National Semiconductor

DP7304B/DP8304B 8-Bit TRI-STATE® Bidirectional Transceiver (Non-Inverting)

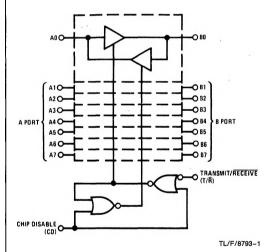
General Description

The DP73048B/DP8304B are high speed Schottky 8-bit TRI-STATE bidirectional transceivers designed to provide bidirectional drive for bus oriented microprocessor and digital communications systems. They are all capable of sinking 16 mA on the A ports and 48 mA on the B ports (bus ports). PNP inputs for low input current and an increased output high (V_{OH}) level allow compatibility with MOS, CMOS, and other technologies that have a higher threshold and less drive capabilities. In addition, they all feature glitch-free power up/down on the B port preventing erroneous glitches on the system bus in power up or down.

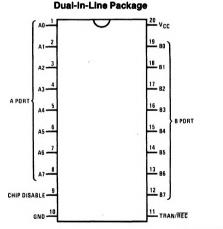
DP7304B/DP8304B are featured with Transmit/Receive (T/R) and Chip Disable (CD) inputs to simplify control logic.

Features

- 8-bit bidirectional data flow reduces system package count
- Bidirectional TRI-STATE inputs/outputs interface with bus oriented systems
- PNP inputs reduce input loading
- Output high voltage interfaces with TTL, MOS, and CMOS
- 48 mA/300 pF bus drive capability
- Pinouts simplify system interconnections
- Transmit/Receive and chip disable simplify control logic
- Compact 20-pin dual-in-line package
- Bus port glitch free power up/down



Logic and Connection Diagrams



TL/F/8793-2

Top View Order Number DP7304BJ, DP8304BJ, DP8304BN or DP8304BWM See NS Package Number J20A, N20A or M20B

Logic Table

Inputs		Resulting Conditions				
Chip Disable	Transmit/Receive	A Port	B Port			
0	0	OUT	IN			
0	1	IN	OUT			
1	x	TRI-STATE	TRI-STATE			

X = Don't Care

DP7304B/DP8304B

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	5.5V
Output Voltage	5.5V
Storage Temperature	-65°C to +150°C
Maximum Power Dissipation* at 25°C	
Cavity Package	1667 mW
Molded Package	1832 mW
Lead Temperature (soldering, 4 sec.)	260°C
*Derate cavity package 11.1 mW/°C above 25°C	: derate molded package

*Derate cavity package 11.1 mW/°C above 25°C; derate molded package 14.7 mW/°C above 25°C.

Recommended Operating Conditions

	Min	Max	Units
Supply Voltage (V _{CC})			
DP7304B	4.5	5.5	v
DP8304B	4.75	5.25	v
Temperature (T _A)			
DP7304B	- 55	125	°C
DP8304B	0	70	۰C

DC Electrical Characteristics (Notes 2 and 3)

