UNITRODE

9-Line Low Capacitance SCSI Active Terminator

FEATURES

- Complies with SCSI, SCSI-2 and SPI-2 Standards

- 5pF Channel Capacitance during Disconnect

- Meets SCSI Hot Plugging

- −400mA Sourcing Current for Termination

- +100mA Sinking Current for Active Negation

- 1V Dropout Voltage Regulator

- Logic High Command Disconnects all Termination Lines

- 100µA Supply Current in Disconnect Mode

- Trimmed Termination Current to 5%

- Trimmed Impedance to 5%

- Low Thermal Resistance Surface Mount Packages

DESCRIPTION

The UC5612 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 only functional differences between the UC5603 and UC5612 is the absence of the negative clamps on the output lines. Parametrically, the UC5612 has a 5% tolerance on impedance and current compared to a 3% tolerance on the UC5603. Custom power packages are utilized to allow normal operation at full power (2 Watts).

The UC5612 provides a disconnect feature which, when opened or driven high, disconnects all terminating resistors, disables the regulator and greatly reduces standby power consumption. The output channels remain high impedance even without Termpwr applied. A low channel capacitance of 5pF allows interim points of the bus to have little to no effect on the signal integrity.

Internal circuit trimming is utilized, first to trim the impedance to a 5% tolerance, and then most importantly, to trim the output current to a 5% tolerance, as close to the maximum SCSI specification as possible. This maximizes the 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
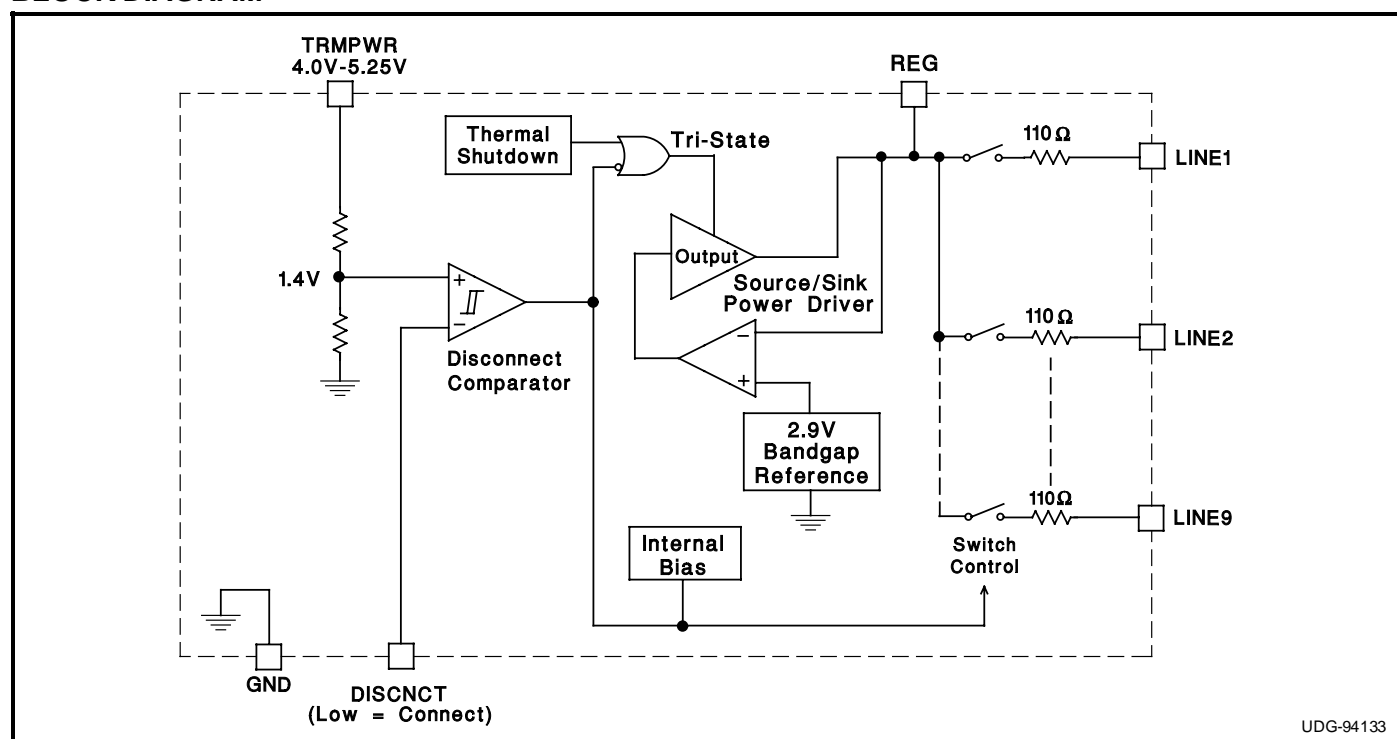
Circuit Design Patented

