

**1.8V 16-Bit Buffer/Driver  
with 3-State Outputs**
**Features**

- PI74AUC16244 is designed for low-voltage operation,  $V_{CC} = 0.8V$  to  $2.7V$ , optimized at  $1.8V$ .
- 3.6V I/O Tolerant inputs and outputs
- $I_{OFF}$  supports partial power-down operation
- Latch-Up Performance exceeds 100mA per JESD 78
- ESD Protection Exceeds JESD 22
  - 2000V Human-Body Model (A114-B)
  - 200V Machine Model (A115-A)
- Industrial operation:  $-40^{\circ}C$  to  $+85^{\circ}C$
- Packaging:
  - 48-pin TSSOP (A)
  - 48-pin TSSOP (K)

**Description**

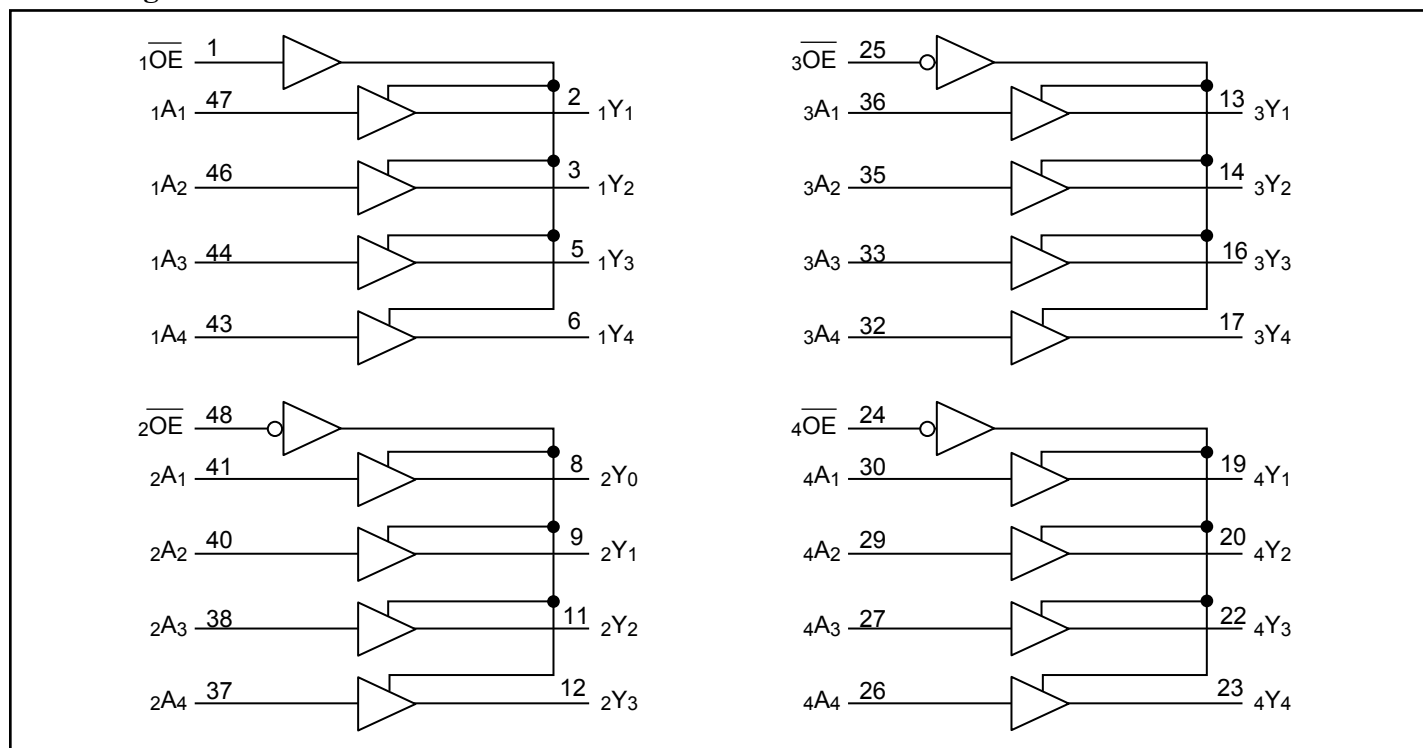
Pericom Semiconductor's PI74AUC series of logic circuits are produced using the Company's advanced submicron CMOS technology, achieving industry leading speeds.

