LINFINITY MICROELECTRONICS

THE INFINITE POWER OF INNOVATION

UltraMAX™ LX5225

ULTRA 18-LINE, PLUG AND PLAY SCSI TERMINATOR

PRODUCTION DATA SHEET

DESCRIPTION

The LX5225 SCSI terminator is part of Linfinity's UltraMAX family of high-performance, adaptive, non-linear mode SCSI products, which are designed to deliver true UltraSCSI performance in SCSI applications. The low voltage BiCMOS architecture employed in its design offers superior performance to older linear passive and active techniques.

Linfinity's UltraMAX architecture employs high-speed adaptive elements for each channel, thereby providing the fastest response possible — typically 35MHz, which is 100 times faster than the older linear regulator/terminator approach used by other manufacturers. Products using this older linear regulator approach have bandwidths which are dominated by the output capacitor and which are limited to 500KHz (see further discussion in the Functional Description section). The UltraMAX architecture also eliminates the output compensation capacitor typical in earlier terminator designs. Each is approved for use with SCSI-1, -2, -3, UltraSCSI and beyond — providing the highest performance alternative available today.

The LX5225 architecture is much more tolerant of marginal system integrations. A key improvement offered by the LX5225 lies in its ability to ensure reliable, error-free communications even in systems which do not adhere to recommended SCSI hardware design guidelines, such as the use of improper cable lengths and impedances. Frequently, this situation is not controlled by the peripheral or host designer and, when problems occur, they are the first to be made aware of the problem.

To enter the disconnect mode, the disconnect pins must be driven low thereby disconnecting the LX5225 from the SCSI bus. The LX5225 has two disconnect pins for SCSI Plug and Play (PnP) applications. Quiescent current is less than 150µA in this mode.

Reduced component counts is also inherent in the LX5225 architecture. Traditional termination techniques require large stabilization and transient protection capacitors of up to 20µF in value and size. The LX5225 architecture does not require these components, allowing all the cost savings associated with inventory, board space, assembly, reliability, and component costs.

The LX5225 is a superior pin-for-pin replacement for the LX5205 and the UCC5607.

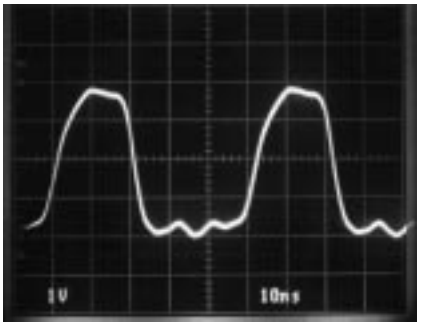
KEY FEATURES

- SCSI Plug And Play, Dual Low Disconnect, Logic Low Command Disconnects All Termination Lines
- Ultra-Fast Response For Fast-20 SCSI Applications
- 35MHz Channel Bandwidth
- Sleep-Mode Current Less Than 150µA
- NO External Compensation Capacitors
- Compatible With Active Negation Drivers
- Compatible With Passive And Active Terminations
- Approved For Use With SCSI 1, 2, 3 And Ultra SCSI
- Hot Swap Compatible
- Pin-For-Pin Compatible With LX5205 And UC5607

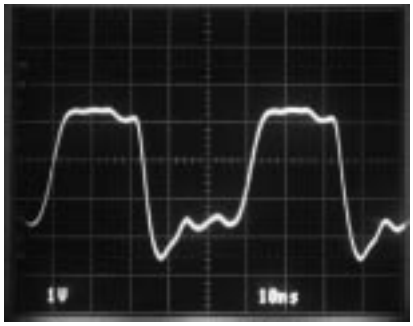
NOTE: For current data & package dimensions, visit our web site: **http://www.linfinity.com.**

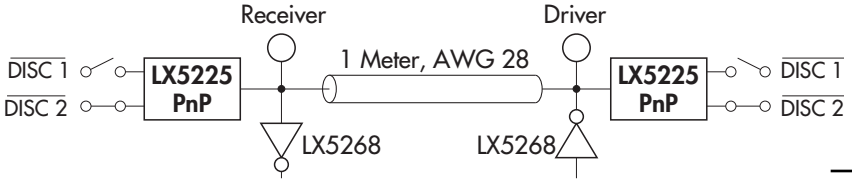
PRODUCT HIGHLIGHT

RECEIVING WAVEFORM - 20MHz



DRIVING WAVEFORM - 20MHz





PACKAGE ORDER INFO

T_A (°C)	DWP Plastic SOWB 28-pin, Power
0 to 70	LX5225CDWP

Note: All surface-mount packages are available in Tape & Reel. Append the letter "T" to part number. (i.e. LX5225CDWPT)

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

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ABSOLUTE MAXIMUM RATINGS (Note 1)

TermPwr Voltage ..... +7V
Signal Line Voltage ..... 0V to +7V
Operating Junction Temperature
Plastic (DWP Packages) ..... 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.

