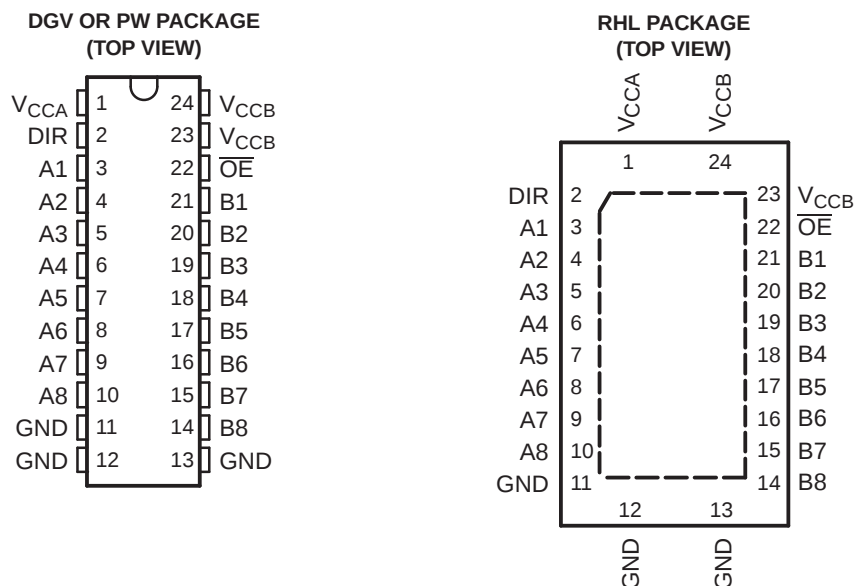


FEATURES

- Control Inputs V_{IH}/V_{IL} Levels Are Referenced to V_{CCA} Voltage
- V_{CC} Isolation Feature – If Either V_{CC} Input Is at GND, All I/O Ports Are in the High-Impedance State
- I_{off} Supports Partial Power-Down-Mode Operation
- Fully Configurable Dual-Rail Design Allows Each Port to Operate Over the Full 1.4-V to 3.6-V Power-Supply Range
- I/Os Are 4.6-V Tolerant
- Max Data Rates
 - 170 Mbps ($V_{CCA} < 1.8\text{ V}$ or $V_{CCB} < 1.8\text{ V}$)
 - 320 Mbps ($V_{CCA} \geq 1.8\text{ V}$ and $V_{CCB} \geq 1.8\text{ V}$)
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
 - 8000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)



DESCRIPTION/ORDERING INFORMATION

This 8-bit noninverting bus transceiver uses two separate configurable power-supply rails. The SN74AVC8T245 is optimized to operate with V_{CCA}/V_{CCB} set at 1.4 V to 3.6 V. It is operational with V_{CCA}/V_{CCB} as low as 1.2 V. The A port is designed to track V_{CCA} . V_{CCA} accepts any supply voltage from 1.2 V to 3.6 V. The B port is designed to track V_{CCB} . V_{CCB} accepts any supply voltage from 1.2 V to 3.6 V. This allows for universal low-voltage bidirectional translation between any of the 1.2-V, 1.5-V, 1.8-V, 2.5-V, and 3.3-V voltage nodes.

ORDERING INFORMATION

T_A	PACKAGE ⁽¹⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	QFN – RHL	Reel of 1000	SN74AVC8T245RHLR	WE245
	TSSOP – PW	Tube of 60	SN74AVC8T245PW	WE245
		Reel of 2000	SN74AVC8T245PWR	
	TVSOP – DGV	Reel of 2000	SN74AVC8T245DGVR	WE245

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

DESCRIPTION/ORDERING INFORMATION (CONTINUED)

The SN74AVC8T245 is designed for asynchronous communication between data buses. The device transmits data from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable ($\overline{OE}$) input can be used to disable the outputs so the buses are effectively isolated.

The SN74AVC8T245 is designed so the control pins (DIR and $\overline{OE}$) are supplied by V_{CCA} .

The SN74AVC8T245 solution is compatible with a single-supply system and can be replaced later with a '245 function, with minimal printed circuit board redesign.

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.

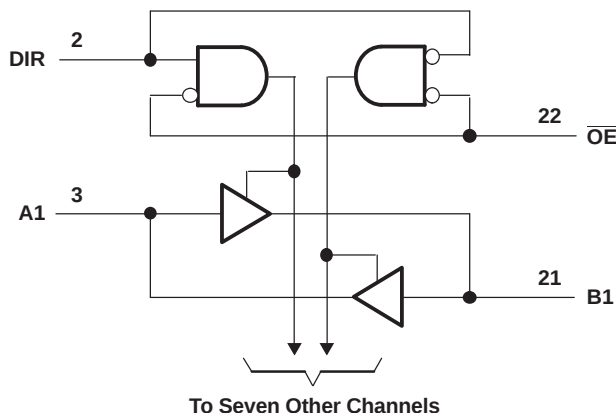
The V_{CC} isolation feature ensures that if either V_{CC} input is at GND, both ports are in the high-impedance state.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ shall 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.

