

Am2946/Am2947

Octal Three-State Bidirectional Bus Transceivers

DISTINCTIVE CHARACTERISTICS

- 8-bit bidirectional data flow reduces system package count
- 3-state inputs/outputs for interfacing with bus-oriented systems; PNP inputs reduce input loading
- $V_{CC} - 1.15V_{OH}$ interfaces with TTL, MOS and CMOS
- 48mA, 300pF bus drive capability; Low power – 8mA per bidirectional bit
- Am2946 inverting transceivers; Am2947 noninverting transceivers; Transmit/Receive and Chip Disable simplify control logic
- Bus port stays in hi-impedance state during power up/down

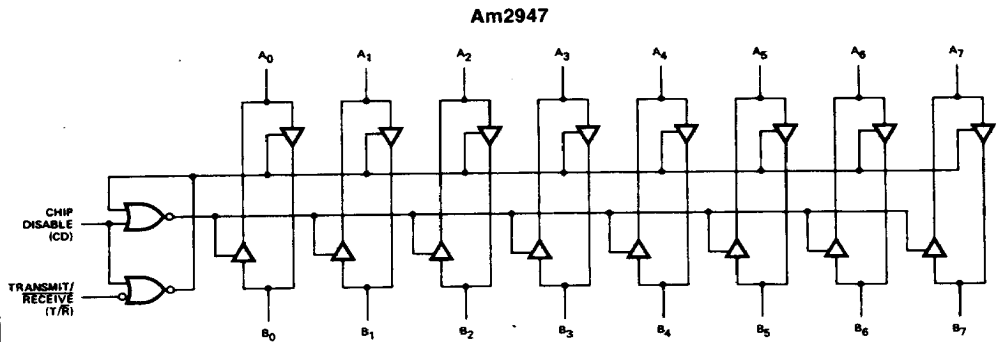
GENERAL DESCRIPTION

The Am2946 and Am2947 are 8-bit state Schottky transceivers. They provide bidirectional drive for bus-oriented microprocessor and digital communications systems. Straight through bidirectional transceivers are featured, with 24mA drive capability on the A ports and 48mA bus drive capability on the B ports. PNP inputs are incorporated to reduce input loading.

One input, Transmit/Receive, determines the direction of logic signals through the bidirectional transceiver. The Chip Disable input disables both A and B ports by placing them in a 3-state condition. Chip Disable is functionally the same as an active LOW chip select.

The output high voltage (V_{OH}) is specified at $V_{CC} - 1.15V$ minimum to allow interfacing with MOS, CMOS, TTL, ROM, RAM, or microprocessors.

BLOCK DIAGRAM



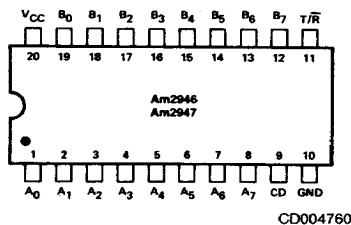
BD002530

Am2946 has inverting transceivers.

05406A

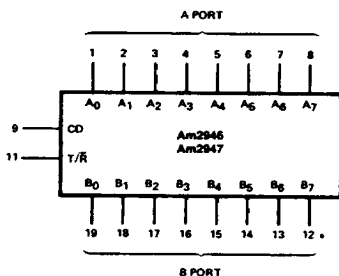
CONNECTION DIAGRAM Top View

D-20-1



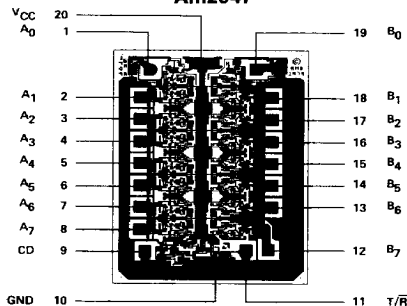
Note: Pin 1 is marked for orientation

LOGIC SYMBOL



LS001060

METALLIZATION AND PAD LAYOUT Am2947



DIE SIZE .069" x .089"

Note: The Am2946 has inverting transceivers

ORDERING INFORMATION

AMD products are available in several packages and operating ranges. The order number is formed by a combination of the following: Device number, speed option (if applicable), package type, operating range and screening option (if desired).

