



U74AUC244

Advance

CMOS IC

OCTAL BUFFER/DRIVER WITH 3-STATE OUTPUTS

DESCRIPTION

This octal buffer/driver is operational at 0.8V to 2.7V V_{CC} , but is designed specifically for 1.65V to 1.95V V_{CC} operation.

The **U74AUC244** is organized as two 4-bit line drivers with separate output-enable (\overline{OE}) inputs. When \overline{OE} is low, the device passes data from the A inputs to the Y outputs. When \overline{OE} is high, the outputs are in the high-impedance state.

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.

This device is fully specified for partial-power-down applications using I_{OFF} . The I_{OFF} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

FEATURES

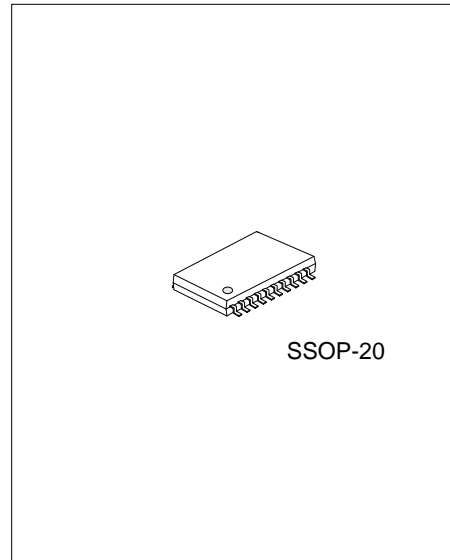
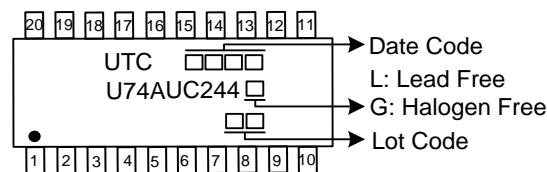
- * Optimized for 1.8V Operation and is 3.6V I/O Tolerant to Support Mixed-Mode Signal Operation
- * Partial-Power-Down Mode Operation
- * Low Power Consumption, 20 μ A Max. I_{CC}
- * ± 8 mA Output Drive at 1.8V

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
U74AUC244L-S20-R	U74AUC244G-S20-R	SOP-20	Tape Reel

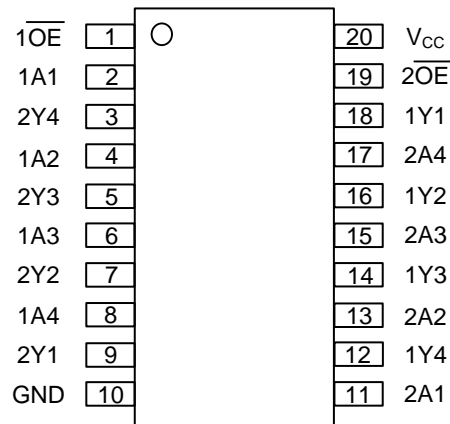
<p>U74AUC244G-S20-R</p> <p>(1)Packing Type</p> <p>(2)Package Type</p> <p>(3)Green Package</p>	<p>(1) R: Tape Reel</p> <p>(2) R20: SSOP-20</p> <p>(3) G: Halogen Free and Lead Free, L: Lead Free</p>
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MARKING



