

Octal buffer (3-State)

54F244

FEATURES

- Octal bus interface
- 3-State buffer outputs sink 48mA
- 12mA source current

DESCRIPTION

The 54F244 is an octal buffer that is ideal for driving bus lines or buffer memory address registers. The outputs are all capable of sinking 48mA and sourcing up to 12mA, producing very good capacitive drive characteristics. The device features two Output Enables, OE, each controlling four of the 3-State outputs.

FUNCTION TABLE

INPUTS				OUTPUTS	
OE _a	I _a	OE _b	I _b	Y _a	Y _b
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

ORDERING INFORMATION

DESCRIPTION	ORDER CODE	PACKAGE DESIGNATOR*
20-Pin Ceramic DIP	54F244/BRA	GDIP1-T20
20-Pin Ceramic Flat Pack	54F244/BSA	GDFP2-F20
20-Pin Ceramic LLCC	54F244/B2A	CQCC2-N20

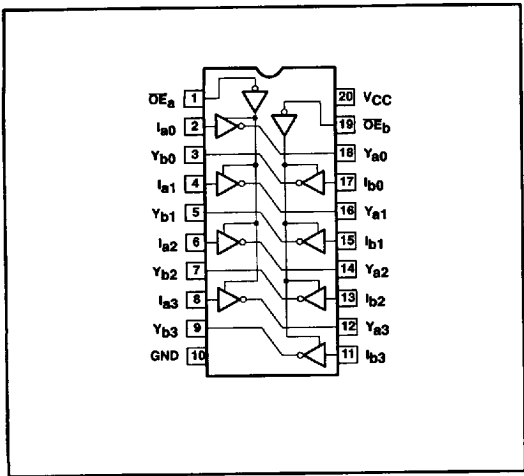
* MIL-STD 1835 or Appendix A of 1995 Military Data Handbook

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

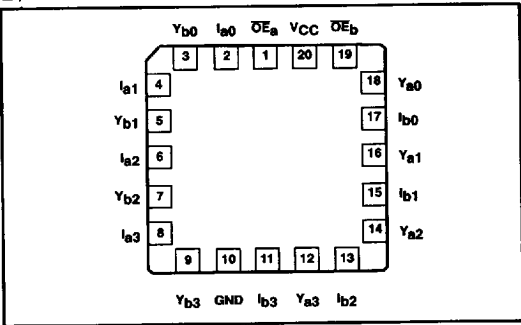
PINS	DESCRIPTION	54F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
OE _a	3-State output enable input (active Low)	1.0/1.67	20μA/1.0mA
OE _b	3-State output enable input (active Low)	1.0/1.67	20μA/1.0mA
I _{a0} - I _{a3} , I _{b0} - I _{b3}	Data inputs	1.0/2.67	20μA/1.6mA
Y _{a0} - Y _{a3} , Y _{b0} - Y _{b3}	Data outputs	600/80	12mA/48mA

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

PIN CONFIGURATION



LLCC LEAD CONFIGURATION



7110826 0085612 889

February 19, 1988

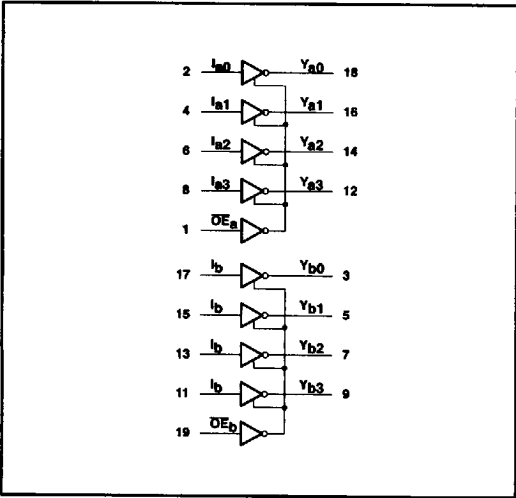
820

853-0239 F01024

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LOGIC SYMBOL



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 range	-0.5 to +7.0	V
V _I	Input voltage range	-0.5 to +7.0	V
I _I	Input current range	-30 to +5	mA
V _O	Voltage applied to output in High output state range	-0.5 to V _{CC}	V
I _O	Current applied to output in Low output state	96	mA
T _{STG}	Storage temperature range	-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		Min	Typ	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 _{OH1}	High-level output current			-1	mA
I _{OH2}	High-level output current			-3	mA
I _{OH3}	High-level output current			-12	mA
I _{OL}	Low-level output current			48	mA
T _A	Operating free-air temperature range	-55		+125	°C

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DC ELECTRICAL CHARACTERISTICS