Am2946/2947

D

C

B

Screening Option
Blank - Standard processing
B - Burn-in

Temperature (See Operating Range)
C - Commercial (0°C to +70°C)
M - Military (-55°C to +125°C)

Package
D - 20-pin Cerdip
X - Dice

Device type
Bidirectional Bus Transceivers

Valid Combinations

Am2946
Am2947

PC
DC, DCB, DM,
DMB
XC

Valid Combinations

Consult the AMD sales office in your area to determine if a device is currently available in the combination you wish.

PIN DESCRIPTION

Pin No.	Name	I/O	Description
	A ₀ -A ₇	I/O	A port inputs/outputs are receiver output drivers when T/R is LOW and are transmit inputs when T/R is HIGH.
	B ₀ -B ₇	I/O	B port inputs/outputs are transmit output drivers when T/R is HIGH and receiver inputs when T/R is LOW.
9	CD	I	Chip Disable forces all output drivers into 3-state when HIGH (same function as active LOW chip select, CS).
11	T/R	I	Transmit/Receive direction control determines whether A port or B port drivers are in 3-state. With T/R HIGH A port is the input and B port is the output. With T/R LOW A port is the output and B port is the input.

FUNCTION TABLE

Inputs	Conditions		
Chip Disable	L	L	H
Transmit/Receive	L	H	X
A Port	Out	In	Hi-Z
B Port	In	Out	Hi-Z

ABSOLUTE MAXIMUM RATINGS

Storage Temperature -65°C to +150°C
 Supply Voltage 7.0V
 Input Voltage 5.5V
 Output Voltage 5.5V
 Lead Temperature (Solder, 10 seconds) 300°C

Stresses above those listed under ABSOLUTE MAXIMUM RATINGS may cause permanent device failure. Functionality at or above these limits is not implied. Exposure to absolute maximum ratings for extended periods may affect device reliability.

OPERATING RANGES

Commercial (C) Devices

Temperature 0°C to +70°C
 Supply Voltage +4.75V to +5.25V

Military (M) Devices

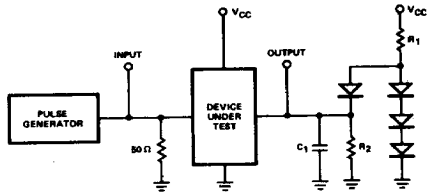
Temperature -55°C to +125°C
 Supply Voltage +4.5V to +5.5V

Operating ranges define those limits over which the functionality of the device is guaranteed.