FUNCTION TABLE
(each 8-bit section)

INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	All outputs Hi-Z

LOGIC DIAGRAM (POSITIVE LOGIC)



Absolute Maximum Ratings⁽¹⁾

over operating free-air temperature range (unless otherwise noted)

		MIN	MAX	UNIT
V_{CCA} V_{CCB}	Supply voltage range	–0.5	4.6	V
V_I	Input voltage range ⁽²⁾	I/O ports (A port)	–0.5	4.6
		I/O ports (B port)	–0.5	4.6
		Control inputs	–0.5	4.6
V_O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾	A port	–0.5	4.6
		B port	–0.5	4.6
V_O	Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾	A port	–0.5 $V_{CCA} + 0.5$	V
		B port	–0.5 $V_{CCB} + 0.5$	V
I_{IK}	Input clamp current	$V_I < 0$	–50	mA
I_{OK}	Output clamp current	$V_O < 0$	–50	mA
I_O	Continuous output current		±50	mA
	Continuous current through V_{CCA} , V_{CCB} , or GND		±100	mA
θ_{JA}	Package thermal impedance ⁽⁴⁾	DGV package	86	°C/W
		PW package	88	
		RHL package	43	
T_{stg}	Storage temperature range	–65	150	°C

(1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The input voltage and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(3) The output positive-voltage rating may be exceeded up to 4.6 V maximum if the output current rating is observed.

(4) The package thermal impedance is calculated in accordance with JESD 51-7.

Recommended Operating Conditions⁽¹⁾⁽²⁾⁽³⁾

			V _{CCI}	V _{CCO}	MIN	MAX	UNIT
V _{CCA}	Supply voltage				1.2	3.6	V
V _{CCB}	Supply voltage				1.2	3.6	V
V _{IH}	High-level input voltage	Data inputs	1.2 V to 1.95 V		V _{CCI} × 0.65		V
			1.95 V to 2.7 V		1.6		
			2.7 V to 3.6 V		2		
V _{IL}	Low-level input voltage	Data inputs	1.2 V to 1.95 V		V _{CCI} × 0.35		V
			1.95 V to 2.7 V		0.7		
			2.7 V to 3.6 V		0.8		
V _{IH}	High-level input voltage	DIR (referenced to V _{CCA})	1.2 V to 1.95 V		V _{CCA} × 0.65		V
			1.95 V to 2.7 V		1.6		
			2.7 V to 3.6 V		2		
V _{IL}	Low-level input voltage	DIR (referenced to V _{CCA})	1.2 V to 1.95 V		V _{CCA} × 0.35		V
			1.95 V to 2.7 V		0.7		
			2.7 V to 3.6 V		0.8		
V _I	Input voltage				0	3.6	V
V _O	Output voltage	Active state			0	V _{CCO}	V
		3-state			0	3.6	
I _{OH}	High-level output current			1.2 V		−3	mA
				1.4 V to 1.6 V		−6	
				1.65 V to 1.95 V		−8	
				2.3 V to 2.7 V		−9	
				3 V to 3.6 V		−12	
I _{OL}	Low-level output current			1.2 V		3	mA
				1.4 V to 1.6 V		6	
				1.65 V to 1.95 V		8	
				2.3 V to 2.7 V		9	
				3 V to 3.6 V		12	
Δt/Δv	Input transition rise or fall rate					5	ns/V
T _A	Operating free-air temperature				−40	85	°C

(1) V_{CCI} is the V_{CC} associated with the input port.(2) V_{CCO} is the V_{CC} associated with the output port.(3) All unused data inputs of the device must be held at V_{CCI} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

