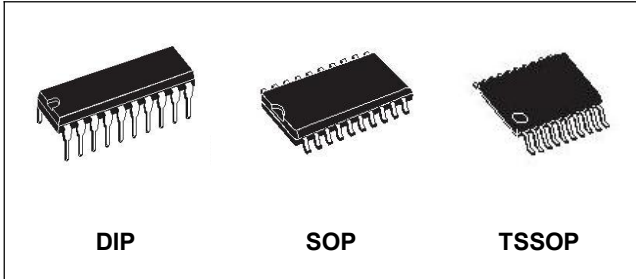


OCTAL BUS BUFFER WITH 3 STATE OUTPUTS (NON INVERTED)

Datasheet- production data



Description

The RD74HC244 is an advanced high-speed CMOS OCTAL BUS BUFFER (3-STATE) fabricated with silicon gate CMOS technology.

\overline{G} control input governs four BUS BUFFERS.

This device is designed to be used with 3 state memory address drivers, etc.

All inputs are equipped with protection circuits against static discharge and transient excess voltage.

Features

- HIGH SPEED:
 $t_{PD} = 10\text{ns}$ (TYP.) at $V_{CC} = 6\text{V}$
- LOW POWER DISSIPATION:
 $I_{CC} = 4\mu\text{A}$ (MAX.) at $T_A=25^\circ\text{C}$
- HIGH NOISE IMMUNITY:
 $V_{NIH} = V_{NIL} = 28\% V_{CC}(\text{MIN.})$
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OH}| = I_{OL} = 6\text{mA}$ (MIN.)
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \approx t_{PHL}$
- WIDE OPERATING VOLTAGE RANGE:
 $V_{CC}(\text{OPR.}) = 2\text{V}$ to 6V

