![UNITRODE logo] **UNITRODE**

18-Line 3-5 Volt SCSI Active Terminator, Reverse Disconnect

FEATURES

- Complies with SCSI, SCSI-2, SCSI-3 and FAST-20 (Ultra) Standards

- 2.75V to 7V Operation

- 1.8pF Channel Capacitance during Disconnect

- 1µA Supply Current in Disconnect Mode

- 110 Ohm/2.5k Programmable Termination

- Completely Meets SCSI Hot Plugging

- −650mA Sourcing Current for Termination

- +400mA Sinking Current for Active Negation Drivers

- Trimmed Termination Current to 4%

- Trimmed Impedance to 7%

- Current Limit and Thermal Shutdown Protection

DESCRIPTION

The UCC5611 provides 18 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 segment.
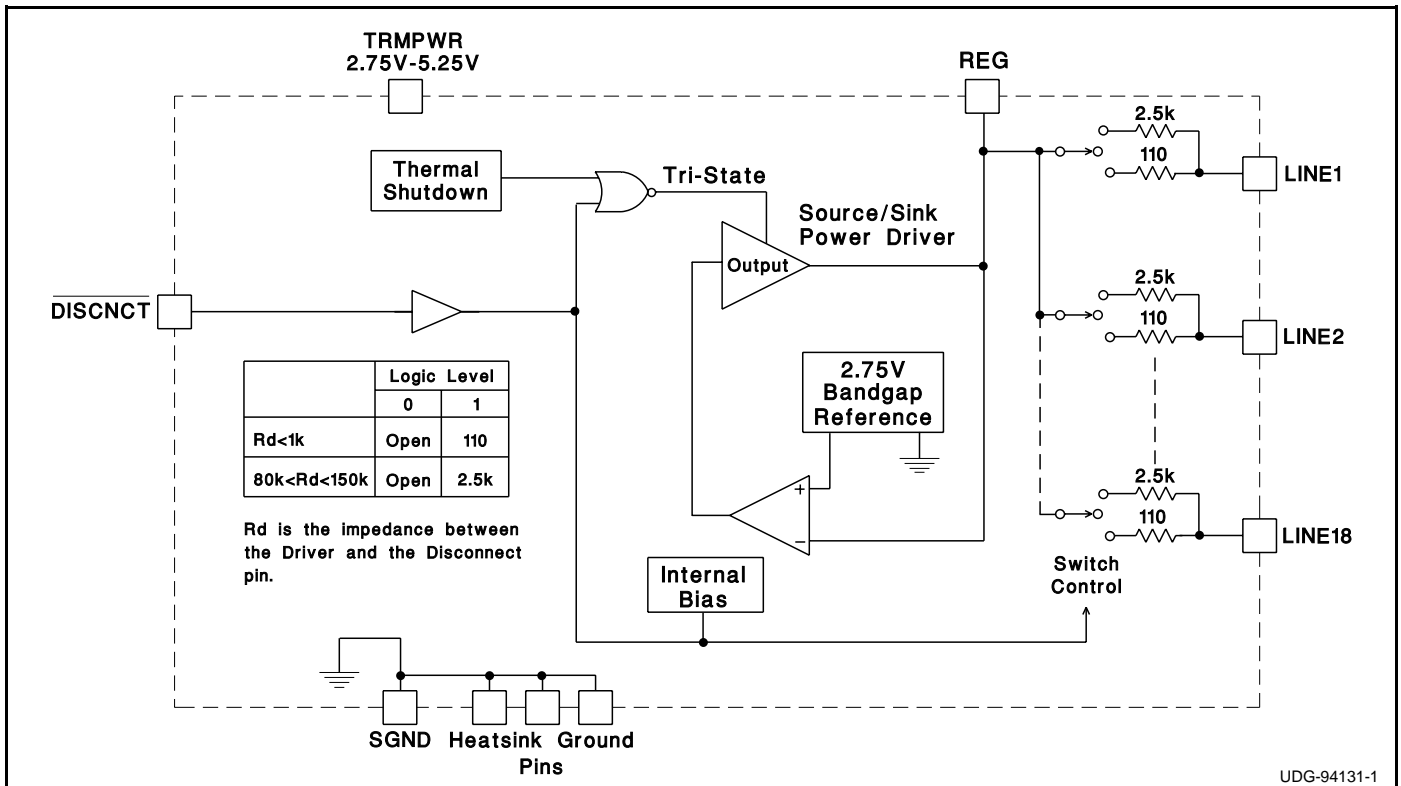
The UCC5611 is ideal for high performance 3.3V SCSI systems. The key features contributing to such low operating voltage are the 0.1V drop out regulator and the 2.75V reference. The reduced reference voltage was necessary to accommodate the lower termination current dictated in the SCSI-3 specification. During disconnect the supply current is typically only 1µA, which makes the IC attractive for battery powered systems.