SSOP-20

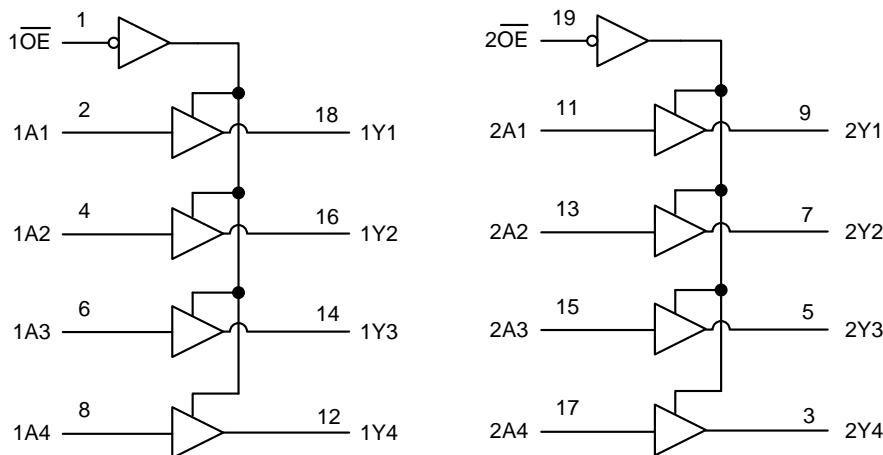
■ PIN CONFIGURATION



■ FUNCTION TABLE (each gate)

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

■ LOGIC DIAGRAM (Positive Logic)



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

PARAMETER	SYMBOL	CONDITIONS	RATINGS	UNIT
Supply Voltage	V_{CC}		-0.5 ~ 3.6	V
Input Voltage	V_{IN}		-0.5 ~ 3.6	V
Output Voltage	V_{OUT}	Output in high-impedance or power-off state	-0.5 ~ 3.6	V
		Output in high or low state	-0.5 ~ $V_{CC}+0.5$	V
Input Clamp Current	I_{IK}	$V_I < 0$	-50	mA
Output Clamp Current	I_{OK}	$V_O < 0$	-50	mA
Output Current	I_{OUT}		± 20	mA
Continuous current through V_{CC} or GND	I_{CC}		± 100	mA
Storage Temperature	T_{STG}		-65 ~ +150	$^\circ\text{C}$

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** ($T_A=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V_{CC}	Operating	0.8		2.7	V
Input Voltage	V_{IN}		0		3.6	V
Output Voltage	V_{OUT}	Active state	0		V_{CC}	V
		3-state	0		3.6	V
High-Level Input Voltage	V_{IH}	$V_{CC}=0.8\text{V}$	V_{CC}			V
		$V_{CC}=1.1\text{V}\sim 1.95\text{V}$	$0.65 \times V_{CC}$			V
		$V_{CC}=2.3\text{V}\sim 2.7\text{V}$	1.7			V
Low-Level Input Voltage	V_{IL}	$V_{CC}=0.8\text{V}$			0	V
		$V_{CC}=1.1\text{V}\sim 1.95\text{V}$			$0.35 \times V_{CC}$	V
		$V_{CC}=2.3\text{V}\sim 2.7\text{V}$			0.7	V
High-Level Output Current	I_{OH}	$V_{CC}=0.8\text{V}$			-0.7	mA
		$V_{CC}=1.1\text{V}$			-3	mA
		$V_{CC}=1.4\text{V}$			-5	mA
		$V_{CC}=1.65\text{V}$			-8	mA
		$V_{CC}=2.3\text{V}$			-9	mA
Low-Level Output Current	I_{OL}	$V_{CC}=0.8\text{V}$			0.7	mA
		$V_{CC}=1.1\text{V}$			3	mA
		$V_{CC}=1.4\text{V}$			5	mA
		$V_{CC}=1.65\text{V}$			8	mA
		$V_{CC}=2.3\text{V}$			9	mA
Operating Temperature (Note)	T_A		-40		+125	$^\circ\text{C}$
Input Transition Rise or Fall Rate	$\Delta t/\Delta v$				20	ns/V