Symbol	Parameter	Conditions		Min	Тур	Max	Unit
A PORT	(A0-A7)						
VIH	Logical "1" Input Voltage	$CD = V_{IL}, T/\overline{R} = 2.0V$		2.0			v
VIL	Logical "0" Input Voltage	$CD = V_{ L}, T/\overline{R} = 2.0V$	DP8304B			0.8	v
			DP7304B			0.7	v
V _{OH}	Logical "1" Output Voltage	$CD = V_{IL}, T/\overline{R} = V_{IL}$	$I_{OH} = -0.4 \text{ mA}$	V _{CC} -1.15	V _{CC} -0.7		v
			$I_{OH} = -3 \text{ mA}$	2.7	3.95		V
VOL	Logical "0" Output Voltage	$CD = T/\overline{R} = V_{IL} I_{OL} = 16 \text{ mA}$	8304B)		0.35	0.5	v
		I _{OL} = 8 mA (t	oth)		0.3	0.4	V
los	Output Short Circuit Current	$\begin{split} & \text{CD} = V_{\text{IL}}, \text{T}/\overline{\text{R}} = V_{\text{IL}}, \text{V}_{\text{O}} = 0\text{V}, \\ & \text{V}_{\text{CC}} = \text{Max} \left(\text{Note 4}\right) \end{split}$		-10	-38	-75	m/
	Logical "1" Input Current	$CD = V_{IL}, T/\overline{R} = 2.0V, V_{IH} = 2.7$	v		0.1	80	μA
l	Input Current at Maximum Input Voltage	$CD = 2.0V, V_{CC} = Max, V_{IH} = 5$.25V			1	m/
۱ _{IL}	Logical "0" Input Current	$CD = V_{IL}, T/\overline{R} = 2.0V, V_{IN} = 0.4$	V		-70	-200	μA
VCLAMP	Input Clamp Voltage	$CD = 2.0V, I_{IN} = -12 \text{ mA}$			-0.7	-1.5	v
I _{OD}	Output/Input	CD = 2.0V	$V_{IN} = 0.4V$			-200	μA
	TRI-STATE Current		$V_{IN} = 4.0V$			80	μA
B PORT	(80-87)				E		
VIH	Logical "1" Input Voltage	$CD = V_{IL}, T/\overline{R} = V_{IL}$		2.0			v
VIL	Logical "0" Input Voltage	$CD = V_{IL}, T/\overline{R} = V_{IL}$	DP8304B			0.8	v
			DP7304B	100		0.7	v
VOH	Logical "1" Output Voltage	$CD = V_{IL}, T/\overline{R} = 2.0V$	$I_{OH} = -0.4 \text{ mA}$	V _{CC} -1.15	V _{CC} -0.8		V
			$I_{OH} = -5 \text{mA}$	2.7	3.9		v
			$I_{OH} = -10 \text{ mA}$	2.4	3.6		v
V _{OL}	Logical "0" Output Voltage	$CD = V_{IL}, T/\overline{R} = 2.0V$	I _{OL} = 20 mA		0.3	0.4	v
			$I_{OL} = 48 \text{ mA}$		0.4	0.5	v
los	Output Short Circuit Current	$CD = V_{IL}, T/\overline{R} = 2.0V, V_O = 0V$ $V_{CC} = Max (Note 4)$		-25	-50	- 150	m/

