

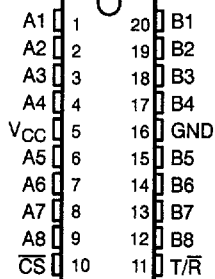
SN55ALS056, SN55ALS057, SN75ALS056, SN75ALS057 TRAPEZOIDAL-WAVEFORM INTERFACE BUS TRANSCEIVERS

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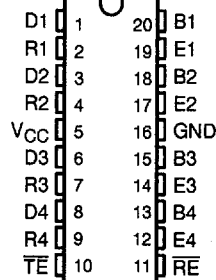
SUITABLE FOR IEEE STANDARD 896 APPLICATIONS†

- SN55ALS056 and SN75ALS056 are Octal Transceivers
- SN55ALS057 and SN75ALS057 are Quad Transceivers
- High-Speed Advanced Low-Power Schottky (ALS) Circuitry
- Low Power Dissipation:
SN55* Devices . . . 60 mW/Channel Max
SN75* Devices . . . 52.5 mW/Channel Max
- High-Impedance pnp Inputs
- Logic-Level 1-V Bus Swing Reduces Power Consumption
- Trapezoidal Bus Output Waveform Reduces Noise Coupling to Adjacent Lines
- Power-Up/Power-Down Protection (Glitch Free)
- Open-Collector Driver Outputs Allow Wired-OR Connections
- Designed to Be a Faster, Lower-Power Functional Equivalent of National DS3896, DS3897

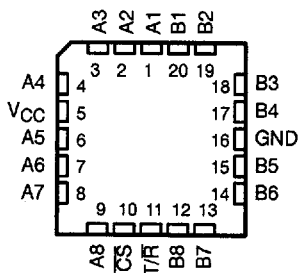
SN55ALS056 . . . J OR W PACKAGE
SN75ALS056 . . . DW OR N PACKAGE
(TOP VIEW)



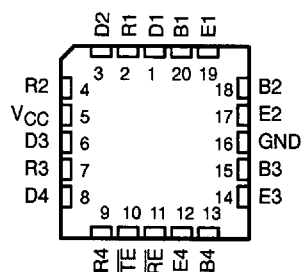
SN55ALS057 . . . J OR W PACKAGE
SN75ALS057 . . . DW OR N PACKAGE
(TOP VIEW)



SN55ALS056 . . . FK PACKAGE
(TOP VIEW)



SN55ALS057 . . . FK PACKAGE
(TOP VIEW)



† The transceivers are suitable for IEEE Standard 896 applications to the extent of the operating conditions and characteristics specified in this data sheet. Certain limits contained in the IEEE specification are not met or cannot be tested over the entire military temperature range.

PRODUCTION DATA Information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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SN55ALS056, SN55ALS057, SN75ALS056, SN75ALS057 TRAPEZOIDAL-WAVEFORM INTERFACE BUS TRANSCEIVERS

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description

The SN55ALS056 and SN75ALS056 are 8-channel, monolithic, high-speed, advanced low-power Schottky (ALS) devices designed for 2-way data communication in a densely populated backplane. The SN55ALS057 and SN75ALS057 are 4-channel versions with independent driver-input (Dn) and receiver-output (Rn) pins and a separate driver disable for each driver (En).

These transceivers feature open-collector driver outputs with series Schottky diodes to reduce capacitive loading to the bus. By using a 2-V pullup termination on the bus, the output signal swing is approximately 1 V, which reduces the power necessary to drive the bus load capacitance. The driver outputs generate trapezoidal waveforms that reduce crosstalk between channels. The drivers are capable of driving an equivalent dc load as low as 18.5 Ω . The receivers have internal low-pass filters to further improve noise immunity.

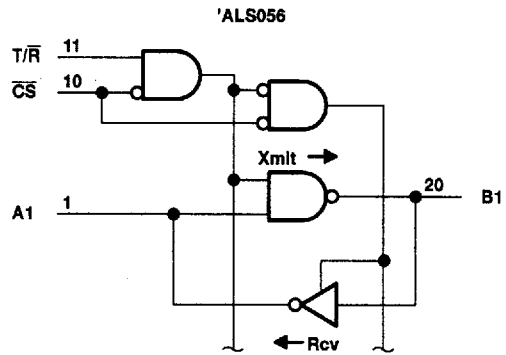
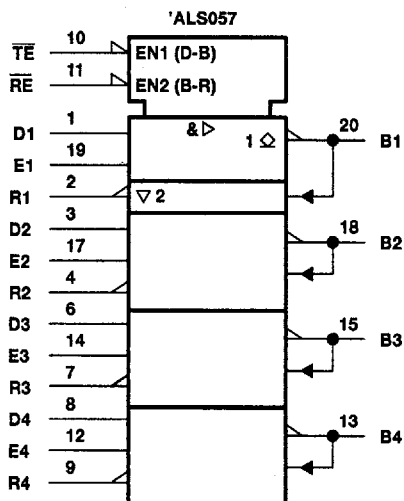
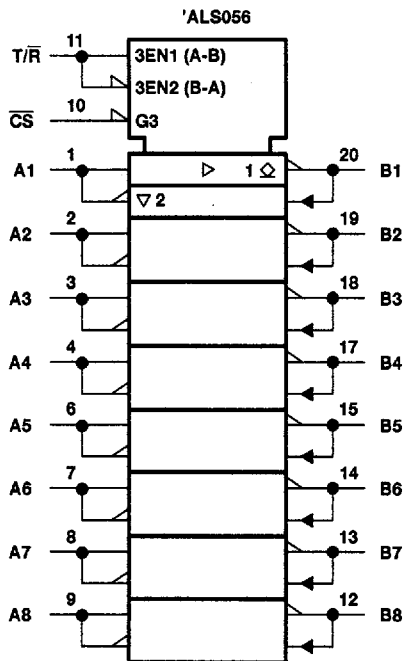
The SN55ALS056 and SN55ALS057 are characterized over the full military operating range of -55°C to 125°C . The SN75ALS056 and SN75ALS057 are characterized for operation from 0°C to 70°C .

