

# DATA SHEET

## **74F1244** Octal buffer (3-State)

Product specification

1989 Apr 04

IC15 Data Handbook

# Octal buffer (3-State)

# 74F1244

## FEATURES

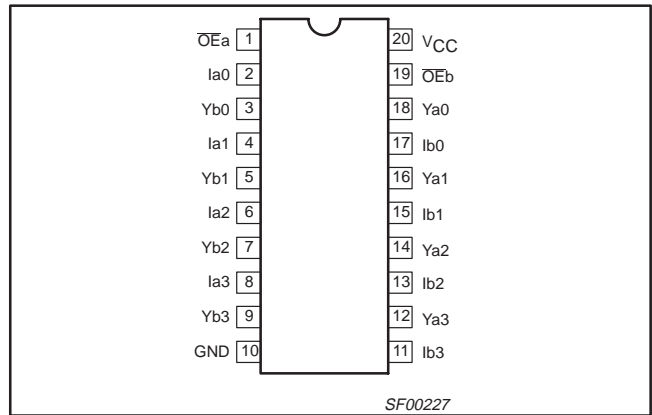
- High impedance NPN base inputs for reduced loading (20µA in High and Low states)
- Low power, light loading
- Functional pin-for-pin equivalent of 74F244
- 1/30th the bus loading of 74F244
- Provides ideal interface and increase fan-out of MOS microprocessors
- Octal bus interface
- 3-State buffer outputs sink 64mA and source 15mA

## DESCRIPTION

The 74F1244 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.

The 74F1244 is pin and functionally compatible with the 74F244. The lower power and light bus loading features make it an ideal part to interface directly with MOS microprocessors.

## PIN CONFIGURATION



TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F1244	4.5ns	43mA

## ORDERING INFORMATION

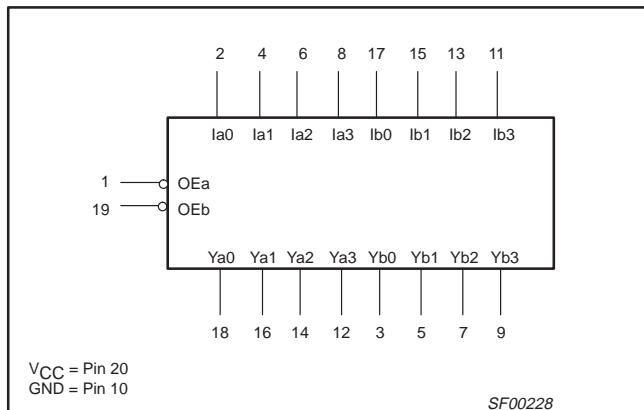
DESCRIPTION	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$ , $T_{amb} = 0^{\circ}C$ to $+70^{\circ}C$	DRAWING NUMBER
20-pin plastic DIP	N74F1244N	SOT146-1
20-pin plastic SOL	N74F1244D	SOT163-1

## INPUT AND OUTPUT LOADING AND FAN OUT TABLE

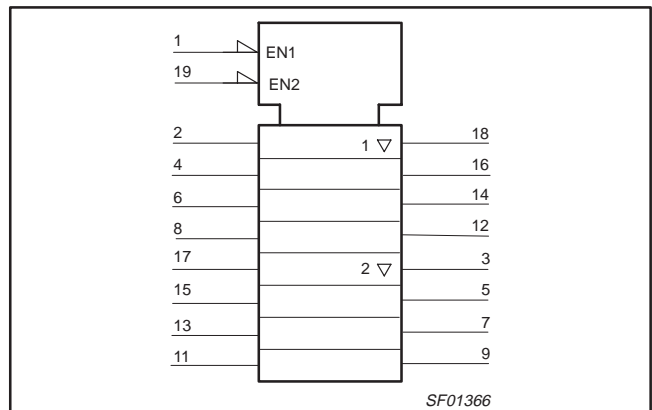
PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
Ian, Ibn	Data inputs	1.0/0.033	20µA/20µA
$\overline{OE}a$ , $\overline{OE}b$	Output enable inputs (active Low)	1.0/0.033	20µA/20µA
Yan, Ybn	Data outputs	750/106.7	15mA/64mA

NOTE: One (1.0) FAST unit load is defined as: 20µA in the high state and 0.6mA in the low state.

