

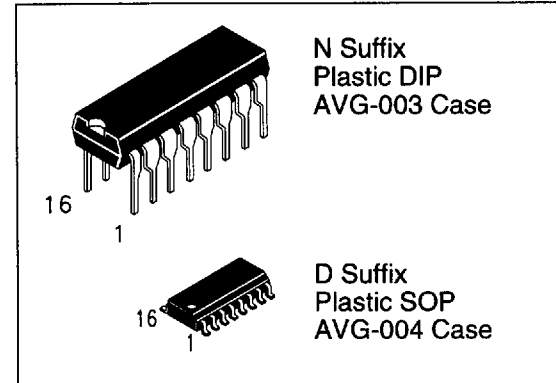
Available Q3, 1995

8 Input Multiplexer with 3-State Outputs, 8 Input Digital Multiplexer

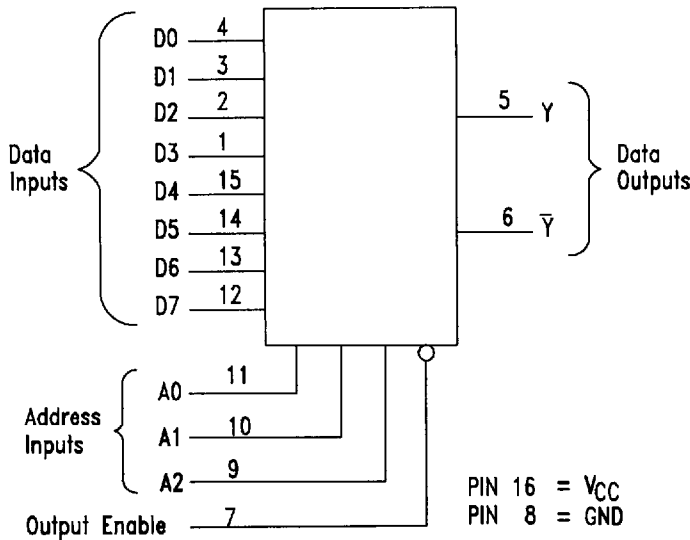
This device is a high speed, 1-of-8 digital multiplexer. It is able to select one line of data from up to eight inputs. The DV74AC251/ACT251 can be utilized as a universal function generator to generate any four variable logic function. Both true and complementary outputs are provided.

- 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

DV74AC251 DV74ACT251



LOGIC DIAGRAM



TRUTH TABLE

Output Enable	Inputs			Outputs	
	A2	A1	A0	\bar{Y}	Y
H	X	X	X	Z	Z
L	L	L	L	\bar{D}_0	D ₀
L	L	L	H	\bar{D}_1	D ₁
L	L	H	L	\bar{D}_2	D ₂
L	L	H	H	\bar{D}_3	D ₃
L	H	L	L	\bar{D}_4	D ₄
L	H	L	H	\bar{D}_5	D ₅
L	H	H	L	\bar{D}_6	D ₆
L	H	H	H	\bar{D}_7	D ₇

H = HIGH Voltage Level, L = LOW Voltage Level
X = Either Low or High Logic Level, Z = High Impedance

ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	AC251, ACT251	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
T _{stg}	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
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		85	°C	
C _{IN}	Input Capacitance V _{CC} = 5.0 V	V _{CC} = 5.0 V		4.5	pF	
CPD	Power Dissipation Capacitance	V _{CC} = 5.0 V		70	pF	