■ ELECTRICAL CHARACTERISTICS (T_A=25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
High-Level Output Voltage	V _{OH}	V _{CC} =0.8V~2.7V, I _{OH} =-100uA	V _{CC} -0.1			V
		V _{CC} =0.8V, I _{OH} =-0.7mA		0.55		V
		V _{CC} =1.1V, I _{OH} =-3mA	0.8			V
		V _{CC} =1.4V, I _{OH} =-5mA	1			V
		V _{CC} =1.65V, I _{OH} =-8mA	1.2			V
		V _{CC} =2.3V, I _{OH} =-9mA	1.8			V
Low-Level Output Voltage	V _{OL}	V _{CC} =0.8V to 2.7V, I _{OL} =100uA			0.2	V
		V _{CC} =0.8V, I _{OL} =0.7mA		0.25		V
		V _{CC} =1.1V, I _{OL} =3mA			0.3	V
		V _{CC} =1.4V, I _{OL} =5mA			0.4	V
		V _{CC} =1.65V, I _{OL} =8mA			0.45	V
		V _{CC} =2.3V, I _{OL} =9mA			0.6	V
Input Leakage Current (A and \overline{OE} Inputs)	I _{I(LEAK)}	V _{CC} =0~2.7V, V _{IN} =V _{CC} or GND			±5	μA
Power OFF Leakage Current	I _{OFF}	V _{CC} =0V, V _{IN} or V _{OUT} =2.7V			±10	μA
Output OFF-State Current	I _{OZ}	V _{CC} =2.7V, V _{OUT} =0 or V _{CC}			±10	μA
Quiescent Supply Current	I _{CC}	V _{CC} =0.8V to 2.7V, V _{IN} =V _{CC} or GND, I _{OUT} =0A			20	μA
Input Capacitance	C _I	V _{CC} =2.5V, V _{IN} =V _{CC} or GND		2	3	pF
Output Capacitance	C _O	V _{CC} =2.5V, V _{OUT} =V _{CC} or GND		5.5	6	pF

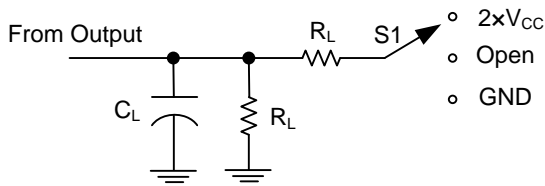
■ SWITCHING CHARACTERISTICS (T_A=25°C , unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT		
From Input(A) to Output(Y)	t _{pd}	V _{CC} =0.8V		6.5		ns		
		V _{CC} =1.2V±0.1V	C _L =15pF	1.1		3.7	ns	
		V _{CC} =1.5V±0.1V		0.6		2.3	ns	
		V _{CC} =1.8V±0.15V		0.5	1.1	1.9	ns	
		V _{CC} =2.5V±0.2V	C _L =30pF	C _L =15pF	0.8	1.5	2.5	ns
				C _L =30pF	0.4		1.5	ns
			C _L =30pF	C _L =15pF	0.7		1.9	ns
				C _L =30pF				
From Input(\overline{OE}) to Output(Y)	t _{en}	V _{CC} =0.8V		8		ns		
		V _{CC} =1.2V±0.1V	C _L =15pF	1.2		4.5	ns	
		V _{CC} =1.5V±0.1V		0.7		2.8	ns	
		V _{CC} =1.8V±0.15V		0.6	1.2	2.3	ns	
		V _{CC} =2.5V±0.2V	C _L =30pF	C _L =15pF	0.8	1.7	3.1	ns
				C _L =15pF	0.5		1.7	ns
			C _L =30pF	C _L =15pF	0.7		2.3	ns
				C _L =30pF				
From Input(\overline{OE}) to Output(Y)	t _{dis}	V _{CC} =0.8V		10.4		ns		
		V _{CC} =1.2V±0.1V	C _L =15pF	1.7		6	ns	
		V _{CC} =1.5V±0.1V		1.1		4	ns	
		V _{CC} =1.8V±0.15V		1.7	2.4	4.2	ns	
		V _{CC} =2.5V±0.2V	C _L =30pF	C _L =15pF	1.7	2.4	4.2	ns
				C _L =15pF	0.6		3.8	ns
			C _L =30pF	C _L =15pF	0.5		2.3	ns
				C _L =30pF				

