

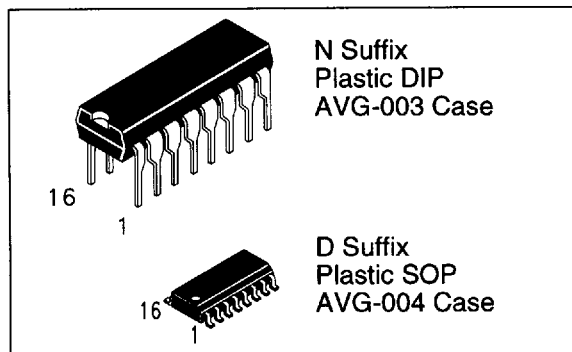
Available Q2, 1995

DV74AC157, DV74ACT157 DV74AC158, DV74ACT158

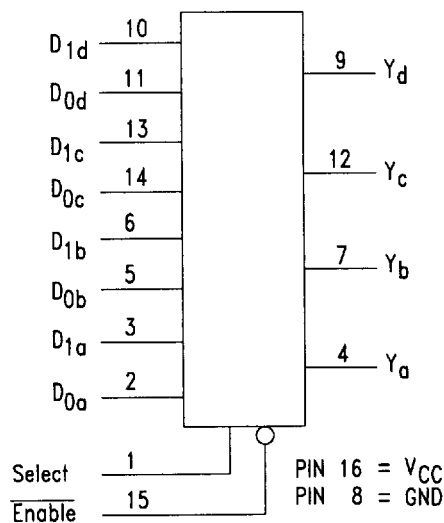
Quad 2-Input Multiplexer

These devices are high speed, quad 2-input multiplexers with common select inputs and enable inputs for each section. It can select 4 bits of data from two sources. In addition to multiplexer operation, it can act as a function generator. The '157 has non-inverted outputs, the '158 has inverted outputs.

- 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 $+85^{\circ}\text{C}$



LOGIC DIAGRAM



PIN ASSIGNMENT

Select	1	16	V_{CC}
D_{0a}	2	15	Enable
D_{1a}	3	14	D_{0c}
Y_a	4	13	D_{1c}
D_{0b}	5	12	Y_c
D_{1b}	6	11	D_{0d}
Y_b	7	10	D_{1d}
GND	8	9	Y_d

TRUTH TABLE

Inputs				'157 Output	'158 Output
\bar{E}	S	D_0	D_1	Y	Y
H	X	X	X	L	H
L	H	X	L	L	H
L	H	X	H	H	L
L	L	L	X	L	H
L	L	H	X	H	L

H=HIGH Voltage Level
L=LOW Voltage Level
X=Don't Care

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ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	AC157-158, ACT157-158	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 $+150$	$^{\circ}\text{C}$

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 _{PD}	Power Dissipation Capacitance	V _{CC} = 5.0 V		50	pF	
C _{IN}	Input Capacitance V _{CC} = 5.0 V	V _{CC} = 5.0 V		4.5	pF	

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

2. V_{IN} from 0.8 to 2.0 V

AC — 157,158

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	AC157,158			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}	I _{OH}	-12mA	3.0		2.56	2.46	V
				-24mA	4.5		3.86	3.76	
		-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}	I _{OH}	12mA	3.0		0.36	0.44	V
				24mA	4.5		0.36	0.44	
		24 mA	5.5		0.36	0.44			
I _{IN}	Maximum Input Leakage Current	V _I = V _{CC} , GND	5.5		±0.1	±1.0	μA		
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5		8.0	80	μA		

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AC CHARACTERISTICS (*Voltage Range 3.3 V is 3.3 V ± 0.3 V; Voltage Range 5.0 V is 5.0 V ± 0.5 V)

Symbol	Parameter (C _L = 50 pF)	V _{CC} (V)	AC157				Unit
			T _A = +25°C		T _A = -40°C to +85°C		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay S to Y _n	3.3	1.5	11.5	1.5	13.0	ns
t _{PHL}		5.0	1.5	9.0	1.5	10.0	
t _{PLH}	Propagation Delay E to Y _n	3.3	1.5	11.0	1.5	12	ns
t _{PHL}		5.0	1.5	8.5	1.0	9.5	
t _{PLH}	Propagation Delay D _n to Y _n	3.3	1.5	8.5	1.0	9.0	ns
t _{PHL}		5.0	1.5	6.5	1.0	7.0	