DC CHARACTERISTICS over operating range unless otherwise specified

Parameters	Description	Test Conditions		Min	Typ (Note 1)	Max	Units
A PORT (A ₀ -A ₇)							
V _{IH}	Logical "1" Input Voltage	CD = V _{IH} MAX, T/R = 2.0V		2.0			Volts
V _{IL}	Logical "0" Input Voltage	CD = V _{IL} MAX T/R = 2.0V	COM'L MIL			0.8 0.7	Volts
V _{OH}	Logical "1" Output Voltage	CD = V _{IH} MAX, T/R = 0.8V	I _{OH} = -0.4mA I _{OH} = -3.0mA	V _{CC} - 1.15 2.7	V _{CC} - 0.7 3.95		Volts
V _{OL}	Logical "0" Output Voltage	CD = V _{IL} MAX, T/R = 0.8V	I _{OL} = 12mA COM'L I _{OL} = 24mA		0.3 0.35	0.4 0.50	Volts
I _{OS}	Output Short Circuit Current	CD = V _{IH} MAX, T/R = 0.8V, V _O = 0V, V _{CC} = MAX, Note 2		-10	-38	-75	mA
I _{IH}	Logical "1" Input Current	CD = V _{IH} MAX, T/R = 2.0V, V _I = 2.7V			0.1	80	μA
I _I	Input Current at Maximum Input Voltage	CD = 2.0V, V _{CC} MAX, V _I = V _{CC} MAX				1	mA
I _{IL}	Logical "0" Input Current	CD = V _{IL} MAX, T/R = 2.0V, V _I = 0.4V			-70	-200	μA
V _C	Input Clamp Voltage	CD = 2.0V, I _{IN} = -12mA			-0.7	-1.5	Volts
I _{OD}	Output/Input 3-State Current	CD = 2.0V	V _O = 0.4V V _O = 4.0V			-200 80	μA
B PORT (B ₀ -B ₇)							
V _{IH}	Logical "1" Input Voltage	CD = V _{IH} MAX, T/R = V _{IH} MAX		2.0			Volts
V _{IL}	Logical "0" Input Voltage	CD = V _{IL} MAX, T/R = V _{IL} MAX	COM'L MIL			0.8 0.7	Volts
V _{OH}	Logical "1" Output Voltage	CD = V _{IH} MAX, T/R = 2.0V	I _{OH} = -0.4mA I _{OH} = -5.0mA I _{OH} = -10mA	V _{CC} - 1.15 2.7 2.4	V _{CC} - 0.8 3.9 3.6		Volts
V _{OL}	Logical "0" Output Voltage	CD = V _{IL} MAX, T/R = 2.0V	I _{OL} = 20mA I _{OL} = 48mA		0.3 0.4	0.4 0.5	Volts