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ABSOLUTE MAXIMUM RATINGS

Termpwr Voltage . . . . +7V
Signal Line Voltage. . . . . 0V to +7V
Regulator Output Current 0.6A
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.
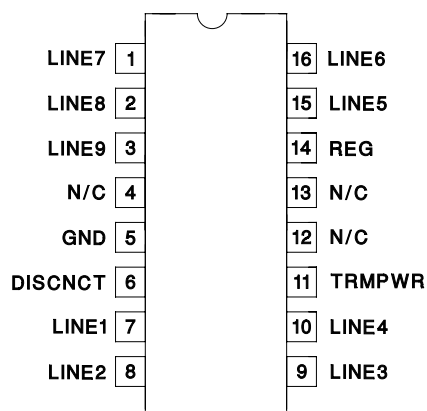*Consult Packaging Section of Unitrode Integrated Circuits databook for thermal limitations and considerations of packages.*
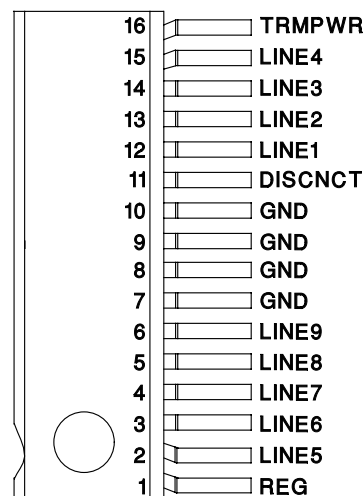
RECOMMENDED OPERATING CONDITIONS

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

LINE7	1	16	LINE6
LINE8	2	15	LINE5
LINE9	3	14	REG
N/C	4	13	N/C
GND	5	12	N/C
DISCNCT	6	11	TRMPWR
LINE1	7	10	LINE4
LINE2	8	9	LINE3

ZIP-16 (Top View)
Z Package

16	TRMPWR
15	LINE4
14	LINE3
13	LINE2
12	LINE1
11	DISCNCT
10	GND
9	GND
8	GND
7	GND
6	LINE9
5	LINE8
4	LINE7
3	LINE6
2	LINE5
1	REG

SOIC-16 (Top View)
DP Package

LINE7	1	16	LINE6
LINE8	2	15	LINE5
LINE9	3	14	REG
GND*	4	13	GND*
SGND*	5	12	GND*
DISCNCT	6	11	TRMPWR
LINE1	7	10	LINE4
LINE2	8	9	LINE3

