

- Complies With SPI-2 and SPI-3 Standards
- 2.75-V to 7-V Operation
- 1.8-pF Channel Capacitance during Disconnect
- 0.5- $\mu$ A Supply Current in Disconnect Mode
- 110- $\Omega$ /2.5-k $\Omega$  Programmable Termination
- Completely Meets SCSI Hot Plugging
- -650-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

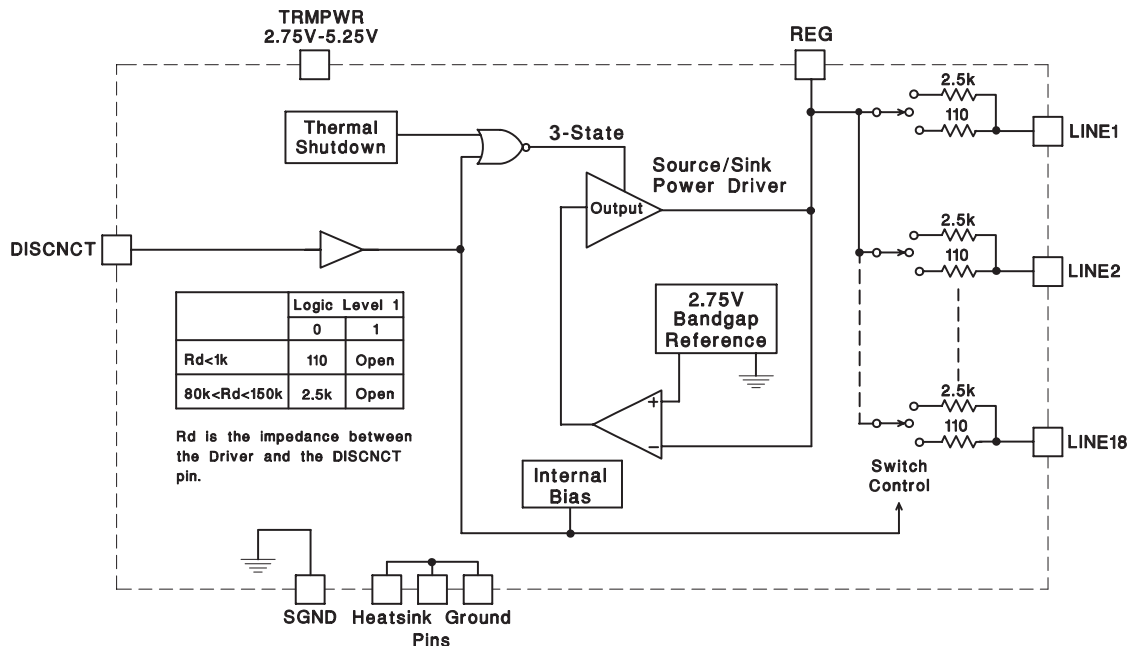
The UCC5610 provides 18 lines of active termination for a SCSI (small computer systems interface) parallel bus. The SCSI standard recommends active termination at both ends of the cable.

The UCC5610 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 2.75-V reference. During disconnect the supply current is typically only 0.5  $\mu$ A, which makes the IC attractive for battery powered systems.

The UCC5610 is designed with an ultralow-channel capacitance of 1.8 pF, which eliminates effects on signal integrity from disconnected terminators at interim points on the bus.

The UCC5610 can be programmed for either a 110- $\Omega$  or 2.5-k $\Omega$  termination. The 110- $\Omega$  termination is used for standard SCSI bus lengths and the 2.5-k $\Omega$  termination is typically used in short bus applications. When driving the TTL compatible DISCNCT pin directly, the 110- $\Omega$  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 k $\Omega$  and 150 k $\Omega$ , the 2.5-k $\Omega$  termination is connected when the DISCNCT pin is driven low, and disconnected when driven high.

## block diagram



UDG-94128-1



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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UCC5610
18-LINE 3-5 VOLT LOW CAPACITANCE SCSI
ACTIVE TERMINATOR

SLUS362A - FEBRUARY 1997 - REVISED NOVEMBER 2000

description (continued)