Table 1. Device summary

PART NUMBER	PACKAGE
RD74HC244BDI	DIP20
RD74HC244BSO	SOP20
RD74HC244BTS	TSSOP20

1 Pin information

Figure 1. Pin connection and IEC logic symbols

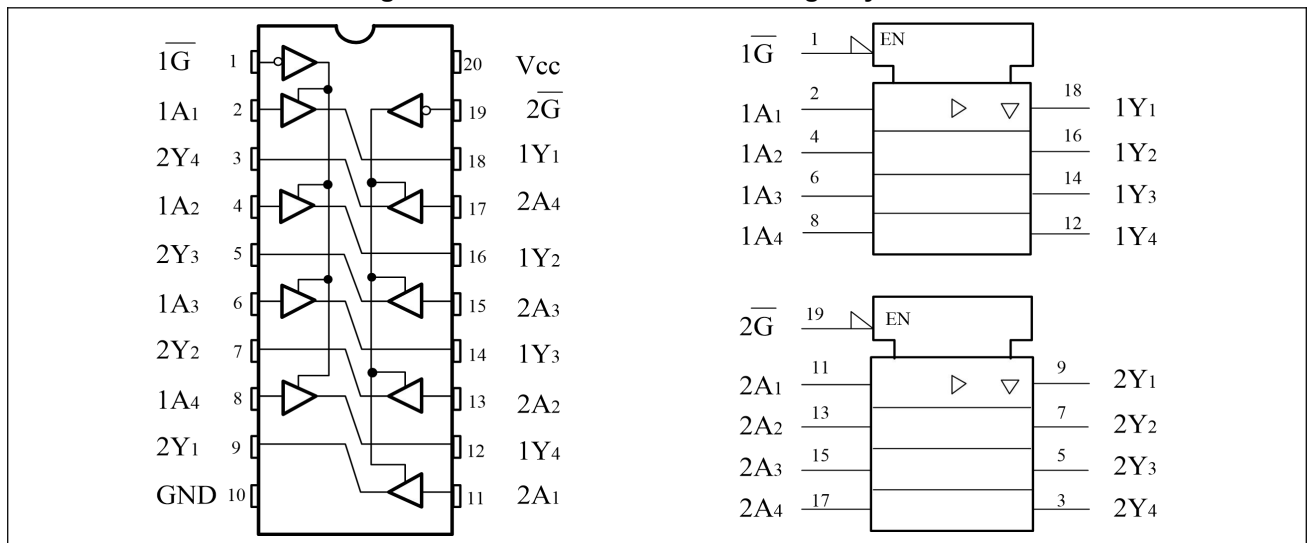


Table 2. Pin description

Pin No	Symbol	Name and function
1	$\overline{1G}$	Output Enable Input
2, 4, 6, 8	1A1 to 1A4	Data Inputs
9, 7, 5, 3	2Y1 to 2Y4	Data Outputs
11, 13, 15, 17	2A1 to 2A4	Data Inputs
18, 16, 14, 12	1Y1 to 1Y4	Data Outputs
19	$\overline{2G}$	Output Enable Input
10	GND	Ground (0V)
20	V _{CC}	Positive Supply Voltage

2 Functional description

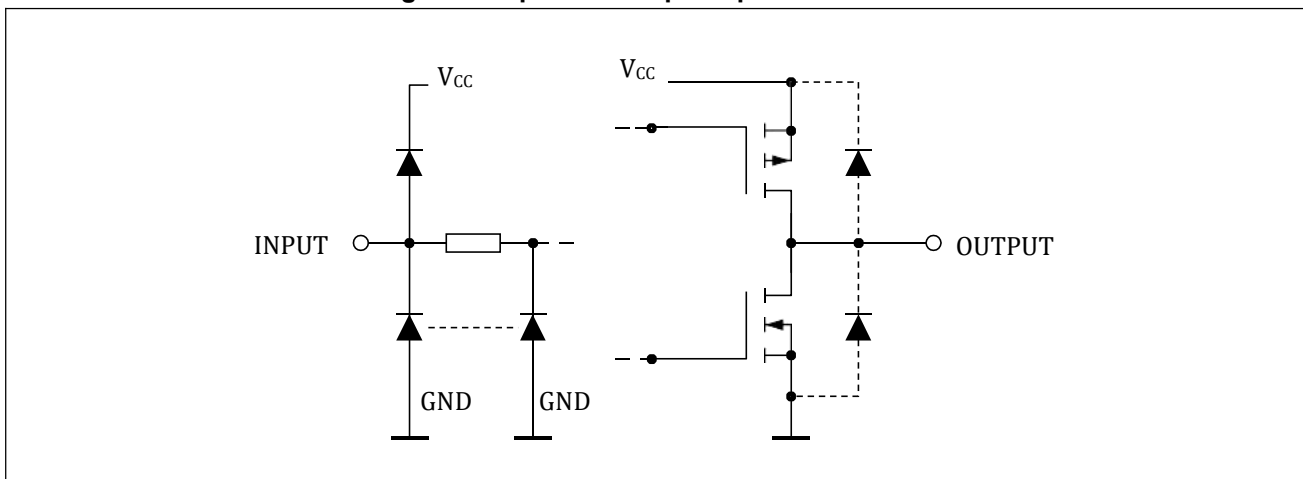
Table 3. Truth table

INPUTS		OUTPUT
\overline{G}	A _n	Y _n
L	L	L
L	H	H
H	X	Z

X = Don't care

Z = High impedance

Figure 2. Input and output equivalent circuit



3 Electrical characteristics

Table 4. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to + 7.0	V
V_I	DC Input Voltage	-0.5 to $V_{CC} + 0.5$	V
V_O	DC Output Voltage	-0.5 to $V_{CC} + 0.5$	V
I_{IK}	DC Input Diode Current	± 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Current	± 35	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 70	mA
P_D	Power Dissipation	500 (*)	mW
T_{stg}	Storage Temperature	-65 to + 150	°C
T_L	Lead Temperature (10 sec)	300	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied

(*) 500mW at 65 °C; derate to 300mW by 10mW/°C from 65°C to 85°C

Table 5. Recommended operating conditions

Symbol	Parameter	Value	Unit	
V_{CC}	Supply Voltage	2 to 6	V	
V_I	Input Voltage	0 to V_{CC}	V	
V_O	Output Voltage	0 to V_{CC}	V	
T_{op}	Operating Temperature	-40 to +85	°C	
t_r, t_f	Input Rise and Fall Time	$V_{CC} = 2.0V$	0 to 1000	ns
		$V_{CC} = 4.5V$	0 to 500	ns
		$V_{CC} = 6.0V$	0 to 400	ns

Table 6. DC specifications

Symbol	Parameter	Test Condition		Value					Unit
		V _{CC} (V)		T _A = 25 °C			-40 to 85°C		
				Min	Typ	Max	Min	Max	
V _{IH}	High Level Input Voltage	2.0		1.5			1.5		V
		4.5		3.15			3.15		
		6.0		4.2			4.2		
V _{IL}	Low Level Input Voltage	2.0				0.5		0.5	V
		4.5				1.35		1.35	
		6.0				1.8		1.8	
V _{OH}	High Level Output Voltage	2.0	I _O =-20μA	1.9	2.0		1.9		V
		4.5	I _O =-20μA	4.4	4.5		4.4		
		6.0	I _O =-20μA	5.9	6.0		5.9		
		4.5	I _O =-6.0 mA	4.18	4.31		4.13		
		6.0	I _O =-7.8 mA	5.68	5.8		5.63		
V _{OL}	Low Level Output Voltage	2.0	I _O =20 μA		0.0	0.1		0.1	V
		4.5	I _O =20 μA		0.0	0.1		0.1	
		6.0	I _O =20 μA		0.0	0.1		0.1	
		4.5	I _O =6.0 mA		0.17	0.26		0.33	
		6.0	I _O =7.8 mA		0.18	0.26		0.33	
I _I	Input Leakage Current	6.0	V _I = V _{CC} or GND			±0.1		±1	μA
I _{OZ}	High Impedance Output Leakage Current	6.0	V _I = V _{IH} or V _{IL} V _O = V _{CC} or GND			±0.5		±5	μA
I _{CC}	Quiescent Supply Current	6.0	V _I = V _{CC} or GND			4		40	μA

Table 7. AC electrical characteristics ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

Symbol	Parameter	Test Condition			Value					Unit
		V_{CC} (V)	C_L (pF)		$T_A = 25^\circ\text{C}$			-40 to 85°C		
					Min	Typ	Max	Min	Max	
$t_{TLH}t_{THL}$	Output Transition Time	2.0	50			25	60		75	ns
		4.5				7	12		19	
		6.0				6	10		13	
$t_{PLH}t_{PHL}$	Propagation Delay Time	2.0	50			36	90		115	ns
		4.5				12	18		23	
		6.0				10	15		20	
		2.0	150			51	130		165	ns
		4.5				17	26		33	
		6.0				14	22		28	
$t_{PZL}t_{PZH}$	High Impedance Output Enable Time	2.0	50	$R_L = 1\text{K}\Omega$		48	125		155	ns
		4.5				16	25		31	
		6.0				14	21		25	
		2.0	150	$R_L = 1\text{K}\Omega$		63	165		205	ns
		4.5				21	33		41	
		6.0				18	28		35	
$t_{PLZ}t_{PHZ}$	High Impedance Output Disable Time	2.0	50	$R_L = 1\text{K}\Omega$		32	125		155	ns
		4.5				15	25		31	
		6.0				14	21		26	