I _{OS}	Output Short Circuit Current	CD = V _{IH} MAX, T/R = 2.0V, V _O = 0V V _{CC} = MAX, Note 2		-25	-50	-150	mA
I _{IH}	Logical "1" Input Current	CD = V _{IH} MAX, T/R = V _{IH} MAX, V _I = 2.7V			0.1	80	μA
I _I	Input Current at Minimum Input Voltage	CD = 2.0V, V _{CC} = MAX, V _I = V _{CC} MAX				1	mA
I _{IL}	Logical "0" Input Current	CD = V _{IL} MAX, T/R = V _{IL} MAX, V _I = 0.4V			-70	-200	μA
V _C	Input Clamp Voltage	CD = 2.0V, I _{IN} = -12mA			-0.7	-1.5	Volts
I _{CO}	Output/Input 3-State Current	CD = 2.0V	V _O = 0.4V V _O = 4.0V			-200 200	μA
CONTROL INPUTS CD, T/R							
V _{IH}	Logical "1" Input Voltage			2.0			Volts
V _{IL}	Logical "0" Input Voltage		COM'L MIL			0.8 0.7	Volts
I _{IH}	Logical "1" Input Current	V _I = 2.7V			0.5	20	μA
I _I	Input Current at Maximum Input Voltage	V _{CC} = MAX, V _I = V _{CC} MAX				1.0	mA
I _{IL}	Logical "0" Input Current	V _I = 0.4V	T/R CD		-0.1 -0.1	-0.25 -0.25	mA
V _C	Input Clamp Voltage	I _{IN} = -12mA			-0.8	-1.5	Volts
POWER SUPPLY CURRENT							
I _{CC}	Power Supply Current	Am2946	CD = V _I = 2.0V, V _{CC} = MAX		70	100	mA
			CD = 0.4V, V _I = 2.0V, V _{CC} = MAX		100	150	
		Am2947B	CD = 2.0V, V _I = 0.4V, V _{CC} = MAX		70	100	
			CD = V _I = 0.4V, T/R = 2.0V, V _{CC} = MAX		90	140	

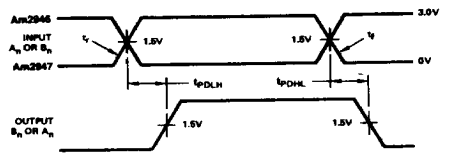
SWITCHING TEST CIRCUIT



TC001480

Note: C_1 includes test fixture capacitance.

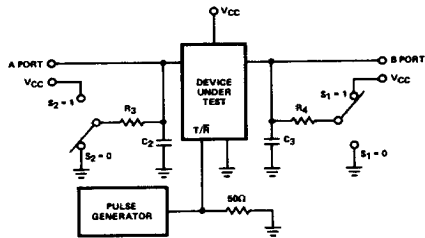
SWITCHING TIME WAVEFORM



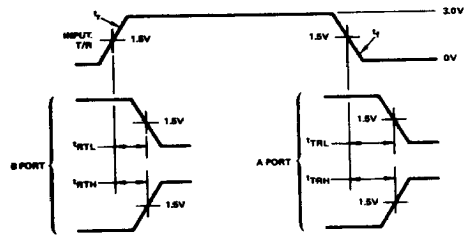
WF003150

$$t_r = t_f < 10\text{ns } 10\% \text{ to } 90\%$$

Figure 1. Propagation Delay from A Port to B Port or from B Port to A Port.



