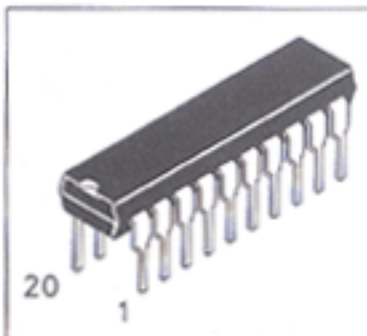
Octal 3-State Noninverting Bus Transceiver

DV74HC245A
DV74HCT245A

The DV74HC245A and DV74HCT245A are identical in pinout to the LS245. This 3-state non-inverting transceiver is used for 2-way asynchronous commmunication between data busses. The device has an active-low Output Enable pin, which is used to place the I/O ports into high-impedance states. The Direction control determines whether data flows from A to B or from B to A. The output enable input, when high, disables both A and B ports by placing them in a high "Z" condition.

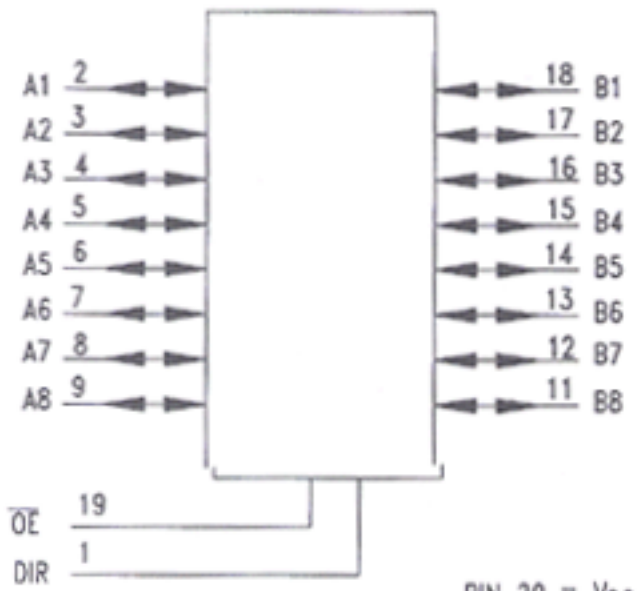
- **Output Drive Capability: 15 LSTTL Loads**
- **Outputs Directly Interface to CMOS, NMOS, and TTL**
- **Operating Voltage Range: 2 to 6 V for HC device**
- **Low Input Current: 1 μA**
- **DC, AC parameters guaranteed from -55°C to 125°C**



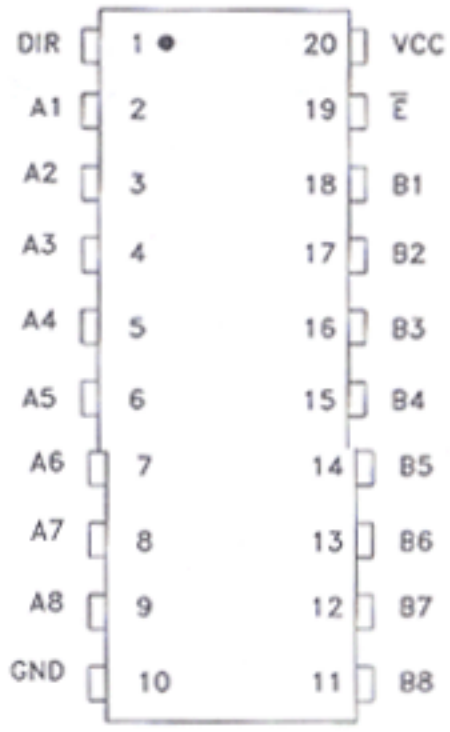
N Suffix
Plastic DIP
AVG-005 Case

DW Suffix
Plastic SOP
AVG-006 Case

245



PIN ASSIGNMENT



TRUTH TABLE

Control Inputs		Operation
Output Enable	Direction	
L	L	Data Transmited from Bus B to Bus A
L	H	Data Transmitted from Bus A to Bus B
H	X	High Z State

H = High Logic Level
L = Low Logic Level
X = Don't Care
Z = High Impedance

ABSOLUTE MAXIMUM RATINGS

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

Symbol	Parameters	Value	Unit
V_{CC}	DC Supply Voltage (Referenced to GND)	– 0.5 to + 7.0	V
V_{IN}	DC Input Voltage (Referenced to GND)	– 1.5 to V_{CC} + 1.5	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	± 35	mA
I_{CC}	DC Supply Current, Vcc and GND Pins	± 75	mA
PD	Power Dissipation in Still Air, Plastic DIP SOP Package	750 500	mW
Tstg	Storage Temperature	– 65 to +150	°C
T_L	Lead Temperature, 1mm from Case for 10 seconds	260	°C

GUARANTEED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	DC Supply Voltage HC(HCT), Referenced to GND	2.0(4.5)	6.0(5.5)	V
V_{IN}, V_{OUT}	DC Input Voltage, Output Voltage ,Referenced to GND	0	V_{CC}	V
T_A	Ambient Temperature	–55	+125	°C
t_r, t_f	Input Rise and Fall Time: HC: V_{CC}=2.0V HCT: V_{CC}=5.5V / HC: V_{CC}=4.5V HC: V_{CC}=6.0V	0 0 0	1000 500 400	ns