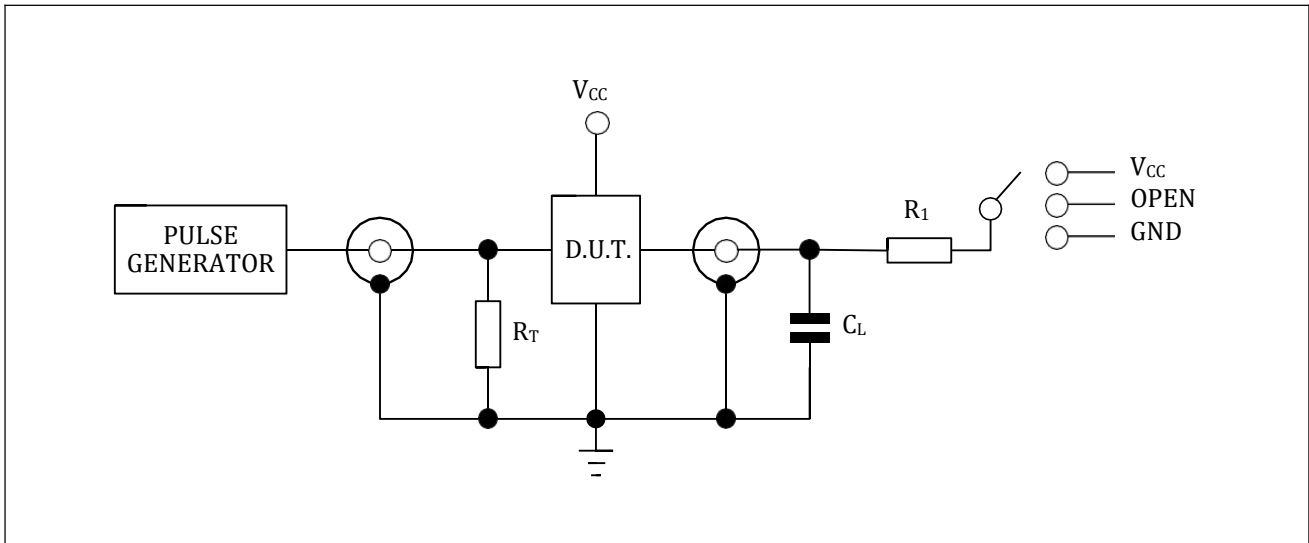
Table 8. Capacitive characteristics

Symbol	Parameter	Test Condition		Value					Unit
		V_{CC} (V)		$T_A = 25^\circ\text{C}$			-40 to 85°C		
				Min	Typ	Max	Min	Max	
C_{IN}	Input Capacitance	5.0			5	10		10	pF
C_{OUT}	Output Capacitance	5.0			10				pF
C_{PD}	Power Dissipation Capacitance ⁽¹⁾	5.0			33				pF

1. C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to test circuit). Average operating current can be obtained by the following equation:
 $I_{CC(oper)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/8$ (per circuit)

4 Test circuit

Figure 3. Test circuit



TEST	SWITCH
t_{PLH} , t_{PHL}	OPEN
t_{PZL} , t_{PLZ}	V _{CC}
t_{PZH} , t_{PHZ}	GND

R_T = Z_{OUT} of pulse generator (typically 50Ω)

R_1 = 1KΩ or equivalent

C_L = 50pF/150pF or equivalent (includes jig and probe capacitance)

Figure 4. Waveform 1: propagation delay time (f=1MHz; 50% duty cycle)