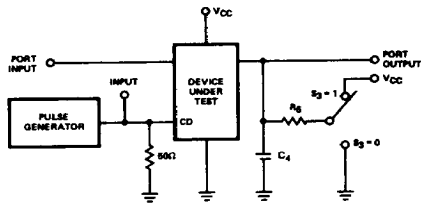
TC001390

Note: C_2 and C_3 include test fixture capacitance.

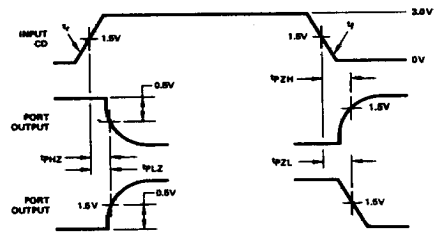
WF003110

$$t_r = t_f < 10\text{ns } 10\% \text{ to } 90\%$$

Figure 2. Propagation Delay from T/R to A Port or B Port.



TC001400

Note: C_4 includes test fixture capacitance. Port input is in a fixed logical condition.

WF003011

$$t_r = t_f < 10\text{ns } 10\% \text{ to } 90\%$$

Figure 3. Propagation Delay from CD to A Port or B Port.

SWITCHING CHARACTERISTICS ($T_A = +25^\circ\text{C}$, $V_{CC} = 5.0\text{V}$)
Am2946

Parameter	Description	Test Conditions	Typ (Note 1)	Max	Units
A PORT DATA/MODE SPECIFICATIONS					
tPDHLA	Propagation Delay to a Logical "0" from B Port to A Port	CD = 0.4V, T/R = 0.4V (Figure 1) R ₁ = 1k, R ₂ = 5k, C ₁ = 30pF	8	12	ns
tPDLHA	Propagation Delay to a Logical "1" from B Port to A Port	CD = 0.4V, T/R = 0.4V (Figure 1) R ₁ = 1k, R ₂ = 5k, C ₁ = 30pF	11	16	ns
tPLZA	Propagation Delay from a Logical "0" to 3-State from CD to A Port	B ₀ to B ₇ = 2.4V, T/R = 0.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 15pF	10	15	ns
tPHZA	Propagation Delay from a Logical "1" to 3-State from CD to A Port	B ₀ to B ₇ = 0.4V, T/R = 0.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 15pF	8	15	ns
tPZLA	Propagation Delay from 3-State to a Logical "0" from CD to A Port	B ₀ to B ₇ = 2.4V, T/R = 0.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 30pF	19	25	ns
tPZHA	Propagation Delay from 3-State to a Logical "1" from CD to A Port	B ₀ to B ₇ = 0.4V, T/R = 0.4V (Figure 3) S ₃ = 0, R ₅ = 5k, C ₄ = 30pF	19	25	ns
B PORT DATA/MODE SPECIFICATIONS					
tPDHLB	Propagation Delay to a Logical "0" from A Port to B Port	CD = 0.4V, T/R = 2.4V (Figure 1) R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF	12	18	ns
		R ₁ = 667Ω, R ₂ = 5k, C ₁ = 45pF	7	12	ns
tPDLHB	Propagation Delay to a Logical "1" from A Port to B Port	CD = 0.4V, T/R = 2.4V (Figure 1) R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF	15	20	ns
		R ₁ = 667Ω, R ₂ = 5k, C ₁ = 45pF	9	14	ns
tPLZB	Propagation Delay from a Logical "0" to 3-State from CD to B Port	A ₀ to A ₇ = 2.4V, T/R = 2.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 15pF	13	18	ns
tPHZB	Propagation Delay from a Logical "1" to 3-State from CD to B Port	A ₀ to A ₇ = 0.4V, T/R = 2.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 15pF	8	15	ns
tPZLB	Propagation Delay from 3-State to a Logical "0" from CD to B Port	A ₀ to A ₇ = 0.4V, T/R = 2.4V (Figure 3) S ₃ = 1, R ₅ = 100Ω, C ₄ = 300pF	25	35	ns
		S ₃ = 1, R ₅ = 667Ω, C ₁ = 45pF	16	22	ns
tPZHB	Propagation Delay from 3-State to a Logical "1" from CD to B Port	A ₀ to A ₇ = 0.4V, T/R = 2.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 300pF	22	35	ns
		S ₃ = 0, R ₅ = 5k, C ₁ = 45pF	14	22	ns
TRANSMIT RECEIVE MODE SPECIFICATIONS					
tTRL	Propagation Delay from Transmit Mode to Receive a Logical "0", T/R to A Port	CD = 0.4V (Figure 2) S ₁ = 1, R ₄ = 100Ω, C ₃ = 5pF S ₂ = 1, R ₃ = 1k, C ₂ = 30pF	23	33	ns
tTRH	Propagation Delay from Transmit Mode to Receive a Logical "1", T/R to A Port	CD = 0.4V (Figure 2) S ₁ = 0, R ₄ = 100Ω, C ₃ = 5pF S ₂ = 0, R ₃ = 5k, C ₂ = 30pF	22	33	ns
tRTL	Propagation Delay from Transmit Mode to Receive a Logical "0", T/R to B Port	CD = 0.4V (Figure 2) S ₁ = 1, R ₄ = 100Ω, C ₃ = 300pF S ₂ = 1, R ₃ = 300Ω, C ₂ = 5pF	26	35	ns
tRTH	Propagation Delay from Transmit Mode to Receive a Logical "1", T/R to B Port	CD = 0.4V (Figure 2) S ₁ = 0, R ₄ = 1k, C ₃ = 300pF S ₂ = 0, R ₃ = 300Ω, C ₂ = 5pF	27	35	ns
Note: 1. All typical values given are for V _{CC} = 5.0V and T _A = 25°C. 2. Only one output at a time should be shorted.					

