PO74G164245A

1.65v-3.6v, 16-bit Dual Supply Level Shifting Bidirectional Transceiver with 3 state outputs

02/01/09

74 Series GHz Logic

FEATURES:

. Patented technology
. Operating frequency up to 1GHz with 2pf load
. VCC Operates from 1.65V to 3.6V
. Low input capacitance: 5pf typical
. Available in 48pin TSSOP package
. Comparator A inputs for accuracy signals

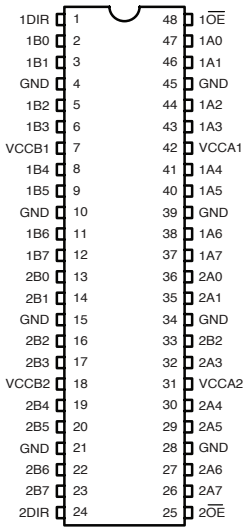
DESCRIPTION:

Potato Semiconductor's PO74G164245A is designed for world top performance using submicron CMOS technology to achieve 1GHz TTL /CMOS output frequency.This Octal bus buffer gate is designed for 1.65v-3.6v, 16-bit Dual Supply Level ShiftingBidirectional Transceiver with 3 state outputs operation.

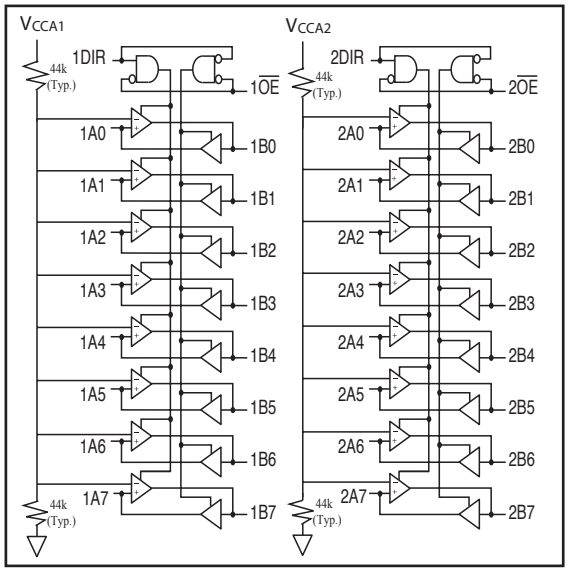
Contains two separate supply rails: B port (VCCB) must set higher voltage (equal) then A port (VCCA).This arrangement permits translation from a 1.8-2.5V to 3.3V environment.

The PO74G164245A features independent 16-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
xOE	3-State Output Enable Inputs (Active LOW)
xDIR	Direction Control Input
xAx	Side A Inputs or 3-State Inputs
xBx	Side B Outputs or 3-State Outputs
GND	Ground
V_{CC}	Power

Truth Table

Inputs		Outputs
xOE	xDIR	
L	L	Bus B Data to Bus A
L	H	Bus A Data to Bus B
H	X	Z

xDIR	VCCAx	Comparator InputAx
X	0V	disable
L	X	disable
H	>0V	Enable

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 ($1.65V < V_{CCA} \leq 1.95V$, $2.3V < V_{CCB} \leq 2.7V$)