The UCC5611 is designed with an ultra low channel capacitance of 1.8pF, which eliminates effects on signal integrity from disconnected terminators at interim points on the bus.

The UCC5611 can be programmed for either a 110 ohm or 2.5k ohm termination. The 110 ohm termination is used for standard SCSI bus lengths and the 2.5k ohm termination is typically used in short bus applications. When driving the TTL compatible $\overline{\text{DISCNCT}}$ pin directly, the 110 ohm termination is connected when the $\overline{\text{DISCNCT}}$ pin is driven high, and disconnected when low. When the $\overline{\text{DISCNCT}}$ pin is driven through an impedance between 80k and 150k, the 2.5k ohm termination is connected when the $\overline{\text{DISCNCT}}$ pin is driven high, and disconnected when driven low.

continued

BLOCK DIAGRAM

	Logic Level	
	0	1
Rd<1k	Open	110
80k<Rd<150k	Open	2.5k

Rd is the impedance between the Driver and the Disconnect pin.

UDG-94131-1

Circuit Design Patented

Description Continued

The power amplifier output stage allows the UCC5611 to source full termination current and sink active negation current when all termination lines are actively negated.

The UCC5611 is pin for pin compatible with Unitrode's other 18 line SCSI terminators, except that DISCNCT is now active low, allowing lower capacitance and lower voltage upgrades to existing systems. The UCC5611, as with all Unitrode terminators, is completely hot pluggable and appears as high impedance at the terminating channels with $V_{TRMPWR} = 0V$ or open.

Internal circuit trimming is utilized, first to trim the 110

ohm termination impedance to a 7% tolerance, and then most importantly, to trim the output current to a 4% tolerance, as close to the max SCSI-3 spec as possible, which maximizes noise margin in FAST-20 SCSI operation.

Other features include thermal shutdown and current limit.

This device is offered in low thermal resistance versions of the industry standard 28 pin wide body SOIC, 24 pin wide body DIP and 28 pin PLCC.

ABSOLUTE MAXIMUM RATINGS

Termpwr Voltage . . . . +7V
Signal Line Voltage. . . . . 0V to +7V
Regulator Output Current . . . . Self-regulating
Storage Temperature . . . . –65°C to +150°C
Operating Temperature . . . . –55°C to +150°C
Lead Temperature (Soldering, 10 Sec.) . . . . +300°C
Unless otherwise specified all voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.
Consult Packaging Section of Unitrode Integrated Circuits databook for thermal limitations and considerations of packages.
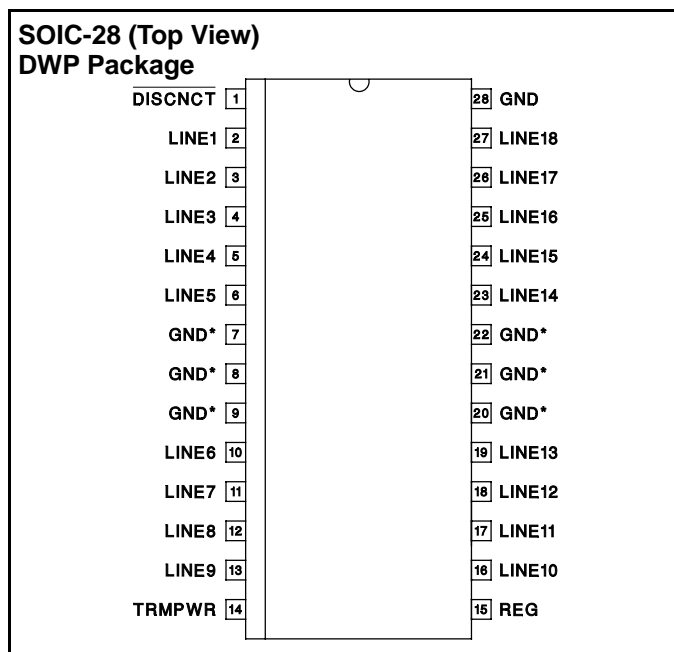
RECOMMENDED OPERATING CONDITIONS