The PI74AUC16244 is a 16-bit buffer driver designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers and bus-oriented receivers and transmitters.

The device can be used as four 4-bit buffers, two 8-bit buffers, or one 16-bit buffer. It provides non-inverting outputs and symmetrical active-low output-enable  $\overline{OE}$  inputs.

To ensure the high-impedance state during power-up or power-down,  $\overline{OE}$  should be tied to  $V_{CC}$  through a pull-up resistor; the minimum value of the resistor is determined by the current-sinking ability of the driver.

The PI74AUC16244 is specified for partial power down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the outputs preventing current backflow through the device when it is powered down.

**Block Diagram**


**Maximum Ratings** (Above which the useful life may be impaired. For user guidelines, not tested.)

Supply voltage range, $V_{CC}$ .....	-0.5V to +3.6V
Input voltage range, $V_I^{(1)}$ .....	-0.5V to +3.6V
Voltage range applied to any output in the high-impedance or power-off state, $V_O^{(1)}$ ....	-0.5V to +3.6V
Output voltage range $V_O^{(1,2)}$ .....	-0.5V to $V_{CC}+0.5V$
Input clamp current, $I_{IK} (V_I < 0)$ .....	-50mA
Output clamp current, $I_{OK} (V_O < 0)$ .....	-50mA
Continuous output current, $I_O$ .....	$\pm 20mA$
Continuous current through each $V_{CC}$ or GND .....	$\pm 100mA$
Package thermal impedance, $\theta_{JA}^{(3)}$ : package A .....	104°C/W
package K .....	107°C/W
Storage Temperature range, $T_{stg}$ .....	-65°C to 150°C

**Notes:**

1. Input negative voltage & output voltage ratings may be exceeded if the input and output current rating are observed.
2. This value is limited to 3.6V maximum.
3. The package thermal impedance is calculated in accordance with JESD 51.
4. Stresses greater than those 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.

**Pin Configuration**

$1\overline{OE}$	1	48	$2\overline{OE}$
$1Y_1$	2	47	$1A_1$
$1Y_2$	3	46	$1A_2$
GND	4	45	GND
$1Y_3$	5	44	$1A_3$
$1Y_4$	6	43	$1A_4$
$V_{CC}$	7	42	$V_{CC}$
$2Y_1$	8	41	$2A_1$
$2Y_2$	9	40	$2A_2$
GND	10	39	GND
$2Y_3$	11	38	$2A_3$
$2Y_4$	12	37	$2A_4$
$3Y_1$	13	36	$3A_1$
$3Y_2$	14	35	$3A_2$
GND	15	34	GND
$3Y_3$	16	33	$3A_3$
$3Y_4$	17	32	$3A_4$
$V_{CC}$	18	31	$V_{CC}$
$4Y_1$	19	30	$4A_1$
$4Y_2$	20	29	$4A_2$
GND	21	28	GND
$4Y_3$	22	27	$4A_3$
$4Y_4$	23	26	$4A_4$
$4\overline{OE}$	24	25	$3\overline{OE}$

**Pin Description**

Pin Name	Description
$x\overline{OE}$	3-State Output Enable Inputs (Active LOW)
$xAX$	Inputs
$xYX$	3-State Outputs
GND	Ground
$V_{CC}$	Power