SN55ALS056, SN55ALS057, SN75ALS056, SN75ALS057 TRAPEZOIDAL-WAVEFORM INTERFACE BUS TRANSCEIVERS

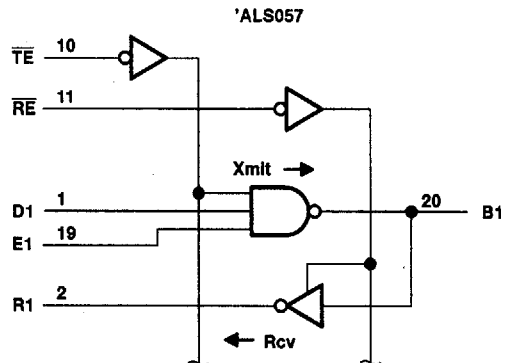
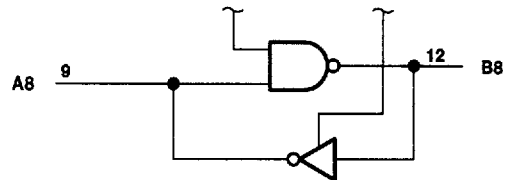
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logic symbols†

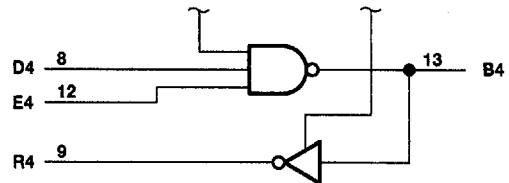
logic diagrams (positive logic)



6 Identical Channels Not Shown



2 Identical Channels Not Shown



† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.



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Function Tables

'ALS056
TRANSMIT/RECEIVE

CONTROLS		CHANNELS
CS	T/R	A ↔ B
L	H	T (A → B)
L	L	R (B → A)
H	X	D

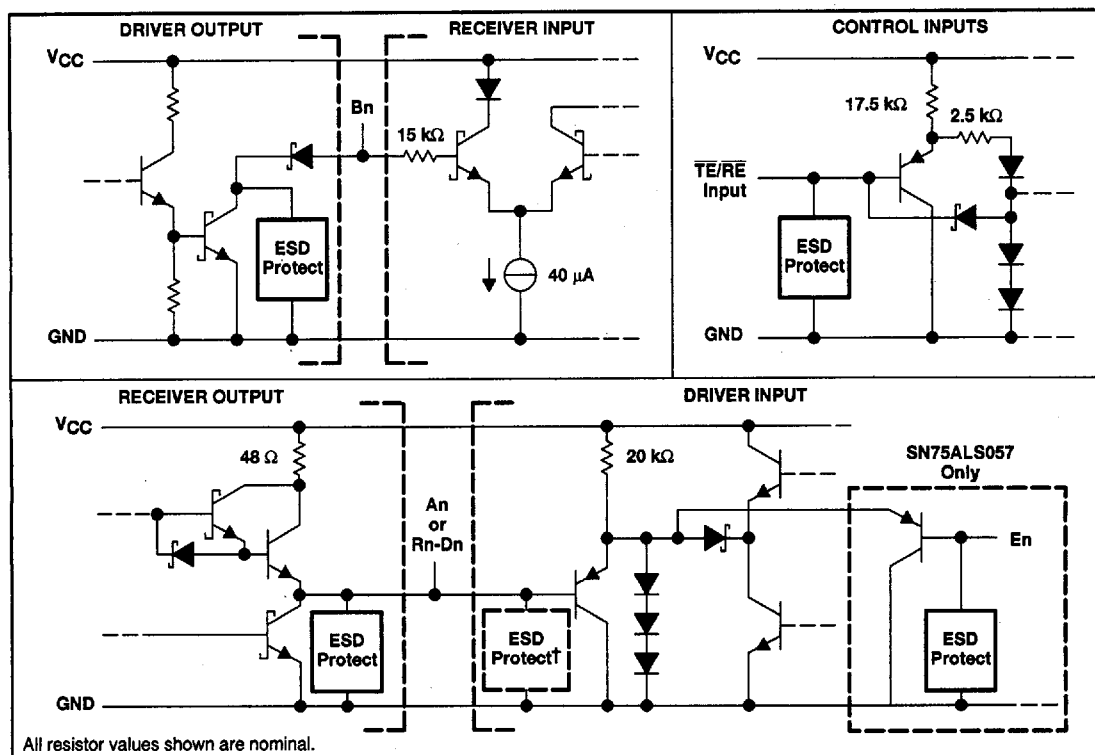
'ALS057
TRANSMIT/RECEIVE

CONTROLS			CHANNELS	
TE	RE	En	D → B	B → R
L	L	L	D	R
L	L	H	T	R
L	H	L	D	D
L	H	H	T	D
H	L	X	D	R
H	H	X	D	D

H = high level, L = low level, R = receive, T = transmit, D = disable, X = irrelevant

Direction of data transmission is from An to Bn for the 'ALS056 and from Dn to Bn for the 'ALS057. Direction of data reception is from Bn to An for the 'ALS056 and from Bn to Rn for the 'ALS057. Data transfer is inverting in both directions.

schematics of inputs and outputs



† Additional ESD protection is on the 'ALS057, which has separate receiver-output and driver-input pins.

SN55ALS056, SN55ALS057, SN75ALS056, SN75ALS057 TRAPEZOIDAL-WAVEFORM INTERFACE BUS TRANSCEIVERS

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

Supply voltage, V_{CC} (see Note 1)	6 V
Control input voltage, V_I	5.5 V
Driver input voltage, V_I	5.5 V
Driver output voltage, V_O	2.5 V
Receiver input voltage, V_I	2.5 V
Receiver output voltage, V_O	5.5 V
Continuous total power dissipation	See Dissipation Rating Table
Operating free-air temperature range, T_A : SN55ALS05_	–55°C to 125°C
SN75ALS05_	0°C to 70°C
Storage temperature range, T_{stg}	–65°C to 150°C
Case temperature for 60 seconds, T_C : FK package	300 °C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds: DW or N package	260 °C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J or W package	300 °C

