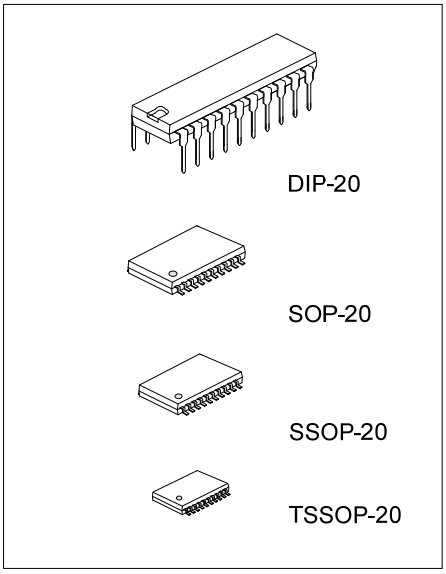
U74AHC245

CMOS IC

OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS



■ DESCRIPTION

The **U74AHC245** octal bus transceivers is designed for asynchronous two-way communication between data buses. The control-function implementation minimizes external timing requirements.

The device allows data transmission from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable ($\overline{OE}$) input can be used to disable the device so that the buses are effectively isolated.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

■ FEATURES

* Operating range 2V to 5.5V V_{CC}

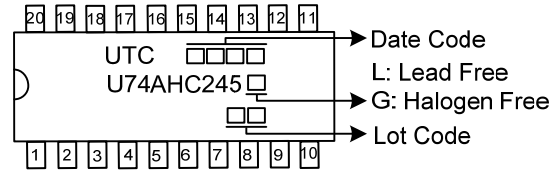
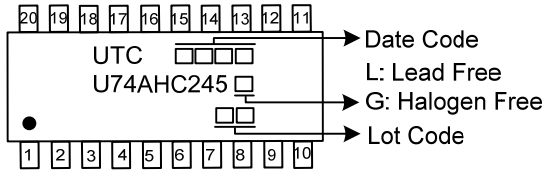
■ ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AHC245L-D20-T	U74AHC245G-D20-T	DIP-20	Tube
U74AHC245L-S20-R	U74AHC245G-S20-R	SOP-20	Tape Reel
U74AHC245L-R20-R	U74AHC245G-R20-R	SSOP-20	Tape Reel
U74AHC245L-P20-R	U74AHC245G-P20-R	TSSOP-20	Tape Reel

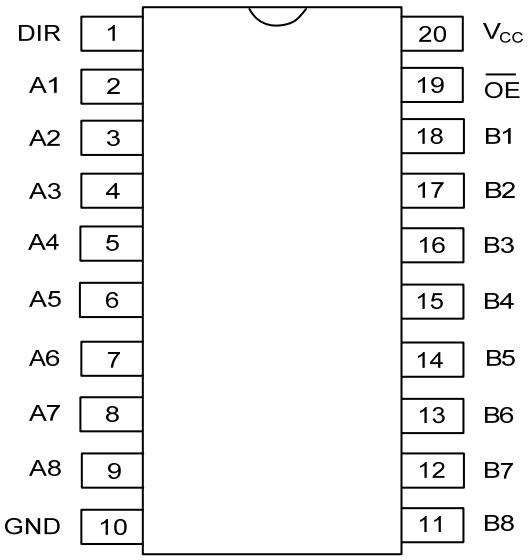
U74AHC245G-D20-T
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) D20: DIP-20, S20: SOP-20, R20: SSOP-20
P20: TSSOP-20
(3) G: Halogen Free and Lead Free, L: Lead Free

