UC5604

UNITRODE

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 Termpwr 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

UDG-94064

Circuit Design Patented
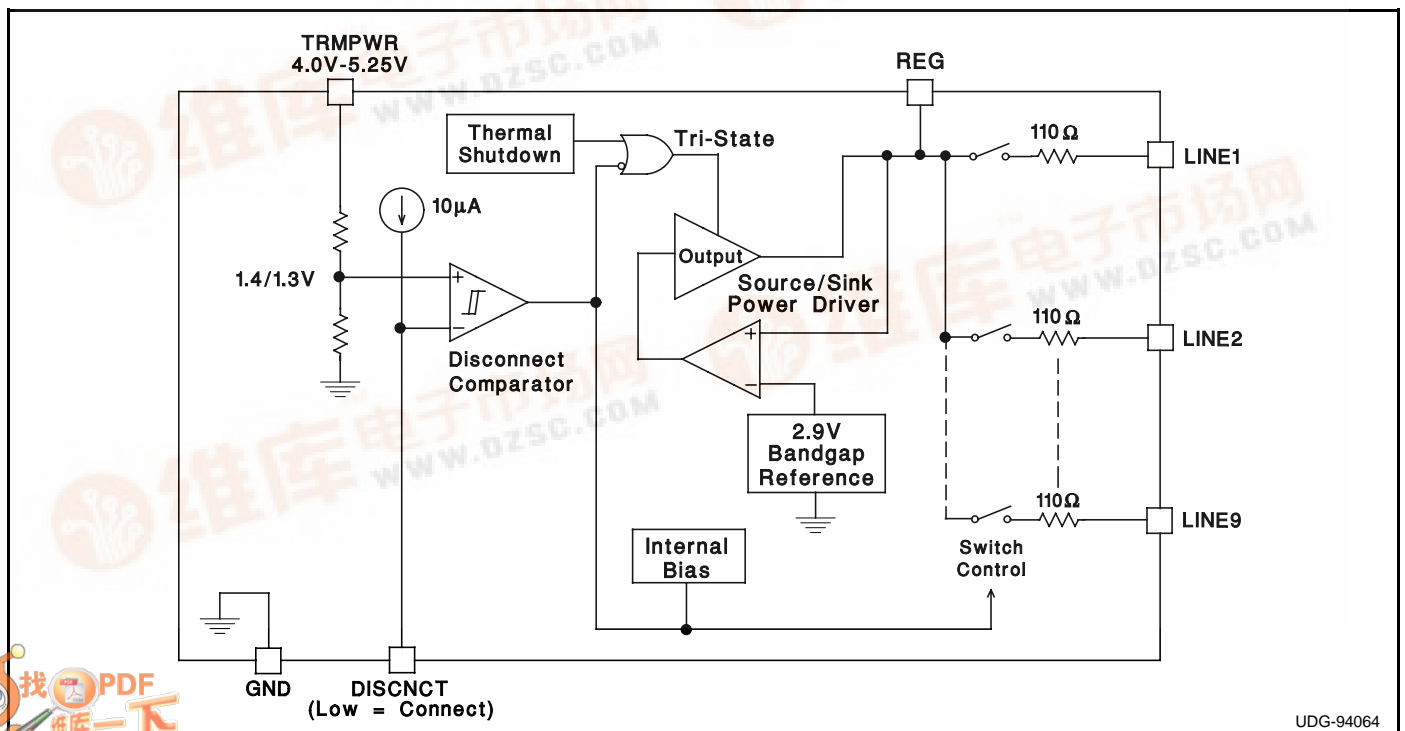
ABSOLUTE MAXIMUM RATINGS