NOTE 1: Voltage values are with respect to network ground terminal.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING	$T_A = 125^\circ\text{C}$ POWER RATING
DW	1025 mW	8.2 mW/°C	656 mW	—
FK	1375 mW	11.0 mW/°C	880 mW	275 mW
N	1150 mW	9.2 mW/°C	736 mW	—
J	1375 mW	11.0 mW/°C	880 mW	275 mW
W	1000 mW	8.0 mW/°C	640 mW	200 mW

recommended operating conditions

		MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	SN55ALS05_	4.5	5	5.5	V
	SN75ALS05_	4.75	5	5.25	
High-level driver and control input voltage, V_{IH}		2			V
Low-level driver and control input voltage, V_{IL}				0.8	V
Bus termination voltage		1.9		2.1	V
Operating free-air temperature, T_A	SN55ALS05_	–55		125	°C
	SN75ALS05_	0		70	



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TRAPEZOIDAL-WAVEFORM INTERFACE BUS TRANSCEIVERS

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electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

SN55ALS056

PARAMETER		TEST CONDITION†	MIN	TYP†	MAX	UNIT
V_{IK}	Input clamp voltage at An, T/R, or CS	$V_{CC} = 4.5 \text{ V}$, $I_I = -18 \text{ mA}$			-1.5	V
V_{IT}	Receiver input threshold voltage at Bn	$V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$	1.43		1.69	V
		$V_{CC} = 5 \text{ V}$, $T_A = -55^\circ\text{C to } 125^\circ\text{C}$	1.4		1.7	
V_{OH}	High-level output voltage at An	$V_{CC} = 4.5 \text{ V}$, Bn at 1.2 V, CS at 0.8 V, T/R at 0.8 V, $I_{OH} = -400 \mu\text{A}$	2.4			V
V_{OL}	An	$V_{CC} = 4.5 \text{ V}$, Bn at 2 V, CS at 0.8 V, T/R at 0.8 V, $I_{OL} = 16 \text{ mA}$			0.5	V
	Bn	$V_{CC} = 4.5 \text{ V}$, An at 2 V, CS at 0.8 V, T/R at 2 V, See Figure 1	0.75		1.2	
I_{IH}	An, T/R or CS	$V_I = V_{CC} = 5.5 \text{ V}$			40	μA
	Bn	$V_{CC} = 5.5 \text{ V}$, $V_I = 2 \text{ V}$, An at 0.8 V, T/R at 0.8 V			100	
I_{IL}	Low level input current at An, T/R, or CS	$V_{CC} = 5.5 \text{ V}$, $V_I = 0.4 \text{ V}$			-400	μA
I_{OS}	Short-circuit output current at An	$V_{CC} = 5.5 \text{ V}$, An at 0, Bn at 1.2 V, CS at 0.8 V, T/R at 0.8 V	-35		-125	mA
I_{CC}	Supply current	$V_{CC} = 5.5 \text{ V}$			85	mA
$C_{O(B)}$	Driver output capacitance			4.5		pF

SN75ALS056

PARAMETER		TEST CONDITION†	MIN	TYP†	MAX	UNIT
V_{IK}	Input clamp voltage at An, T/R, or CS	$I_I = -18 \text{ mA}$			-1.5	V
V_{IT}	Receiver input threshold voltage at Bn		1.405		1.69	V
V_{OH}	High-level output voltage at An	Bn at 1.2 V, CS at 0.8 V, T/R at 0.8 V, $I_{OH} = -400 \mu\text{A}$	2.4			V
V_{OL}	An	Bn at 2 V, CS at 0.8 V, T/R at 0.8 V, $I_{OL} = 16 \text{ mA}$			0.5	V
	Bn	An at 2 V, CS at 0.8 V, T/R at 2 V, $V_L = 2 \text{ V}$, $R_L = 18.5 \Omega$, See Figure 1	0.75		1.2	
I_{IH}	An, T/R or CS	$V_I = V_{CC}$			40	μA
	Bn	$V_I = 2 \text{ V}$, $V_{CC} = 0 \text{ or } 5.25 \text{ V}$, An at 0.8 V, T/R at 0.8 V			100	
I_{IL}	Low level input current at An, T/R, or CS	$V_I = 0.4 \text{ V}$			-400	μA
I_{OS}	Short-circuit output current at An	An at 0, Bn at 1.2 V, CS at 0.8 V, T/R at 0.8 V	-40		-120	mA
I_{CC}	Supply current				75	mA
$C_{O(B)}$	Driver output capacitance			4.5		pF

† All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

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electrical characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

SN55ALS057

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V _{IK}	Input clamp voltage at Dn, En, $\overline{TE}$, or $\overline{RE}$	V _{CC} = 4.5 V, I _I = -18 mA			-1.5	V
V _{IT}	Receiver input threshold voltage at Bn	V _{CC} = 5 V, T _A = 25°C	1.43		1.69	V
		V _{CC} = 5 V, T _A = -55°C to 125°C	1.4		1.7	
V _{OH}	High-level output voltage at Rn	V _{CC} = 4.5 V, Bn at 1.2 V, RE at 0.8 V, I _{OH} = -400 µA	2.4			V
V _{OL}	Rn	V _{CC} = 4.5 V, Bn at 2 V, RE at 0.8 V, I _{OL} = 16 mA			0.5	V
	Bn	V _{CC} = 4.5 V, Dn at 2 V, TE at 0.8 V, See Figure 1	0.75		1.2	
I _{IH}	Dn, En, $\overline{TE}$, or $\overline{RE}$	V _I = V _{CC} = 5.5 V			40	µA
	Bn	V _{CC} = 5.5 V, V _I = 2 V, Dn at 0.8 V, En at 0.8 V, $\overline{TE}$ at 0.8 V			100	
I _{IL}	Low-level input current at Dn, En, $\overline{TE}$, or $\overline{RE}$	V _{CC} = 5.5 V, V _I = 0.4 V			-400	µA
I _{OS}	Short-circuit output current at Rn	V _{CC} = 5.5 V, Bn at 0, RE at 0.8 V	-435		-125	mA
I _{CC}	Supply current	V _{CC} = 5.5 V			45	mA
C _{O(B)}	Driver output capacitance			4.5		pF

† All typical values are at V_{CC} = 5 V, T_A = 25°C.

