National Semiconductor

74F794
8-Bit Register with Readback

General Description

The 'F794 is an 8-bit register with readback capability designed to store data as well as read the register information back onto the data bus. The I/O bus (D bus) has TRI-STATE® outputs. Current sinking capability is 64 mA on both the D and Q busses.

Data is loaded into the registers on the low-to-high transition of the clock (CP). The output enable ($\overline{OE}$) is used to enable data on D_0–D_7. When $\overline{OE}$ is low, the output of the registers is enabled on D_0–D_7, enabling D as an output bus. When $\overline{OE}$ is high, D_0–D_7 are inputs to the registers configuring D as an input bus.

Features

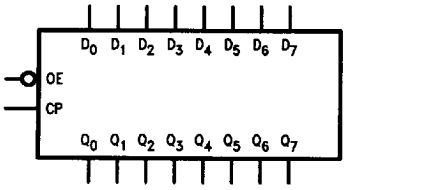
- TRI-STATE outputs on the I/O port
- D and Q output sink capability of 64 mA
- Guaranteed 4000V minimum ESD protection
- Functionally and pin equivalent to the 'LS794

Ordering Code: See Section 11

Commercial	Package Number	Package Description
74F794PC	N20A	20-Lead (0.300" Wide) Molded Dual-In-Line
74F794SC (Note 1)	M20B	20-Lead (0.300" Wide) Molded Small Outline, JEDEC

Note 1: Devices also available in 13" reel. Use suffix = SCX.

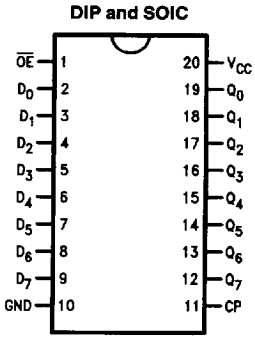
Logic Symbol



TL/F/10652–1

Connection Diagram

DIP and SOIC



TL/F/10652–2

Input Loading/Fan-Out

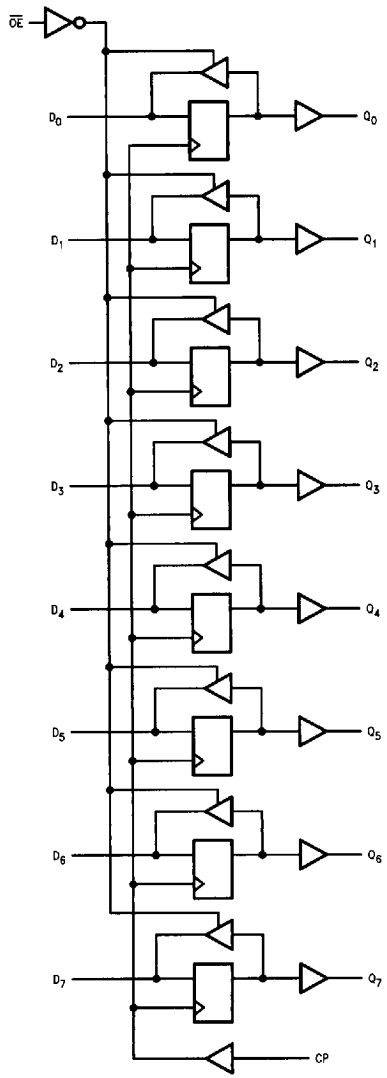
Pin Names	Description	74F High/Low	
		(U.L.)	Current
$\overline{OE}$	Output Enable Input	1.0/1.0	20 μA/−0.6 mA
CP	Clock Pulse Inputs	1.0/1.0	20 μA/−0.6 mA
D_0–D_7	D Bus Inputs/	3.5/1.083	70 μA/−650 μA
	TRI-STATE Outputs	750/106.6	−15 mA/64 mA
Q_0–Q_7	Q Bus Outputs	750/106.6	−15 mA/64 mA

Truth Table

Inputs		Outputs	
CP	$\overline{OE}$	Q	D
L or H or ↓	L	Q_n	Output, Q
L or H or ↓	H	Q_n	Input
↑	L	Q_n	Output, Q*
↑	H	D	Input

*In this case the output of the register is clocked to the inputs and the overall Q output is unchanged at Q_n.