Symbol	Parameter	1.00	Conditions		Min	Тур	2	Max	Units
B PORT (B0-B7) (Continued)	14		1 E	. B -			4 C	12
ιн	Logical "1" Input Current	$T/\overline{R} = V_{IL}, V_{IH} = 2.$	7V		0.1		80	μA	
ų	Input Current at Maximum Input Voltage		$V_{\rm CC} = Max, V_{\rm IH} =$					1	mA
կլ	Logical "0" Input Current	$CD = V_{IL}$	$T/\overline{R} = V_{IL}, V_{IN} = 0.$	4V		-7	0	- 200	μΑ
VCLAMP	Input Clamp Voltage		$I_{\rm IN} = -12 \rm{mA}$			-0.	7	-1.5	V
IOD	Output/Input	CD = 2.0V		V _{IN} = 0.4V				-200	μΑ
	TRI-STATE Current			$V_{\rm IN} = 4.0V$				+ 200	μA
CONTRO	L INPUTS CD, T/R							3 N	
VIH	Logical "1" Input Voltage				2.0				V
VIL	Logical "0" Input Voltage			DP8304B		ī		0.8	v
				DP7304B				0.7	v
ιн	Logical "1" Input Current	V _{IH} = 2.7V	/			0.5	5	,20	μΑ
li -	Maximum Input Current	V _{CC} = Max	x, V _{IH} = 5.25V	-62-				1.0	mA
ΙL	Logical "0" Input Current	$V_{IL} = 0.4V$		T/R		-0.	1	-0.25	mA
		-		CD		-0.2	25	-0.5	mA
VCLAMP	Input Clamp Voltage	I _{IN} = -12	mA			0.	8	-1.5	v
POWER	SUPPLY CURRENT								
lcc	Power Supply Current	CD = 2.0V	, v _{IN} = 0.4V, v _{CC} =	Max		70		100	mA
		$CD = V_{INA}$, = 0.4V, T/R = 2V,		×-	70 90		100 140	mA mA
	Power Supply Current	$CD = V_{INA}$	$f_{A} = 0.4V, T/\overline{R} = 2V,$ $f_{C} = 5V, T_{A} = 25^{\circ}C$.*				mA
AC E Symbol	lectrical Character	CD = V _{INA}	$f_{A} = 0.4V, T/\overline{R} = 2V,$ $f_{C} = 5V, T_{A} = 25^{\circ}C$	V _{CC} = Max	*	90		140	
AC E Symbol	lectrical Character Parameter	CD = V _{INA} istics v _{CC}	$f_{A} = 0.4V, T/\overline{R} = 2V,$ $f_{C} = 5V, T_{A} = 25^{\circ}C$	V _{CC} = Max nditions = 0.4V (Figure A)	×	90		140	mA
AC E Symbol A PORT I	Parameter Parameter DATA/MODE SPECIFICATION Propagation Delay to a Logic	CD = V _{INA} istics V _{CC} IS eal "0" from	$T_{A} = 0.4V, T/\overline{R} = 2V,$ $T_{C} = 5V, T_{A} = 25^{\circ}C$ Cor CD = 0.4V, T/\overline{R} =	V _{CC} = Max 		90	Тур	140 Max	mA Unit:
AC E Symbol A PORT I ^t PDHLA	Parameter Parameter DATA/MODE SPECIFICATION Propagation Delay to a Logic B Port to A Port Propagation Delay to a Logic	$CD = V_{INA}$ istics V_{CC} is eal "0" from eal "1" from gical "0" to	$c = 0.4V, T/\overline{R} = 2V,$ $c = 5V, T_A = 25^{\circ}C$ Cor $CD = 0.4V, T/\overline{R} =$ $R1 = 1k, R2 = 5i$ $CD = 0.4V, T/\overline{R} =$	V _{CC} = Max nditions = 0.4V (<i>Figure A</i>) , C1 = 30 pF = 0.4V (<i>Figure A</i>) , C1 = 30 pF T/R = 0.4V (<i>Fig</i>		90	Typ	140 Max 18	mA Unit:
AC E Symbol A PORT I ^t PDHLA ^t PDLHA	Parameter Parameter DATA/MODE SPECIFICATION Propagation Delay to a Logic B Port to A Port Propagation Delay to a Logic B Port to A Port Propagation Delay from a Logic	$CD = V_{INA}$ istics V_{CC} is $S_{CA} = V_{CC}$ is $S_{CC} = V_{CC}$ is S_{CC	$c = 0.4V, T/\overline{R} = 2V,$ $c = 5V, T_A = 25^{\circ}C$ Cor $CD = 0.4V, T/\overline{R} =$ $R1 = 1k, R2 = 5k$ $CD = 0.4V, T/\overline{R} =$ $R1 = 1k, R2 = 5k$ $B0 \text{ to } B7 = 0.4V,$	$V_{CC} = Max$ nditions = 0.4V (<i>Figure A</i>) $C_{C1} = 30 \text{ pF}$ = 0.4V (<i>Figure A</i>) $C_{C1} = 30 \text{ pF}$ $T/\overline{R} = 0.4V$ (<i>Fig.</i> C4 = 15 pF $T/\overline{R} = 0.4V$ (<i>Fig.</i>	ure C)	90	Тур 14 13	140 Max 18 18	mA Unit: ns
AC E Symbol A PORT I tPDHLA tPDLHA tPLLA	Parameter Parameter DATA/MODE SPECIFICATION Propagation Delay to a Logic B Port to A Port Propagation Delay to a Logic B Port to A Port Propagation Delay from a Lo TRI-STATE from CD to A Po Propagation Delay from a Lo	$CD = V_{INA}$ istics V_{CC} is $Sister in the set of the s$	$c = 0.4V, T/\overline{R} = 2V,$ $c = 5V, T_A = 25^{\circ}C$ Cor $CD = 0.4V, T/\overline{R} =$ $R1 = 1k, R2 = 5k$ $CD = 0.4V, T/\overline{R} =$ $R1 = 1k, R2 = 5k$ $B0 to B7 = 0.4V,$ $S3 = 1, R5 = 1k,$ $B0 to B7 = 2.4V,$	$V_{CC} = Max$ nditions $= 0.4V (Figure A)$,, C1 = 30 pF $= 0.4V (Figure A)$,, C1 = 30 pF T/R = 0.4V (Fig CA = 15 pF T/R = 0.4V (Fig CR = 15 pF T/R = 0.4V (Fig	ure C) ure C)	90	Тур 14 13 11	140 Max 18 18 15	mA Unit