SN75ALS057

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V _{IK}	Input clamp voltage at Dn, En, $\overline{TE}$, or $\overline{RE}$	I _I = -18 mA			-1.5	V
V _{IT}	Receiver input threshold voltage at Bn		1.41		1.69	V
V _{OH}	High-level output voltage at Rn	Bn at 1.2 V, RE at 0.8 V, I _{OH} = -400 µA	2.4			V
V _{OL}	Rn	Bn at 2 V, RE at 0.8 V, I _{OL} = 16 mA			0.5	V
	Bn	Dn at 2 V, TE at 0.8 V, V _L = 2 V, R _L = 18.5 Ω, See Figure 1	0.75		1.2	
I _{IH}	Dn, En, $\overline{TE}$, or $\overline{RE}$	V _I = V _{CC}			40	µA
	Bn	V _I = 2 V, Dn at 0.8 V, TE at 0.8 V, V _{CC} = 0 or 5.25 V, En at 0.8 V			100	
I _{IL}	Low-level input current at Dn, En, $\overline{TE}$, or $\overline{RE}$	V _I = 0.4 V			-400	µA
I _{OS}	Short-circuit output current at Rn	Rn at 0, Bn at 1.2 V, RE at 0.8 V	-40		-120	mA
I _{CC}	Supply current				40	mA
C _{O(B)}	Driver output capacitance			4.5		pF

† All typical values are at V_{CC} = 5 V, T_A = 25°C.



SN55ALS056, SN55ALS057, SN75ALS056, SN75ALS057 TRAPEZOIDAL-WAVEFORM INTERFACE BUS TRANSCEIVERS

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switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

SN55ALS056 driver

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	T_A †	MIN	TYP‡	MAX	UNIT
t_{PLH1} Propagation delay time, low-to-high-level input	$\overline{CS}$	Bn	An and $T/\overline{R}$ at 2 V, $V_L = 2$ V, $R_{L1} = 18 \Omega$, $R_{L2} = 500 \Omega$, $C_L = 50$ pF, See Figure 2	25°C			18	ns
t_{PHL1} Propagation delay time, high-to-low-level input				Full range			30	
				25°C			20	
				Full range			22	
t_{PLH2} Propagation delay time, low-to-high-level input	An	Bn	$\overline{CS}$ at 0.8 V, $V_L = 2$ V, $R_{L2} = 500 \Omega$, See Figure 2	25°C			10	ns
t_{PHL2} Propagation delay time high-to-low-level input				Full range			40	
				25°C			12	
				Full range			15	
t_{PLH2} Propagation delay time, high-to-low-level input	An	Bn	$\overline{CS}$ at 0.8 V, $R_{L1} = 18 \Omega$, $C_L = 50$ pF, See Figure 2	25°C	1	3	10	ns
t_{PHL2} Propagation delay time, low-to-high-level input				Full range	1		13	
				25°C	1	3	8	ns
				Full range	1		33	ns
t_{PLH3} Propagation delay time, low-to-high-level input	$T/\overline{R}$	Bn	$\overline{CS}$ at 0.8 V, $R_{L1} = 18 \Omega$, $C_L = 50$ pF, See Figure 2	25°C			18	ns
t_{PHL3} Propagation delay time, high-to-low-level input				Full range			37	
				25°C			18	
				Full range			21	

SN75ALS056 driver

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP§	MAX	UNIT
t_{PLH1} Propagation delay time, low-to-high-level output	$\overline{CS}$	Bn	An and $T/\overline{R}$ at 2 V, $V_L = 2$ V, $R_{L1} = 18 \Omega$, $C_L = 30$ pF, See Figure 2			24	ns
t_{PHL1} Propagation delay time, high-to-low-level output						20	
t_{PLH2} Propagation delay time, low-to-high-level output	An	Bn	$\overline{CS}$ at 0.8 V, $V_L = 2$ V, R_{L2} not connected, See Figure 2			19	ns
t_{PHL2} Propagation delay time high-to-low-level output						18	
t_{PLH3} Propagation delay time, low-to-high-level output	$T/\overline{R}$	Bn	$V_I(An) = 5$ V, $R_{L1} = 18 \Omega$, R_{L2} not connected, See Figure 3			25	ns
t_{PHL3} Propagation delay time, high-to-low-level output						35	
t_{TLH} Transition time, low-to-high-level output	An	Bn	$\overline{CS}$ at 0.8 V, $V_L = 2$ V, $R_{L1} = 18 \Omega$, See Figure 2	1	3	11	ns
t_{THL} Transition time, high-to-low-level output				1	3	6	

† Full range is -55°C to 125°C.

‡ Typical values are at $V_{CC} = 5$ V.

§ Typical values are at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$.

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switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

SN55ALS056 receiver

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	T _A †	MIN	MAX	UNIT
t _{PLH4} Propagation delay time, low-to-high-level output	Bn	An	$\overline{CS}$ at 0.8 V, R _{L1} = 500 Ω, C _L = 50 pF, T/ $\overline{R}$ at 0.8 V, R _{L2} = 500 Ω, See Figure 4	25°C		20	ns
t _{PHL4} Propagation delay time, high-to-low-level output				Full range		22	
				25°C		18	
				Full range		20	
t _{PLZ1} Output disable time from low level	T/ $\overline{R}$	An	Bn at 2 V, V _L = 5 V, R _{L2} = 500 Ω, See Figure 3	25°C		17	ns
t _{PZL1} Output enable time to low level				Full range		20	
				25°C		25	
				Full range		40	
t _{PHZ1} Output disable time from high level	T/ $\overline{R}$	An	Bn at 0.8 V, V _L = 0, R _{L2} = 500 Ω, See Figure 3	25°C		12	ns
				Full range		13	
t _{PZH1} Output enable time to high level	T/ $\overline{R}$	An	Bn at 0.8 V, R _{L1} open, C _L = 50 pF, See Figure 3	25°C		15	ns
				Full range		22	
t _{PLZ2} Output disable time from low level	$\overline{CS}$	An	Bn at 2 V, R _{L1} = 500 Ω, C _L = 50 pF, See Figure 5	25°C		20	ns
t _{PZL2} Output enable time to low level				Full range		22	
				25°C		13	
				Full range		14	
t _{PHZ2} Output disable time from high level	$\overline{CS}$	An	Bn at 0.8 V, V _L = 0, R _{L1} = R _{L2} = 500 Ω, See Figure 5	25°C		12	ns
				Full range		13	
t _{PZH2} Output enable time to high level	$\overline{CS}$	An	Bn at 0.8 V, R _{L1} not connected, C _L = 50 pF, See Figure 5	25°C		14	ns
				Full range		22	
t _{w(NR)} Receiver noise rejection pulse duration	Bn	An	V _L = 5 V, R _{L2} = 500 Ω, See Figure 6	25°C		4	ns
				Full range		2	

† Full range is –55°C to 125°C.