## LOGIC SYMBOL



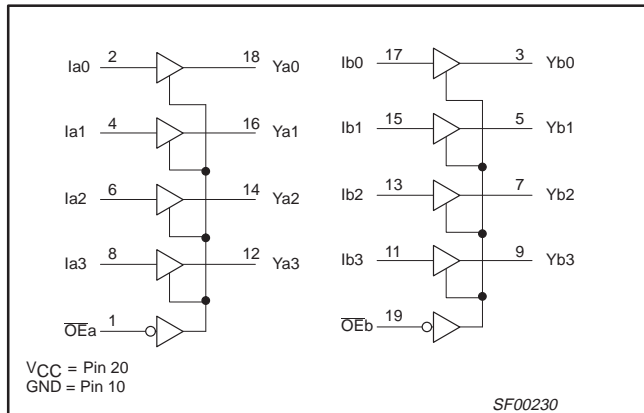
## IEC/IEEE SYMBOL



# Octal buffer (3-State)

74F1244

## LOGIC DIAGRAM



## FUNCTION TABLE

INPUTS				OUTPUTS	
$\overline{OEa}$	Ia	$\overline{OEb}$	Ib	Ya	Yb
L	L	L	L	L	L
L	H	L	H	H	H
H	X	H	X	Z	Z

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

## 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

## Octal buffer (3-State)

74F1244

**DC ELECTRICAL CHARACTERISTICS**

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

SYMBOL	PARAMETER	TEST CONDITIONS <sup>1</sup>			LIMITS			UNIT	
					MIN	TYP <sup>2</sup>	MAX		
V <sub>OH</sub>	High-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>IH</sub> = MIN	I <sub>OH</sub> = -3mA	±10% V <sub>CC</sub>	2.5			V	
				±5% V <sub>CC</sub>	2.7	3.4		V	
			I <sub>OH</sub> = -15mA	±10% V <sub>CC</sub>	2.0			V	
				±5% V <sub>CC</sub>	2.0			V	
V <sub>OL</sub>	Low-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>IH</sub> = MIN	I <sub>OL</sub> = 48mA	±10% V <sub>CC</sub>		0.38	0.55	V	
			I <sub>OL</sub> = 64mA	±5% V <sub>CC</sub>		0.42	0.55	V	
V <sub>IK</sub>	Input clamp voltage	V <sub>CC</sub> = MIN, I <sub>I</sub> = I <sub>IK</sub>				-0.73	-1.2	V	
I <sub>I</sub>	Input current at maximum input voltage	V <sub>CC</sub> = 0.0V, V <sub>I</sub> = 7.0V					100	μA	
I <sub>IH</sub>	High-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7V					20	μA	
I <sub>IL</sub>	Low-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5V					-20	μA	
I <sub>OZH</sub>	Off-state output current, High-level voltage applied	V <sub>CC</sub> = MAX, V <sub>O</sub> = 2.7V					50	μA	
I <sub>OZL</sub>	Off-state output current, Low-level voltage applied	V <sub>CC</sub> = MAX, V <sub>O</sub> = 0.5V					-50	μA	
I <sub>OS</sub>	Short-circuit output current <sup>3</sup>	V <sub>CC</sub> = MAX			-100		-225	mA	
I <sub>CC</sub>	Supply current (total)	I <sub>CCH</sub>	V <sub>CC</sub> = MAX				30	40	mA
		I <sub>CCL</sub>					57	75	mA
		I <sub>CCZ</sub>					43	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<sub>CC</sub> = 5V, T<sub>amb</sub> = 25°C.
- Not more than one output should be shorted at a time. For testing I<sub>OS</sub>, 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<sub>OS</sub> tests should be performed last.

