



MC54F374 MC74F374

Advance Information

OCTAL D-TYPE FLIP-FLOP (With 3-State Outputs)

DESCRIPTION — The MC54F/74F374 is a high-speed, low-power octal D-type flip-flop featuring separate D-type inputs for each flip-flop and 3-state outputs for bus oriented applications. A buffered Clock (CP) and Output Enable (\overline{OE}) are common to all flip-flops.

- Edge-triggered D-Type Inputs
- Buffered Positive Edge-triggered Clock
- 3-State Outputs for Bus Oriented Applications

FUNCTIONAL DESCRIPTION — the 'F374 consists of eight edge-triggered flip-flops with individual D-type inputs and 3-state true outputs. The buffered clock and buffered Output Enable are common to all flip-flops. The eight flip-flops will store the state of their individual D inputs that meet the setup and hold times requirements on the LOW-to-HIGH Clock (CP) transition. With the Output Enable (\overline{OE}) LOW, the contents of the eight flip-flops are available at the outputs. When the \overline{OE} is HIGH, the outputs go to the high impedance state. Operation of the \overline{OE} input does not affect the state of the flip-flops.

TRUTH TABLE

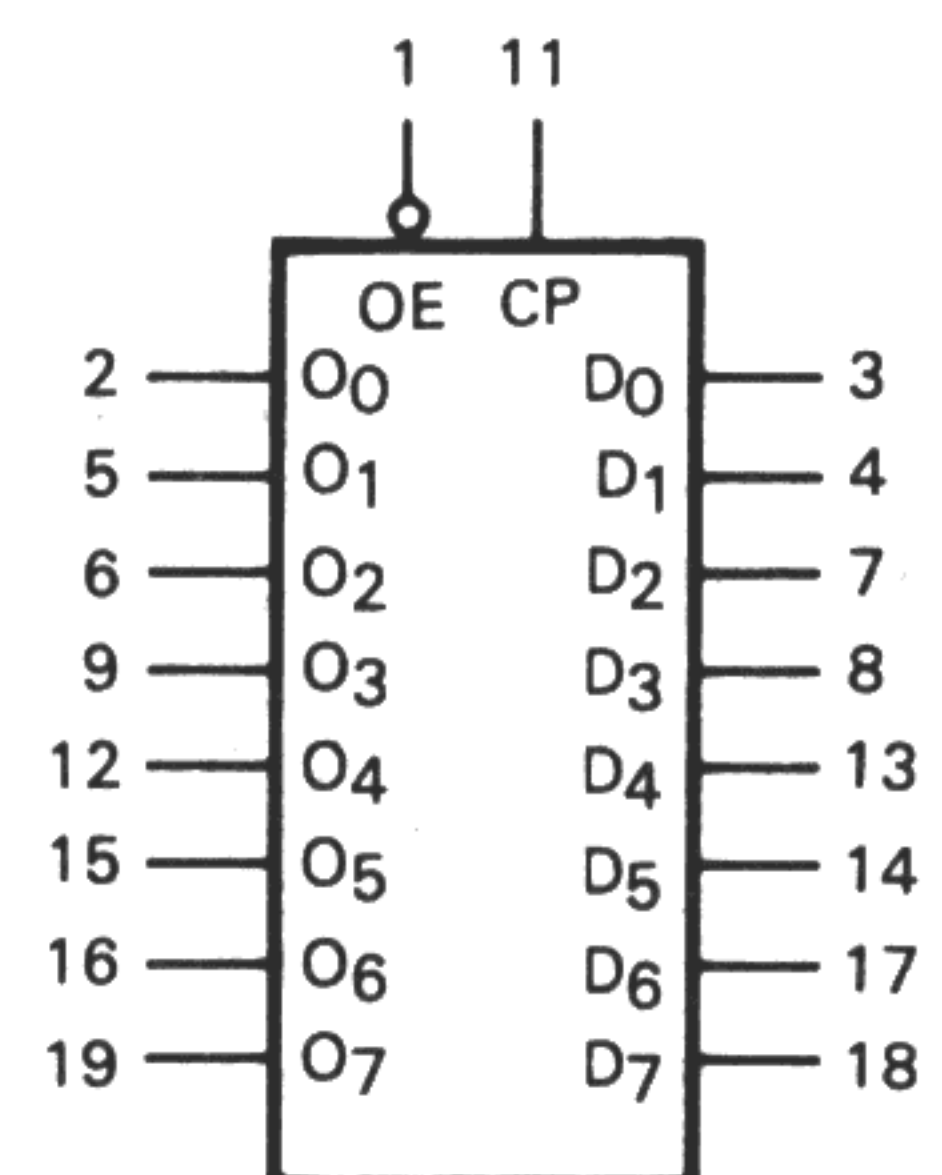
INPUTS		OUTPUTS	
D _n	CP	\overline{OE}	O _n
H	↗	L	H
L	↗	L	L
X	X	H	Z