■ MARKING

DIP-20	SOP-20 / SSOP-20 / TSSOP-20
	

■ PIN CONFIGURATION

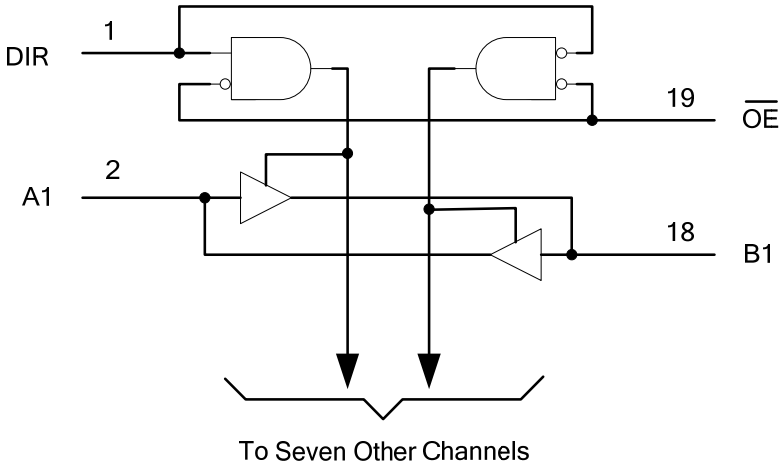


■ FUNCTION TABLE

INPUT		FUNCTION
$\overline{OE}$	DIR	
H	X	Isolation
L	H	Transmit data from A bus to B bus
L	L	Transmit data from B bus to A bus

Note: H: HIGH voltage level;
L: LOW voltage level;
X: Don't care

■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	-0.5 ~ 7.0	V
Input Voltage Range	V_I	-0.5 ~ 7.0	V
Output Voltage Range	V_O	-0.5 ~ V_{CC}+0.5	V
Input Clamp Current (V_{iN}<0)	I_{IK}	-20	mA
Output Clamp Current (V_O<0 or V_O>V_{CC})	I_{OK}	±20	mA
Output Current	I_{OUT}	±25	mA
V_{CC} or GND Current	I_{CC}	±75	mA
Storage Temperature	T_{STG}	-65 ~ +150	°C

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

■ RECOMMENDED OPERATING CONDITIONS (Unless otherwise specified)

PARAMETER		SYMBOL	MIN	TYP	MAX	UNIT
Supply Voltage		V_{CC}	2		5.5	V
Input Voltage		V_{IN}	0		5.5	V
Output Voltage		V_{OUT}	0		V_{CC}	V
Input Transition Rise or Fall Rate	V_{CC} =3.3V±0.3V	Δt/Δv			100	ns/V
	V_{CC} =5V±0.5V				20	
Operating Free-air Temperature		T_A	-40		+125	°C

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-20	θ_{JA}	57	°C/W
	SOP-20		80	°C/W
	SSOP-20		96	°C/W
	TSSOP-20		103	°C/W

■ ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
HIGH-level input voltage		V_{IH}	V_{CC}=2V	1.5			V
			V_{CC}=3V	2.1			
			V_{CC}=5.5V	3.85			
LOW-lever output voltage		V_{IL}	V_{CC}=2V			0.5	V
			V_{CC}=3V			0.9	
			V_{CC}=5.5V			1.65	
High-Level Output Voltage		V_{OH}	V_{CC}=2V, I_{OH}=-50μA	1.9	2		V
			V_{CC}=3V, I_{OH}=-50μA	2.9	3		
			V_{CC}=4.5V, I_{OH}=-50μA	4.4	4.5		
			V_{CC}=3V, I_{OH}=-4mA	2.58			
			V_{CC}=4.5V, I_{OH}=-8mA	3.94			
Low-Level Output Voltage		V_{OL}	V_{CC}=2V, I_{OL}=50μA			0.1	V
			V_{CC}=3V, I_{OL}=50μA			0.1	
			V_{CC}=4.5V, I_{OL}=50μA			0.1	
			V_{CC}=3V, I_{OL}=4mA			0.36	
			V_{CC}=4.5V, I_{OL}=8mA			0.36	
Input Leakage Current	A or B inputs	$I_{I(LEAK)}$	V_{CC}=5.5V, V_{IN}=V_{CC} or GND			±0.1	μA
	$\overline{OE}$ or DIR		V_{CC}=0 to 5.5V, V_{IN}=V_{CC} or GND				
Output OFF-state current		I_{OZ}	V_{CC}=5.5V, V_{OUT}=V_{CC} or GND			±0.25	μA
Quiescent Supply Current		I_Q	V_{CC}=5.5V, V_{IN}=V_{CC} or GND, I_{OUT}=0			4	μA
Input Capacitance ($\overline{OE}$ or DIR)		C_{IN}	V_{CC}=5V, V_{IN}=V_{CC} or GND		2.5	10	pF
Input Capacitance (A or B inputs)		C_{IO}	V_{CC}=5V, V_{IN}=V_{CC} or GND		4		pF