1. V_{IN} from 30% to 70% V_{CC}

AC — 251

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	AC251			Unit
				T _A = +25°C		T _A = -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	1.5	2.1	2.1	V
			4.5	2.25	3.15	3.15	
			5.5	2.75	3.85	3.85	
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	3.0	1.5	0.9	0.9	V
			4.5	2.25	1.35	1.35	
			5.5	2.75	1.65	1.65	
V _{OH}	Minimum High Level Output Voltage	I _{OUT} = -50 μA	3.0	2.99	2.9	2.9	V
			4.5	4.49	4.4	4.4	
			5.5	5.49	5.4	5.4	
		V _{IN} = V _{IL} or V _{IH} -12mA	3.0		2.56	2.46	V
I _{OH} -24mA	4.5		3.86	3.76			
	I _{OH} -24 mA	5.5		4.86	4.76		
V _{OL}	Maximum Low Level Output Voltage	I _{OUT} = 50 μA	3.0	0.002	0.1	0.1	V
			4.5	0.001	0.1	0.1	
			5.5	0.001	0.1	0.1	
		V _{IN} = V _{IL} or V _{IH} 12mA	3.0		0.36	0.44	V
I _{OH} 24mA	4.5		0.36	0.44			
I _{OH} 24 mA	5.5		0.36	0.44			
I _{IN}	Maximum Input Leakage Current	V _{IN} = V _{CC} , GND	5.5		±0.1	±1.0	μA
I _{oz}	Maximum 3-state current	V _{IN} = (OE) = V _{IL} , V _{IH} V _{IN} = V _{CC} , GND V _{OUT} = V _{CC} , GND	5.5		±0.5	±5.0	mA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5		8.0	80	μA

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AC CHARACTERISTICS

Symbol	Parameter ($C_L = 50 \text{ pF}$)	V_{CC} (V) $\pm 10\%$	AC251					Unit
			$T_A = +25^\circ\text{C}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		
			Min	Typ	Max	Min	Max	
t_{PLH}	Propagation Delay A_n to Y or \bar{Y}	3.3	1.5	11.5	17.5	1.5	19.0	ns
		5.0	1.5	8.5	12.5	1.5	13.5	
t_{PHL}	Propagation Delay A_n to Y or \bar{Y}	3.3	1.5	11	17.5	1.5	19.0	ns
		5.0	1.5	8.0	12.5	1.5	13.5	
t_{PLH}	Propagation Delay D to Y or \bar{Y}	3.3	1.5	10	14	1.5	15.5	ns
		5.0	1.5	7.0	10	1.5	11	
t_{PHL}	Propagation Delay D to Y or \bar{Y}	3.3	1.5	9.0	14	1.5	15.5	ns
		5.0	1.5	6.5	10	1.5	11	
t_{PZH}	Output Enable Time Output Enable to Y or \bar{Y}	3.3	1.5	7.5	11	1.5	12	ns
		5.0	1.5	5.5	8	1.5	9.0	
t_{PZL}	Output Enable Time Output Enable to Y or \bar{Y}	3.3	1.5	7.5	11	1.5	12	ns
		5.0	1.5	5.5	8	1.5	9.0	
t_{PHZ}	Output Disable Time Output Enable to Y or \bar{Y}	3.3	1.5	8.5	11.5	1.5	13	ns
		5.0	1.5	7.0	9.5	1.5	10	
t_{PLZ}	Output Disable Time Output Enable to Y or \bar{Y}	3.3	1.5	7.0	11	1.5	12	ns
		5.0	1.5	5.5	8.0	1.5	8.5	

