

# 9-Line Low Capacitance SCSI Active Terminator

## FEATURES

- Complies with SCSI, SCSI-2 Standards
- 9pF Channel Capacitance during Disconnect
- 100µA Supply Current in Disconnect Mode
- Meets SCSI Hot Plugging Capability
- -300mA Sourcing Current for Termination
- +40mA Sinking Current for Active Negation
- Logic Command Disconnects all Termination Lines
- Trimmed Termination Current to 7%
- Trimmed Impedance to 7%
- Current Limit and Thermal Shutdown Protection

## DESCRIPTION

The UC5604 provides 9 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 UC5604 provides a disconnect feature which, when opened or driven high, will disconnect all terminating resistors and disable the regulator, greatly reducing standby power. The output channels remain high impedance even without Tempwr applied.

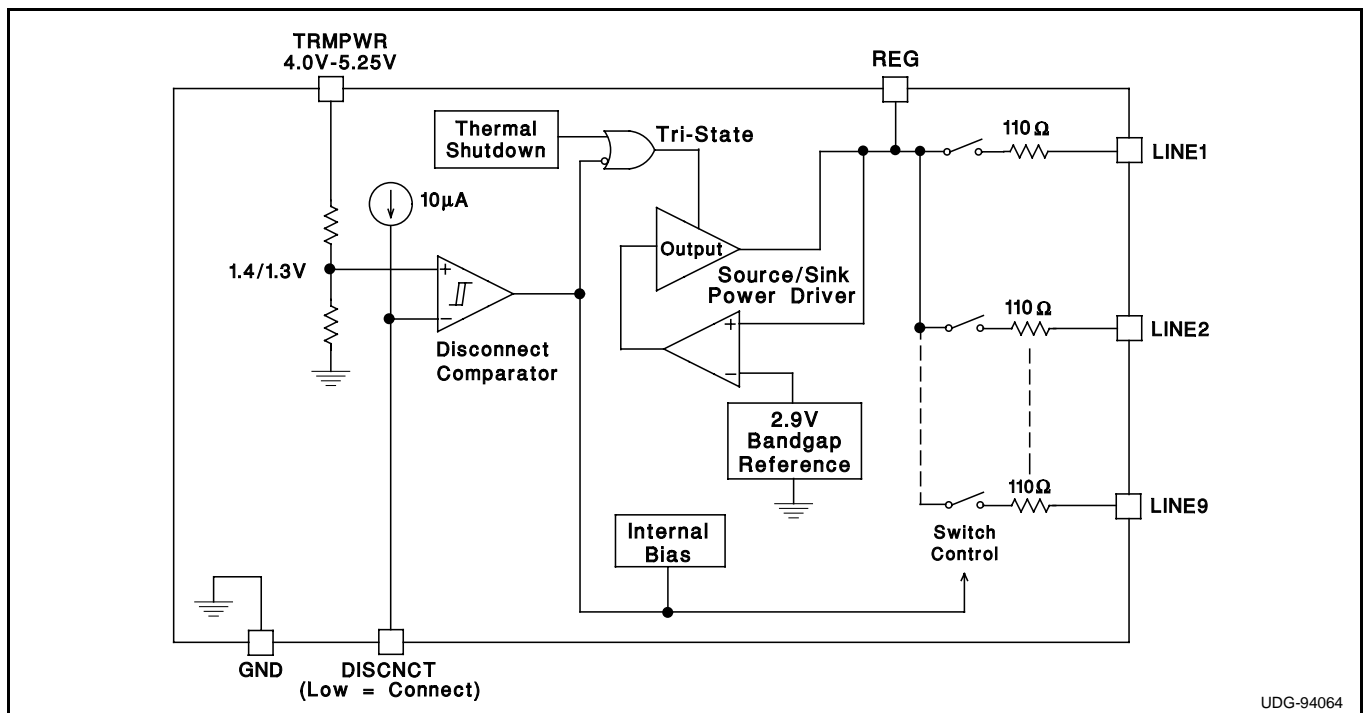
The UC5604 is pin-for-pin compatible with its predecessor, the UC5603 - 9 line Active Terminator. The only functional difference between the UC5604 and UC5603 is the absence of the negative clamps. Parametrically, the UC5604 has a 7% tolerance on impedance and current compared to a 3% tolerance on the UC5603 and the sink current is reduced from 300mA to 40mA. Custom power packages are utilized to allow normal operation at full power conditions (1.2 watts).

Internal circuit trimming is utilized, first to trim the impedance to a 7% tolerance, and then most importantly, to trim the output current to a 7% tolerance, as close to the max SCSI spec 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 ZIP (zig-zag in line package) and 24 pin TSSOP.

