

18-Line Low Capacitance SCSI Active Terminator

FEATURES

- Reverse Disconnect
- Complies with SCSI, SCSI-2 and SPI-2 Standards
- 6pF Channel Capacitance during Disconnect
- 100µA Supply Current in Disconnect Mode
- Meets SCSI Hot Plugging Capability
- -650mA Sourcing Current for Termination
- +200mA Sinking Current for Active Negation
- Provides Active Termination for 18 Lines
- Logic Command Disconnects all Termination Lines
- Trimmed Termination Current to 5%
- Trimmed Impedance to 5%
- Current Limit and Thermal Shutdown Protection

DESCRIPTION

The UC5609 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 bus cable.

The UC5609 is pin-for-pin compatible with its predecessors, the UC5601, UC5602 and UC5608 - 18 Line Active Terminators, except for the reverse disconnect sense. Parametrically the UC5609 has a 5% tolerance on impedance and current compared to a 3% tolerance on the UC5601 and the sink current is increased from 20 to 200mA. The low side clamps have been removed. Custom power packages are utilized to allow normal operation at full power conditions (2 Watts).

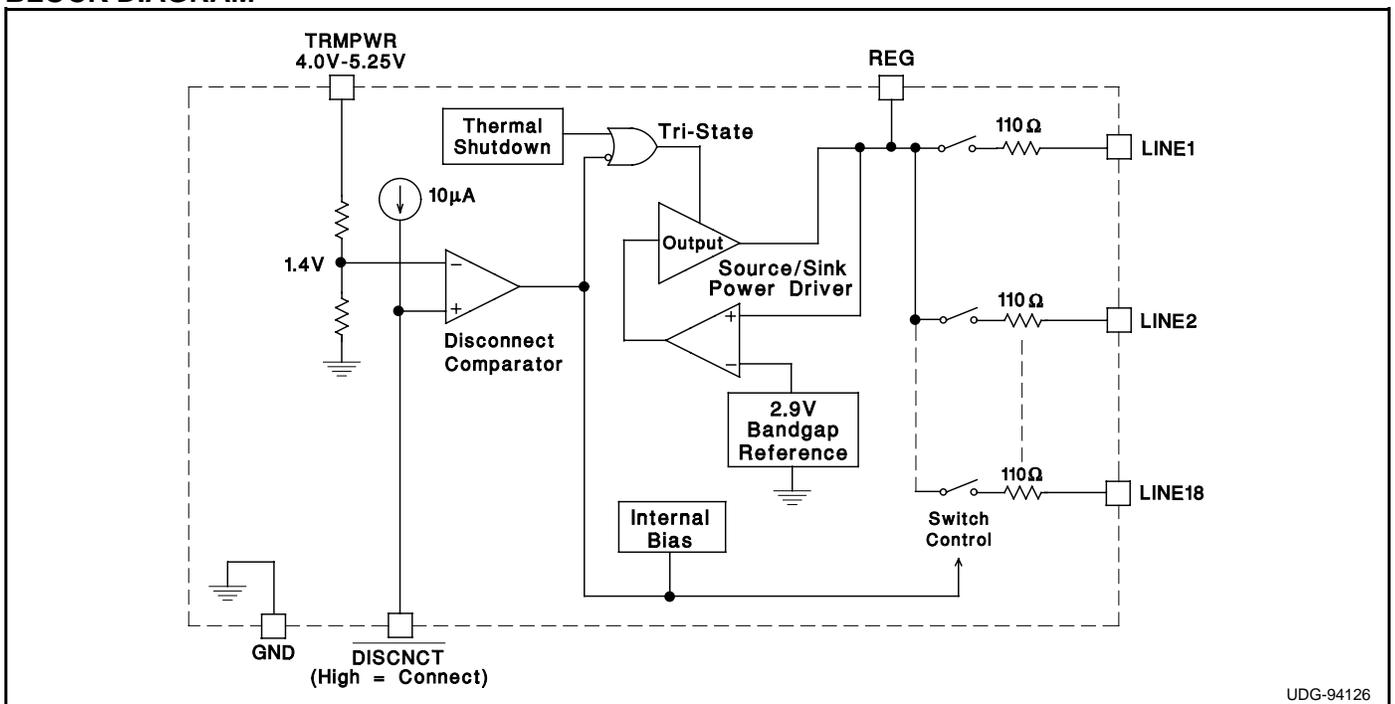
When in disconnect mode the terminator will disconnect all terminating resistors and disable the regulator, greatly reducing standby power. The output channels remain high impedance even without Tempwr applied.

