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# CD54/74FCT240, CD54/74FCT240AT, CD54/74FCT241, CD54/74FCT244, CD54/74FCT244AT

## FCT Interface Logic Octal Buffers/Line Drivers, Three-State

### Features

- **CD54/74FCT240, CD54/74FCT240AT - Inverting**
- **CD54/74FCT241, CD54/74FCT244, CD54/74FCT244AT - Non-Inverting**
- **Buffered Inputs**
- **Typical Propagation Delay:  
4.1ns at VCC = 5V, TA = 25°C (FCT240AT, FCT244AT)**
- **SCR-Latchup-Resistant BiCMOS Process and Circuit Design**
- **FCTXXX Types - Speed of Bipolar FAST®/AS/S;  
FCTXXXAT Types - 30% Faster Than FAST/AS/S with  
Significantly Reduced Power Consumption**
- **48mA to 64mA Output Sink Current (Commercial/Extended Industrial)**
- **Output Voltage Swing Limited to 3.7V at VCC = 5V**
- **Controlled Output-Edge Rates**
- **Input/Output Isolation to VCC**
- **BiCMOS Technology with Low Quiescent Power**

### Ordering Information

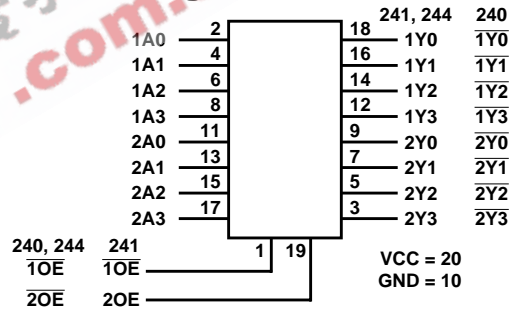
PART NUMBER	TEMP. RANGE (°C)	PACKAGE
CD54/74FCT240E	-55 to 125, 0 to 70	20 Ld PDIP
CD54/74FCT240ATE	-55 to 125, 0 to 70	20 Ld PDIP
CD54/74FCT241E	-55 to 125, 0 to 70	20 Ld PDIP
CD54/74FCT244E	-55 to 125, 0 to 70	20 Ld PDIP
CD54/74FCT244ATE	-55 to 125, 0 to 70	20 Ld PDIP
CD54/74FCT240M	-55 to 125, 0 to 70	20 Ld SOIC
CD54/74FCT240ATM	-55 to 125, 0 to 70	20 Ld SOIC
CD54/74FCT241M	-55 to 125, 0 to 70	20 Ld SOIC
CD54/74FCT244M	-55 to 125, 0 to 70	20 Ld SOIC
CD54/74FCT244ATM	-55 to 125, 0 to 70	20 Ld SOIC
CD54/74FCT240SM	-55 to 125, 0 to 70	20 Ld SSOP
CD54/74FCT241SM	-55 to 125, 0 to 70	20 Ld SSOP
CD54/74FCT244SM	-55 to 125, 0 to 70	20 Ld SSOP
CD54FCT240H	-55 to 125	
CD54FCT241H	-55 to 125	
CD54FCT244H	-55 to 125	

### Description

The CD54/74FCT240, 240AT, 241, 244 and 244AT three-state octal buffers/line drivers use a small-geometry BiCMOS technology. The output stage is a combination of bipolar and CMOS transistors that limits the output-HIGH level to two diode drops below VCC. This resultant lowering of output swing (0V to 3.7V) reduces power bus ringing (a source of EMI) and minimizes VCC bounce and ground bounce and their effects during simultaneous output switching. The output configuration also enhances switching speed and is capable of sinking 48mA to 64mA.

The CD54/74FCT240, 240AT, 244 and 244AT have active-LOW output enables ( $\overline{1OE}$ ,  $\overline{2OE}$ ). The CD54/74FCT241 and CD54/74FCT241AT have one active-LOW ( $\overline{1OE}$ ) and one active-HIGH ( $2OE$ ) output enable.

