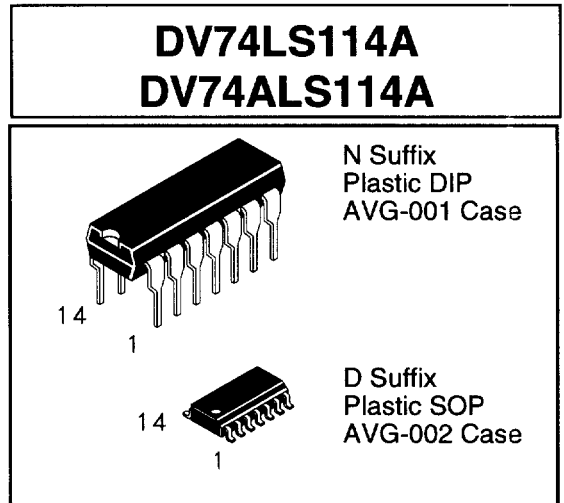
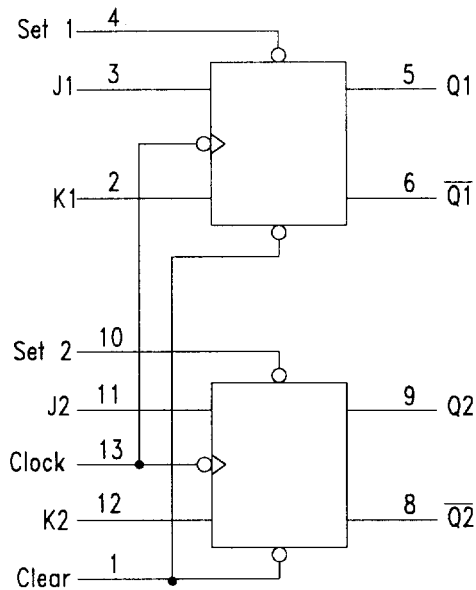


114 Dual JK Negative Edge-Triggered Flip-Flops with SET, common CLEAR and common CLOCK

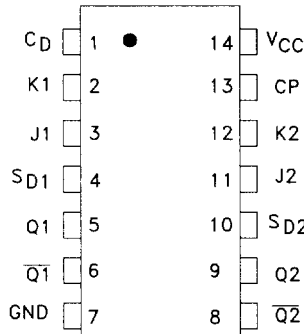
The circuitry in this device contains common clock and common clear inputs. When the clock goes HIGH, the inputs are enabled and data will be accepted. The logic level of the J and K inputs may be allowed to change when the clock pulse is HIGH and the flip-flop will perform according to the truth table as long as minimum set-up times are observed. Input data is transferred to the outputs on the negative -going edge of the clock pulse.



- 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



PIN ASSIGNMENT



PIN 14 = V_{CC}
PIN 7 = GND

Note: Both outputs will be HIGH when both Set and Clear are LOW, but the output states are unpredictable if Set and Clear go HIGH simultaneously.

TRUTH TABLE						
Inputs					Output	
Set	Clear	Clock	J	K	Q	Q̄
L	H	X	X	X	H	L
H	L	X	X	X	L	H
L	L	X	X	X	H	H
H	H	↓	L	L	Q ₀	Q̄ ₀
H	H	↓	H	L	H	L
H	H	↓	L	H	L	H
H	H	↓	H	H	Toggle	
H	H	H	X	X	Q ₀	Q̄ ₀

H=HIGH Voltage Level
L=LOW Voltage Level
X=Immaterial

ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

Symbol	Parameter	LS114A	ALS114A	Unit
V _{CC}	Supply Voltage	7.0	7.0	V
V _{IN}	Input Voltage	-0.5 to +7.0	7.0	V
T _{STG}	Storage Temperature Range	-65 to +150	-65 to +150	°C

GUARANTEED OPERATING CONDITIONS

Symbol	Parameter	LS114A		ALS114A		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		2		V
V _{IL}	Low Level Input Voltage		0.8		0.8	V
I _{OH}	High Level Output Current		-0.4		-0.4	mA
I _{OL}	Low Level Output Current		8.0	0	8.0	mA
T _A	Operating Free Air Temperature Range	-10 to +70		-10 to +70		°C

Symbol	Parameter	Condition	LS114A			ALS114A			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		V _{CC} -2			V
V _{OL}	Low Level Output Voltage	V _{CC} =min I _{OL} = 4 mA		0.25	0.4		0.25	0.4	V
				0.35	0.5		0.35	0.5	V
I _{IH}	High Level Input Current J, K Clock Set Clear	V _{CC} =max, V _{IN} = 2.7V			20 160 60 120			20 20 40 40	μA
					0.1 0.8 0.3 0.6		0.1 0.1 0.2 0.2	mA	
I _{IL}	Low Level Input Current J, K Clock Clear Set	V _{CC} =max, V _{IN} =0.4V			-0.4 -1.6 -1.6 -0.8			-0.2 -0.2 -0.4 -0.4	mA
I _O	Output Short Circuit Current	V _{CC} =max, V _{OUT} =2.25V	-20		-110	-30		-112	mA
I _{CC}	Power Supply Current	V _{CC} =max			6.0		2.5	4.5	mA

SWITCHING CHARACTERISTICS

Symbol	Parameter	INPUT	OUTPUT	LS114A C _L =15 pF		ALS114A C _L =50pF R _L =500Ω		Unit
				Min	Max	Min	Max	
f _{MAX}	Maximum Clock Frequency			30		30		MHz
t _{PLH}	Propogation Delay Time Low-to-High Level Output	Clock	Any Q		20	3	15	ns
t _{PHL}	Propogation Delay Time High-to-Low Level Output	Clock	Any Q		20	5	19	ns
t _{PLH}	Propogation Delay Time Low-to-High Level Output	Set or Clear	Any Q		20	3	15	ns
t _{PHL}	Propogation Delay Time High-to-Low Level Output	Set or Clear	Any Q		20	4	18	ns

AC SETUP REQUIREMENTS

Symbol	Parameter	Limits				Unit
		LS114A		ALS 114A		
		MIN	MAX	MIN	MAX	
t_w	Pulse Width	Set or Reset Low	25		10	ns
		Clock High	20		16.5	
		Clock Low	20		16.5	
t_s	Setup Time	Data	20		22	ns
		Set or Reset			20	
t_h	Hold Time	0		0	ns	

SWITCHING WAVEFORMS

