

DATA SHEET

74F1240

Octal inverter buffer (3-State)

Product specification
Supersedes data of 1999 Jan 08
IC15 Data Handbook

2000 Jun 30

Octal inverter buffer (3-State)

74F1240

FEATURES

- High impedance NPN base inputs for reduced loading (20 μ A in High and Low states)
- Low power, light loading
- Functional pin-for-pin equivalent of 74F240
- 1/30th the bus loading of 74F240
- Provides ideal interface and increase fan-out of MOS microprocessors
- Octal bus interface
- 3-State buffer outputs sink 64mA
- 15mA source current

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F1240	3.5ns	40mA

ORDERING INFORMATION

DESCRIPTION	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$, $T_{amb} = 0^{\circ}C$ to $+70^{\circ}C$	DRAWING NUMBER
20-pin plastic DIP	N74F1240N	SOT146-1
20-pin plastic SOL	N74F1240D	SOT163-1

DESCRIPTION

The 74F1240 is an octal buffer that is 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 device features two Output Enables, $\overline{OE}a$ and $\overline{OE}b$, each controlling four of the 3-State outputs.

INPUT AND OUTPUT LOADING AND FAN OUT TABLE

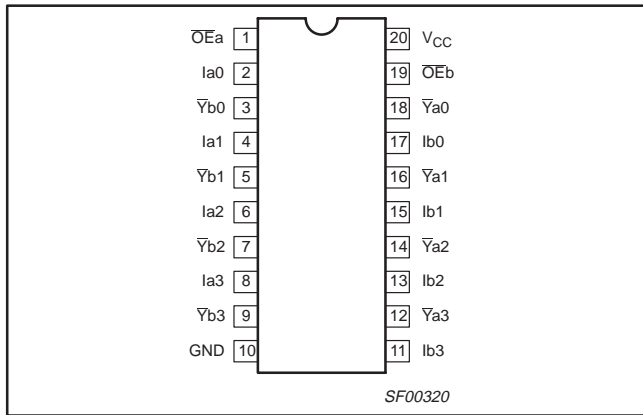
PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
Ian, Ibn	Data inputs	1.0/0.033	20 μ A/20 μ A
$\overline{OE}a$, $\overline{OE}b$	Output enable inputs (active Low)	1.0/0.033	20 μ A/20 μ A
$\overline{Y}an$, $\overline{Y}bn$	Data outputs (74F1240)	750/106.7	15mA/64mA

NOTE: One (1.0) FAST unit load is defined as: 20 μ A in the High state and 0.6mA in the Low state.

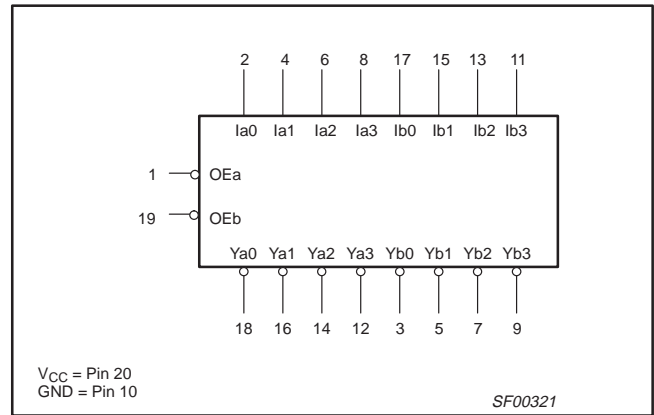
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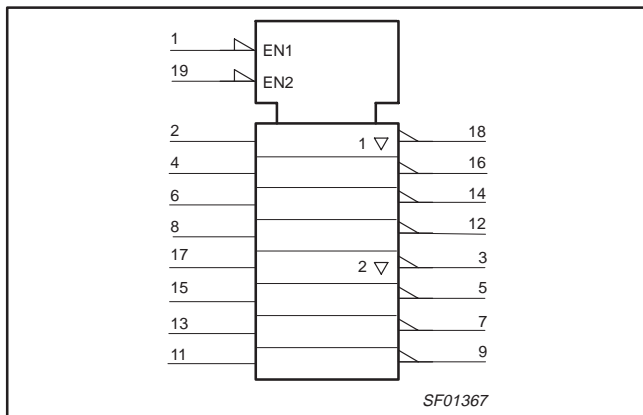
PIN CONFIGURATION