SWITCHING CHARACTERISTICS over operating range unless otherwise specified
Am2946

Parameter	Description	Test Conditions	COMMERCIAL Am2946	MILITARY Am2946	Units
			Max	Max	
A PORT DATA/MODE SPECIFICATIONS					
t_{PDHLA}	Propagation Delay to a Logical "0" from B Port to A Port	CD = 0.4V, T/R = 0.4V (Figure 1) R ₁ = 1k, R ₂ = 5k, C ₁ = 30pF	16	19	ns
t_{PDLHA}	Propagation Delay to a Logical "1" from B Port to A Port	CD = 0.4V, T/R = 0.4V (Figure 1) R ₁ = 1k, R ₂ = 5k, C ₁ = 30pF	20	23	ns
t_{PLZA}	Propagation Delay from a Logical "0" to 3-State from CD to A Port	B ₀ to B ₇ = 2.4V, T/R = 0.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 15pF	18	21	ns
t_{PHZA}	Propagation Delay from a Logical "1" to 3-State from CD to A Port	B ₀ to B ₇ = 0.4V, T/R = 0.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 15pF	18	21	ns
t_{PZLA}	Propagation Delay from 3-State to a Logical "0" from CD to A Port	B ₀ to B ₇ = 2.4V, T/R = 0.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 30pF	28	33	ns
t_{PZHA}	Propagation Delay from 3-State to a Logical "1" from CD to A Port	B ₀ to B ₇ = 0.4V, T/R = 0.4V (Figure 3) S ₃ = 0, R ₅ = 5k, C ₄ = 30pF	28	33	ns
B PORT DATA/MODE SPECIFICATIONS					
t_{PDHLB}	Propagation Delay to a Logical "0" from A Port to B Port	CD = 0.4V, T/R = 2.4V (Figure 1)	24	29	ns
		R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF R ₁ = 667Ω, R ₂ = 5k, C ₁ = 45pF	16	19	ns
t_{PDLHB}	Propagation Delay to a Logical "1" from A Port to B Port	CD = 0.4V, T/R = 2.4V (Figure 1)	25	30	ns
		R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF R ₁ = 367Ω, R ₂ = 5k, C ₁ = 45pF	19	22	ns
t_{PLZB}	Propagation Delay from a Logical "0" to 3-State from CD to B Port	A ₀ to A ₇ = 2.4V, T/R = 2.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 15pF	23	26	ns
t_{PHZB}	Propagation Delay from a Logical "1" to 3-State from CD to B Port	A ₀ to A ₇ = 0.4V, T/R = 2.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 15pF	18	21	ns
t_{PZLB}	Propagation Delay from 3-State to a Logical "0" from CD to B Port	A ₀ to A ₇ = 2.4V, T/R = 2.4V (Figure 3) S ₃ = 1, R ₅ = 100Ω, C ₄ = 300pF	38	43	ns
		S ₃ = 1, R ₅ = 667Ω, C ₄ = 45pF	26	30	ns
t_{PZHB}	Propagation Delay from 3-State to a Logical "1" from CD to B Port	A ₀ to A ₇ = 0.4V, T/R = 2.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 300pF	38	43	ns
		S ₃ = 0, R ₅ = 5k, C ₄ = 45pF	26	30	ns
TRANSMIT RECEIVE MODE SPECIFICATIONS					
t_{TRL}	Propagation Delay from Transmit Mode to Receive a Logical "0", T/R to A Port	CD = 0.4V (Figure 2) S ₁ = 1, R ₄ = 100Ω, C ₃ = 5pF S ₂ = 1, R ₃ = 1k, C ₂ = 30pF	38	43	ns
t_{TRH}	Propagation Delay from Transmit Mode to Receive a Logical "1", T/R to A Port	CD = 0.4V (Figure 2) S ₁ = 0, R ₄ = 100Ω, C ₃ = 5pF S ₂ = 0, R ₃ = 5k, C ₂ = 30pF	38	43	ns
t_{RTL}	Propagation Delay from Receive Mode to Transmit a Logical "0", T/R to B Port	CD = 0.4V (Figure 2) S ₁ = 1, R ₄ = 100Ω, C ₃ = 300pF S ₂ = 1, R ₃ = 300Ω, C ₂ = 5pF	41	47	ns
t_{RTH}	Propagation Delay from Receive Mode to Transmit a Logical "1", T/R to B Port	CD = 0.4V (Figure 2) S ₁ = 0, R ₄ = 1k, C ₃ = 300pF S ₂ = 0, R ₃ = 300Ω, C ₂ = 5pF	41	47	ns

05406A

SWITCHING CHARACTERISTICS ($T_A = +25^\circ\text{C}$, $V_{CC} = 5.0\text{V}$)
Am2947

