74 Series GHz Logic

FEATURES:

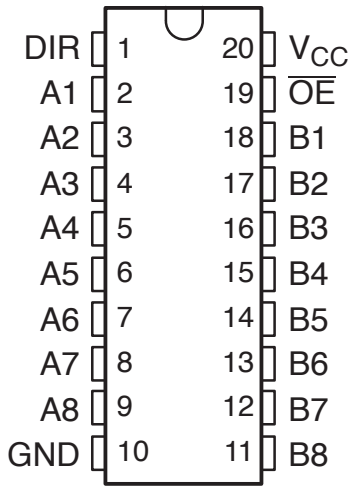
. Patented technology
. Operating frequency up to 1GHz with 2pf load
. Operating frequency up to 730MHz with 5pf load
. Operating frequency up to 320MHz with 15pf load
. Operating frequency up to 75MHz with 50pf load
. VCC Operates from 1.2V to 3.6V
. Propagation delay < 1.65ns max with 15pf load
. Low input capacitance: 5pf typical
. Available in 20pin TSSOP package

DESCRIPTION:

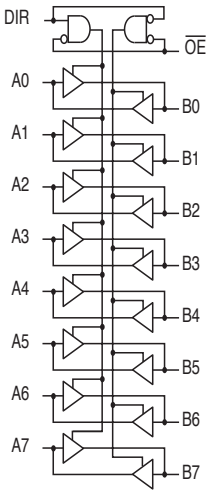
Potato Semiconductor's PO74G245A is designed for world top performance using submicron CMOS technology to achieve 1GHz TTL /CMOS output frequency with less than 1.65ns propagation delay. This Octal bus buffer gate is designed for 1.2-V to 3.6-V V_{CC} operation.

The PO74G245A features independent 8-bit Bidirectional Transceiver with 3 state outputs. Each output is disabled when the associated output- enable(OE) input is high.

Pin Configuration



Logic Block Diagram



Pin Description

Pin Name	Description
$\overline{OE}$	3-State Output Enable Inputs (Active LOW)
DIR	Direction Control Input
Ax	Side A Inputs or 3-State Inputs
Bx	Side B Outputs or 3-State Outputs
GND	Ground
V_{CC}	Power

Truth Table

Inputs		Outputs
$\overline{OE}$	DIR	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	Z

Maximum Ratings

Description	Max	Unit
Storage Temperature	-65 to 150	°C
Operation Temperature	-40 to 85	°C
Operation Voltage	-0.5 to +4.6	V
Input Voltage	-0.5 to +Vcc	V
Output Voltage	-0.5 to Vcc+0.5	V

Note:
stresses greater than listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability specification is not implied.

DC Electrical Characteristics (Over the Operating Range, T_A = –40°C +85°C)

			Min.	Max.	Units
V_{CC}	Supply Voltage	Operating	1.4	3.6	V
		Data retention only	1.2		
V_{IH}	High-level Input Voltage	V_{CC} = 1.2V	V_{CC}		
		V_{CC} = 1.4V to 1.6V	0.65 x V_{CC}		
		V_{CC} = 1.65V to 1.95V	0.65 x V_{CC}		
		V_{CC} = 2.3V to 2.7V	1.7		
		V_{CC} = 3V to 3.6V	2		
V_{IL}	Low-level Input Voltage	V_{CC} = 1.2V		GND	
		V_{CC} = 1.4V to 1.6V		0.35 x V_{CC}	
		V_{CC} = 1.65V to 1.95V		0.35 x V_{CC}	
		V_{CC} = 2.3V to 2.7V		0.7	
		V_{CC} = 3V to 3.6V		0.8	
V_I	Input Voltage		0	3.6	
V_O	Output Voltage	Active State	0	V_{CC}	
		3-State	0	3.6	
I_{OH}	High-level output current	V_{CC} = 1.4V to 1.6V		– 4	mA
		V_{CC} = 1.65V to 1.95V		– 6	
		V_{CC} = 2.3V to 2.7V		– 12	
		V_{CC} = 3V to 3.6V		– 24	
I_{OL}	Low-level output current	V_{CC} = 1.4V to 1.6V		4	
		V_{CC} = 1.65V to 1.95V		6	
		V_{CC} = 2.3V to 2.7V		12	
		V_{CC} = 3V to 3.6V		24	
$\Delta t/\Delta v$	Input transition rise or fall rate	V_{CC} = 1.4V to 3.6V		5	ns/V
T_A	Operating free-air temperature		–40	85	°C