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

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,	I _{OH1} = -1mA	2.5			V
			V _{IL} = Max,	I _{OH2} = -3mA	2.4			V
			V _{IH} = Min	I _{OH3} = -12mA	2.0			V
V _{OL}	Low-level output voltage		V _{CC} = Min, V _{IL} = Max, V _{IH} = Min	I _{OL} = Max		0.35	0.50	V
V _{IK}	Input clamp voltage		V _{CC} = Min, I _I = I _{IK}			-0.73	-1.2	V
I _{IH2}	Input current at maximum input voltage		V _{CC} = Max, V _I = 7.0V				100	μA
I _{IH1}	High-level input current		V _{CC} = Max, V _I = 2.7V			1	20	μA
I _{IL}	Low-level input current	OE _a , OE _b	V _{CC} = Max, V _I = 0.5V			-0.7	-1.0	mA
		I _{a0} - I _{a3} , I _{b0} - I _{b3}				-0.6	-1.6	mA
I _{OZH}	Off-state output current, High-level voltage applied		V _{CC} = Max, V _{IH} = Min, V _O = 2.7V			2	50	μA
I _{OZL}	Off-state output current, Low-level voltage applied		V _{CC} = Max, V _{IH} = Min, V _O = 0.5V			-2	-50	μA
I _{OS}	Short-circuit output current ³		V _{CC} = Max, V _O = 0.0V		-100	-150	-225	mA
I _{CC}	Supply current ⁴ (total)	I _{CCH}	V _{CC} = Max			40	60	mA
		I _{CCL}				60	90	mA
		I _{CCZ}				60	90	mA

AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS						UNIT
			T _A = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω			T _A = -55°C to +125°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω			
			Min	Typ	Max	Min	Max		
t _{PLH}	Propagation delay	Waveform 1	2.5	4.0	5.2	2.5	6.5	ns	
t _{PHL}	Propagation delay	Waveform 1	2.5	4.0	5.2	2.5	7.0	ns	
t _{PZH}	Enable to High	Waveform 2	2.0	4.3	6.0	2.0	7.5	ns	
t _{PZL}	Enable to Low	Waveform 3	2.0	5.0	7.0	2.0	8.5	ns	
t _{PHZ}	Disable from High	Waveform 2	2.0	3.5	6.0	2.0	7.0	ns	
t _{PLZ}	Disable from Low	Waveform 3	2.0	4.0	6.0	2.0	7.5	ns	

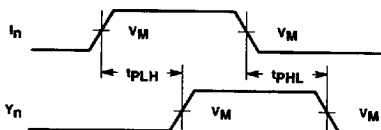
NOTES:

- For conditions shown as Min or Max, use the appropriate value specified under recommended operating conditions for the applicable type and functional table for operating mode.
- 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.
- I_{CC} is measured with outputs open.

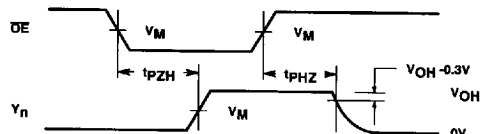
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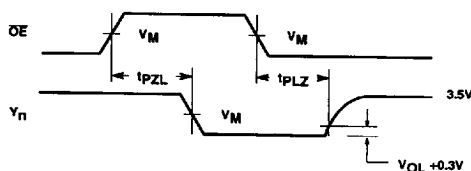
AC WAVEFORMS



Waveform 1. For Non-Inverting Outputs



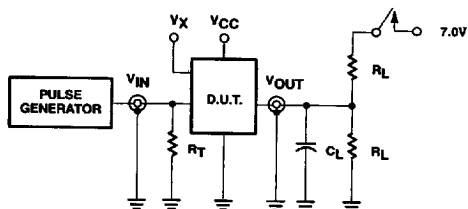
Waveform 2. 3-State Output Enable Time to High Level and Output Disable Time from High Level



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

NOTE: For all waveforms, $V_M = 1.5V$

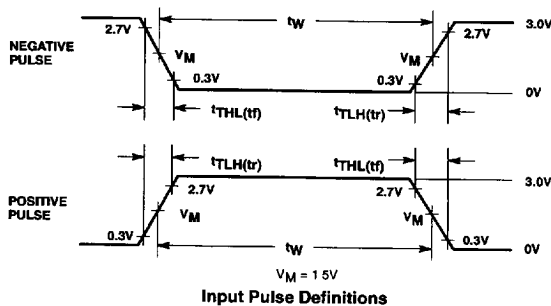
TEST CIRCUIT AND WAVEFORM



Test Circuit for 3-State Outputs

SWITCH POSITION

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



Input Pulse Definitions

INPUT PULSE CHARACTERISTICS

Family	Rep. Rate	Pulse Width	t_{TLH}	t_{THL}
54F	1MHz	500ns	$\leq 2.5ns$	$\leq 2.5ns$

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_X = Unlocked pins must be held at: $\leq 0.8V$; $\geq 2.7V$ or open per Function Table.