Termpwr Voltage . . . . 2.75V to 5.25V
Signal Line Voltage. . . . . 0V to +5V
Disconnect Input Voltage . . . . 0V to Termpwr

CONNECTION DIAGRAMS

PLCC-28 (Top View)
QP Package
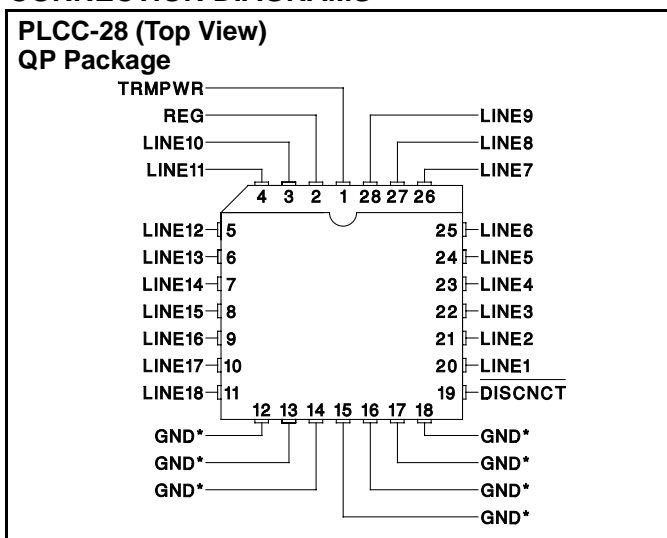
* QP package pins 12 - 18 serve as both heatsink and signal ground.

SOIC-28 (Top View)
DWP Package

* DWP package pin 28 serves as signal ground; pins 7, 8, 9, 20, 21, 22 serve as heatsink/ground.

DIL-24 (Top View)
N or J Package
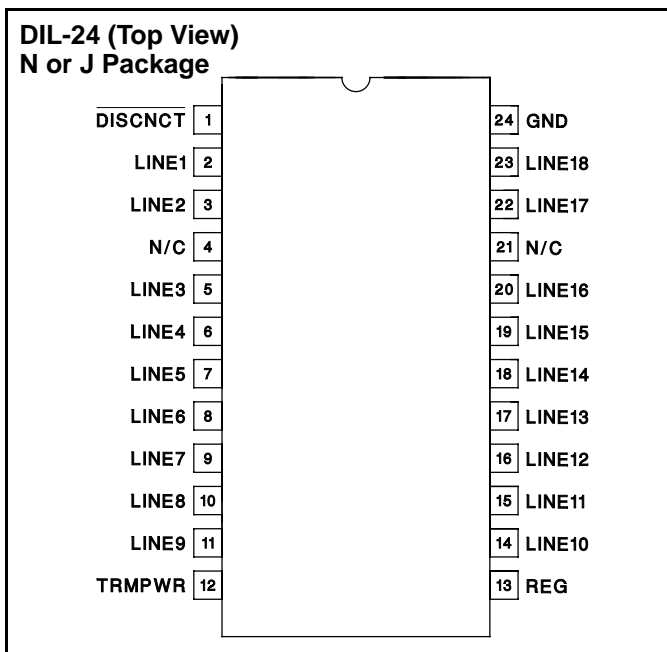
Note: Drawings are not to scale.