Electrical Characteristics⁽¹⁾⁽²⁾

over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	V _{CCA}	V _{CCB}	T _A = 25°C			−40°C to 85°C		UNIT
					MIN	TYP	MAX	MIN	MAX	
V _{OH}		I _{OH} = −100 μA	V _I = V _{IH}	1.2 V to 3.6 V	1.2 V to 3.6 V			V _{CCO} − 0.2		V
		I _{OH} = −3 mA		1.2 V	1.2 V	0.95				
		I _{OH} = −6 mA		1.4 V	1.4 V			1.05		
		I _{OH} = −8 mA		1.65 V	1.65 V			1.2		
		I _{OH} = −9 mA		2.3 V	2.3 V			1.75		
		I _{OH} = −12 mA		3 V	3 V			2.3		
V _{OL}		I _{OL} = 100 μA	V _I = V _{IL}	1.2 V to 3.6 V	1.2 V to 3.6 V			0.2		V
		I _{OL} = 3 mA		1.2 V	1.2 V	0.15				
		I _{OL} = 6 mA		1.4 V	1.4 V			0.35		
		I _{OL} = 8 mA		1.65 V	1.65 V			0.45		
		I _{OL} = 9 mA		2.3 V	2.3 V			0.55		
		I _{OL} = 12 mA		3 V	3 V			0.7		
I _I	Control inputs	V _I = V _{CCA} or GND	1.2 V to 3.6 V	1.2 V to 3.6 V	±0.025	±0.25			±1	μA
I _{off}	A or B port	V _I or V _O = 0 to 3.6 V	0 V	0 V to 3.6 V	±0.1	±1			±5	μA
			0 V to 3.6 V	0 V	±0.1	±1			±5	
I _{OZ} ⁽³⁾	A or B port	V _O = V _{CCO} or GND, V _I = V _{CCI} or GND, OE = V _{IH}	3.6 V	3.6 V	±0.5	±2.5			±5	μA
I _{CCA}		V _I = V _{CCI} or GND, I _O = 0	1.2 V to 3.6 V	1.2 V to 3.6 V					15	μA
			0 V	3.6 V					−2	
			3.6 V	0 V					15	
I _{CCB}		V _I = V _{CCI} or GND, I _O = 0	1.2 V to 3.6 V	1.2 V to 3.6 V					15	μA
			0 V	3.6 V					15	
			3.6 V	0 V					−2	
I _{CA} + I _{CB}		V _I = V _{CCI} or GND, I _O = 0	1.2 V to 3.6 V	1.2 V to 3.6 V					25	μA
C _i	Control inputs	V _I = 3.3 V or GND	3.3 V	3.3 V	3.5				4.5	pF
C _{io}	A or B port	V _O = 3.3 V or GND	3.3 V	3.3 V	6				7	pF

(1) V_{CCO} is the V_{CC} associated with the output port.

(2) V_{CCI} is the V_{CC} associated with the input port.

(3) For I/O ports, the parameter I_{OZ} includes the input leakage current.

Switching Characteristics

over recommended operating free-air temperature range, $V_{CCA} = 1.2\text{ V}$ (see [Figure 10](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.2\text{ V}$	$V_{CCB} = 1.5\text{ V}$	$V_{CCB} = 1.8\text{ V}$	$V_{CCB} = 2.5\text{ V}$	$V_{CCB} = 3.3\text{ V}$	UNIT
			TYP	TYP	TYP	TYP	TYP	
t_{PLH}	A	B	3.1	2.6	2.5	3	3.5	ns
t_{PHL}			3.1	2.6	2.5	3	3.5	
t_{PLH}	B	A	3.1	2.7	2.5	2.4	2.3	ns
t_{PHL}			3.1	2.7	2.5	2.4	2.3	
t_{PZH}	$\overline{OE}$	A	5.3	5.3	5.3	5.3	5.3	ns
t_{PZL}			5.3	5.3	5.3	5.3	5.3	
t_{PZH}	$\overline{OE}$	B	5.1	4	3.5	3.2	3.1	ns
t_{PZL}			5.1	4	3.5	3.2	3.1	
t_{PHZ}	$\overline{OE}$	A	4.8	4.8	4.8	4.8	4.8	ns
t_{PLZ}			4.8	4.8	4.8	4.8	4.8	
t_{PHZ}	$\overline{OE}$	B	4.7	4	4.1	4.3	5.1	ns
t_{PLZ}			4.7	4	4.1	4.3	5.1	

Switching Characteristics

over recommended operating free-air temperature range, $V_{CCA} = 1.5\text{ V} \pm 0.1\text{ V}$ (see [Figure 10](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.2\text{ V}$	$V_{CCB} = 1.5\text{ V} \pm 0.1\text{ V}$		$V_{CCB} = 1.8\text{ V} \pm 0.15\text{ V}$		$V_{CCB} = 2.5\text{ V} \pm 0.2\text{ V}$		$V_{CCB} = 3.3\text{ V} \pm 0.3\text{ V}$		UNIT
			TYP	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	B	2.7	0.5	5.4	0.5	4.6	0.5	4.9	0.5	6.8	ns
t_{PHL}			2.7	0.5	5.4	0.5	4.6	0.5	4.9	0.5	6.8	
t_{PLH}	B	A	2.6	0.5	5.4	0.5	5.1	0.5	4.7	0.5	4.5	ns
t_{PHL}			2.6	0.5	5.4	0.5	5.1	0.5	4.7	0.5	4.5	
t_{PZH}	$\overline{OE}$	A	3.7	1.1	8.7	1.1	8.7	1.1	8.7	1.1	8.7	ns
t_{PZL}			3.7	1.1	8.7	1.1	8.7	1.1	8.7	1.1	8.7	
t_{PZH}	$\overline{OE}$	B	4.8	1.1	7.6	1.1	7.1	1	5.6	1	5.2	ns
t_{PZL}			4.8	1.1	7.6	1.1	7.1	1	5.6	1	5.2	
t_{PHZ}	$\overline{OE}$	A	3.1	0.5	8.6	0.5	8.6	0.5	8.6	0.5	8.6	ns
t_{PLZ}			3.1	0.5	8.6	0.5	8.6	0.5	8.6	0.5	8.6	
t_{PHZ}	$\overline{OE}$	B	4.1	0.5	8.4	0.5	7.6	0.5	7.2	0.5	7.8	ns
t_{PLZ}			4.1	0.5	8.4	0.5	7.6	0.5	7.2	0.5	7.8	

