UNITRODE

9-Line SCSI Active Terminator

FEATURES

- Complies with SCSI, SCSI-2 and SPI-2 Standards
- 6pF Channel Capacitance during Disconnect
- 100µA Supply Current in Disconnect Mode
- Meets SCSI Hot Plugging
- -400mA Sourcing Current for Termination
- +400mA Sinking Current for Active Negation Drivers
- Logic Command Disconnects all Termination Lines
- Trimmed Termination Current to 3%
- Trimmed Impedance to 3%
- Negative Clamping on all Signal Lines
- Current Limit and Thermal Shutdown Protection

DESCRIPTION

The UC5603 provides 9 lines of active termination for a SCSI (Small Computers Systems Interface) parallel bus. The SCSI standard recommends active termination at both ends of the cable segment.

The UC5603 provides a disconnect feature which, when opened or driven high, will disconnect all terminating resistors, and disables the regulator; greatly reducing standby power. The output channels remain high impedance even without Termpwr applied. A low channel capacitance of 6pF allows units at interim points of the bus to have little to no effect on the signal integrity.

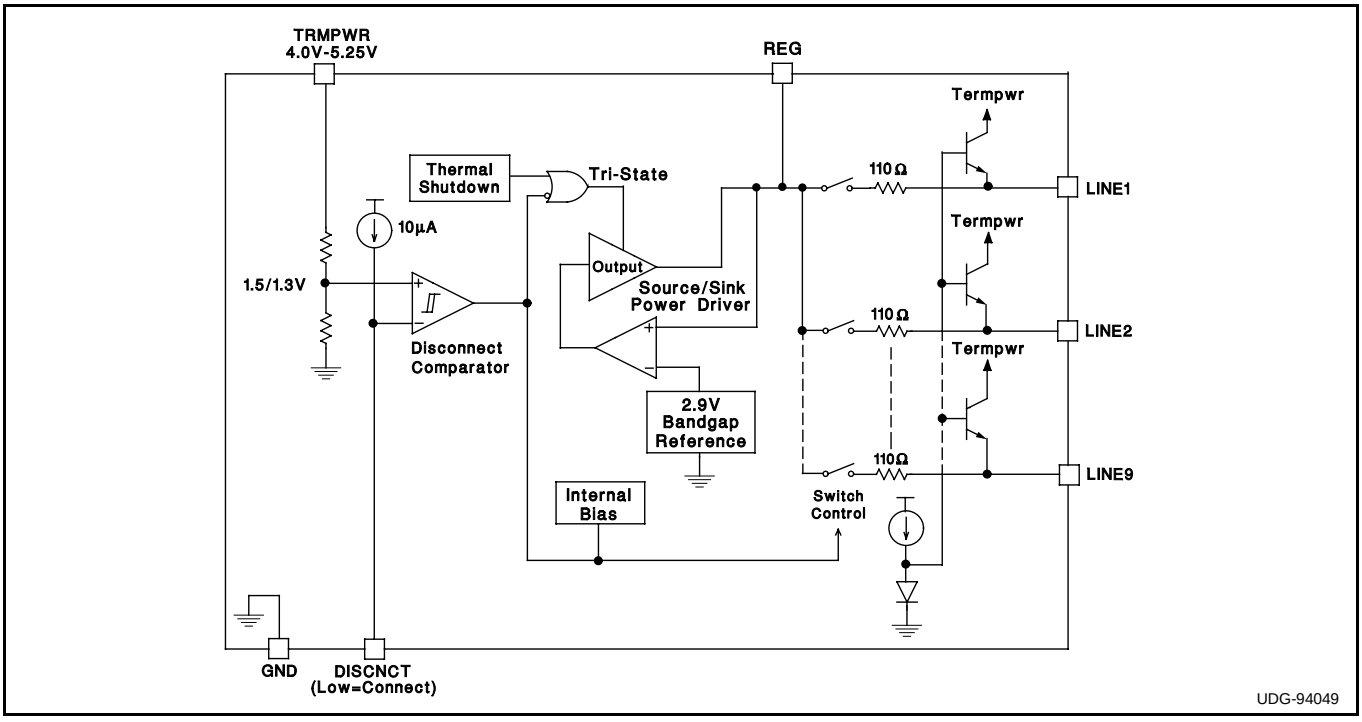
Functionally the UC5603 is similar to its predecessor, the UC5601 - 18 line Active Terminator. Several electrical enhancements were incorporated in the UC5603, such as a sink/source regulator output stage to accommodate all signal lines at +5V, while the regulator remains at its nominal value, reduced channel capacitance to 6pF typical, and as with the UC5601, 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 3% tolerance, and then most importantly, to trim the output current to a 3% tolerance, as close to the max SCSI spec as possible, which maximizes noise margin in fast SCSI operation.