DC Electrical Characteristics (Over the Operating Range, $T_A = -40°C$ +85°C)

Parameters		Test Conditions[1]	V_{CC}	Min.	Typ.	Max.	Units
V_{OH}		I_{OHS} = –4mA V_{IH} = 0.91V	1.4V	1.05			V
		I_{OHS} = –6mA V_{IH} = 1.07V	1.65V	1.2			
		I_{OHS} = –12mA V_{IH} = 1.7V	2.3V	1.75			
		I_{OHS} = –24mA V_{IH} = 2V	3V	2.0			
V_{OL}		I_{OLS} = 4mA V_{IL} = 0.49V	1.4V			0.4	
		I_{OLS} = 6mA V_{IL} = 0.57V	1.65V			0.45	
		I_{OLS} = 12mA V_{IL} = 0.7V	2.3V			0.55	
		I_{OLS} = 24mA V_{IL} = 0.8V	3V			0.8	
I_I		$V_I = V_{CC}$ or GND	3.6V			±2.5	µA
I_{OZ}		$V_O = V_{CC}$ or GND	3.6V			±10	
I_{CC}		$V_I = V_{CC}$ or GND I_O = 0	3.6V			±350	
C_I	Control Inputs	$V_I = V_{CC}$ or GND			3.5		pF
	Data Inputs				5		
C_O	Outputs	$V_O = V_{CC}$ or GND			5		

Notes:
1. Typical values are measured at $T_A = 25°C$.

