



U74LVC245

CMOS IC

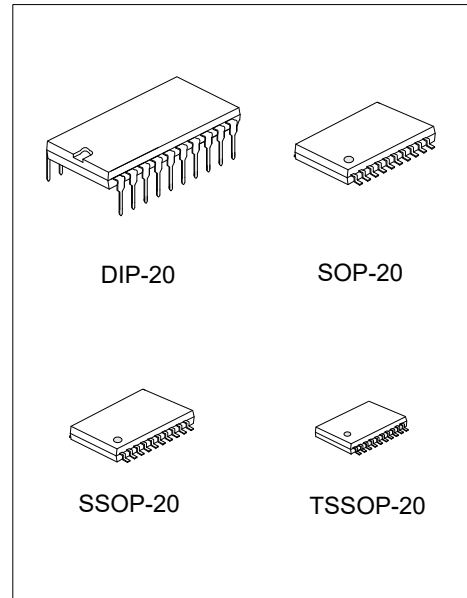
OCTAL BUS TRANSCEIVER WITH 3-STATE OUTPUTS

DESCRIPTION

The **U74LVC245** is designed for the communication between data buses asynchronously. 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 1.65V to 3.6V
- * Input Accept Voltages to 5.5V
- * Partial-Power-Down Mode Operation



ORDERING INFORMATION

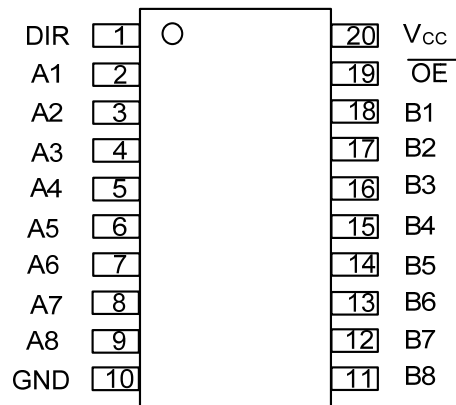
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC245L-D20-T	U74LVC245G-D20-T	DIP-20	Tube
U74LVC245L-S20-R	U74LVC245G-S20-R	SOP-20	Tape Reel
U74LVC245L-R20-R	U74LVC245G-R20-R	SSOP-20	Tape Reel
U74LVC245L-P20-R	U74LVC245G-P20-R	TSSOP-20	Tape Reel

U74LVC245G-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
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MARKING

DIP-20	SOP-20 / SSOP-20 / TSSOP-20
20 19 18 17 16 15 14 13 12 11 UTC □□□□ → Date Code U74LVC245 □ → L: Lead Free □□ → G: Halogen Free □□ → Lot Code 1 2 3 4 5 6 7 8 9 10	20 19 18 17 16 15 14 13 12 11 UTC □□□□ → Date Code U74LVC245 □ → L: Lead Free □□ → G: Halogen Free □□ → Lot Code 1 2 3 4 5 6 7 8 9 10

PIN CONFIGURATION

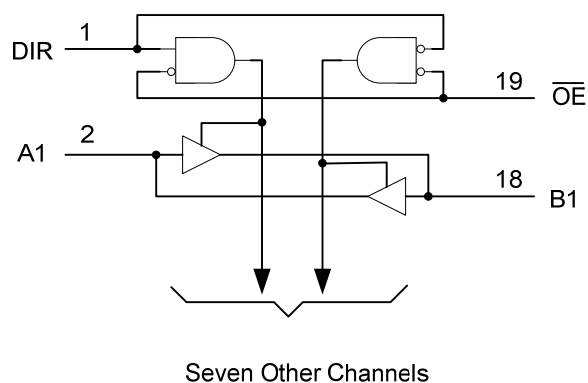


FUNCTION TABLE (each gate)

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

H = High voltage level ; L = Low voltage level ; X = Don't care

LOGIC DIAGRAM (positive logic)



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ 6.5	V
Input Voltage	V_{IN}		-0.5 ~ 6.5	V
Voltage Applied To Output In High-Impedance or Power-off State	V_{OUT}		-0.5 ~ 6.5	V
Voltage Applied to Output In High or Low State			-0.5 ~ $V_{CC}+0.5$	V
Input Clamp Current	I_{IK}	$V_{IN} < 0$	-50	mA
Output Clamp Current	I_{OK}	$V_{OUT} < 0$	-50	mA
Output Current	I_{OUT}	$V_{OUT}=0 \sim V_{CC}$	± 50	mA
V_{CC} or GND Current	I_{CC}		± 100	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.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-20	θ_{JA}	60	°C/W
	SOP-20		80	°C/W
	SSOP-20		95	°C/W
	TSSOP-20		100	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	1.65		3.6	V
		Data retention only	1.5			V
Input Voltage	V_{IN}		0		5.5	V
Output Voltage	V_{OUT}		0		V_{CC}	V
Operating Temperature	T_A		-40		+125	°C

