

Signetics

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Status	Product
FAST Products	

FEATURES

- 30Ω line driver
- 160mA output drive capability
- High speed
- Facilitates incident wave switching
- 3nh lead inductance each on V_{CC} and GND when both side pins are used

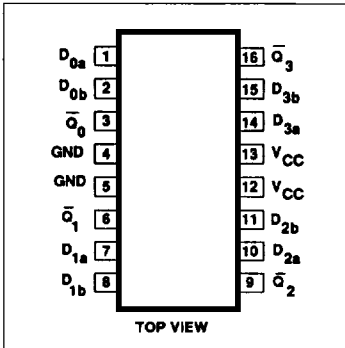
DESCRIPTION

The 74F3038 is a high current Open-Collector Line Driver composed of four 2-input NAND gates. It has been designed to deal with the transmission line effects of PC boards which appear when fast edge rates are used.

The 74F 3038 can sink 160mA with a V_{CC} as low as 4.5V. This guarantees incident wave switching with V_{OL} not more than 0.8V while driving impedances as low as 30 ohm. This is applicable with any combination of outputs using continuous duty.

The AC specifications for the 74F3038 were determined using the standard

PIN CONFIGURATION



FAST 74F3038

30Ω Line Driver

Quad Two-Input NAND 30Ω Line Driver (Open Collector)

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F3038	6.0 ns	17 mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE V _{CC} = 5V±10%; T _A = 0°C to +70°C
16-Pin Plastic DIP	74F3038N
16-Pin Plastic SOL ¹	74F3038D

NOTE:

1. Thermal mounting techniques are recommended. See SMD Process Applications (page 17) for a discussion of thermal consideration for surface mounted devices. If driving impedances 42 ohms or greater then thermal mounting is not necessary.

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
D _{na} , D _{nb}	Data inputs	1.0/1.0	20μA/0.6mA
\bar{Q}_n	Data outputs	OC/266	OC/160mA

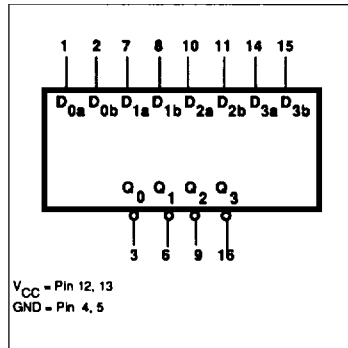
NOTE:

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

FAST load for open-collector parts of 50 pF capacitance, a 500 ohm pull-up resistor and a 500 ohm pull-down resistor. (See Test Circuit).

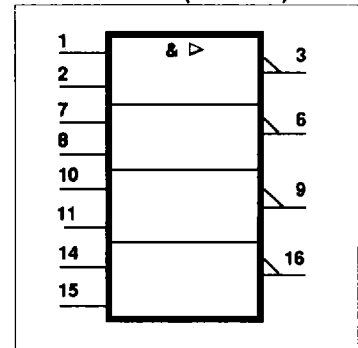
Reducing the load resistors to 100 ohm will decrease the t_{PLH} propagation delay

LOGIC SYMBOL



by approximately 50 % while increasing t_{PHL} only slightly. The graph of typical propagation delay vs load resistor (See AC Characteristics section for Graph) shows a spline fit curve from four measured data points. R_L = 30 ohm, R_L = 100 ohm, R_L = 300 ohm, and R_L = 500 ohm.

LOGIC SYMBOL (IEEE/IEC)



30Ω Line Driver

FAST 74F3038

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

SYMBOL	PARAMETER	TEST CONDITIONS ¹		LIMITS			UNIT
				Min	Typ ²	Max	
I_{OH}	High-level output current	$V_{CC} = \text{MIN}, V_{IL} = \text{MAX}, V_{IH} = \text{MIN}, V_{OH} = \text{MAX}$				250	μA
V_{OL}	Low-level output current	$V_{CC} = \text{MIN}$ $V_{IL} = \text{MAX}$ $V_{IH} = \text{MIN}$	$I_{OL} = 100\text{mA}$	$\pm 10\%V_{CC}$.42	.55	V
			$I_{OL} = 160\text{mA}^3$	$\pm 5\%V_{CC}$.80	V
V_{IK}	Input clamp voltage	$V_{CC} = \text{MIN}, I_I = I_{IK}$			-0.73	-1.2	V
I_I	Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 7.0\text{V}$				100	μA
I_{IH}	High-level input current	$V_{CC} = \text{MAX}, V_I = 2.7\text{V}$				20	μA
I_{IL}	Low-level input current	$V_{CC} = \text{MAX}, V_I = 0.5\text{V}$				-0.6	mA
I_{CC}	Supply current [total]	I_{CCH}	$V_{CC} = \text{MAX}$	$V_{IN} = \text{GND}$	3.5	6.0	mA
		I_{CCL}		$V_{IN} = 4.5\text{V}$	30	40	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 $V_{CC} = 5\text{V}, T_A = 25^\circ\text{C}$.
3. I_{OL1} is the current necessary to guarantee the High to Low transition in a 30Ω transmission line on the incident wave.

AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			$T_A = +25^\circ\text{C}$			$T_A = 0^\circ\text{C to } +70^\circ\text{C}$		
			Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation delay D_{na}, D_{nb} to \bar{Q}_n	Waveform 1	6.0 1.0	8.5 2.0	11.5 5.0	6.0 1.0	12.0 5.0	ns

AC WAVEFORMS