Internal circuit trimming is utilized to trim the impedance to a 5% tolerance and, most importantly, to trim the output current to a 5% tolerance, as close to the max SCSI spec as possible, which maximizes noise margin in fast SCSI operation.

Other features include 4.0 to 5.25V Tempwr, thermal shutdown and current limit.

This device is offered in low thermal resistance versions of the industry standard 28 pin wide body SOIC, 28 pin wide body TSSOP, and 28 pin PLCC, as well as 24 pin DIP.

BLOCK DIAGRAM



UDG-94126

Circuit Design Patented

ABSOLUTE MAXIMUM RATINGS

| | | |
|---------------------------------------|-------|-----------------|
| Tempwr Voltage | | +7V |
| Signal Line Voltage | | 0V to +7V |
| Regulator Output Current | | 1A |
| Storage Temperature | | -65°C to +150°C |
| Operating Temperature | | -55°C to +150°C |
| Lead Temperature (Soldering, 10 Sec.) | | +300°C |

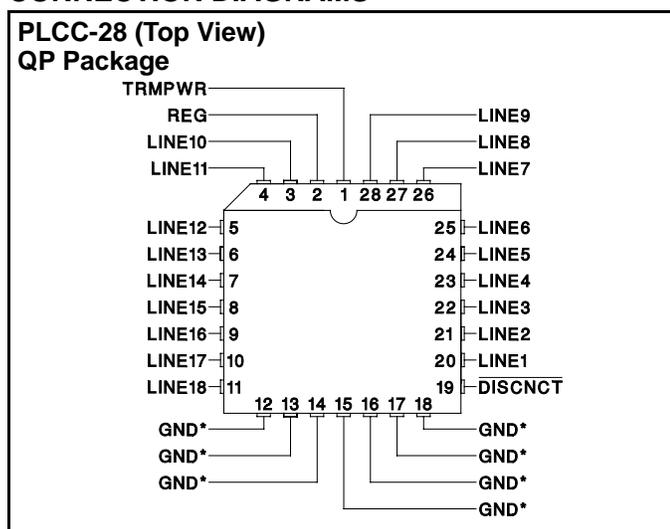
Unless otherwise specified all voltages are with respect to Ground. Currents are positive into, negative out of the specified terminal.

