

AM2946, AM2947

Octal Three-State Bidirectional Bus Transceivers

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 directions 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.

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
 - Class Q Military
 - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
 - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

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

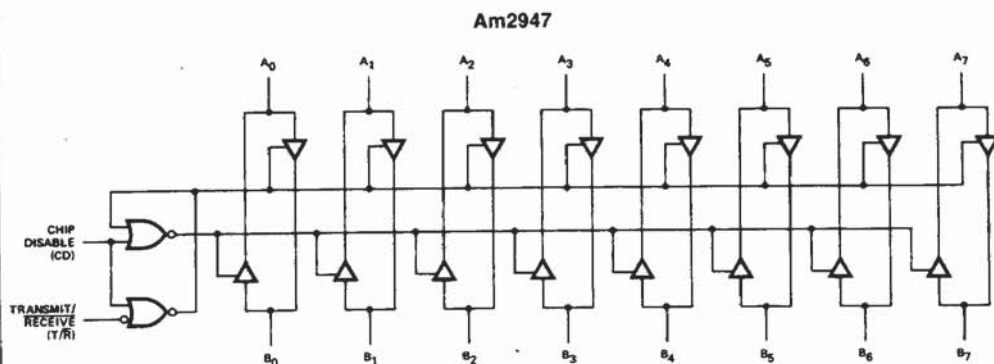
GENERAL DESCRIPTION

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



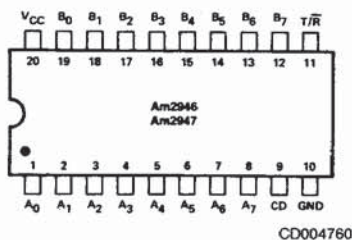
Am2946 has inverting transceivers.

BD002530

05406A

CONNECTION DIAGRAM Top View

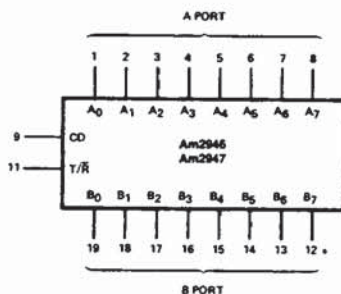
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CD004760

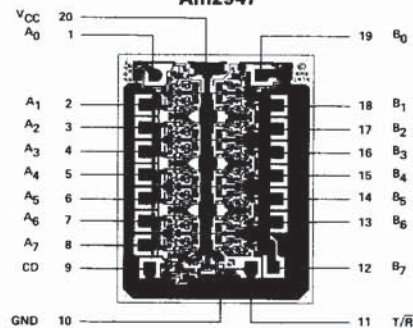
Note: Pin 1 is marked for orientation

LOGIC SYMBOL



LS001060

METALLIZATION AND PAD LAYOUT Am2947

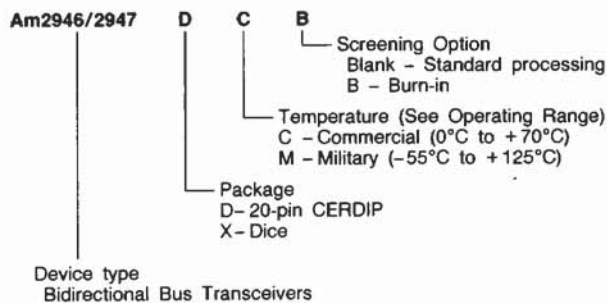


DIE SIZE .069" x .089"

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).



Valid Combinations

Am2946	PC
Am2947	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/ \bar{R} is LOW and are transmit inputs when T/ \bar{R} is HIGH.
	B ₀ -B ₇	I/O	B port inputs/outputs are transmit output drivers when T/ \bar{R} is HIGH and receiver inputs when T/ \bar{R} is LOW.
9	CD	I	Chip Disable forces all output drivers into 3-state when HIGH (same function as active LOW chip select, \overline{CS}).
11	T/ \bar{R}	I	Transmit/Receive direction control determines whether A port or B port drivers are in 3-state. With T/ \bar{R} HIGH A port is the input and B port is the output. With T/ \bar{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

