

**U74HC245E**

Preliminary

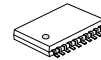
CMOS IC

**OCTAL BUS TRANSCEIVERS
WITH 3-STATE OUTPUTS****DESCRIPTION**

The **U74HC245E** 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

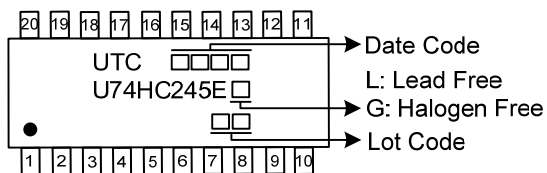


TSSOP-20U

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74HC245EL-ULA-R	U74HC245EG-ULA-R	TSSOP-20U	Tape Reel

U74HC245EG-ULA-R (1) Packing Type (2) Package Type (3) Green Package	(1) R: Tape Reel (2) ULA: TSSOP-20U (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

DIR	1		20	V _{CC}
A1	2		19	$\overline{\text{OE}}$
A2	3		18	B1
A3	4		17	B2
A4	5		16	B3
A5	6		15	B4
A6	7		14	B5
A7	8		13	B6
A8	9		12	B7
GND	10		11	B8

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

Logic diagram of the 74VHC147 decoder. The diagram shows the internal logic structure, including two 3-input AND gates and two inverters. The inputs are DIR (1), A1 (2), and B1 (18). The outputs are labeled 19 (OE) and 18 (B1). The outputs of the AND gates are connected to the inputs of the inverters. The outputs of the inverters are connected to the inputs of the AND gates. The outputs of the AND gates are labeled 19 (OE) and 18 (B1). The outputs of the inverters are connected to a bus labeled 'Seven Other channels'.

■ **ABSOLUTE MAXIMUM RATING** ($T_A=25^{\circ}\text{C}$, unless otherwise specified) (Note 1)

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ 7.0	V
Input Clamp Current (Note 2)	I_{IK}	$V_{IN}<0$ or $V_{IN}>V_{CC}$	± 20	mA
Output Clamp Current (Note 2)	I_{OK}	$V_{OUT}<0$ or $V_{OUT}>V_{CC}$	± 20	mA
Output Current	I_{OUT}	$V_{OUT}=0$ to V_{CC}	± 35	mA
V_{CC} or GND Current	I_{CC}		± 70	mA
Electrostatic Discharge	$V_{(ESD)}$	Human-Body Model (HBM) Per JESD22-A114/115	2000	V
Storage Temperature	T_{STG}		-65 ~ +150	$^{\circ}\text{C}$

Note: 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.

■ **THERMAL DATA**

PARAMETER	SYMBOL	RATINGS	UNIT
Junction to Ambient	θ_{JA}	110	$^{\circ}\text{C}/\text{W}$

■ **RECOMMENDED OPERATING CONDITIONS**

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}		2		6	V
Input Voltage	V_{IN}		0		V_{CC}	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Input Transition Rise or Fall Time	t_R / t_F	$V_{CC}=2\text{V}$			1000	ns
		$V_{CC}=4.5\text{V}$			500	ns
		$V_{CC}=6\text{V}$			400	ns
Ambient Operating Temperature	T_A		-40		+125	$^{\circ}\text{C}$

ELECTRICAL CHARACTERISTICS (Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
High-Level Input Voltage	V _{IH}	V _{CC} =2V	1.5			1.5			V
		V _{CC} =4.5V	3.15			3.15			V
		V _{CC} =6V	4.2			4.2			V
Low-Level Input Voltage	V _{IL}	V _{CC} =2V			0.5			0.5	V
		V _{CC} =4.5V			1.35			1.35	V
		V _{CC} =6V			1.8			1.8	V
High-Level Output Voltage	V _{OH}	V _{CC} =2V, I _{OH} =-20μA	1.9	1.998		1.9			V
		V _{CC} =4.5V, I _{OH} =-20μA	4.4	4.499		4.4			V
		V _{CC} =6V, I _{OH} =-20μA	5.9	5.999		5.9			V
		V _{CC} =4.5V, I _{OH} =-6mA	3.98			3.7			V
		V _{CC} =6V, I _{OH} =-7.8mA	5.48			5.2			V
Low- Level Output Voltage	V _{OL}	V _{CC} =2V, I _{OL} =20μA		0.002	0.1			0.1	V
		V _{CC} =4.5V, I _{OL} =20μA		0.001	0.1			0.1	V
		V _{CC} =6V, I _{OL} =20μA		0.001	0.1			0.1	V
		V _{CC} =4.5V, I _{OL} =6mA			0.26			0.4	V
		V _{CC} =6V, I _{OL} =7.8mA			0.26			0.4	V
Input Current of DIR or $\overline{\text{OE}}$	I _{I(LEAK)}	V _{CC} =6V, V _{IN} =V _{CC} or GND			±100			±1000	nA
Output Off-State Current	I _{OZ}	V _{CC} =6V, V _{OUT} =V _{CC} or GND			±0.5			±10	μA
Quiescent Supply Current	I _Q	V _{CC} =6V, V _{IN} =V _{CC} or GND, I _{OUT} =0			8			160	μA

