



## U74HC245

CMOS IC

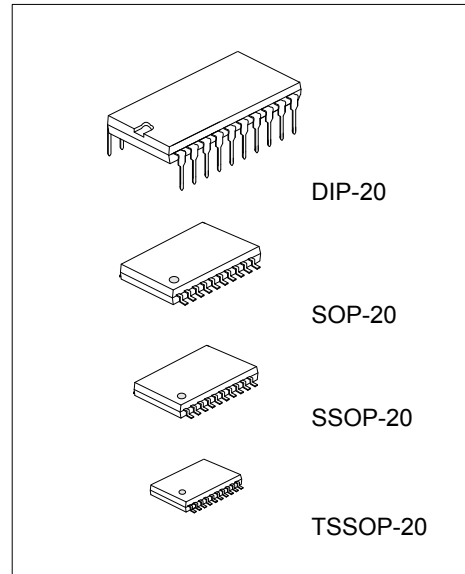
### OCTAL BUS TRANSCEIVERS WITH 3-STATE OUTPUTS

#### DESCRIPTION

The **U74HC245** is designed for the asynchronous communication between data buses. While the direction-control(DIR) is high, data transmits from the A bus to the B bus. Data transmits from the B bus to the A bus if DIR is low. The output-enable( $\overline{OE}$ ) will isolate the device from the buses when high voltage is applied on it.

#### FEATURES

- \* Operate from 2V to 6V
- \* Max  $t_{PD}$  is 18ns at 6V



#### ORDERING INFORMATION

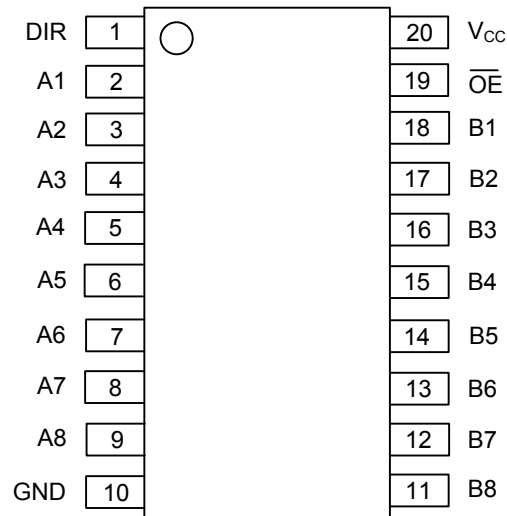
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC245L-D20-T	U74HC245G-D20-T	DIP-20	Tube
U74HC245L-S20-R	U74HC245G-S20-R	SOP-20	Tape Reel
U74HC245L-R20-R	U74HC245G-R20-R	SSOP-20	Tape Reel
U74HC245L-P20-R	U74HC245G-P20-R	TSSOP-20	Tape Reel

<p>U74HC245G-D20-T</p> <p>(1) Packing Type (2) Package Type (3) Green Package</p>	<p>(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</p>
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#### MARKING

DIP-20	SOP-20 / SSOP-20 / TSSOP-20
<p>20 19 18 17 16 15 14 13 12 11 → Date Code UTC □□□□ → L: Lead Free U74HC245 □ → G: Halogen Free □□ → Lot Code</p>	<p>20 19 18 17 16 15 14 13 12 11 → Date Code UTC □□□□ → L: Lead Free U74HC245 □ → G: Halogen Free □□ → Lot Code</p>

■ PIN CONFIGURATION

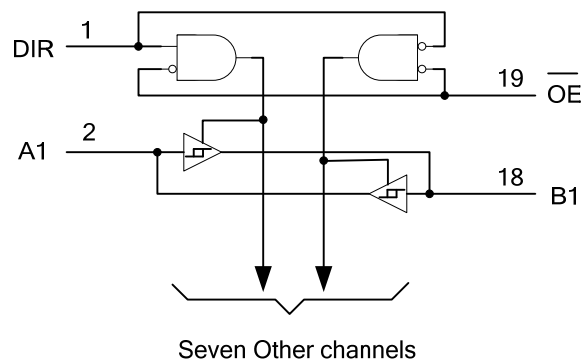


■ FUNCTION TABLE

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.

■ LOGIC DIAGRAM



■ ABSOLUTE MAXIMUM RATING (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	-0.5 ~ 7.0	V
Input Clamp Current (V <sub>IN</sub> <0)	I <sub>IK</sub>	±20	mA
Output Clamp Current (V <sub>OUT</sub> <0)	I <sub>OK</sub>	±20	mA
Output Current	I <sub>OUT</sub>	±35	mA
V <sub>CC</sub> or GND Current	I <sub>CC</sub>	±70	mA
Storage Temperature	T <sub>STG</sub>	-65 ~ +150	°C

Note: 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.