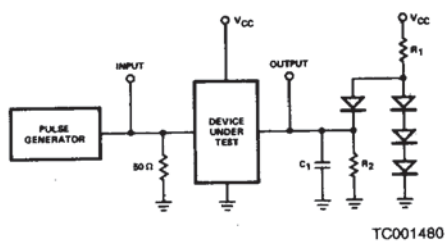
Military (M) Devices

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

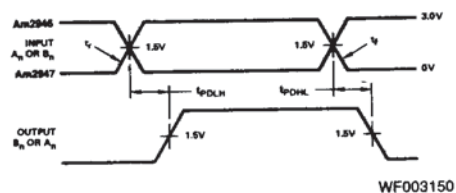
Parameters	Description	Test Conditions	Min	Typ (Note 1)	Max	Units	
A PORT (A₀-A₇)							
V _{IH}	Logical "1" Input Voltage	CD = V _{IL} MAX, T/R = 2.0V	2.0			Volts	
V _{IL}	Logical "0" Input Voltage	CD = V _{IL} MAX T/R = 2.0V	COM'L MIL		0.8 0.7	Volts	
V _{OH}	Logical "1" Output Voltage	CD = V _{IL} 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 _{IL} 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 _{IL} 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 (B₀-B₇)							
V _{IH}	Logical "1" Input Voltage	CD = V _{IL} MAX, T/R = V _{IL} 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 _{IL} 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 _{IL} 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 _{IL} MAX, T/R = V _{IL} 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 _{INA} = T/R = 2.0V, V _{CC} = MAX		100	150	
		Am2947B	CD = 2.0V, V _I = 0.4V, V _{CC} = MAX		70	100	
			CD = V _{INA} = 0.4V, T/R = 2.0V, V _{CC} = MAX		90	140	

SWITCHING TEST CIRCUIT



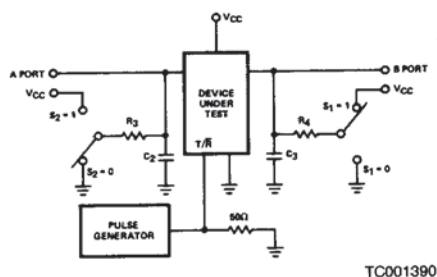
Note: C_1 includes test fixture capacitance.

SWITCHING TIME WAVEFORM

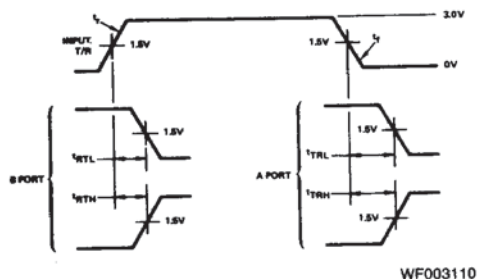


$$t_r = t_f < 10\text{ns } 10\% \text{ to } 90\%$$

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

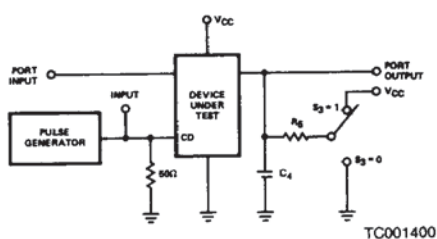


Note: C_2 and C_3 include test fixture capacitance.