AC E Symbol A PORT I tPDHLA tPDLHA tPLLA tPLZA	Parameter Parameter DATA/MODE SPECIFICATION Propagation Delay to a Logic B Port to A Port Propagation Delay to a Logic B Port to A Port Propagation Delay from a Lo TRI-STATE from CD to A Po Propagation Delay from a Lo TRI-STATE from CD to A Po Propagation Delay from TRI-	$CD = V_{INA}$ istics V_{CC} is $Sal "0" from CD = V_{INA} is Sal "1" from CD = V_{INA} is Sal "1" from CD = V_{INA} is Sal = V_{INA}$	$c = 0.4V, T/\overline{R} = 2V,$ $c = 5V, T_A = 25^{\circ}C$ Cor $CD = 0.4V, T/\overline{R} =$ $R1 = 1k, R2 = 5k$ $CD = 0.4V, T/\overline{R} =$ $R1 = 1k, R2 = 5k$ $B0 to B7 = 0.4V,$ $S3 = 1, R5 = 1k,$ $B0 to B7 = 2.4V,$ $S3 = 0, R5 = 1k,$ $B0 to B7 = 0.4V,$	$V_{CC} = Max$ nditions $= 0.4V (Figure A)$,, C1 = 30 pF $= 0.4V (Figure A)$,, C1 = 30 pF T/R = 0.4V (Figure A) ,, C1 = 30 pF T/R = 0.4V (Figure A) , C1 = 30 pF T/R = 0.4V (Figure A)	ure C) ure C) ure C)	90	Typ 14 13 11 8	140 Max 18 18 15 15	mA Unit: ns ns ns ns
AC E Symbol A PORT I tPDHLA tPDLHA tPLZA tPHZA tPHZA tPZLA tPZHA	Parameter Parameter Parameter PATA/MODE SPECIFICATION Propagation Delay to a Logic B Port to A Port Propagation Delay to a Logic B Port to A Port Propagation Delay from a Lo TRI-STATE from CD to A Po Propagation Delay from TRI- a Logical "0" from CD to A P Propagation Delay from TRI- a Logical "0" from CD to A P	CD = VINA istics V _{CC} IS al "0" from cal "1" from gical "0" to rt gical "1" to rt STATE to Port STATE to Port	$c = 0.4V, T/\overline{R} = 2V,$ $c = 5V, T_A = 25^{\circ}C$ Cor $CD = 0.4V, T/\overline{R} =$ $R1 = 1k, R2 = 5k$ $CD = 0.4V, T/\overline{R} =$ $R1 = 1k, R2 = 5k$ $B0 to B7 = 0.4V,$ $S3 = 1, R5 = 1k,$ $B0 to B7 = 2.4V,$ $S3 = 0, R5 = 1k,$ $B0 to B7 = 0.4V,$ $S3 = 1, R5 = 1k,$ $B0 to B7 = 0.4V,$ $S3 = 1, R5 = 1k,$ $B0 to B7 = 2.4V,$	$V_{CC} = Max$ nditions $= 0.4V (Figure A)$,, C1 = 30 pF $= 0.4V (Figure A)$,, C1 = 30 pF T/R = 0.4V (Figure A) ,, C1 = 30 pF T/R = 0.4V (Figure A) , C1 = 30 pF T/R = 0.4V (Figure A)	ure C) ure C) ure C)	90	Typ 14 13 11 8 27	140 Max 18 18 15 15 35	mA Unit: ns ns ns ns ns
AC E Symbol A PORT I tPDHLA tPDLHA tPLZA tPLZA tPHZA tPZLA tPZLA	Propagation Delay from CD to A Por Propagation Delay from a Logic B Port to A Port Propagation Delay to a Logic B Port to A Port Propagation Delay from a Logic Propagation Delay from a Lo TRI-STATE from CD to A Po Propagation Delay from TRI- a Logical "0" from CD to A F Propagation Delay from TRI- a Logical "1" from CD to A F Propagation Delay from TRI- a Logical "1" from CD to A F Propagation Delay from TRI- a Logical "1" from CD to A F	CD = VINA istics V _{CC} is istics v _{CC} is is is '0" from gical "0" from gical "0" to rt gical "1" to rt STATE to Port STATE to Port	$ \begin{array}{l} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = 2 \text{V}, \\ \hline c = 5 \text{V}, \text{T}_{\text{A}} = 25^{\circ}\text{C} \\ \hline \hline \text{Cor} \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 1 \text{k}, \text{R2} = 5 \text{k} \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 1 \text{k}, \text{R2} = 5 \text{k} \\ \hline \text{B0 to B7} = 0.4 \text{V}, \\ \text{S3} = 1, \text{R5} = 1 \text{k}, \\ \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 1 \text{k}, \\ \hline \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 1, \text{R5} = 1 \text{k}, \\ \hline \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 1 \text{k}, \\ \hline \text{B0 to B7} = 2.4 \text{V}, \\ \ \text{S3} = 0, \text{R5} = 5 \text{k}, \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{C}} = \\ \hline \ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R} = 1 \text{V} =$	$V_{CC} = Max$ nditions $= 0.4V (Figure A)$ $x, C1 = 30 \text{ pF}$ $= 0.4V (Figure A)$ $x, C1 = 30 \text{ pF}$ $T/\overline{R} = 0.4V (Fig$ $C4 = 15 \text{ pF}$ $T/\overline{R} = 0.4V (Fig$ $C4 = 15 \text{ pF}$ $T/\overline{R} = 0.4V (Fig$ $C4 = 30 \text{ pF}$ $T/\overline{R} = 0.4V (Fig$ $C4 = 30 \text{ pF}$ $= 2.4V (Figure A)$	ure C) ure C) ure C) ure C)	90	Typ 14 13 11 8 27 19	140 Max 18 18 15 35 25	mA Unit ns ns ns ns ns
AC E Symbol A PORT I tPDHLA tPDLHA tPLZA tPLZA tPZLA tPZLA tPZLA tPZLA tPZLA	Parameter Parameter DATA/MODE SPECIFICATION Propagation Delay to a Logic B Port to A Port Propagation Delay to a Logic B Port to A Port Propagation Delay from a Lo TRI-STATE from CD to A Po Propagation Delay from a Lo TRI-STATE from CD to A Po Propagation Delay from TRI- a Logical "0" from CD to A P Propagation Delay from TRI- a Logical "1" from CD to A P DATA/MODE SPECIFICATION	CD = VINA istics V _{CC} is istics v _{CC} is is is '0" from gical "0" from gical "0" to rt gical "1" to rt STATE to Port STATE to Port	$\begin{array}{l} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = 2 \text{V}, \\ \hline c = 5 \text{V}, \text{T}_{\text{A}} = 25^{\circ}\text{C} \\ \hline \text{Cor} \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 1 \text{k}, \text{R2} = 5 \text{i} \\ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 1 \text{k}, \text{R2} = 5 \text{i} \\ \text{B0 to B7} = 0.4 \text{V}, \\ \text{S3} = 1, \text{R5} = 1 \text{k}, \\ \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 1 \text{k}, \\ \text{B0 to B7} = 0.4 \text{V}, \\ \text{S3} = 1, \text{R5} = 1 \text{k}, \\ \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 5 \text{k}, \\ \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 5 \text{k}, \\ \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 5 \text{k}, \\ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 100 \Omega, \text{R2} \end{array}$	$V_{CC} = Max$ Inditions $= 0.4V (Figure A, K, C1 = 30 \text{ pF})$ $= 0.4V (Figure A, K, C1 = 30 \text{ pF})$ $T/\overline{R} = 0.4V (Fig, C4 = 15 \text{ pF})$ $T/\overline{R} = 0.4V (Fig, C4 = 15 \text{ pF})$ $T/\overline{R} = 0.4V (Fig, C4 = 30 \text{ pF})$ $T/\overline{R} = 0.4V (Fig, C4 = 30 \text{ pF})$ $= 2.4V (Figure A, K)$ $= 2.4V (Figure A, K)$	ure C) ure C) ure C) ure C)) pF	90	Typ 14 13 11 8 27 19 18	140 Max 18 18 15 15 35 25 23	mA Unit ns ns ns ns ns
AC E Symbol A PORT I tPDHLA tPDLHA tPLZA tPLZA tPLZA tPZLA tPZLA tPZLA tPZHA B PORT I tPDHLB	Parameter Parameter PATA/MODE SPECIFICATION Propagation Delay to a Logic B Port to A Port Propagation Delay to a Logic B Port to A Port Propagation Delay from a Lo TRI-STATE from CD to A Po Propagation Delay from TRI- a Logical "0" from CD to A Po Propagation Delay from TRI- a Logical "0" from CD to A P Propagation Delay from TRI- a Logical "1" from CD to A P Propagation Delay from TRI- a Logical "1" from CD to A P Propagation Delay from TRI- a Logical "1" from CD to A P Propagation Delay from TRI- a Logical "1" from CD to A P Propagation Delay from TRI- a Logical "1" from CD to A P	CD = VINA istics V _{CC} is istics V _{CC} is is is '0" from gical '0" from gical '1" to rt state to bort