Symbol	Parameter		Conditions	V_{CCA} (V)	V_{CCB} (V)	Min	Max	Units
V_{IHA}	HIGH Level Input Voltage	A_n		1.65–1.95	2.3–2.7	0.65 x V_{CC}		V
V_{IHB}		B_n, DIR, $\overline{OE}$		1.65–1.95	2.3–2.7	1.6		V
V_{ILA}	LOW Level Input Voltage	A_n		1.6–1.95	2.3–2.7		0.35 x V_{CC}	V
V_{ILB}		B_n, DIR, $\overline{OE}$		1.65–1.95	2.3–2.7		0.7	V
V_{OHA}	HIGH Level Output Voltage		I_{OH} = –6 mA	1.65	2.3–2.7	1.25		V
V_{OHB}	HIGH Level Output Voltage		I_{OH} = –18 mA	1.65–1.95	2.3	1.7		V
V_{OLA}	LOW Level Output Voltage		I_{OL} = 6 mA	1.65	2.3–2.7		0.3	V
V_{OLB}	LOW Level Output Voltage		I_{OL} = 18 mA	1.65–1.95	2.3		0.6	V
I_{IA}	Input Leakage Current @ $\overline{OE}$, DIR		$0V \leq V_I \leq V_{CCA}$	1.65 1.95	2.3 2.7		±2.5	μA
I_{IB}	Input Leakage Current @ $\overline{OE}$, DIR		$0V \leq V_I \leq V_{CCB}$	1.65–1.95	2.3–2.7		±2.5	μA
I_{OZA}	3-STATE Output Leakage		$0V \leq V_O \leq V_{CCA}$ $\overline{OE} = V_{CCB}$ $V_I = V_{IH}$ or V_{IL}	1.65–1.95	2.3–2.7		±2.5	μA
I_{OZB}	3-STATE Output Leakage		$0V \leq V_O \leq V_{CCB}$ $\overline{OE} = V_{CCB}$ $V_I = V_{IH}$ or V_{IL}	1.65–1.95	2.3 2.7		±2.5	μA
I_{CCA}	Quiescent Supply Current, per supply		$A_n = V_{CCA}$ or GND, DIR= V_{CCB} B_n & $\overline{OE} = V_{CCB}$ or GND	1.65–1.95	2.3–2.7		±20	μA
			$A_n = V_{CCA}$ or GND, DIR= GND B_n & $\overline{OE} = V_{CCB}$ or GND	1.65–1.95	2.3–2.7		±20	μA
I_{CCB}	Quiescent Supply Current, per supply		$A_n = V_{CCA}$ or GND, DIR= V_{CCB} B_n & $\overline{OE} = V_{CCB}$ or GND	1.65–1.95	2.3–2.7		20	mA
			$A_n = V_{CCA}$ or GND, DIR= GND B_n & $\overline{OE} = V_{CCB}$ or GND	1.65–1.95	2.3–2.7		±20	μA

DC Electrical Characteristics ($1.65V < V_{CCA} \leq 1.95V$, $3.0V < V_{CCB} \leq 3.6V$)

Symbol	Parameter		Conditions	V_{CCA} (V)	V_{CCB} (V)	Min	Max	Units
V_{IHA}	HIGH Level	A_n		1.65–1.95	3.0–3.6	0.65 x V_{CC}		V
V_{IHB}	Input Voltage	B_n, DIR, $\overline{OE}$		1.65–1.95	3.0–3.6	2.3		V
V_{ILA}	LOW Level	A_n		1.65–1.95	3.0–3.6		0.35 x V_{CC}	V
V_{ILB}	Input Voltage	B_n, DIR, $\overline{OE}$		1.65–1.95	3.0–3.6		0.8	V
V_{OHA}	HIGH Level Output Voltage		$I_{OH} = -6$ mA	1.65	3.0–3.6	1.25		V
V_{OHB}	HIGH Level Output Voltage		$I_{OH} = -24$ mA	1.65–1.95	3.0	2.5		V
V_{OLA}	LOW Level Output Voltage		$I_{OL} = 6$ mA	1.65	3.0–3.6		0.3	V
V_{OLB}	LOW Level Output Voltage		$I_{OL} = 24$ mA	1.65–1.95	3.0		0.65	V
I_{IA}	Input Leakage Current @ $\overline{OE}$, DIR		$0V < V_I < V_{CCA}$	1.65 –1.95	3.0–3.6		±2.5	µA
I_{IB}	Input Leakage Current @ $\overline{OE}$, DIR		$0V \leq V_I \leq V_{CCB}$	1.65 –1.95	3.0–3.6		±2.5	µA
I_{OZA}	3-STATE Output Leakage		$0V \leq V_O \leq V_{CCA}$ $\overline{OE} = V_{CCB}$ $V_I = V_{IH}$ or V_{IL}	1.65–1.95	3.0–3.6		±2.5	µA
I_{OZB}	3-STATE Output Leakage		$0V \leq V_O \leq V_{CCB}$ $\overline{OE} = V_{CCB}$ $V_I - V_{IH}$ or V_{IL}	1.65–1.95	3.0–3.6		±2.5	µA
I_{CCA}	Quiescent Supply Current, per supply		$A_n = V_{CCA}$ or GND, DIR= V_{CCB} B_n & $\overline{OE} = V_{CCB}$ or GND	1.65–1.95	3.0–3.6		±20	µA
			$A_n = V_{CCA}$ or GND, DIR= GND B_n & $\overline{OE} = V_{CCB}$ or GND	1.65–1.95	3.0–3.6		±20	µA
I_{CCB}	Quiescent Supply Current, per supply		$A_n = V_{CCA}$ or GND, DIR= V_{CCB} B_n & $\overline{OE} = V_{CCB}$ or GND	1.65–1.95	3.0–3.6		185	mA
			$A_n = V_{CCA}$ or GND, DIR= GND B_n & $\overline{OE} = V_{CCB}$ or GND	1.65–1.95	3.0–3.6		±20	µA

