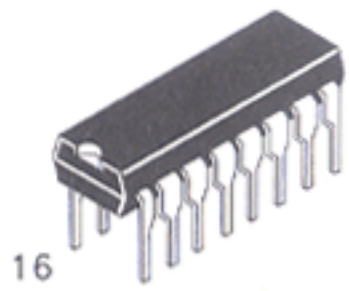
Quad D Flip-Flop with Master Reset

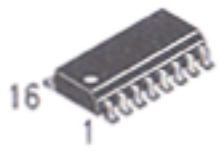
DV74LS175
DV74ALS175

This device is useful for general flip-flop requirements featuring common clock and clear inputs, and both complementary and true outputs. The information on the D inputs is stored during the LOW to HIGH clock transition. A Reset input resets all flip-flops, independent of the Clock or D inputs, when LOW.

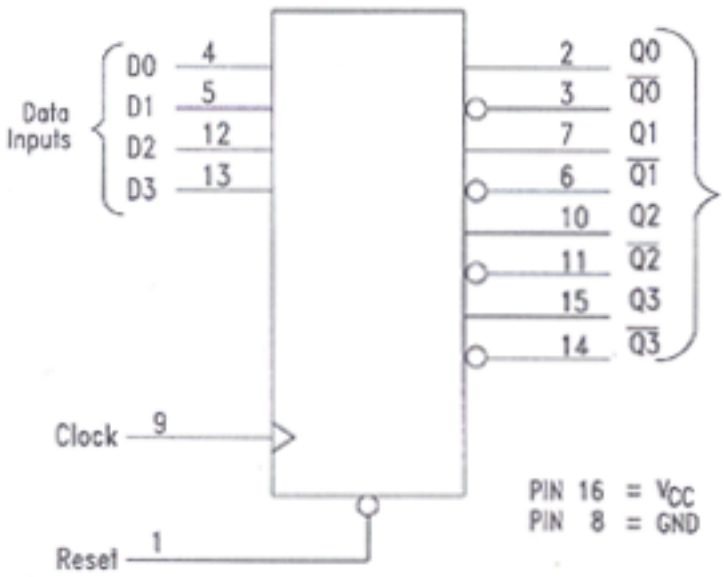
- **AVG's LS operates over extended Vcc from 4.5 to 5.5 V**
- **AVG's LS and ALS both have guaranteed DC and AC specification over full temperature and Vcc range**
- **Switching specifications for ALS at 50 pF**
- **AVG's ALS has the lowest speed power product (4pJ per gate typical) of all logic series**

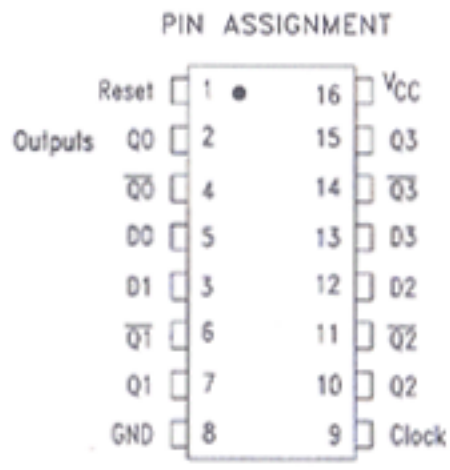


N Suffix
Plastic DIP
AVG-003Case



D Suffix
Plastic SOP
AVG-004 Case





TRUTH TABLE

Inputs			Output	
Reset	Clock CP	Data D_N	Q	$\overline{Q}$
L	X	X	L	H
H	↑	H	H	L
H	↑	L	L	H
H	L	X	Q	$\overline{Q}$

H = High Logic Level
L = Low Logic Level
X = Don't Care
↑ = Transition from LOW to HIGH Level
Q = the level of Q before the indicated steady-state input conditions were established

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	LS175	ALS175	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	LS175		ALS175		Unit
		Min	Max	Min	Max	
V_{CC}	Supply Voltage	4.5	5.5	4.5	5.5	V
V_{OH}	High Level Output Voltage		5.5		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	LS175			ALS175			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	3.5		VCC−2			V
V_{OL}	Low Level Output Voltage	V_{CC}=min; I_{OL} =4 mA V_{CC}=min; I_{OL} =8 mA		0.25 0.35	0.4 0.5		0.25 0.35	0.4 0.5	V
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
					0.1			0.1	mA
I_{IL}	Low Level Input Current	V_{CC}=max, V_{IN}=0.4V			−0.4			−0.1	mA
I_O	Output Short Circuit Current	V_{CC}=max, V_{IN}= 2.25V	−20		−110	−30		−112	mA
I_{CC}	Supply Current	V_{CC}=Max			18		9	14	mA

SWITCHING CHARACTERISTICS over full operating conditions

Symbol	Parameter	LS175 CL=15pF		ALS175 CL=50 pF RL=500ω		Unit
		Min	Max	Min	Max	
f_{MAX}	Maximum Clock Frequency	30		50		MHz
t_{PLH}	Turn Off Delay, MR to Output, Low to High Level Output		30	5	18	ns
t_{PHL}	Turn On Delay, MR to Output, High to Low Level Output		30	.8	23	ns
t_{PLH}	Turn Off Delay, Clock to Output, Low to High Level Output		25	3	15	ns
t_{PHL}	Turn On Delay, Clock to Output, High to Low Level Output		25	5	17	ns

AC SETUP REQUIREMENTS over full operating conditions

Symbol	Parameter	LS175		ALS175		Unit
		Min	Max	Min	Max	
t_w	Clock or MR Pulse Width	20		10		ns
t_s	Data Setup Time	20		10		ns
t_H	Data Hold Time	5.0		0		ns
t_{rec}	Recovery Time	25		6		ns

SWITCHING CHARACTERISTICS