■ THERMAL DATA

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

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V <sub>CC</sub>		2	5	6	V
Input Voltage	V <sub>IN</sub>		0		V <sub>CC</sub>	V
Output Voltage	V <sub>OUT</sub>		0		V <sub>CC</sub>	V
Input Transition Rise and Fall Time	t <sub>R</sub> / t <sub>F</sub>	V <sub>CC</sub> = 2V			1000	ns
		V <sub>CC</sub> = 4.5V			500	ns
		V <sub>CC</sub> = 6V			400	ns
Ambient Operating Temperature	T <sub>A</sub>		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-level input voltage	V <sub>IH</sub>	V <sub>CC</sub> =2V	1.5			V
		V <sub>CC</sub> =4.5V	3.15			V
		V <sub>CC</sub> =6V	4.2			V
Low-level output voltage	V <sub>IL</sub>	V <sub>CC</sub> =2V			0.5	V
		V <sub>CC</sub> =4.5V			1.35	V
		V <sub>CC</sub> =6V			1.8	V
High-Level Output Voltage	V <sub>OH</sub>	V <sub>CC</sub> =2V, I <sub>OH</sub> =-20μA	1.9	1.998		V
		V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-20μA	4.4	4.499		V
		V <sub>CC</sub> =6V, I <sub>OH</sub> =-20μA	5.9	5.999		V
		V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-6mA	3.98	4.3		V
		V <sub>CC</sub> =6V, I <sub>OH</sub> =-7.8mA	5.48	5.8		V
Low-Level Output Voltage	V <sub>OL</sub>	V <sub>CC</sub> =2V, I <sub>OL</sub> =20μA		0.002	0.1	V
		V <sub>CC</sub> =4.5V, I <sub>OL</sub> =20μA		0.001	0.1	V
		V <sub>CC</sub> =6V, I <sub>OL</sub> =20μA		0.001	0.1	V
		V <sub>CC</sub> =4.5V, I <sub>OL</sub> =6mA		0.17	0.26	V
		V <sub>CC</sub> =6V, I <sub>OL</sub> =7.8mA		0.15	0.26	V
Input Current of DIR or $\overline{OE}$	I <sub>I(LEAK)</sub>	V <sub>CC</sub> =6V, V <sub>IN</sub> =V <sub>CC</sub> or GND		±0.1	±100	nA
Output OFF-state current	I <sub>OZ</sub>	V <sub>CC</sub> =6V, V <sub>OUT</sub> =V <sub>CC</sub> or GND		±0.01	±0.5	μA
Quiescent Supply Current	I <sub>Q</sub>	V <sub>CC</sub> =6V, V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0			8	μA
Input Capacitance of DIR or $\overline{OE}$	C <sub>IN</sub>	V <sub>CC</sub> =6V, V <sub>IN</sub> =V <sub>CC</sub> or GND		3	10	pF

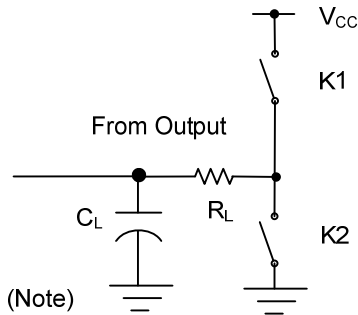
■ SWITCHING CHARACTERISTICS ( $T_A=25^\circ\text{C}$ ,  $C_L=50\text{pF}$ ,  $R_L=1\text{k}\Omega$ , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation delay from input (A or B) to output (B or A)	$t_{PD}$ ( $t_{PLH}/t_{PHL}$ )	$V_{CC}=2\text{V}$		40	105	ns
		$V_{CC}=4.5\text{V}$		15	21	ns
		$V_{CC}=6\text{V}$		12	18	ns
3-state output enable time from input ( $\overline{OE}$ ) to output (A or B)	$t_{EN}$ ( $t_{PZL}/t_{PZH}$ )	$V_{CC}=2\text{V}$		125	230	ns
		$V_{CC}=4.5\text{V}$		23	46	ns
		$V_{CC}=6\text{V}$		20	39	ns
3-state output disable time from input ( $\overline{OE}$ ) to output (A or B)	$t_{DIS}$ ( $t_{PLZ}/t_{PHZ}$ )	$V_{CC}=2\text{V}$		74	200	ns
		$V_{CC}=4.5\text{V}$		25	40	ns
		$V_{CC}=6\text{V}$		21	34	ns
Output transition time (A or B)	$t_T$ ( $t_R/t_F$ )	$V_{CC}=2\text{V}$		20	60	ns
		$V_{CC}=4.5\text{V}$		8	12	ns
		$V_{CC}=6\text{V}$		6	10	ns

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	$C_{PD}$	No load		40		pF

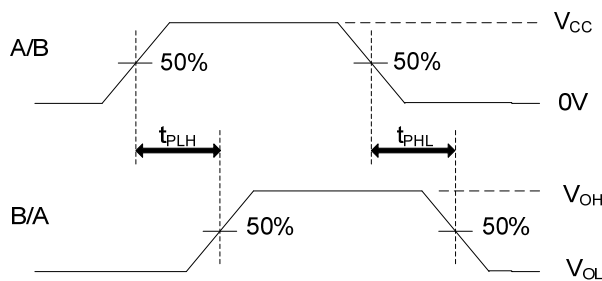
■ TEST CIRCUIT AND WAVEFORMS



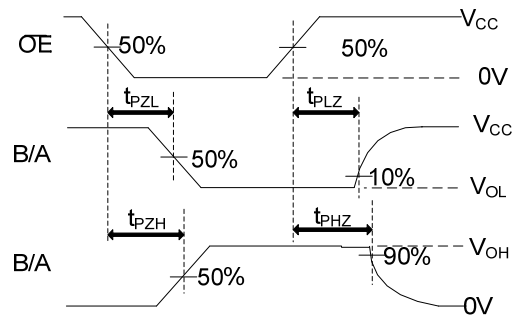
TEST	K1	K2
$t_{PLH}/t_{PHL}$	Open	Open
$t_{PHZ}/t_{PZH}$	Open	Close
$t_{PLZ}/t_{PZL}$	Close	Open

Note:  $C_L$  includes probe and jig capacitance.

$$P_{RR} \leq 1\text{MHz}, Z_0 = 50\Omega, t_R \leq 6\text{ns}, t_F \leq 6\text{ns}$$



Propagation Delay Times



Enable and Disable Times

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