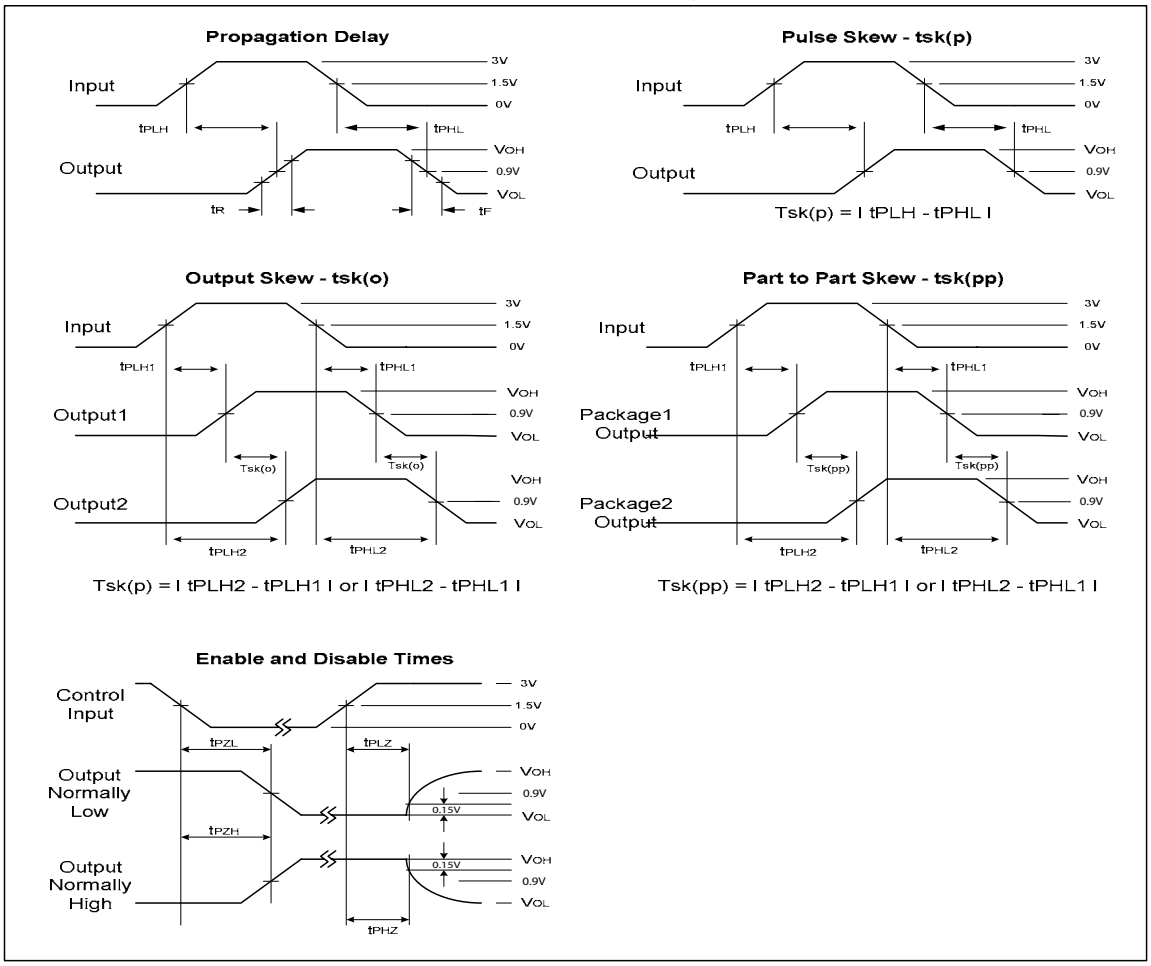
DC Electrical Characteristics ($2.3V < V_{CCA} \leq 2.7V$, $3.0V < V_{CCB} \leq 3.6V$)