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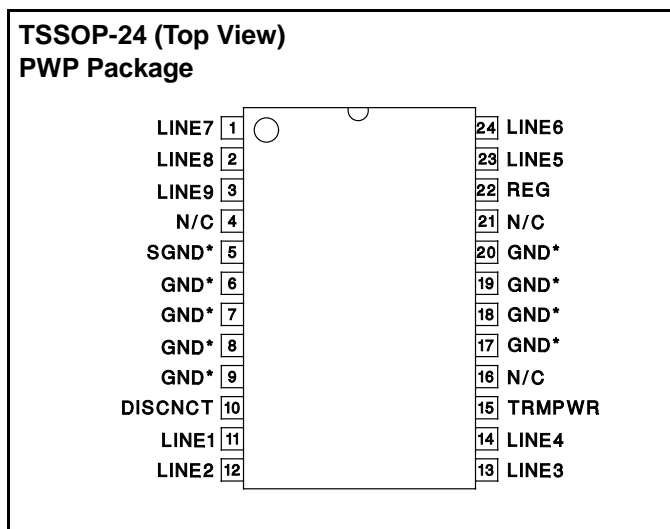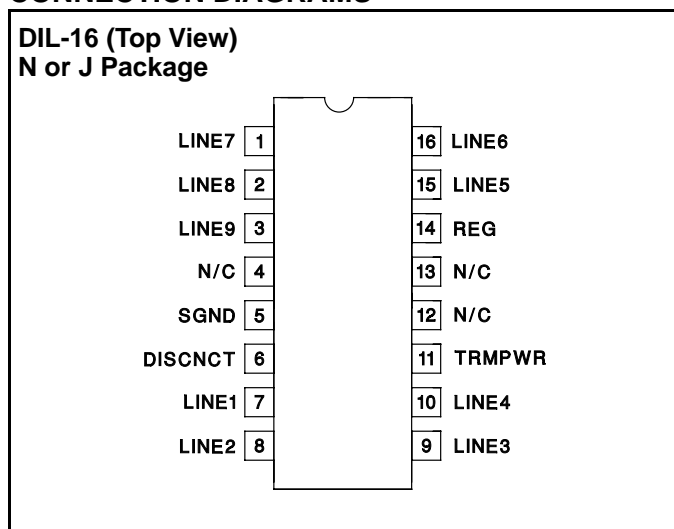*Unless otherwise specified all voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.*
Consult Packaging Section of Unitrode Integrated Circuits databook for thermal limitations and considerations of packages.
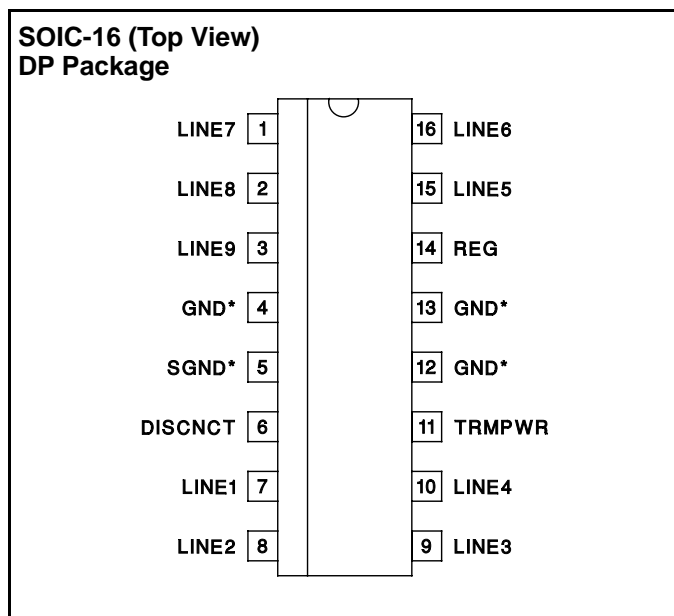
RECOMMENDED OPERATING CONDITIONS

