**UNITRODE**

# 27-Line SCSI Source/Sink Regulator

## FEATURES

- Complies with SCSI, SCSI-2, SCSI-3 SPI and Ultra SCSI (Fast-20)

- 2.85V Regulated Output Voltage With 1.4% Tolerance

- Provides Current for up to 27 Lines of Active Termination for SCSI Buses

- −750mA Sourcing Current for Termination

- +300mA Sinking Current for Active Negation Drivers

- 0.9V Dropout Voltage Regulator at 750mA and 2.75V Output

- 100μA Supply Current in Disconnect Mode

- Current Limit and Thermal Shutdown Protection

- Low Thermal Resistance Surface Mount Packages

## DESCRIPTION

The UC560 provides current for up to 27 lines of active termination for a SCSI (Small Computers Systems Interface) parallel bus. The SCSI standard requires active termination at both ends of the cable. The UC560 is based on the UC5603 and UC5613 SCSI Active Terminators. It uses the voltage regulator and internal logic circuits of those parts, but has no termination circuits. The UC560 provides greater source current drive capability compared to the UC5603 and UC5613.

The UC560 sink current maintains regulation with all active-negation drivers negated. It provides a disconnect feature which disables the regulator to greatly reduce standby power. Internal circuit trimming is utilized for a 1.4% tolerance output voltage. Other features include thermal shutdown and current limit for short circuit conditions.

The UC560 is available in low thermal resistance versions of the industry standard 8-pin power SOIC, 5-pin TO-220 and 5-pin TO-263.

## BLOCK DIAGRAM



*Pin Numbers refer to 8-pin DP package.*

UDG-95136-1

**SLUS213 - APRIL 1998**
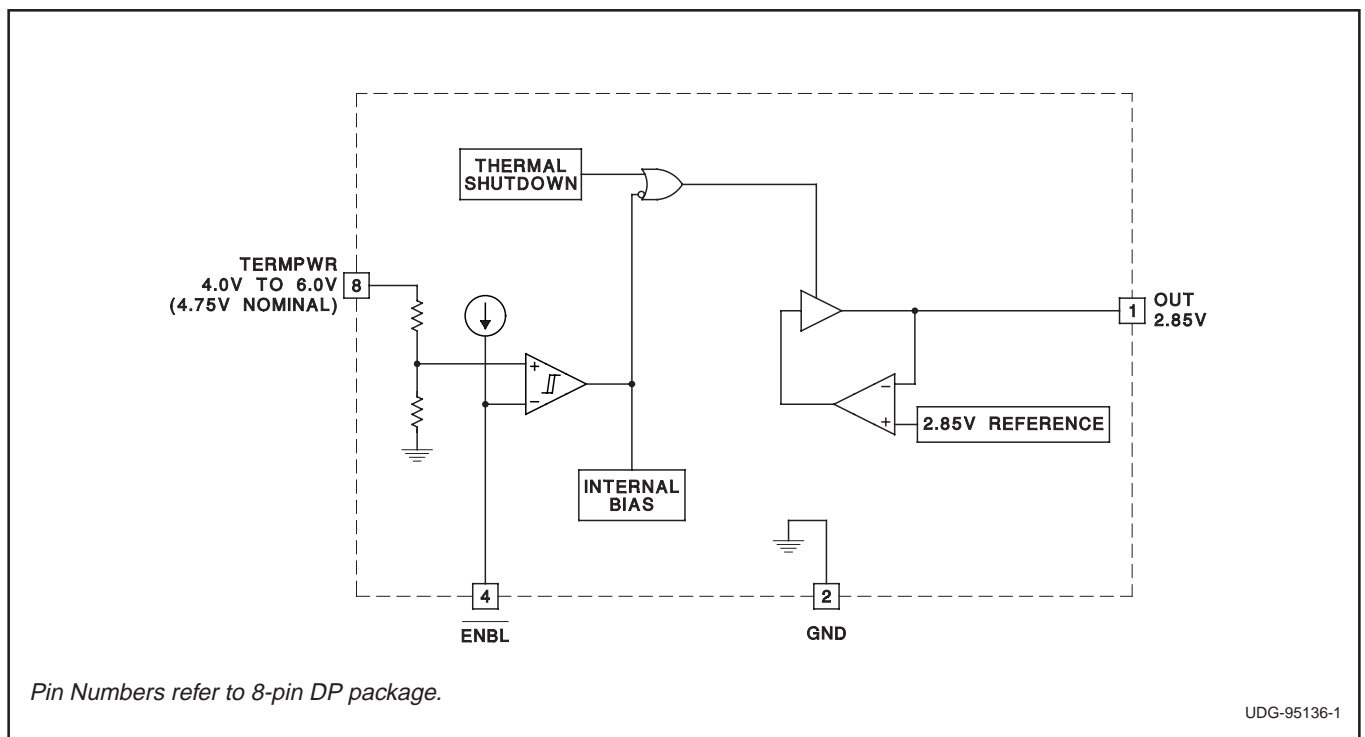
## ABSOLUTE MAXIMUM RATINGS

TERMPWR Voltage. . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 7V
ENBL Voltage . . . . . . . . . . . . . . . . –0.3V to TERMPWR + 0.3V
Regulator Output Current . . . . . . . . . . . . . . . . . . . . . . . . . . 1.4A
Power Dissipation . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 2.5W
Storage Temperature . . . . . . . . . . . . . . . . . . . –65°C to +150°C
Junction Temperature. . . . . . . . . . . . . . . . . . . –55°C to +150°C
Lead Temperature (Soldering, 10 sec.) . . . . . . . . . . . . +300°C