**Truth Table**

Inputs		Outputs
$x\overline{OE}$	$xAX$	$xYX$
L	H	H
L	L	L
H	X	

**Note:**

1. H = High Signal Level, L = Low Signal Level  
X = Don't Care or Irrelevant, Z = High Impedance

**Recommended Operating Conditions<sup>(1)</sup>**

Parameters	Description	Operating Conditions	Min.	Max.	Units
V <sub>CC</sub>	Supply Voltage		0.8	2.7	
V <sub>IH</sub>	High-Level Input Voltage	V <sub>CC</sub> = 0.8V	V <sub>CC</sub>		V
		V <sub>CC</sub> = 1.1V to 1.95V	0.65 x V <sub>CC</sub>		
		V <sub>CC</sub> = 2.3V to 2.7V	1.7		
V <sub>IL</sub>	Low-Level Input Voltage	V <sub>CC</sub> = 0.8V		0	
		V <sub>CC</sub> = 1.1V to 1.95V		0.35 x V <sub>CC</sub>	
		V <sub>CC</sub> = 2.3V to 2.7V		0.7	
V <sub>I</sub>	Input Voltage		0	3.6	
V <sub>O</sub>	Output Voltage	Active State	0	V <sub>CC</sub>	
		3-state	0	3.6	
I <sub>OH</sub>	High-Level Output Current	V <sub>CC</sub> = 0.8V			mA
		V <sub>CC</sub> = 1.1V			
		V <sub>CC</sub> = 1.4V			
		V <sub>CC</sub> = 1.65V			
		V <sub>CC</sub> = 2.3V			
I <sub>OL</sub>	Low-Level Output Current	V <sub>CC</sub> = 0.8V			
		V <sub>CC</sub> = 1.1V			
		V <sub>CC</sub> = 1.4V			
		V <sub>CC</sub> = 1.65V			
		V <sub>CC</sub> = 2.3V			
Δt/Δv	Input Transition Rise or Fall Rate			5	ns/V
T <sub>A</sub>	Operating Free-Air Temperature		-40	85	°C

**Note:**

- All unused inputs must be held at V<sub>CC</sub> or GND to ensure proper device operation.

**DC Electrical Characteristics** (Over the Operating Range,  $T_A = -40^\circ\text{C} + 85^\circ\text{C}$ )

Parameters	Test Conditions <sup>(1)</sup>	V <sub>CC</sub>	Min.	Typ. <sup>(1)</sup>	Max.	Units
V <sub>OH</sub>	I <sub>OH</sub> = -100μA	0.8V to 2.7V	V <sub>CC</sub> - 0.1V			V
	I <sub>OH</sub> = -0.7mA	0.8V		0.55		
	I <sub>OH</sub> = -3mA	1.1V	0.8			
	I <sub>OH</sub> = -5mA	1.4V	1			
	I <sub>OH</sub> = -8mA	1.65V	1.2			
	I <sub>OH</sub> = -9mA	2.3V	1.8			
V <sub>OL</sub>	I <sub>OL</sub> = 100μA	0.8V to 2.7V			0.2	
	I <sub>OL</sub> = 0.7mA	0.8V		0.25		
	I <sub>OL</sub> = 3mA	1.1V			0.3	
	I <sub>OL</sub> = 5mA	1.4V			0.4	
	I <sub>OL</sub> = 8mA	1.65V			0.45	
	I <sub>OL</sub> = 9mA	2.3V			0.6	
I <sub>I</sub> <sup>(2)</sup>	V <sub>I</sub> = V <sub>CC</sub> or GND	0 to 2.7V			±5	μA
I <sub>OFF</sub>	V <sub>I</sub> or V <sub>O</sub> = 2.7V	0V			±10	
I <sub>OZ</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	0.8V to 2.7V			±10	
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	0.8V to 2.7V			20	
C <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	2.5V		3		pF
C <sub>O</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	2.5V		4		

**Note:**

- Typical values are measured at  $T_A = 25^\circ\text{C}$ .
- I<sub>I</sub> - A Port or OE inputs.

