MOTOROLA

MC54F/74F398

QUAD 2-PORT REGISTER

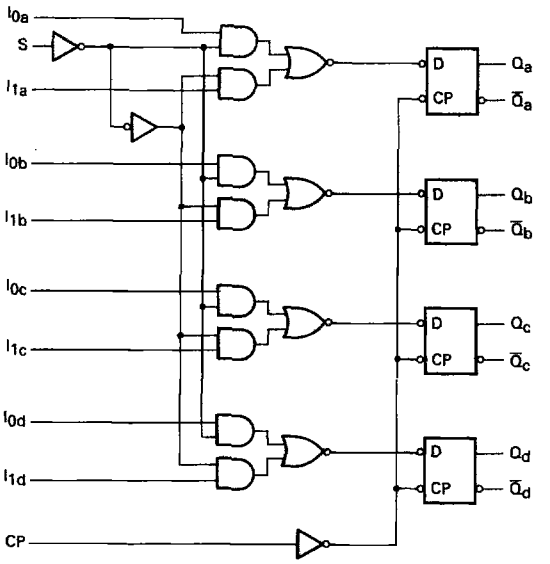
FAST™ SCHOTTKY TTL

QUAD 2-PORT REGISTER

DESCRIPTION — The MC54F/74F398 is the logical equivalent of a quad 2-input multiplexer feeding into four edge-triggered flip-flops. A common Select input determines which of the two 4-bit words is accepted. The selected data enters the flip-flops on the rising edge of the clock.

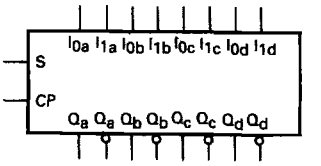
- **Select Inputs from Two Data Sources**
- **Fully Positive Edge-Triggered Operation**
- **Both True and Complement Outputs**

LOGIC DIAGRAM

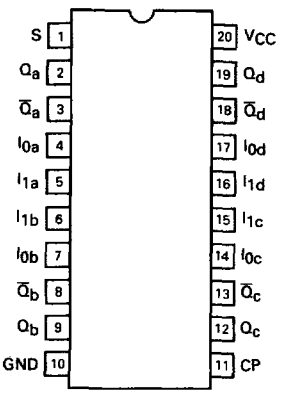


Please note that this diagram is provided only for the understanding of logic operations and should not be used to estimate propagation delays.

LOGIC SYMBOL



CONNECTION DIAGRAMS



J Suffix — Case 732-03 (Ceramic)
N Suffix — Case 738-03 (Plastic)
DW Suffix — Case 751D-03 (SOIC)

FUNCTIONAL DESCRIPTION

The MC54/74F398 is a high-speed quad 2-port register. It will select four bits of data from either of two sources (Ports) under control of a common Select input (S). The selected data is transferred to a 4-bit output register synchronous with the LOW-to-HIGH transition of the Clock input (CP). The 4-bit D-type output register is fully edge-triggered. The Data inputs (I_{0x}, I_{1x}) and Select input (S) must be stable only a setup time prior to and hold time after the LOW-to-HIGH transition of the Clock input for predictable operation. The MC54/74F398 has both Q and $\overline{Q}$ outputs.

FUNCTION TABLE

INPUTS			OUTPUTS	
S	I_0	I_1	Q	$\overline{Q}$
l	l	X	L	H
l	h	X	H	L
h	X	l	L	H
h	X	h	H	L

H = HIGH Voltage Level
L = LOW Voltage Level
h = HIGH Voltage Level one setup time prior to the LOW-to-HIGH clock transition
l = LOW Voltage Level one setup time prior to the LOW-to-HIGH clock transition
X = Immaterial

GUARANTEED OPERATING RANGES

SYMBOL	PARAMETER		MIN	TYP	MAX	UNIT
V_{CC}	Supply Voltage	54, 74	4.5	5.0	5.5	V
T_A	Operating Ambient Temperature Range	54	−55	25	125	°C
		74	0	25	70	
I_{OH}	Output Current — High	54, 74			−1.0	mA
I_{OL}	Output Current — Low	54, 74			20	mA

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	PARAMETER		LIMITS MIN	LIMITS TYP	LIMITS MAX	UNITS	TEST CONDITIONS	
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, 74	2.5	3.4		V	I_{OH} = −1.0 mA	V_{CC} = 4.5 V
		74	2.7	3.4		V	I_{OH} = −1.0 mA	V_{CC} = 4.75 V
V_{OL}	Output LOW Voltage			0.35	0.5	V	I_{OL} = 20 mA	V_{CC} = MIN
I_{IH}	Input HIGH Current				20	μA	V_{IN} = 2.7 V	V_{CC} = MAX
					100	μA	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_{CC}	Power Supply Current			25	38	mA	V_{CC} = MAX	V_{IN} = GND, CP = ⎍

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.

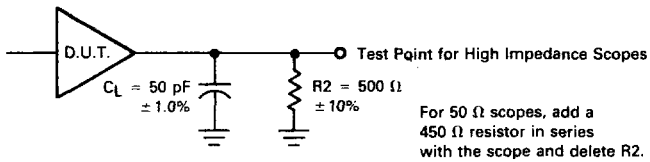
AC CHARACTERISTICS

SYMBOL	PARAMETER	54F/74F T_A = +25°C, V_{CC} = +5.0 V, C_L = 50 pF			54F T_A, V_{CC} = MIL, C_L = 50 pF		74F T_A, V_{CC} = COM, C_L = 50 pF		UNITS
		MIN	TYP	MAX	MIN	MAX	MIN	MAX	
f_{max}	Input Clock Frequency	100	140		80		100		MHz
t_{PLH} t_{PHL}	Propagation Delay CP to Q or $\overline{Q}$	3.0 3.0	5.7 6.8	7.5 9.5	3.0 3.0	9.5 11.5	3.0 3.0	8.5 10.0	ns

AC OPERATING REQUIREMENTS

SYMBOL	PARAMETER	54F/74F T_A = +25°C, V_{CC} = +5.0 V			54F T_A, V_{CC} = MIL		74F T_A, V_{CC} = COM		UNITS
		MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_s(H)$ $t_s(L)$	Setup Time, HIGH or LOW I_n to CP	3.0 3.0			4.5 4.5		3.0 3.0		ns
$t_h(H)$ $t_h(L)$	Hold Time, HIGH or LOW I_n to CP	1.0 1.0			1.5 1.5		1.0 1.0		
$t_s(H)$ $t_s(L)$	Setup Time, HIGH or LOW S to CP ('F398)	7.5 7.5			10.5 10.5		8.5 8.5		ns
$t_h(H)$ $t_h(L)$	Hold Time, HIGH or LOW S to CP	0 0			0 0		0 0		
$t_w(H)$ $t_w(L)$	CP Pulse Width HIGH or LOW	4.0 5.0			4.0 7.0		4.0 5.0		ns

AC TEST CIRCUIT



PROPAGATION DELAY MEASUREMENTS