LOGIC SYMBOL



IEC/IEEE SYMBOL

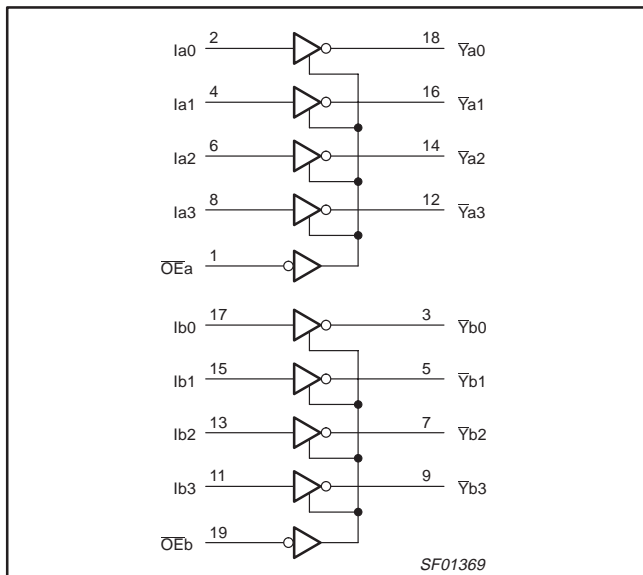


FUNCTION TABLE

INPUTS				OUTPUTS	
OEa	Ia	OEb	Ib	Ya	Yb
L	L	L	L	H	H
L	H	L	H	L	L
H	X	H	X	Z	Z

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

LOGIC DIAGRAM



Octal inverter buffer (3-State)

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ABSOLUTE MAXIMUM RATINGS

(Operation beyond the limit 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 _{amb}	Operating free-air temperature range	0 to +70	°C
T _{stg}	Storage temperature range	-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
I _{OH}	High-level output current			-15	mA
I _{OL}	Low-level output current			64	mA
T _{amb}	Operating free-air temperature range	0		+70	°C

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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	3.3		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} = 48mA	±10% V _{CC}		0.38	0.55	V	
			I _{OL} = 64mA	±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)	I _{CCH}	V _{CC} = MAX				22	30	mA
		I _{CCL}					58	75	mA
		I _{CCZ}					44	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} = 5V, T_{amb} = 25°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.

AC ELECTRICAL CHARACTERISTICS

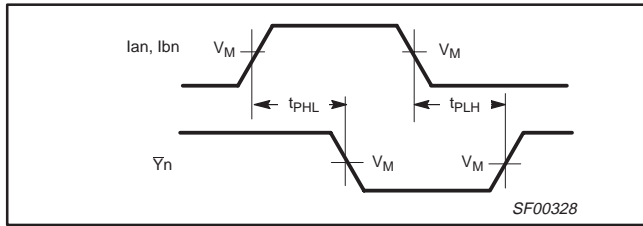
SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			T _{amb} = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω			T _{amb} = 0°C to +70°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
t _{PLH} t _{PHL}	Propagation delay I _{an} , I _{bn} , to \bar{Y}_n	Waveform 1	3.0 1.5	4.5 2.5	6.5 4.5	2.5 1.5	7.5 5.0	ns ns
t _{PZH} t _{PZL}	Output Enable time to High or Low level	Waveform 3 Waveform 4	3.0 4.0	5.5 7.0	7.5 9.0	3.0 4.0	8.0 9.5	ns ns
t _{PHZ} t _{PLZ}	Output Disable time to 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 ns

Octal inverter buffer (3-State)

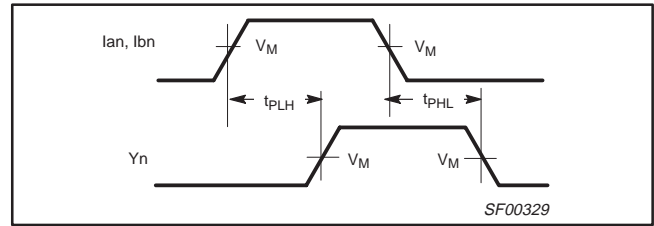
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AC WAVEFORMS

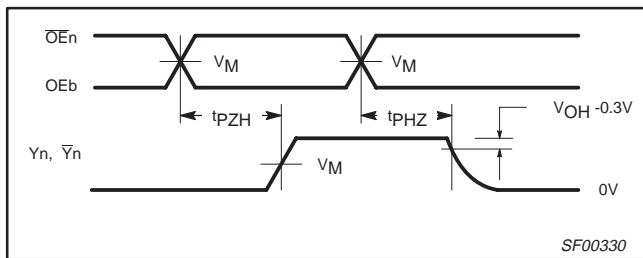
For all waveforms, $V_M = 1.5V$.