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switching characteristics over recommended ranges of supply voltage and operating free-air temperature

SN75ALS056 receiver

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS			MIN	MAX	UNIT
t _{PLH4} Propagation delay time, low-to-high-level output	Bn	An	$\overline{CS}$ at 0.8 V, R _{L1} = 1.6 kΩ, C _L = 30 pF, See Figure 4	T/ $\overline{R}$ at 0.8 V, C _L = 30 pF, See Figure 4	R _{L1} = 390 Ω, See Figure 4	18	ns	
t _{PHL4} Propagation delay time, high-to-low-level output								
t _{PLZ1} Output disable time from low level	T/ $\overline{R}$	An	$\overline{CS}$ at 0.8 V, R _{L1} = 390 Ω, C _L = 15 pF, See Figure 3	V _I (Bn) = 2 V, R _{L2} not connected, See Figure 3	V _L = 5 V, See Figure 3	20	ns	
t _{PZL1} Output enable time to low level	T/ $\overline{R}$	An	$\overline{CS}$ at 0.8 V, R _{L1} = 390 Ω, C _L = 30 pF, See Figure 3	V _I (Bn) = 2 V, R _{L2} = 1.6 kΩ, See Figure 3	V _L = 5 V, See Figure 3	40	ns	
t _{PHZ1} Output disable time from high level	T/ $\overline{R}$	An	$\overline{CS}$ at 0.8 V, R _{L1} = 390 Ω, C _L = 15 pF, See Figure 3	V _I (Bn) = 0, R _{L2} not connected, See Figure 3	V _L = 0, See Figure 3	17	ns	
t _{PZH1} Output enable time to high level	T/ $\overline{R}$	An	$\overline{CS}$ at 0.8 V, R _{L1} not connected, C _L = 30 pF, See Figure 3	V _I (Bn) = 0, R _{L2} = 1.6 kΩ, See Figure 3	V _L = 0, R _{L2} = 1.6 kΩ, See Figure 3	15	ns	
t _{PLZ2} Output disable time from low level	$\overline{CS}$	An	Bn at 2 V, V _L = 5 V, R _{L2} not connected, See Figure 5	T/ $\overline{R}$ at 0.8 V, R _{L1} = 390 Ω, C _L = 5 pF, See Figure 5	C _L = 5 pF, See Figure 5	18	ns	
t _{PZL2} Output enable time to low level	$\overline{CS}$	An	Bn at 2 V, V _L = 5 V, See Figure 5	T/ $\overline{R}$ at 0.8 V, R _{L1} = 390 Ω, C _L = 30 pF, R _{L2} = 1.6 kΩ, See Figure 5	C _L = 30 pF, R _{L2} = 1.6 kΩ, See Figure 5	15	ns	
t _{PHZ2} Output disable time from high level	$\overline{CS}$	An	Bn at 0.8 V, V _L = 0, R _{L2} not connected, See Figure 5	T/ $\overline{R}$ at 0.8 V, R _{L1} = 390 Ω, C _L = 5 pF, See Figure 5	C _L = 5 pF, See Figure 5	8	ns	
t _{PZH2} Output enable time to high level	$\overline{CS}$	An	Bn at 0.8 V, V _L = 0, R _{L2} = 1.6 kΩ, See Figure 5	T/ $\overline{R}$ at 0.8 V, R _{L1} not connected, C _L = 30 pF, See Figure 5	C _L = 30 pF, See Figure 5	17	ns	
t _{w(NR)} Receiver noise rejection pulse duration	Bn	An	$\overline{CS}$ at 0.8 V, R _{L2} = 1.6 kΩ, See Figure 6	T/ $\overline{R}$ at 0.8 V, C _L = 30 pF, See Figure 6	R _{L1} = 390 Ω, V _L = 5 V, See Figure 6	3	ns	

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 **TEXAS
INSTRUMENTS**

SN55ALS056, SN55ALS057, SN75ALS056, SN75ALS057 TRAPEZOIDAL-WAVEFORM INTERFACE BUS TRANSCEIVERS

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switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

SN55ALS057 driver

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	$T_A^\dagger$	MIN	TYP ‡	MAX	UNIT
t_{PLH1} Propagation delay time, low-to-high-level output	$\overline{TE}$	B_n	$D_n, E_n, \overline{RE}$ at 2 V, $V_L = 2$ V, $R_{L1} = 18 \Omega$, $R_{L2} = 500 \Omega$, $C_L = 50$ pF, See Figure 2	25°C			10	ns
t_{PHL1} Propagation delay time, high-to-low-level output				Full range			27	
				25°C			17	ns
				Full range			19	
t_{PLH2} Propagation delay time, low-to-high-level output	D_n or E_n	B_n	$\overline{TE}$ at 0.8 V, $\overline{RE}$ at 2 V, $V_L = 2$ V, $R_{L1} = 18 \Omega$, $R_{L2} = 500 \Omega$, $C_L = 50$ pF, See Figure 2	25°C			10	ns
t_{PHL2} Propagation delay time, high-to-low-level output				Full range			27	
				25°C			12	ns
				Full range			15	
t_{TLH} Transition time, low-to-high-level output	D_n or E_n	B_n	$\overline{RE}$ at 2 V, $V_L = 2$ V, $R_{L1} = 18 \Omega$, $R_{L2} = 500 \Omega$, $C_L = 50$ pF, See Figure 2	25°C	1	3	8	ns
t_{THL} Transition time, high-to-low-level output				Full range	1		33	ns
				25°C	1	3	10	
				Full range	1		13	ns

† Full range is -55°C to 125°C.

‡ Typical values are at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$.