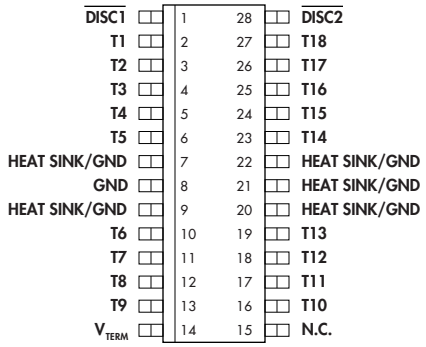
THERMAL DATA

DWP PACKAGE:

THERMAL RESISTANCE-JUNCTION TO LEADS, θ_{JL}	18°C/W
THERMAL RESISTANCE-JUNCTION TO AMBIENT, θ_{JA}	40°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



DWP PACKAGE
(Top View)

RECOMMENDED OPERATING CONDITIONS (Note 2)

Parameter	Symbol	Recommended Operating Conditions			Units
		Min.	Typ.	Max.	
Termpwr Voltage	V_{TERM}	4.0		5.5	V
Signal Line Voltage		0		5	V
Disconnect Input Voltage		0		V_{TERM}	V
Operating Virtual Junction Temperature Range					
LX5225C		0		125	°C

Note 2. Range over which the device is functional.

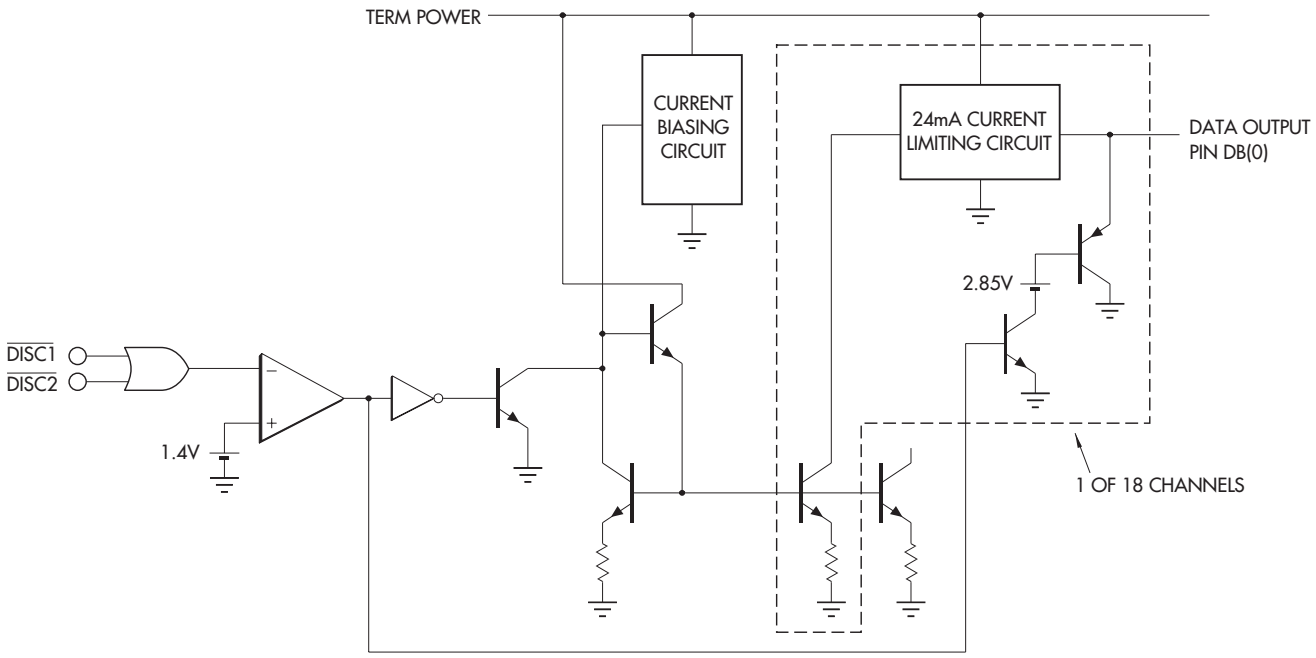
ELECTRICAL CHARACTERISTICS

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	LX5225			Units
			Min.	Typ.	Max.	
Output High Voltage	V_{OUT}		2.65	2.85		V
TermPwr Supply Current	I_{CC}	All data lines = open		10	15	mA
		All data lines = 0.2V		424	450	mA
		$\overline{DISC1}$ and $\overline{DISC2}$ Pins < 0.8V		50	150	µA
Output Current	I_{OUT}	V_{OUT} = 0.2V	-20	-22	-24	mA
Disconnect Input Current	I_{IN}	$\overline{DISC1}$ and $\overline{DISC2}$ Pins = 0V			-10	µA
Output Leakage Current	I_{OL}	$\overline{DISC1}$ and $\overline{DISC2}$ Pins = < 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

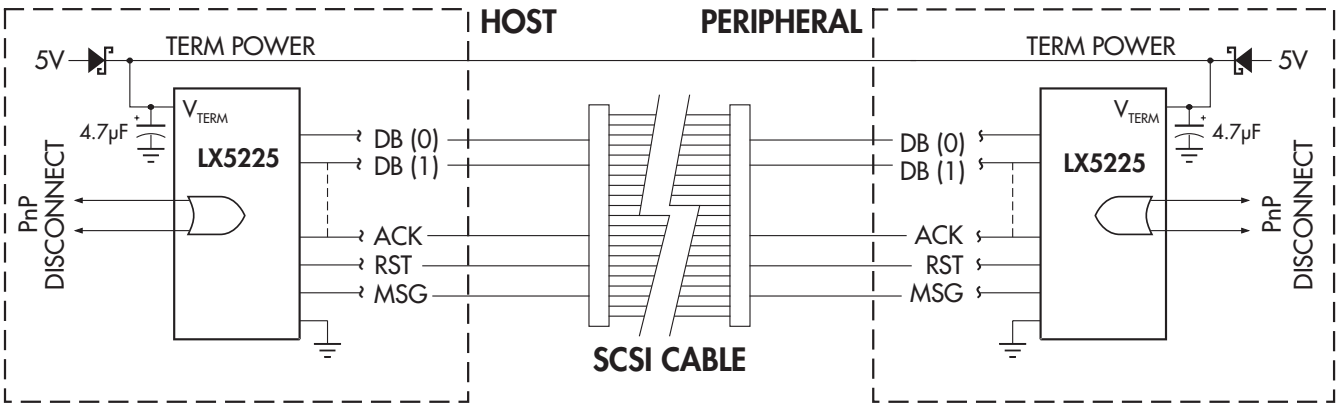
