74FCT244A

Octal Buffer/Line Driver with TRI-STATE Outputs

The ‘FCT244A is an octal buffer and line driver designated to be employed as a memory address driver, clock driver and bus-oriented transmitter/receiver which provides improved PC board density.

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
    - Class Q Military
    - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
    - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer’s datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. ‘Typical’ values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

T-52-09

National Semiconductor

74FCT244A
Octal Buffer/Line Driver with TRI-STATE® Outputs

General Description

The 'FCT244A is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus-oriented transmitter/receiver which provides improved PC board density.

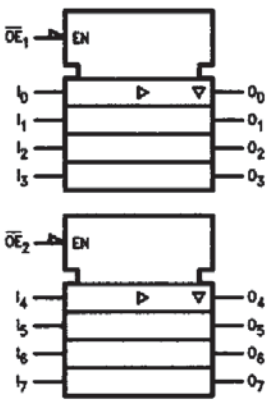
Features

- I_{CC} and I_{OZ} reduced to 40.0 μA and ±2.5 μA respectively
- NSC 74FCT244A is pin and functionally equivalent to IDT 74FCT244A
- TRI-STATE outputs drive lines or buffer memory address registers
- TTL input and output level compatible
- TTL inputs accept CMOS levels
- High current latch up immunity
- I_{OL} = 64 mA
- Electrostatic discharge protection ≥ 2 kV

Ordering Code: See Section 8

Logic Symbol

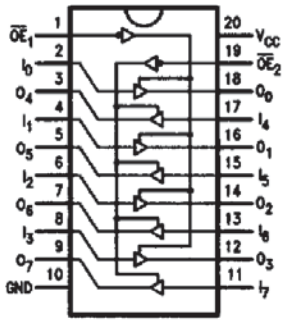
IEEE/IEC



TL/F/10270–1

Connection Diagram

Pin Assignment for DIP, QSOP and SOIC



TL/F/10270–2

Pin Names	Description
$\overline{OE}_1$, $\overline{OE}_2$	TRI-STATE Output Enable Inputs
I_0–I_7	Inputs
O_0–O_7	Outputs

Truth Tables

Inputs		Outputs (Pins 12, 14, 16, 18)
$\overline{OE}_1$	D	
L	L	L
L	H	H
H	X	Z

Inputs		Outputs (Pins 3, 5, 7, 9)
$\overline{OE}_2$	D	
L	L	L
L	H	H
H	X	Z

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance

7

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Terminal Voltage with Respect to GND (V_{TERM})
74FCTA −0.5V to +7.0V

Temperature under Bias (T_{BIAS})
74FCTA −55°C to +125°C

Storage Temperature (T_{STG})
74FCTA −55°C to +125°C

DC Output Current (I_{OUT}) 120 mA

Note 1: Absolute maximum ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. National does not recommend operation of FACT FCT circuits outside databook specifications.

Recommended Operating Conditions

Supply Voltage (V_{CC})
74FCTA 4.75V to 5.25V

Input Voltage 0V to V_{CC}

Output Voltage 0V to V_{CC}

Operating Temperature (T_A)
74FCTA −0°C to +70°C

Junction Temperature (T_J)
PDIP 140°C

Note: All commercial packaging is not recommended for applications requiring greater than 2000 temperature cycles from −40°C to +125°C.

DC Characteristics for 'FCTA Family Devices

Typical values are at V_{CC} = 5.0V, 25°C ambient and maximum loading. For test conditons shown as Max, use the value specified for the appropriate device type: Com: V_{CC} = 5.0V ±5%, T_A = 0°C to +70°C; $V_{HC} = V_{CC} - 0.2V$.

Symbol	Parameter	74FCTA			Units	Conditions	
		Min	Typ	Max			
V_{IH}	Minimum High Level Input Voltage	2.0			V		
V_{IL}	Maximum Low Level Input Voltage			0.8	V		
I_{IH}	Input High Current			5.0 5.0	µA	V_{CC} = Max	$V_I = V_{CC}$ V_I = 2.7V (Note 2)
I_{IL}	Input Low Current			−5.0 −5.0	µA	V_{CC} = Max	V_I = 0.5V (Note 2) V_I = GND
I_{OZ}	Maximum TRI-STATE Current			2.5 2.5 −2.5 −2.5	µA	V_{CC} = Max	$V_O = V_{CC}$ V_O = 2.7V (Note 2) V_O = 0.5V (Note 2) V_O = GND
V_{IK}	Clamp Diode Voltage		−0.7	−1.2	V	V_{CC} = Min; I_N = −18 mA	
I_{OS}	Short Circuit Current	−60	−120		mA	V_{CC} = Max (Note 1); V_O = GND	
V_{OH}	Minimum High Level Output Voltage	2.8	3.0		V	V_{CC} = 3V; V_{IN} = 0.2V or V_{HC}; I_{OH} = −32 µA	
		V_{HC} 2.4	V_{CC} 4.3			V_{CC} = Min $V_{IN} = V_{IH}$ or V_{IL}	I_{OH} = −300 µA I_{OH} = −15 mA
V_{OL}	Maximum Low Level Output Voltage		GND	0.2	V	V_{CC} = 3V; V_{IN} = 0.2V or V_{HC}; I_{OL} = 300 µA	
			GND 0.3	0.2 0.55		V_{CC} = Min $V_{IN} = V_{IH}$ or V_{IL}	I_{OL} = 300 µA I_{OL} = 64 mA
I_{CC}	Maximum Quiescent Supply Current		1.0	40.0	µA	V_{CC} = Max $V_{IN} \geq V_{HC}$, $V_{IN} \leq$ 0.2V f_I = 0	
ΔI_{CC}	Quiescent Supply Current; TTL Inputs HIGH		0.5	2.0	mA	V_{CC} = Max V_{IN} = 3.4V (Note 3)	