**Switching Characteristics**

(Over recommended operating free-air temperature range, unless otherwise noted, see Figure 1)

Parameters	From (Input)	To (Output)	V <sub>CC</sub> = 0.8V	V <sub>CC</sub> = 1.2V ± 0.1V		V <sub>CC</sub> = 1.5V ± 0.1V		V <sub>CC</sub> = 1.8V ± 0.15V			V <sub>CC</sub> = 2.5V ± 0.2V		Units
			Typ.	Min.	Max.	Min.	Max.	Min.	Typ.	Max.	Min.	Max.	
tpd	A	Y	5.4	0.8	2.8	0.6	1.9	0.7	1.3	1.8	0.5	1.8	ns
ten	$\overline{\text{OE}}$	Y	8	1	4.4	0.7	2.6	0.8	1.4	2.5	0.6	1.9	
tdis	$\overline{\text{OE}}$	Y	12	1.9	4.9	1	4.6	1.5	2.6	4	0.5	3	

**Operating Characteristics,  $T_A = 25^\circ\text{C}$** 

Parameters		Test Conditions	V <sub>CC</sub> = 0.8V	V <sub>CC</sub> = 1.2V	V <sub>CC</sub> = 1.5V	V <sub>CC</sub> = 1.8V	V <sub>CC</sub> = 2.5V	Units
			Typical	Typical	Typical	Typical	Typical	
Cpd Power Dissipation Capacitance	Outputs Enabled	C <sub>L</sub> = 0pF, f = 10 MHz	21	22	23	25	30	pF
	Outputs Disabled		1	1	1	1		

