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MICROELECTRONICS

THE INFINITE POWER OF INNOVATION

UltraMAX™

LX5121

ULTRA 27-LINE, PLUG AND PLAY SCSI TERMINATOR

PRODUCTION DATA SHEET

DESCRIPTION

The LX5121 Plug and Play UltraMAX™ termi-nator represents next-generation technology for SCSI termination applications. The low-voltage BiCMOS architecture employed in its design offers superior performance to older passive and active techniques.

Linfinity's architecture employs high-speed adaptive elements for each channel, providing the fastest response possible. The channel bandwidth is typically 35MHz. The LX5121 compares favorably to older linear regulator approaches whose bandwidth's are domi-nated by the output compensation capacitor and are limited to the 500KHz bandwidth region (see further discussion in the Functional Description section). Linfinity's architecture also eliminates the output compensation capacitor typical in earlier terminator designs. Each is approved for use with SCSI-1,-2,-3, ULTRA and beyond — providing the highest performance alternative available today.

Another key improvement of LX5121 prod-ucts lies in their ability to ensure reliable, error-free communications even in systems which do not necessarily adhere to recommended SCSI hardware design guidelines, such as the use of improper cable lengths and imped-ances. Frequently, this situation is not con-trolled by the peripheral or host designer and, when problems occur, they are the first to be made aware of these problems. The LX5121 architecture is much more tolerant of marginal system integrations.

Recognizing the needs of portable and configurable peripherals, the LX5121 has a TTL compatible sleep/disable mode. Typi-cally, quiescent current is less than 150µA in this mode.

Reduced component count is also inherent in the LX5121 architecture. Traditional ter-mination techniques require large stabiliza-tion and transient protection capacitors of up to 20µF in value and size. The LX5121 architecture does not require these compo-nents, allowing all the cost savings associated with inventory, board space, assembly, reli-ability, and component costs.

The LX5121 has multiple disables for full Plug and Play SCSI capability for Host Bus Adapters with 3 SCSI connectors. It also splits the upper 9 termination lines for mixing 16-bit (wide) and 8-bit (narrow) buses with minimal board trace capacitance.
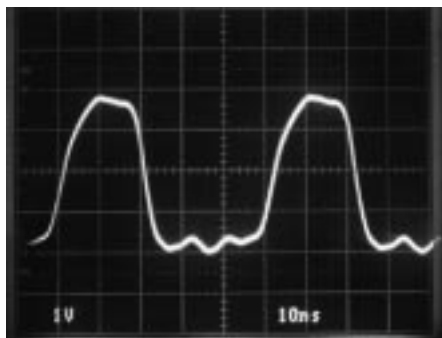
KEY FEATURES

- Ultra-Fast Response For Fast-20 SCSI Applications
- Plug And Play SCSI For Host Bus Adapters With 3 SCSI Connectors
- Split Disconnect For Mixing 16-Bit (Wide) Or 8-Bit (Narrow) Buses
- 35mhz Channel Bandwidth
- Sleep-Mode Current Less Than 150µA
- Hot-Swap Compatible
- NO External Compensation Capacitors
- Compatible With Active Negation Drivers
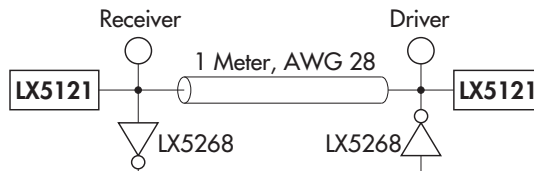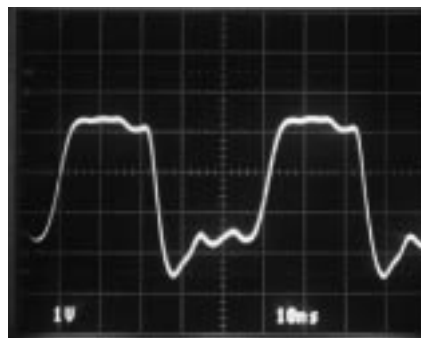- Superior Pin-for-Pin Replacement For The UCC5621

NOTE: For current data & package dimensions, visit our web site: **http://www.linfinity.com.**

PRODUCT HIGHLIGHT

RECEIVING WAVEFORM - 20MHz

DRIVING WAVEFORM - 20MHz

Receiver — 1 Meter, AWG 28 — Driver
LX5121 — LX5268 — LX5268 — LX5121

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

PACKAGE ORDER INFO

T_J (°C)		
	DB	Plastic SSOP 44-pin
0 to 125		**LX5121CDB**

Note: Available in Tape & Reel.
Append the letter "T" to part number. (i.e. LX5121CDBT)

ULTRA 27-LINE, PLUG AND PLAY SCSI TERMINATOR

P R O D U C T I O N   D A T A   S H E E T

ABSOLUTE MAXIMUM RATINGS (Note 1)

TermPwr Voltage 7V
Continuous Output Voltage Range .... 0 to 5.5V
Continuous Disable Voltage Range .... 0 to 5.5V
Operating Junction Temperature
    Plastic (DB Packages) .... 150°C
Storage Temperature Range .... -65°C to +150°C
Solder Temperature (Soldering, 10 seconds) .... 300°C

Note 1.   Exceeding these ratings could cause damage to the device.

