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/$\overline{\text{Receive}}$ and Chip Disable simplify control logic
- Bus port stays in hi-impedance state during power up/down

GENERAL DESCRIPTION

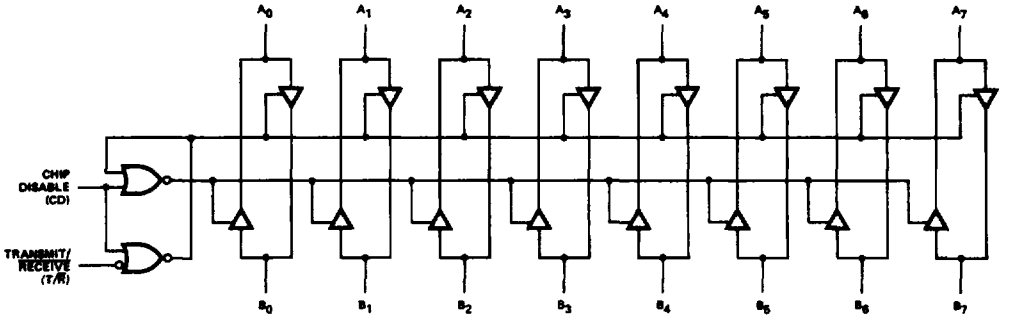
The Am2946 and Am2947 are 8-bit state Schottky transceivers. They provide bidirectional drive for bus-oriented microprocessor and digital communications systems. Straight through bidirectional transceivers are featured, with 24mA drive capability on the A ports and 48mA bus drive capability on the B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

One input, Transmit/$\overline{\text{Receive}}$, 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

Am2947



BD002530

Am2946 has inverting transceivers.

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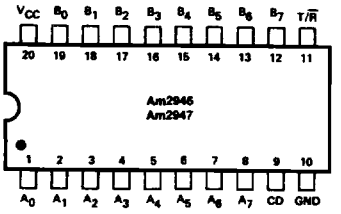
Refer to Page 13-1 for Essential Information on Military Devices

CONNECTION DIAGRAM
Top View

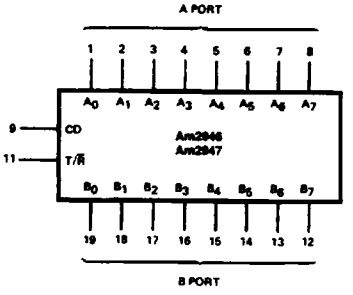
D-20-1



CD004760

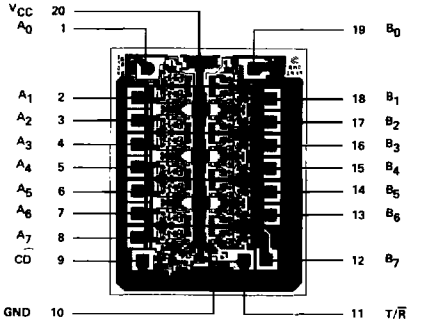
Note: Pin 1 is marked for orientation

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**

- **B** — Screening Option
  - Blank – Standard processing
  - B – Burn-in
- **C** — Temperature (See Operating Range)
  - C – Commercial (0°C to +70°C)
  - M – Military (–55°C to +125°C)
- **D** — Package
  - D– 20-pin CERDIP
  - X– Dice
- **Am2946/2947** — 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/$\overline{R}$ is LOW and are transmit inputs when T/$\overline{R}$ is HIGH.
	B_0-B_7	I/O	B port inputs/outputs are transmit output drivers when T/$\overline{R}$ is HIGH and receiver inputs when T/$\overline{R}$ is LOW.
9	$\overline{CD}$	I	Chip Disable forces all output drivers into 3-state when HIGH (same function as active LOW chip select, $\overline{CS}$).
11	T/$\overline{R}$	I	Transmit/$\overline{Receive}$ direction control determines whether A port or B port drivers are in 3-state. With T/$\overline{R}$ HIGH A port is the input and B port is the output. With T/$\overline{R}$ LOW A port is the output and B port is the input.

