

DESCRIPTION

The LX5269 is a six-channel, non-inverting transceiver that is used to drive and receive the signals from the single-ended Small Computer Systems Interface (SCSI) bus. The totem-pole outputs provide active signal negation for higher signal-to-noise ratios on the bus. All the drivers and receivers may be disabled with the CE control pin. The A inputs of the drivers are taken low to ensure a low on the output when the input is open or to eliminate external pullup resistors. The drivers also feature controlled turn-on and turn-off times to reduce crosstalk in and RF emissions from the SCSI cable.

The LX5269 non-inverting receivers exhibit 600mV of hysteresis and incorporates a 5ns pulse filter to reject high-frequency noise coupling from adjacent signal lines. These improvements to typically single-ended SCSI I/O's provide less data errors and higher data throughput with less noise emissions. The DE/RE enable has a pulldown resistor on

the input to ensure that the receiver is enabled when the DE/RE input is open.

The switching speeds of the LX5269 are sufficient to transfer data over the data bus at 80-million transfers per second. Proper bus termination is required to meet these data rates. Linfinity offers a broad range of terminator solutions such as the LX5218, 9-Channel Current Mode Terminator and the LX5208, 18-Channel Boulay Terminator. The pin assignment of the LX5269 and its enabling logic make this device applicable for the data path (8 data bits plus parity) for the SCSI bus.

This device is available in the space-efficient shrink-small-outline package (SSOP) with 25-mil pin pitch. Each of the 6 identical channels conform to the requirements of ANSI X3.131 - 1986 (SCSI-1) and the proposed SCSI-2 and -3 standards.

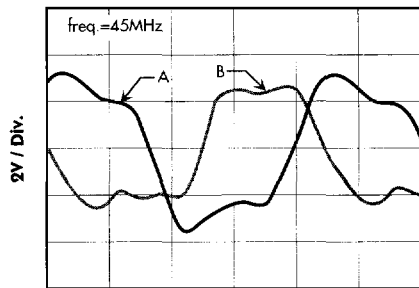
The LX5269 is characterized for operation from 0°C to 70°C.

KEY FEATURES

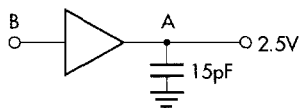
- **OUTPUT CAPACITANCE: 15pF Typ.**
- **ACTIVE NEGATION (TOTEM-POLE) OR OPEN-DRAIN; SELECTABLE DRIVER OUTPUTS**
- TOTEM-POLE; 40mA SOURCE / 48mA SINK CURRENT
- OPEN-DRAIN; 48mA SINK CURRENT
- CONTROLLED DRIVER RISE AND FALL TIMES 6ns TYPICAL
- LOW SKEW, $t_{pd(max)}$... 4ns TYPICAL
- HIGH RECEIVER INPUT VOLTAGE HYSTERESIS - 600mV typ.
- RECEIVER INPUT NOISE PULSE FILTER - 5ns MAXIMUM
- EACH DRIVER AND RECEIVER MEETS ANSI X3.131-1986 (SCSI-1) AND SCSI-2 & 3 STANDARDS
- POWER UP/DOWN GLITCH PROTECTION
- HIGH IMPEDANCE WITH V_{CC} AT 0V
- COMPATIBLE WITH ACTIVE TERMINATORS FROM LINFINITY:
 - LX5218, 9-Channel ULTRA
 - LX5212, 9-Channel Low Capacitance
 - LX5207, 18-Channel Low Capacitance

PRODUCT HIGHLIGHT

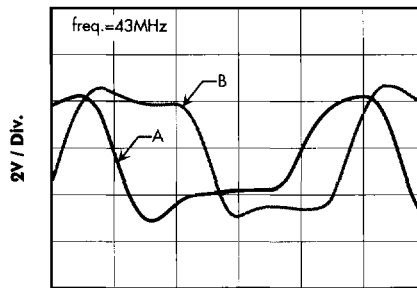
RECEIVING WAVEFORM



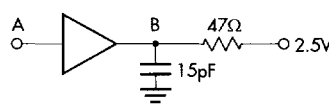
Time - (5ns/Div.)