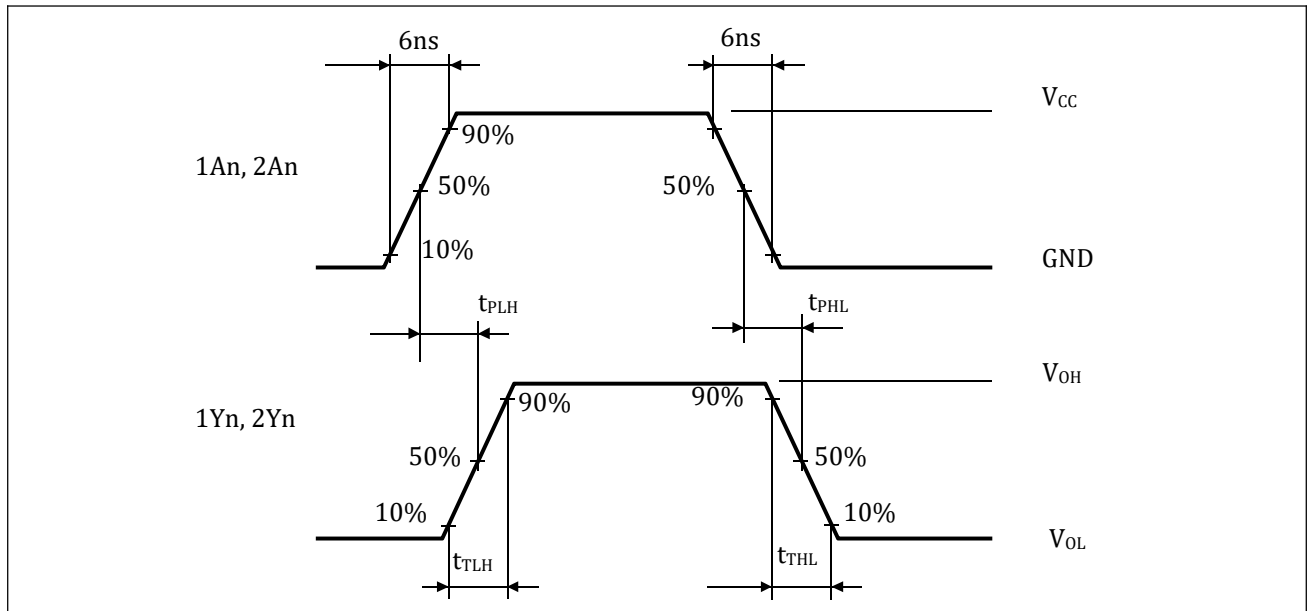
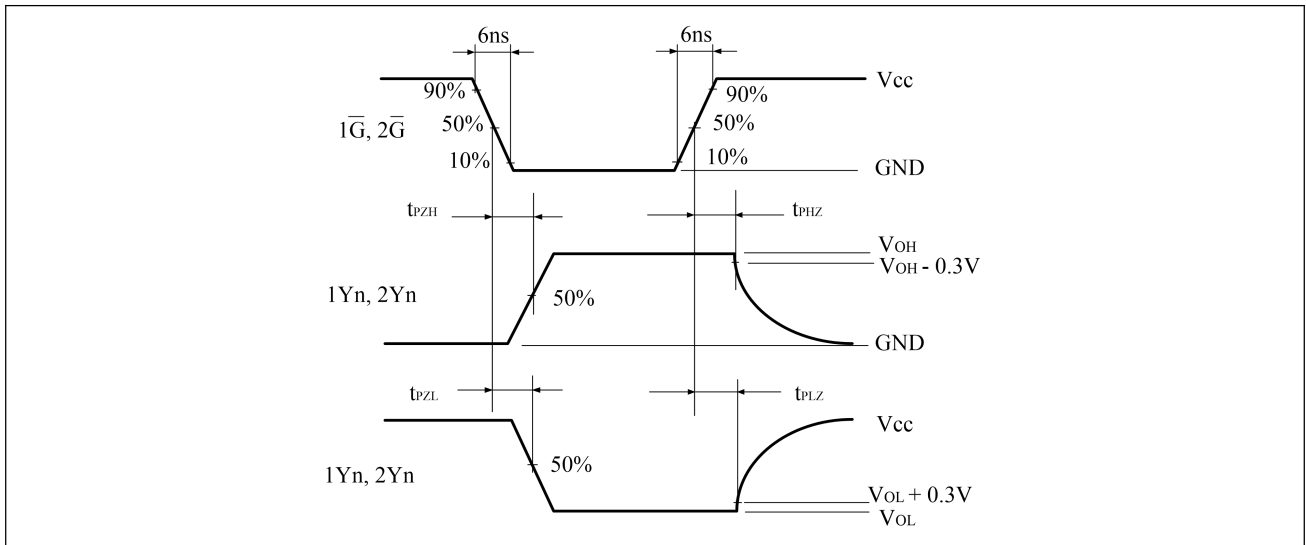


