CY54/74FCT240T
CY54/74FCT244T
8-BIT BUFFERS/LINE DRIVERS

FEATURES

- **Function, pinout and drive compatible with the FCT and F logic**
- **FCT-C speed at 4.1ns max. (Com'l) 'FCT244T FCT-A speed at 4.8ns max. (Com'l)**
- **Reduced V_{OH} (typically = 3.3V) versions of equivalent FCT functions**
- **Edge-rate control circuitry for significantly improved noise characteristics**
- **Power-off disable feature**
- **Matched rise and fall times**
- **Fully compatible with TTL input and output logic levels**
- **64mA Sink Current (Com'l), 48mA (Mil) 15mA Source Current (Com'l), 12mA (Mil)**

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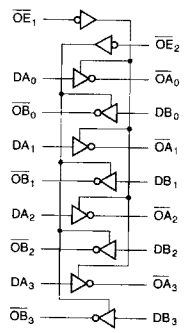
DESCRIPTION

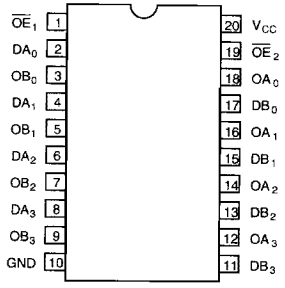
The 'FCT240T and 'FCT244T are octal buffers and line drivers designed to be employed as memory address drivers, clock drivers and bus-oriented transmitters/receivers. The devices provide speed and drive capabilities equivalent to their fastest bipolar logic counterparts while reducing power dissipation. The input and output voltage levels allow direct interface with TTL, NMOS and CMOS devices without external components.

FUNCTIONAL BLOCK DIAGRAM and PIN CONFIGURATIONS

'FCT240T

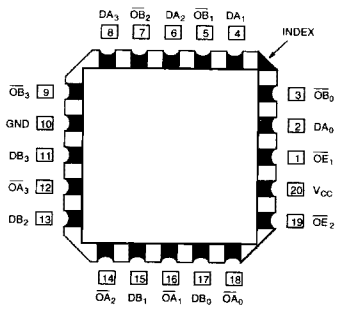


Top View



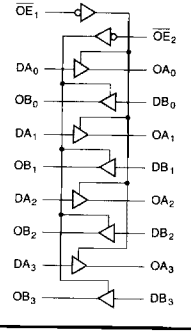
DIP (P5, D6), SOIC (S5), QSOP (Q5)

Top View

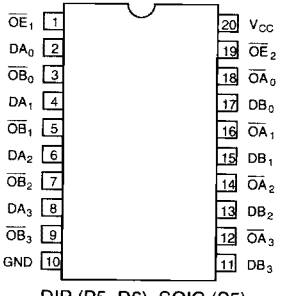


LCC (L61)

'FCT244T

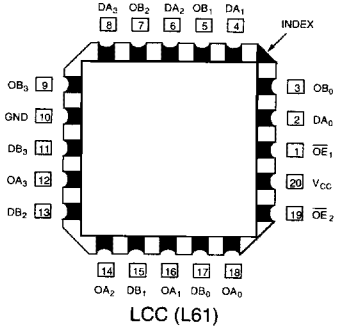


Top View



DIP (P5, D6), SOIC (S5), QSOP (Q5)

Top View



LCC (L61)

ABSOLUTE MAXIMUM RATINGS[1,2]

Symbol	Parameter	Value	Unit
T_{STG}	Storage Temperature	–65 to +150	°C
T_A	Ambient Temperature Under Bias	–65 to +135	°C
V_{CC}	V_{CC} Potential to Ground	–0.5 to +7.0	V
P_T	Power Dissipation	0.5	W
I_{OUTPUT}	Current Applied to Output	120	mA
V_{IN}	Input Voltage	–0.5 to +7.0	V
V_{OUT}	Voltage Applied to Output	–0.5 to +7.0	V

RECOMMENDED OPERATING CONDITIONS

Free Air Ambient Temperature	Min	Max
Military	–55°C	+125°C
Commercial	0°C	+70°C

Supply Voltage (V_{CC})	Min	Max
Military	+4.5V	+5.5V
Commercial	+4.75V	+5.25V

DC ELECTRICAL CHARACTERISTICS (Over recommended operating conditions)