Symbol	Parameter		Conditions	V_{CCA} (V)	V_{CCB} (V)	Min	Max	Units
V_{IHA}	HIGH Level Input Voltage	A_n		2.3–2.7	3.0–3.6	1.6		V
V_{IHB}		B_n, DIR, $\overline{OE}$		2.3–2.7	3.0–3.6	2.3		V
V_{ILA}	LOW Level Input Voltage	A_n		2.3–2.7	3.0–3.6		0.7	V
V_{ILB}		B_n, DIR, $\overline{OE}$		2.3–2.7	3.0–3.6		0.8	V
V_{OHA}	HIGH Level Output Voltage		$I_{OH} = -18$ mA	2.3	3.0–3.6	1.7		V
V_{OHB}	HIGH Level Output Voltage		$I_{OH} = -24$ mA	2.3–2.7	3.0	2.5		V
V_{OLA}	LOW Level Output Voltage		$I_{OL} = 18$ mA	2.3	3.0–3.6		0.6	V
V_{OLB}	LOW Level Output Voltage		$I_{OL} = 24$ mA	2.3–2.7	3.0		0.55	V
I_{IA}	Input Leakage Current @ $\overline{OE}$, DIR		$0V \leq V_I \leq V_{CCA}$	1.65–2.7	3.0–3.6		±2.5	µA
I_{IB}	Input Leakage Current @ $\overline{OE}$, DIR		$0V \leq V_I \leq V_{CCB}$	1.65–2.7	3.0–3.6		±2.5	µA
I_{OZA}	3-STATE Output Leakage @ A_n		$0V \leq V_O \leq V_{CCA}$ $\overline{OE} = V_{CCA}$ $V_I = V_{IH}$ or V_{IL}	2.3–2.7	3.0–3.6		±2.5	µA
I_{OZB}	3-STATE Output Leakage @ A_n		$0V \leq V_O \leq V_{CCB}$ $\overline{OE} = V_{CCA}$ $V_I = V_{IH}$ or V_{IL}	2.3–2.7	3.0–3.6		±2.5	µA
I_{CCA}	Quiescent Supply Current, per supply		$A_n = V_{CCA}$ or GND, DIR= V_{CCB} B_n & $\overline{OE} = V_{CCB}$ or GND	2.3–2.7	3.0–3.6		±20	µA
			$A_n = V_{CCA}$ or GND, DIR= GND B_n & $\overline{OE} = V_{CCB}$ or GND	2.3–2.7	3.0–3.6		±20	µA
I_{CCB}	Quiescent Supply Current, per supply		$A_n = V_{CCA}$ or GND, DIR= V_{CCB} B_n & $\overline{OE} = V_{CCB}$ or GND	2.3–2.7	3.0–3.6		45	mA
			$A_n = V_{CCA}$ or GND, DIR= GND B_n & $\overline{OE} = V_{CCB}$ or GND	2.3–2.7	3.0–3.6		±20	µA