## BLOCK DIAGRAM



Circuit Design Patented

UDG-94064

**ABSOLUTE MAXIMUM RATINGS**

Tempwr Voltage .....	+7V
Signal Line Voltage .....	0V to +7V
Regulator Output Current .....	0.5A
Storage Temperature .....	-65°C to +150°C
Operating Temperature .....	-55°C to +150°C
Lead Temperature (Soldering, 10 Sec.) .....	+300°C

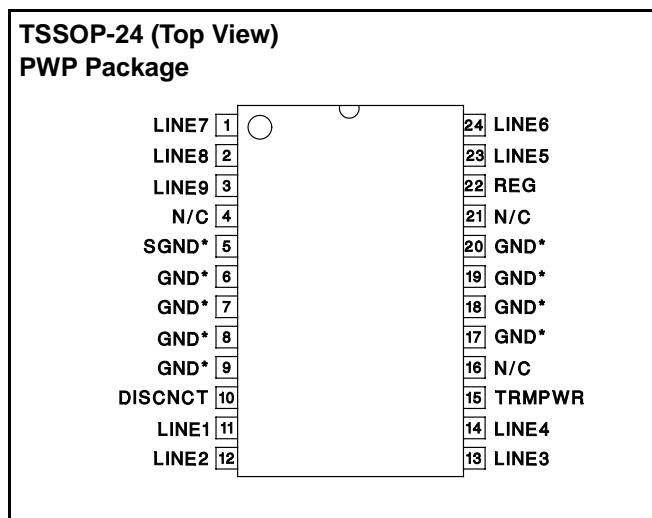
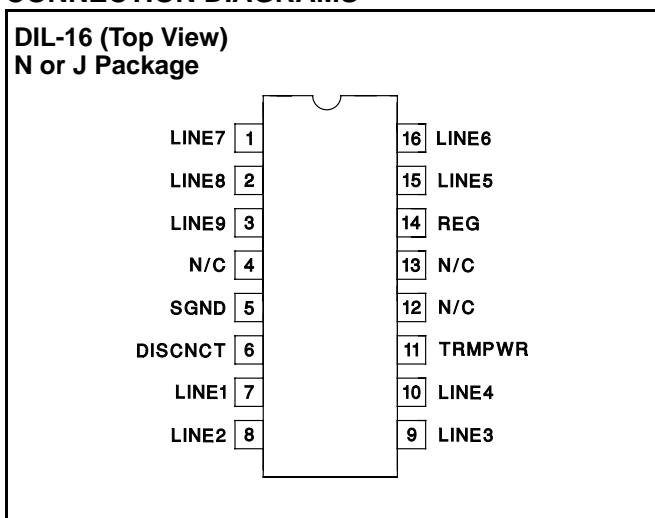
Unless otherwise specified all voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

Consult Packaging Section of Unitrode Integrated Circuits databook for thermal limitations and considerations of packages.

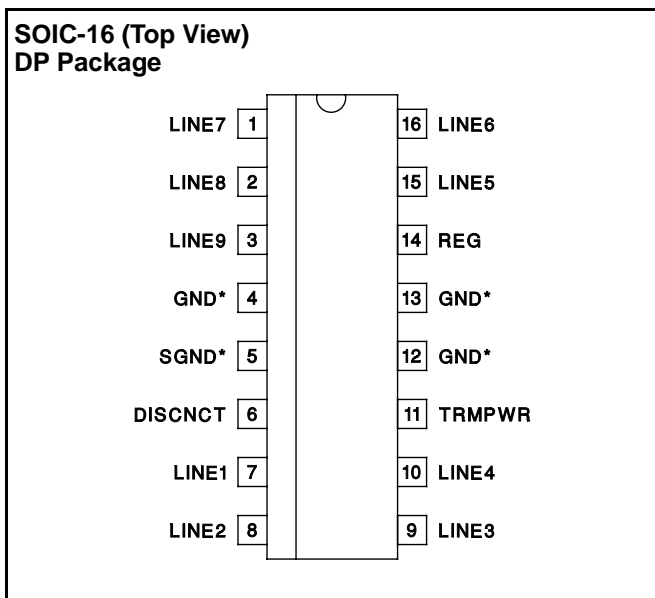
**RECOMMENDED OPERATING CONDITIONS**

Tempwr Voltage .....	3.8V to 5.25V
Signal Line Voltage .....	0V to +5V
Disconnect Input Voltage .....	0V to Tempwr