2

ELECTRICAL CHARACTERISTICS Unless otherwise stated, these specifications apply for T_A = 0°C to 70°C.
TRMPWR = 3.3V, $\overline{DISCNCT}$ = 3.3V, RDISCNCT = 0 ohms. T_A = T_J.

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current Section					
Termpwr Supply Current	All termination lines = Open		1	2	mA
	All termination lines = 0.2V		415	435	mA
Power Down Mode	$\overline{DISCNCT}$ = 0V		0.5	5	µA
Output Section (110 ohms - Terminator Lines)					
Terminator Impedance	(Note 4)	102.3	110	117.7	Ohms
Output High Voltage	TRMPWR = 3V (Note 1)	2.5	2.7	3.0	V
Max Output Current	V_{LINE} = 0.2V, T_J = 25°C	−22.1	−23	−24	mA
	V_{LINE} = 0.2V	−21	−23	−24	mA
	V_{LINE} = 0.2V, TRMPWR = 3V, T_J = 25°C (Note 1)	−20.2	−23	−24	mA
	V_{LINE} = 0.2V, TRMPWR = 3V (Note 1)	−19	−23	−24	mA
	V_{LINE} = 0.5V			−22.4	mA
Output Leakage	$\overline{DISCNCT}$ = 0V, TRMPWR = 0V to 5.25V		10	400	nA
Output Capacitance	$\overline{DISCNCT}$ = 0V, DWP Package (Note 2, 3)		1.8	2.5	pF
Output Section (2.5k ohms - Terminator Lines) (RDISCNCT = 80k ohms)					
Terminator Impedance		2	2.5	3	kΩ
Output High Voltage	TRMPWR = 3V (Note 1)	2.5	2.7	3.0	V
Max Output Current	V_{LINE} = 0.2V	−0.7	−1	−1.4	mA
	V_{LINE} = 0.2V, TRMPWR = 3V (Note 1)	−0.6	−1	−1.5	mA
Output Leakage	$\overline{DISCNCT}$ = 0V, TRMPWR = 0 to 5.25V		10	400	nA
Output Capacitance	$\overline{DISCNCT}$ = 0V, DWP Package (Note 2, 3)		1.8	2.5	pF
Regulator Section					
Regulator Output Voltage	5.25V > TRMPWR > 3V	2.5	2.7	3.0	V
Drop Out Voltage	All Termination Lines = 0.2V		0.1	0.2	V
Short Circuit Current	V_{REG} = 0V	−450	−650	−800	mA
Sinking Current Capability	V_{REG} = 3V	200	400	800	mA
Thermal Shutdown	(Note 2)		170		°C
Thermal Shutdown Hysteresis	(Note 2)		10		°C
Disconnect Section					
Disconnect Threshold	RDISCNCT = 0 & 80k	0.8	1.5	2.0	V
Input Current	$\overline{DISCNCT}$ = 3.3V		30	50	µA