DRIVING WAVEFORM



Time - (5ns/Div.)



PACKAGE ORDER INFO

T_A (°C)	DB Plastic SSOP 36-pin
0 to 70	LX5269CDB

Note: All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number. (i.e. LX5269CDBT)

NOTE:

For An In-Depth Discussion On Applying SCSI, Request Linfinity Application Note: "Understanding The Single-Ended SCSI Bus"

FOR FURTHER INFORMATION CALL (714) 898-8121

11861 WESTERN AVENUE, GARDEN GROVE, CA. 92841

LX5269

40MHz SINGLE-ENDED 6-CHANNEL NON-INV. BUS TRANSCEIVER

PRELIMINARY DATA SHEET

ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage Range (V_{CC})	-0.5V to 7V
Bus Voltage Range	-0.5V to $V_{DD} + 0.5V$
Data I/O and Control (A-side) Voltage Range	-0.5V to $V_{DD} + 0.5V$
Continuous Power Dissipation	Internally Limited
Operating Junction Temperature	
Plastic (DB Package)	150°C
Storage Temperature Range	-65°C to 150°C
Lead Temperature (Soldering, 10 seconds)	300°C

Note 1. Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

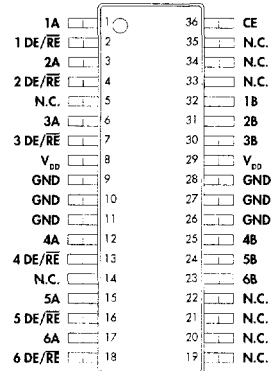
THERMAL DATA

DB PACKAGE:

THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	80° C/W
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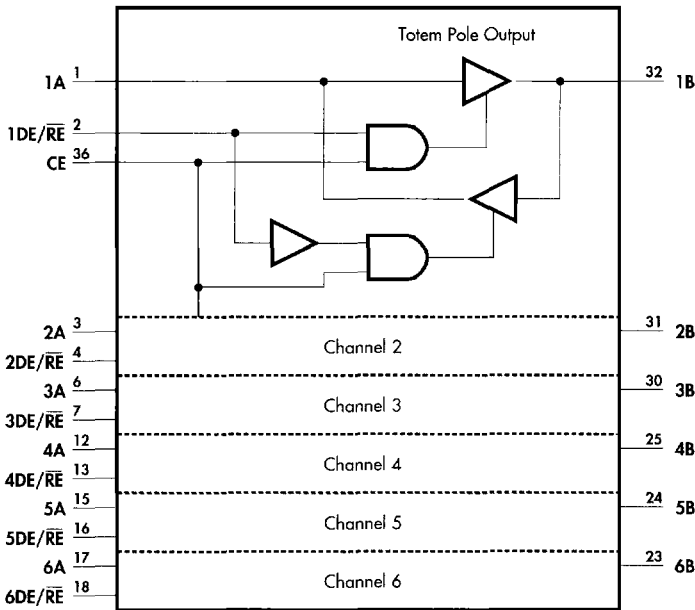
Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
 The θ_{JA} numbers are guidelines for the thermal performance of the device/pc-board system. All of the above assume no ambient airflow.

PACKAGE PIN OUTS



DB PACKAGE
(Top View)

FUNCTIONAL BLOCK DIAGRAM



40MHz SINGLE-ENDED 6-CHANNEL NON-INV. BUS TRANSCEIVER

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RECOMMENDED OPERATING CONDITIONS (Note 2)

Parameter	Symbol	Recommended Operating Conditions			Units
		Min.	Typ.	Max.	
Supply Voltage	V_{CC}	4.75	5	5.25	V
High-Level Input Voltage	V_{IH}	2.0			V
Low-Level Input Voltage	V_{IL}			0.8	V
High-Level Output Current	Driver	I_{OH}		-40	mA
	Receiver				
Low-Level Output Current	Driver	I_{OL}		48	mA
	Receiver				
Operating Virtual Junction Temperature Range: LX5269		T_A	0	125	°C

Note 2. Range over which the device is functional.

ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, these specifications apply over the operating ambient temperatures of $0^{\circ}\text{C} \leq T_A \leq 70^{\circ}\text{C}$. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

Parameter	Symbol	Test Conditions	LX5269			Units
			Min.	Typ.	Max.	
Driver Section (Totem-Pole)						
High-Level Output Voltage	V_{OH}	$I_{OH} = -20\text{mA}$ See Figure 1	2.0			V
Low-Level Output Voltage	V_{OL}	$I_{OL} = 48\text{mA}$ See Figure 1			0.5	V
High-Impedance State Output Current	I_{OZ}	$V_O = \text{GND}$			-1	μA
		$V_O = V_{CC}$			1	μA
Output Capacitance	C_{OUT}			15		pF
Receiver Section						
High-Level Output Voltage	V_{OH}	$I_{OH} = -8\text{mA}$ See Figure 2	2	3.5		V
Low-Level Output Voltage	V_{OL}	$I_{OL} = 8\text{mA}$ See Figure 2		0.2	0.8	V
Positive Going Input Threshold Voltage	V_{T+}			1.7	2	V
Negative Going Input Threshold Voltage	V_{T-}		0.8	1.1		V
Input Hysteresis	V_{HYS}			0.6		V
High-Level Input Current	I_{IH}	$V_{IH} = 2\text{V}$ See Figure 2		500		μA
Low-Level Input Current	I_{IL}	$V_{IL} = 0.5\text{V}$ See Figure 2		-500		μA
High-Impedance State Output Current	I_{OZ}	$V_O = \text{GND}$			-1	mA
		$V_O = V_{CC}$			10	μA
Driver Switching Section (Totem-Pole) See Figure 3						
Propagation Delay Time, High to Low	t_{PHL}			10	20	ns
Propagation Delay Time, Low to High	t_{PLH}			10	20	ns
Pulse Skew ($t_{PHL} - t_{PLH}$)	t_{SK}	See Note 3			9	ns
Rise Time	t_r	$C_L = 15\text{pF}$	4	6		ns
Fall Time	t_f	$C_L = 15\text{pF}$	4	6		ns

Note 3. This specification applies to any 5°C band within the operating temperature range.

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PRELIMINARY DATA SHEET

ELECTRICAL CHARACTERISTICS (Continued)

Parameter	Symbol	Test Conditions	LX5269			Units
			Min.	Typ.	Max.	
Receiver Switching Section (See Figure 4)						
Propagation Delay Time, High to Low Level Output	t_{PHL}	See Figure 4		10	16	ns
Propagation Delay Time, Low to High Level Output	t_{PLH}	See Figure 4		10	16	ns
Enable Time (3-state output) to High Level	t_{PZH}			20	30	ns
Enable Time (3-state output) to Low Level	t_{PZL}			20	30	ns
Disable Time (3-state output) from High Level	t_{PHZ}			20	30	ns
Disable Time (3-state output) from Low Level	t_{PLZ}			20	30	ns
Pulse Skew ($t_{PHL} - t_{PLH}$)	$t_{SK(LIM)}$	$V_{CC} = 5V$, See Note 3			9	ns
Rise Time	t_r			5		ns
Fall Time	t_f			5		ns
Rejected Noise Pulse Duration	t_w			5		ns
Supply Section						
Operating Mode	Driver Enabled	I_{DD}	No Load, All Inputs Open, $CE = V_{CC}$		2	mA
	Driver Disabled		No Load, All Inputs Open, $CE = V_{CC}$		1	mA
Standby Mode			No Load, All Inputs Open, $CE = 0V$		100	μA