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

OCTAL D-TYPE FLIP-FLOP (With 3-State Outputs)

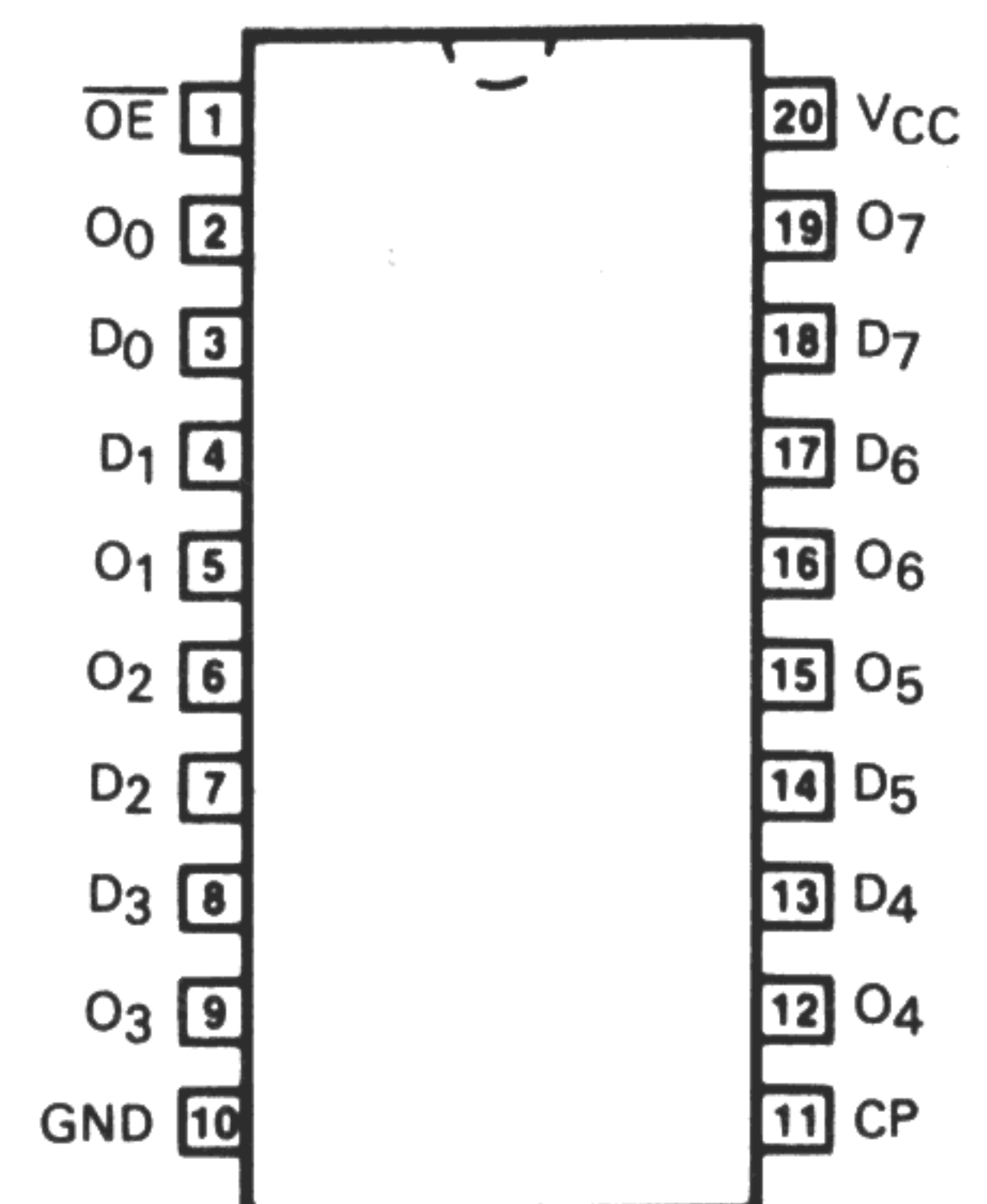
FAST™ SCHOTTKY TTL

LOGIC SYMBOL



VCC = Pin 20
GND = Pin 10

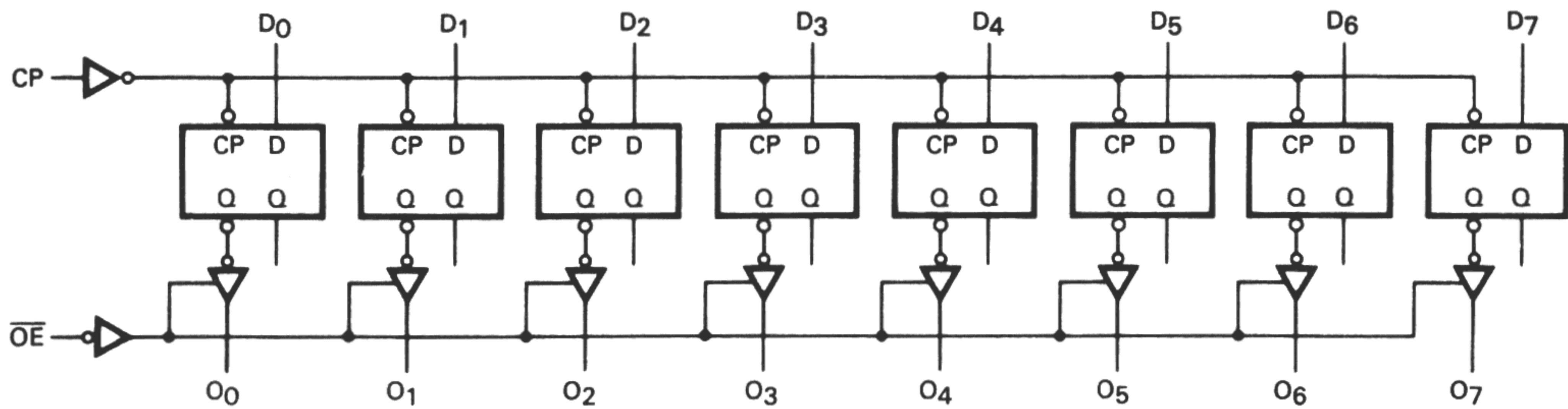
CONNECTION DIAGRAM



J Suffix — Case 732-03 (Ceramic)
N Suffix — Case 738-01 (Plastic)

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LOGIC DIAGRAM



GUARANTEED OPERATING RANGES

SYMBOL	PARAMETER		MIN	TYP	MAX	UNIT
V _{CC}	Supply Voltage*	54	4.50	5.0	5.50	V
		74	4.75	5.0	5.25	
T _A	Operating Ambient Temperature Range	54	-55	25	125	°C
		74	0	25	70	
I _{OH}	Output Current — High	54, 74			-3.0	mA
I _{OL}	Output Current — Low	54, 74			20	mA

* 74F devices may be operated over the 4.5 to 5.5 V supply range where they will meet the specifications of 54F devices over the 0° to 70°C temperature range.