Switching Characteristics

over recommended operating free-air temperature range, $V_{CCA} = 1.8 \text{ V} \pm 0.15 \text{ V}$ (see [Figure 10](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.2 \text{ V}$	$V_{CCB} = 1.5 \text{ V} \pm 0.1 \text{ V}$		$V_{CCB} = 1.8 \text{ V} \pm 0.15 \text{ V}$		$V_{CCB} = 2.5 \text{ V} \pm 0.2 \text{ V}$		$V_{CCB} = 3.3 \text{ V} \pm 0.3 \text{ V}$		UNIT
			TYP	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	B	2.5	0.5	5.1	0.5	4.4	0.5	4	0.5	3.9	ns
t_{PHL}			2.5	0.5	5.1	0.5	4.4	0.5	4	0.5	3.9	
t_{PLH}	B	A	2.5	0.5	4.6	0.5	4.4	0.5	3.9	0.5	3.7	ns
t_{PHL}			2.5	0.5	4.6	0.5	4.4	0.5	3.9	0.5	3.7	
t_{PZH}	$\overline{OE}$	A	3	1	6.8	1	6.8	1	6.8	1	6.8	ns
t_{PZL}			3	1	6.8	1	6.8	1	6.8	1	6.8	
t_{PZH}	$\overline{OE}$	B	4.6	1.1	8.2	1	6.7	0.5	5.1	0.5	4.5	ns
t_{PZL}			4.6	1.1	8.2	1	6.7	0.5	5.1	0.5	4.5	
t_{PHZ}	$\overline{OE}$	A	2.8	0.5	7.1	0.5	7.1	0.5	7.1	0.5	7.1	ns
t_{PLZ}			2.8	0.5	7.1	0.5	7.1	0.5	7.1	0.5	7.1	
t_{PHZ}	$\overline{OE}$	B	3.9	0.5	7.8	0.5	6.9	0.5	6	0.5	5.8	ns
t_{PLZ}			3.9	0.5	7.8	0.5	6.9	0.5	6	0.5	5.8	

Switching Characteristics

over recommended operating free-air temperature range, $V_{CCA} = 2.5 \text{ V} \pm 0.2 \text{ V}$ (see [Figure 10](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.2 \text{ V}$	$V_{CCB} = 1.5 \text{ V} \pm 0.1 \text{ V}$		$V_{CCB} = 1.8 \text{ V} \pm 0.15 \text{ V}$		$V_{CCB} = 2.5 \text{ V} \pm 0.2 \text{ V}$		$V_{CCB} = 3.3 \text{ V} \pm 0.3 \text{ V}$		UNIT
			TYP	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	B	2.4	0.5	4.7	0.5	3.9	0.5	3.1	0.5	2.8	ns
t_{PHL}			2.4	0.5	4.7	0.5	3.9	0.5	3.1	0.5	2.8	
t_{PLH}	B	A	3	0.5	4.9	0.5	4	0.5	3.1	0.5	2.9	ns
t_{PHL}			3	0.5	4.9	0.5	4	0.5	3.1	0.5	2.9	
t_{PZH}	$\overline{OE}$	A	2.2	0.5	4.8	0.5	4.8	0.5	4.8	0.5	4.8	ns
t_{PZL}			2.2	0.5	4.8	0.5	4.8	0.5	4.8	0.5	4.8	
t_{PZH}	$\overline{OE}$	B	4.5	1.1	7.9	0.5	6.4	0.5	4.6	0.5	4	ns
t_{PZL}			4.5	1.1	7.9	0.5	6.4	0.5	4.6	0.5	4	
t_{PHZ}	$\overline{OE}$	A	1.8	0.5	5.1	0.5	5.1	0.5	5.1	0.5	5.1	ns
t_{PLZ}			1.8	0.5	5.1	0.5	5.1	0.5	5.1	0.5	5.1	
t_{PHZ}	$\overline{OE}$	B	3.6	0.5	7.1	0.5	6.3	0.5	5.1	0.5	3.9	ns
t_{PLZ}			3.6	0.5	7.1	0.5	6.3	0.5	5.1	0.5	3.9	

