



Integrated Device Technology, Inc.

**3.3V CMOS OCTAL
BUFFER/LINE DRIVER**

**PRELIMINARY
IDT54/74FCT3244/A**

T-52.07

FEATURES:

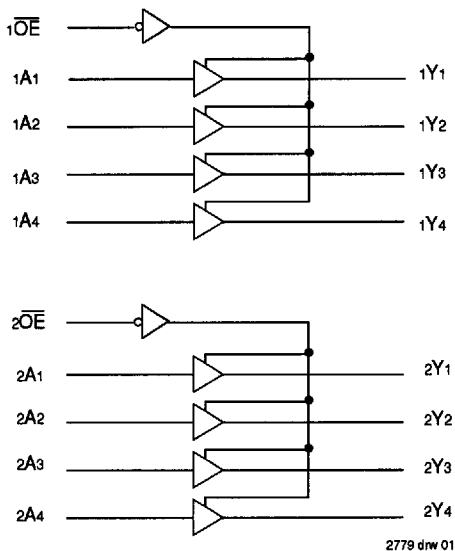
- 0.5 MICRON CEMOS™ Technology
- **Can serve as 5V to 3.3V translator**
- ESD > 2000V per MIL-STD-883, Method 3015; > 200V using machine model (C = 200pF, R = 0)
- 25 mil Center SSOP and Cerpack Packages
- Extended commercial range of -40°C to +85°C
- Vcc = 3.3V ±0.3V
- CMOS power levels (0.16mW typ. static)
- Rail-to-Rail output swing for increased noise margin
- Military product compliant to MIL-STD-883, Class B
- Inputs (except I/O) can be driven by 3.3V or 5V components

DESCRIPTION:

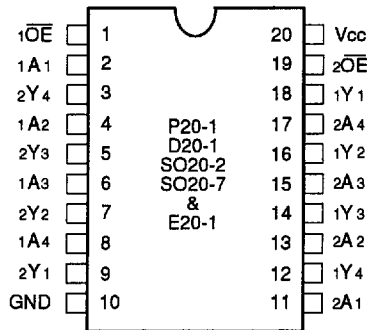
The IDT54/74FCT3244/A octal buffer/line drivers are built using advanced CEMOS, dual metal CMOS technology. These high-speed, low-power buffers are designed to be used as memory data and address drivers, clock drivers, and bus-oriented transmitter/receivers. The three-state controls are designed to operate these devices in a dual-nibble or single-byte mode. All inputs are designed with hysteresis for improved noise margin.

The data(xAx) and output enable (xOE) inputs of these buffers can be driven from either 3.3V or 5V devices. This feature enables the IDT54/74FCT3244/A buffers to be used as 5V to 3.3V unidirectional translators in a 5V/3.3V mixed supply system.

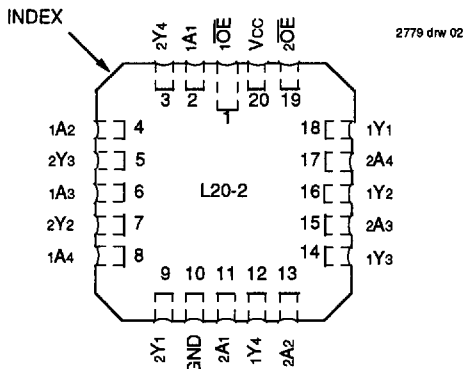
FUNCTIONAL BLOCK DIAGRAM



PIN CONFIGURATIONS



DIP/SSOP/SSOP/CERPACK TOP VIEW



LCC TOP VIEW

2779 drw 03

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MILITARY AND COMMERCIAL TEMPERATURE RANGES

MAY 1992

IDT54/74FCT3244/A

3.3V CMOS OCTAL BUFFER/LINE DRIVER

MILITARY AND COMMERCIAL TEMPERATURE RANGES

PIN DESCRIPTION

Pin Names	Description
xOE	3-State Output Enable Inputs (Active LOW)
xAx	Data Inputs
xYx	3-State Outputs

2779 tbl 01

FUNCTION TABLE⁽¹⁾

Inputs		Outputs
xOE	xAx	xYx
L	L	L
L	H	H
H	X	Z

2779 tbl 02

NOTE:

- H = HIGH Voltage Level
- X = Don't Care
- L = LOW Voltage Level
- Z = High Impedance