STATE to bort STATE to bort state to bort state to bort state to bort	$\begin{array}{l} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = 2 \text{V}, \\ \hline c = 5 \text{V}, \text{T}_{\text{A}} = 25^{\circ}\text{C} \\ \hline \text{Cor} \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 1 \text{k}, \text{R2} = 5 \text{H} \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 1 \text{k}, \text{R2} = 5 \text{H} \\ \hline \text{B0 to B7} = 0.4 \text{V}, \\ \text{S3} = 1, \text{R5} = 1 \text{k}, \\ \hline \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 1 \text{k}, \\ \hline \text{B0 to B7} = 2.4 \text{V}, \\ \ \text{S3} = 1, \text{R5} = 1 \text{k}, \\ \hline \text{B0 to B7} = 2.4 \text{V}, \\ \ \text{S3} = 1, \text{R5} = 1 \text{k}, \\ \hline \text{B0 to B7} = 5 \text{K}, \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \ \text{R1} = 100\Omega, \text{R2} \\ \hline \text{R1} = 667\Omega, \text{R2} \end{array}$	V _{CC} = Max nditions = 0.4V (Figure A) x, C1 = 30 pF = 0.4V (Figure A) x, C1 = 30 pF T/ \overline{R} = 0.4V (Figure A) x, C1 = 30 pF T/ \overline{R} = 0.4V (Figure A) C4 = 15 pF T/ \overline{R} = 0.4V (Fig C4 = 30 pF T/ \overline{R} = 0.4V (Fig C4 = 30 pF T/ \overline{R} = 0.4V (Fig C4 = 30 pF T/ \overline{R} = 0.4V (Figure A) e = 1k, C1 = 300 e = 1k, C1 = 300 e = 5k, C1 = 45	ure C) ure C) ure C) ure C) 0 pF pF	90	Typ 14 13 11 8 27 19	140 Max 18 18 15 35 25	mA Unit ns ns ns ns ns
AC E Symbol A PORT I tPDHLA tPDLHA tPLZA tPLZA tPZLA tPZLA tPZLA tPZLA tPZLA	Propagation Delay from CD to A Por Propagation Delay from a Logic B Port to A Port Propagation Delay to a Logic B Port to A Port Propagation Delay from a Logic Propagation Delay from a Lo TRI-STATE from CD to A Po Propagation Delay from TRI- a Logical "0" from CD to A F Propagation Delay from TRI- a Logical "1" from CD to A F Propagation Delay from TRI- a Logical "1" from CD to A F Propagation Delay from TRI- a Logical "1" from CD to A F	CD = VINA istics V _{CC} is istics V _{CC} is is is '0" from gical '0" from gical '1" to rt state to bort STATE to bort STATE to bort state to bort state to bort state to bort	$\begin{array}{l} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = 2 \text{V}, \\ \hline c = 5 \text{V}, \text{T}_{\text{A}} = 25^{\circ}\text{C} \\ \hline \text{Cor} \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 1 \text{k}, \text{R2} = 5 \text{i} \\ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 1 \text{k}, \text{R2} = 5 \text{i} \\ \text{B0 to B7} = 0.4 \text{V}, \\ \text{S3} = 1, \text{R5} = 1 \text{k}, \\ \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 1 \text{k}, \\ \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 1, \text{R5} = 1 \text{k}, \\ \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 1 \text{k}, \\ \text{B0 to B7} = 2.4 \text{V}, \\ \text{S3} = 0, \text{R5} = 5 \text{k}, \\ \hline \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \text{R1} = 100 \Omega, \text{R2} \\ \text{R1} = 667 \Omega, \text{R2} \\ \text{CD} = 0.4 \text{V}, \text{T}/\overline{\text{R}} = \\ \end{array}$	V _{CC} = Max nditions = 0.4V (Figure A) x, C1 = 30 pF = 0.4V (Figure A) x, C1 = 30 pF T/ \overline{R} = 0.4V (Figure A) x, C1 = 30 pF T/ \overline{R} = 0.4V (Figure A) C4 = 15 pF T/ \overline{R} = 0.4V (Fig C4 = 30 pF T/ \overline{R} = 0.4V (Fig C4 = 30 pF T/ \overline{R} = 0.4V (Fig C4 = 30 pF T/ \overline{R} = 0.4V (Figure A) e = 1k, C1 = 300 e = 1k, C1 = 300 e = 5k, C1 = 45	ure C) ure C) ure C) ure C) 0 pF pF	90	Typ 14 13 11 8 27 19 18	140 Max 18 18 15 15 35 25 23	mA Unit: ns ns ns ns ns