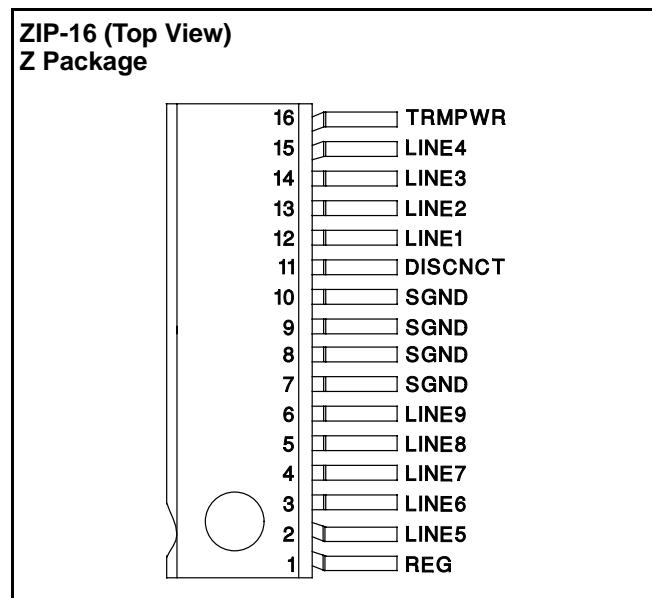
**CONNECTION DIAGRAMS**



\* PWP package pin 5 serves as signal ground; pins 6, 7, 8, 9, 17, 18, 19, and 20 serve as heatsink/ground.



\* DP package pin 5 serves as signal ground; pins 4, 12, 13 serve as heatsink/ground.



Note: Drawings are not to scale.

**ELECTRICAL CHARACTERISTICS** Unless otherwise stated, these specifications apply for  $T_A = 0^\circ\text{C}$  to  $70^\circ\text{C}$ .  
 $TRMPWR = 4.75\text{V}$ ,  $DISCNCT = 0\text{V}$ .  $T_A = T_J$ .

PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNITS	
<b>Supply Current Section</b>							
Tempwr Supply Current	All termination lines = Open			14	20	mA	
	All termination lines = 0.5V			200	220	mA	
Power Down Mode	DISCNCT = Open			100	150	$\mu\text{A}$	
<b>Output Section (Terminator Lines)</b>							
Terminator Impedance	$\Delta I_{LINE} = -5\text{mA}$ to $-15\text{mA}$		97	110	129	Ohms	
Output High Voltage	TRMPWR = 4V (Note 1)	$0^\circ\text{C} < T_J < 70^\circ\text{C}$	2.55		3.2	V	
		$T_J = 25^\circ\text{C}$	2.6	2.9	3.1	V	
Max Output Current	$V_{LINE} = 0.5\text{V}$	$T_J = 25^\circ\text{C}$	-19.5	-21.9	-22.4	mA	
		$0^\circ\text{C} < T_J < 70^\circ\text{C}$	-18.5	-21.9	-22.4	mA	
Max Output Current	$V_{LINE} = 0.5\text{V}$ , TRMPWR = 4V (Note 1)	$T_J = 25^\circ\text{C}$	-18.0	-21.9	-22.4	mA	
		$0^\circ\text{C} < T_J < 70^\circ\text{C}$	-17.0	-21.9	-22.4	mA	
Output Clamp Level	$I_{LINE} = -30\text{mA}$		-0.2	-0.05	0.1	V	
Output Leakage	DISCNCT = 4V	TRMPWR = 0V to 5.25V REG = 0V	$V_{LINE} = 0$ to 4V		10	400	nA
		TRMPWR = 0V to 5.25V, REG = Open $V_{LINE} = 0\text{V}$ to 5.25V	$V_{LINE} = 5.25\text{V}$			100	$\mu\text{A}$
Output Capacitance	DISCNCT = Open (Note 2)			9	12	pF	
<b>Regulator Section</b>							
Regulator Output Voltage			2.5	2.9	3.2	V	
Regulator Output Voltage	All Termination Lines = 5V		2.55	2.9	3.1	V	
Line Regulation	TRMPWR = 4V to 6V			10	20	mV	
Load Regulation	$I_{REG} = +100\text{mA}$ to $-100\text{mA}$			20	50	mV	
Drop Out Voltage	All Termination Lines = 0.5V			1.0	1.2	V	
Short Circuit Current	$V_{REG} = 0\text{V}$		-200	-400	-600	mA	
Sinking Current Capability	$V_{REG} = 3.5\text{V}$		20	40		mA	
Thermal Shutdown				170		$^\circ\text{C}$	
Thermal Shutdown Hysteresis				10		$^\circ\text{C}$	
<b>Disconnect Section</b>							
Disconnect Threshold			1.1	1.4	1.7	V	
Threshold Hysteresis				100		mV	
Input Current	DISCNCT = 0V			150	200	$\mu\text{A}$	

Note 1: Measuring each termination line while other 8 are low (0.5V).  
 Note 2: Guaranteed by design. Not 100% tested in production.