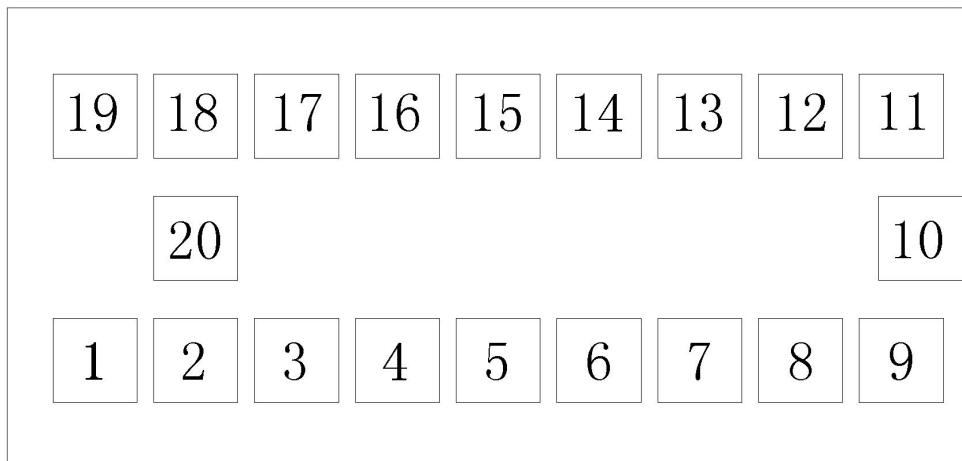
Figure 5. Waveform 2: output enable and disable time (f=1MHz; 50% duty cycle)



5 Die Information

Die Type	RD74HC244	Wafer Size	8 Inch
Die Size (μm)	X/Y: 630/300	Bond Area (μm)	X/Y: 55/55
Scribeline (μm)	60	Chip Thickness	
Metal	Front	Al+0.5%Cu	
	Back	Si	
	Top Metal Thickness	9000Å	

(630, 300)



(0, 0)

Pin No.	Pin Name	Coordinate		Pin No.	Pin Name	Coordinate	
		X	Y			X	Y
1	1G	57.3	70.5	11	2A1	583.7	229.5
2	1A1	123.1	70.5	12	1Y4	517.9	229.5
3	2Y4	188.9	70.5	13	2A2	452.1	229.5
4	1A2	254.7	70.5	14	1Y3	386.3	229.5
5	2Y3	320.5	70.5	15	2A3	320.5	229.5
6	1A3	386.3	70.5	16	1Y2	254.7	229.5
7	2Y2	452.1	70.5	17	2A4	188.9	229.5
8	1A4	517.9	70.5	18	1Y1	123.1	229.5
9	2Y1	583.7	70.5	19	2G	57.3	229.5
10	GND	596.35	150.0	20	V _{CC}	123.1	150.0

6 Ordering information

Table 9 Device summary

Order code	Package	Packing
RD74HC244BDI	DIP20	Tape and reel
RD74HC244BSO	SOP20	
RD74HC244BTS	TSSOP20	
RD74HC244B		Wafer

7 Revision history

Table 10 Document revision history ⁽¹⁾

Date	Revision	Changes
18-Jan-2022	1	Initial release
12-Dec-2023	2	Added : Die information Revised document presentation, minor textual updates

1. Information in this document is provided solely in connection with Relitech products. Relitech reserves the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at anytime, without notice.