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER	LIMITS			UNITS	TEST CONDITIONS	
		MIN	TYP	MAX			
V _{IH}	Input HIGH Voltage	2.0			V	Guaranteed Input HIGH Voltage	
V _{IL}	Input LOW Voltage			0.8	V	Guaranteed Input LOW Voltage	
V _{IK}	Input Clamp Diode Voltage			-1.2	V	I _{IN} = -18 mA	V _{CC} = MIN
V _{OH}	Output HIGH Voltage	54	2.5	3.4		I _{OH} = -1.0 mA	V _{CC} = MIN
		54	2.4	3.3		I _{OH} = -3.0 mA	
		74	2.7	3.3		I _{OH} = -3.0 mA	
V _{OL}	Output LOW Voltage		0.35	0.5	V	I _{OL} = 20 mA	V _{CC} = MIN
I _{OZH}	Output OFF Current — HIGH			50	μA	V _{OUT} = 2.4 V	V _{CC} = MAX
I _{OZL}	Output OFF Current — LOW			-50	μA	V _{OUT} = 0.5 V	V _{CC} = MAX
I _{IH}	Input HIGH Current			20	μA	V _{IN} = 2.7 V	V _{CC} = MAX
				100		V _{IN} = 7.0 V	
I _{IL}	Input LOW Current			-0.6	mA	V _{IN} = 0.5 V	V _{CC} = MAX
I _{OS}	Output Short Circuit Current (Note 2)	-60		-150	mA	V _{OUT} = 0 V	V _{CC} = MAX
I _{CCL}	Power Supply Current (All Outputs OFF)		55	86	mA	D _n = Gnd OE = 4.5V	V _{CC} = MAX

NOTES:

1. For conditions such as MIN or MAX, use the appropriate value specified under guaranteed operating ranges.
2. Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS

SYMBOL	PARAMETER	54/74F			54F		74F		UNITS
		T _A = +25°C V _{CC} = +5.0 V C _L = 50 pF			T _A = -55 to +125°C V _{CC} = 5.0 V ±10% C _L = 50 pF		T _A = 0 to +70°C V _{CC} = 5.0 V ±5% C _L = 50 pF		
		MIN	TYP	MAX	MIN	MAX	MIN	MAX	
f _{max}	Maximum Clock Frequency	100			60		70		MHz
t _{PLH} t _{PHL}	Propagation Delay CP to O _n	4.0 4.0	6.5 6.5	8.5 8.5	4.0 4.0	10.5 11	4.0 4.0	10 10	ns
t _{PZH} t _{PZL}	Output Enable Time	2.0 2.0	9.0 5.8	11.5 7.5	2.0 2.0	14 10	2.0 2.0	12.5 8.5	ns
t _{PHZ} t _{PLZ}	Output Disable Time	2.0 2.0	5.3 4.3	7.0 5.5	2.0 2.0	8.0 7.5	2.0 2.0	8.0 6.5	

AC OPERATING REQUIREMENTS:

SYMBOL	PARAMETER	54/74F			54F		74F		UNITS
		T _A = +25°C V _{CC} = +5.0 V			T _A = -55 to +125°C V _{CC} = 5.0 V ±10%		T _A = 0 to +70°C V _{CC} = 5.0 V ±5%		
		MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _s (H) t _s (L)	Setup Time, HIGH or LOW D _n to CP	2.0 2.0			2.5 2.0		2.0 2.0		ns
t _h (H) t _h (L)	Hold Time, HIGH or LOW D _n to CP	2.0 2.0			2.0 2.5		2.0 2.0		
t _w (H) t _w (L)	CP Pulse Width, HIGH or LOW	7.0 6.0			7.0 6.0		7.0 6.0		ns

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