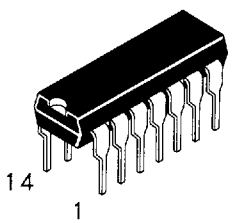
Available Q2, 1995

Dual 4-Input AND Gate

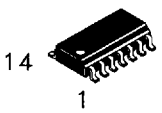
DV74AC21
DV74ACT21

This device contains two independent gates, each of which performs the logic AND function.

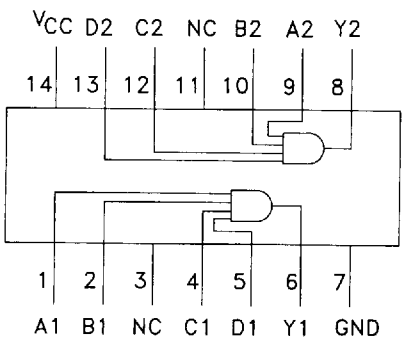
- **Advanced very high speed CMOS**
- **Outputs source/sink 24 mA**
- **Transmission line driving 50 ohms**
- **ACT has TTL compatible inputs**
- **Operation from 2 to 6 volts guaranteed**
- **DC & AC Parameters guaranteed over –40 to +85°C**



N Suffix
Plastic DIP
AVG-001 Case



D Suffix
Plastic SOP
AVG-002 Case



NC = No Connection

TRUTH TABLE

Inputs				Output
A	**B**	**C**	**D**	**Y**
L	X	X	X	L
X	L	X	X	L
X	X	L	X	L
X	X	X	L	L
H	H	H	H	H

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

ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	AC21, ACT21	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	– 0.5 to +7.0	V
V_{IN}	DC Input Voltage (Referenced to GND)	– 0.5 to V_{CC} +0.5	V
V_{OUT}	DC Output Voltage (Referenced to GND)	– 0.5 to V_{CC} +0.5	V
I_{IN}	DC Input Current, per Pin	± 20	mA
I_{OUT}	DC Output Sink/Source Current, per Pin	± 50	mA
I_{CC}	DC V_{CC} or GND Current per Output Pin	± 50	mA
Tstg	Storage Temperature	– 65 to +150	°C

GUARANTEED OPERATING CONDITIONS

Symbol	Parameter		Min	Typ	Max	Unit
V_{CC}	Supply Voltage	'AC	2.0	5.0	6.0	V
		'ACT	4.5	5.0	5.5	
V_{IN}, V_{OUT}	DC Input Voltage, Output Voltage, (Ref. to GND)		0		V_{CC}	V
t_r, t_f	Input Rise and Fall Time (Note 1) **AC** Devices	V_{CC} @ 3.0 V			150	ns/V
		V_{CC} @ 4.5 V			40	ns/V
		V_{CC} @ 5.5 V			25	ns/V

GUARANTEED OPERATING CONDITIONS (continued)

Symbol	Parameter		Min	Typ	Max	Unit
t_r, t_f	Input Rise and Fall Time (Note 2) **ACT** Devices	V_{CC} @ 4.5 V			10	ns/V
		V_{CC} @ 5.5 V			8.0	ns/V
T_A	Operating Ambient Temperature Range		–40	25	85	°C
C_{IN}	Input Capacitance V_{CC} = 5.0 V	V_{CC} = 5.0 V		4.5		pF
C_{PD}	Power Dissipation Capacitance	V_{CC} = 5.0 V		30		pF

1. V_{IN} from 30% to 70% V_{CC}
2. V_{IN} from 0.8 to 2.0 V

AC — 21

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Vcc (V)	AC21			Unit
				TA = +25°C	TA = –40 to +85°C		
				Typ	Guaranteed Limits		
V_{IH}	Minimum High Level Input Voltage	V_{OUT} = 0.1V or V_{CC} – 0.1 V	3.0 4.5 5.5	1.5 2.25 2.75	2.1 3.15 3.85	2.1 3.15 3.85	V
V_{IL}	Maximum Low Level Input Voltage	V_{OUT} = 0.1V or V_{CC} – 0.1 V	3.0 4.5 5.5	1.5 2.25 2.75	0.9 1.35 1.65	0.9 1.35 1.65	V
V_{OH}	Minimum High Level Output Voltage	I_{OUT}= –50 µA	3.0 4.5 5.5	2.99 4.49 5.49	2.9 4.4 5.4	2.9 4.4 5.4	V
		V_{IN} = V_{IL} or V_{IH} –12mA I_{OH} –24mA –24mA	3.0 4.5 5.5		2.56 3.86 4.86	2.46 3.76 4.76	V
V_{OL}	Maximum Low Level Output Voltage	I_{OUT} = 50 µA	3.0 4.5 5.5	0.002 0.001 0.001	0.1 0.1 0.1	0.1 0.1 0.1	V
		V_{IN} = V_{IL} or V_{IH} 12mA I_{OL} 24mA 24mA	3.0 4.5 5.5		0.36 0.36 0.36	0.44 0.44 0.44	V
I_{IN}	Maximum Input Leakage Current	V_{IN} = V_{CC} or GND	5.5		±0.1	±1.0	µA
I_{CC}	Maximum Quiescent Supply Current	V_{IN} = V_{CC} or GND	5.5		4.0	40	µA