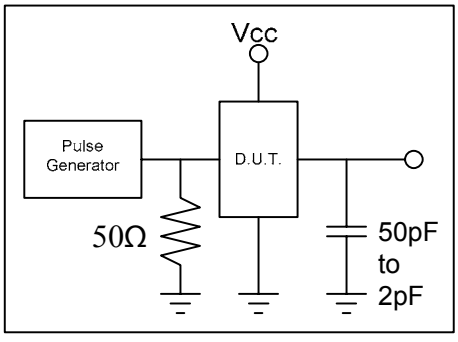
Switching Characteristics

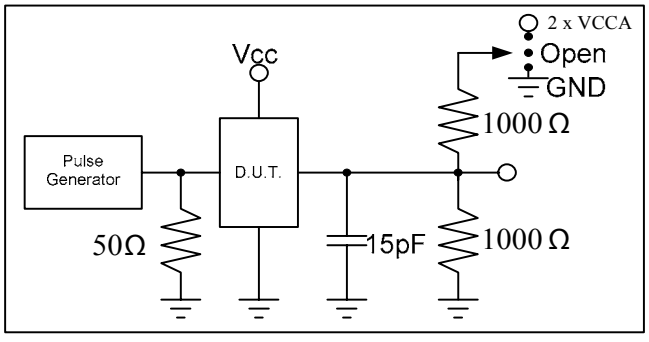
Parameter	Conditions	T_A = –40°C to +85°C,					Units
		V_{CCA} = 1.65V to 1.95V V_{CCB} = 2.3V to 2.7V	V_{CCA} = 2.3V to 2.7V V_{CCB} = 2.3V to 2.7V	V_{CCA} = 1.65V to 1.95V V_{CCB} = 3.0V to 3.6V	V_{CCA} = 2.3V to 2.7V V_{CCB} = 3.0V to 3.6V	V_{CCA} = 3.0V to 3.6V V_{CCB} = 3.0V to 3.6V	
		Max.	Max.	Max.	Max.	Max.	
t_{PHL}, t_{PLH}	Propagation Delay, A to B	2.3	2.3	2.3	1.8	1.8	ns
t_{PHL}, t_{PLH}	Propagation Delay, B to A	3.3	2.1	3.8	2.2	1.8	ns
t_{PZL}, t_{PZH}	Output Enable Time, OE to B	6.0	6.0	4.5	4.5	4.5	ns
t_{PZL}, t_{PZH}	Output Enable Time, OE to A	7.5	6.0	7.5	5.5	4.5	ns
t_{PLZ}, t_{PHZ}	Output Disable Time, OE to B	6.0	6.0	4.5	4.5	4.5	ns
t_{PLZ}, t_{PHZ}	Output Disable Time, OE to A	7.5	6.0	7.5	5.5	4.5	ns
fmax CL=2pf	A to B	380	430	370	660	1100	Mhz
fmax CL=5pf	A to B	360	330	350	610	670	
fmax CL=15pf	A to B	270	190	240	390	330	
fmax CL=50pf	A to B	90	50	50	100	85	
fmax CL=2pf	B to A	230	630	160	530	1100	
fmax CL=5pf	B to A	160	400	135	350	800	
fmax CL=15pf	B to A	110	190	80	170	330	
fmax CL=50pf	B to A	20	50	30	50	85	