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

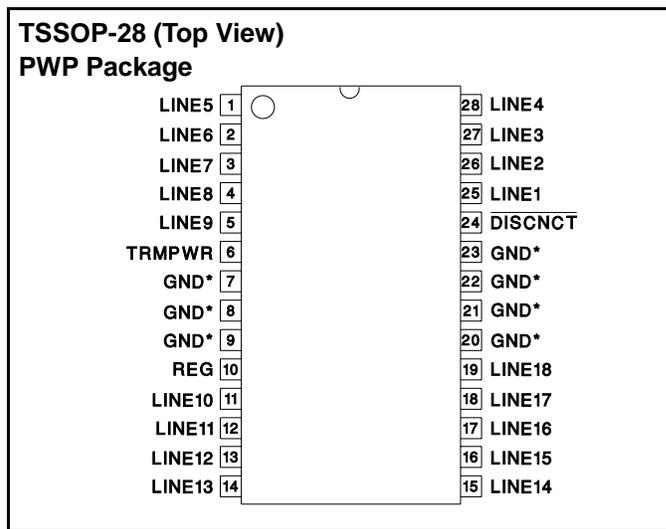
RECOMMENDED OPERATING CONDITIONS

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

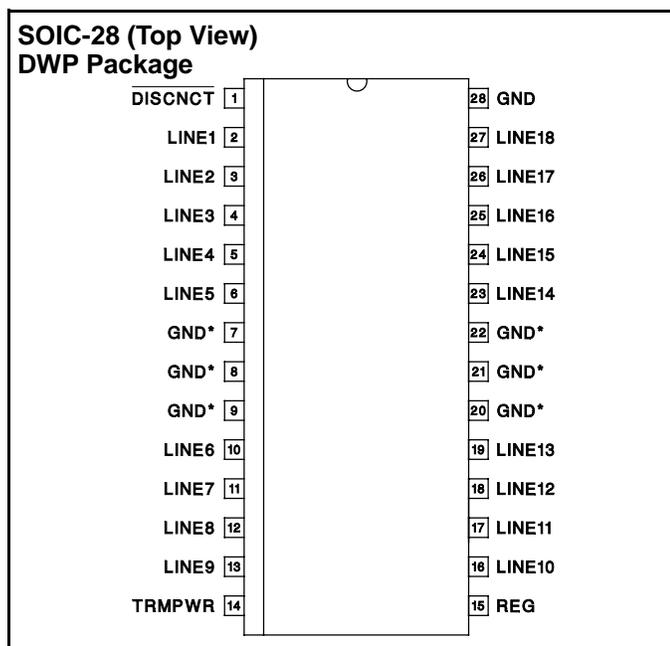
CONNECTION DIAGRAMS



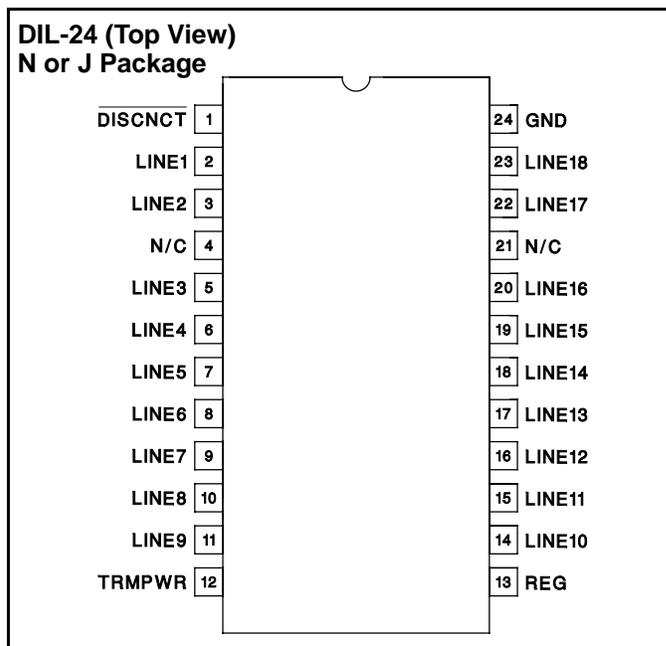
* QP package pins 12 - 18 serve as both heatsink and signal ground.



* PWP package pin 23 serves as signal ground; pins 7, 8, 9, 20, 21 and 22 serve as heatsink/ground.



* DWP package pin 28 serves as signal ground; pins 7, 8, 9, 20, 21, 22 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°C . TRMPWR = 4.75V, DISCNCT = 2.4V. $T_A = T_J$.

| PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNITS | | |
|--|--|--|----------------------------------|-------|------------------|-----|---------------|
| Supply Current Section | | | | | | | |
| Tempwr Supply Current | All termination lines = Open | | 17 | 25 | mA | | |
| | All termination lines = 0.5V | | 400 | 430 | mA | | |
| Power Down Mode | DISCNCT = GND | | 100 | 150 | μA | | |
| Output Section (Terminator Lines) | | | | | | | |
| Terminator Impedance | $\Delta\text{LINE} = -5\text{mA}$ to -15mA | 104.5 | 110 | 115.5 | Ω | | |
| Output High Voltage | $V_{\text{TRMPWR}} = 4\text{V}$ (Note 1) | 2.65 | 2.9 | 3.0 | V | | |
| Max Output Current | $V_{\text{LINE}} = 0.5\text{V}$ | $T_J = 25^\circ\text{C}$ | -20.3 | -21.5 | -22.4 | mA | |
| | | $0^\circ\text{C} < T_J < 70^\circ\text{C}$ | -19.8 | -21.5 | -22.4 | mA | |
| Max Output Current | $V_{\text{LINE}} = 0.5\text{V}$, TRMPWR = 4V (Note 1) | $T_J = 25^\circ\text{C}$ | -19.5 | -21.5 | -22.4 | mA | |
| | | $0^\circ\text{C} < T_J < 70^\circ\text{C}$ | -19.0 | -21.5 | -22.4 | mA | |
| | $V_{\text{LINE}} = 0.2\text{V}$, TRMPWR = 4V to 5.25V | $0^\circ\text{C} < T_J < 70^\circ\text{C}$ | -21.6 | -24.0 | -25.4 | mA | |
| Output Leakage | DISCNCT = GND | TRMPWR = 0V to 5.25V REG = 0V | $V_{\text{LINE}} = 0$ to 4V | | 10 | 400 | nA |
| | | | $V_{\text{LINE}} = 5.25\text{V}$ | | | 100 | μA |
| | | TRMPWR = 0V to 5.25V, REG = Open $V_{\text{LINE}} = 0\text{V}$ to 5.25V | | 10 | 400 | nA | |
| Output Capacitance | DISCNCT = GND (Note 2) | | 6 | 7 | pF | | |
| Regulator Section | | | | | | | |
| Regulator Output Voltage | | 2.8 | 2.9 | 3 | V | | |
| Regulator Output Voltage | All Termination Lines = 4V | 2.8 | 2.9 | 3 | 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 | $V_{\text{REG}} = 0\text{V}$ | -450 | -650 | -950 | mA | | |
| Sinking Current Capability | $V_{\text{REG}} = 3.5\text{V}$ | 100 | 200 | 500 | mA | | |
| Thermal Shutdown | | | 170 | | $^\circ\text{C}$ | | |
| Thermal Shutdown Hysteresis | | | 10 | | $^\circ\text{C}$ | | |
| Disconnect Section | | | | | | | |
| Disconnect Threshold | | 1.1 | 1.4 | 1.7 | V | | |

Note 1: Measuring each termination line while other 17 are low (0.5V).

Note 2: Guaranteed by design. Not 100% tested in production.

APPLICATION INFORMATION

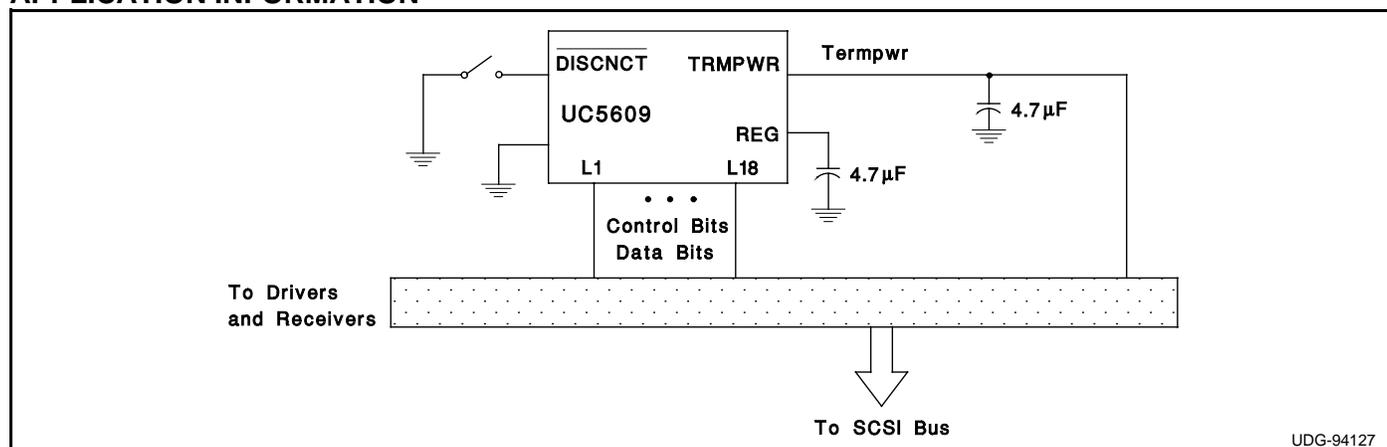


Figure 1: Typical SCSI Bus Configuration

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