■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Input Voltage High-Level	V _{IH}	V _{CC} = 1.65V to 1.95V	0.65 ×V _{CC}			0.65 ×V _{CC}			V
		V _{CC} = 2.3V to 2.7V	1.7			1.7			V
		V _{CC} = 2.7V to 3.6V	2			2			V
Input Voltage Low-Level	V _{IL}	V _{CC} = 1.65V to 1.95V			0.35 ×V _{CC}			0.35 ×V _{CC}	V
		V _{CC} = 2.3V to 2.7V			0.7			0.7	V
		V _{CC} = 2.7V to 3.6V			0.8			0.8	V
Output Voltage High-Level	V _{OH}	V _{CC} =1.65V to 3.6V, I _{OH} = -100μA	V _{CC} -0.2			V _{CC} -0.3			V
		V _{CC} =1.65V, I _{OH} = -4mA	1.29			1.05			V
		V _{CC} =2.3V, I _{OH} = -8mA	1.9			1.6			V
		V _{CC} =2.7V, I _{OH} = -12mA	2.2			2.05			V
		V _{CC} =3V, I _{OH} = -12mA	2.4			2.25			V
		V _{CC} =3V, I _{OH} = -24mA	2.3			2.0			V
Output Voltage Low-Level	V _{OL}	V _{CC} =1.65V to 3.6V, I _{OL} =100μA			0.1			0.3	V
		V _{CC} =1.65V, I _{OL} = 4mA			0.24			0.65	V
		V _{CC} =2.3V, I _{OL} = 8mA			0.3			0.8	V
		V _{CC} =2.7V, I _{OL} = 12mA			0.4			0.6	V
		V _{CC} =3V, I _{OL} = 24mA			0.55			0.8	V
Input Leakage Current	I _{I(LEAK)}	V _{CC} =3.6V V _{IN} = 5.5V or GND			±1			±20	μA
Power OFF Leakage Current	I _{OFF}	V _{CC} =0V, V _{IN} or V _{OUT} =5.5V			±1			±20	μA
Input Leakage Current (For I/O Ports)	I _{OZ}	V _{CC} =3.6V, V _{OUT} = 0~5.5V			±1			±20	μA
Quiescent Supply Current	I _Q	V _{CC} =3.6V, V _{IN} =V _{CC} or GND, I _{OUT} =0			1			40	μA
		V _{CC} =3.6V, 3.6V ≤ V _{IN} ≤ 5.5V, I _{OUT} =0			1			30	μA
Additional Quiescent Supply Current	ΔI _Q	V _{CC} =2.7V to 3.6V, One input at V _{CC} -0.6V, Other inputs at V _{CC} or GND			500			5000	μA

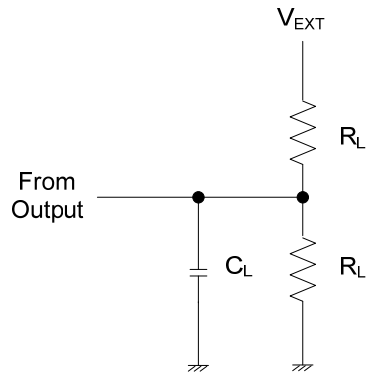
■ SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	T _A =25°C			T _A =-40~+125°C			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
Propagation Delay From A to B or B to A	t _{PLH} /t _{PHL}	V _{CC} =1.8V ± 0.15V	1		16			19	ns
		V _{CC} =2.5V ± 0.2V	1		13			15	ns
		V _{CC} =2.7V	1		11			13	ns
		V _{CC} =3.3V ± 0.3V	1.5		8			10	ns
Propagation Delay From $\overline{\text{OE}}$ to A or B	t _{PZL} /t _{PZH}	V _{CC} =1.8V ± 0.15V	1		19.5			23	ns
		V _{CC} =2.5V ± 0.2V	1		16			19	ns
		V _{CC} =2.7V	1		13			15	ns
		V _{CC} =3.3V ± 0.3V	1.5		9.5			12	ns
Propagation Delay From $\overline{\text{OE}}$ to A or B	t _{PLZ} /t _{PHZ}	V _{CC} =1.8V ± 0.15V	1		19			24	ns
		V _{CC} =2.5V ± 0.2V	1		14			17	ns
		V _{CC} =2.7V	1		9.5			11	ns
		V _{CC} =3.3V ± 0.3V	1.7		8			10	ns