ABSOLUTE MAXIMUM RATINGS⁽¹⁾

Symbol	Rating	Commercial	Military	Unit
VTERM ⁽²⁾	Terminal Voltage with Respect to GND	-0.5 to +4.6	-0.5 to +4.6	V
VTERM ⁽³⁾	Terminal Voltage with Respect to GND	-0.5 to +7.0	-0.5 to +7.0	V
VTERM ⁽⁴⁾	Terminal Voltage with Respect to GND	-0.5 to Vcc + 0.5	-0.5 to Vcc + 0.5	V
TA	Operating Temperature	-40 to +85	-55 to +125	°C
TBIAS	Temperature Under Bias	-55 to +125	-65 to +135	°C
TSTG	Storage Temperature	-55 to +125	-65 to +150	°C
PT	Power Dissipation	1.0	1.0	W
IOUT	DC Output Current	-60 to +60	-60 to +60	mA

2779 lmk 03

NOTES:

- Stresses greater than those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
- Vcc terminals.
- Input terminals.
- Output and I/O terminals.

CAPACITANCE (TA = +25°C, f = 1.0MHz)

Symbol	Parameter ⁽¹⁾	Conditions	Typ.	Max.	Unit
CIN	Input Capacitance	VIN = 0V	4.5	6.0	pF
COU	Output Capacitance	VOUT = 0V	5.5	8.0	pF

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NOTE:

- This parameter is measured at characterization but not tested.

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IDT8474FCT3244/A
3.3V CMOS OCTAL BUFFER/LINE DRIVER

MILITARY AND COMMERCIAL TEMPERATURE RANGES

DC ELECTRICAL CHARACTERISTICS OVER OPERATING RANGE

Following Conditions Apply Unless Otherwise Specified:

Commercial: $T_A = -40^\circ\text{C}$ to $+85^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 0.3\text{V}$; Military: $T_A = -55^\circ\text{C}$ to $+125^\circ\text{C}$, $V_{CC} = 3.3\text{V} \pm 0.3\text{V}$

Symbol	Parameter	Test Conditions ⁽¹⁾		Min.	Typ. ⁽²⁾	Max.	Unit
V _{IH}	Input HIGH Level (Input pins)	Guaranteed Logic HIGH Level		2.0	—	5.5	V
	Input HIGH Level (I/O pins)			2.0	—	V _{CC} +0.5	
V _{IL}	Input LOW Level (Input and I/O pins)	Guaranteed Logic LOW Level		-0.5	—	0.8	V
I _{IH}	Input HIGH Current (Input pins)	V _{CC} = Max.	V _I = 5.5V	—	—	±5	µA
	Input HIGH Current (I/O pins)		V _I = V _{CC}	—	—	±15	
I _{IL}	Input LOW Current (Input pins)		V _I = GND	—	—	±5	
	Input LOW Current (I/O pins)		V _I = GND	—	—	±15	
I _{OZH}	High Impedance Output Current (3-State Output pins)	V _{CC} = Max.	V _O = V _{CC}	—	—	±10	µA
I _{OZL}			V _O = GND	—	—	±10	
V _{IK}	Clamp Diode Voltage	V _{CC} = Min., I _{IN} = -18mA		—	-0.7	-1.2	V
I _{ODH}	Output HIGH Current	V _{CC} = 3.3V, V _{IN} = V _{IH} or V _{IL} , V _O = 1.5V ⁽³⁾		-36	-60	-110	mA
I _{ODL}	Output LOW Current	V _{CC} = 3.3V, V _{IN} = V _{IH} or V _{IL} , V _O = 1.5V ⁽³⁾		50	90	200	mA
V _{OH}	Output HIGH Voltage	V _{CC} = Min. V _{IN} = V _{IH} or V _{IL}	I _{OH} = -0.1mA	V _{CC} -0.2	—	—	V
			I _{OH} = -6mA MIL.	2.4 ⁽⁵⁾	3.0	—	
			I _{OH} = -8mA COM'L.	—	—	—	
V _{OL}	Output LOW Voltage	V _{CC} = Min. V _{IN} = V _{IH} or V _{IL}	I _{OL} = 0.1mA	—	—	0.2	V
			I _{OL} = 16mA	—	0.2	0.4	
			I _{OL} = 24mA	—	0.3	0.5	
I _{OS}	Short Circuit Current ⁽⁴⁾	V _{CC} = Max., V _O = GND ⁽³⁾		-60	-135	-240	mA
V _H	Input Hysteresis	—		—	150	—	mV
I _{CC1} I _{CC2} I _{CC3}	Quiescent Power Supply Current	V _{CC} = Max., V _{IN} = GND or V _{CC}		—	0.05	1.5	mA