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DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V_{CC} (V)	Guaranteed Limits			Unit
				25°C to -55°C	≤ 85°C	≤ 125°C	
V_{IH}	Minimum High Level Input Voltage	V_{OUT} = V_{CC}–0.1 V $\|I_{OUT}\|$ ≤ 20 µA	2.0 4.5 6.0	1.5 3.15 4.2	1.5 3.15 4.2	1.5 3.15 4.2	V
V_{IL}	Maximum Low Level Input Voltage	V_{OUT} = 0.1V $\|I_{OUT}\|$ ≤ 20 µA	2.0 4.5 6.0	0.5 1.35 1.8	0.5 1.35 1.8	0.5 1.35 1.8	V
V_{OH}	Minimum High Level Output Voltage	V_{IN} = V_{IH} $\|I_{OUT}\|$ ≤ 20 µA	2.0 4.5 6.0	1.9 4.4 5.9	1.9 4.4 5.9	1.9 4.4 5.9	V
		V_{IN} = V_{IH} $\|I_{OUT}\|$ ≤ 6.0 mA $\|I_{OUT}\|$ ≤ 7.8 mA	 4.5 6.0	 3.98 5.48	 3.84 5.34	 3.70 5.20	V
V_{OL}	Maximum Low Level Output Voltage	V_{IN} = V_{IL} $\|I_{OUT}\|$ ≤ 20 µA	2.0 4.5 6.0	0.1 0.1 0.1	0.1 0.1 0.1	0.1 0.1 0.1	V
		V_{IN} = V_{IL} $\|I_{OUT}\|$ ≤ 6.0 mA $\|I_{OUT}\|$ ≤ 7.8 mA	 4.5 6.0	 0.26 0.26	 0.33 0.33	 0.40 0.40	V
I_{IN}	Maximum Input Leakage Current	V_{IN}=V_{CC} or GND	6.0	±0.1	±1.0	±1.0	µA
I_{OZ}	Maximum 3-State Current (Output in High Impedence State)	V_{IN}=V_{IL} or V_{IH} V_{OUT}=V_{CC} or GND, I/O Pins	6.0	±0.5	±5.0	±10.0	mA
I_{CC}	Maximum Quiescent Supply Current	V_{IN} = V_{CC} or GND I_{OUT} = 0 µA	6.0	4	40	160	µA

AC CHARACTERISTICS over full operating conditions (C_L=50pF, Input t_f=t_r=6.0ns)

Symbol	Parameter	V_{CC} (V)	Guaranteed Limits			Unit
			25° C to –55°C	≤ 85°C	≤ 125°C	
t_{PLH}, t_{PHL}	Maximum Propagation Delay A to B or B to A	2.0 4.5 6.0	75 15 13	100 20 16	110 22 20	ns
t_{PLZ}, t_{PHZ}	Maximum Propagation Delay Output Disable or Direction to Output	2.0 4.5 6.0	110 22 20	140 28 24	165 33 28	ns
t_{PZL}, t_{PZH}	Maximum Propagation Delay Direction or Output Enable to Output	2.0 4.5 6.0	110 22 19	140 28 24	165 33 28	ns

Symbol	Parameter	V_{CC} (V)	Guaranteed Limits			Unit
			25° C to −55°C	≤ 85°C	≤ 125°C	
t_{TLH} t_{THL}	Maximum Output Transition Time, Any Output	2.0 4.5 6.0	60 12 10	75 15 13	90 18 15	ns
C_{IN}	Maximum Input Capacitance		10	10	10	pF
C_{OUT}	Maximum Three-State Output Capacitance (Output in High-Impedance State)		15	15	15	pF

C_{PD}	Power Dissipation Capacitance (Output in High-Impedance) Used to determine the no-load dynamic power consupmption: $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$	Typical @ 25oC, V_{CC} = 5.0 V 40	pF