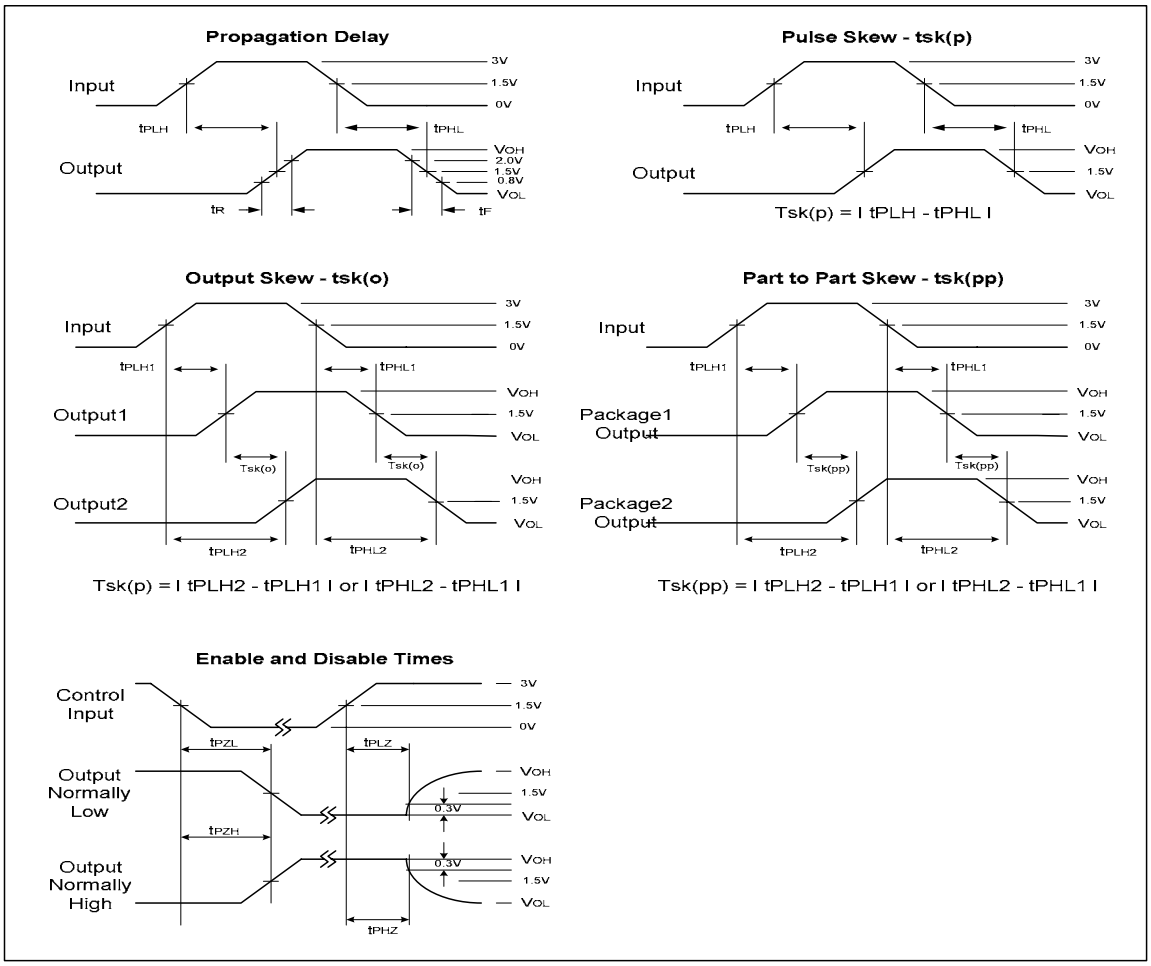
Switching Characteristics

Parameters	From (Input)	To (Output)	V_{CC} = 1.2V	V_{CC} = 1.5V ± 0.1V	V_{CC} = 1.8V ± 0.15V	V_{CC} = 2.5V ± 0.2V	V_{CC} = 3.3V ± 0.3V	Units
			Typ.	Max	Max	Max	Max	
t_{pd}	A or B	B or A	3.5	3.5	2.9	1.85	1.65	ns
t_{en}	$\overline{OE}$	B or A	8.4	9.6	7.0	4.3	3.5	
t_{dis}	$\overline{OE}$	B or A	8.4	9.6	7.0	4.3	3.5	
fmax CL=2pf	A or B	B or A		270	300	685	1000	Mhz
fmax CL=5pf	A or B	B or A		150	150	390	730	
fmax CL=15pf	A or B	B or A		100	130	220	320	
fmax CL=50pf	A or B	B or A		45	50	70	75	

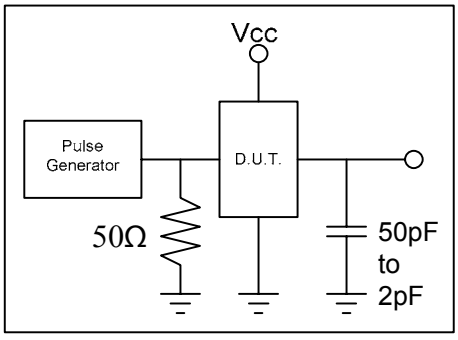
Operating Characteristics, T_A=25°C

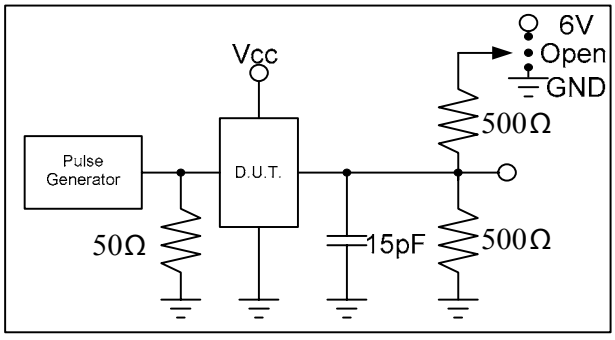
Parameters	Test Conditions	V_{CC} = 1.2V	V_{CC} = 1.8V ±0.15V	V_{CC} = 2.5V ±0.2V	V_{CC} = 3.3V ±0.3V	Units
		Typical	Typical	Typical	Typical	
C_{pd} Power Dissipation Capacitance	C_L = 0pF, f = 10 MHz	18.5	20	22	26	pF