SN75ALS057 driver

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP ‡	MAX	UNIT
t_{PLH1} Propagation delay time, low-to-high-level output	$\overline{TE}$	B_n	$D_n, E_n, \overline{RE}$ at 2 V, $V_L = 2$ V, R_{L2} not connected, $R_{L1} = 18 \Omega$, $C_L = 30$ pF, See Figure 2			24	ns
t_{PHL1} Propagation delay time, high-to-low-level output						20	
t_{PLH2} Propagation delay time, low-to-high-level output	D_n or E_n	B_n	$\overline{TE}$ at 0.8 V, $\overline{RE}$ at 2 V, $V_L = 2$ V, $R_{L1} = 18 \Omega$, R_{L2} not connected, $C_L = 30$ pF, See Figure 2			19	ns
t_{PHL2} Propagation delay time, high-to-low-level output						18	
t_{TLH} Transition time, low-to-high-level output	D_n or E_n	B_n	$\overline{RE}$ at 2 V, $V_L = 2$ V, $\overline{TE}$ at 0.8 V, $R_{L1} = 18 \Omega$, R_{L2} not connected, $C_L = 30$ pF, See Figure 2	1	3	11	ns
t_{THL} Transition time, high-to-low-level output				1	3	6	

‡ Typical values are at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$.



TEXAS
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SN55ALS056, SN55ALS057, SN75ALS056, SN75ALS057 TRAPEZOIDAL-WAVEFORM INTERFACE BUS TRANSCEIVERS

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switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (continued)

SN55ALS057 receiver

PARAMETER		FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	T _A †	MIN	MAX	UNIT	
t _{PLH4}	Propagation delay time, low-to-high-level output	B _n	R _n	$\overline{R\overline{E}}$ at 0.8 V, V _L = 5 V, R _{L2} = 500 Ω, See Figure 4	$\overline{T\overline{E}}$ at 2 V, R _{L1} = 500 Ω, C _L = 50 pF,	25°C	20	ns	
t _{PHL4}	Propagation delay time, high-to-low-level output				Full range	22			
		25°C	18						
		Full range	20						
t _{PLZ2}	Output disable time from low level	$\overline{R\overline{E}}$	R _n	B _n at 2 V, V _L = 5 V, R _{L2} = 500 Ω, See Figure 5	$\overline{T\overline{E}}$ at 2 V, R _{L1} = 500 Ω, C _L = 50 pF,	25°C	15	ns	
t _{PZL2}	Output enable time to low level				Full range	17			
		25°C	13						
		Full range	14						
t _{PHZ2}	Output disable time from high level	$\overline{R\overline{E}}$	R _n	B _n at 0.8 V, V _L = 0, R _{L2} = 500 Ω, See Figure 5	$\overline{T\overline{E}}$ at 2 V, R _{L1} = 500 Ω, C _L = 50 pF,	25°C	12	ns	
					Full range	13			
t _{PZH2}	Output enable time to high level				B _n at 0.8 V, R _{L1} not connected C _L = 50 pF,	$\overline{T\overline{E}}$ at 2 V, R _{L2} = 500 Ω, See Figure 5	25°C		14
							Full range		15
t _{w(NR)}	Receiver noise rejection pulse duration	B _n	R _n	V _L = 5 V, R _{L2} = 500 Ω, See Figure 6	R _{L1} = 500 Ω, C _L = 50 pF,	25°C	4	ns	
						Full range	2		

† Full range is –55°C to 125°C.

SN75ALS057 receiver

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	MAX	UNIT
t _{PLH4} Propagation delay time, low-to-high-level output	B _n	R _n	$\overline{R\overline{E}}$ at 0.8 V, R _{L1} = 390 Ω, See Figure 4		18	ns
t _{PHL4} Propagation delay time, high-to-low-level output					18	
t _{PLZ2} Output disable time from low level	$\overline{R\overline{E}}$	R _n	B _n at 2 V, C _L = 5 pF, R _{L2} not connected, See Figure 5		18	ns
t _{PZL2} Output enable time to low level	$\overline{R\overline{E}}$	R _n	B _n at 2 V, C _L = 30 pF, See Figure 5		15	ns
t _{PHZ2} Output disable time from high level	$\overline{R\overline{E}}$	R _n	B _n at 0.8 V, C _L = 5 pF, R _{L2} not connected, See Figure 5		17	ns
t _{PZH2} Output enable time to high level	$\overline{R\overline{E}}$	R _n	B _n at 0.8 V, C _L = 30 pF, R _{L2} = 1.6 kΩ, See Figure 5		17	ns
t _{w(NR)} Receiver noise rejection pulse duration	B _n	R _n	$\overline{T\overline{E}}$ at 2 V, R _{L1} = 390 Ω, See Figure 6		3	ns

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switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (continued)

SN55ALS057 driver plus receiver

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	T _A †	MIN	MAX	UNIT
t _{PLH5} Propagation delay time, low-to-high-level output	Dn	Rn	$\overline{R\overline{E}}$ at 0.8 V, $\overline{T\overline{E}}$ at 0.8 V, $V_L = 2$ V, $R_{L1} = 500\ \Omega$, $R_{L2} = 500\ \Omega$, $C_L = 50$ pF, See Figure 7	25°C		25	ns
				Full range		35	
t _{PHL5} Propagation delay time, high-to-low-level output				25°C		25	
				Full range		44	

† Full range is –55°C to 125°C.

SN75ALS057 driver plus receiver

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	MAX	UNIT
t _{PLH6} Propagation delay time, low-to-high-level output	Dn	Rn	$\overline{R\overline{E}}$ at 0.8 V, $\overline{T\overline{E}}$ at 0.8 V, $R_{L1} = 390\ \Omega$, $R_{L2} = 1.6\ \text{k}\Omega$, $C_L = 30$ pF, See Figure 8		40	ns
t _{PHL6} Propagation delay time, high-to-low-level output					40	