THERMAL DATA

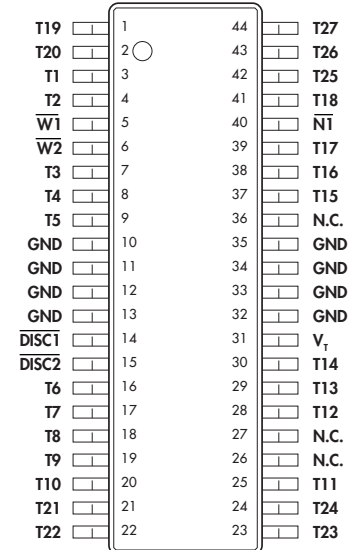**DB PACKAGE:**

THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	50°C/W

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

T19	1	44	T27
T20	2	43	T26
T1	3	42	T25
T2	4	41	T18
$\overline{W1}$	5	40	$\overline{N1}$
$\overline{W2}$	6	39	T17
T3	7	38	T16
T4	8	37	T15
T5	9	36	N.C.
GND	10	35	GND
GND	11	34	GND
GND	12	33	GND
GND	13	32	GND
$\overline{DISC1}$	14	31	V_T
$\overline{DISC2}$	15	30	T14
T6	16	29	T13
T7	17	28	T12
T8	18	27	N.C.
T9	19	26	N.C.
T10	20	25	T11
T21	21	24	T24
T22	22	23	T23

DB PACKAGE
(Top View)

RECOMMENDED OPERATING CONDITIONS (Note 2)

Parameter	Symbol	Recommended Operating Conditions			Units
		Min.	Typ.	Max.	
Termination Voltage	V_{TERM}	4.0		5.5	V
High Level Disable Input Voltage	V_{IH}	2		V_{TERM}	V
Low Level Disable Input Voltage	V_{IL}	0		0.8	V
Operating Virtual Junction Temperature Range					
LX5121C		0		125	°C

Note 2. Range over which the device is functional.

## ELECTRICAL CHARACTERISTICS

Term Power = 4.75V unless otherwise specified. Unless otherwise specified, these specifications apply at the recommended operating ambient temperature of T_A = 25°C. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.

Parameter	Symbol	Test Conditions	LX5121			Units
			Min.	Typ.	Max.	
Output High Voltage	V_{OUT}		2.65	2.85		V
TermPwr Supply Current	I_{CC}	All data lines = open		12	20	mA
		All data lines = 0.2V		635	670	mA
		Disable Pins 1 & 2 < 0.8V		50	150	µA
Output Current	I_{OUT}	V_{OUT} = 0.2V	-20	-22	-24	mA
Disable Input Current $\overline{DISC1}$	I_{IN}	$\overline{DISC1}$ = 0V			-10	µA
$\overline{DISC2}$		$\overline{DISC2}$ = 0V			-10	µA
Output Leakage Current		$\overline{DISC1}$ and $\overline{DISC2}$ = < 0.8V, V_O = 0.2V			1	µA
Channel Bandwidth	BW			35		MHz
Termination Sink Current, per Channel	I_{SINK}	V_{OUT} = 4V	7			mA

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M I C R O E L E C T R O N I C S

