

Philips Semiconductors-Signetics

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Status	Product Specification
FAST Products	

FAST 74F30240, 74F30244

30Ω Line Drivers

'F30240 Octal 30Ω Line Driver With Enable, Inverting
(Open Collector)

'F30244 Octal 30Ω Line Driver With Enable, Non-Inverting
(Open Collector)

FEATURES

- Ideal for driving transmission lines or backplanes. 160mA I_{OL}
Ideal for applications with impedance as low as 30Ω
- Guaranteed threshold voltages on the incident wave while driving line as low as 30Ω.
- High impedance NPN base inputs for reduced loading (20μA in High and Low states)
- Ideal for applications which require high output drive and minimal bus loading
- Octal Interface
- 'F30240 Inverting
- 'F30244 Non-Inverting
- Open-Collector outputs sink 160mA
- Multiple side pins are used for V_{CC} and GND to reduce lead inductance (Improves speed and noise immunity)
- Available in 24-pin standard slim DIP (300mil) plastic, SOL or CERDIP packages

DESCRIPTION

The 74F30240/F30244 are high current open collectors octal buffers composed of eight inverters. The 'F30240 has inverting data paths and the 'F30244 has non-inverting paths. Each device has eight inverters with two Output Enables ($\overline{OE}_0, \overline{OE}_1$) each controlling four outputs. Both drivers are designed to deal with the low-impedance transmis-

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F30240	9.5ns	62.5mA
74F30244	10.5ns	69mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$; $T_A = 0^\circ C$ to $+70^\circ C$
24-Pin Cerdip (300 mil)	N74F30240F, N74F30244F
24-Pin Plastic Slim DIP (300 mil) ¹	N74F30240N, N74F30244N
24-Pin Plastic SOL ²	N74F30240D, N74F30244D

NOTE:

1. Thermal mounting techniques are recommended. See SMD Process Applications (page 17) for a discussion of thermal consideration for surface mounted devices.
2. Because of the high current sinking capability of these parts, the SOL package should only be used under the following conditions: a) 50% duty cycle AND b) 3/5 of remaining 50% driving ≤ 100 mA (leaving the remaining 2/5 of the to drive ≤ 160 mA) OR c) use ≥ 450 linear feet per minute forced air or other thermal mounting techniques.

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
$D_0 - D_7$	Data inputs	1.0/0.033	20μA/20μA
$\overline{OE}_0 - \overline{OE}_1$	Output Enable inputs (active Low)	1.0/0.033	20μA/20μA
$\overline{Q}_0 - \overline{Q}_7$	Data outputs (OC) for 'F30240	OC/266.7	OC/160mA
$Q_0 - Q_7$	Data outputs (OC) for 'F30244	OC/266.7	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

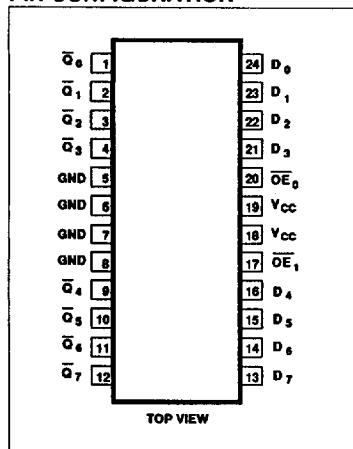
sion line effects found on printed circuit boards when fast edge rates are used. The 160 mA I_{OL} provides ample power to

achieve TTL switching voltages on the incident wave.