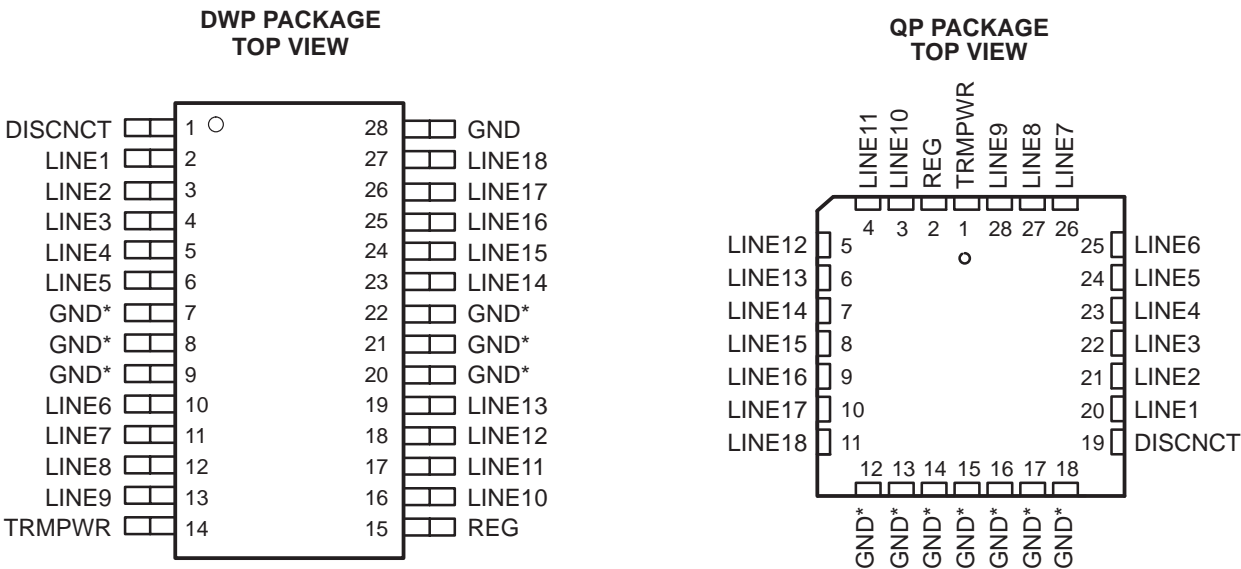
The power amplifier output stage allows the UCC5610 to source full termination current and sink active negation current when all termination lines are actively negated.

The UCC5610 is pin for pin compatible with Unitrode's other 18-line SCSI terminators, allowing lower capacitance and lower voltage upgrades to existing systems. The UCC5610, 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, which maximizes noise margin.

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 and 28-pin PLCC.



\* DWP package pin 28 serves as signal ground; pins 7, 8, 9, 20, 21, 22 serve as heatsink/ground.
\* QP package pins 12-18 serve as both heatsink and signal ground.

AVAILABLE OPTIONS

Table with 3 columns: TJ, PACKAGED DEVICES, SOIC (DWP), PLCC (QP), and rows for 0°C to 70°C with device models UCC5610DWP and UCC5610QP.

† Available tape and reeled. Add TR suffix to device type to order quantities of 1000 devices per reel.

# UCC5610

## 18-LINE 3-5 VOLT LOW CAPACITANCE SCSI ACTIVE TERMINATOR

SLUS362A – FEBRUARY 1997 – REVISED NOVEMBER 2000

### absolute maximum ratings over operating free-air temperature (unless otherwise noted)<sup>†</sup>

Tempwr voltage	7 V
Signal line voltage	0 V to 7 V
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

<sup>†</sup> 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.

<sup>‡</sup> Unless otherwise specified all voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal. Consult Packaging Section of Interface Products Data Book (TI Literature Number SLUD002) for thermal limitations and considerations of packages.

### recommended operating conditions

Tempwr voltage	2.75 V to 5.25 V
Signal line voltage	0 V to 5 V
Disconnect input voltage	0 V to Tempwr

**electrical characteristics, these specifications apply for  $T_A = 0^\circ\text{C}$  to  $70^\circ\text{C}$ ,  $\text{TRMPWR} = 3.3\text{ V}$ ,  $\text{DISCNCT} = 0\text{ V}$ ,  $R_{\text{DISCNCT}} = 0\ \Omega$ ,  $T_A = T_J$ , (unless otherwise noted)**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
<b>Supply Current Section</b>					
Tempwr supply current	All termination lines = open		1	2	mA
	All termination lines = 0.2 V		415	455	mA
Power down mode	DISCNCT = tempwr		0.5	5	$\mu\text{A}$
<b>Output Section (110 <math>\Omega</math> – Terminator Lines)</b>					
Terminator impedance	See Note 4	102.3	110	117.7	$\Omega$
Output high voltage	See Note 1	2.5	2.7	3.0	V
Max output current	$V_{\text{LINE}} = 0.2\text{ V}$ , $T_J = 25^\circ\text{C}$	–25.4	–23	–22.1	mA
	$V_{\text{LINE}} = 0.2\text{ V}$	–25.4	–23	–21	mA
	$V_{\text{LINE}} = 0.2\text{ V}$ , $\text{TRMPWR} = 3\text{ V}$ , $T_J = 25^\circ\text{C}$ See Note 1	–25.4	–23	–20.2	mA
	$V_{\text{LINE}} = 0.2\text{ V}$ , $\text{TRMPWR} = 3\text{ V}$ , See Note 1	–25.4	–23	–19	mA
	$V_{\text{LINE}} = 0.5\text{ V}$			–22.4	mA
Output leakage	DISCNCT = 2.4 V, $\text{TRMPWR} = 0\text{ V}$ to 5.25 V		10	400	nA
Output capacitance	DISCNCT = 2.4 V, See Note 2, See Note 3, DWP package		1.8	2.5	pF
<b>Output Section (2.5 k<math>\Omega</math> – Terminator Lines) (<math>R_{\text{DISCNCT}} = 80\text{ k}\Omega</math>)</b>					
Terminator impedance		2	2.5	3	k $\Omega$
Output high voltage	$\text{TRMPWR} = 3\text{ V}$ , See Note 1	2.5	2.7	3.0	V
Max output current	$V_{\text{LINE}} = 0.2\text{ V}$	–1.4	–1	–0.7	mA
	$V_{\text{LINE}} = 0.2\text{ V}$ , $\text{TRMPWR} = 3\text{ V}$ , See Note 1	–1.5	–1	–0.6	mA
Output leakage	DISCNCT = 2.4 V, $\text{TRMPWR} = 0$ to 5.25 V		10	400	nA
Output capacitance	DISCNCT = 2.4 V, See Note 2, See Note 3, DWP package		1.8	2.5	pF