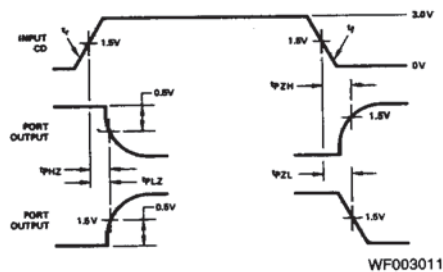


$$t_r = t_f < 10\text{ns } 10\% \text{ to } 90\%$$

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



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



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

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					
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	8	12	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	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/ \bar{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/ \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 = 2.4V, 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 = 0.4V, 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	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/ \bar{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/ \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 = 0.4V, 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
		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/ \bar{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/ \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	23	33	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 = 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/ \bar{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/ \bar{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 $V_{CC} = 5.0\text{V}$ and $T_A = 25^\circ\text{C}$.
 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) $R_1 = 100\Omega, R_2 = 1k, C_1 = 300pF$	24	29	ns
		$R_1 = 667\Omega, R_2 = 5k, C_1 = 45pF$	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) $R_1 = 100\Omega, R_2 = 1k, C_1 = 300pF$	25	30	ns
		$R_1 = 667\Omega, R_2 = 5k, C_1 = 45pF$	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) $S_3 = 1, R_5 = 100\Omega, C_4 = 300pF$	38	43	ns
		$S_3 = 1, R_5 = 667\Omega, C_4 = 45pF$	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) $S_1 = 1, R_4 = 100\Omega, C_3 = 5pF$ $S_2 = 1, R_3 = 1k, C_2 = 30pF$	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) $S_1 = 0, R_4 = 100\Omega, C_3 = 5pF$ $S_2 = 0, R_3 = 5k, C_2 = 30pF$	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) $S_1 = 1, R_4 = 100\Omega, C_3 = 300pF$ $S_2 = 1, R_3 = 300\Omega, C_2 = 5pF$	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) $S_1 = 0, R_4 = 1k, C_3 = 300pF$ $S_2 = 0, R_3 = 300\Omega, C_2 = 5pF$	41	47	ns