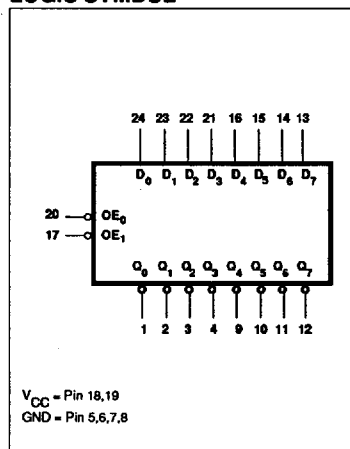
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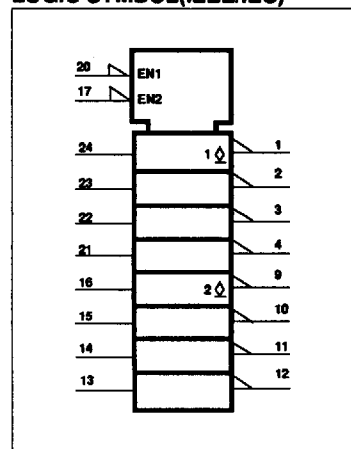
PIN CONFIGURATION



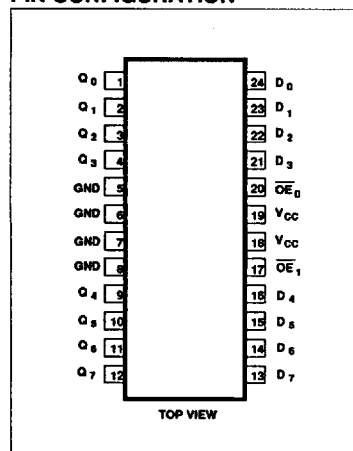
LOGIC SYMBOL



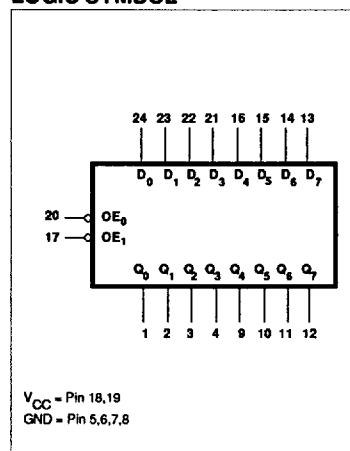
LOGIC SYMBOL(IEEE/IEC)



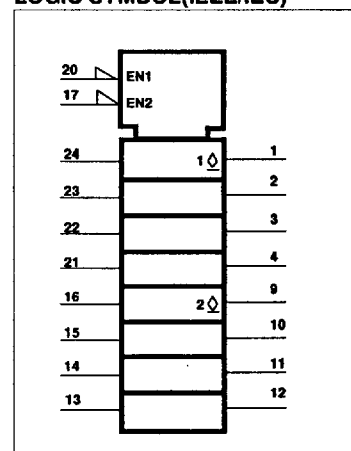
PIN CONFIGURATION



LOGIC SYMBOL



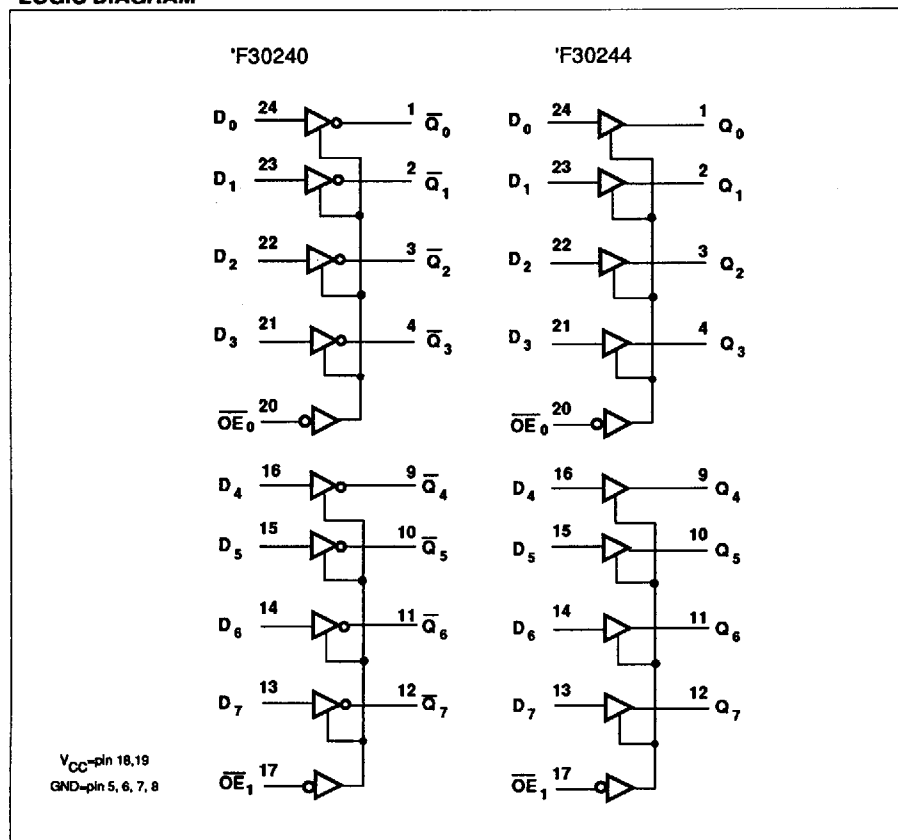
LOGIC SYMBOL(IEEE/IEC)



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LOGIC DIAGRAM



FUNCTION TABLE

INPUTS		OUTPUTS	
		'F30240	'F30244
$\overline{OE}_n$	D_n	$\overline{Q}_n$	Q_n
L	L	H	L
L	H	L	H
H	X	OFF	OFF

H=High voltage level

L=Low voltage level

X=Don't care

OFF=Pulled up through resistor (open collector)

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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	-0.5 to +7.0	V
V_{IN}	Input voltage	-0.5 to +7.0	V
I_{IN}	Input current	-30 to +5	mA
V_{OUT}	Voltage applied to output in High output state	-0.5 to +5.5	V
I_{OUT}	Current applied to output in Low output state	320	mA
T_A	Operating free-air temperature range	0 to +70	°C
T_{STG}	Storage temperature	-65 to +150	°C

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			160	mA
T_A	Operating free-air temperature range	0		70	°C

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} = MIN, V _{IL} = MAX, V _{IH} = MIN, V _{OH} = MAX				250	μA
V _{OL}	Low-level output current			V _{CC} = MIN V _{IL} = MAX V _{IH} = MIN	I _{OL} = 100mA	±10%V _{CC}	.42	.55	V
					I _{OL} = 160mA ³	±5%V _{CC}		.80	V
V _{IK}	Input clamp voltage			V _{CC} = MIN, I _I = I _{IK}			-0.73	-1.2	V
I _I	Input current at maximum input voltage			V _{CC} = 0.0V, V _I = 7.0V				100	μA
I _{IH}	High-level input current			V _{CC} = MAX, V _I = 2.7V				20	μA
I _{IL}	Low-level input current			V _{CC} = MAX, V _I = 0.5V				-20	μA
I _{CC}	Supply current [total]	'F30240	I _{CCH}	V _{CC} = MAX			13	23	mA
			I _{CCL}				70	95	mA
		'F30244	I _{CCH}				19	27	mA
			I _{CCL}				70	100	mA

NOTES:

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at $V_{CC} = 5\text{V}, T_A = 25^\circ\text{C}$.
- I_{OL1} is the current necessary to guarantee the High to Low transition in a 30Ω transmission line on the incident wave.