- NOTES: 1. Measuring each termination line while other 17 are low (0.2 V).  
2. Ensured by design. Not production tested.  
3. Output capacitance is measured at 0.5 V.  
4. Tested by measuring  $I_{\text{OUT}}$  with  $V_{\text{OUT}} = 0.2\text{ V}$  and  $V_{\text{OUT}} = V_{\text{REG}} - 0.1\text{ V}$  then calculating the impedance.



# UCC5610

## 18-LINE 3–5 VOLT LOW CAPACITANCE SCSI

### ACTIVE TERMINATOR

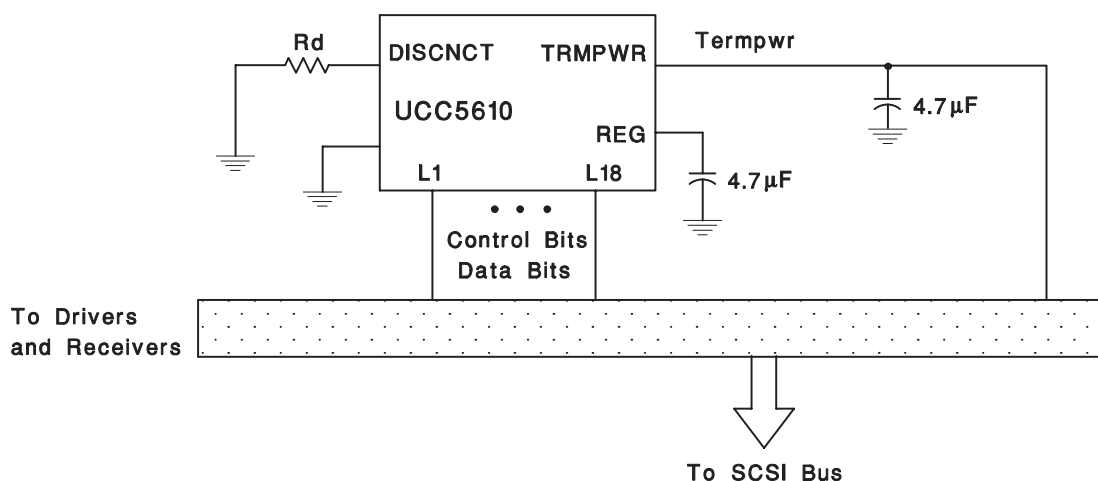
SLUS362A – FEBRUARY 1997 – REVISED NOVEMBER 2000

electrical characteristics, these specifications apply for  $T_A = 0^\circ\text{C}$  to  $70^\circ\text{C}$ ,  $\text{TRMPWR} = 3.3\text{ V}$ ,  $\text{DISCNCT} = 0\text{ V}$ ,  $R_{\text{DISCNCT}} = 0\ \Omega$ ,  $T_A = T_J$ , (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
<b>Regulator Section</b>					
Regulator output voltage	$5.25\text{ V} > \text{TRMPWR} > 3\text{ V}$	2.5	2.7	3.0	V
Drop out voltage	All termination lines = $0.2\text{ V}$		0.1	0.2	V
Short circuit current	$V_{\text{REG}} = 0\text{ V}$	–800	–650	–450	mA
Sinking current capability	$V_{\text{REG}} = 3\text{ V}$	200	400	800	mA
Thermal shutdown	See Note 2		170		$^\circ\text{C}$
Thermal shutdown hysteresis	See Note 2		10		$^\circ\text{C}$
<b>Disconnect Section</b>					
Disconnect threshold	$R_{\text{DISCNCT}} = 0\ \Omega$ & $80\text{ k}\Omega$	0.8	1.5	2.0	V
Input current	$\text{DISCNCT} = 0\text{ V}$		30	50	$\mu\text{A}$

NOTES: 2. Ensured by design. Not production tested.

## APPLICATION INFORMATION



UDG-94130

Figure 1. Typical SCSI Bus Configurations Utilizing a UCC5610 Device

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