Parameter Measurement Information, V_{CCA} = 1.8V ±0.1V

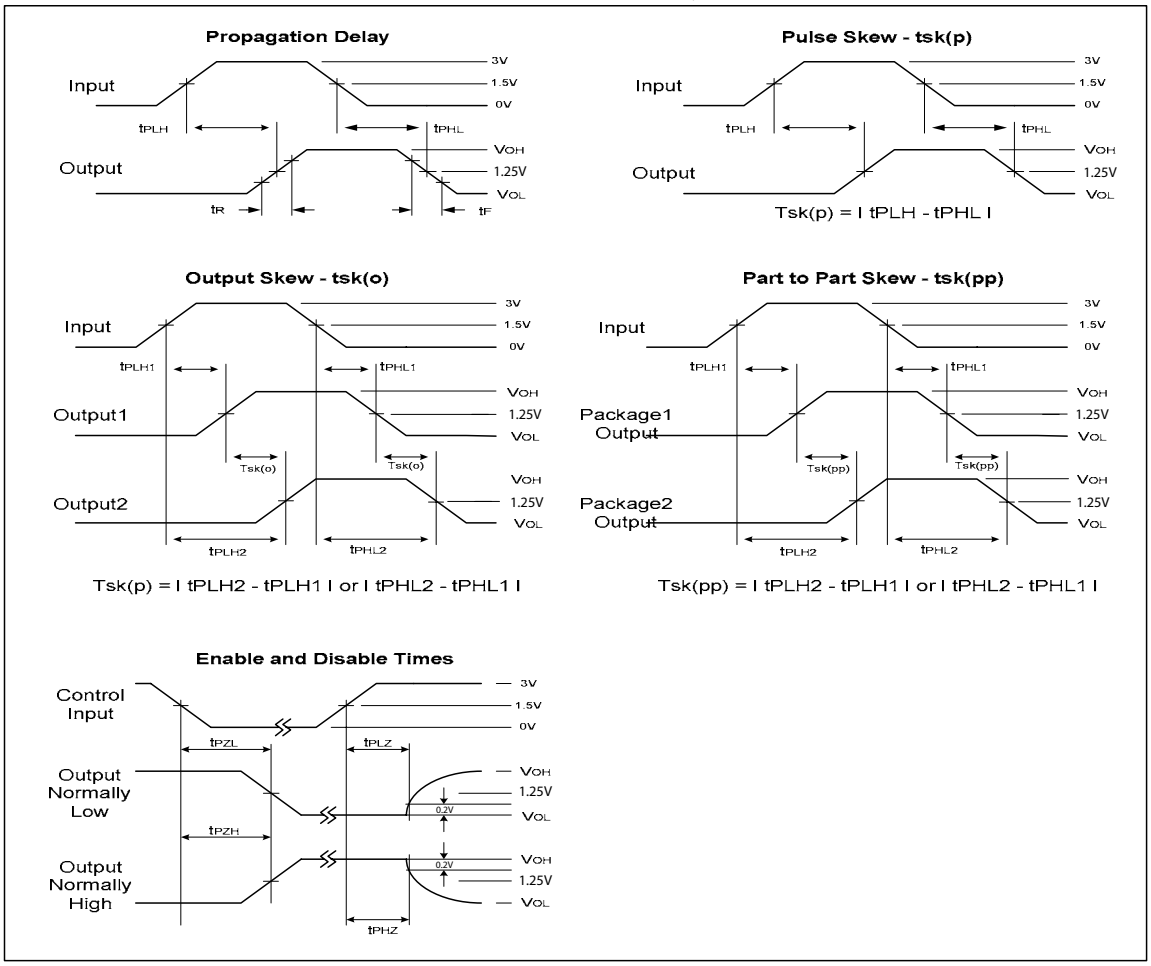


Test Circuit





Parameter Measurement Information, V_{CCA} = 2.5V ±0.2V