Symbol	Parameter		Min	Typ[3]	Max	Units	V_{CC}	Conditions
V_{IH}	Input HIGH Voltage		2.0			V		
V_{IL}	Input LOW Voltage				0.8	V		
V_H	Hysteresis			0.2		V		All inputs
V_{IK}	Input Clamp Diode Voltage			-0.7	–1.2	V	MIN	I_{IN} = –18mA
V_{OH}	Output HIGH Voltage	Military	2.4	3.3		V	MIN	I_{OH} = –12mA
		Commercial	2.4	3.3		V	MIN	I_{OH} = –15mA
V_{OL}	Output LOW Voltage	Military		0.3	0.55	V	MIN	I_{OL} = 48mA
		Commercial		0.3	0.55	V	MIN	I_{OL} = 64mA
I_I	Input HIGH Current				20	µA	MAX	$V_{IN} = V_{CC}$
I_{IH}	Input HIGH Current				5	µA	MAX	V_{IN} = 2.7V
I_{IL}	Input LOW Current				–5	µA	MAX	V_{IN} = 0.5V
I_{OZH}	Off State I_{OUT} HIGH-Level Output Current				10	µA	MAX	V_{OUT} = 2.7V
I_{OZL}	Off State I_{OUT} LOW-Level Output Current				–10	µA	MAX	V_{OUT} = 0.5V
I_{OS}	Output Short Circuit Current[4]		–60	–120	–225	mA	MAX	V_{OUT} = 0.0V
I_{OFF}	Power-off Disable				100	µA	0V	V_{OUT} = 4.5V
C_{IN}	Input Capacitance[5]			5	10	pF	MAX	All inputs
C_{OUT}	Output Capacitance[5]			9	12	pF	MAX	All outputs
I_{CC}	Quiescent Power Supply Current			0.2	1.5	mA	MAX	$V_{IN} \leq 0.2V$, $V_{IN} \geq V_{CC}-0.2V$

Notes:

1. Operation beyond the limits set forth in the above table may impair the useful life of the device. Unless otherwise noted, these limits are over the operating free-air temperature range.
2. Unused inputs must always be connected to an appropriate logic voltage level, preferably either V_{CC} or ground.
3. Typical values are at V_{CC} = 5.0V, T_A = +25°C ambient.
4. Not more than one output should be shorted at a time. Duration of short should not exceed one second. The use of high speed test apparatus and/or sample and hold techniques are preferable in order to minimize internal chip 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.
5. This parameter is guaranteed but not tested.

DC CHARACTERISTICS (Over recommended operating conditions unless otherwise specified.)

Symbol	Parameter	Typ[3]	Max	Units	Conditions
ΔI_{CC}	Quiescent Power Supply Current (TTL inputs)	0.5	2.0	mA	V_{CC} = MAX, V_{IN} = 3.4V[6], f_1 = 0, Outputs Open
I_{CCD}	Dynamic Power Supply Current[7]	0.15	0.25	mA/ MHz	V_{CC} = MAX, One Input Toggling, 50% Duty Cycle, Outputs Open, $\overline{OE}_1 = \overline{OE}_2$ = GND, $OE_2 = V_{CC}$, $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V$
I_C	Total Power Supply Current[9]	1.7	4.0	mA	V_{CC} = MAX, 50% Duty Cycle, Outputs Open, One Bit Toggling at f_1 = 10MHz, $\overline{OE}_1 = \overline{OE}_2$ = GND, $OE_2 = V_{CC}$, $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V$
		2.0	5.0	mA	V_{CC} = MAX, 50% Duty Cycle, Outputs Open, One Bit Toggling at f_1 = 10MHz, $\overline{OE}_1 = \overline{OE}_2$ = GND, $OE_2 = V_{CC}$, V_{IN} = 3.4V or V_{IN} = GND
		3.2	6.5[8]	mA	V_{CC} = MAX, 50% Duty Cycle, Outputs Open, Eight Bits Toggling at f_1 = 2.5MHz, $\overline{OE}_1 = \overline{OE}_2$ = GND, $OE_2 = V_{CC}$, $V_{IN} \leq 0.2V$ or $V_{IN} \geq V_{CC} - 0.2V$
		5.2	14.5[8]	mA	V_{CC} = MAX, 50% Duty Cycle, Outputs Open, Eight Bits Toggling at f_1 = 2.5MHz, $\overline{OE}_1 = \overline{OE}_2$ = GND, $OE_2 = V_{CC}$, V_{IN} = 3.4V or V_{IN} = GND