### Parameter Measurement Information

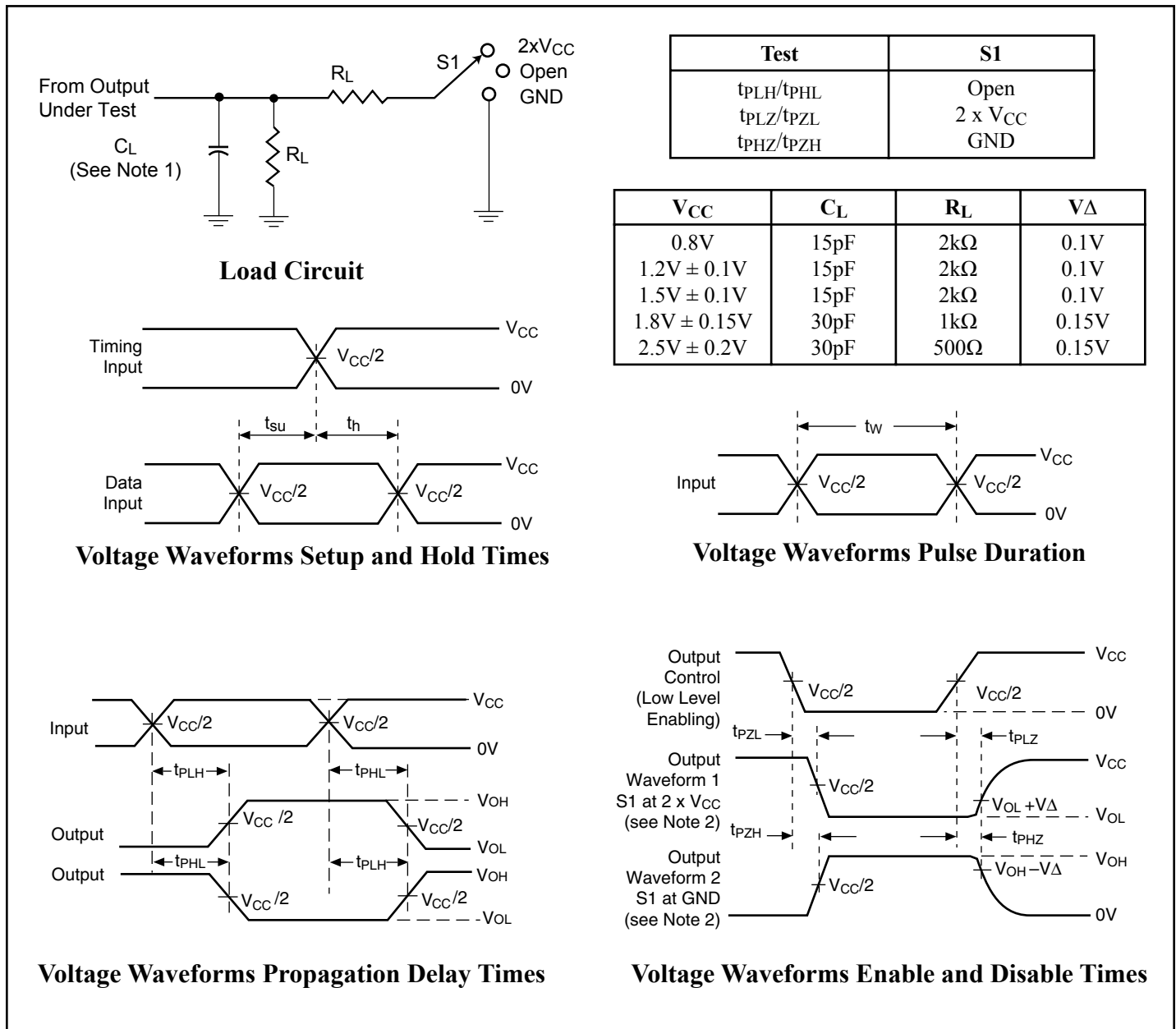
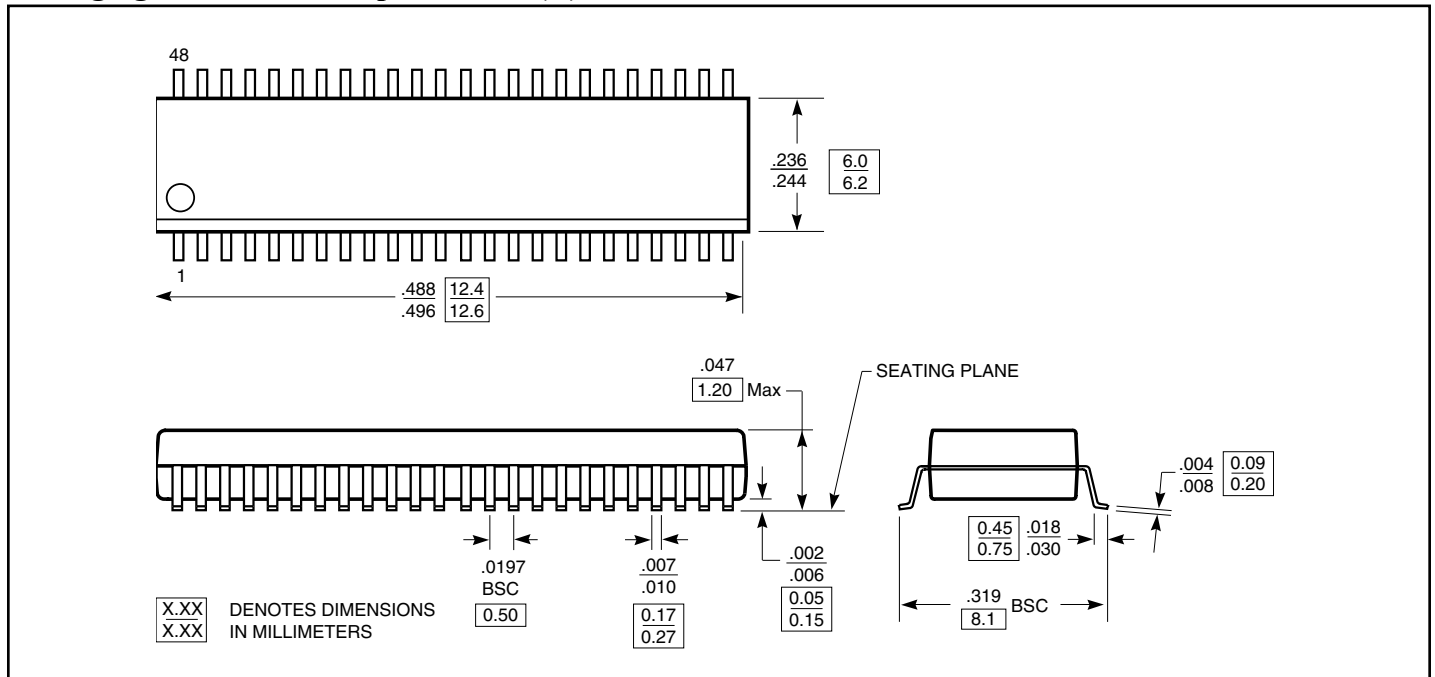
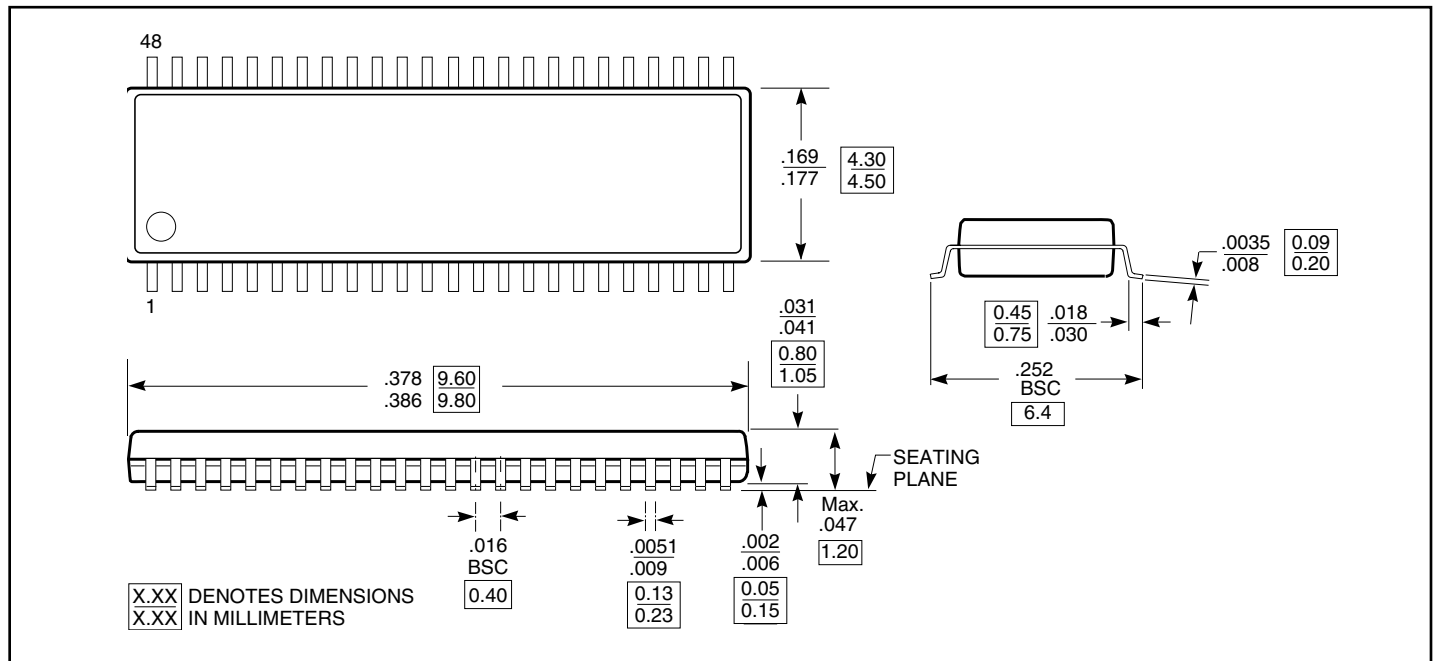


Figure 1. Load Circuit and Voltage Waveforms

#### Notes:

- $C_L$  includes probe and jig capacitance.
- Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
- All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10$  MHz,  $Z_O = 50\Omega$ , slew rate  $\geq 1V/ns$
- The outputs are measured one at a time with one transition per measurement.
- $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$
- $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$
- $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$
- All parameters and waveforms are not applicable to all devices.

**Packaging Mechanical: 48-pin TSSOP (A)**

**Packaging Mechanical: 48-pin TSSOP (K)**


**Ordering Information**

<b>Ordering Code</b>	<b>Packaging Code</b>	<b>Package Description</b>
PI74AUC16244A	A	48-pin TSSOP
PI74AUC16244K	K	48-pin TVSOP

**Notes:**

1. Thermal characteristics can be found on the company web site at [www.pericom.com/packaging/](http://www.pericom.com/packaging/).