Parameter	Description	Test Conditions	Typ (Note 1)	Max	Units
A PORT DATA/MODE SPECIFICATIONS					
t _{PDHLA}	Propagation Delay to a Logical "0" from B Port to A Port	CD = 0.4V, T/ $\bar{R}$ = 0.4V (Figure 1) R ₁ = 1k, R ₂ = 5k, C ₁ = 30pF	14	18	ns
t _{PDLHA}	Propagation Delay to a Logical "1" from B Port to A Port	CD = 0.4V, T/ $\bar{R}$ = 0.4V (Figure 1) R ₁ = 1k, R ₂ = 5k, C ₁ = 30pF	13	18	ns
t _{PLZA}	Propagation Delay from a Logical "0" to 3-State from CD to A Port	B ₀ to B ₇ = 0.4V, T/ $\bar{R}$ = 0.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 15pF	11	15	ns
t _{PHZA}	Propagation Delay from a Logical "1" to 3-State from CD to A Port	B ₀ to B ₇ = 2.4V, T/ $\bar{R}$ = 0.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 15pF	8	15	ns
t _{PZLA}	Propagation Delay from 3-State to a Logical "0" from CD to A Port	B ₀ to B ₇ = 0.4V, T/ $\bar{R}$ = 0.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 30pF	19	25	ns
t _{PZHA}	Propagation Delay from 3-State to a Logical "1" from CD to A Port	B ₀ to B ₇ = 2.4V, T/ $\bar{R}$ = 0.4V (Figure 3) S ₃ = 0, R ₅ = 5k, C ₄ = 30pF	19	25	ns
B PORT DATA/MODE SPECIFICATIONS					
t _{PDHLB}	Propagation Delay to a Logical "0" from A Port to B Port	CD = 0.4V, T/ $\bar{R}$ = 2.4V (Figure 1) R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF	18	23	ns
		R ₁ = 667Ω, R ₂ = 5k, C ₁ = 45pF	11	18	ns
t _{PDLHB}	Propagation Delay to a Logical "1" from A Port to B Port	CD = 0.4V, T/ $\bar{R}$ = 2.4V (Figure 1) R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF	16	23	ns
		R ₁ = 667Ω, R ₂ = 5k, C ₁ = 45pF	11	18	ns
t _{PLZB}	Propagation Delay from a Logical "0" to 3-State from CD to B Port	A ₀ to A ₇ = 0.4V, T/ $\bar{R}$ = 2.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 15pF	13	18	ns
t _{PHZB}	Propagation Delay from a Logical "1" to 3-State from CD to B Port	A ₀ to A ₇ = 2.4V, T/ $\bar{R}$ = 2.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 15pF	8	15	ns
t _{PZLB}	Propagation Delay from 3-State to a Logical "0" from CD to B Port	A ₀ to A ₇ = 0.4V, T/ $\bar{R}$ = 2.4V (Figure 3) S ₃ = 1, R ₅ = 100Ω, C ₄ = 300pF	25	35	ns
		R ₃ = 1, R ₅ = 667Ω, C ₁ = 45pF	16	22	ns
t _{PZHB}	Propagation Delay from 3-State to a Logical "1" from CD to B Port	A ₀ to A ₇ = 2.4V, T/ $\bar{R}$ = 2.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 300pF	26	35	ns
		S ₃ = 0, R ₅ = 5k, C ₁ = 45pF	14	22	ns
TRANSMIT RECEIVE MODE SPECIFICATIONS					
t _{TRL}	Propagation Delay from Transmit Mode to Receive a Logical "0", T/ $\bar{R}$ to A Port	CD = 0.4V (Figure 2) S ₁ = 1, R ₄ = 100Ω, C ₃ = 5pF S ₂ = 1, R ₃ = 1k, C ₂ = 30pF	28	38	ns
t _{TRH}	Propagation Delay from Transmit Mode to Receive a Logical "1", T/ $\bar{R}$ to A Port	CD = 0.4V (Figure 2) S ₁ = 1, R ₄ = 100Ω, C ₃ = 5pF S ₂ = 0, R ₃ = 5k, C ₂ = 30pF	28	38	ns
t _{RTL}	Propagation Delay from Transmit Mode to Receive a Logical "0", T/ $\bar{R}$ to B Port	CD = 0.4V (Figure 2) S ₁ = 1, R ₄ = 100Ω, C ₃ = 300pF S ₂ = 0, R ₃ = 300Ω, C ₂ = 5pF	31	40	ns
t _{RTH}	Propagation Delay from Transmit Mode to Receive a Logical "1", T/ $\bar{R}$ to B Port	CD = 0.4V (Figure 2) S ₁ = 0, R ₄ = 1k, C ₃ = 300pF S ₂ = 1, R ₃ = 300Ω, C ₂ = 5pF	31	40	ns
Note: 1. All typical values given are for V _{CC} = 5.0V and T _A = 25°C. 2. Only one output at a time should be shorted.					