TSSOP-24 (Top View)
PWP Package

LINE7	1	24	LINE6
LINE8	2	23	LINE5
LINE9	3	22	REG
N/C	4	21	N/C
GND*	5	20	GND*
GND*	6	19	GND*
GND*	7	18	GND*
GND*	8	17	GND*
SGND*	9	16	N/C
DISCNCT	10	15	TRMPWR
LINE1	11	14	LINE4
LINE2	12	13	LINE3
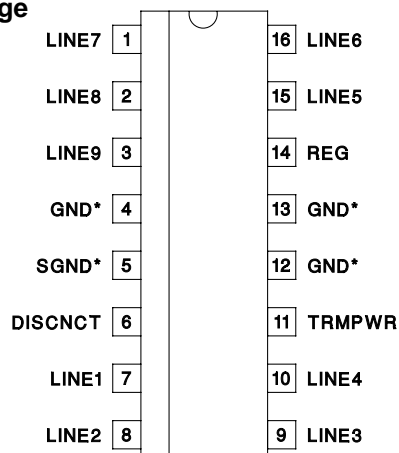
* DP package pin 5 serves as signal ground; pins 4, 12, 13 serve as heatsink/ground.
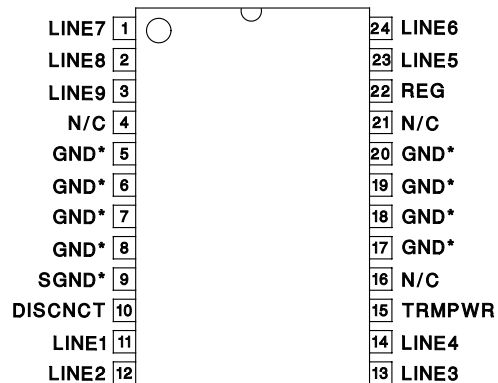
* PWP package pin 9 serves as signal ground; pins 5, 6, 7, 8, 17, 18, 19, and 20 serve as heatsink/ground.

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				17	23	mA
	All termination lines = 0.5V				200	225	mA
Power Down Mode	DISCNCT = Open				100	150	µA
Output Section (Termination Lines)							
Terminator Impedance	ΔI_{LINE} = -5mA to -15mA			104.5	110	115.5	Ohms
Output High Voltage				2.65	2.9	3.1	V
Max Output Current	V_{LINE} = 0.5V		T_J = 25°C	-20.3	-21.5	-22.4	mA
			0°C < T_J < 70°C	-19.8	-21.5	-22.4	mA
Max Output Current	V_{LINE} = 0.5V, TRMPWR = 4V (Note 1)		T_J = 25°C	-19.5	-21.5	-22.4	mA
			0°C < T_J < 70°C	-19.0	-21.5	-22.4	mA
	V_{LINE} = 0.2V, TRMPWR = 4V to 5.25V		0°C < T_J < 70°C	-21.6	-24.0	-25.4	mA
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
		REG = Open	V_{LINE} = 0V to 5.25V		10	400	nA
Output Capacitance	DISCNCT = Open (Note 2) (DP Package)				5	6	pF
Regulator Section							
Regulator Output Voltage				2.7	2.9	3.1	V
	All Termination Lines = 4V			2.7	2.9	3.1	V
Line Regulation	TRMPWR = 4V to 6V				10	20	mV
Drop Out Voltage	All Termination Lines = 0.5V				1.0	1.2	V
Short Circuit Current	REG = 0V			-200	-400	-600	mA
Sinking Current Capability	REG = 3.5V			75	100	400	mA
Thermal Shutdown					170		°C
Thermal Shutdown Hysteresis					10		°C
Disconnect Section							
Disconnect Threshold				1.1	1.4	1.7	V
Input Current	DISCNCT = 0V				-10	-20	µA