### Functional Diagram



CD54/74FCT240, CD54/74FCT240AT TRUTH TABLE

INPUT	INPUT	OUTPUT
$\overline{1OE}, \overline{2OE}$	A	$\overline{Y}$
L	L	H
L	H	L
H	X	Z

CD54/74FCT244, CD54/74FCT244AT TRUTH TABLE

INPUT	INPUT	OUTPUT
$\overline{1OE}, \overline{2OE}$	A	Y
L	L	H
L	H	L
H	X	Z

CD54/74FCT241 TRUTH TABLE

INPUT		OUTPUT	INPUT		OUTPUT
$\overline{1OE}$	1A	1Y	2OE	2A	2Y
L	L	L	L	X	Z
L	H	H	H	L	L
H	X	Z	H	H	H

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

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**CD54/74FCT540, CD54/74FCT540AT, CD54/74FCT241, CD54/74FCT244, CD54/74FCT244AT**

**Switching Specifications** FCT Series  $t_r, t_f = 2.5\text{ns}$ ,  $C_L = 50\text{pF}$ ,  $R_L$  - See Figure 2

PARAMETER	SYMBOL	$V_{CC}$ (V)	+25°C		0°C to +70°C		-55°C to +125°C		+25°C		0°C to +70°C		-55°C to +125°C		UNITS
			TYP	MIN	MAX	MIN	MAX	TYP	MIN	MAX	MIN	MAX			
Propagation Delays															
Data to Outputs	FCT240/AT	$t_{PLH}, t_{PHL}$	5†	5	1.5	8	1.5	9	4.4	1.5	5.6	1.5	6.7	ns	
	FCT241	$t_{PLH}, t_{PHL}$	5	4	1.5	6.5	1.5	7	-	-	-	-	-	ns	
	FCT244/AT	$t_{PLH}, t_{PHL}$	5	4.5	1.5	6.5	1.5	7	3.8	1.5	5.3	1.5	6.2	µs	
Output Enable Times	FCT240/AT	$t_{PZL}, t_{PZH}$	5	7	1.5	10	1.5	10.5	4.7	1.5	6.2	1.5	7.7	µs	
	FCT241	$t_{PZL}, t_{PZH}$	5	5.5	1.5	8	1.5	8.5	-	-	-	-	-	ns	
	FCT244/AT	$t_{PZL}, t_{PZH}$	5	6	1.5	8	1.5	8.5	4.8	1.5	6.5	1.5	7.8	ns	
Output Disable Times	FCT240/AT	$t_{PLZ}, t_{PHZ}$	5	6	1.5	9.5	1.5	10	4	1.5	5.6	1.5	6.5	µs	
	FCT241	$t_{PLZ}, t_{PHZ}$	5	4.5	1.5	7	1.5	7.5	-	-	-	-	-	ns	
	FCT244/AT	$t_{PLZ}, t_{PHZ}$	5	5	1.5	7	1.5	7.5	4.5	1.5	5.8	1.5	6.8	µs	
Power Dissipation Capacitance	FCT240/AT	$C_{PD}§$	-	38 Typical					38 Typical					pF	
	FCT241	$C_{PD}§$	-	33 Typical					-					pF	
	FCT244/AT	$C_{PD}§$	-	35 Typical					35 Typical					pF	
Min. (Valley) $V_{OHV}$ During Switching of Other Outputs (Output Under Test Not Switching)	$V_{OHV}$ See Figure 1	5	0.5 Typical at +25°C										V		
Max. (Peak) $V_{OLP}$ During Switching of Other Outputs (Output Under Test Not Switching)	$V_{OLP}$ See Figure 1	5	1 Typical at +25°C										V		
Input Capacitance	$C_I$	-	-	-	10	-	10	-	-	10	-	10	-	10	pF
3-State Output Capacitance	$C_O$	-	-	-	15	-	15	-	-	15	-	15	-	15	pF

† 5V: min. is at 5.5V, max. is at 4.5V.

5V: min. is at 5.25V for 0°C to +70°C, max. is at 4.75V for 0°C to +70°C, typ. is at 5V

§  $C_{PD}$ , measured per function, is used to determine the dynamic power consumption.  $P_D$  (per package) =  $V_{CC} I_{CC} + \sum (V_{CC}^2 f_i C_{PD} + V_O^2 f_o C_L + V_{CC} \Delta I_{CC} D)$  where:

$V_{CC}$  = supply voltage

$\Delta I_{CC}$  = flow through current x unit load

$C_L$  = output load capacitance

D = duty cycle of input high

$f_o$  = output frequency

$f_i$  = input frequency

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