Test Waveforms

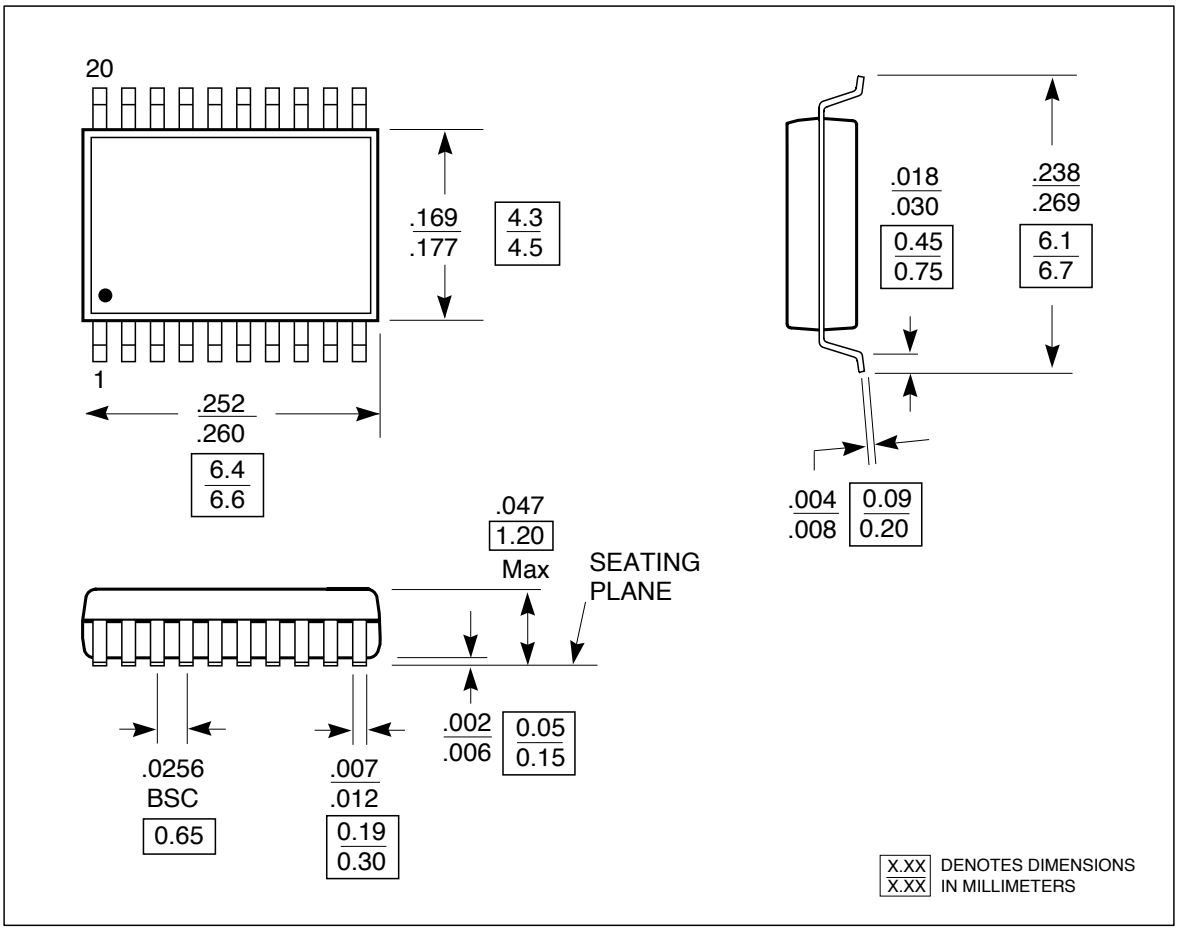


Test Circuit





Packaging Mechanical Drawing: 20 pin TSSOP



Ordering Information

Ordering Code	Package			Top-Marking	T_A
PO74G245ASU	20pin TSSOP	Tube	Pb-free & Green	PO74G245AS	-40°C to 85°C
PO74G245ASR	20pin TSSOP	Tape and reel	Pb-free & Green	PO74G245AS	-40°C to 85°C

IC Package Information

PACKAGE CODE	PACKAGE TYPE	TAPE WIDTH (mm)	TAPE PITCH (mm)	PIN 1 LOCATION	TAPE TRAILER LENGTH	QTY PER REEL	TAPE LEADER LENGTH	QTY PER TUBE
T	TSSOP 20	16	8	Top Left Corner	39 (12")	3000	64 (20")	74