BLOCK DIAGRAM

FIGURE 1 — LX5225 BLOCK DIAGRAM



APPLICATION SCHEMATIC

FIGURE 2 — 8-BIT SCSI SYSTEM APPLICATION



FUNCTIONAL DESCRIPTION

Cable transmission theory suggests to optimize signal speed and quality, the termination should act both as an ideal voltage reference when the line is released (deasserted) 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 LX5225, 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 LX5225 closely reproduces the optimum case when the device is enabled. To enable the device a $\overline{\text{DISC1}}$ and $\overline{\text{DISC2}}$ pins must be pulled Logic High. During this mode of operation, quiescent current is 10mA and the device will respond to line demands by delivering 24mA on assertion and by imposing 2.85V on deassertion. In order to disable the device, the $\overline{\text{DISC1}}$ and $\overline{\text{DISC2}}$ pins must be driven logic **Low**. This mode of operation 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 LX5225 is its compatibility with active negation drivers.

POWER UP / POWER DOWN FUNCTION TABLE

$\overline{\text{DISC 1}}$	$\overline{\text{DISC 2}}$	Outputs	Quiescent Current
H	H	Disabled	15mA
H	L	Enabled	15mA
L	H	Enabled	15mA
L	L	Disabled	150µA
Open	Open	Disabled	150µA