■ **OPERATING CHARACTERISTICS** (f=10MHz, T_A=25°C , unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	Outputs Enabled	C _{PD}	V _{CC} =0.8V		21		pF
			V _{CC} =1.2V		21		pF
			V _{CC} =1.5V		22		pF
			V _{CC} =1.8V		23		pF
			V _{CC} =2.5V		30		pF
	Outputs Disabled		V _{CC} =0.8V		3		pF
			V _{CC} =1.2V		3		pF
			V _{CC} =1.5V		3		pF
			V _{CC} =1.8V		3.5		pF
			V _{CC} =2.5V		4.5		pF

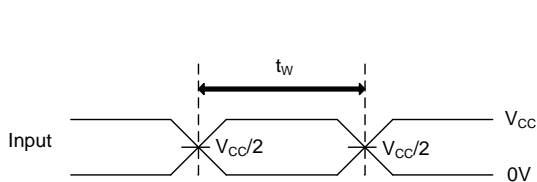
■ TEST CIRCUIT AND WAVEFORMS



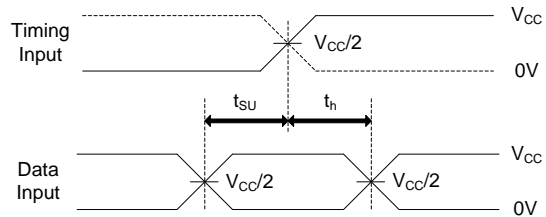
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$
t_{PHZ}/t_{PZH}	GND

TEST CIRCUIT

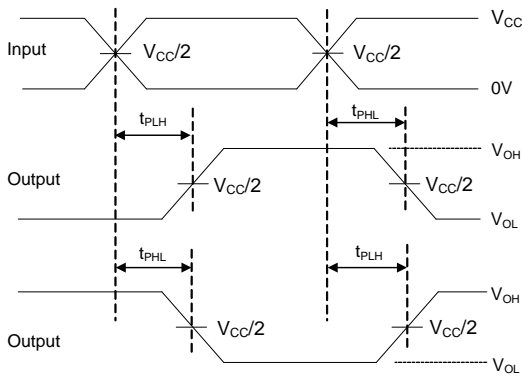
V_{CC}	C_L	R_L	V_{Δ}
$V_{CC}=0.8V$	15pF	2K Ω	0.1V
$V_{CC}=1.2V \pm 0.1V$	15pF	2K Ω	0.1V
$V_{CC}=1.5V \pm 0.1V$	15pF	2K Ω	0.1V
$V_{CC}=1.8V \pm 0.15V$	15pF	2K Ω	0.15V
$V_{CC}=2.5V \pm 0.2V$	15pF	2K Ω	0.15V
$V_{CC}=1.8V \pm 0.15V$	30pF	1K Ω	0.15V
$V_{CC}=2.5V \pm 0.2V$	30pF	500 Ω	0.15V



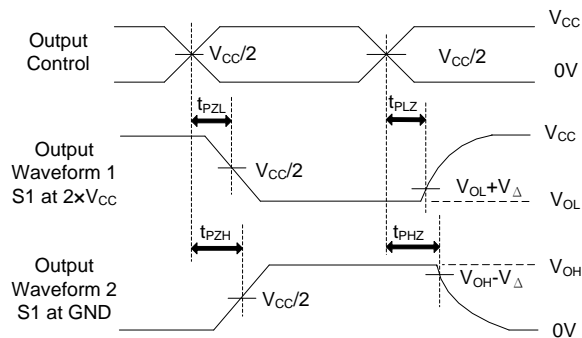
PULSE DURATION



SETUP AND HOLD TIMES



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 \leq 10MHz, $Z_O = 50\Omega$.

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