

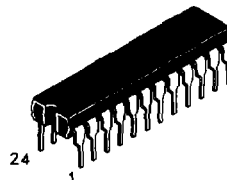
Available Q4, 1995

DV74AC651, DV74AC652 DV74ACT651, DV74ACT652

Octal Transceiver/Register with 3-State Outputs

This device is a high speed registered, bus transceiver circuit with outputs D-flip flops and control circuitry providing multiplexed transmission from the buses or from the internal registers. The 'AC/ACT 651 has inverted outputs. The 'AC/ACT 652 has normal outputs.

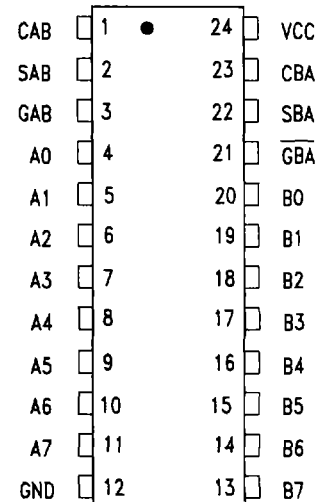
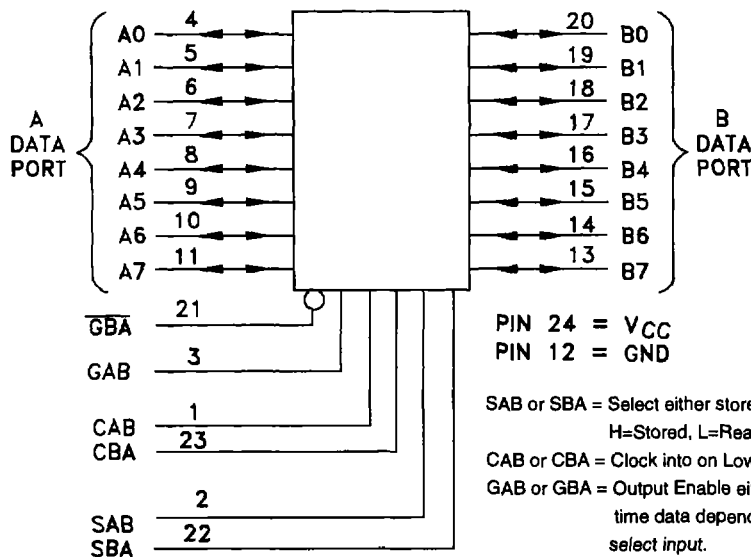
- Advanced very high speed CMOS
- Outputs source/sink 24 mA
- Transmission line driving 50 ohms
- ACT has TTL compatible inputs
- Operation from 2 to 6 volts guaranteed
- DC & AC Parameters guaranteed over -40 to +85°C



N Suffix
Plastic DIP
AVG-011 Case



DW Suffix
Plastic SOP
AVG-012 Case



SAB or SBA = Select either stored or real time data -
 H=Stored, L=Real Time
 CAB or CBA = Clock into on Low to High transition
 GAB or GBA = Output Enable either stored or real
 time data depending on status of
 select input.

AC651 – Inverting Outputs
 ACT652 – Noninverting Outputs

TRUTH TABLE

Inputs						Data I/O		Operation or Function
GAB	GBA	CAB	CBA	SAB	SBA	A0-A7	B0-B7	
L	H	Hor L	Hor L	X	X	Input	Input	Isolation
L	H	↑	↑	X	X	Input	Input	Store A and B Data
X	H	↑	Hor L	X	X	Input	Unspecified*	Store A, Hold B
H	H	↑	↑	X**	X	Input	Output	Store A in Both Registers
L	X	Hor L	↑	X	X	Unspecified*	Input	Hold A, Store B
L	L	↑	↑	X	X**	Output	Input	Store B in Both Registers
L	L	X	X	X	L	Output	Input	Real-Time B Data to A Bus
L	L	X	Hor L	X	H	Output	Input	Stored B Data to A Bus
H	H	X	X	L	X	Input	Output	Real-Time A Data to B Bus
H	H	Hor L	X	H	X	Input	Output	Stored A Data to B Bus
H	L	Hor L	Hor L	H	H	Output	Output	Stored A Data to B Bus and Stored B Data to A Bus

H=HIGH Voltage Level L=LOW Voltage Level X=Don't Care ↑=LOW-to-HIGH Transition
 * The data output functions may be enabled or disabled by various signals at the GBA and GAB inputs.
 Data input functions are always enabled; i.e., data at the bus pins will be stored on every LOW-to-HIGH
 transition of the appropriate clock inputs.
 ** Select control=L:Clocks can occur simultaneously

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ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	Value	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

GUARANTEED OPERATING CONDITIONS over full range

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 (V _{IN} from 30% to 70% V _{CC}) 'AC Devices except Schmitt Inputs	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 (V _{IN} from 0.8 to 2.0 V) 'ACT Devices except Schmitt Inputs	V _{CC} @ 4.5 V		10	ns/V	
		V _{CC} @ 5.5 V		8.0	ns/V	
C _{IN}	Input Capacitance		4.5		pF	
CPD	Power Dissipation Capacitance		45		pF	

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

2. V_{IN} from 0.8 to 2.0 V

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DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	AC651, AC 652			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	

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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} I _{OH} = 12mA 24mA 24 mA	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} , GND	5.5		±0.1	±1.0	μA
I _{OZ}	Maximum 3-State Current	V _{OE} = V _{IH} V _{IN} = V _{CC} or GND V _O = V _{CC} or GND	5.5		±0.6	±6.0	μA
I _{CC}	Maximum Quiescent Supply Current	V _{IN} = V _{CC} or GND	5.5		8.0	80	μA

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)	AC651, AC652				Unit
			T _A = +25°C		T _A = -40°C to +85°C		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay CBA or CAB to A _n or B _n	3.0	4.0	17	3.0	19	ns
t _{PHL}		5.0	2.5	12	2.0	14	
t _{PLH}	Propagation Delay A or B to B _n or A _n	3.0	3.0	14	2.5	16	ns
t _{PHL}		5.0	2.0	9.5	1.5	11	
t _{PLH}	Propagation Delay SBA or SAB to A _n or B _n	3.0	3.0	14	2.5	16	ns
t _{PHL}		5.0	2.5	10	2.0	11.5	
t _{PZH}	Output Enable Time GBA to A _n	3.0	2.5	12	2.0	13.5	ns
t _{PZL}		5.0	1.5	9.0	1.0	10	
t _{PHZ}	Output Disable Time GBA to A _n	3.0	3.0	13	2.5	14	ns
t _{PLZ}		5.0	2.0	11	1.5	12	
t _s	Setup Time, Data to Clock	5.0	7.0		8.0		ns
t _h	Hold Time, Clock to Data	5.0	2.5		2.5		ns
t _w	Clock Pulse Width	5.0	6.0		7.0		ns

ACT — 651, 652

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	ACT651,652			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 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V

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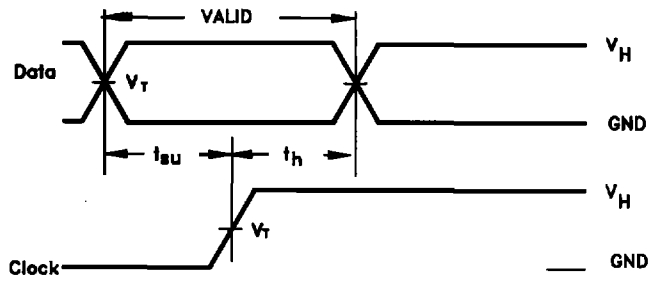
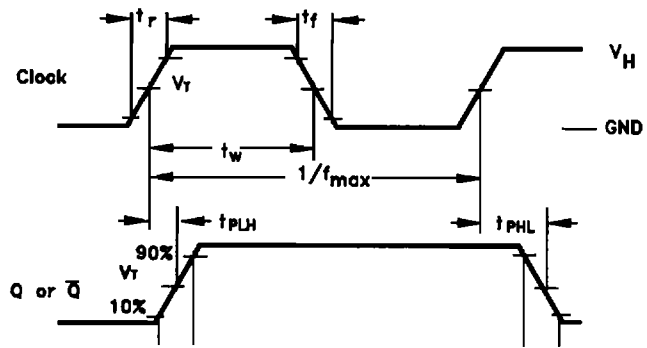
Symbol	Parameter	Conditions	V _{CC} (V)	ACT651,652			Unit
				TA = +25°C		TA = -40 to +85°C	
				Typ	Guaranteed Limits		
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V
V _{OH}	Minimum High Level Output Voltage	I _{OUT} = -50 μA	4.5 5.5	4.49 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} = V _{CC} , GND	5.5		±0.1	±1.0	μA
ΔI _{CCT}	Additional Max I _{CC} /Input	V _{IN} = V _{CC} - 2.1 V	5.5	0.6		1.5	mA
I _{OZ}	Maximum 3-State Current	V _{OE} = V _{IH} V _{IN} = V _{CC} or GND V _O = V _{CC} or GND	5.5		±0.6	±6.0	μA
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} * (V)	ACT651, 652				Unit
			TA = +25°C		TA = -40°C to +85°C		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay, CBA or CAB to A _n or B _n	5.0	4.0	14.5	3.5	16.5	ns
t _{PHL}			3.5	14.5	3.0	16.5	ns
t _{PLH}	Propagation Delay, A or B to B _n or A _n	5.0	2.5	11.5	2.0	13	ns
t _{PHL}			2.5	11.5	2.0	133	ns
t _{PLH}	Propagation Delay, SBA or SAB to A _n or B _n	5.0	2.5	12	2.0	13.5	ns
t _{PHL}			3.0	12	2.5	13.5	ns
t _{PZH}	Output Enable Time, GBA to A _n	5.0	2.0	11.5	1.5	13	ns
t _{PZL}			2.5	11.5	2.0	13	ns
t _{PHZ}	Output Disable Time, GBA to A _n	5.0	3.0	13	2.5	14	ns
t _{PLZ}			2.5	12.5	2.0	14	ns
t _{PZH}	Output Enable Time, GAB to B _n	5.0	2.5	12	2.0	13.5	ns
t _{PZL}			2.5	12	2.0	13.5	ns
t _{PHZ}	Output Disable Time, GAB to B _n	5.0	3.5	13.5	3.0	14.5	ns
t _{PLZ}			3.0	13.5	2.5	15	ns
t _s	Setup Time, HIGH or LOW A _n or B _n to CBA or CAB	5.0	7.0		8.0		ns
t _h	Hold Time, HIGH or LOW A _n or B _n to CPBA or CPAB	5.0	2.5		2.5		ns
t _w	CAB, CBA Pulse Width, HIGH or LOW	5.0	6.0		7.0		ns

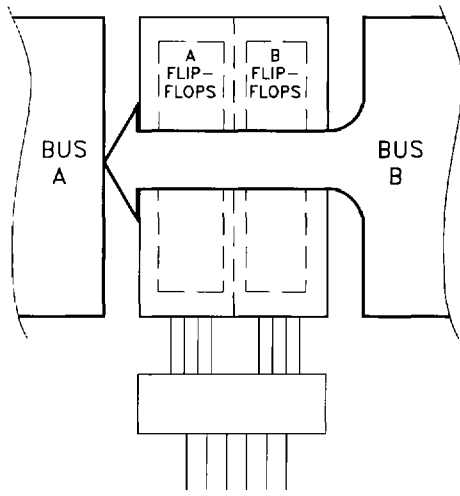
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SWITCHING WAVEFORMS



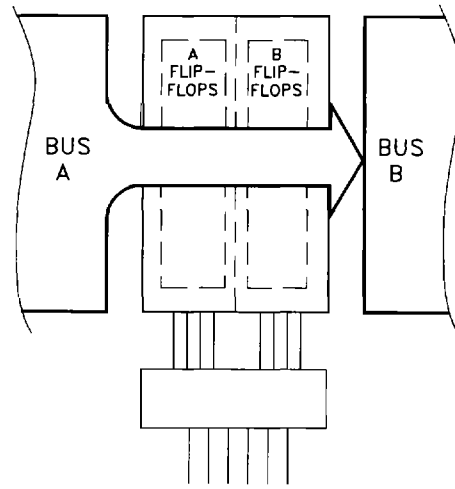
Input and output threshold voltage:
 $V_T = 50\% V_{CC}$ for AC; 1.5V for ACT
 $V_H = V_{CC}$ for AC, 3V for ACT

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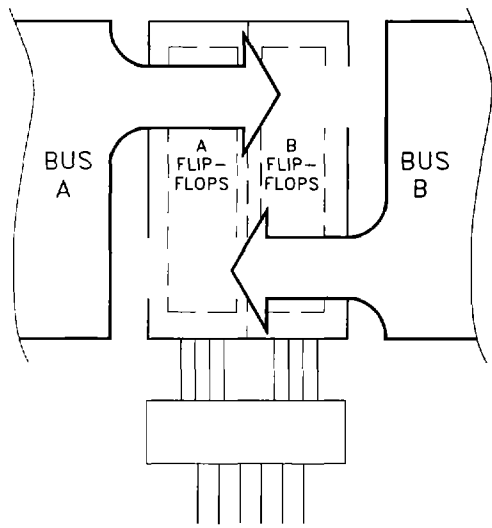
Real-Time Transfer
Bus B to Bus A

Real-Time Transfer Bus B to Bus A						
Pin #	21	3	1	23	2	22
Function	GBA	GAB	CAB	CBA	SAB	SBA
Logic State	L	L	X	X	X	L



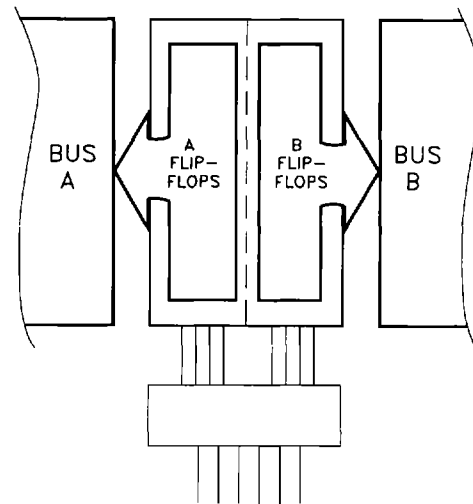
Real-Time Transfer
Bus A to Bus B

Real-Time Transfer Bus A to Bus B						
Pin #	21	3	1	23	2	22
Function	GBA	GAB	CAB	CBA	SAB	SBA
Logic State	H	H	X	X	L	X



Storage From
A, B, or A and B

Storage From A, B or GAB						
Pin #	21	3	1	23	2	22
Function	GBA	GAB	CAB	CBA	SAB	SBA
Logic State	H	L	↑	↑	X	X



Transfer Stored Data
To A or B

Transfer Stored Data to A or B						
Pin #	21	3	1	23	2	22
Function	GBA	GAB	CAB	CBA	SAB	SBA
Logic State	L	H	X	X	H	H