

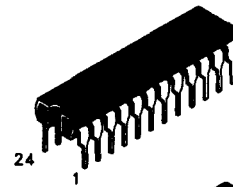
Available Q4, 1995

Octal Transceiver/Register with 3-State Outputs (Non-inverting)

This device consists of registered bus transceiver circuits with outputs, and D-type flip-flops and control circuitry providing multiplexed transmission of data directly from the input bus or from the internal storage registers. Data on the A or B bus will be loaded into the respective registers on the LOW-to-HIGH transition of the appropriate clock pin (CAB or CBA).

- 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

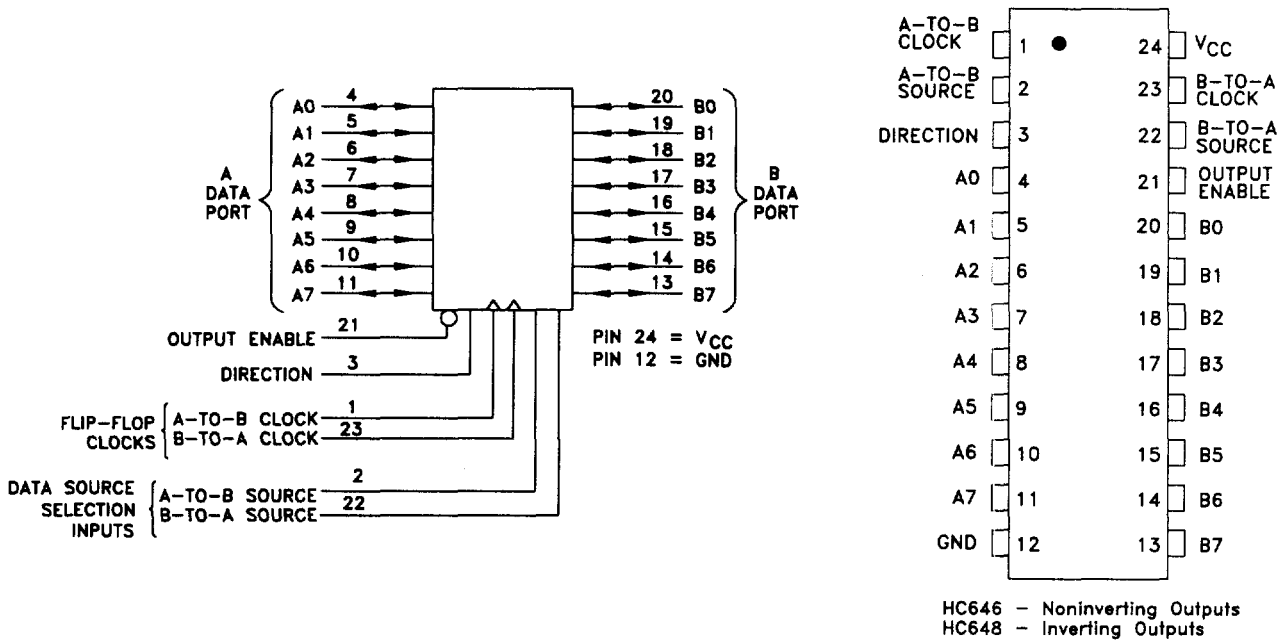
DV74AC646
DV74ACT646



N Suffix
Plastic DIP
AVG-011 Case



D Suffix
Plastic SOP
AVG-012 Case



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TRUTH TABLE

Output Enable	DIR	Clock CAB	Clock CBA	Source SAB	Source SBA	A ₀ -A ₇	B ₀ -B ₇	Operation or Function
H	X	H or L	H or L	X	X	Input	Input	Isolation
H	X	↑	↑	X	X	Input	Input	Store A and B Data
L	L	X	X	X	L	Output	Input	Real Time B Data to A Bus
L	L	X	X	X	H	Output	Input	Stored B Data to A Bus
L	H	X	X	L	X	Input	Output	Real Time A Data to B Bus
L	H	H or L	X	H	X	Input	Output	Stored A Data to B Bus

H=HIGH Voltage Level L=LOW Voltage Level X=Either Low or High Logic Level ↑ = Low to High Transition
The data output functions may be enabled or disabled by various signals at the OE or DIR 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.

ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	AC646, ACT646	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 _{PD}	Power Dissipation Capacitance		60		pF	
C _{IN}	Input Capacitance		4.5		pF	

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

2. V_{IN} from 0.8 to 2.0 V

AC — 646

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	AC646		Unit
				T _A = +25°C	T _A = -40 to +85°C	
				Guaranteed Limits		
V _{IH}	Minimum High Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	3.0	2.1	2.1	V
			4.5	3.15	3.15	
			5.5	3.85	3.85	
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	3.0	0.9	0.9	V
			4.5	1.35	1.35	
			5.5	1.65	1.65	
V _{OH}	Minimum High Level Output Voltage	I _{OUT} = -50 μA	3.0	2.9	2.9	V
			4.5	4.4	4.4	
			5.5	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	
		-24 mA	5.5	4.86	4.76	

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Symbol	Parameter	Conditions	V _{CC} (V)	AC646		Unit
				T _A = +25°C	T _A = -40 to +85°C	
				Guaranteed Limits		
V _{OL}	Maximum Low Level Output Voltage	I _{OUT} = 50 μA	3.0	0.1	0.1	V
			4.5	0.1	0.1	
			5.5	0.1	0.1	
		V _{IN} = V _{IL} or V _{IH}	3.0	0.36	0.44	V
		12mA	4.5	0.36	0.44	
		I _{OH} 24mA	5.5	0.36	0.44	
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	±0.6	±6.0	μA
I _{IN}	Maximum Input Leakage Current	V _{IN} = 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

AC CHARACTERISTICS

Symbol	Parameter (C _L = 50 pF)	V _{CC} (V) ±10%	AC646				Unit
			T _A = +25°C		T _A = -40°C to +85°C		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay Clock to Bus	3.3	4.0	16.5	3.0	18.5	ns
		5.0	2.5	12.0	2.0	13.0	
t _{PHL}	Clock to Bus	3.3	3.0	14.5	2.5	16.0	
		5.0	2.0	10.5	1.5	11.5	
t _{PLH}	Propagation Delay Bus to Bus	3.3	2.5	12.0	2.0	13.5	ns
		5.0	1.5	8.0	1.0	9.0	
t _{PHL}	Bus to Bus	3.3	1.5	12.5	1.5	13.5	
		5.0	1.5	9.0	1.0	9.5	
t _{PLH}	Propagation Delay SBA or SAB to A _n or B _n (w/A _n or B _n HIGH or LOW)	3.3	2.0	13.5	1.5	15.5	ns
		5.0	1.5	10.0	1.5	11.0	
t _{PHL}	SBA or SAB to A _n or B _n (w/A _n or B _n HIGH or LOW)	3.3	1.5	13.5	1.5	15.0	
		5.0	1.5	10.0	1.5	11.0	
t _{PZH}	Enable Time OE to A _n or B _n	3.3	2.5	11.5	2.0	12.5	ns
		5.0	1.5	8.5	1.5	9.0	
t _{PZL}	OE to A _n or B _n	3.3	2.5	12.5	2.0	14.0	ns
		5.0	1.5	9.0	1.5	10.0	
t _{PHZ}	Disable Time OE to A _n or B _n	3.3	3.0	12.5	2.5	13.5	ns
		5.0	2.0	10.0	2.0	11.0	
t _{PLZ}	OE to A _n or B _n	3.3	2.0	12.0	2.0	13.5	ns
		5.0	1.5	9.5	1.5	10.5	
t _{PZH}	Enable Time DIR to A _n or B _n	3.3	2.0	11.0	1.5	12.0	ns
		5.0	1.5	8.0	1.0	8.5	
t _{PZL}	DIR to A _n or B _n	3.3	2.5	11.5	2.0	13.0	ns
		5.0	1.5	8.0	1.0	9.0	
t _{PHZ}	Disable Time DIR to A _n or B _n	3.3	2.5	11.5	1.5	12.5	ns
		5.0	1.5	9.5	1.5	10.0	
t _{PLZ}	DIR to A _n or B _n	3.3	1.5	12.0	1.5	13.5	ns
		5.0	1.5	9.5	1.5	10.5	
t _s	Setup Time, HIGH or LOW Bus to Clock	3.3	5.0		5.5		ns
		5.0	4.0		4.5		
t _h	Hold Time, HIGH or LOW, Bus to Clock	3.3	0		0		ns
		5.0	0.5		1.0		
t _w	Clock Pulse Width HIGH or LOW	3.3	3.5		4.5		ns
		5.0	3.5		3.5		

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DC ELECTRICAL CHARACTERISTICS

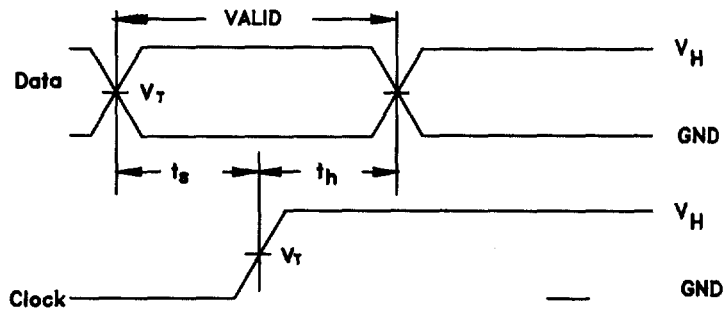
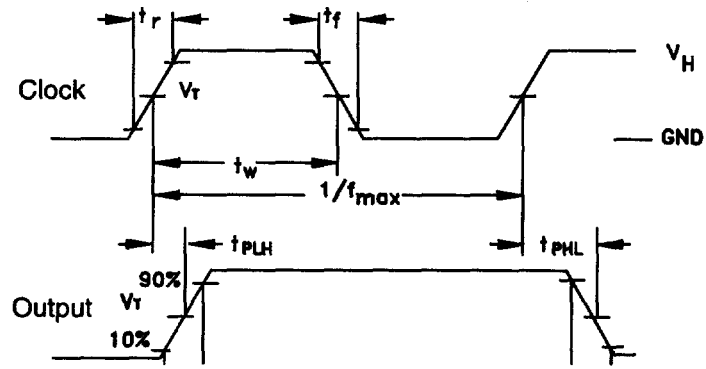
Symbol	Parameter	Conditions	V _{CC} (V)	ACT646		Unit
				TA = +25°C	TA = -40 to +85°C	
				Guaranteed Limits		
V _{IH}	Minimum High Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	4.5	2.0	2.0	V
			5.5	2.0	2.0	
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	4.5	0.8	0.8	V
			5.5	0.8	0.8	
V _{OH}	Minimum High Level Output Voltage	I _{OUT} = -50 μA	4.5	4.4	4.4	V
			5.5	5.4	5.4	
		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	I _{OUT} = 50 μA	4.5	0.1	0.1	V
			5.5	0.1	0.1	
		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 _{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	±0.6	±6.0	μA
ΔI _{CC} T	Additional Max I _{CC} /Input	V _{IN} = V _{CC} - 2.1 V	5.5		1.5	mA
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) ±10%	AC646				Unit
			TA = +25°C		TA = -40°C to +85°C		
			Min	Max	Min	Max	
t _{PLH}	Propogation Delay Clock to Bus	5.0	3.5	14.5	3.0	16.0	ns
t _{PHL}			4.0	14.5	3.5	16.0	
t _{PLH}	Propogation Delay Bus to Bus	5.0	3.0	11.0	2.5	12.0	ns
t _{PHL}			2.5	11.0	2.0	12.0	
t _{PLH}	Propogation Delay SBA or SAB to A _n or B _n (w/A _n or B _n HIGH or LOW)	5.0	3.0	12.0	2.5	13.0	ns
t _{PHL}			3.0	12.0	2.5	13.0	
t _{PZH}	Enable Time OE to A _n or B _n	5.0	2.0	11.0	1.5	12.0	ns
t _{PZL}	OE to A _n or B _n	5.0	3.5	11.0	3.0	12.0	ns
t _{PHZ}	Disable Time OE to A _n or B _n	5.0	5.0	13.0	4.5	14.5	ns
t _{PLZ}			3.5	12.5	3.0	14.0	
t _{PZH}	Enable Time DIR to A _n or B _n	5.0	2.0	12.5	1.5	13.5	ns
t _{PZL}	DIR to A _n or B _n	5.0	3.5	12.5	3.0	13.5	ns
t _{PHZ}	Disable Time DIR to A _n or B _n	5.0	5.0	12.5	4.5	13.5	ns
t _{PLZ}			3.5	12.5	3.0	13.5	
t _s	Setup Time, HIGH or LOW Bus to Clock	5.0	7.0		8.0		ns
t _h	Hold Time, HIGH or LOW, Bus to Clock	5.0	2.5		2.5		ns
t _w	Clock Pulse Width HIGH or LOW	5.0	7.0		8.0		ns

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SWITCHING WAVEFORMS



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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