Notes:

6. Per TTL driven input (V_{IN} = 3.4V); all other inputs at V_{CC} or GND.
7. This parameter is not directly testable, but is derived for use in Total Power Supply calculations.
8. Values for these conditions are examples of the I_{CC} formula. These limits are guaranteed but not tested.
9. $I_C = I_{QUIESCENT} + I_{INPUTS} + I_{DYNAMIC}$
   $I_C = I_{CC} + \Delta I_{CC} D_H N_T + I_{CCD}(f_0/2 + f_1 N_1)$
   I_{CC} = Quiescent Current with CMOS input levels
   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 TTL Inputs at D_H
   I_{CCD} = Dynamic Current Caused by an Input Transition Pair (HLH or LHL)
   f_0 = Clock Frequency for Register Devices (Zero for Non-Register Devices)
   f_1 = Input Frequency
   N_1 = Number of Inputs at f_1
   All currents are in milliamps and all frequencies are in megahertz.

TRUTH TABLES

'FCT240T			
Inputs			Output
$\overline{OE}_1$	$\overline{OE}_2$	D	
L	L	L	H
L	L	H	L
H	H	X	Z

'FCT244T			
Inputs			Output
$\overline{OE}_1$	$\overline{OE}_2$	D	
L	L	L	L
L	L	H	H
H	H	X	Z

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

AC CHARACTERISTICS

Symbol	Parameter	'FCT240T				'FCT240AT				'FCT240CT				Units	Fig. No.*
		MIL		COM'L		MIL		COM'L		MIL		COM'L			
		Min.[10]	Max.	Min.[10]	Max.	Min.[10]	Max.	Min.[10]	Max.	Min.[10]	Max.	Min.[10]	Max.		
t_{PLH} t_{PHL}	Propagation Delay Data to Output	1.5	9.0	1.5	8.0	1.5	5.1	1.5	4.8	1.5	4.7	1.5	4.3	ns	1, 2
t_{PZH} t_{PZL}	Output Enable Time	1.5	10.5	1.5	10.0	1.5	6.5	1.5	6.2	1.5	5.7	1.5	5.0	ns	1 7 8
t_{PHZ} t_{PLZ}	Output Disable Time	1.5	10.0	1.5	9.5	1.5	5.9	1.5	5.6	1.5	4.6	1.5	4.5	ns	

Notes:
* See "Parameter Measurement Information" in the General Information Section.

AC CHARACTERISTICS

Symbol	Parameter	'FCT244T				'FCT244AT				'FCT244CT				Units	Fig. No.*
		MIL		COM'L		MIL		COM'L		MIL		COM'L			
		Min.[10]	Max.	Min.[10]	Max.	Min.[10]	Max.	Min.[10]	Max.	Min.[10]	Max.	Min.[10]	Max.		
t_{PLH} t_{PHL}	Propagation Delay Data to Output	1.5	7.0	1.5	6.5	1.5	5.1	1.5	4.8	1.5	4.6	1.5	4.1	ns	1, 3
t_{PZH} t_{PZL}	Output Enable Time	1.5	8.5	1.5	8.0	1.5	6.5	1.5	6.2	1.5	6.5	1.5	5.8	ns	1 7 8
t_{PHZ} t_{PLZ}	Output Disable Time	1.5	7.5	1.5	7.0	1.5	5.9	1.5	5.6	1.5	5.7	1.5	5.2	ns	

Notes:
10. Minimum limits are not guaranteed but are tested on propagation delays.
* See "Parameter Measurement Information" in the General Information Section.

ORDERING INFORMATION