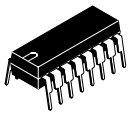


SLUS349A – DECEMBER 1994 – REVISED APRIL 2003

9-LINE 3 TO 5 VOLT LOW CAPACITANCE SCSI ACTIVE TERMINATOR

FEATURES

- **Complies with SCSI, SCSI–2 and SPI–2 Single Ended Standards**
- **2.7-V to 5.25-V Operation**
- **1.8-pF Channel Capacitance during Disconnect**
- **0.5-μA Supply Current in Disconnect Mode**
- **110-Ω/2.5-kΩ Programmable Termination**
- **Completely Meets SCSI Hot Plugging**
- **–400-mA Sourcing Current for Termination**
- **+400-mA Sinking Current for Active Negation Drivers**
- **Trimmed Termination Current to 4%**
- **Trimmed Impedance to 7%**
- **Current Limit and Thermal Shutdown Protection**

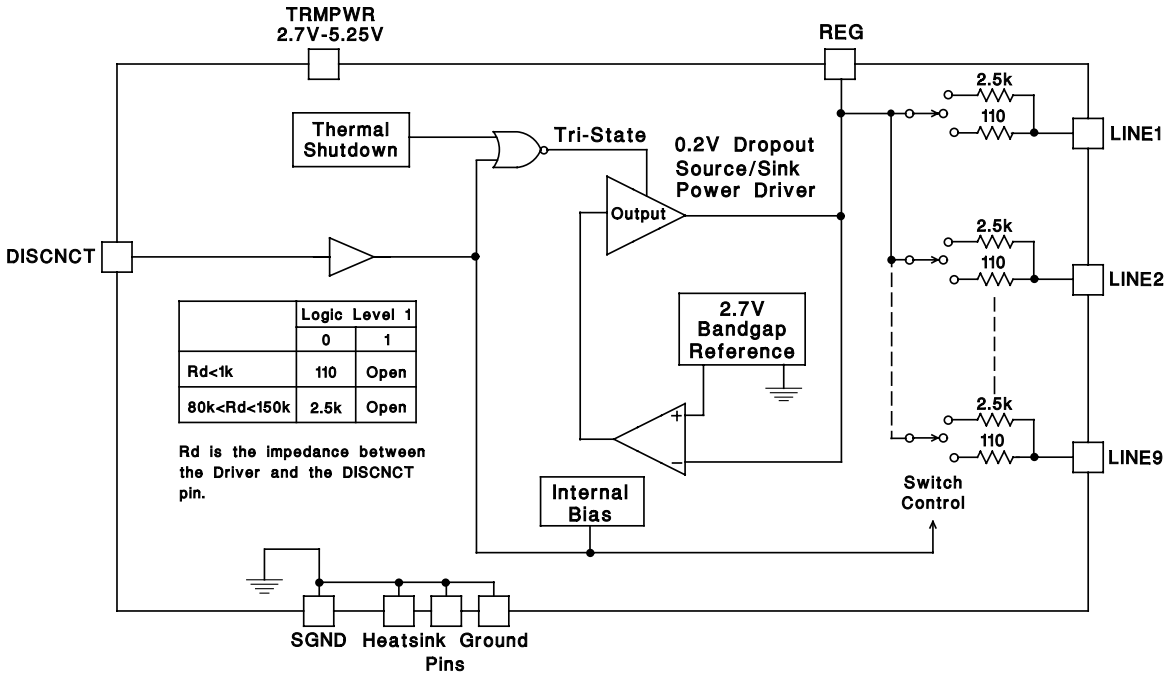
DESCRIPTION

The UCC5614 provides 9 lines of active termination for a small computer system's interface (SCSI) parallel bus. The SCSI standard recommends active termination at both ends of the cable segment.