Other features include negative clamping on all signal lines to protect external circuitry from latch-up, 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

ABSOLUTE MAXIMUM RATINGS

Termpwr 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

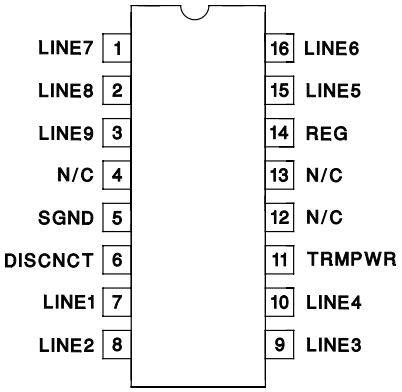
Unless otherwise specified all voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.
Consult Packaging Section of Unitrode Integrated Circuits databook for thermal limitations and considerations of packages.

RECOMMENDED OPERATING CONDITIONS

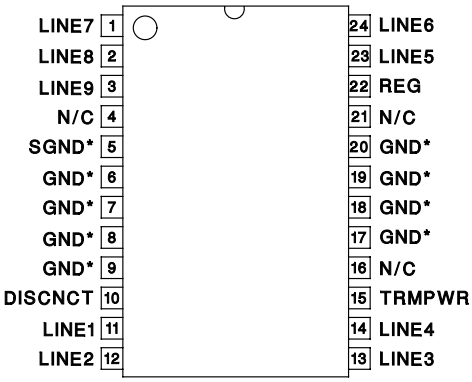
Termpwr Voltage . . . . . 3.8V to 5.25V
Signal Line Voltage . . . . . 0V to +5V
Disconnect Input Voltage . . . . . 0V to Termpwr

CONNECTION DIAGRAMS

DIL-16 (Top View)
N or J Package

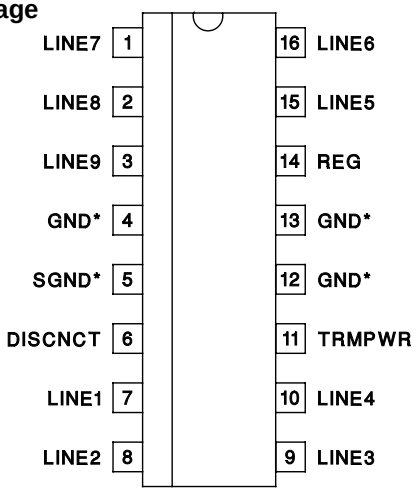


TSSOP-24 (Top View)
PWP Package



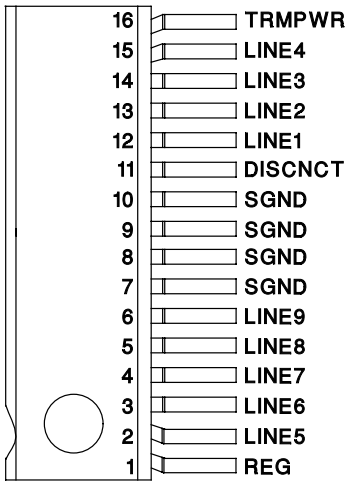
** PWP package pin 5 serves as signal ground; pins 6, 7, 8, 9, 17, 18, 19, and 20 serve as heatsink/ground.*

SOIC-16 (Top View)
DP Package



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

ZIP-16 (Top View)
Z Package



Note: Drawings are not to scale.

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

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNITS
Supply Current Section							
Termpwr Supply Current	All termination lines = Open				12	18	mA
	All termination lines = 0.5V				200	220	mA
Power Down Mode	DISCNCT = Open				100	150	µA
Output Section (Terminator Lines)							
Terminator Impedance	ΔI_{LINE} = -5mA to -15mA			107	110	113	Ohms
Output High Voltage	V_{TRMPWR} = 4V (Note 1)			2.7	2.9		V
Max Output Current	V_{LINE} = 0.5V		T_J = 25°C	-21.1	-21.9	-22.4	mA
			0°C < T_J < 70°C	-20.5	-21.9	-22.4	mA
Max Output Current	V_{LINE} = 0.5V, TRMPWR = 4V (Note 1)		T_J = 25°C	-20.3	-21.9	-22.4	mA
			0°C < T_J < 70°C	-19.8	-21.9	-22.4	mA
	V_{LINE} = 0.2V, TRMPWR = 4.0V to 5.25V		0°C < T_J < 70°C	–22.0	–24.0	–25.4	mA
Output Clamp Level	I_{LINE} = -30mA			-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
			V_{LINE} = 5.25V			100	µA
		TRMPWR = 0V to 5.25V, REG = Open V_{LINE} = 0V to 5.25V			10	400	nA
Output Capacitance	DISCNCT = Open (Note 2) (DP Package)				6	8	pF
Regulator Section							
Regulator Output Voltage				2.8	2.9	3	V
Regulator Output Voltage	All Termination Lines = 5V			2.8	2.9	3	V
Line Regulation	TRMPWR = 4V to 6V				10	20	mV
Load Regulation	I_{REG} = +100mA to -100mA				20	50	mV
Drop Out Voltage	All Termination Lines = 0.5V				0.7	1	V
Short Circuit Current	V_{REG} = 0V			-200	-400	-600	mA
Sinking Current Capability	V_{REG} = 3.5V			200	400	600	mA
Thermal Shutdown					170		°C
Thermal Shutdown Hysteresis					10		°C
Disconnect Section							
Disconnect Threshold				1.3	1.5	1.7	V
Threshold Hysteresis				100	160	250	mV

