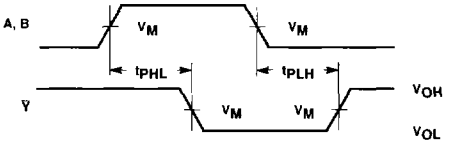
AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS					UNIT
			T_A = +25°C, V_{CC} = +5.0V C_L = 50pF R_L = 500Ω			T_A = -55°C to +125°C V_{CC} = +5.0V ± 10% C_L = 50pF, R_L = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay A, B to $\overline{Y}$	Waveform 1	7.5 1.5	10 3.0	12.5 5.0	7.0 1.0	14.5 6.0	ns ns

NOTES:

4. For conditions shown as Min or Max, use the appropriate value specified under the recommended operating conditions for the applicable type and function table for operating mode.
5. All typical values are at V_{CC} = 5V, T_A = 25°C.
6. When using open collector parts, the value of the pull-up resistor greatly affects the value of the T_{PLH}. For example, changing the specified pull-up resistor value from 500Ω to 100Ω will improve the T_{PLH} up to 50% with only a slight increase in the T_{PHL}. However, if the value of the pull-up resistor is changed, the user must make certain that the total I_{OL} current through the resistor, plus the total I_{IL}s of the receivers does not exceed the I_{OL} maximum specification.

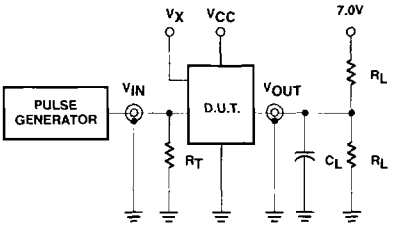
AC WAVEFORM



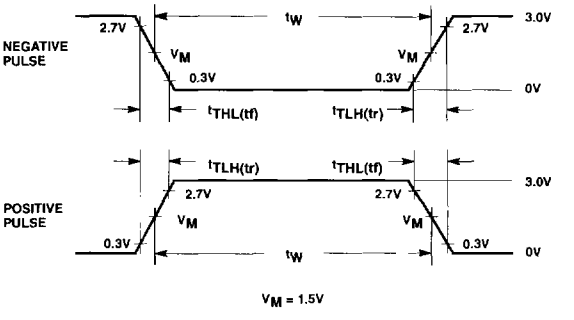
NOTE: For all waveforms, V_M = 1.5V.

Waveform 1. Propagation Delay Input to Output

TEST CIRCUIT AND WAVEFORM



Test Circuit for Open Collecor Outputs



V_M = 1.5V

Input Pulse Definition

INPUT PULSE CHARACTERISTICS				
Family	Rep. Rate	Pulse Width	t_{TLH}	t_{THL}
54F	1MHz	500ns	≤2.5ns	≤2.5ns

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.
V_X = Unclocked pins must be held at: ≤0.8V; ≥2.7V or open per FunctionTable.