FUNCTION TABLE

Inputs	Conditions		
Chip Disable	L	L	H
Transmit/$\overline{Receive}$	L	H	X
A Port	Out	In	HI-Z
B Port	In	Out	HI-Z

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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	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = 2.0V		2.0			Volts
V_{IL}	Logical "0" Input Voltage	$\overline{CD}$ = V_{IL}MAX, T/$\overline{R}$ = 2.0V	COM'L			0.8	Volts
			MIL			0.7	
V_{OH}	Logical "1" Output Voltage	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = 0.8V	I_{OH} = −0.4mA	V_{CC} − 1.15	V_{CC} − 0.7		Volts
			I_{OH} = −3.0mA	2.7	3.95		
V_{OL}	Logical "0" Output Voltage	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = 0.8V	I_{OL} = 12mA		0.3	0.4	Volts
			COM'L I_{OL} = 24mA		0.35	0.50	
I_{OS}	Output Short Circuit Current	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = 0.8V, V_O = 0V, V_{CC} = MAX, Note 2		−10	−38	−75	mA
I_{IH}	Logical "1" Input Current	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = 2.0V, V_I = 2.7V			0.1	80	µA
I_I	Input Current at Maximum Input Voltage	$\overline{CD}$ = 2.0V, V_{CC} MAX, V_I = V_{CC} MAX				1	mA
I_{IL}	Logical "0" Input Current	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = 2.0V, V_I = 0.4V			−70	−200	µA
V_C	Input Clamp Voltage	$\overline{CD}$ = 2.0V, I_{IN} = −12mA			−0.7	−1.5	Volts
I_{OD}	Output/Input 3-State Current	$\overline{CD}$ = 2.0V	V_O = 0.4V			−200	µA
			V_O = 4.0V			80	
B PORT (B_0-B_7)							
V_{IH}	Logical "1" Input Voltage	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = V_{IL} MAX		2.0			Volts
V_{IL}	Logical "0" Input Voltage	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = V_{IL} MAX	COM'L			0.8	Volts
			MIL			0.7	
V_{OH}	Logical "1" Output Voltage	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = 2.0V	I_{OH} = −0.4mA	V_{CC}−1.15	V_{CC}−0.8		Volts
			I_{OH} = −5.0mA	2.7	3.9		
			I_{OH} = −10mA	2.4	3.6		
V_{OL}	Logical "0" Output Voltage	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = 2.0V	I_{OL} = 20mA		0.3	0.4	Volts
			I_{OL} = 48mA		0.4	0.5	
I_{OS}	Output Short Circuit Current	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = 2.0V, V_O = 0V V_{CC} = MAX, Note 2		−25	−50	−150	mA
I_{IH}	Logical "1" Input Current	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = V_{IL} MAX, V_I = 2.7V			0.1	80	µA
I_I	Input Current at Minimum Input Voltage	$\overline{CD}$ = 2.0V, V_{CC} = MAX, V_I = V_{CC} MAX				1	mA
I_{IL}	Logical "0" Input Current	$\overline{CD}$ = V_{IL} MAX, T/$\overline{R}$ = V_{IL} MAX, V_I = 0.4V			−70	−200	µA
V_C	Input Clamp Voltage	$\overline{CD}$ = 2.0V, I_{IN} = −12mA			−0.7	−1.5	Volts
I_{CO}	Output/Input 3-State Current	$\overline{CD}$ = 2.0V	V_O = 0.4V			−200	µA
			V_O = 4.0V			200	
CONTROL INPUTS $\overline{CD}$, T/$\overline{R}$							
V_{IH}	Logical "1" Input Voltage			2.0			Volts
V_{IL}	Logical "0" Input Voltage		COM'L			0.8	Volts
			MIL			0.7	
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/$\overline{R}$		−0.1	−0.25	mA
			$\overline{CD}$		−0.1	−0.25	
V_C	Input Clamp Voltage	I_{IN} = −12mA			−0.8	−1.5	Volts
POWER SUPPLY CURRENT							
I_{CC}	Power Supply Current	Am2946	$\overline{CD}$ = V_I = 2.0V, V_{CC} = MAX		70	100	mA
			$\overline{CD}$ = 0.4V, V_{INA} = T/$\overline{R}$ = 2.0V, V_{CC} = MAX		100	150	
		Am2947B	$\overline{CD}$ = 2.0V, V_I = 0.4V, V_{CC} = MAX		70	100	
			$\overline{CD}$ = V_{INA} = 0.4V, T/$\overline{R}$ = 2.0V, V_{CC} = MAX		90	140	