The UCC5614 is ideal for high performance 3.3-V SCSI systems. The key features contributing to such low operating voltage are the 0.1-V drop-out regulator and the 2.7-V reference. During disconnect the supply current is typically only 0.5 μA, which makes the device attractive for battery powered systems.

The UCC5614 is designed with an ultra low channel capacitance of 1.8 pF, which eliminates effects on signal integrity from disconnected terminators at interim points on the bus.

BLOCK DIAGRAM



DESCRIPTION (CONTINUED)

The UCC5614 can be programmed for either a 110-Ω or 2.5-kΩ termination. The 110-Ω termination is used for standard SCSI bus lengths and the 2.5-kΩ termination is typically used in short bus applications. When driving the TTL compatible DISCNCT pin directly, the 110-Ω termination is connected when the DISCNCT pin is driven low, and disconnected when driven high. When the DISCNCT pin is driven through an impedance between 80 kΩ and 150 kΩ, the terminator is in short bus mode. The 2.5-kΩ termination is connected when the DISCNCT pin is driven low and disconnected when driven high.

The power amplifier output stage allows the UCC5614 to source full termination current and sink active negation current when all termination lines are actively negated.

The UCC5614 is pin for pin compatible with Unitrode's other 9-line SCSI terminators, allowing lower capacitance and lower voltage upgrades to existing systems. The UCC5614, as with all Unitrode terminators, is completely hot pluggable and appears as high impedance at the terminating channels with VTRMPWR = 0 V or open.

Internal circuit trimming is utilized, first to trim the 110-Ω 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 specification as possible, which maximizes noise margin in fast SCSI operation.

Other features include thermal shutdown and current limit.

This device is offered in low thermal resistance versions of the industry standard 16-pin narrow body SOIC, 16-pin N and 24-pin TSSOP.

ORDERING INFORMATION

T_A	PACKAGED DEVICE		
	SOIC-16 (DP)†	**DIL-16 (N)**	**TSSOP-24 (PWP)‡**
0°C to 70°C	UCC5614DP	UCC5614N	UCC5614PWP

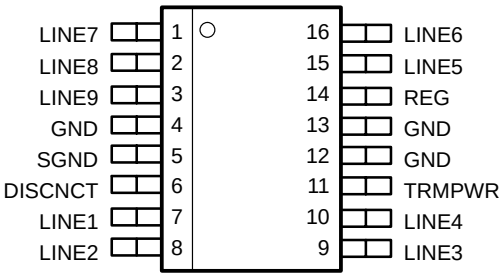
†

† The DP package is available taped and reeled in quanities of 2,500. Add TR suffix to device type (e.g. UCC5614DPTR) to order quantities of 2,500 devices per reel.

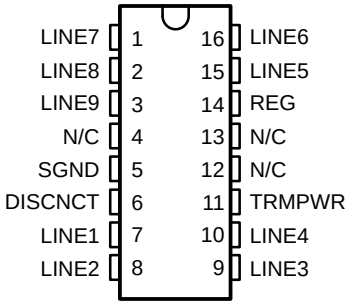
‡ The PWP package is available taped and reeled in quanities of 2,000. Add TR suffix to device type (e.g. UCC5614PWPTR) to order quantities of 2,000 devices per reel.

CONNECTION DIAGRAMS

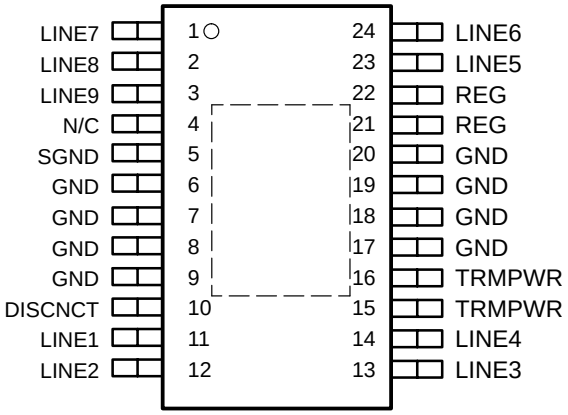
SOIC–16 (Top View)
DP Package (1) (2)



DIL–16 (Top View)
N Package (1)



TSSOP–24 (Top View)
PWP Package (1) (3)



NOTES: (1). Drawings are not to scale.
(2). DP package pin 5 serves as ground and pins 4,12 and 13 serve as heatsink ground.
(3). PWP package pin 5 serves as ground and pins 6,7,8,9,17,18,19 and 20 serve as heatsink ground.

ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range unless otherwise noted†‡

	UCC5629	UNIT
TRMPWR voltage	6	V
Input voltage	0 to 7	
Regulator output current	2	W
Storage temperature, T_{stg}	–65 to 150	°C
Operating junction temperature, T_J	–55 to 150	
Lead temperature (soldering, 10 sec.)	300	

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability. All voltages are with respect to GND. Currents are positive into and negative out of, the specified terminal.

‡ Currents are positive into, negative out of the specified terminal. Consult Packaging Section of Databook for thermal limitations and considerations of packages. All voltages are referenced to GND.

RECOMMENDED OPERATING CONDITIONS

	MIN	NOM	MAX	UNIT
TRMPWR voltage	2.7		5.25	V
Temperature ranges	0		70	°C
Signal line voltage	0		5	V
DISCNCT input voltage	0		TRMPWR	

ELECTRICAL CHARACTERISTICS

T_A = 0°C to 70°C, TRMPWR = 3.3 V, DISCNCT = 0 V, $R_{DISCNCT}$ = 0 Ω, T_A = T_J, (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current Section					
Termpwr supply current	All termination lines = Open		1	2	mA
	All termination lines = 0.2 V		210	218	
Power down mode	DISCNCT = Trmpwr		0.5	5	µA
Output Section (110 Ω – Terminator Lines)					
Terminator impedance		102.3	110	117.7	Ohms
Output high voltage	(Note 1)	2.5	2.7	3.0	V
Max output current	VLINE = 0.2 V TJ = 25°C	–22.1	–23	–24	mA
	VLINE = 0.2 V	–21	–23	–24	
	VLINE = 0.2 , TRMPWR = 3 V, TJ = 25°C (Note 1)	–20.2	–23	–24	
	VLINE = 0.2 V, TRMPWR = 3 V (Note 1)	–19	–23	–24	
	VLINE = 0.5 V			–22.4	
Output leakage	DISCNCT = 2.4 V, TRMPWR = 0 V to 5.25 V		10	400	nA
Output capacitance	DISCNCT = 2.4 V (Note 2) (DP Package)		1.8	2.5	pF
Output Section (2.5 kΩ – Terminator Lines) (RDISCNCT = 80 kΩ)					
Terminator impedance		2	2.5	3	kΩ
Output high voltage	TRMPWR = 3 V (Note 1)	2.5	2.7	3.0	V
Max output current	VLINE = 0.2 V	–0.7	–1	–1.4	mA
	VLINE = 0.2 V, TRMPWR = 3 V (Note 1)	–0.6	–1	–1.5	
Output leakage	DISCNCT = 2.4 V, TRMPWR = 0 to 5.25 V		10	400	nA
Output capacitance	DISCNCT = 2.4 V (Note 2) (DP Package)		1.8	2.5	pF
Regulator Section					
Regulator output voltage	5.25 V > TRMPWR > 3 V	2.5	2.7	3.0	V
Drop out voltage	All Termination Lines = 0.2 V		0.1	0.2	
Short circuit current	VREG = 0 V	–200	–400	–800	mA
Sinking current capability	VREG = 3 V	200	400	800	
Thermal shutdown	(Note 2)		170		°C
Thermal shutdown hysteresis	(Note 2)		10		
Disconnect Section					
Disconnect threshold	RDISCNCT = 0 & 80 kΩ	0.8	1.5	2.0	V
Input current	DISCNCT = 0 V		30	50	mA

NOTES: 1. Measuring each termination line while other eight are low (0.2 V).
2. Ensured by design. Not production tested.