ACT — 251

DC ELECTRICAL CHARACTERISTICS

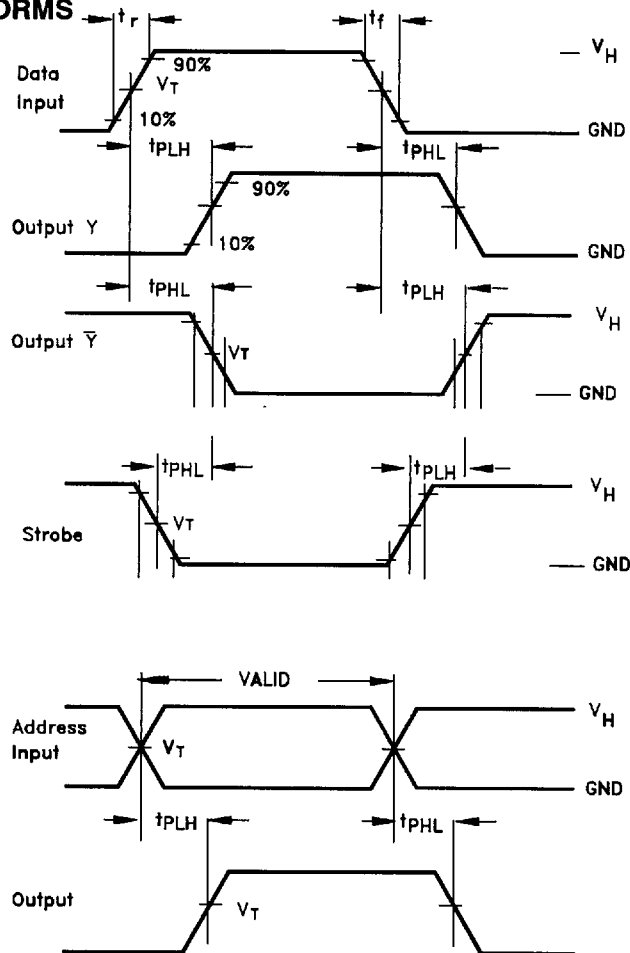
Symbol	Parameter	Conditions	V_{CC} (V)	ACT251			Unit
				$T_A = +25^\circ\text{C}$		$T_A = -40$ to $+85^\circ\text{C}$	
				Typ	Guaranteed Limits		
V_{IH}	Minimum High Level Input Voltage	$V_{OUT} = 0.1\text{V}$ or $V_{CC} - 0.1\text{V}$	4.5 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V
V_{IL}	Maximum Low Level Input Voltage	$V_{OUT} = 0.1\text{V}$ or $V_{CC} - 0.1\text{V}$	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V
V_{OH}	Minimum High Level Output Voltage	$I_{OUT} = -50 \mu\text{A}$	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V
		$V_{IN} = V_{IL}$ or V_{IH} $I_{OH} = -24\text{mA}$ -24mA	4.5 5.5		3.86 4.86	3.76 4.76	V
V_{OL}	Maximum Low Level Output Voltage	$I_{OUT} = 50 \mu\text{A}$	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V
		$V_{IN} = V_{IL}$ or V_{IH} $I_{OL} = 24\text{mA}$ 24mA	4.5 5.5		0.36 0.36	0.44 0.44	V
I_{IN}	Maximum Input Leakage Current	$V_{IN} = V_{CC}, \text{GND}$	5.5		± 0.1	± 1.0	μA
ΔI_{CC}	Additional Max I_{CC} /Input	$V_{IN} = V_{CC} - 2.1\text{V}$	5.5	0.6		1.5	mA
I_{OZ}	Maximum 3-State Current	$V_{IN} = (\text{OE}) = V_{IL}, V_{IH}$ $V_{IN} = V_{CC}, \text{GND}$ $V_{OUT} = V_{CC}, \text{GND}$	5.5		± 0.5	± 5.0	μA
I_{CC}	Maximum Quiescent Supply Current		5.5		8.0	80	μA

AC CHARACTERISTICS

Symbol	Parameter ($C_L = 50 \text{ pF}$)	V_{CC}^* (V) $\pm 10\%$	ACT251					Unit
			$T_A = +25^\circ\text{C}$			$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		
			Min	Typ	Max	Min	Max	
tPLH	Propagation Delay A_n to Y or \bar{Y}	5.0	2.5	7.0	15.5	2.0	17	ns
tPHL			2.5	7.5	16.5	2.5	18.5	
tPLH	Propagation Delay D to Y or \bar{Y}	5.0	2.5	5.5	12	2.0	13	ns
tPHL			2.5	6.5	12.5	2.5	14	
tpZH	Output Enable Time Output Enable to Y or \bar{Y}	5.0	1.5	5.0	8.5	1.5	9.0	ns
tpZL			1.5	4.5	8.5	1.5	9.5	
tpHZ	Output Disable Time Output Enable to Y or \bar{Y}	5.0	2.0	6.0	12	2.0	13	ns
tpLZ			1.5	4.5	8.5	1.5	9	

Symbol	Parameter	Test Conditions	Value Typ	Unit
C_{IN}	Input Capacitance	$V_{CC} = 5.0 \text{ V}$	4.5	pF
CPD	Power Dissipation Capacitance	$V_{CC} = 5.0 \text{ V}$	40	pF

SWITCHING WAVEFORMS



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