DC Characteristics for 'FCTA Family Devices (Continued)

Typical values are at V_{CC} = 5.0V, 25°C ambient and maximum loading. For test conditons shown as Max, use the value specified for the appropriate device type: Com: V_{CC} = 5.0V ±5%, T_A = 0°C to +70°C; V_{HC} = V_{CC} − 0.2V.

Symbol	Parameter	74FCTA Min	74FCTA Typ	74FCTA Max	Units	Conditions	
I_{CCD}	Dynamic Power Supply Current (Note 4)		0.25	0.40	mA/MHz	V_{CC} = Max Outputs Open $\overline{OE}_1$ = $\overline{OE}_2$ = GND One Input Toggling 50% Duty Cycle	$V_{IN} \geq V_{HC}$ $V_{IN} \leq 0.2V$
I_C	Total Power Supply Current (Note 6)		1.5	4.5	mA	V_{CC} = Max Outputs Open $\overline{OE}_1$ = $\overline{OE}_2$ = GND	$V_{IN} \geq V_{HC}$ $V_{IN} \leq 0.2V$
			1.8	5.0		f_i = 10 MHz One Bit Toggling 50% Duty Cycle	V_{IN} = 3.4V V_{IN} = GND
			3.0	8.0		(Note 5) V_{CC} = Max Outputs Open $\overline{OE}_1$ = $\overline{OE}_2$ = GND	$V_{IN} \geq V_{HC}$ $V_{IN} \leq 0.2V$
			5.0	14.5		f_i = 2.5 MHz Eight Bits Toggling 50% Duty Cycle	V_{IN} = 3.4V V_{IN} = GND

Note 1: Maximum test duration not to exceed one second, not more than one output shorted at one time.

Note 2: This parameter guaranteed but not tested.

Note 3: Per TTL driven input (V_{IN} = 3.4V); all other inputs at V_{CC} or GND.

Note 4: This parameter is not directly testable, but is derived for use in Total Power Supply calculations.

Note 5: Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.

Note 6: $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$

$I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP}/2 + f_i N_i)$

I_{CC} = Quiescent Current

ΔI_{CC} = Power Supply Current for a TTL High Input (V_{IN} = 3.4V)

D_H = Duty Cycle for TTL Inputs High

N_T = Number of Inputs at D_H

I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)

f_{CP} = Clock Frequency for Register Devices (Zero for Non-Register Devices)

f_i = Input Frequency

N_i = Number of Inputs at f_i

All currents are in milliamps and all frequencies are in megahertz.

AC Electrical Characteristics: See Section 2 for Waveforms

Symbol	Parameter	74FCTA $T_A = +25°C$, $V_{CC} = 5.0V$	74FCTA $T_A, V_{CC} = Com$, $R_L = 500\Omega$, $C_L = 50\ pF$		Units	Fig. No.
		Typ	Min (Note 1)	Max		
t_{PLH} t_{PHL}	Propagation Delay D_n to O_n	3.1	1.5	4.8	ns	2-8
t_{PZH} t_{PZL}	Output Enable Time	3.8	1.5	6.2	ns	2-11
t_{PHZ} t_{PLZ}	Output Disable Time	3.3	1.5	5.6	ns	2-11

Note 1: Minimum limits are guaranteed but not tested on propagation delays.

Capacitance ($T_A = +25°C$, f = 1.0 MHz)

Symbol	Parameter (Note)	Typ	Max	Units	Conditions
C_{IN}	Input Capacitance	6	10	pF	$V_{IN} = 0V$
C_{OUT}	Output Capacitance	8	12	pF	$V_{OUT} = 0V$

Note: This parameter is measured at characterization but not tested.