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

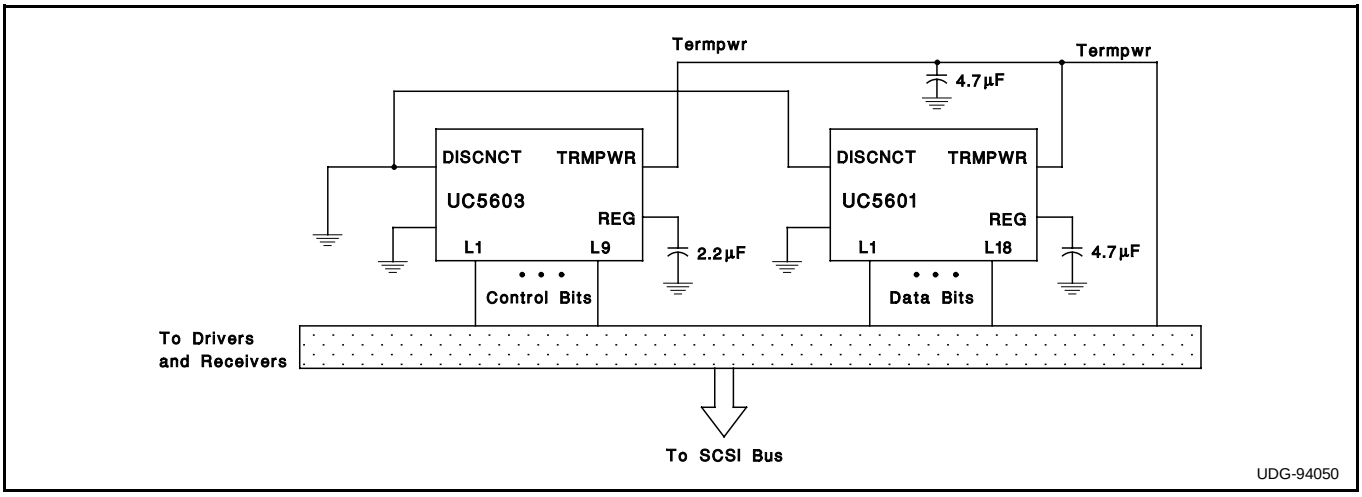


Figure 1: Typical Wide SCSI Bus Configurations Utilizing 1 UC5601 and 1 UC5603 Device

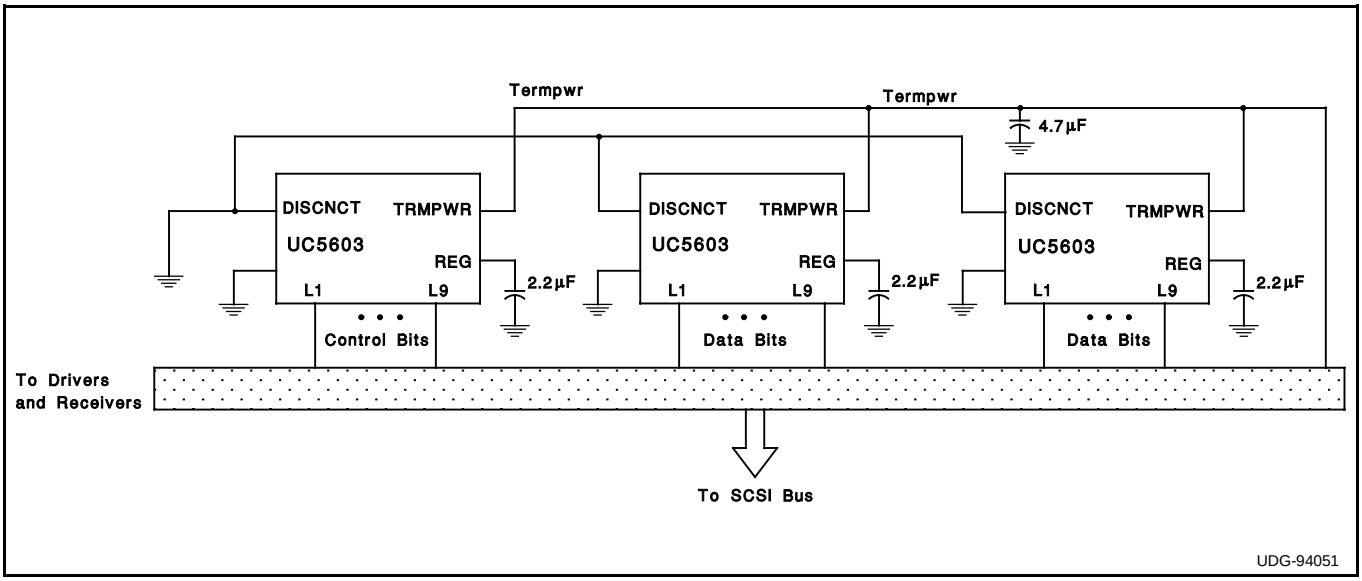


Figure 2: Typical Wide SCSI Bus Configurations Utilizing 3 UC5603 Devices.

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