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AC CHARACTERISTICS over full operating conditions

Symbol	Parameter	Vcc ±10% (V)	AC21				Unit
			T_A = +25°C C_L = 50 pF		T_A = – 40°C to +85°C C_L = 50 pF		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay	3.3 5.0	1.5 1.5	7.5 6.0	1.0 1.0	8.0 6.5	ns
t_{PHL}	Propagation Delay	3.3 5.0	1.5 1.5	7.5 6.5	1.0 1.0	8.0 7.0	ns

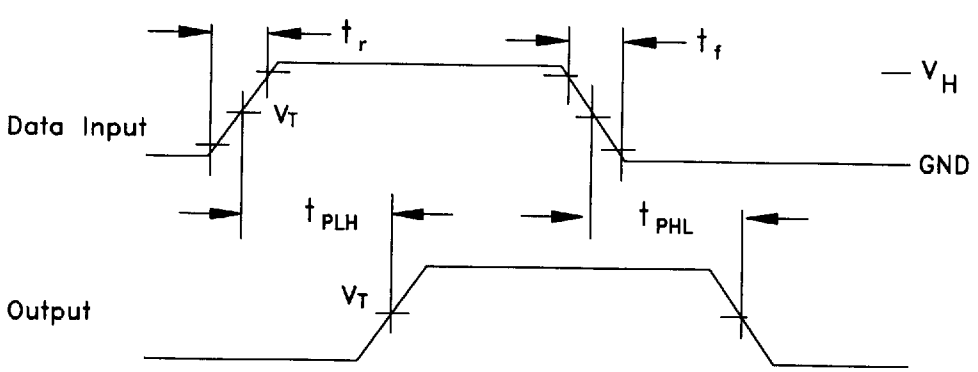
DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	Vcc (V)	ACT21			Unit
				TA = +25°C		TA = –40 to +85°C	
				Typ	Guaranteed Limits		
V_{IH}	Minimum High Level Input Voltage	V_{OUT} = 0.1V or V_{CC} – 0.1 V	4.5 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V
V_{IL}	Maximum Low Level Input Voltage	V_{OUT} = 0.1V or V_{CC} – 0.1 V	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V
V_{OH}	Minimum High Level Output Voltage	I_{OUT} = –50 µA	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V
		V_{IN} = V_{IL} or V_{IH} I_{OH} –24mA –24 mA	4.5 5.5		3.86 4.86	3.76 4.76	V
V_{OL}	Maximum Low Level Output Voltage	I_{OUT} = 50 µA	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V
		V_{IN} = V_{IL} or V_{IH} I_{OL} 24mA 24 mA	4.5 5.5		0.36 0.36	0.44 0.44	V
I_{IN}	Maximum Input Leakage Current	V_{IN} = VCC or GND	5.5		±0.1	±1.0	µA
ΔI_{CCT}	Additional Max Icc/Input	V_{IN} = V_{CC} – 2.1 V	5.5	0.6		1.5	mA
I_{CC}	Maximum Quiescent Supply Current	V_{IN} = V_{CC} or GND	5.5		4.0	40	µA

AC CHARACTERISTICS over full operating conditions

Symbol	Parameter	Vcc ±10% (V)	ACT21				Unit
			T_A = +25°C C_L = 50 pF		T_A = – 40°C to +85°C C_L = 50 pF		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay	5.0	1.5	8.5	1.0	9.0	ns
t_{PHL}	Propagation Delay	5.0	1.5	9.5	1.0	10	ns

SWITCHING WAVEFORMS



Input and output threshold voltage:
V_T = 50% Vcc for AC; 1.5V for ACT
V_H = V_{CC} for AC, 3V for ACT