

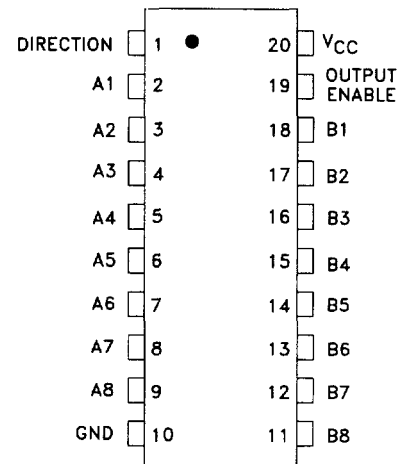
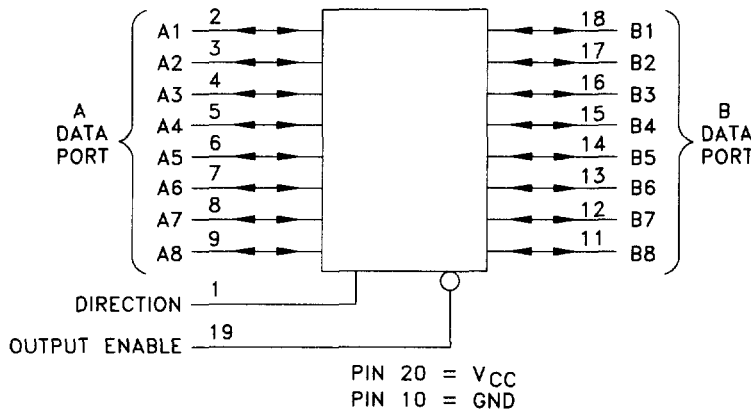
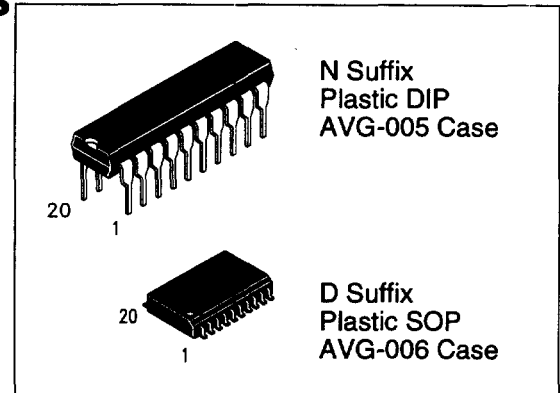
Available Q3, 1995

Octal Bi-Directional Transceiver with 3-State Outputs

This device is designed for asynchronous two-way communication between data buses. The device transmits data from bus A to bus B when Direction Input = HIGH, or from bus B to bus A when Direction Input = LOW. The enable input can be used to disable the device so the buses are effectively isolated.

- 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

DV74AC640 DV74ACT640



TRUTH TABLE

Output Enable	Direction Input	Applied Inputs	Valid Direction I/P → O/P	Output
H	X	X	X	X
L	H	H	A to B	L
L	H	L	A to B	H
L	L	H	B to A	L
L	L	L	B to A	H

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

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ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameter	AC640, ACT640	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	V _{CC} = 5.0 V		45	pF	
C _{IN}	Input Capacitance	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 — 640

DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V _{CC} (V)	AC640		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}	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	0.1	0.1	V		
			4.5	0.1	0.1			
			5.5	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 _{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		

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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 ($C_L = 50 \text{ pF}$)	V _{CC} (V) ±10%	AC640				Unit
			T _A = +25°C		T _A = -40°C to +85°C		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay A _n to B _n or B _n to A _n	3.3	1.5	8.5	1.0	9.5	ns
		5.0	1.5	6.5	1.0	7.5	
t _{PHL}		3.3	1.5	8.5	1.0	9.5	
		5.0	1.5	6.5	1.0	7.5	
t _{PZH}	Output Enable Time	3.3	2.5	11.5	2.0	12.5	ns
		5.0	1.5	8.0	1.0	9.0	
t _{PZL}		3.3	2.5	12.5	2.0	13.5	ns
		5.0	1.5	9.5	1.0	10	
t _{PHZ}	Output Disable Time	3.3	2.0	12.0	1.0	12.5	ns
		5.0	1.5	9.0	1.0	10	
t _{PLZ}		3.3	2.0	12.0	1.5	13.5	ns
		5.0	1.5	9.5	1.0	10.5	

ACT — 640

DC ELECTRICAL CHARACTERISTICS

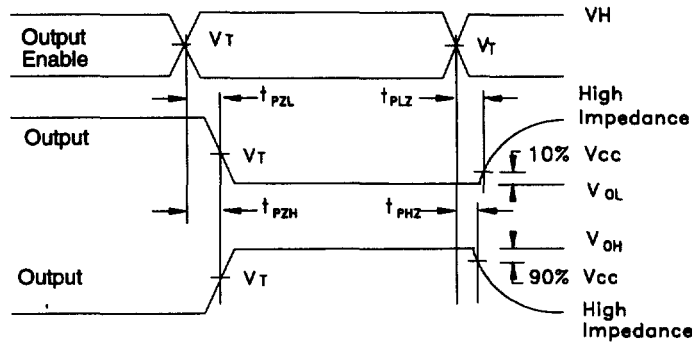
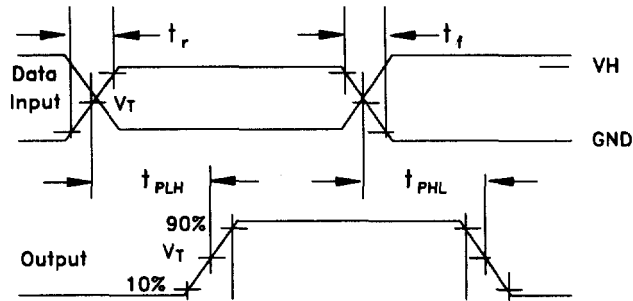
Symbol	Parameter	Conditions	V _{CC} (V)	ACT640		Unit
				T _A = +25°C	T _A = -40 to +85°C	
				Guaranteed Limits		
V _{IH}	Minimum High Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	4.5 5.5	2.0 2.0	2.0 2.0	V
V _{IL}	Maximum Low Level Input Voltage	V _{OUT} = 0.1V or V _{CC} - 0.1 V	4.5 5.5	0.8 0.8	0.8 0.8	V
V _{OH}	Minimum High Level Output Voltage	I _{OUT} = -50 μA	4.5 5.5	4.4 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 _{OL}	Maximum Low Level Output Voltage	I _{OUT} = 50 μA	4.5 5.5	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	
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 _{CCCT}	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

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AC CHARACTERISTICS

Symbol	Parameter ($C_L = 50 \text{ pF}$)	V_{CC} (V) $\pm 10\%$	ACT640				Unit
			$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		
			Min	Max	Min	Max	
t_{PLH}	Propagation Delay, A_n to B_n or B_n to A_n	5.0	1.5	1.5	1.0	8.5	ns
t_{PHL}			1.5	8.0	1.0	9.0	ns
t_{PZH}	Output Enable Time	5.0	1.5	10.0	1.0	11.0	ns
t_{PZL}			1.5	10.0	1.0	11.0	ns
t_{PHZ}	Output Disable Time	5.0	1.5	10.0	1.0	11.0	ns
t_{PLZ}			1.5	10.0	1.0	11.0	ns

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