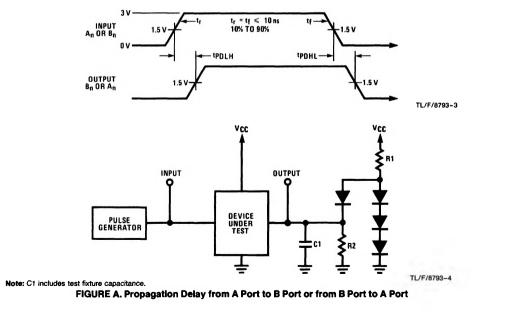
Symbol	Parameter	Conditions	Min	Тур	Max	Units
B PORT (DATA/MODE SPECIFICATIONS (Continued)					
^t PLZB	Propagation Delay from a Logical "0" to TRI-STATE from CD to B Port	A0 to A7 = 0.4V, T/\overline{R} = 2.4V (Figure C) S3 = 1, R5 = 1k, C4 = 15 pF		13	18	ns
t _{PHZB}	Propagation Delay from a Logical "1" to TRI-STATE from CD to B Port	A0 to A7 = 2.4V, T/ \overline{R} = 2.4V (<i>Figure C</i>) S3 = 0, R5 = 1k, C4 = 15 pF		8	15	ns
^t PZLB	Propagation Delay from TRI-STATE to a Logical "0" from CD to B Port	A0 to A7 = 0.4V, T/ \overline{R} = 2.4V (Figure C) S3 = 1, R5 = 100 Ω , C4 = 300 pF S3 = 1, R5 = 667 Ω , C4 = 45 pF		32 16	40 22	ns ns
t _{PZHB}	Propagation Delay from TRI-STATE to a Logical "1" from CD to B Port	A0 to A7 = 2.4V, T/\overline{R} = 2.4V (<i>Figure C</i>) S3 = 0, R5 = 1k, C4 = 300 pF S3 = 0, R5 = 5k, C4 = 45 pF		26 14	35 22	ns ns
TRANSM	IT/RECEIVE MODE SPECIFICATIONS					
t _{TRL}	Propagation Delay from Transmit Mode to Receive a Logical "0", T/\overline{R} to A Port	CD = 0.4V (Figure B) S1 = 0, R4 = 100 Ω , C3 = 5 pF S2 = 1, R3 = 1k, C2 = 30 pF		30	40	ns
t _{TRH}	Propagation Delay from Transmit Mode to Receive a Logical "1", T/R to A Port	CD = 0.4V, <i>(Figure B)</i> S1 = 1, R4 ≈ 100Ω, C3 ≈ 5 pF S2 = 0, R3 = 5k, C2 = 30 pF		28	40	ns
^t RTH	Propagation Delay from Receive Mode to Transmit a Logical "1", T/R to B Port	CD = $0.4V$ (Figure B) S1 = $0, R4 \approx 1k, C3 = 300 pF$ S2 = $1, R3 = 300\Omega, C2 = 5 pF$		28	40	ns