Switching Characteristics

over recommended operating free-air temperature range, $V_{CCA} = 3.3 \text{ V} \pm 0.3 \text{ V}$ (see Figure 10)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCB} = 1.2 \text{ V}$	$V_{CCB} = 1.5 \text{ V} \pm 0.1 \text{ V}$		$V_{CCB} = 1.8 \text{ V} \pm 0.15 \text{ V}$		$V_{CCB} = 2.5 \text{ V} \pm 0.2 \text{ V}$		$V_{CCB} = 3.3 \text{ V} \pm 0.3 \text{ V}$		UNIT
			TYP	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	B	2.3	0.5	4.5	0.5	3.7	0.5	2.9	0.5	2.5	ns
t_{PHL}			2.3	0.5	4.5	0.5	3.3	0.5	2.9	0.5	2.5	
t_{PLH}	B	A	3.5	0.5	6.8	0.5	3.9	0.5	2.8	0.5	2.5	ns
t_{PHL}			3.5	0.5	6.8	0.5	3.9	0.5	2.8	0.5	2.5	
t_{PZH}	$\overline{OE}$	A	2	0.5	4	0.5	4	0.5	4	0.5	4	ns
t_{PZL}			2	0.5	4	0.5	4	0.5	4	0.5	4	
t_{PZH}	$\overline{OE}$	B	4.5	1.1	7.8	0.5	6.2	0.5	4.5	0.5	3.9	ns
t_{PZL}			4.5	1.1	7.8	0.5	6.2	0.5	4.5	0.5	3.9	
t_{PHZ}	$\overline{OE}$	A	1.7	0.5	4	0.5	4	0.5	4	0.5	4	ns
t_{PLZ}			1.7	0.5	4	0.5	4	0.5	4	0.5	4	
t_{PHZ}	$\overline{OE}$	B	3.4	0.5	6.9	0.5	6	0.5	4.8	0.5	4.2	ns
t_{PLZ}			3.4	0.5	6.9	0.5	6	0.5	4.8	0.5	4.2	

Operating Characteristics

$T_A = 25^\circ\text{C}$

PARAMETER			TEST CONDITIONS	$V_{CCA} =$ $V_{CCB} = 1.2 \text{ V}$	$V_{CCA} =$ $V_{CCB} = 1.5 \text{ V}$	$V_{CCA} =$ $V_{CCB} = 1.8 \text{ V}$	$V_{CCA} =$ $V_{CCB} = 2.5 \text{ V}$	$V_{CCA} =$ $V_{CCB} = 3.3 \text{ V}$	UNIT
				TYP	TYP	TYP	TYP	TYP	
$C_{pdA}^{(1)}$	A to B	Outputs enabled	$C_L = 0,$ $f = 10 \text{ MHz},$ $t_r = t_f = 1 \text{ ns}$	1	1	1	1	1	pF
		Outputs disabled		1	1	1	1	1	
	B to A	Outputs enabled		12	12	12	13	14	
		Outputs disabled		1	1	1	1	1	
$C_{pdB}^{(1)}$	A to B	Outputs enabled	$C_L = 0,$ $f = 10 \text{ MHz},$ $t_r = t_f = 1 \text{ ns}$	12	12	12	13	14	pF
		Outputs disabled		1	1	1	1	1	
	B to A	Outputs enabled		1	1	1	1	1	
		Outputs disabled		1	1	1	1	1	

(1) Power dissipation capacitance per transceiver

Table 1. Typical Total Static Power Consumption ($I_{CCA} + I_{CCB}$)

V_{CCB}	V_{CCA}						UNIT
	0 V	1.2 V	1.5 V	1.8 V	2.5 V	3.3 V	
0 V	0	<0.5	<0.5	<0.5	<0.5	<0.5	μA
1.2 V	<0.5	<1	<1	<1	<1	1	
1.5 V	<0.5	<1	<1	<1	<1	1	
1.8 V	<0.5	<1	<1	<1	<1	<1	
2.5 V	<0.5	1	<1	<1	<1	<1	
3.3 V	<0.5	1	<1	<1	<1	<1	

TYPICAL CHARACTERISTICS

Typical Propagation Delay (A to B) vs Load Capacitance
 $T_A = 25^\circ\text{C}$, $V_{CCA} = 1.2\text{ V}$

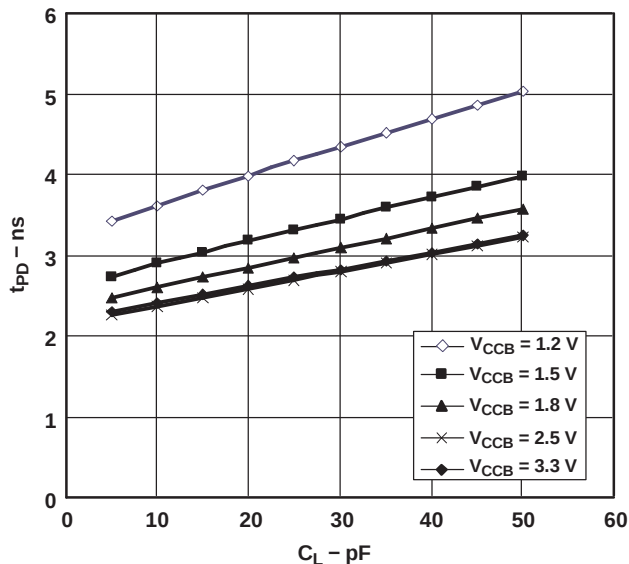


Figure 1.