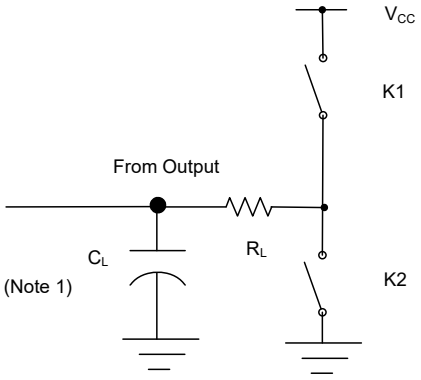
■ SWITCHING CHARACTERISTICS (R_L=1kΩ, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output (B or A)	t_{pd} (t_{PLH}/t_{PHL})	V_{CC}=3.3V±0.3V, C_L=15pF		5.8	8.4	ns
		V_{CC}=3.3V±0.3V, C_L=50pF		8.3	11.9	
		V_{CC}=5V±0.5V, C_L=15pF		4	5.5	
		V_{CC}=5V±0.5V, C_L=50pF		5.5	7.5	
3-state output enable time from input ($\overline{OE}$) to output (A or B)	t_{en} (t_{PZL}/t_{PZH})	V_{CC}=3.3V±0.3V, C_L=15pF		8.5	13.2	ns
		V_{CC}=3.3V±0.3V, C_L=50pF		11	16.7	
		V_{CC}=5V±0.5V, C_L=15pF		5.8	8.5	
		V_{CC}=5V±0.5V, C_L=50pF		7.3	10.6	
3-state output disable time from input ($\overline{OE}$) to output (A or B)	t_{dis} (t_{PLZ}/t_{PHZ})	V_{CC}=3.3V±0.3V, C_L=15pF		8.9	12.5	ns
		V_{CC}=3.3V±0.3V, C_L=50pF		11.5	15.8	
		V_{CC}=5V±0.5V, C_L=15pF		5.6	7.8	
		V_{CC}=5V±0.5V, C_L=50pF		7	9.7	

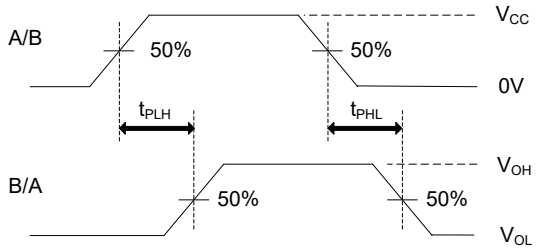
■ OPERATING CHARACTERISTICS (V_{CC}=5V, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load, f=1MHz		14		pF

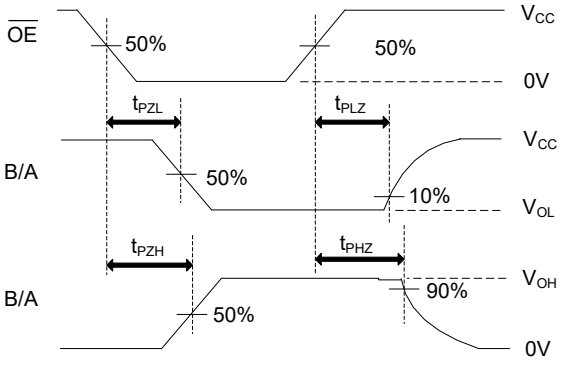
■ TEST CIRCUIT AND WAVEFORMS



TEST	K1	K2
t_{PLH}/t_{PHL}	Open	Open
t_{PHZ}/t_{PZH}	Open	Close
t_{PLZ}/t_{PZL}	Close	Open



PROPAGATION DELAY TIMES



ENABLE AND DISABLE TIMES

Notes: 1. C_L includes probe and jig capacitance.
2. All input pulses are supplied by generators having the following characteristics:
PRR≤1MHZ, Z_O=50Ω, t_r ≤ 3ns, t_f ≤ 3ns.
3. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms