27 - Line SCSI Terminator With Split Reverse Disconnect

FEATURES

- Complies with SCSI, SCSI-2, SCSI-3, SPI and FAST-20 (Ultra) Standards
- 2.5pF Channel Capacitance During Disconnect
- 100μA Supply Current in Disconnect Mode
- 4V To 7V Operation
- 110Ω Termination
- Completely Meets SCSI Hot Plugging
- –900mA Sourcing Current for Termination
- +500mA Sinking Current for Active Negation
- Logic Command Disconnects all Termination Lines
- Split Reverse Controls Lines 1 to 9 and 10 to 27 Separately
- Trimmed Impedance to 5%
- Current Limit and Thermal Shutdown Protection

DESCRIPTION

UCC5621 provides 27 lines of active termination for a SCSI (Small Computer Systems Interface) parallel bus. The SCSI standard recommends active termination at both ends of the cable.

The UCC5621 is ideal for high performance 5V SCSI systems. During disconnect the supply current is typically only 100μA, which makes the IC attractive for lower powered systems.

The UCC5621 features a split reverse disconnect allowing the user to control termination lines 10 to 27 with disconnect one, $\overline{\text{DISCNCT1}}$, and control terminiation lines 1 to 9 with disconnect two, $\overline{\text{DISCNCT2}}$.

The UCC5621 is designed with a low channel capacitance of 2.5pF, which eliminates effects on signal integrity from disconnected terminators at interim points on the bus.

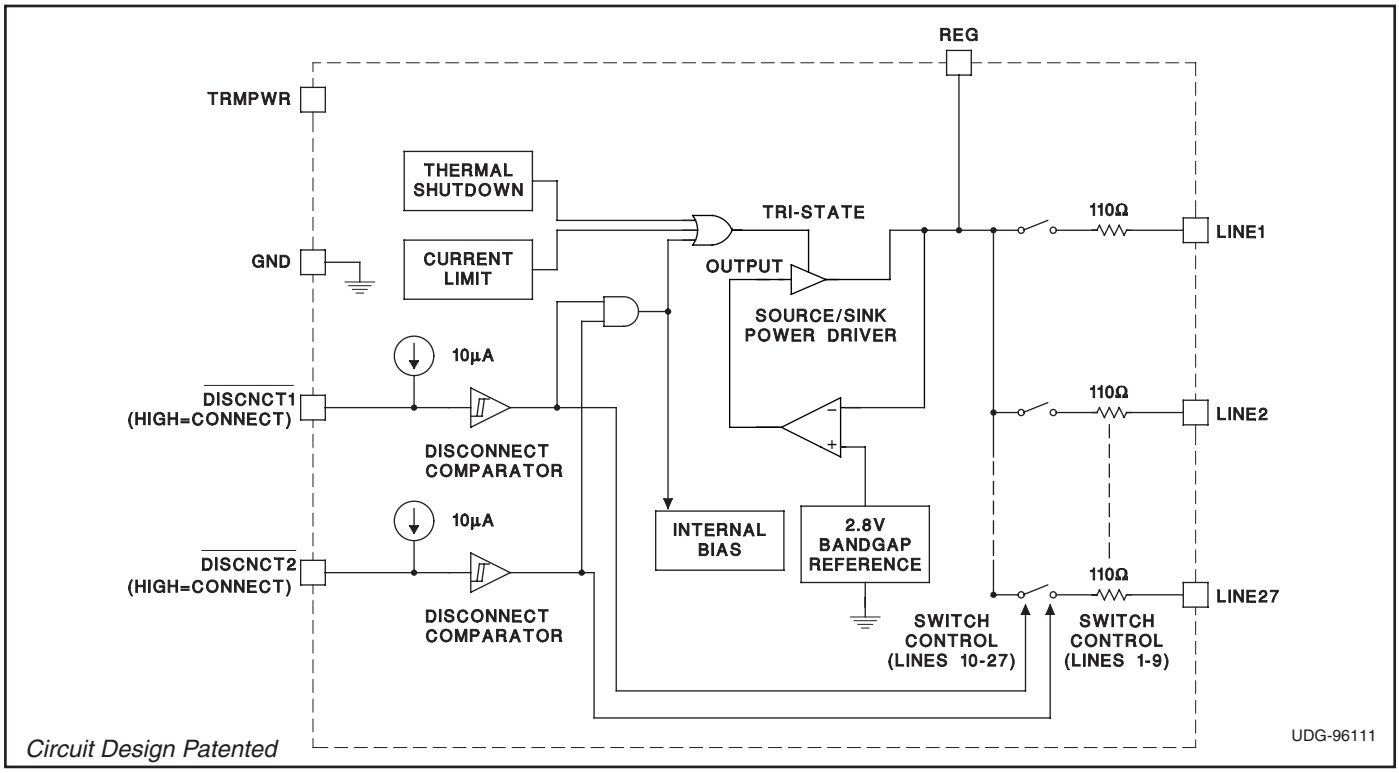
The power amplifier output stage allows the UCC5621 to source full termination current and sink active negation current when all termination lines are actively negated.

The UCC5621, as with all Unitrode terminators, is completely hot pluggable and appears as high impedance at the teminating channels with V_{TRMPWR} = 0V or open.

Internal circuit trimming is utilized, first to trim the 110Ω impedance, and then most importantly, to trim the output current as close to the maximum SCSI-3 specification as possible, which maximizes noise margin in FAST-20 SCSI operation.

(continued)

BLOCK DIAGRAM



DESCRIPTION (cont.)

Other features include thermal shutdown and current limit. This device is offered in low thermal resistance versions of the industry standard 44 pin wide body QSOP (MWP). Consult QSOP-44 Packaging Diagrams for exact dimensions.

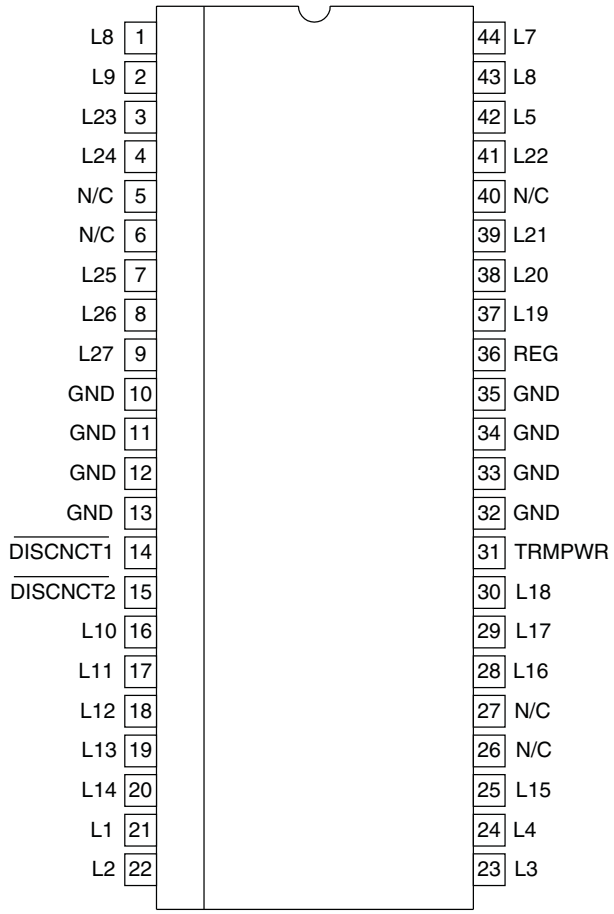
ABSOLUTE MAXIMUM RATINGS

TRMPWR Voltage . . . . . +7V
Signal Line Voltage . . . . . 0V to +7V
Regulator Output Current 1.5A
Storage Temperature . . . . . –65°C to +150°C
Junction Temperature . . . . . –55°C to +150°C
Lead Temperature (Soldering, 10 Sec.). . . . . +300°C

Currents are positive into, negative out of the specified terminal. Consult Packaging Section of Databook for thermal limitations and considerations of packages.

CONNECTION DIAGRAM

QSOP-44 (Top View)
MWP Package



ELECTRICAL CHARACTERISTICS Unless otherwise stated, these specifications apply for T_A = 0°C to 70°C, TRMPWR = 4.75V, $\overline{\text{DISCNCT1}}$ = $\overline{\text{DSCNCT2}}$ = 4.75V, $T_A = T_J$.

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current Section					
TRMPWR Supply Current	All Termination Lines = Open		1	2	mA
	All Termination Lines = 0.2V		630	650	mA
Power Down Mode	$\overline{\text{DISCNCT1}}$ = $\overline{\text{DSCNCT2}}$ = 0V		100	200	µA
Output Section (Termination Lines)					
Termination Impedance	(Note 3)	104.5	110	115.5	Ω
Output High Voltage	(Note 1)	2.6	2.8	3.0	V
Max Output Current	V_{LINE} = 0.2V, T_J = 25°C	–22.1	–23.3	–24	mA
	V_{LINE} = 0.2V	–20.7	–23.3	–24	mA
	V_{LINE} = 0.2V, TRMPWR = 4V, T_J = 25°C (Note 1)	–21	–23	–24	mA
	V_{LINE} = 0.2V, TRMPWR = 4V (Note 1)	–20	–23	–24	mA
	V_{LINE} = 0.5V			–22.4	mA
Output Leakage	$\overline{\text{DISCNCT1}}$ = $\overline{\text{DISCNCT2}}$ = 0V, TRMPWR = 0V to 5.25V		10	400	nA
Output Capacitance	$\overline{\text{DISCNCT1}}$ = $\overline{\text{DISCNCT2}}$ = 0V (Note 2)		2.5	4	pF

ELECTRICAL CHARACTERISTICS Unless otherwise stated, these specifications apply for T_A = 0°C to 70°C, TRMPWR = 4.75V, DISCNCT1 = DSCNCT2 = 4.75V, $T_A = T_J$.

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Regulator Section					
Regulator Output Voltage		2.6	2.8	3.0	V
Drop Out Voltage	All Termination Lines = 0.2V		0.4	0.8	V
Short Circuit Current	V_{REG} = 0V	–650	–900	–1300	mA
Sinking Current Capability	V_{REG} = 3.5V	300	500	900	mA
Thermal Shutdown			170		°C
Thermal Shutdown Hysteresis			10		°C
Disconnect Section					
Disconnect Threshold $\overline{\text{DISCNCT1}}$	Controls Lines 10 to 27	0.8	1.5	2.0	V
Input Current $\overline{\text{DISCNCT1}}$	$\overline{\text{DISCNCT1}}$ = 0V		–10	–30	µA
Disconnect Threshold $\overline{\text{DISCNCT2}}$	Controls Lines 1 to 9	0.8	1.5	2	V
Input Current $\overline{\text{DISCNCT2}}$	$\overline{\text{DISCNCT2}}$ = 0V		–10	–30	µA

Note 1: Measuring each termination line while other 26 are low (0.2V).
Note 2: Ensured by design. Not 100% tested in production.
Note 3: Tested by measuring I_{OUT} with V_{OUT} = 0.2V and V_{OUT} with no load, then calculate:

$$Z = \frac{V_{OUT}\ N.L. - 0.2V}{I_{OUT}\ at\ 0.2V}$$

PIN DESCRIPTIONS

$\overline{\text{DISCNCT1}}$: Disconnect one controls termination lines L10 – L27. Taking this pin low causes termination lines L10 – L27 to become high impedence, taking this pin high or leaving it open allows the channels to provide normal termination.

$\overline{\text{DISCNCT2}}$: Disconnect two controls termination lines L1 – L9. Taking this pin low causes termination lines L1 – L9 to become high impedence. Taking this pin high or leaving it open allows the channels to provide normal terminiation. Taking both disconnect pins low will put the chip in to sleep mode where it will be in low-power mode.

GND: Ground reference for the IC.

L1 - L27: 110Ω termination channels.

REG: Output of the internal 2.7V regulator.

TRMPWR: Power for the IC.

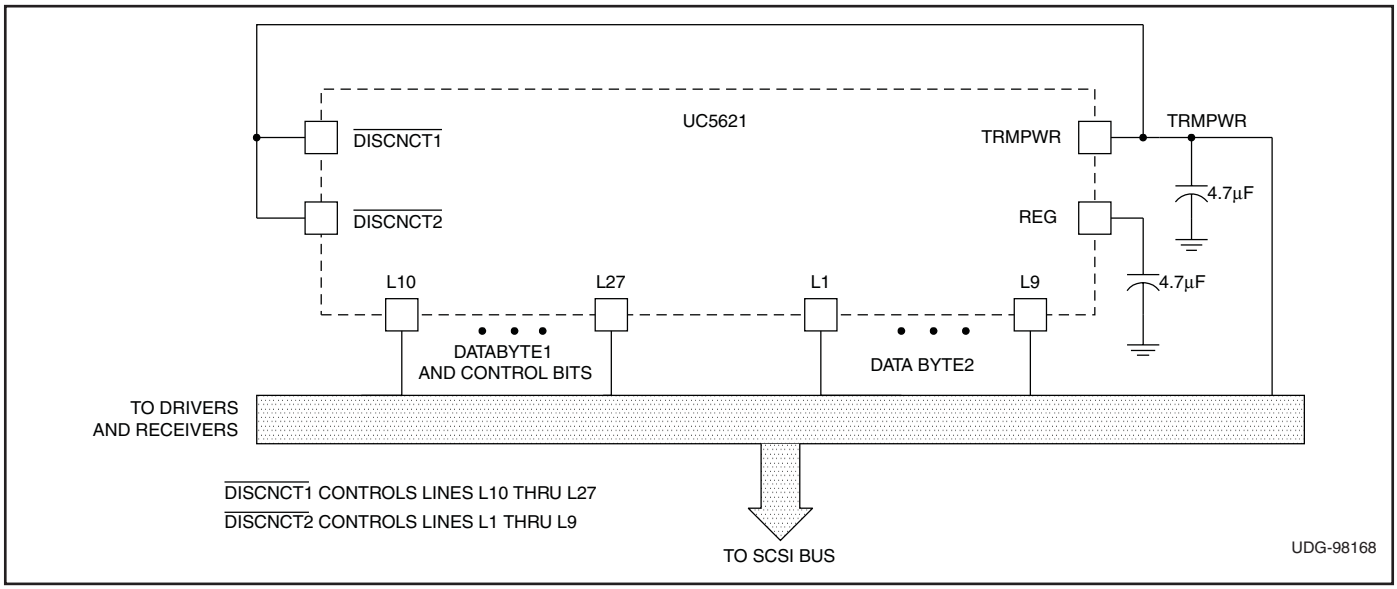


Figure 1. Typical Wide SCSI Bus Configuration Using the UCC5621

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
UCC5621MWP	ACTIVE	SSOP	DCE	44	20	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC5621MWPG4	ACTIVE	SSOP	DCE	44	20	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC5621MWPTR	ACTIVE	SSOP	DCE	44	1000	TBD	Call TI	Call TI
UCC5621MWPTRG4	ACTIVE	SSOP	DCE	44	1000	TBD	Call TI	Call TI

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.