**AC ELECTRICAL CHARACTERISTICS**

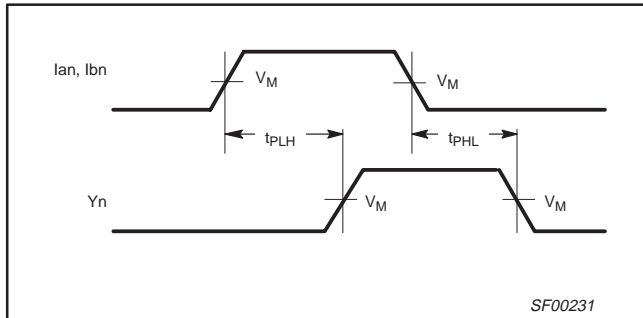
SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			T <sub>amb</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω			T <sub>amb</sub> = 0°C to +70°C V <sub>CC</sub> = +5.0V ± 10% C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay I <sub>an</sub> , I <sub>bn</sub> to Y <sub>n</sub>	Waveform 1	2.5 2.0	4.0 5.0	5.5 7.0	2.5 2.0	6.0 7.5	ns ns
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable time to High or Low level	Waveform 2 Waveform 3	3.0 3.0	6.0 6.5	7.5 8.0	3.0 3.0	8.5 8.5	ns ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Output Disable time to High or Low level	Waveform 2 Waveform 3	2.0 2.0	4.0 4.0	5.5 5.5	2.0 2.0	6.0 6.0	ns ns

# Octal buffer (3-State)

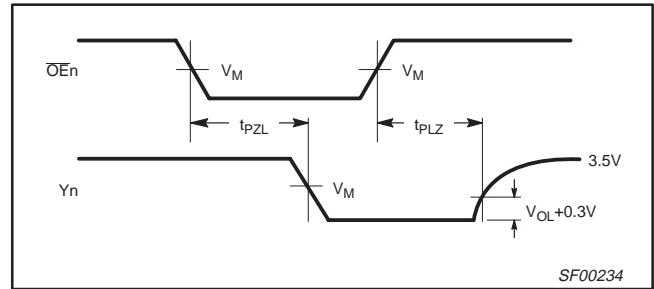
74F1244

## AC WAVEFORMS

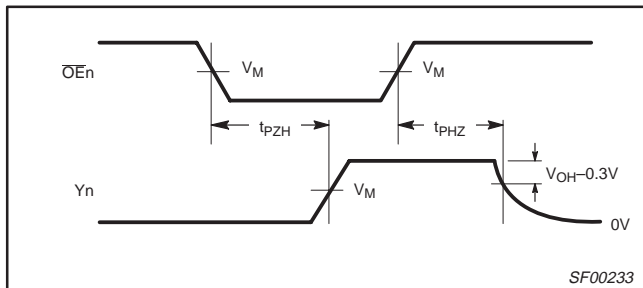
For all waveforms,  $V_M = 1.5V$ .



Waveform 1. For Non-Inverting Outputs



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



Waveform 2. 3-State Output Enable Time to High Level and Output Disable Time from High Level

## TEST CIRCUIT AND WAVEFORMS

**Test Circuit for 3-State Outputs**

**Input Pulse Definition**

**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.

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

SF00777

# Octal buffer (3-State)

74F1244

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 <sub>1</sub> min.	A <sub>2</sub> max.	b	b <sub>1</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	e <sub>1</sub>	L	M <sub>E</sub>	M <sub>H</sub>	w	Z <sup>(1)</sup> 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

# Octal buffer (3-State)

74F1244

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 <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	z <sup>(1)</sup>	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

## Octal buffer (3-State)

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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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