National Semiconductor

August 1995

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.

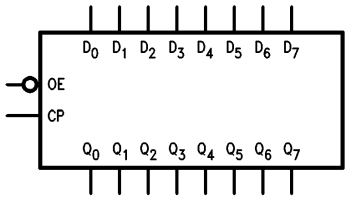
Features

- 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

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



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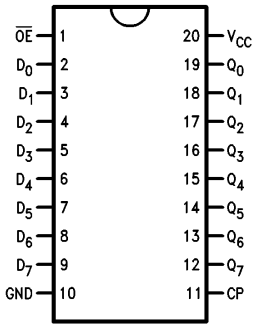
Connection Diagram

DIP and SOIC



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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

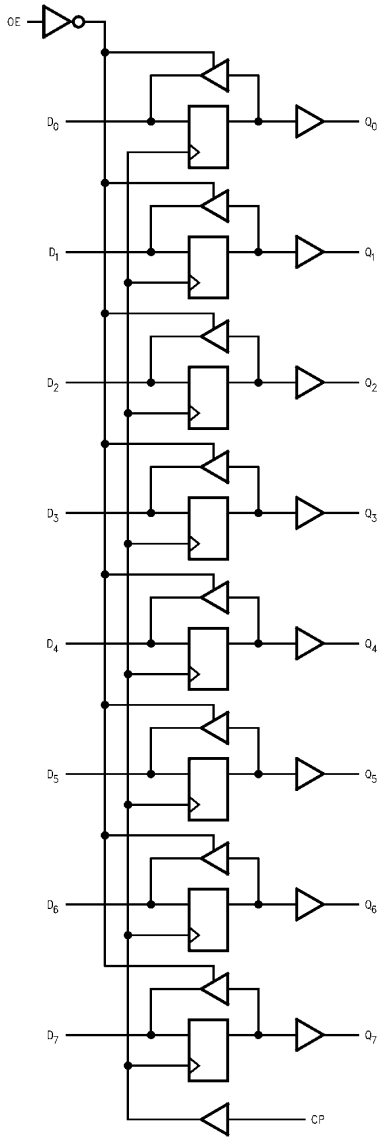
TRI-STATE® is a registered trademark of National Semiconductor Corporation.

Truth Table

Inputs		Outputs	
CP	$\overline{\textbf{OE}}$	**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



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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			Units	V_{CC}	Conditions
			Min	Typ	Max			
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

Symbol	Parameter	74F			74F		Units
		T_A = +25°C V_{CC} = +5.0V C_L = 50 pF			T_A, V_{CC} = Comm C_L = 50 pF		
		Min	Typ	Max	Min	Max	
f_{MAX}	Max. Clock Frequency	90			90		MHz
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
t_{PZH} t_{PZL}	Output Enable Time	2.3 2.0		8.5 10.0	2.0 2.0	9.0 10.5	ns
t_{PHZ} t_{PLZ}	Output Disable Time	1.0 1.0		7.0 7.0	1.0 1.0	8.0 8.0	ns
t_s(H) t_s(L)	Setup Time, HIGH or LOW Bus to Clock	4.0 4.0			4.0 4.0		ns
t_h(H) t_h(L)	Hold Time, HIGH or LOW Bus to Clock	1.5 1.5			1.5 1.5		ns
t_w(H	Clock Pulse Width HIGH or LOW	5.8 5.8			5.8 5.8		ns

Ordering Informaton

The device number is used to form part of a simplified purchasing code where a package type and temperature range are defined as follow:

74F 794 S C X

Temperature Range Family
74F = Commercial

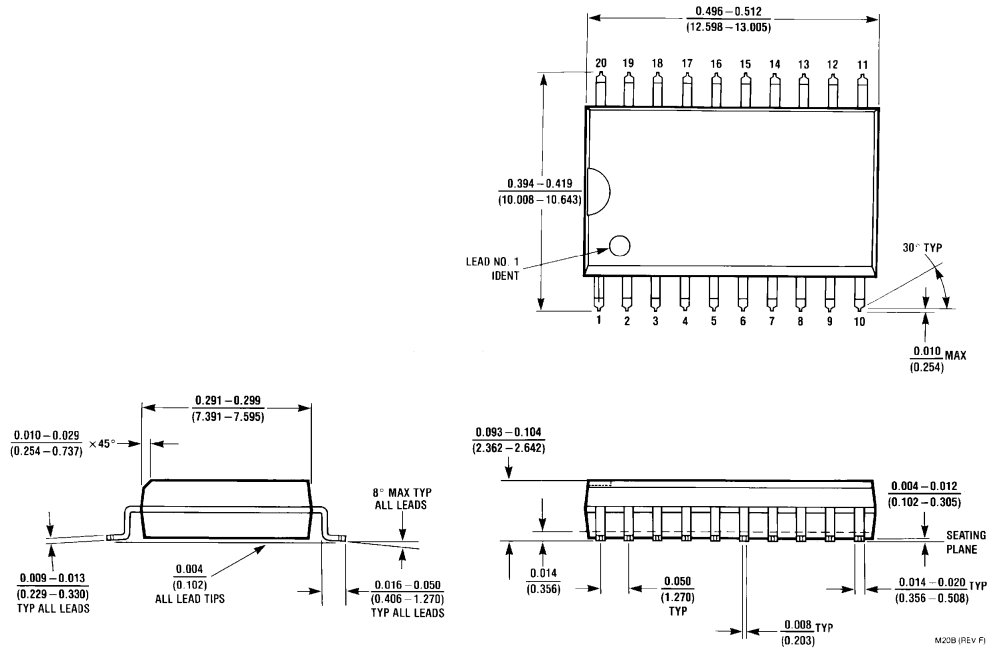
Device Type

Package Code
P = Plastic DIP
S = Small Outline (SOIC)

Special Variations
X = Devices shipped in 13″ reels

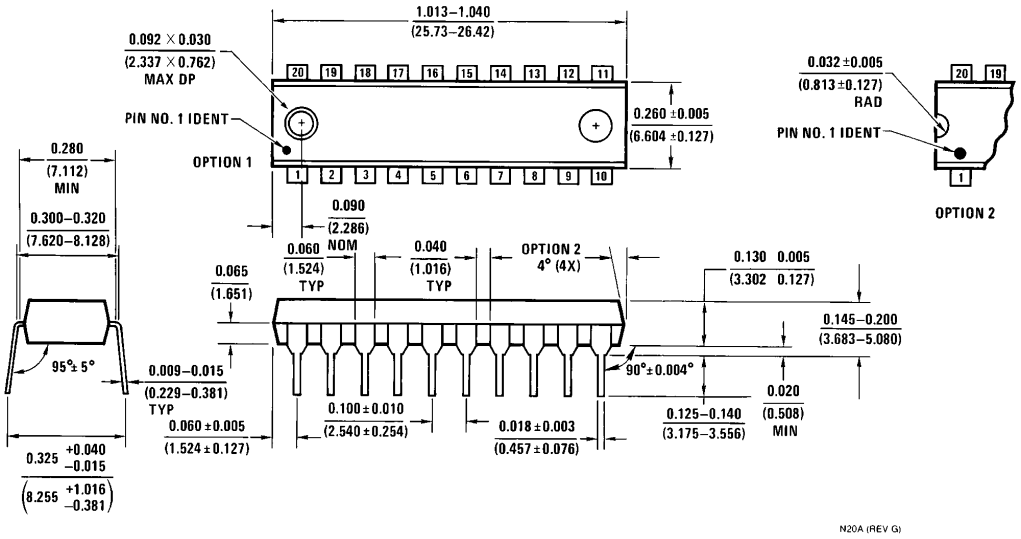
Temperature Range
C = Commercial (0°C to +70°C)

Physical Dimensions inches (millimeters)



20-Lead (0.300″ Wide) Molded Small Outline Package, JEDEC (S)
NS Package Number M20B

Physical Dimensions inches (millimeters) (Continued)



20-Lead (0.300″ Wide) Molded Dual-In-Line Package (P)
NS Package Number N20A

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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