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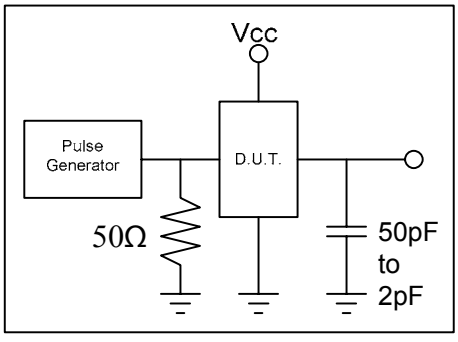
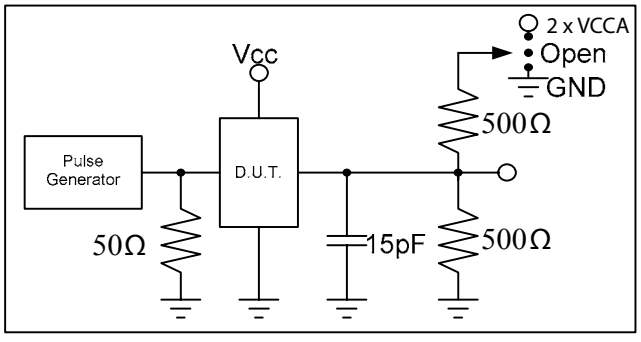
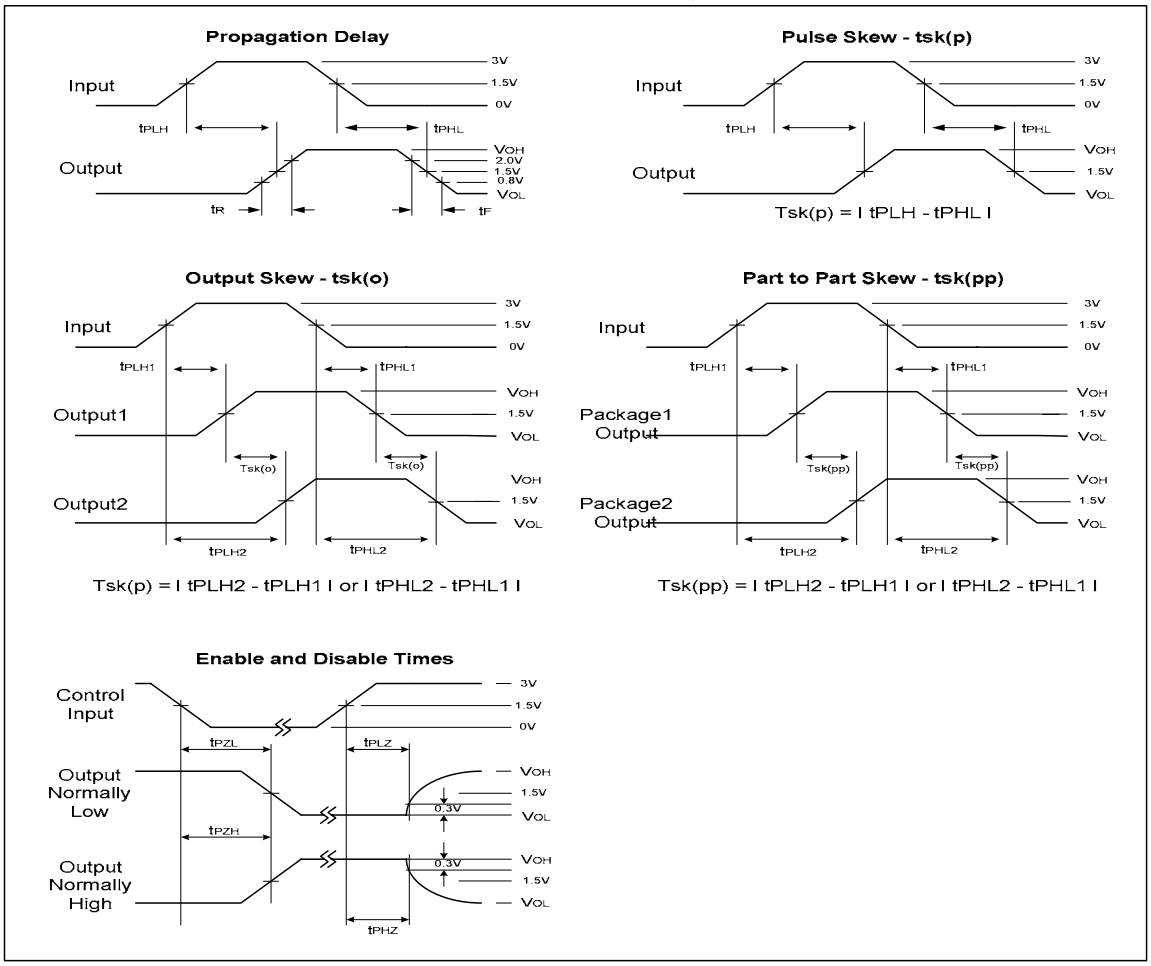