Note 1: *Measuring each termination line while other 8 are low.*
Note 2: *Guaranteed by design. Not 100% tested in production.*
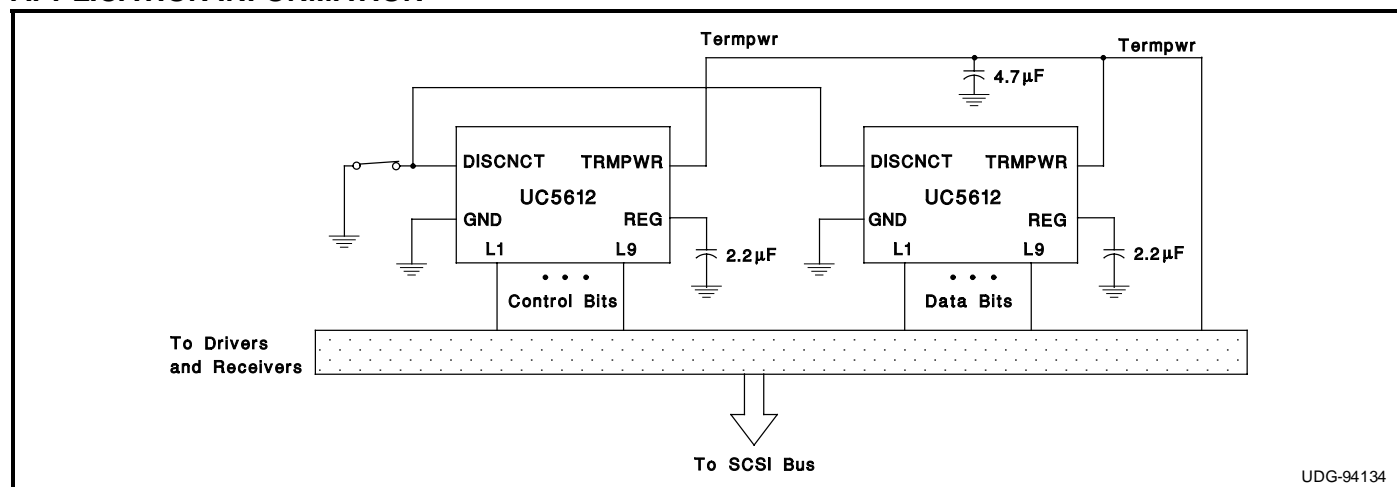
APPLICATION INFORMATION

Figure 1: Typical SCSI Bus Configurations Utilizing 2 UC5612 Devices
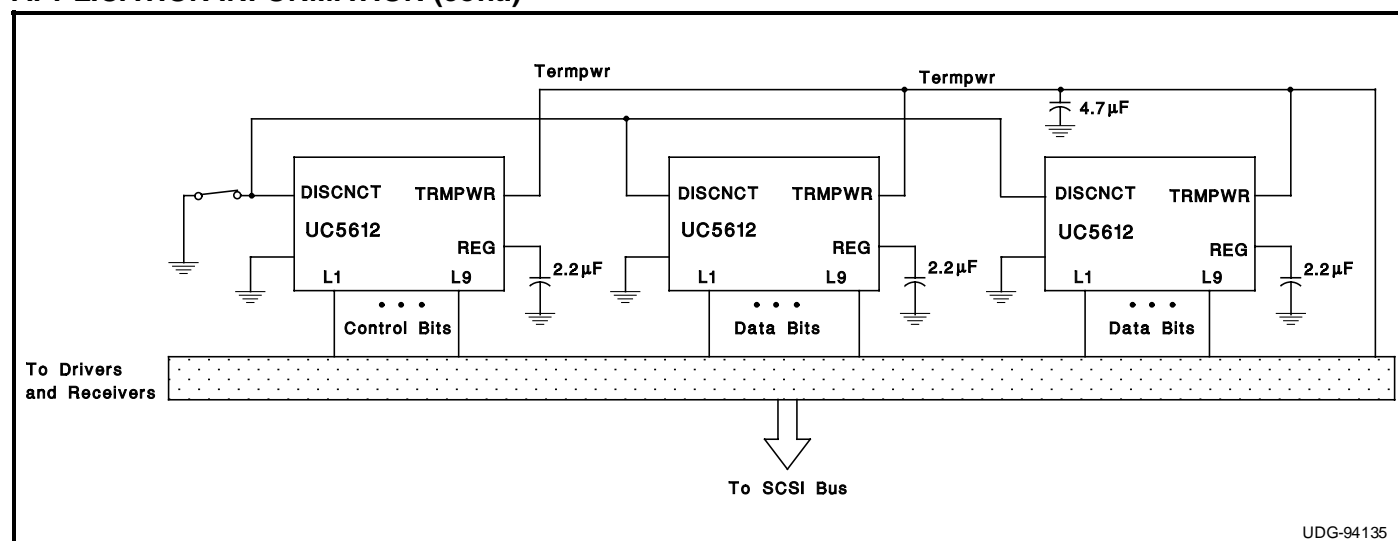
APPLICATION INFORMATION (cont.)

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Figure 2: Typical Wide SCSI Bus Configurations Utilizing 3 UC5612 Devices.