Note 1: Measuring each termination line while other 17 are low (0.2V).
Note 2: Guaranteed by design. Not 100% tested in production.
Note 3: Output Capacitance is measured at 0.5V.
Note 4: Tested by measuring I_{OUT} with V_{OUT} = 0.2V and V_{OUT} = V_{REG} - 0.1V then calculating the impedance.
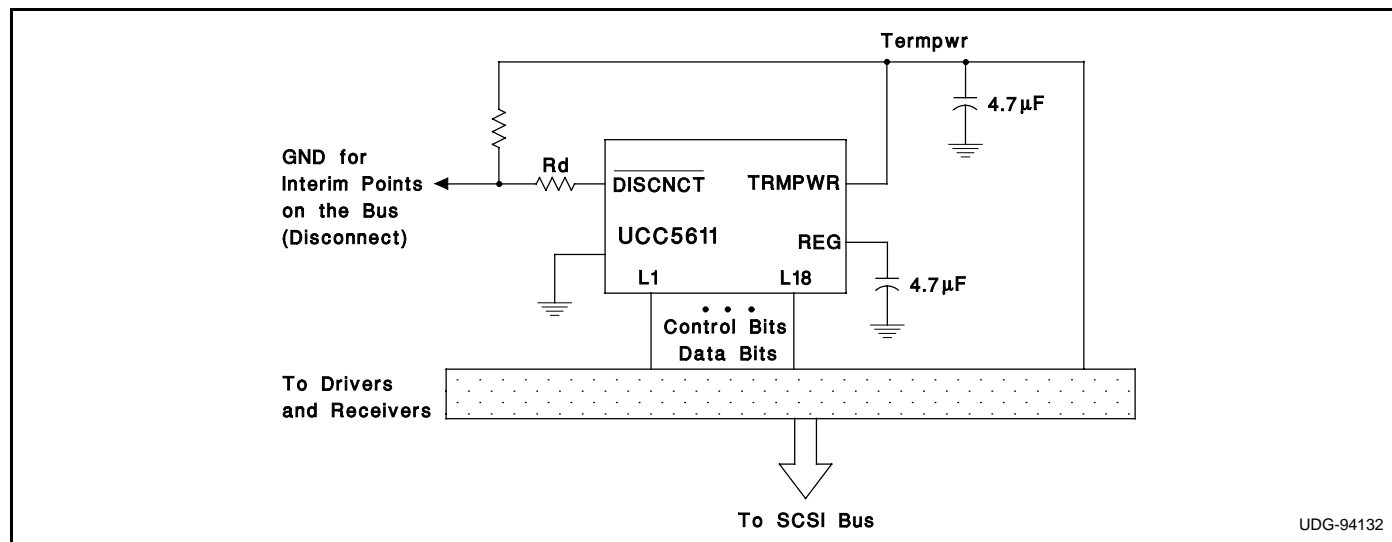
APPLICATION INFORMATION

Figure 1: Typical SCSI Bus Configurations Utilizing A UCC5611 Device

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UCC5611, LOWEST CAPACITANCE 18-LINE 3-5V SE TERMINATOR FOR SCSI THROUGH ULTRA SCSI WITH REVERSE DISCONNECT

Device Status: Active

> Description
> Features
> Datasheets
> Pricing/Samples/Availability
> Application Notes
> Applications

Parameter Name	UCC5611
Number of Lines	18
Driver Types Supported	SE
TERMPWR Voltage (max) (V)	5.25
TERMPWR Voltage (min) (V)	2.7
Disconnect Active State	Low
Integrated SPI-3 Mode Switching Filter/Delay	No
Process	Bi-CMOS
Active Negation Support	Yes
Channel Capacitance (pF)	3
Resistor Tolerance (ppm)	500
Typical Sink Current (mA)	400
Current Tolerance (%)	4
Single-Ended Termination Impedance (ohms)	110, 2500
Single-Ended Tolerance (%)	7
Integrated TERMPWR Regulation	No

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Unitrode Products from Texas Instruments

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To view the following documents, Acrobat Reader 3.x is required.
To download a document to your hard drive, right-click on the link and choose 'Save'.

Datasheets

Full datasheet in Acrobat PDF: slus348.pdf (254 KB)

Pricing/Samples/Availability

Orderable Device	Package	Pins	Temp (ºC)	Status	Price/unit USD (100-999)	Pack Qty	Availability / Samples
UCC5611DWP	DW	28	0 TO 70	ACTIVE	4.28	1	Check stock or order
UCC5611DWPTR	DW	28	0 TO 70	ACTIVE	3.80	1	Check stock or order

Application Reports

- COMPARING BUS SOLUTIONS (SLLA067 - Updated: 03/06/2000)
- ELECTROSTATIC DISCHARGE APPLICATION NOTE (SSYA008 - Updated: 05/05/1999)
- JITTER ANALYSIS (SLLA075 - Updated: 03/31/2000)
- THERMAL CHARACTERISTICS OF LINEAR AND LOGIC PACKAGES USING JEDEC PCB DESIGNS (SZZA017A - Updated: 09/10/1999)

Table Data Updated on: 8/15/2000

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