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Status	Product Specification
FAST Products	

FAST 74F540, 74F541

Buffers

74F540 Octal Inverter Buffer (3-State)
74F541 Octal Buffer (3-State)

FEATURES

- High impedance NPN base inputs for reduced loading (20µA in High and Low states)
- Low power, light bus loading
- Functional similar to the 'F240 and 'F241
- Provides ideal interface and increases fan-out of MOS Micro-processors
- Efficient pinout to facilitate PC board layout
- Octal bus interface
- 3-State buffer outputs sink 64mA
- 15mA source current

DESCRIPTION

The 74F540 and 74F541 are octal buffers that are ideal for driving bus lines or buffer memory address registers. The outputs are capable of sinking 64mA and sourcing up to 15mA, producing very good capacitive drive characteristics. The devices feature input and outputs on opposite sides of the package to facilitate printed circuit board layout.

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F540	3.5ns	58mA
74F541	5.5ns	55mA

ORDERING INFORMATION

PACKAGES	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$; $T_A = 0^\circ C$ to $+70^\circ C$
20-Pin Plastic DIP	N74F540N, N74F541N
20-Pin Plastic SOL	N74F540D, N74F541D

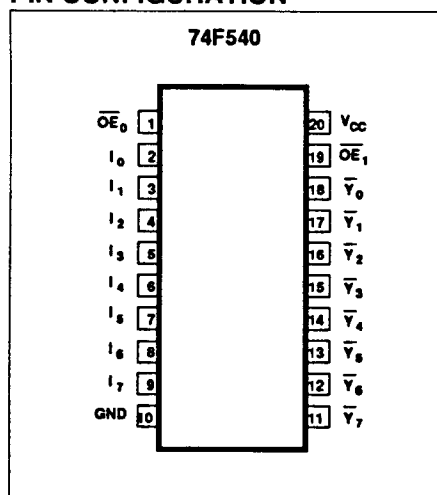
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
$I_0 - I_7$	Data inputs	1.0/0.033	20µA/20µA
$\overline{OE}_0 \overline{OE}_1$	3-state output enable inputs (active Low)	1.0/0.033	20µA/20µA
$Y_0 - Y_7$	Data outputs ('F541)	750/106.7	15mA/64mA
$\overline{Y}_0 - \overline{Y}_7$	Data outputs ('F540)	750/106.7	15mA/64mA

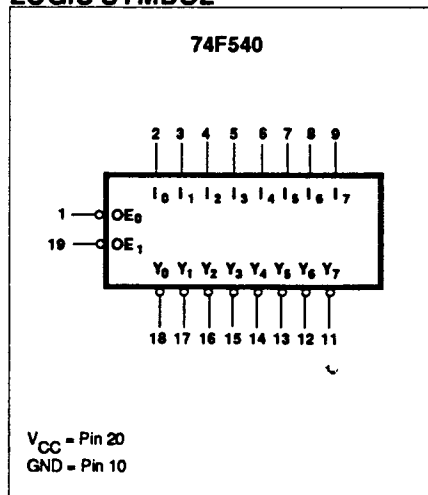
NOTE:

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

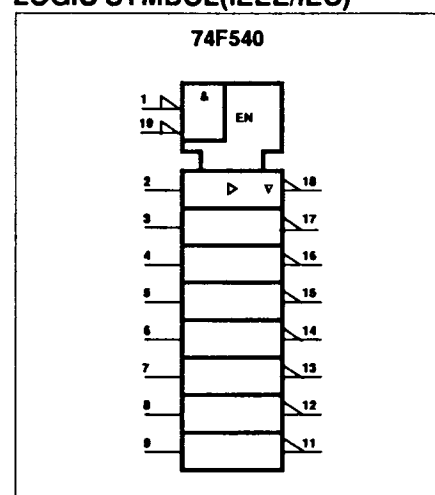
PIN CONFIGURATION



LOGIC SYMBOL

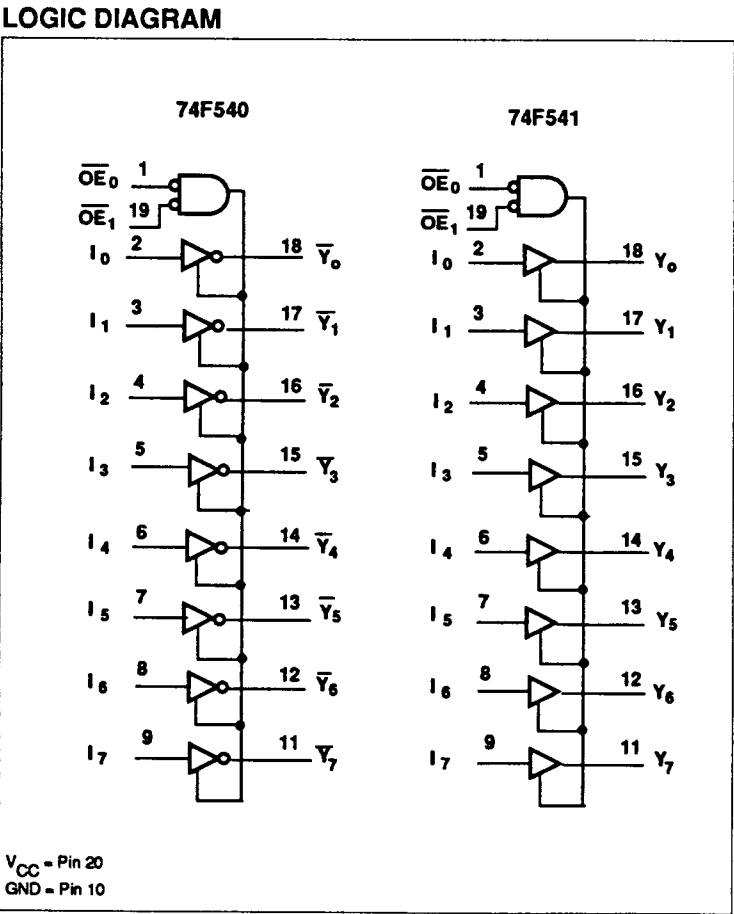
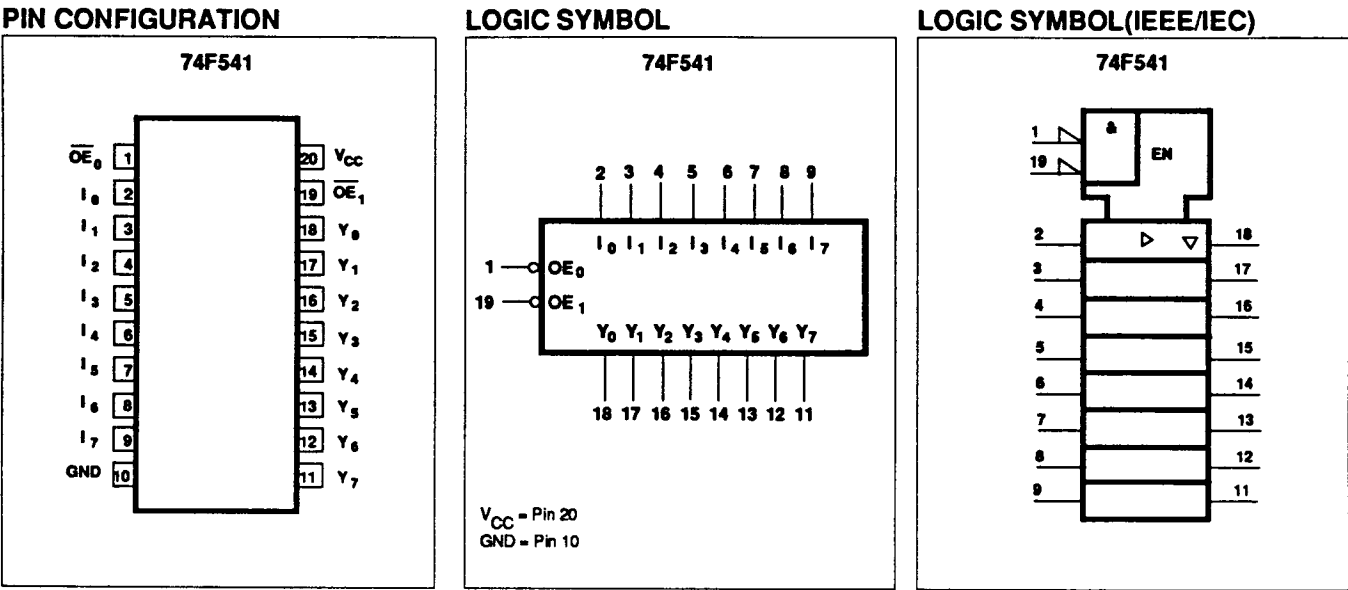


LOGIC SYMBOL (IEEE/IEC)



Buffers

FAST 74F540, 74F541



FUNCTION TABLE

INPUTS			OUTPUTS	
OE ₀	OE ₁	I _n	'F541	'F540
L	L	L	L	H
L	L	H	H	L
X	H	X	Z	Z
H	X	X	Z	Z

H = High voltage level
L = Low voltage level
X = Don't care
Z = High impedance "off" state

Buffers

FAST 74F540, 74F541

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 V_{CC}	V
I_{OUT}	Current applied to output in Low output state	128	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_H	High-level input voltage	2.0			V
V_L	Low-level input voltage			0.8	V
I_{IK}	Input clamp current			-18	mA
I_{OH}	High-level output current			-15	mA
I_{OL}	Low-level output current			64	mA
T_A	Operating free-air temperature range	0		70	°C