Logic Diagram



TL/F/10652–3

Absolute Maximum Ratings (Note 1)

Storage Temperature	−65°C to + 150°C
Ambient Temperature under Bias	−55° to +125°C
Junction Temperature under Bias	−55°C to +175°C
Plastic	−55°C to +150°C
V_{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 2)	−0.5V to +7.0V
Input Current (Note 2)	−30 mA to +5.0 mA
ESD Last Passing Voltage (Min)	4000V

Note 1: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

Voltage Applied to Output	
In HIGH State (with V_{CC} = 0V)	
Standard Output	−0.5V to V_{CC}
TRI-STATE Output	−0.5V to +5.5V
Current Applied to Output	
in LOW State (Max)	Twice the Rated I_{OL} (mA)
ESD Last Passing Voltage (Min)	4000V

Recommended Operating Conditions

Free Air Ambient Temperature	
Commercial	0°C to 70°C
Supply Voltage	
Commercial	+4.5V to +5.5V

DC Characteristics over Operating Temperature Range unless otherwise specified

Symbol	Parameter		74F Min	74F Typ	74F Max	Units	V_{CC}	Conditions
V_{IH}	Input HIGH Voltage		2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage				0.8	V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage				−1.2	V	Min	I_{IN} = −18 mA
V_{OH}	Output HIGH Voltage		2.4 2.0	2.8 2.44		V	Min	I_{OH} = −3 mA I_{OH} = −15 mA
V_{OL}	Output LOW Voltage			0.45	0.55	V	Min	I_{OL} = 64 mA
I_{IH}	Input HIGH Current	74F			5.0	μA	Max	V_{IN} = 2.7V
I_{BVI}	Input HIGH Current Breakdown Test	74F			7.0	μA	Max	V_{IN} = 7.0V ($\overline{OE}$, CP)
I_{BVIT}	Input HIGH Current Breakdown (I/O)	74F			0.5	mA	Max	V_{IN} = 5.5V (D_n)
I_{CEX}	Output HIGH Leakage Current	74F			50	μA	Max	V_{OUT} = V_{CC}
V_{ID}	Input Leakage Test	74F	4.75			V	0.0	I_{ID} = 1.9 μA All Other Pins Grounded
I_{OD}	Output Leakage Circuit Current	74F			3.75	μA	0.0	V_{IOD} = 150 mV All Other Pins Grounded
I_{IL}	Input LOW Current				−0.6	mA	Max	V_{IN} = 0.5V ($\overline{OE}$, CP)

DC Characteristics over Operating Temperature Range unless other specified (Continued)

Symbol	Parameter	74F			Units	V_{CC}	Conditions
		Min	Typ	Max			
I_{OS}	Output Short-Circuit Current	−100		−225	mA	Max	V_{OUT} = 0V
I_{IH} + I_{OZH}	Output Leakage Current			70	μA	Max	V_{OUT} = 2.7V (Dn)
I_{IL} + I_{OZL}	Output Leakage Current			−650	μA	Max	V_{OUT} = 0.5V (Dn)
V_{ID}	Input Leakage Test 74F	4.75			V	0.0	I_{ID} = 1.9 μA All Other Pins Grounded
I_{OD}	Output Circuit Leakage Current 74F			3.75	μA	0.0	V_{IOD} = 150 mV All Other Pins Grounded
I_{ZZ}	Bus Drainage Test			100	μA	0.0	V_{OUT} = 5.25V
I_{CCH}	Power Supply Current			65	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current			80	mA	Max	V_O = LOW
I_{CCZ}	Power Supply Current			80	mA	Max	V_O = HIGH Z

AC Characteristics: See Section 2 for Waveforms and Load Configurations

Symbol	Parameter	74F T_A = +25°C, V_{CC} = +5.0V, C_L = 50 pF			74F T_A, V_{CC} = Comm, C_L = 50 pF		Units	Fig. No.
		Min	Typ	Max	Min	Max		
f_{MAX}	Max. Clock Frequency	90			90		MHz	2-1
t_{PLH} t_{PHL}	Propagation Delay CP to Qn	2.5 2.5		7.0 8.0	2.5 2.5	8.0 9.0	ns	2-3
t_{PZH} t_{PZL}	Output Enable Time	2.3 2.0		8.5 10.0	2.0 2.0	9.0 10.5	ns	2-5
t_{PHZ} t_{PLZ}	Output Disable Time	1.0 1.0		7.0 7.0	1.0 1.0	8.0 8.0	ns	2-5
t_s(H) t_s(L)	Setup Time, HIGH or LOW Bus to Clock	4.0 4.0			4.0 4.0		ns	2-6
t_h(H) t_h(L)	Hold Time, HIGH or LOW Bus to Clock	1.5 1.5			1.5 1.5		ns	2-6
t_w(H	Clock Pulse Width HIGH or LOW	5.8 5.8			5.8 5.8		ns	2-14