2779 Ink 05

NOTES:

- For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at V_{CC} = 3.3V, +25°C ambient.
- Not more than one output should be tested at one time. Duration of the test should not exceed one second.
- This parameter is guaranteed but not tested.
- V_{OH} = V_{CC}-0.6V at rated current.

IDT5474FCT3244A

3.3V CMOS OCTAL BUFFER/LINE DRIVER

MILITARY AND COMMERCIAL TEMPERATURE RANGES

POWER SUPPLY CHARACTERISTICS

Symbol	Parameter	Test Conditions ⁽¹⁾		Min.	Typ. ⁽²⁾	Max.	Unit
ΔI_{CC}	Quiescent Power Supply Current TTL Inputs HIGH	Vcc = Max.	VIN = Vcc - 0.6V ⁽³⁾	—	2.0	30	μA
			VIN = 2.4V ⁽³⁾	—	70	500	
I _{CCD}	Dynamic Power Supply Current ⁽⁴⁾	Vcc = Max. Outputs Open 50% Duty Cycle xOE = GND One Input Toggling	VIN = Vcc VIN = GND	—	60	85	μA / MHz
I _C	Total Power Supply Current ⁽⁶⁾	Vcc = Max. Outputs Open fi = 10MHz 50% Duty Cycle xOE = GND One Bit Toggling	VIN = Vcc - 0.6V VIN = GND	—	0.7	2.4	mA
			VIN = 2.4V VIN = GND	—	0.7	2.6	
		Vcc = Max. Outputs Open fi = 2.5MHz 50% Duty Cycle xOE = GND Eight Bits Toggling	VIN = Vcc - 0.6V VIN = GND	—	1.3	3.3 ⁽⁵⁾	
			VIN = 2.4V VIN = GND	—	1.5	5.2 ⁽⁵⁾	

NOTES: 2779 tbl 08

- For conditions shown as Max. or Min., use appropriate value specified under Electrical Characteristics for the applicable device type.
- Typical values are at Vcc = 3.3V, +25°C ambient.
- Per TTL driven input; all other inputs at Vcc or GND.
- This parameter is not directly testable, but is derived for use in Total Power Supply Calculations.
- Values for these conditions are examples of the Icc formula. These limits are guaranteed but not tested.
- $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
 $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD} (f_{CP} N_{CP} / 2 + f_i N_i)$
 $I_{CC} =$ Quiescent Current (I_{CC1}, I_{CC2} and I_{CC3})
 $\Delta I_{CC} =$ Power Supply Current for a TTL High Input
 $D_H =$ Duty Cycle for TTL Inputs High
 $N_T =$ Number of TTL 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)
 $N_{CP} =$ Number of Clock Inputs at f_{CP}
 $f_i =$ Input Frequency
 $N_i =$ Number of Inputs at f_i

SWITCHING CHARACTERISTICS OVER OPERATING RANGE

Symbol	Parameter	Condition ⁽¹⁾	FCT3244				FCT3244A				Unit
			Com'L		Mil.		Com'l.		Mil.		
			Min. ⁽²⁾	Max.	Min. ⁽²⁾	Max.	Min. ⁽²⁾	Max.	Min. ⁽²⁾	Max.	
t _{PLH}	Propagation Delay	CL = 50pF RL = 500Ω	1.5	6.5	1.5	7.0	1.5	4.8	1.5	5.1	ns
t _{PHL}	xAx to xYx		1.5	8.0	1.5	8.5	1.5	6.2	1.5	6.5	
t _{PZH}	Output Enable Time		1.5	7.0	1.5	7.5	1.5	5.6	1.5	5.9	
t _{PZL}	Output Disable Time		1.5	7.0	1.5	7.5	1.5	5.6	1.5	5.9	

NOTES: 2779 tbl 07

- See test circuit and waveforms.
- Minimum limits are guaranteed but not tested on Propagation Delays.

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