PARAMETER MEASUREMENT INFORMATION

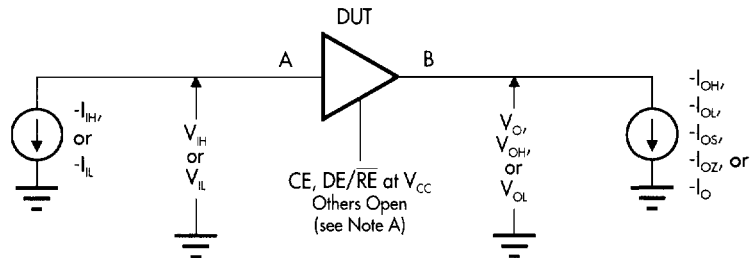


FIGURE 1. — DRIVER TEST CIRCUIT and INPUT CONDITIONS

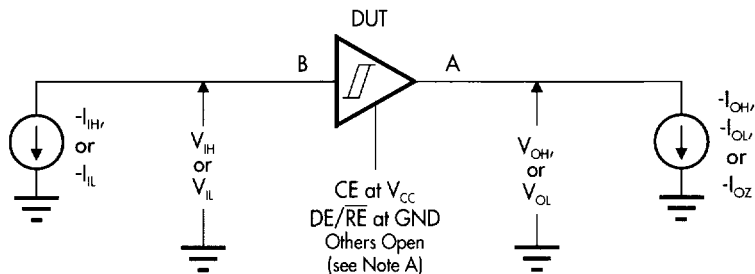


FIGURE 2. — RECEIVER TEST CIRCUIT and INPUT CONDITIONS

Note A. For the I_{OZ} test, the CE input is at GND and all other inputs are grounded.

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PRELIMINARY DATA SHEET

PARAMETER MEASUREMENT INFORMATION

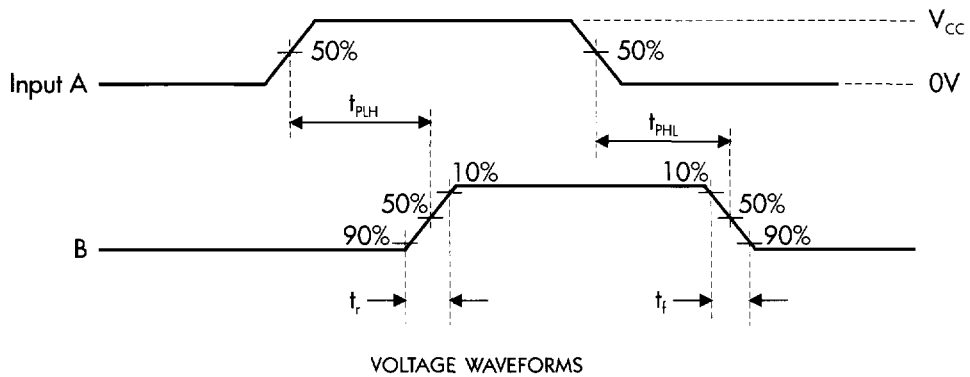
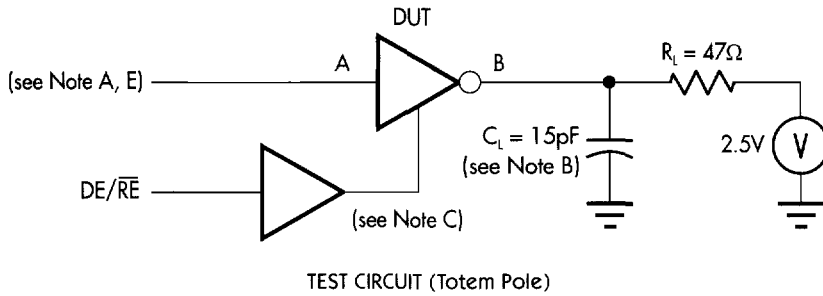


FIGURE 3. — DRIVER TEST CIRCUIT and VOLTAGE WAVEFORMS

- Note A. The input pulse is supplied by a generator having the following characteristics: PRR \leq 1MHz, 50% duty cycle, t_r & $t_f \leq$ 6 ns, and $Z_0 = 50\Omega$.
- B. C_t includes probe and jig capacitance.
- C. CE is at V_{cc} and DE is at V_{cc} .