**APPLICATION INFORMATION**

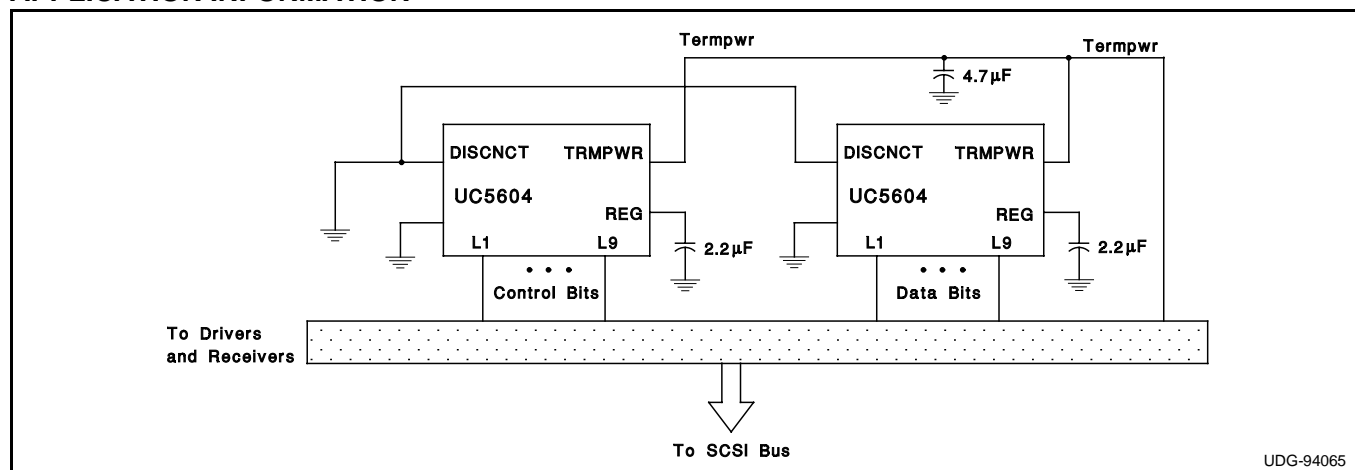


Figure 1: Typical SCSI Bus Configurations Utilizing 2 UC5604 Devices

APPLICATION INFORMATION (cont.)

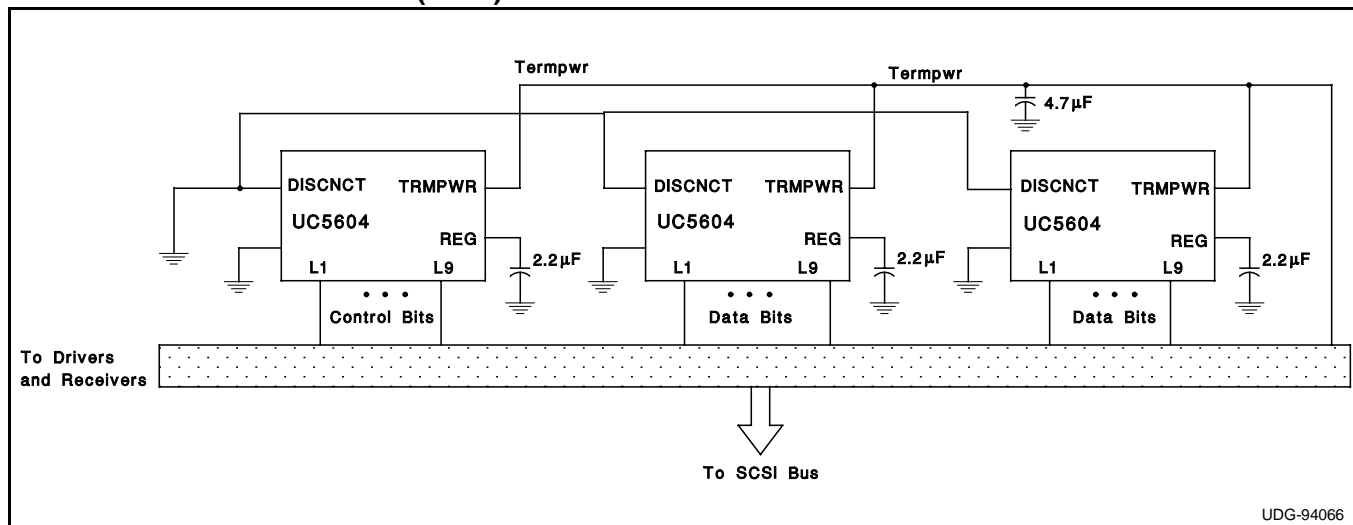


Figure 2: Typical Wide SCSI Bus Configurations Utilizing 3 UC5604 Devices.

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