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

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

TSSOP-24 (Top View)
PWP Package

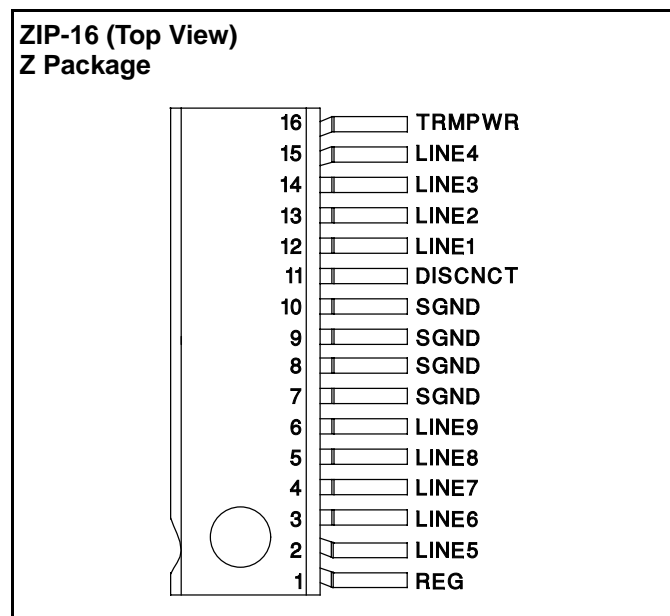|		
LINE7	1	24 LINE6
LINE8	2	23 LINE5
LINE9	3	22 REG
N/C	4	21 N/C
SGND*	5	20 GND*
GND*	6	19 GND*
GND*	7	18 GND*
GND*	8	17 GND*
GND*	9	16 N/C
DISCNCT	10	15 TRMPWR
LINE1	11	14 LINE4
LINE2	12	13 LINE3

* 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

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

ZIP-16 (Top View)
Z Package

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

* 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°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				14	20	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			97	110	129	Ohms
Output High Voltage	TRMPWR = 4V (Note 1)		0°C < T_J < 70°C	2.55		3.2	V
			T_J = 25°C	2.6	2.9	3.1	V
Max Output Current	V_{LINE} = 0.5V		T_J = 25°C	-19.5	-21.9	-22.4	mA
			0°C < T_J < 70°C	-18.5	-21.9	-22.4	mA
Max Output Current	V_{LINE} = 0.5V, TRMPWR = 4V (Note 1)		T_J = 25°C	-18.0	-21.9	-22.4	mA
			0°C < T_J < 70°C	-17.0	-21.9	-22.4	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)				9	12	pF
Regulator Section							
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} = +100mA to -100mA				20	50	mV
Drop Out Voltage	All Termination Lines = 0.5V				1.0	1.2	V
Short Circuit Current	V_{REG} = 0V			-200	-400	-600	mA
Sinking Current Capability	V_{REG} = 3.5V			20	40		mA
Thermal Shutdown					170		°C
Thermal Shutdown Hysteresis					10		°C
Disconnect Section							
Disconnect Threshold				1.1	1.4	1.7	V
Threshold Hysteresis					100		mV
Input Current	DISCNCT = 0V				150	200	µA