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Capacitance	C_{IN}	$V_{CC}=3.3V$, $V_{IN} = V_{CC}$ or GND		6		pF
Power Dissipation Capacitance	C_{PD}	$\overline{OE} = 0$, $f=10MHz$, $V_{CC}=1.8V$		42		pF
		$\overline{OE} = 0$, $f=10MHz$, $V_{CC}=2.5V$		43		pF
		$\overline{OE} = 0$, $f=10MHz$, $V_{CC}=3.3V$		45		pF
		$\overline{OE} = 1$, $f=10MHz$, $V_{CC}=1.8V$		1		pF
		$\overline{OE} = 1$, $f=10MHz$, $V_{CC}=2.5V$		1		pF
		$\overline{OE} = 1$, $f=10MHz$, $V_{CC}=3.3V$		2		pF

■ TEST CIRCUIT AND WAVEFORMS



V _{CC}	V _{IN}	t _R /t _F	V _M	V Δ	C _L	R _L	V _{EXT}		
							t _{PLH} / t _{PHL}	t _{PZH} / t _{PHZ}	t _{PZL} / t _{PLZ}
1.8V $\pm$ 0.15V	V _{CC}	≤ 2 ns	V _{CC} /2	0.15V	30 pF	1 K Ω	OPEN	GND	2 $\times$ V _{CC}
2.5V $\pm$ 0.2V	V _{CC}	≤ 2 ns	V _{CC} /2	0.15V	30 pF	500 Ω	OPEN	GND	2 $\times$ V _{CC}
2.7V	2.7 V	≤ 2.5 ns	1.5V	0.3V	50 pF	500 Ω	OPEN	GND	6 V
3.3V $\pm$ 0.3V	2.7 V	≤ 2.5 ns	1.5V	0.3V	50 pF	500 Ω	OPEN	GND	6 V

Fig. 1 Load circuitry

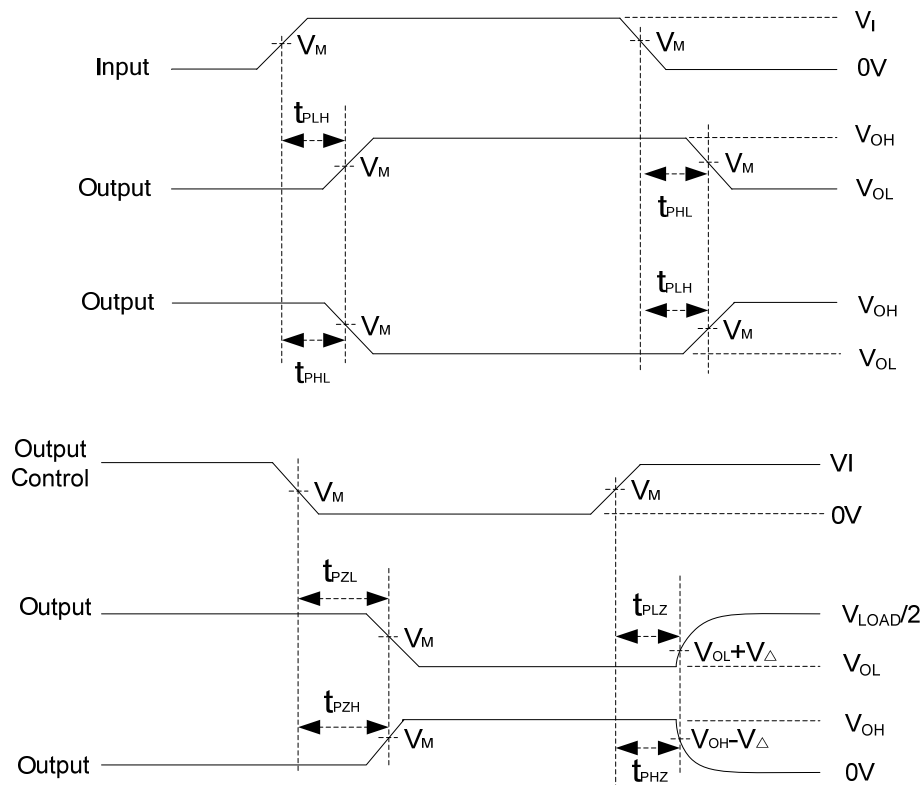


Fig. 2 Propagation delay waves

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