Terminal Functions

TERMINAL NAME	TERMINAL NO.	I/O	DESCRIPTION
DISCNCT	7	I	Taking this pin high causes the 9 channels to become high impedance and the chip to go into low power mode. In short laptop buses an 80-kΩ to 150-kΩ resister to ground terminates the bus at 2.5 kΩ. Less than 110 Ω to ground enables the terminator.
GND	9		Ground reference for the device
LINE1 TO LINE9	4	I	110-Ω termination channels
REG	9	o	Output of the internal 2.7-V regulator
TRMPWR	4	I	Power for the device

APPLICATION INFORMATION

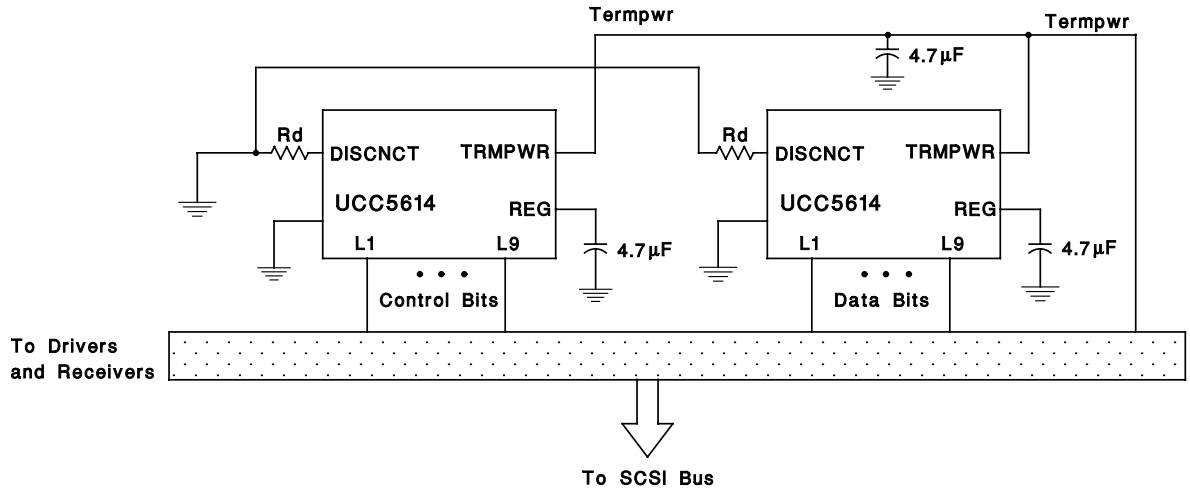


Figure 1. Typical SCSI Bus Configuration Utilizing two UCC5614 Devices

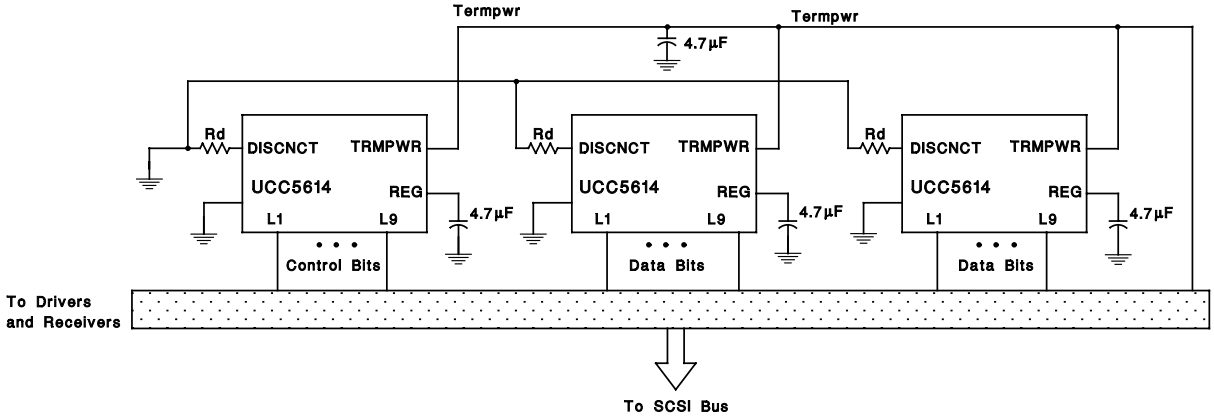