Buffers

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

SYMBOL	PARAMETER		TEST CONDITIONS ¹			LIMITS			UNIT
						Min	Typ ²	Max	
V _{OH}	High-level output voltage		V _{CC} = MIN, V _{IL} = MAX V _{IH} = MIN,	I _{OH} =-3mA	±10%V _{CC}	2.4			V
					±5%V _{CC}	2.7	3.4		V
				I _{OH} =-15mA	±10%V _{CC}	2.0			V
					±5%V _{CC}	2.0			V
V _{OL}	Low-level output voltage		V _{CC} = MIN, V _{IL} = MAX V _{IH} = MIN,	I _{OL} =MAX	±10%V _{CC}			0.55	V
					±5%V _{CC}		0.42	0.55	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 _{OZH}	Off-state output current, High-level voltage applied		V _{CC} = MAX, V _O = 2.7V					50	μA
I _{OZL}	Off-state output current, Low-level voltage applied		V _{CC} = MAX, V _O = 0.5V					-50	μA
I _{OS}	Short-circuit output current ³		V _{CC} = MAX			-100		-225	mA
I _{CC}	Supply current (total)	'F540	I _{CCH}	V _{CC} = MAX	I _n = $\overline{OE}_n$ =GND		22	30	mA
			I _{CCL}		I _n =4.5V, $\overline{OE}_n$ =GND		58	75	mA
			I _{CCZ}		I _n =GND, $\overline{OE}_n$ =4.5V		40	55	mA
		'F541	I _{CCH}		I _n =4.5V, $\overline{OE}_n$ =GND		30	40	mA
			I _{CCL}		I _n = $\overline{OE}_n$ =GND		55	72	mA
			I _{CCZ}		I _n =GND, $\overline{OE}_n$ =4.5V		45	58	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 $V_{CC} = 5\text{V}$, $T_A = 25^\circ\text{C}$.
- Not more than one output should be shorted at a time. For testing I_{OS} , the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

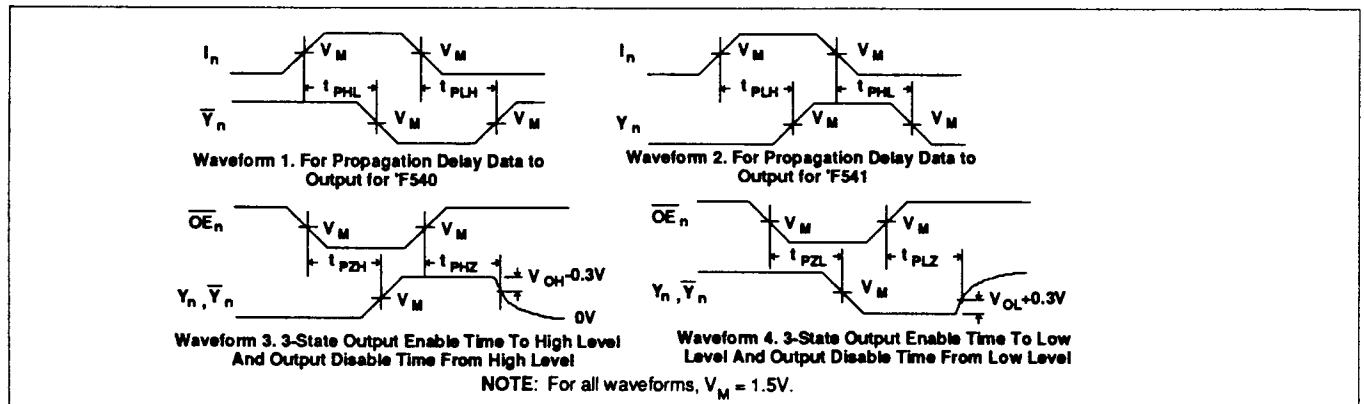
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AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER		TEST CONDITION	LIMITS					UNIT
				$T_A = +25^{\circ}\text{C}$ $V_{CC} = 5\text{V}$ $C_L = 50\text{pF}$ $R_L = 500\Omega$			$T_A = 0^{\circ}\text{C to } +70^{\circ}\text{C}$ $V_{CC} = 5\text{V} \pm 10\%$ $C_L = 50\text{pF}$ $R_L = 500\Omega$		
				Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation delay I_n to Y_n	74F540	Waveform 1	3.0 1.5	4.5 2.5	6.5 4.5	2.5 1.5	7.5 5.0	ns
t_{PZH} t_{PZL}	Output Enable time to High or Low level		Waveform 3 Waveform 4	2.0 4.0	3.5 7.5	6.5 9.5	2.0 4.0	7.0 10.0	ns
t_{PZH} t_{PZL}	Output Disable time from High or Low level		Waveform 3 Waveform 4	2.0 2.0	4.0 4.0	6.0 5.5	2.0 2.0	6.5 6.0	ns
t_{PLH} t_{PHL}	Propagation delay I_n to Y_n		74F541	Waveform 2	2.5 3.5	5.0 6.0	6.5 7.0	2.5 3.0	7.0 7.5
t_{PZH} t_{PZL}	Output Enable time to High or Low level	Waveform 6 Waveform 7		3.0 3.0	5.5 6.5	7.0 8.5	3.0 3.0	7.5 9.5	ns
t_{PZH} t_{PZL}	Output Disable time from High or Low level	Waveform 6 Waveform 7		2.0 2.0	4.0 4.0	7.0 7.0	2.0 2.0	7.5 7.5	ns

AC WAVEFORMS



TEST CIRCUIT AND WAVEFORMS