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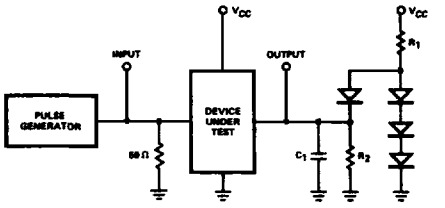
Refer to Page 13-1 for Essential Information on Military Devices

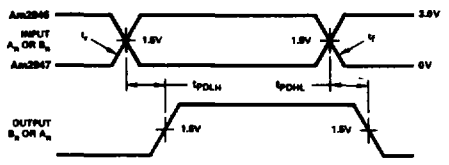
SWITCHING TEST CIRCUIT



TC001480

Note: C_1 includes test fixture capacitance.

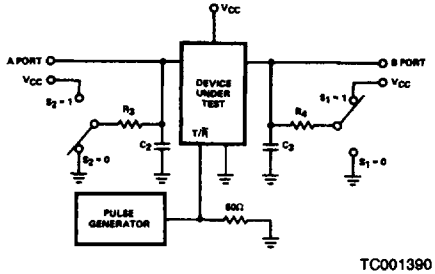
SWITCHING TIME WAVEFORM



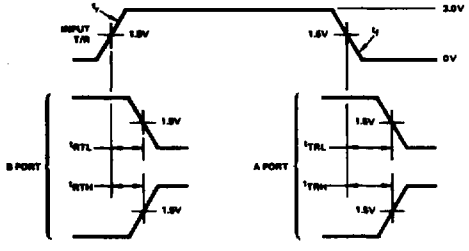
WF003150

$t_r = t_f < 10ns$ 10% to 90%

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



TC001390

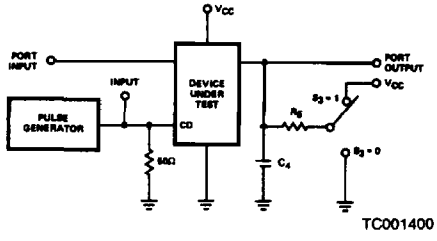


WF003110

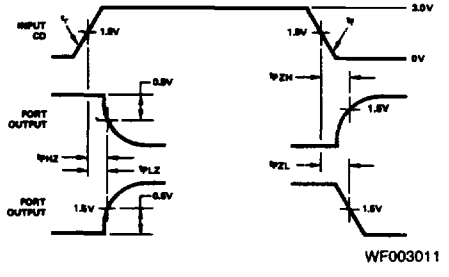
Note: C_2 and C_3 include test fixture capacitance.

$t_r = t_f < 10ns$ 10% to 90%

Figure 2. Propagation Delay from T/$\overline{R}$ to A Port or B Port.