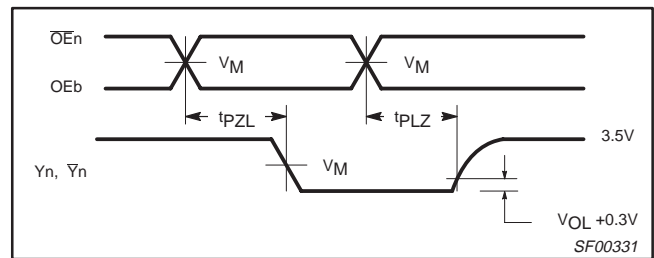
Waveform 1. For Inverting Outputs



Waveform 2. For Non-inverting Outputs



Waveform 3. 3-State Output Enable Time to High Level and Output Disable Time from High Level



Waveform 4. 3-State Output Enable Time to Low Level and Output Disable Time from Low Level

TEST CIRCUIT AND WAVEFORMS

Test Circuit for Open Collector Outputs

SWITCH POSITION	
TEST	SWITCH
t_{PLZ}	closed
t_{PZL}	closed
All other	open

DEFINITIONS:
 R_L = Load resistor; see AC electrical characteristics for value.
 C_L = Load capacitance includes jig and probe capacitance; see AC electrical characteristics for value.
 R_T = Termination resistance should be equal to Z_{OUT} of pulse generators.

Input Pulse Definition

INPUT PULSE REQUIREMENTS						
family	amplitude	V_M	rep. rate	t_w	t_{TLH}	t_{THL}
74F	3.0V	1.5V	1MHz	500ns	2.5ns	2.5ns

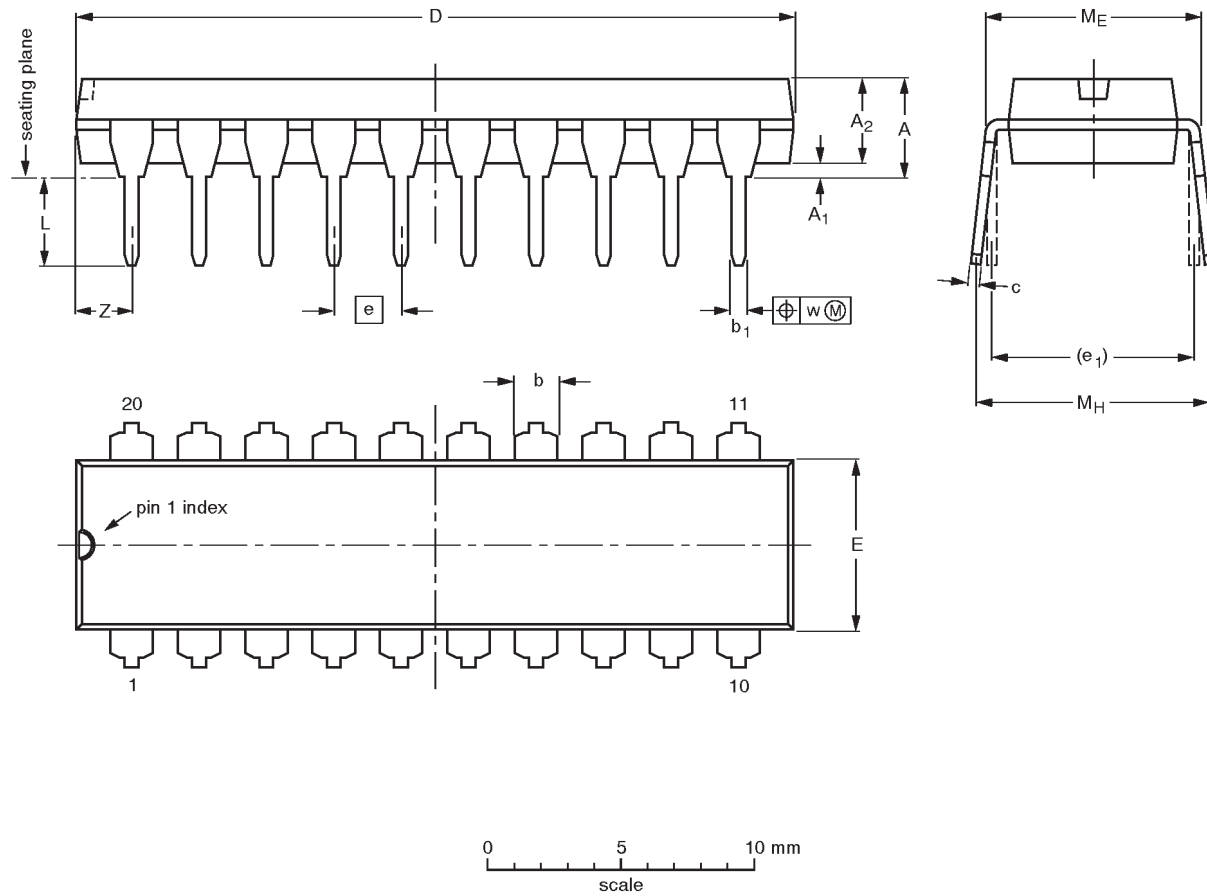
SF00128

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DIP20: plastic dual in-line package; 20 leads (300 mil)