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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	$CD = 0.4\text{V}$, $T/\bar{R} = 0.4\text{V}$ (Figure 1) $R_1 = 1\text{k}$, $R_2 = 5\text{k}$, $C_1 = 30\text{pF}$	14	18	ns
t_{PDLHA}	Propagation Delay to a Logical "1" from B Port to A Port	$CD = 0.4\text{V}$, $T/\bar{R} = 0.4\text{V}$ (Figure 1) $R_1 = 1\text{k}$, $R_2 = 5\text{k}$, $C_1 = 30\text{pF}$	13	18	ns
t_{PLZA}	Propagation Delay from a Logical "0" to 3-State from CD to A Port	B_0 to $B_7 = 0.4\text{V}$, $T/\bar{R} = 0.4\text{V}$ (Figure 3) $S_3 = 1$, $R_5 = 1\text{k}$, $C_4 = 15\text{pF}$	11	15	ns
t_{PHZA}	Propagation Delay from a Logical "1" to 3-State from CD to A Port	B_0 to $B_7 = 2.4\text{V}$, $T/\bar{R} = 0.4\text{V}$ (Figure 3) $S_3 = 0$, $R_5 = 1\text{k}$, $C_4 = 15\text{pF}$	8	15	ns
t_{PZLA}	Propagation Delay from 3-State to a Logical "0" from CD to A Port	B_0 to $B_7 = 0.4\text{V}$, $T/\bar{R} = 0.4\text{V}$ (Figure 3) $S_3 = 1$, $R_5 = 1\text{k}$, $C_4 = 30\text{pF}$	19	25	ns
t_{PZHA}	Propagation Delay from 3-State to a Logical "1" from CD to A Port	B_0 to $B_7 = 2.4\text{V}$, $T/\bar{R} = 0.4\text{V}$ (Figure 3) $S_3 = 0$, $R_5 = 5\text{k}$, $C_4 = 30\text{pF}$	19	25	ns
B PORT DATA/MODE SPECIFICATIONS					
t_{PDHLB}	Propagation Delay to a Logical "0" from A Port to B Port	$CD = 0.4\text{V}$, $T/\bar{R} = 2.4\text{V}$ (Figure 1) $R_1 = 100\Omega$, $R_2 = 1\text{k}$, $C_1 = 300\text{pF}$	18	23	ns
		$R_1 = 667\Omega$, $R_2 = 5\text{k}$, $C_1 = 45\text{pF}$	11	18	ns
t_{PDLHB}	Propagation Delay to a Logical "1" from A Port to B Port	$CD = 0.4\text{V}$, $T/\bar{R} = 2.4\text{V}$ (Figure 1) $R_1 = 100\Omega$, $R_2 = 1\text{k}$, $C_1 = 300\text{pF}$	16	23	ns
		$R_1 = 667\Omega$, $R_2 = 5\text{k}$, $C_1 = 45\text{pF}$	11	18	ns
t_{PLZB}	Propagation Delay from a Logical "0" to 3-State from CD to B Port	A_0 to $A_7 = 0.4\text{V}$, $T/\bar{R} = 2.4\text{V}$ (Figure 3) $S_3 = 1$, $R_5 = 1\text{k}$, $C_4 = 15\text{pF}$	13	18	ns
t_{PHZB}	Propagation Delay from a Logical "1" to 3-State from CD to B Port	A_0 to $A_7 = 2.4\text{V}$, $T/\bar{R} = 2.4\text{V}$ (Figure 3) $S_3 = 0$, $R_5 = 1\text{k}$, $C_4 = 15\text{pF}$	8	15	ns
t_{PZLB}	Propagation Delay from 3-State to a Logical "0" from CD to B Port	A_0 to $A_7 = 0.4\text{V}$, $T/\bar{R} = 2.4\text{V}$ (Figure 3) $S_3 = 1$, $R_5 = 100\Omega$, $C_4 = 300\text{pF}$	25	35	ns
		$R_3 = 1$, $R_5 = 667\Omega$, $C_1 = 45\text{pF}$	16	22	ns
t_{PZHB}	Propagation Delay from 3-State to a Logical "1" from CD to B Port	A_0 to $A_7 = 2.4\text{V}$, $T/\bar{R} = 2.4\text{V}$ (Figure 3) $S_3 = 0$, $R_5 = 1\text{k}$, $C_4 = 300\text{pF}$	26	35	ns
		$S_3 = 0$, $R_5 = 5\text{k}$, $C_1 = 45\text{pF}$	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	$CD = 0.4\text{V}$ (Figure 2) $S_1 = 1$, $R_4 = 100\Omega$, $C_3 = 5\text{pF}$ $S_2 = 1$, $R_3 = 1\text{k}$, $C_2 = 30\text{pF}$	28	38	ns
t_{TRH}	Propagation Delay from Transmit Mode to Receive a Logical "1", T/\bar{R} to A Port	$CD = 0.4\text{V}$ (Figure 2) $S_1 = 1$, $R_4 = 100\Omega$, $C_3 = 5\text{pF}$ $S_2 = 0$, $R_3 = 5\text{k}$, $C_2 = 30\text{pF}$	28	38	ns
t_{RTL}	Propagation Delay from Transmit Mode to Receive a Logical "0", T/\bar{R} to B Port	$CD = 0.4\text{V}$ (Figure 2) $S_1 = 1$, $R_4 = 100\Omega$, $C_3 = 300\text{pF}$ $S_2 = 0$, $R_3 = 300\Omega$, $C_2 = 5\text{pF}$	31	40	ns
t_{RTH}	Propagation Delay from Transmit Mode to Receive a Logical "1", T/\bar{R} to B Port	$CD = 0.4\text{V}$ (Figure 2) $S_1 = 0$, $R_4 = 1\text{k}$, $C_3 = 300\text{pF}$ $S_2 = 1$, $R_3 = 300\Omega$, $C_2 = 5\text{pF}$	31	40	ns

Note: 1. All typical values given are for $V_{CC} = 5.0\text{V}$ and $T_A = 25^\circ\text{C}$.
 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	MILITARY Am2947	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	21	24	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	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/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/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/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/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)	28	34	ns
		R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF			
		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/R = 2.4V (Figure 1)	28	34	ns
		R ₁ = 100Ω, R ₂ = 1k, C ₁ = 300pF			
		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/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/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/R = 2.4V (Figure 3)	38	43	ns
		S ₃ = 1, R ₅ = 100Ω, C ₄ = 300pF			
		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/R = 2.4V (Figure 3)	38	43	ns
		S ₃ = 0, R ₅ = 1k, C ₄ = 300pF			
		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 = 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/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/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/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