Typical Propagation Delay (A to B) vs Load Capacitance
 $T_A = 25^\circ\text{C}$, $V_{CCA} = 1.5\text{ V}$

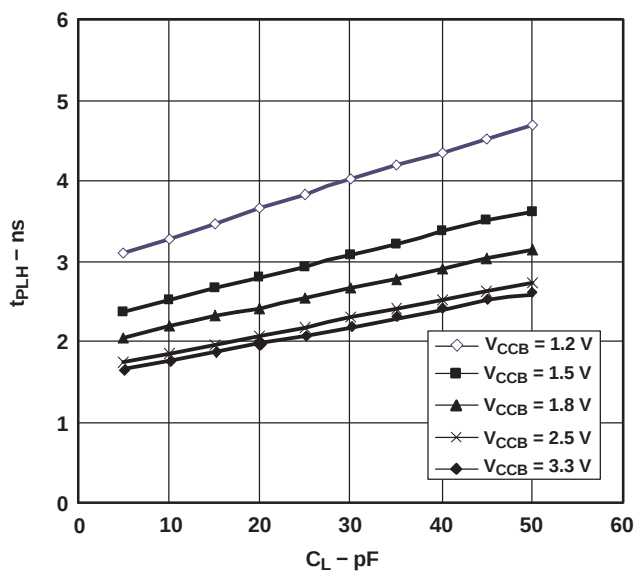


Figure 2.

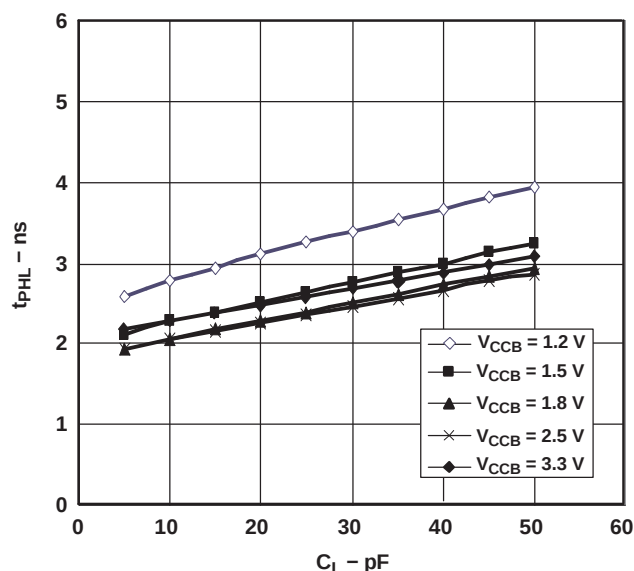


Figure 3.

TYPICAL CHARACTERISTICS (continued)

Typical Propagation Delay (A to B) vs Load Capacitance

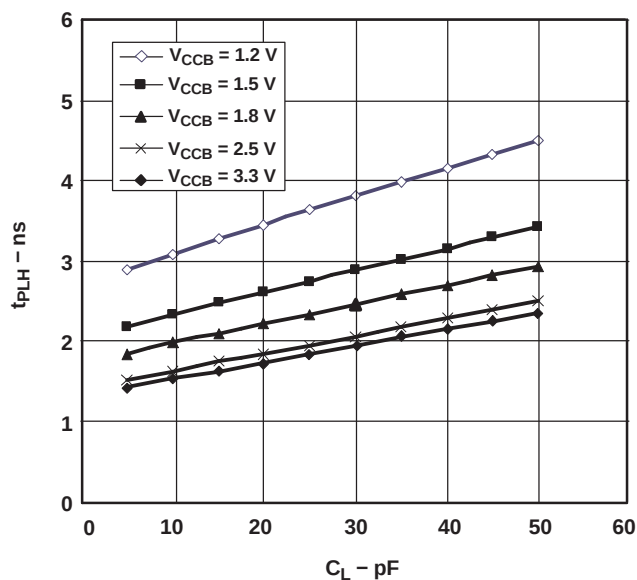
 $T_A = 25^\circ\text{C}$, $V_{CCA} = 1.8\text{ V}$ 

Figure 4.

