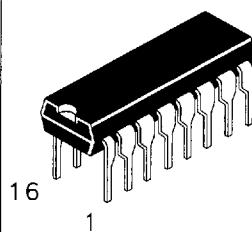


4-Bit D-Type Register with 3-State Outputs

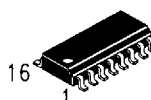
This device is a high-speed 4-Bit Register featuring 3-state outputs for use in bus-organized systems. The clock is fully edge-triggered allowing either a load from the D inputs or a hold depending on the state of the Input Enable Lines. A HIGH on either Output Enable Line brings the output to a high impedance state without affecting the actual register contents. A HIGH on the Reset input resets the Register regardless of the state of the Clock, the Output Enable or the Input Enable lines.

- AVG's LS operates over extended Vcc from 4.5 to 5.5 V
- AVG's LS and ALS both have guaranteed DC and AC specification over full temperature and Vcc range
- Switching specifications for ALS at 50 pF
- AVG's ALS has the lowest speed power product (4pJ per gate typical) of all logic series
- Tristate Driver with 24mA Output Drive IOL
- 24mA Low Level Output Drive

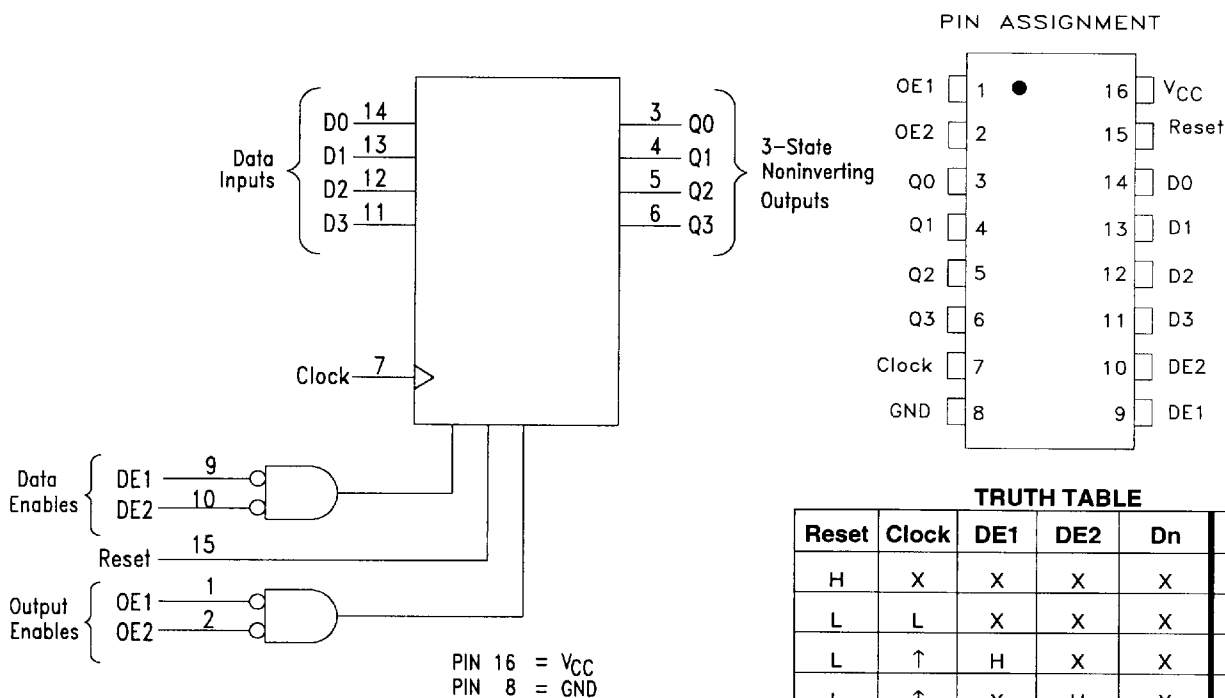
DV74LS173A DV74ALS173A



N Suffix
Plastic DIP
AVG-003 Case



D Suffix
Plastic SOP
AVG-004 Case



NOTE: If either $\overline{OE1}$, or $\overline{OE2}$ is HIGH, the outputs are in the HIGH impedance state. Internal register contents will be unaffected.