SOT146-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁ min.	A ₂ max.	b	b ₁	c	D ⁽¹⁾	E ⁽¹⁾	e	e ₁	L	M _E	M _H	w	Z ⁽¹⁾ max.
mm	4.2	0.51	3.2	1.73 1.30	0.53 0.38	0.36 0.23	26.92 26.54	6.40 6.22	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	2.0
inches	0.17	0.020	0.13	0.068 0.051	0.021 0.015	0.014 0.009	1.060 1.045	0.25 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.078

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

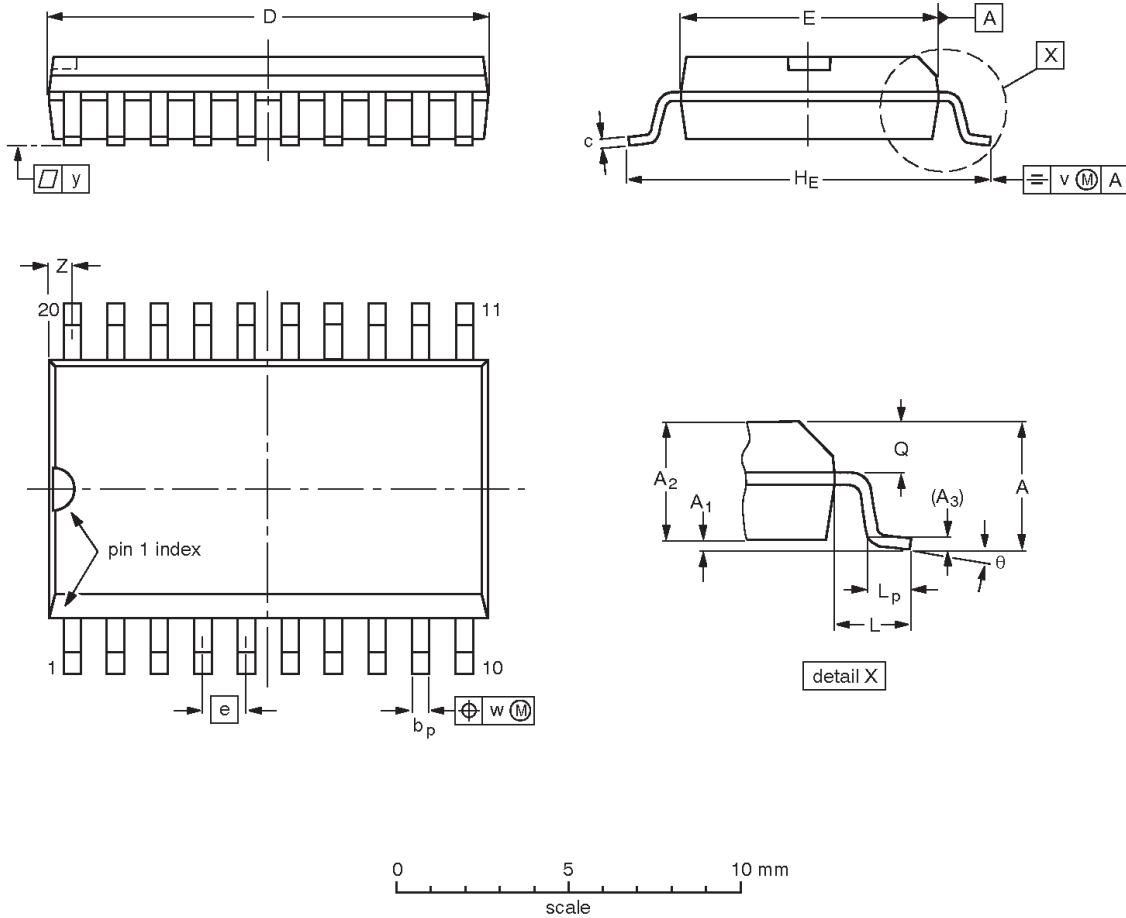
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT146-1			SC603			92-11-17 95-05-24

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SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽¹⁾	e	H _E	L	L _p	Q	v	w	y	z ⁽¹⁾	θ
mm	2.65	0.30 0.10	2.45 2.25	0.25	0.49 0.36	0.32 0.23	13.0 12.6	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8° 0°
inches	0.10	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.51 0.49	0.30 0.29	0.050	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT163-1	075E04	MS-013AC				95-01-24 97-05-22

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NOTES

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Data sheet status

Data sheet status	Product status	Definition [1]
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
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[1] Please consult the most recently issued datasheet before initiating or completing a design.

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Date of release: 06-00

Document order number:

9397-750 07279

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