



U74LVC244

CMOS IC

OCTAL BUFFER/DRIVER WITH 3-STATE OUTPUTS

DESCRIPTION

The UTC **U74LVC244** contains two 4-bit line drivers with separate output-enable ($\overline{OE}$) inputs. When $\overline{OE}$ is low, the device passes data from the A to the Y. When $\overline{OE}$ is high, the outputs are in the high-impedance state.

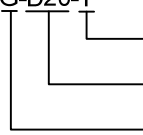
The UTC **U74LVC244** can be used in a mixed 3.3V/5V system environment.

FEATURES

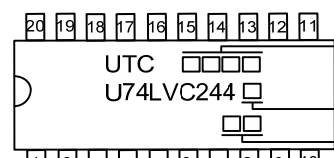
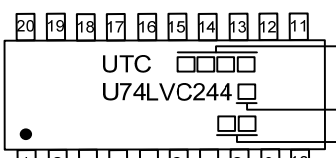
- * Operate From 1.65V to 3.6V
- * Input Accept Voltages to 5.5V
- * Partial-Power-Down Mode Operation
- * Max tpd is 5.9ns at 3.3V

ORDERING INFORMATION

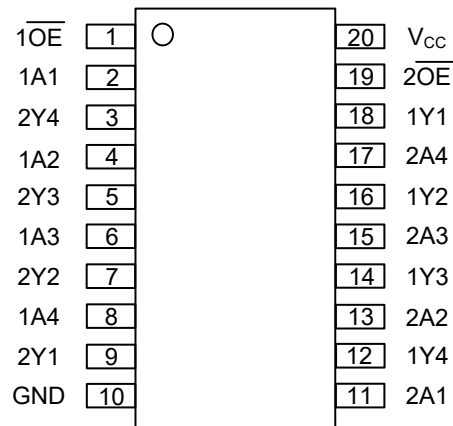
Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74LVC244L-D20-T	U74LVC244G-D20-T	DIP-20	Tube
U74LVC244L-S20-R	U74LVC244G-S20-R	SOP-20	Tape Reel
U74LVC244L-R20-R	U74LVC244G-R20-R	SSOP-20	Tape Reel
U74LVC244L-ULA-R	U74LVC244G-ULA-R	TSSOP-20U	Tape Reel

U74LVC244G-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, ULA: TSSOP-20U (3) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

DIP-20	SOP-20 / SSOP-20 / TSSOP-20U
 20 19 18 17 16 15 14 13 12 11 UTC □□□□ → Date Code U74LVC244 □ → 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 U74LVC244 □ → L: Lead Free □ → G: Halogen Free □□ → Lot Code 1 2 3 4 5 6 7 8 9 10

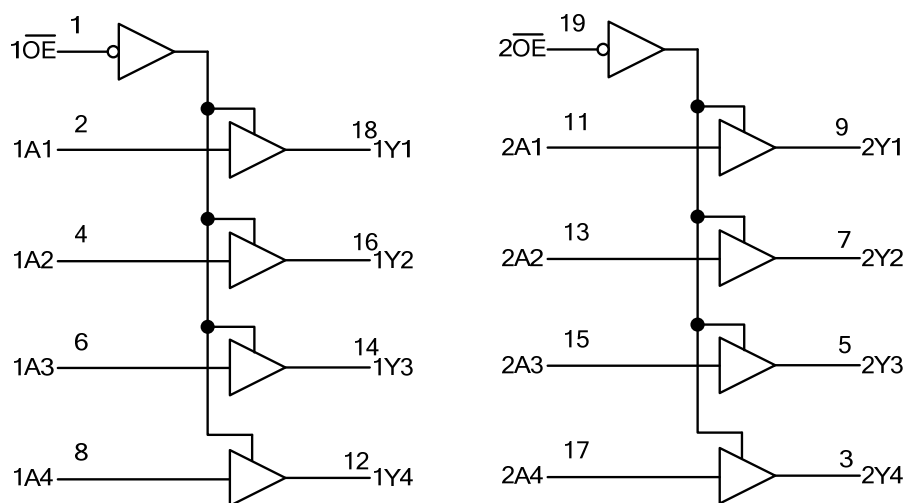
PIN CONFIGURATION



FUNCTION TABLE (each gate)

INPUT($\overline{OE}$)	INPUT(A)	OUTPUT(Y)
H	X	Z
L	H	H
L	L	L

LOGIC DIAGRAM (Positive Logic)