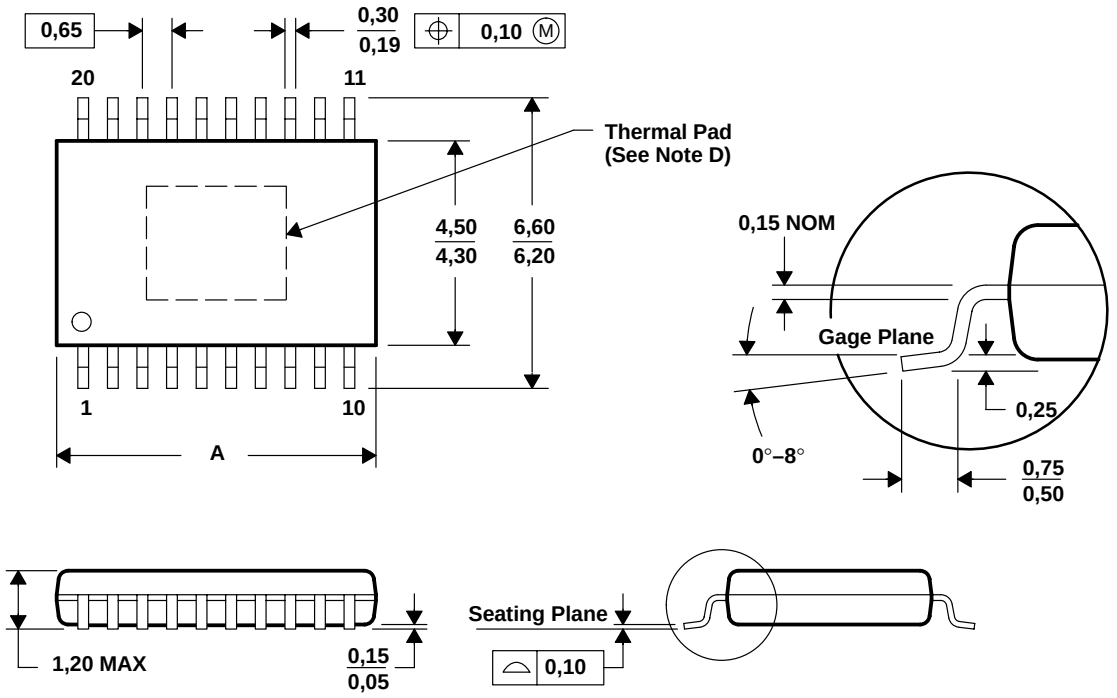


Figure 2. Typical Wide SCSI Bus Configuration Utilizing three UCC5614 Devices

MECHANICAL DATA

PWP (R-PDSO-G)** **PowerPAD™ PLASTIC SMALL-OUTLINE**

20 PINS SHOWN



DIM \ PINS **	14	16	20	24	28
A MAX	5,10	5,10	6,60	7,90	9,80
A MIN	4,90	4,90	6,40	7,70	9,60

4073225/F 10/98

NOTES: A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusions.
D. The package thermal performance may be enhanced by bonding the thermal pad to an external thermal plane. This pad is electrically and thermally connected to the backside of the die and possibly selected leads.
E. Falls within JEDEC MO-153

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