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PRELIMINARY DATA SHEET

PARAMETER MEASUREMENT INFORMATION

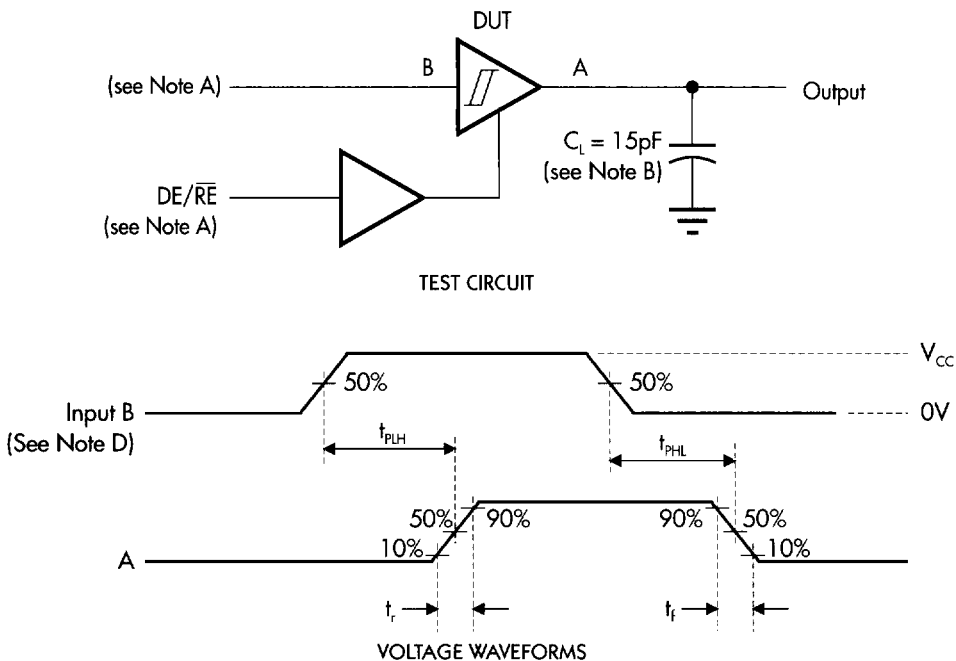


FIGURE 4. — RECEIVER TEST CIRCUIT and VOLTAGE WAVEFORMS

- Note A. The input pulse is supplied by a generator having the following characteristics: PRR \leq 1MHz, 50% duty cycle, t_r & $t_f \leq$ 6 ns, and $Z_o = 50\Omega$.
- B. C_L includes probe and jig capacitance.
- C. CE is at V_{CC} .
- D. DE/ \overline{RE} is at ground.

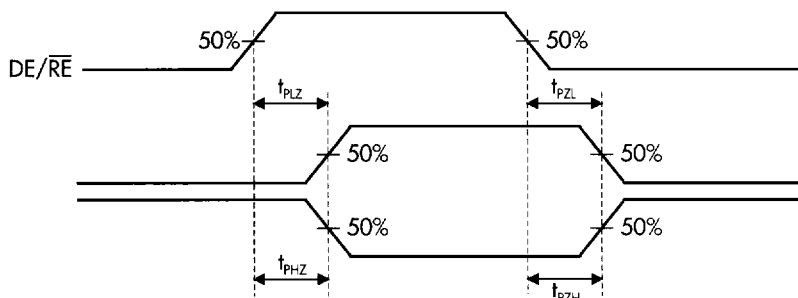


FIGURE 5. — RECEIVER ENABLE DELAY WAVEFORMS

40MHz SINGLE-ENDED 6-CHANNEL NON-INV. BUS TRANSDUCER

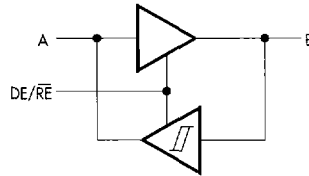
PRELIMINARY DATA SHEET

FUNCTIONAL DESCRIPTION

**Function Table
(Chip Enable) (CE)**

CE	Outputs
L	Hi Z
H	Enabled
Open	Hi Z

TOTEM POLE OUTPUT



Function Table* (Totem-Pole Mode)

DE/RE	Inputs		Outputs	
	A	B	A	B
L	X	L	L	Z
L	X	H	H	Z
H	L	X	Z	L
H	H	X	Z	H

* CE is high
 H = High Level
 L = Low Level
 X = Irrelevant
 Z = High Impedance