■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ 6.5	V
Input Voltage	V_{IN}		-0.5 ~ 6.5	V
Output Voltage	V_{OUT}	Output in high-impedance or power-off state	-0.5 ~ 6.5	V
		Output in high or low state	-0.5 ~ $V_{CC}+0.5$	V
Input Clamp Current	I_{IK}		-50	mA
Output Clamp Current	I_{OK}		-50	mA
Output Current	I_{OUT}		±50	mA
V_{CC} or GND Current	I_{CC}		±100	mA
Operating Temperature	T_{OPR}		-40 ~ +125	°C
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}	63	°C/W
	SOP-20		83	°C/W
	SSOP-20		100	°C/W
	TSSOP-20U		120	°C/W

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	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
High-Level Input Voltage	V_{IH}	$V_{CC}=1.65V$ to 1.95V	$0.65 \times V_{CC}$			V
		$V_{CC}=2.3V$ to 2.7V	1.7			V
		$V_{CC}=2.7V$ to 3.6V	2			V
Low-Level Input Voltage	V_{IL}	$V_{CC}=1.65V$ to 1.95V			$0.35 \times V_{CC}$	V
		$V_{CC}=2.3V$ to 2.7V			0.7	V
		$V_{CC}=2.7V$ to 3.6V			0.8	V
High-Level Output Current	I_{OH}	$V_{CC}=1.65V$			-4	mA
		$V_{CC}=2.3V$			-8	mA
		$V_{CC}=2.7V$			-12	mA
		$V_{CC}=3V$			-24	mA
Low-Level Output Current	I_{OL}	$V_{CC}=1.65V$			4	mA
		$V_{CC}=2.3V$			8	mA
		$V_{CC}=2.7V$			12	mA
		$V_{CC}=3V$			24	mA
Input Rise and Fall Times	t_r / t_f	$V_{CC}=1.65V$ to 2.7V	0		20	ns/V
		$V_{CC}=2.7V$ to 3.6V	0		10	ns/V

■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V_{OH}	$V_{CC}=1.65V$ to $3.6V$, $I_{OH}=-100\mu A$	$V_{CC}-0.2$			V
		$V_{CC}=1.65V$, $I_{OH}=-4mA$	1.29			V
		$V_{CC}=2.3V$, $I_{OH}=-8mA$	1.9			V
		$V_{CC}=2.7V$, $I_{OH}=-12mA$	2.2			V
		$V_{CC}=3V$, $I_{OH}=-12mA$	2.4			V
		$V_{CC}=3V$, $I_{OH}=-24mA$	2.3			V
Low-Level Output Voltage	V_{OL}	$V_{CC}=1.65V$ to $3.6V$, $I_{OL}=100\mu A$			0.1	V
		$V_{CC}=1.65V$, $I_{OL}=4mA$			0.24	V
		$V_{CC}=2.3V$, $I_{OL}=8mA$			0.3	V
		$V_{CC}=2.7V$, $I_{OL}=12mA$			0.4	V
		$V_{CC}=3V$, $I_{OL}=24mA$			0.55	V
Input Leakage Current	$I_{I(LEAK)}$	$V_{CC}=3.6V$, $V_{IN}=5.5V$ or GND			± 1	μA
Power OFF Leakage Current	I_{OFF}	$V_{CC}=0V$, V_{IN} or $V_{OUT}=5.5V$			± 1	μA
Output OFF-State Current	I_{OZ}	$V_{CC}=3.6V$, $V_{OUT}=0$ or $5.5V$			± 1	μA
Quiescent Supply Current	I_Q	$V_{CC}=3.6V$, $V_{IN}=V_{CC}$ or GND, $I_{OUT}=0$			1	μA
		$V_{CC}=3.6V$, $3.6V \leq V_{IN} \leq 5.5V$, $I_{OUT}=0$			1	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	μA
Input Capacitance	C_I	$V_{CC}=3.3V$, $V_{IN}=V_{CC}$ or GND		4		pF
Output Capacitance	C_O	$V_{CC}=3.3V$, $V_{OUT}=V_{CC}$ or GND		5.5		pF