Parameter Measurement Information, V_{CCA} = 3.3V ±0.3V



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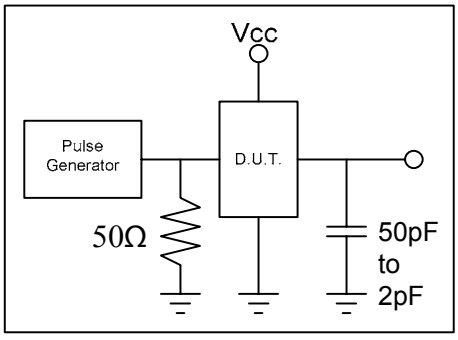
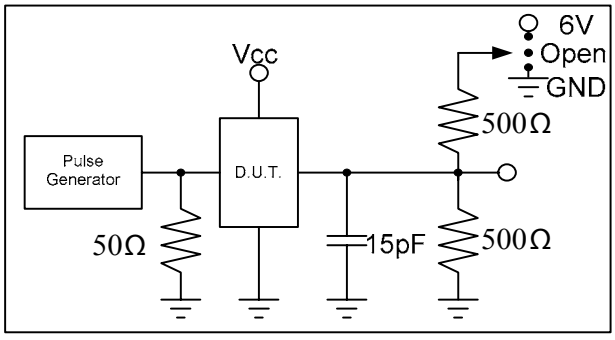
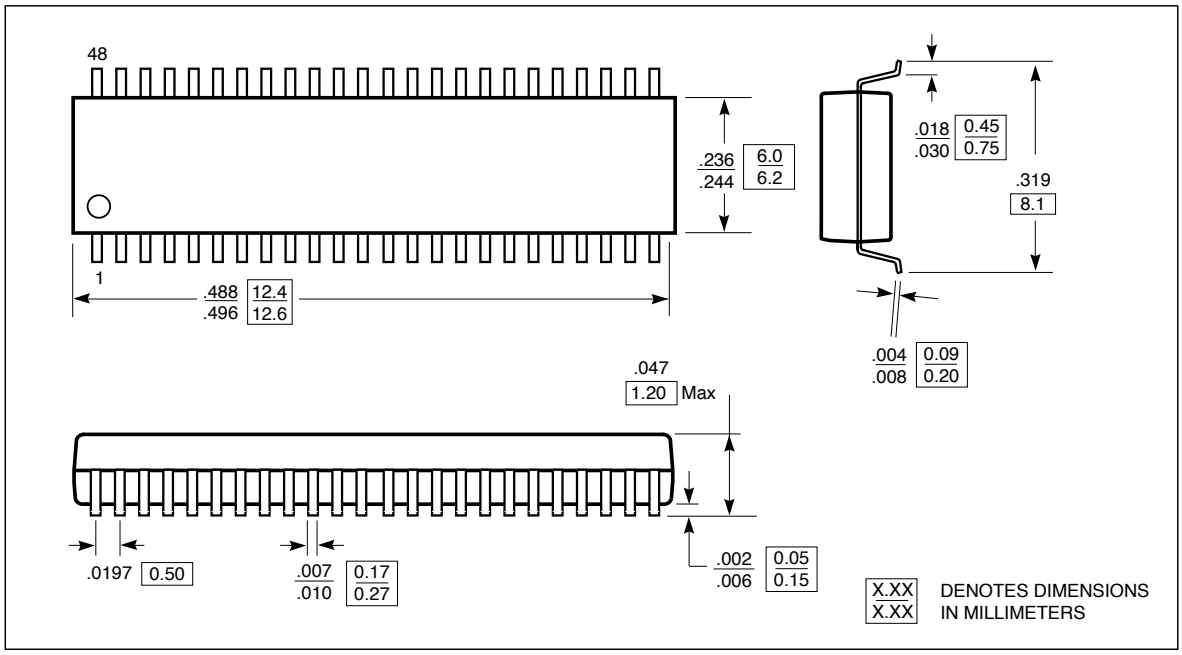




Packaging Mechanical Drawing: 48 pin TSSOP



Ordering Information

Ordering Code	Package			Top-Marking	T_A
PO74G164245ASU	48pin TSSOP	Tube	Pb-free & Green	PO74G164245AS	-40°C to 85°C
PO74G164245ASR	48pin TSSOP	Tape and reel	Pb-free & Green	PO74G164245AS	-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 48	24	12	Top Left Corner	26 (12")	1500	43 (20")	39