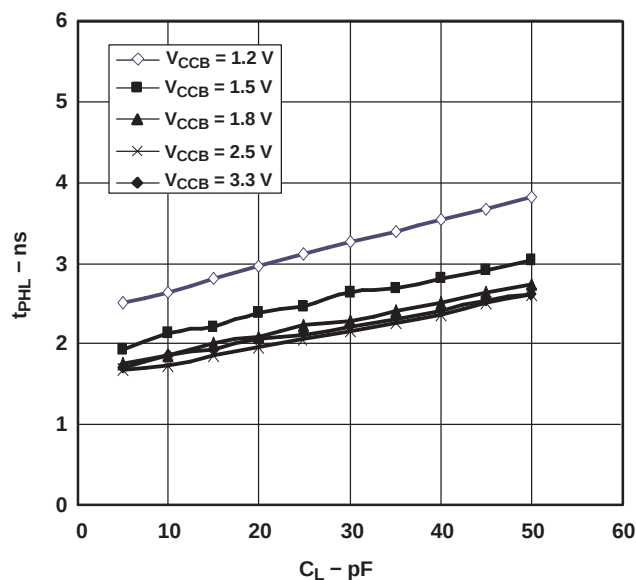


Figure 5.

Typical Propagation Delay (A to B) vs Load Capacitance

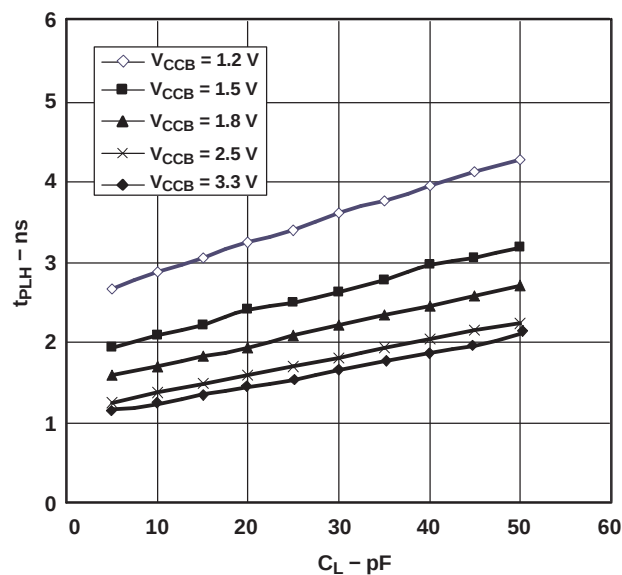
 $T_A = 25^\circ\text{C}$, $V_{CCA} = 2.5\text{ V}$ 

Figure 6.

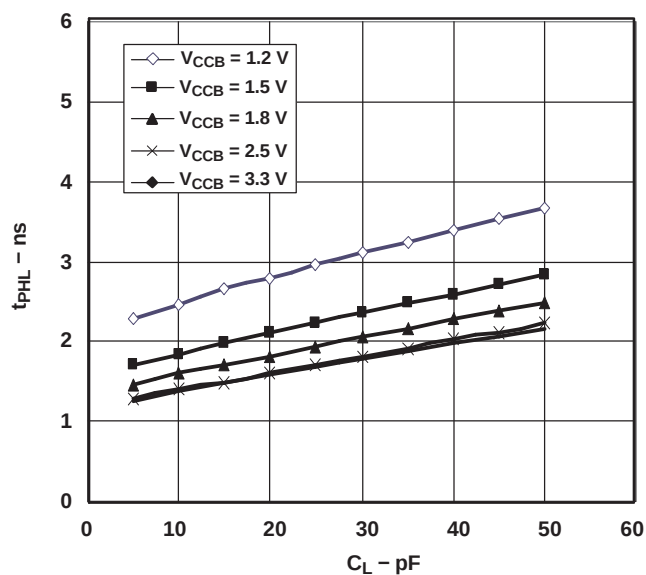


Figure 7.

TYPICAL CHARACTERISTICS (continued)

Typical Propagation Delay (A to B) vs Load Capacitance

$T_A = 25^\circ\text{C}$, $V_{CCA} = 3.3\text{ V}$

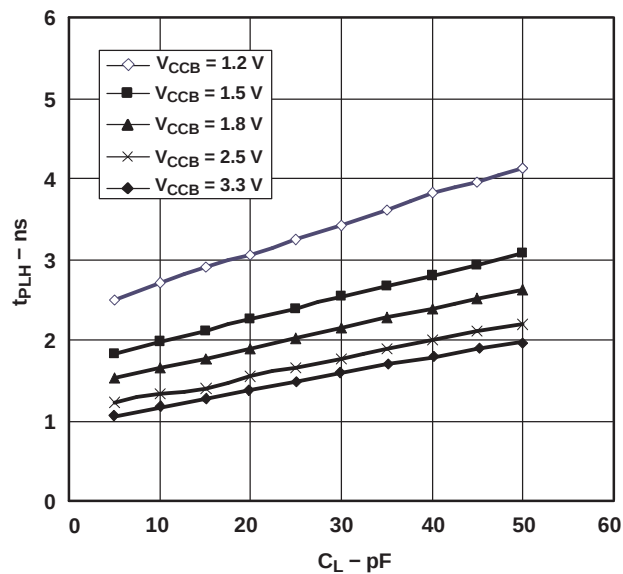


Figure 8.