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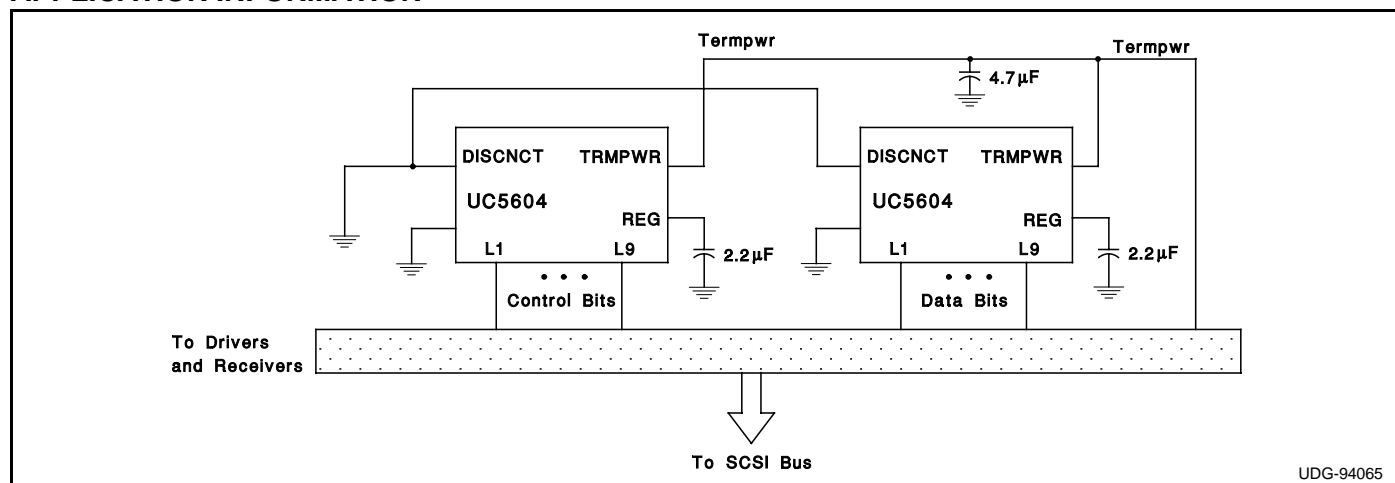
APPLICATION INFORMATION

Figure 1: Typical SCSI Bus Configurations Utilizing 2 UC5604 Devices
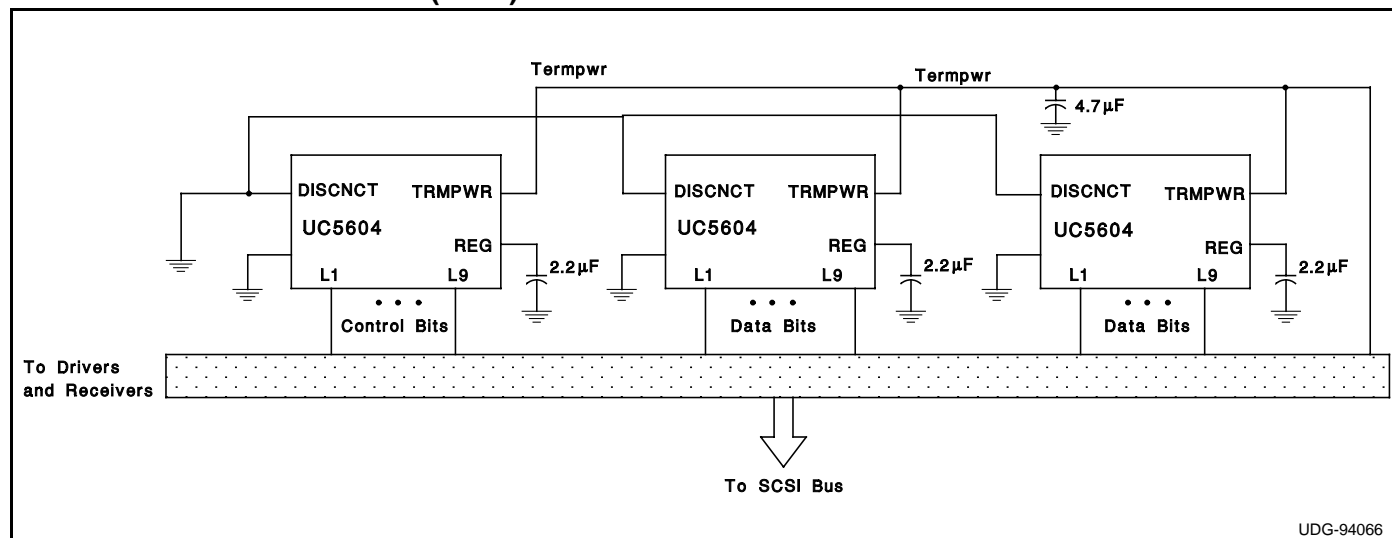
APPLICATION INFORMATION (cont.)

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

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