Symbol	Parameter (C _L = 50 pF)	V _{CC} ±10% (V)	AC158				Unit
			T _A = +25°C		T _A = -40°C to +85°C		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay S to Y _n	3.3	1.5	11.5	1.5	12.5	ns
t _{PHL}		5.0	1.5	9.0	1.0	9.5	
t _{PLH}	Propagation Delay E to Y _n	3.3	1.5	11.5	1.5	12.5	ns
t _{PHL}		5.0	1.5	9.0	1.0	10.0	
t _{PLH}	Propagation Delay D _n to Y _n	3.3	1.5	12.0	1.5	13.0	ns
t _{PHL}		5.0	1.5	9.5	1.5	10.5	
t _{PLH}	Propagation Delay D _n to Y _n	3.3	1.5	9.0	1.5	10.0	ns
t _{PHL}		5.0	1.5	7.0	1.5	7.5	
t _{PLH}	Propagation Delay D _n to Y _n	3.3	1.5	8.0	1.0	8.5	ns
t _{PHL}		5.0	1.5	6.5	1.0	6.5	

ACT — 157, 158

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	ACT157, ACT158			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	4.5	1.5	2.0	2.0	V
			5.5	1.5	2.0	2.0	
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	4.5	1.5	0.8	0.8	V
			5.5	1.5	0.8	0.8	
V _{OH}	Minimum High Level Output Voltage	I _{OUT} = -50 μA	4.5	4.49	4.4	4.4	V
			5.5	5.49	5.4	5.4	
V _{OL}	Maximum Low Level Output Voltage	I _{OUT} = 50 μA	4.5	0.001	0.1	0.1	V
			5.5	0.001	0.1	0.1	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IL} or V _{IH} I _{OH} -24mA -24 mA	4.5		3.86	3.76	V
			5.5		4.86	4.76	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} = V _{IL} or V _{IH} I _{OL} 24mA 24 mA	4.5		0.36	0.44	V
			5.5		0.36	0.44	
I _{IN}	Maximum Input Leakage Current	V _I = V _{CC} , GND	5.5		±0.1	±1.0	μA
ΔI _{CC} T	Additional Max I _{CC} /Input	V _I = V _{CC} - 2.1 V	5.5	0.6		1.5	mA

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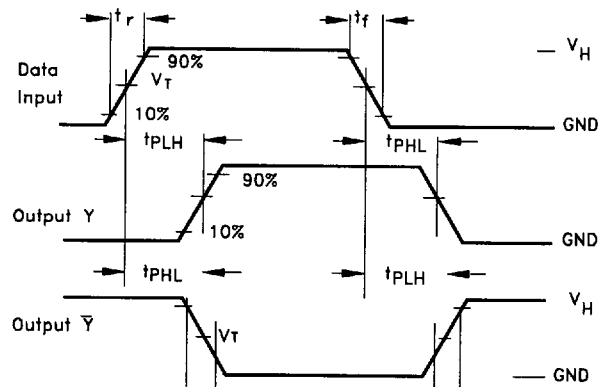
Symbol	Parameter	Conditions	V _{CC} (V)	ACT157, ACT158		Unit	
				T _A = +25°C			T _A = -40 to +85°C
				Typ	Guaranteed Limits		
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5	8.0	80	μA	

AC CHARACTERISTICS

Symbol	Parameter (C _L = 50 pF)	V _{CC} ±10% (V)	ACT157				Unit
			T _A = +25°C		T _A = -40°C to +85°C		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay, S _n to Y _n	5.0	2.0	9.0	1.5	10	ns
t _{PHL}			2.0	9.5	2.0	10.5	
t _{PLH}	Propagation Delay, \bar{E}_n to Y _n	5.0	1.5	10	1.5	11.5	ns
t _{PHL}			1.5	8.5	1.0	9.0	
t _{PLH}	Propagation Delay, D _n to Y _n	5.0	1.5	7.0	1.0	8.5	ns
t _{PHL}			1.5	7.5	1.0	8.5	

Symbol	Parameter (C _L = 50 pF)	V _{CC} (V)	ACT158				Unit
			T _A = +25°C		T _A = -40°C to +85°C		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay, Select to Y _n	5.0	2.5	9.5	2.0	11.0	ns
t _{PHL}			1.5	9.0	1.5	10.0	
t _{PLH}	Propagation Delay, \bar{E}_n to Y _n	5.0	1.5	9.5	1.5	10.5	ns
t _{PHL}			1.5	5.5	1.5	10.5	
t _{PLH}	Propagation Delay, D _n to Y _n	5.0	1.5	4.5	1.0	8.5	ns
t _{PHL}			1.5	6.5	1.0	7.5	

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

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