TC001400



WF003011

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

$t_r = t_f < 10ns$ 10% to 90%

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

SWITCHING CHARACTERISTICS (T_A = +25°C, V_{CC} = 5.0V)
Am2946

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/$\overline{R}$ = 0.4V (Figure 1) R_1 = 1k, R_2 = 5k, C_1 = 30pF	8	12	ns
t_{PDLHA}	Propagation Delay to a Logical "1" from B Port to A Port	CD = 0.4V, T/$\overline{R}$ = 0.4V (Figure 1) R_1 = 1k, R_2 = 5k, C_1 = 30pF	11	16	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/$\overline{R}$ = 0.4V (Figure 3) S_3 = 1, R_5 = 1k, C_4 = 15pF	10	15	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/$\overline{R}$ = 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 = 2.4V, T/$\overline{R}$ = 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 = 0.4V, T/$\overline{R}$ = 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/$\overline{R}$ = 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
t_{PDLHB}	Propagation Delay to a Logical "1" from A Port to B Port	CD = 0.4V, T/$\overline{R}$ = 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
t_{PLZB}	Propagation Delay from a Logical "0" to 3-State from CD to B Port	A_0 to A_7 = 2.4V, T/$\overline{R}$ = 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 = 0.4V, T/$\overline{R}$ = 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/$\overline{R}$ = 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
t_{PZHB}	Propagation Delay from 3-State to a Logical "1" from CD to B Port	A_0 to A_7 = 0.4V, T/$\overline{R}$ = 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					
t_{TRL}	Propagation Delay from Transmit Mode to Receive a Logical "0", T/$\overline{R}$ 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
t_{TRH}	Propagation Delay from Transmit Mode to Receive a Logical "1", T/$\overline{R}$ 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
t_{RTL}	Propagation Delay from Transmit Mode to Receive a Logical "0", T/$\overline{R}$ 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
t_{RTH}	Propagation Delay from Transmit Mode to Receive a Logical "1", T/$\overline{R}$ 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.

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Refer to Page 13-1 for Essential Information on Military Devices

SWITCHING CHARACTERISTICS over operating range unless otherwise specified
Am2946

Parameter	Description	Test Conditions	COMMERCIAL Am2946 Max	MILITARY Am2946 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 2.4V (Figure 1) R_1 = 100Ω, R_2 = 1k, C_1 = 300pF	24	29	ns
		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/$\overline{R}$ = 2.4V (Figure 1) R_1 = 100Ω, R_2 = 1k, C_1 = 300pF	25	30	ns
		R_1 = 667Ω, 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ 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/$\overline{R}$ 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/$\overline{R}$ 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/$\overline{R}$ 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

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Refer to Page 13-1 for Essential Information on Military Devices

SWITCHING CHARACTERISTICS (T_A = +25°C, V_{CC} = 5.0V)
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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ = 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/$\overline{R}$ 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/$\overline{R}$ 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/$\overline{R}$ 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/$\overline{R}$ 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

Parameter	Description	Test Conditions	COMMERCIAL Am2947 Max	MILITARY Am2947 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/$\overline{R}$ = 0.4V (Figure 1) R_1 = 1k, R_2 = 5k, C_1 = 30pF	21	24	ns
t_{PDLHA}	Propagation Delay to a Logical "1" from B Port to A Port	CD = 0.4V, T/$\overline{R}$ = 0.4V (Figure 1) R_1 = 1k, R_2 = 5k, C_1 = 30pF	21	24	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/$\overline{R}$ = 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 = 2.4V, T/$\overline{R}$ = 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 = 0.4V, T/$\overline{R}$ = 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 = 2.4V, T/$\overline{R}$ = 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/$\overline{R}$ = 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
t_{PDLHB}	Propagation Delay to a Logical "1" from A Port to B Port	CD = 0.4V, T/$\overline{R}$ = 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
t_{PLZB}	Propagation Delay from a Logical "0" to 3-State from CD to B Port	A_0 to A_7 = 0.4V, T/$\overline{R}$ = 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 = 2.4V, T/$\overline{R}$ = 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 = 0.4V, T/$\overline{R}$ = 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 = 2.4V, T/$\overline{R}$ = 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/$\overline{R}$ 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
t_{TRH}	Propagation Delay from Transmit Mode to Receive a Logical "1", T/$\overline{R}$ 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
t_{RTL}	Propagation Delay from Receive Mode to Transmit a Logical "0", T/$\overline{R}$ 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
t_{RTH}	Propagation Delay from Receive Mode to Transmit a Logical "1", T/$\overline{R}$ 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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Refer to Page 13-1 for Essential Information on Military Devices