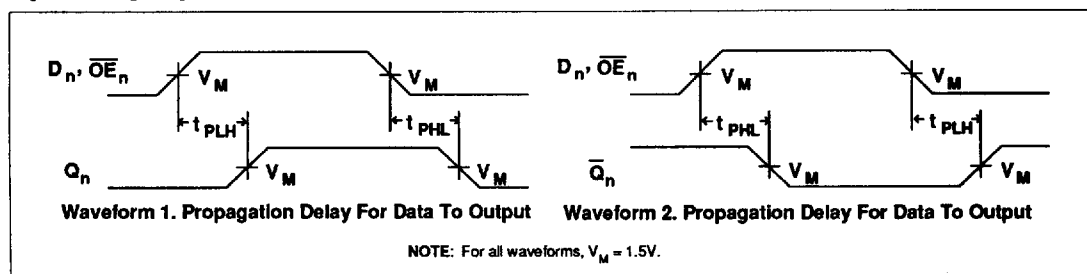
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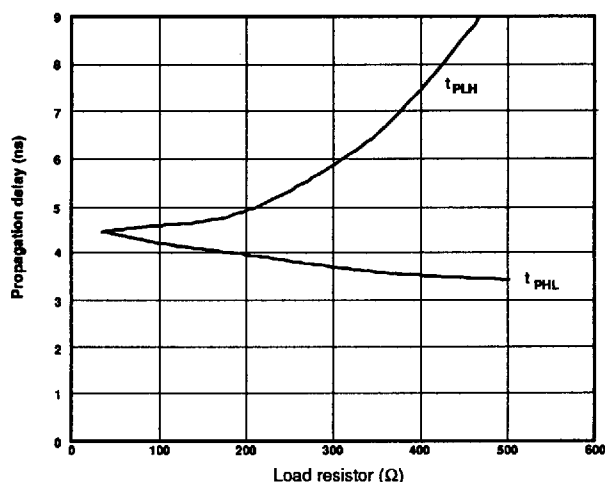
AC ELECTRICAL CHARACTERISTICS

AC ELECTRICAL CHARACTERISTICS									
SYMBOL	PARAMETER		TEST CONDITION	LIMITS					UNIT
				T _A = +25°C V _{CC} = 5V C _L = 50pF R _L = 500Ω			T _A = 0°C to +70°C V _{CC} = 5V ±10% C _L = 50pF R _L = 500Ω		
				Min	Typ	Max	Min	Max	
t _{PLH} t _{PHL}	Propagation delay D _n to Q _n	'F30240	Waveform 2	4.0 1.0	10.0 2.0	14.5 5.0	4.0 1.0	15.0 5.5	ns
t _{PLH} t _{PHL}	Propagation delay OE _n to Q _n		Waveform 1,2	4.0 3.5	10.0 6.0	14.0 9.0	4.0 3.5	14.5 10.5	ns
t _{PLH} t _{PHL}	Propagation delay D _n to Q _n	'F30244	Waveform 1	4.0 3.0	10.5 5.5	14.5 9.0	4.0 3.0	15.0 9.5	ns
t _{PLH} t _{PHL}	Propagation delay OE _n to Q _n		Waveform 1,2	4.0 3.5	9.5 6.0	14.0 9.0	4.0 3.5	14.5 10.5	ns

AC WAVEFORMS



TYPICAL PROPAGATION DELAYS VERSUS LOAD FOR OPEN COLLECTOR OUTPUTS



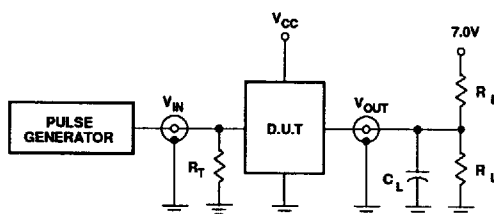
NOTE:

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 and the total I_{IL}'s of the receivers does not exceed the I_{OL} maximum specification.

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TEST CIRCUIT AND WAVEFORMS



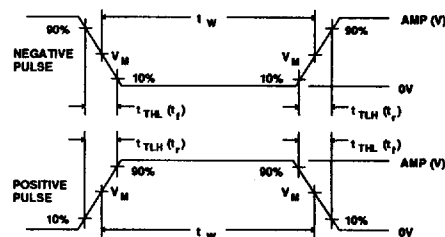
Test Circuit For Open Collector Outputs

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.

 $V_M = 1.5V$

Input Pulse Definition

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	t_w	t_{TLH}	t_{THL}
74F	3.0V	1MHz	500ns	2.5ns	2.5ns