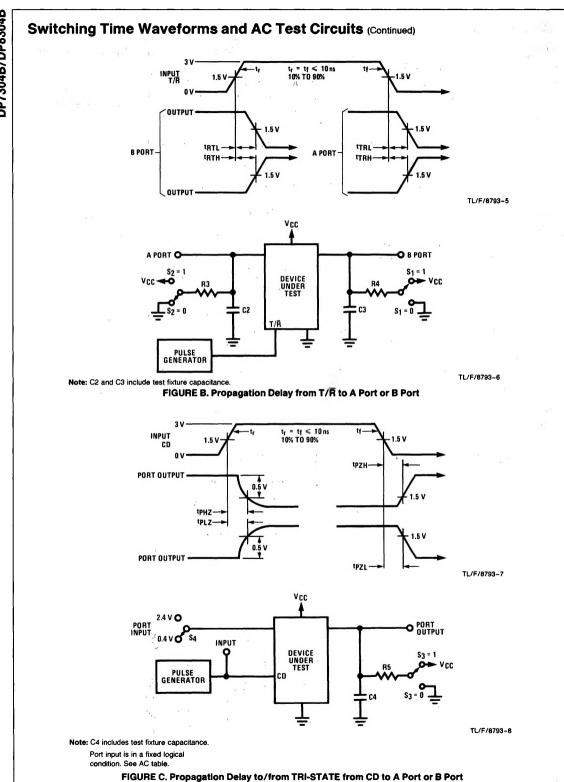
Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. They are not meant to imply that the devices should be operated at these limits. The tables of "Electrical Characteristics" provide conditions for actual device operation.

Note 2: Unless otherwise specified, min/max limits apply across the supply and temperature range listed in the table of Recommended Operating Conditions. All typical values given are for V_{CC} = 5V and T_A = 25°C.

Note 3: All currents into device pins are positive; all currents out of device pins are negative. All voltages are referenced to ground unless otherwise specified. Note 4: Only one output at a time should be shorted.

Switching Time Waveforms and AC Test Circuits





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