ULTRA 27-LINE, PLUG AND PLAY SCSI TERMINATOR

P R O D U C T I O N   D A T A   S H E E T

BLOCK DIAGRAM
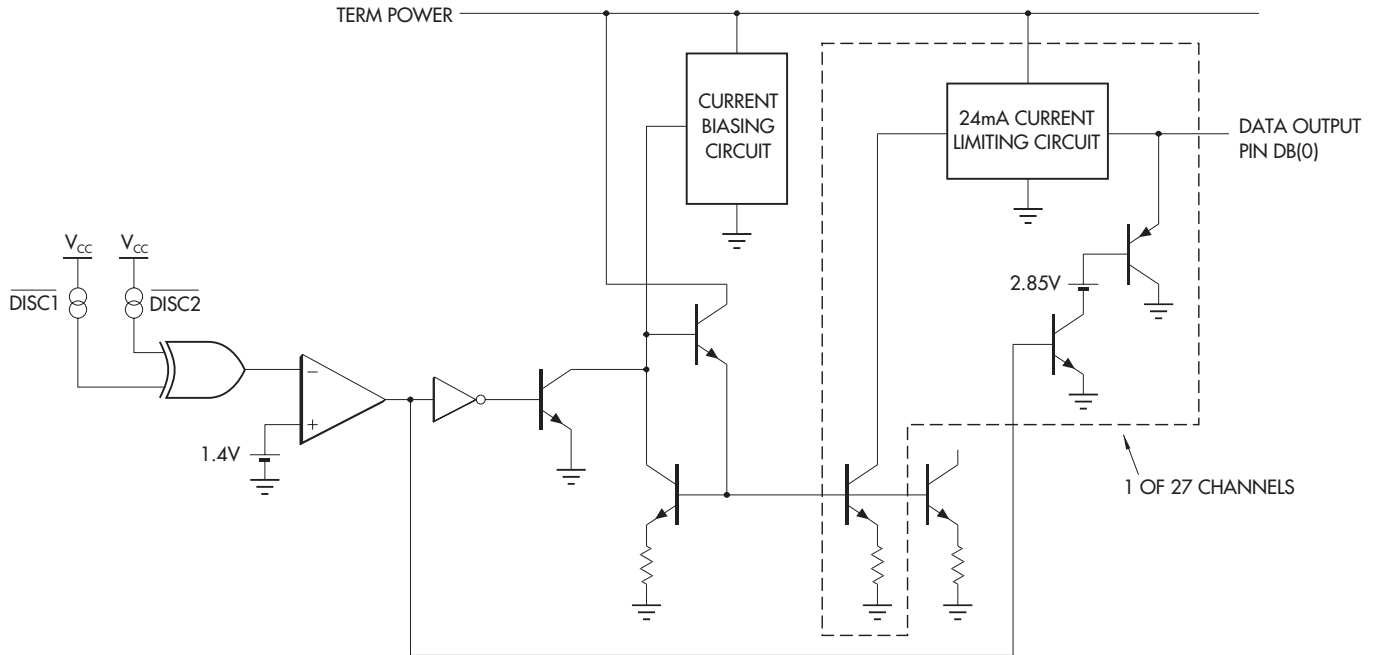
FUNCTIONAL DESCRIPTION

Cable transmission theory suggests that in order to optimize signal speed and quality, the termination should act both as an ideal voltage reference when the line is released (de-asserted) and as an ideal current source when the line is active (asserted). Common active terminators, which consist of Linear Regulators in series with resistors (typically 110Ω), are a compromise. As the line voltage increases, the amount of current decreases linearly by the equation $V = I * R$. The UltraMAX LX5121, with its unique new architecture, applies the maximum amount of current regardless of line voltage until the termination high threshold (2.85V) is reached.

Acting as a near ideal line terminator, the LX5121 closely reproduces the optimum case when the device is enabled. To enable the device the $\overline{DISC1}$ and $\overline{DISC2}$ pins must be driven per the above table. During this mode of operation, quiescent current is 12mA and the device will respond to line demands by delivering 24mA on assertion and by imposing 2.85V on de-assertion. Disable mode places the device in a sleep state, where a 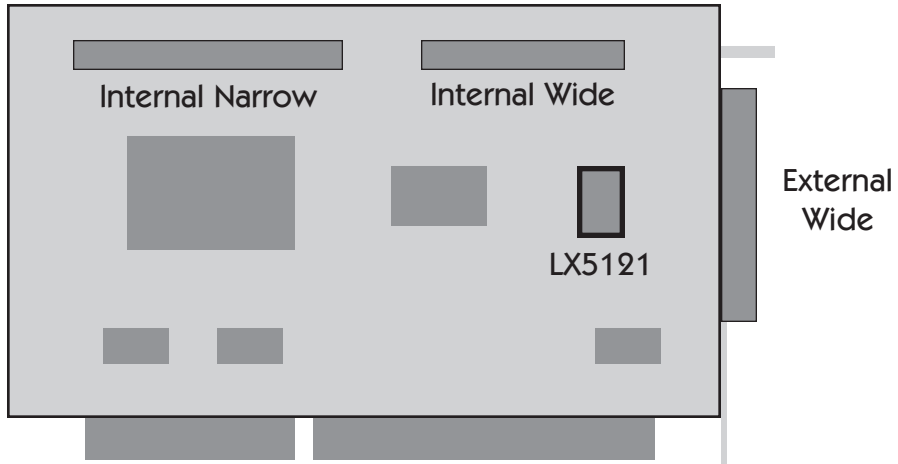meager 150µA of quiescent current is consumed. Additionally, all outputs are in a Hi-Z (impedance) state. Sleep mode can be used for power conservation or to completely eliminate the terminator from the SCSI chain.

An additional feature of the LX5121 is its compatibility with active negation drivers.

POWER UP / POWER DOWN FUNCTION TABLE

DISC1	DISC2	W1	W2	N1	T1-T18	T19-T27
H	L	DC	DC	DC	Enabled	Disabled
L	H	DC	DC	DC	Disabled	Enabled
L	L	DC	DC	DC	Disabled	Disabled
H	H	H	H	H	Enabled	Enabled
H	H	H	H	L	Enabled	Enabled
H	H	H	L	H	Enabled	Enabled
H	H	H	L	L	Disabled	Enabled
H	H	L	H	H	Enabled	Enabled
H	H	L	H	L	Disabled	Enabled
H	H	L	L	H	Disabled	Disabled
H	H	L	L	L	Disabled	Disabled

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PLUG AND PLAY SCSI DIAGRAM

For Plug and Play SCSI auto-termination diabling, connect pin 50 of the External Wide SCSI connector to $\overline{W1}$ of the LX5121, connect pin 50 of the Internal Wide SCSI connector to $\overline{W2}$ of the LX5121, and connect pin 22 of the Internal Narrow connector to $\overline{N1}$ of the LX5121.

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