PARAMETER MEASUREMENT INFORMATION

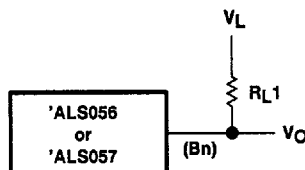


Figure 1. Driver Low-Level-Output-Voltage Test Circuit

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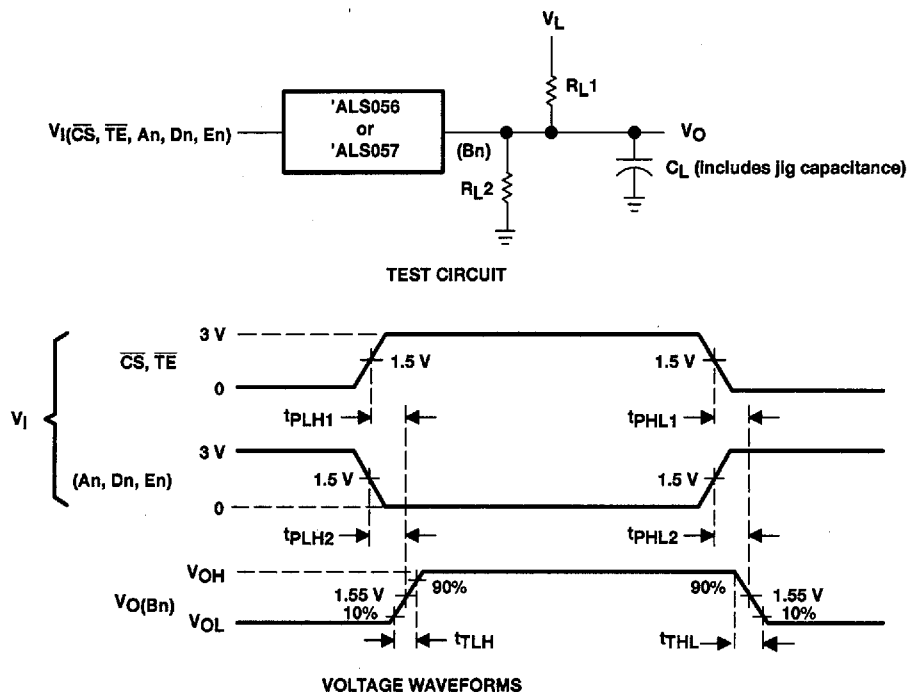
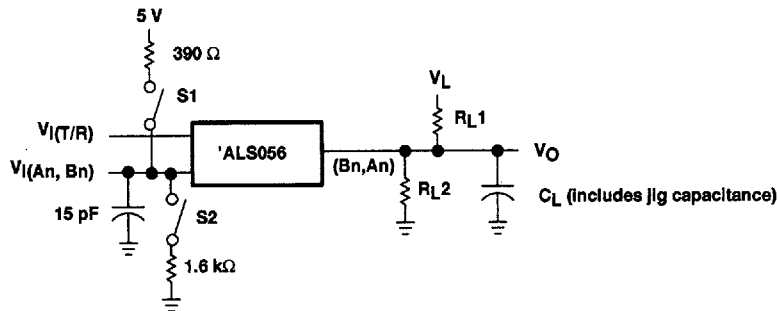


Figure 2. Driver Test Circuit and Voltage Waveforms

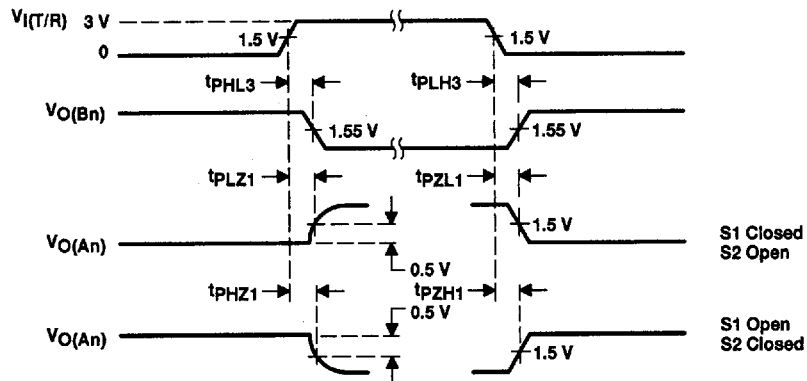
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PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTE: $t_r = t_f \leq 5$ ns from 10% to 90%

Figure 3. Propagation Delay From T/R to An or Bn Test Circuit and Voltage Waveforms

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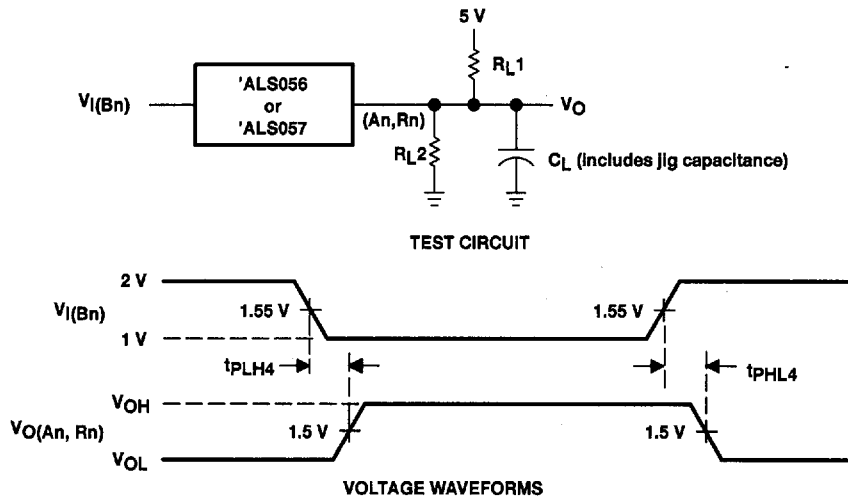