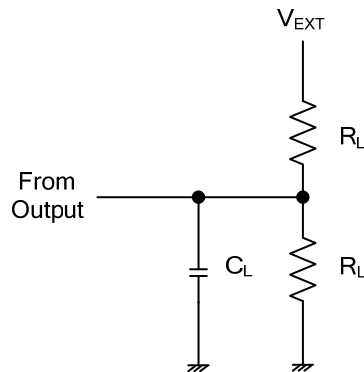
■ SWITCHING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
From Input(A) to Output(Y)	t_{pd}	$V_{CC}=1.5V$	1	7	14.4	ns
		$V_{CC}=1.8V \pm 0.15V$	1	5.9	10.4	ns
		$V_{CC}=2.5V \pm 0.2V$	1	4.2	7.4	ns
		$V_{CC}=2.7V$	1	4.2	6.7	ns
		$V_{CC}=3.3V \pm 0.3V$	1.5	3.9	5.7	ns
From Input($\overline{OE}$) to Output(Y)	t_{en}	$V_{CC}=1.5V$	1	8.3	17.8	ns
		$V_{CC}=1.8V \pm 0.15V$	1	6.4	12.1	ns
		$V_{CC}=2.5V \pm 0.2V$	1	4.6	9.1	ns
		$V_{CC}=2.7V$	1	5	8.4	ns
		$V_{CC}=3.3V \pm 0.3V$	1.5	4.5	7.4	ns
From Input($\overline{OE}$) to Output(Y)	t_{dis}	$V_{CC}=1.5V$	1	7.2	15.6	ns
		$V_{CC}=1.8V \pm 0.15V$	1	5.8	11.6	ns
		$V_{CC}=2.5V \pm 0.2V$	1	3.7	7.3	ns
		$V_{CC}=2.7V$	1	3.8	6.6	ns
		$V_{CC}=3.3V \pm 0.3V$	1.5	3.8	6.3	ns

■ OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	$\overline{OE}=0$, $f=10MHz$, $V_{CC}=1.8V$		43		pF
		$\overline{OE}=0$, $f=10MHz$, $V_{CC}=2.5V$		43		pF
		$\overline{OE}=0$, $f=10MHz$, $V_{CC}=3.3V$		44		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}
1.5V	V_{CC}	$\leq 2\text{ns}$	$V_{CC}/2$	0.1V	15pF	2K Ω	OPEN	GND	$2*V_{CC}$
1.8V $\pm$ 0.15V	V_{CC}	$\leq 2\text{ns}$	$V_{CC}/2$	0.15V	30pF	1K Ω	OPEN	GND	$2*V_{CC}$
2.5V $\pm$ 0.2V	V_{CC}	$\leq 2\text{ns}$	$V_{CC}/2$	0.15V	30pF	500 Ω	OPEN	GND	$2*V_{CC}$
2.7V	2.7V	$\leq 2.5\text{ns}$	1.5V	0.3V	50pF	500 Ω	OPEN	GND	6V
3.3V $\pm$ 0.3V	2.7V	$\leq 2.5\text{ns}$	1.5V	0.3V	50pF	500 Ω	OPEN	GND	6V

Figure 1. Load circuitry

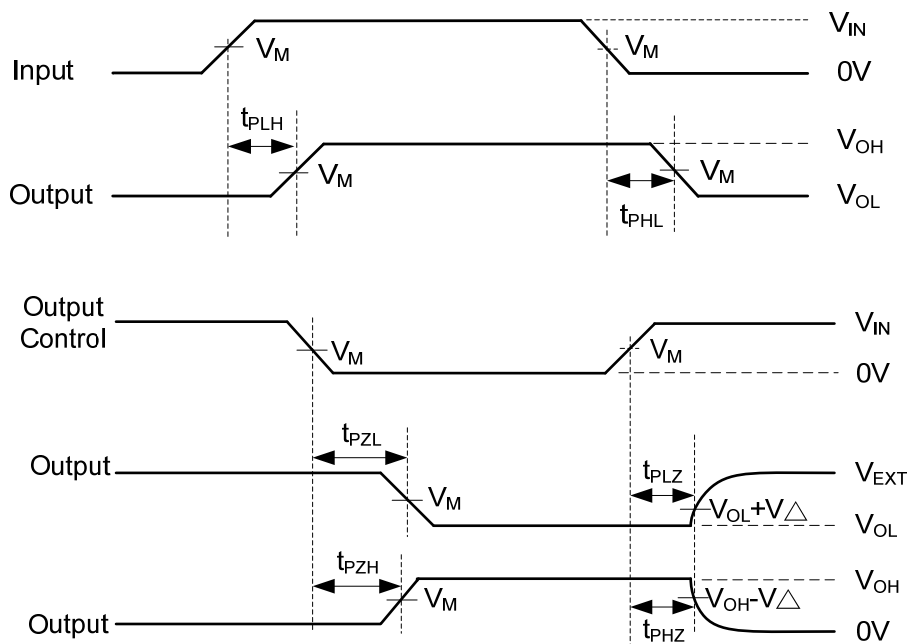


Fig-2 Propagation delay waves

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