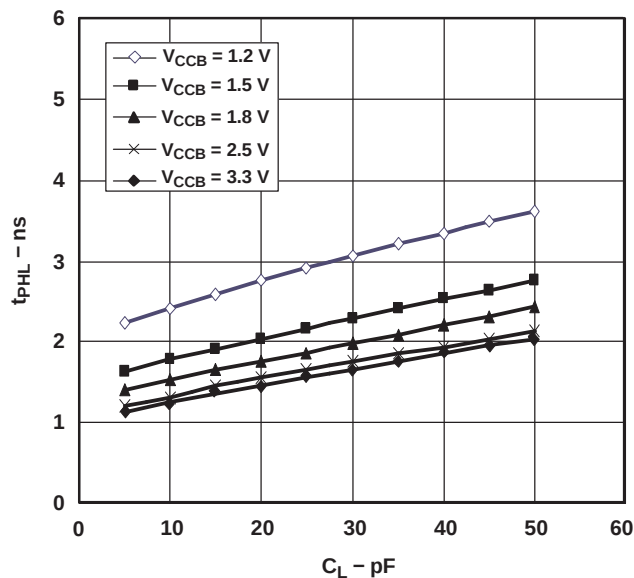
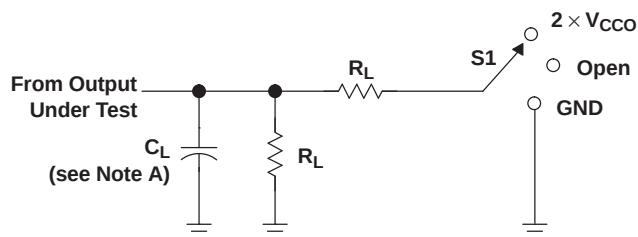


Figure 9.

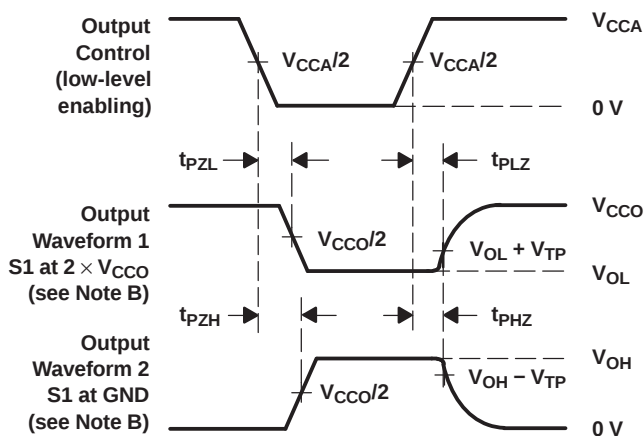
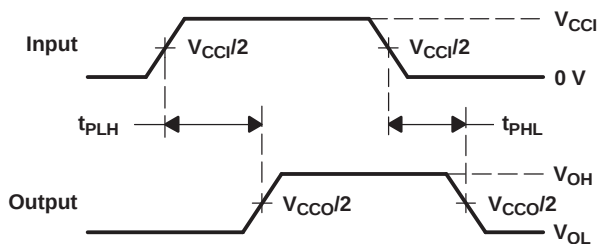
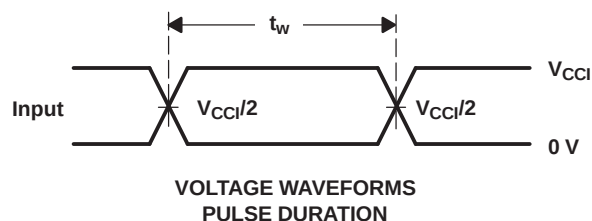
PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT

V_{CCO}	C_L	R_L	V_{TP}
1.2 V	15 pF	2 k Ω	0.1 V
1.5 V $\pm$ 0.1 V	15 pF	2 k Ω	0.1 V
1.8 V $\pm$ 0.15 V	15 pF	2 k Ω	0.15 V
2.5 V $\pm$ 0.2 V	15 pF	2 k Ω	0.15 V
3.3 V $\pm$ 0.3 V	15 pF	2 k Ω	0.3 V

TEST	S1
t_{pd}	Open
t_{PLZ}/t_{PZL}	$2 \times V_{CCO}$
t_{PHZ}/t_{PZH}	GND



- 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, $Z_O = 50 \Omega$, $dv/dt \geq 1$ V/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} .
 - V_{CCI} is the V_{CC} associated with the input port.
 - V_{CCO} is the V_{CC} associated with the output port.

Figure 10. Load Circuit and Voltage Waveforms

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DSP	dsp.ti.com
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
Low Power Wireless	www.ti.com/lpw

Applications

Audio	www.ti.com/audio
Automotive	www.ti.com/automotive
Broadband	www.ti.com/broadband
Digital Control	www.ti.com/digitalcontrol
Military	www.ti.com/military
Optical Networking	www.ti.com/opticalnetwork
Security	www.ti.com/security
Telephony	www.ti.com/telephony
Video & Imaging	www.ti.com/video
Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265