Figure 4. Receiver Test Circuit and Voltage Waveforms

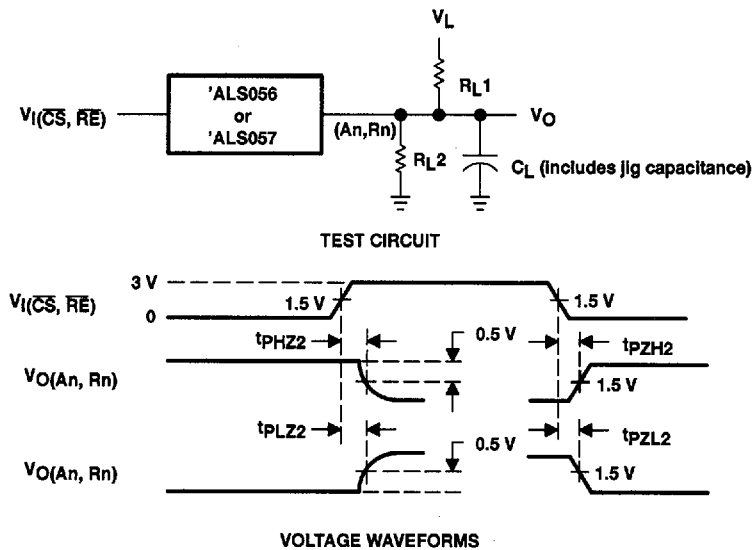
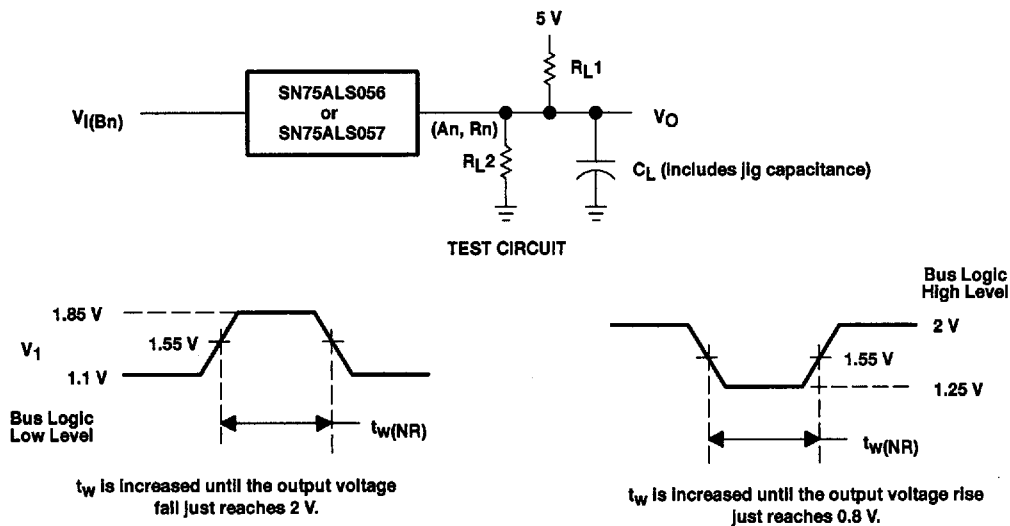


Figure 5. Propagation Delay From $\overline{CS}$ to An or $\overline{RE}$ to Rn Test Circuit and Voltage Waveforms

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PARAMETER MEASUREMENT INFORMATION



VOLTAGE WAVEFORMS

NOTE: $t_r = t_f \leq 2$ ns from 10% to 90%

Figure 6. Receiver Noise Immunity Test Circuit and Voltage Waveforms

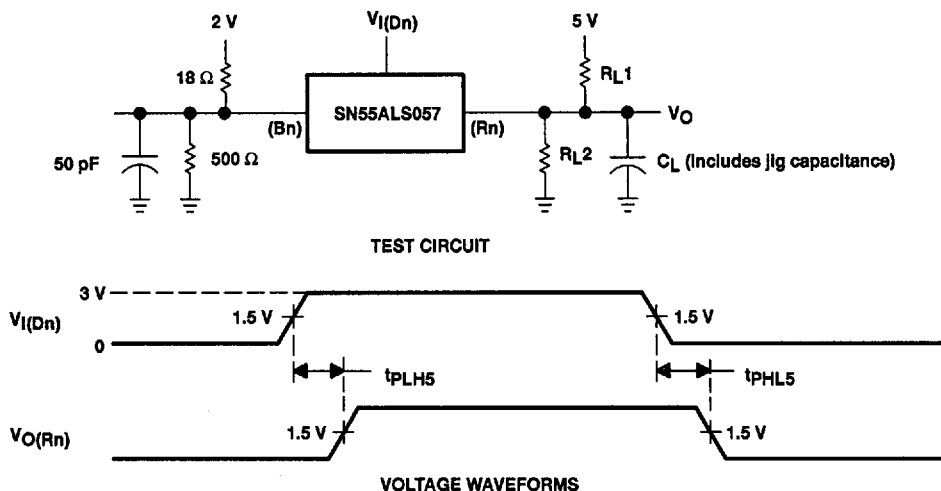
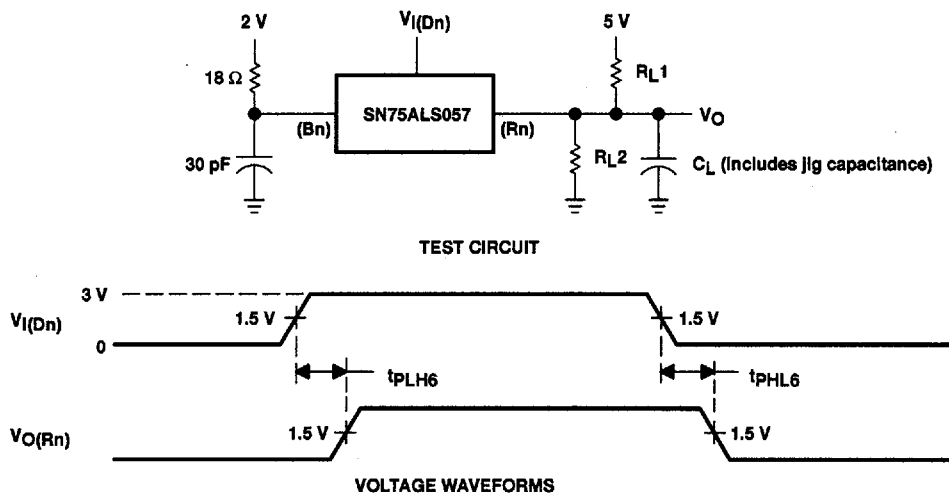


Figure 7. Driver Plus Receiver Delay Times Test Circuits and Voltage Waveforms

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PARAMETER MEASUREMENT INFORMATION



NOTE: $t_r = t_f \leq 5$ ns from 10% to 90%

Figure 8. Driver Plus Receiver Delay Times Test Circuits and Voltage Waveforms