SWITCHING CHARACTERISTICS over operating range unless otherwise specified
Am2947

Am2947				COMMERCIAL Am2947	MILITARY Am2947	
Parameter	Description	Test Conditions	Max	Max	Units	
A PORT DATA/MODE SPECIFICATIONS						
tPDHLA	Propagation Delay to a Logical "0" from B Port to A Port	CD = 0.4V, T/R = 0.4V (Figure 1) R ₁ = 1k, R ₂ = 5k, C ₁ = 30pF	21	24	ns	
tPDLHA	Propagation Delay to a Logical "1" from B Port to A Port	CD = 0.4V, T/R = 0.4V (Figure 1) R ₁ = 1k, R ₂ = 5k, C ₁ = 30pF	21	24	ns	
tPLZA	Propagation Delay from a Logical "0" to 3-State from CD to A Port	B ₀ to B ₇ = 0.4V, T/R = 0.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 15pF	18	21	ns	
tPHZA	Propagation Delay from a Logical "1" to 3-State from CD to A Port	B ₀ to B ₇ = 2.4V, T/R = 0.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 15pF	18	21	ns	
tPZLA	Propagation Delay from 3-State to a Logical "0" from CD to A Port	B ₀ to B ₇ = 0.4V, T/R = 0.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 30pF	28	33	ns	
tPZHA	Propagation Delay from 3-State to a Logical "1" from CD to A Port	B ₀ to B ₇ = 2.4V, T/R = 0.4V (Figure 3) S ₃ = 0, R ₅ = 5k, C ₄ = 30pF	28	33	ns	
B PORT DATA/MODE SPECIFICATIONS						
tPDHLB	Propagation Delay to a Logical "0" from A Port to B Port	CD = 0.4V, T/R = 2.4V (Figure 1) R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF	28	34	ns	
		R ₁ = 667Ω, R ₂ = 5k, C ₁ = 45pF	22	25	ns	
tPDLHB	Propagation Delay to a Logical "1" from A Port to B Port	CD = 0.4V, T/R = 2.4V (Figure 1) R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF	28	34	ns	
		R ₁ = 667Ω, R ₂ = 5k, C ₁ = 45pF	22	25	ns	
tPLZB	Propagation Delay from a Logical "0" to 3-State from CD to B Port	A ₀ to A ₇ = 0.4V, T/R = 2.4V (Figure 3) S ₃ = 1, R ₅ = 1k, C ₄ = 15pF	23	26	ns	
tPHZB	Propagation Delay from a Logical "1" to 3-State from CD to B Port	A ₀ to A ₇ = 2.4V, T/R = 2.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 15pF	18	21	ns	
tPZLB	Propagation Delay from 3-State to a Logical "0" from CD to B Port	A ₀ to A ₇ = 0.4V, T/R = 2.4V (Figure 3) S ₃ = 1, R ₅ = 100Ω, C ₄ = 300pF	38	43	ns	
		S ₃ = 1, R ₅ = 667Ω, C ₄ = 45pF	26	30	ns	
tPZHB	Propagation Delay from 3-State to a Logical "1" from CD to B Port	A ₀ to A ₇ = 2.4V, T/R = 2.4V (Figure 3) S ₃ = 0, R ₅ = 1k, C ₄ = 300pF	38	43	ns	
		S ₃ = 0, R ₅ = 5k, C ₄ = 45pF	26	30	ns	
TRANSMIT RECEIVE MODE SPECIFICATIONS						
tTRL	Propagation Delay from Transmit Mode to Receive a Logical "0", T/R to A Port	CD = 0.4V (Figure 2) S ₁ = 0, R ₄ = 100Ω, C ₃ = 5pF S ₂ = 1, R ₃ = 1k, C ₂ = 30pF	42	48	ns	
tTRH	Propagation Delay from Transmit Mode to Receive a Logical "1", T/R to A Port	CD = 0.4V (Figure 2) S ₁ = 1, R ₄ = 100Ω, C ₃ = 5pF S ₂ = 0, R ₃ = 5k, C ₂ = 30pF	42	48	ns	
tRTL	Propagation Delay from Receive Mode to Transmit a Logical "0", T/R to B Port	CD = 0.4V (Figure 2) S ₁ = 1, R ₄ = 100Ω, C ₃ = 300pF S ₂ = 1, R ₃ = 300Ω, C ₂ = 5pF	45	51	ns	
tRTH	Propagation Delay from Receive Mode to Transmit a Logical "1", T/R to B Port	CD = 0.4V (Figure 2) S ₁ = 0, R ₄ = 1k, C ₃ = 300pF S ₂ = 1, R ₃ = 300Ω, C ₂ = 5pF	45	51	ns	

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