H=High Logic Level, L=Low Logic Level
X=Don't Care

↑ = Low to High Transition

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	LS173A	ALS173A	Unit
V _{CC}	Supply Voltage	7.0	7.0	V
V _{IN}	Input Voltage	7.0	7.0	V
T _{STG}	Storage Temperature Range	-65 to +150	-65 to +150	°C

GUARANTEED OPERATING CONDITIONS

Symbol	Parameter	LS173A		ALS173A		Unit
		Min	Max	Min	Max	
V _{CC}	Supply Voltage	4.5	5.5	4.5	5.5	V
V _{IH}	High Level Input Voltage	2.0		2.0		V
V _{IL}	Low Level Input Voltage		0.8		0.8	V
I _{OL}	Low Level Output Current		8.0		8.0	mA
I _{OH}	High Level Output Current		-0.4		-0.4	mA
T _A	Ambient Temperature Range	-10 to +70		-10 to +70		°C

DC ELECTRICAL CHARACTERISTICS over full operating conditions

Symbol	Parameter	Conditions	LS173A			ALS173A			Unit
			Min	Typ	Max	Min	Typ	Max	
V _{IK}	Input Clamp Voltage	V _{CC} = min, I _{IN} = -18 mA			-1.5			-1.5	V
V _{OH}	High Level Output Voltage	V _{CC} =min, I _{OH} =max	V _{CC} -2			V _{CC} -2			V
V _{OL}	Low Level Output Voltage	V _{CC} =min; I _{OL} =12 mA V _{CC} =min; I _{OL} =24 mA		0.25 0.35	0.4 0.5		0.25 0.35	0.4 0.5	V
I _{OZH}	Output Off Current HIGH	V _{CC} =max, V _{IN} = 2.7V			20				μA
I _{OZL}	Output Off Current LOW	V _{CC} =max, V _{IN} =0.4V			-20				μA
I _{IH}	High Level Input Current	V _{CC} =max, V _{IN} = 2.7V V _{CC} =max, V _{IN} = 7V			20 0.1			20 0.1	μA mA
I _{IL}	Low Level Input Current	V _{CC} =max, V _{IN} =0.4V			-0.4			-0.1	mA
I _{CC}	Supply Current	V _{CC} =Max			30			25	mA

SWITCHING CHARACTERISTICS over full operating conditions

Symbol	Parameter	LS173A C _L =45pF R _L =667Ω		ALS173A C _L =50pF R _L =500Ω		Unit
		Min	Max	Min	Max	
f _{MAX}	Maximum Clock Frequency	30		38		MHz
t _{PLH}	Propagation Delay, Clock to Output		25		15	ns
t _{PHL}			30		18	
t _{PHL}	Propagation Delay, Reset to Output		35		22	ns
t _{PZH}	Output Enable Time		23		14	ns
t _{PZL}			27		18	
		C _L =5.0pF R _L =667Ω		C _L =50pF R _L =500Ω		
t _{PLZ}	Output Disable Time		17		10	ns
t _{PHZ}			17		10	

AC SETUP REQUIREMENTS over full operating conditions

Symbol	Parameter	LS173A		ALS173A		Unit
		Min	Max	Min	Max	
t_w	Pulse Width, Clock, Reset	20	ns	14	ns	
t_s	Data Enable Setup Time	35		25		ns
t_s	Data Setup Time	17		12		ns
t_h	Hold Time, Any Input	0		0		ns
t_{rec}	Recovery Time	10		7		ns

SWITCHING WAVEFORMS