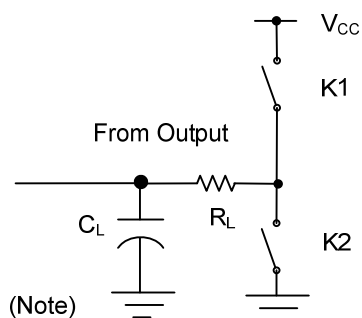
SWITCHING CHARACTERISTICS (C_L=50pF, R_L=1kΩ, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40°C~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From Input (A or B) to Output (B or A)	t _{PD} (t _{PLH} /t _{PHL})	V _{CC} =2V		45	105			135	ns
		V _{CC} =4.5V		16	21			27	ns
		V _{CC} =6V		13	18			23	ns
3-State Output Enable Time From Input ($\overline{\text{OE}}$) to Output (A or B)	t _{EN} (t _{PZL} /t _{PZH})	V _{CC} =2V		50	230			290	ns
		V _{CC} =4.5V		26	46			58	ns
		V _{CC} =6V		13	39			49	ns
3-State Output Disable Time From Input ($\overline{\text{OE}}$) to Output (A or B)	t _{DIS} (t _{PLZ} /t _{PHZ})	V _{CC} =2V		40	200			250	ns
		V _{CC} =4.5V		23	40			50	ns
		V _{CC} =6V		13	34			43	ns
Output Transition Time (A or B)	t _T (t _{TLH} /t _{THL})	V _{CC} =2V			60			90	ns
		V _{CC} =4.5V			12			18	ns
		V _{CC} =6V			10			15	ns

OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance of DIR or $\overline{\text{OE}}$	C _{IN}	V _{CC} =6V, V _{IN} =V _{CC} or GND			10	pF
Power Dissipation Capacitance	C _{PD}	No load		40		pF

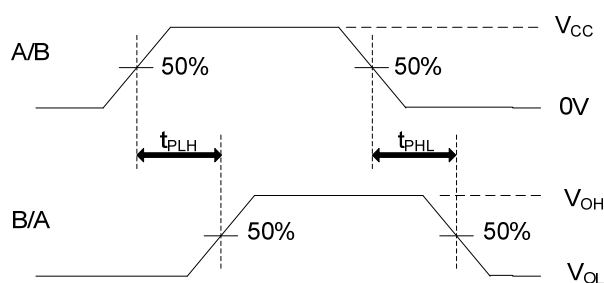
■ TEST CIRCUIT AND WAVEFORMS



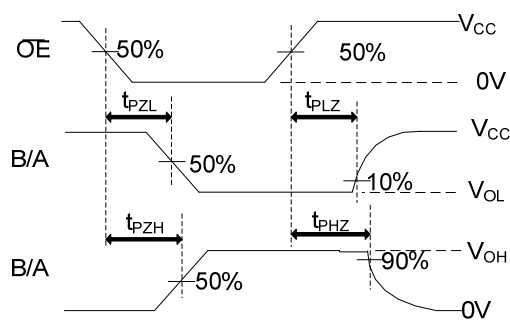
TEST	K1	K2
t_{PLH}/t_{PHL}	Open	Open
t_{PHZ}/t_{PZH}	Open	Close
t_{PLZ}/t_{PLZ}	Close	Open

Note: C_L includes probe and jig capacitance.

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



Propagation Delay Times



Enable and Disable Times

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