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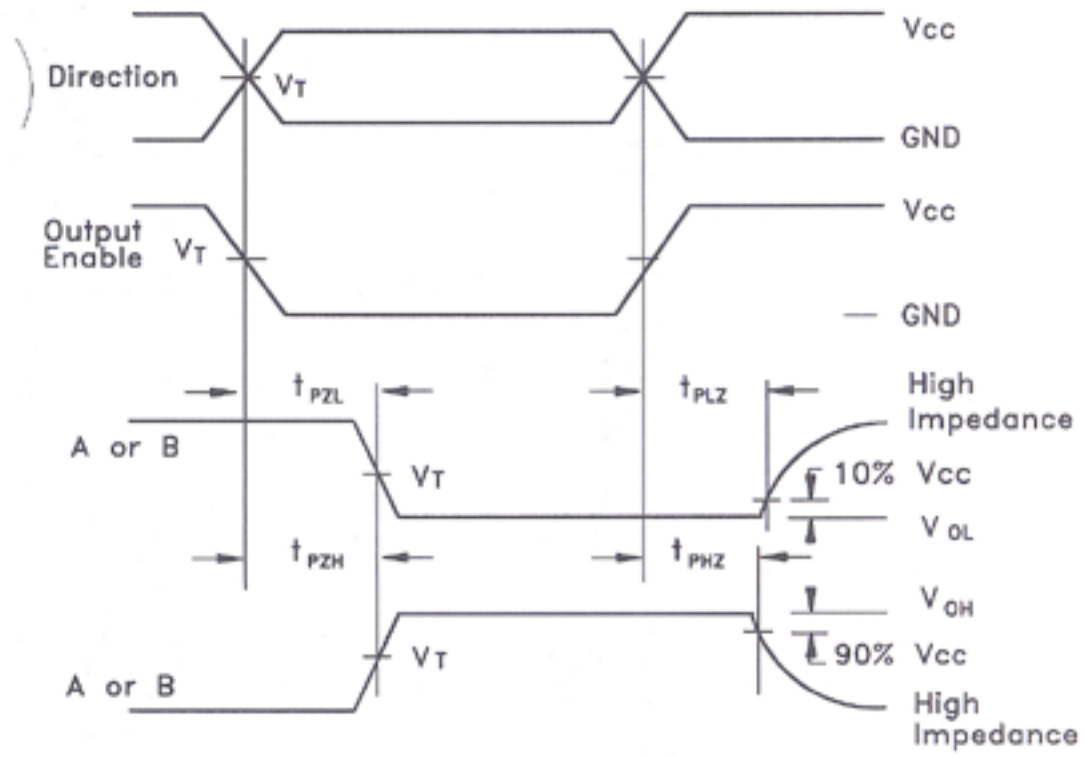
DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V_{CC} (V)	Guaranteed Limits			Unit
				25°C to −55°C	≤ 85°C	≤ 125°C	
V_{IH}	Minimum High Level Input Voltage	V_{OUT} = V_{CC}−0.1 V $\|I_{OUT}\| \le$ 20 µA	4.5 5.5	2.0 2.0	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 $\|I_{OUT}\| \le$ 20 µA	4.5 5.5	0.8 0.8	0.8 0.8	0.8 0.8	V
V_{OH}	Minimum High Level Output Voltage	V_{IN} = V_{IH} $\|I_{OUT}\| \le$ 20 µA	4.5 5.5	4.4 5.4	4.4 5.4	4.4 5.4	V
		V_{IN} = V_{IH} $\|I_{OUT}\| \le$ 6.0 mA	4.5	3.98	3.84	3.70	V
V_{OL}	Maximum Low Level Output Voltage	V_{IN} = V_{IL} $\|I_{OUT}\| \le$ 20 µA	4.5 5.5	0.1 0.1	0.1 0.1	0.1 0.1	V
		V_{IN} = V_{IL} $\|I_{OUT}\| \le$ 6.0 mA	4.5	0.26	0.33	0.40	V
I_{IN}	Maximum Input Leakage Current	V_{IN}=V_{CC} or GND, Pins 1 or 19	5.5	±0.1	±1.0	±1.0	µA
I_{OZ}	Maximum 3-State Current (Output in High Impedence State)	V_{IN}=V_{IL} or V_{IH} V_{OUT}=V_{CC} or GND, I/O Pins	5.5	±0.5	±5.0	±10.0	mA
I_{CC}	Maximum Quiescent Supply Current	V_{IN} = V_{CC} or GND I_{OUT} = 0 µA	6.0	4	40	160	µA
ΔI_{CC}	Additional Quiescent Supply Current (per Package)	V_{IN}=2.4 V, Any One Input V_{IN}= V_{CC} or GND, Other Inputs I_{OUT} = 0 µA	5.5	-55°C to 25°C 2.9	25°C to 125°C 2.4		mA

AC CHARACTERISTICS (V_{CC}=5.0 ± 10%, C_L=50 pF, Input $t_r = t_f$ = 6.0 ns)

Symbol	Parameter	Vcc V	Guaranteed Limits			Unit
			25°C to −55°C	≤ 85°C	≤ 125° C	
t_{PLH}, t_{PHL}	Maximum Propagation Delay A to B or B to A	5.0	22	28	33	ns
t_{PLZ}, t_{PHZ}	Maximum Propagation Delay Time, Output Disable to A or B	5.0	32	40	48	ns
t_{TZL}, t_{TZH}	Maximum Propagation Delay Time, Output Enable to A or B	5.0	30	38	45	ns
t_{TLH}, t_{THL}	Maximum Output Transition Time, any Output	5.0	12	15	18	ns
C_{IN}	Maximum Input Capacitance		10	10	10	pF
C_{OUT}	Maximum Three-State Output Capacitance (I/O in High-Impedance State)		15	15	15	pF
C_{PD}	Power Dissipation Capacitance (Per Enabled Output) Used to determine the no-load dynamic power consumption: $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$			Typical @ 25°C, V_{CC} = 5.0 V		pF
				45		

SWITCHING WAVEFORMS



Input threshold voltage, V_T = 50% Vcc for HC; 1.3V for HCT
VH = Vcc for HC, 3V for HCT