*Currents are positive into, negative out of the specified terminal. Consult Packaging Section of Databook for thermal limitations and considerations of packages.*
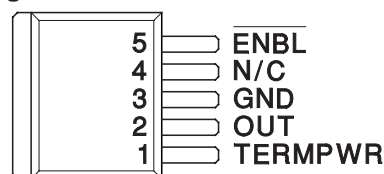
## RECOMMENDED OPERATING CONDITIONS

TERMPWR Voltage . . . . . . . . . . . . . . . . . . . . . . . . 4.0V to 6.0V
ENBL Voltage . . . . . . . . . . . . . . . . . . . . . . . . 0V to TERMPWR

## CONNECTION DIAGRAMS

**SOIC-8 (Top View)**
**DP Package**
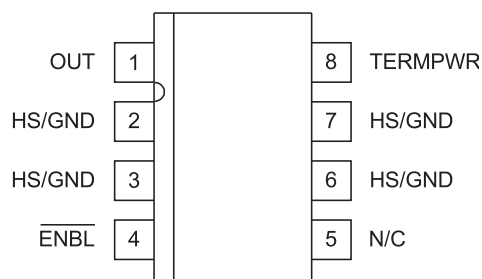


*Note: Pins 2,3,6, and 7 are heat sinking pins. Pin 2 is the connect point for electrical ground.*

**5-Pin TO-220 (Top View)**
**T Package**
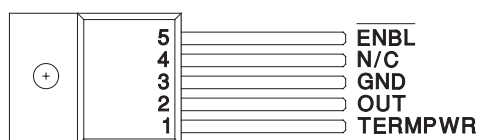


*Note: TAB is ground.*

**5-Pin TO-263 (Top View)**
**TD Package**



*Note: TAB is ground.*

## ELECTRICAL CHARACTERISTICS
Unless otherwise specified, $T_A$ = 0°C to 70°C, TERMPWR = 4.75V, $\overline{ENBL}$ = 0V, $C_{OUT}$ = 4.7μF, $C_{TERMPWR}$ = 4.7μF, $T_A = T_J$.

| PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|
| **Supply Current Section** | | | | | |
| TERMPWR Supply Current | No Load | | 16 | 22 | mA |
| | $I_{OUT}$ = –700mA | | 710 | 750 | mA |
| Power Down Mode | $\overline{ENBL}$ = 2.0V | | 100 | 140 | μA |
| **Regulator Section** | | | | | |
| Regulator Output Voltage | 25°C, No Load | 2.81 | 2.85 | 2.89 | V |
| Load Regulation | $I_{OUT}$ = 300mA to –750mA (Note 2) | | 25 | 30 | mV |
| Line Regulation | TERMPWR = 4.0V to 6.0V, No Load (Note 2) | | 10 | 20 | mV |
| Dropout Voltage | $I_{OUT}$ = –750mA, $V_{OUT}$ = 2.75V | | 0.9 | 1.2 | V |
| Short Circuit Current | $V_{OUT}$ = 0.0V | –0.85 | –1.3 | | A |
| Sinking Current | $V_{OUT}$ = 3.5V | | 500 | 600 | mA |
| | $\overline{ENBL}$ = 2.0V, $V_{OUT}$ = 3.0V | | 1 | 2 | mA |
| Thermal Shutdown | (Note 1) | | 170 | | °C |
| Thermal Shutdown Hysteresis | (Note 1) | | 10 | | °C |
| **Shutdown Section** | | | | | |
| $\overline{ENBL}$ Threshold | | 1.1 | 1.4 | 1.7 | V |
| Threshold Hysteresis | | | 100 | | mV |
| $\overline{ENBL}$ Output Current | | | –10 | –15 | μA |

Note 1: Guaranteed by design. Not 100% tested in production.
Note 2: Tested at a constant junction temperature by low duty cycle pulse testing.

## PIN DESCRIPTIONS

**ENBL:** Enable Bar pin. The $\overline{ENBL}$ function is active low, and the pin will source 10μA typically when at ground and TERMPWR is between 4V and 6V. The part will go into disable mode if $\overline{ENBL}$ is above 1.4V typical, and will turn back on when $\overline{ENBL}$ drops below 1.3V typical. The part also greatly reduces TERMPWR current when disabled (100μA typical).

**GND:** Ground pin.

**OUT:** 2.85V regulated output voltage pin. The part is internally current limited for both sinking and sourcing current to prevent damage. When the part is in disabled mode ($\overline{ENBL} \geq 1.4V$ typical), the output goes to 0V with no external supply source on OUT. The part will sink current, though, if there is an external supply voltage applied to OUT when in disabled mode. For best perfomance, a 4.7μF low ESR capacitor is recommended.

**TERMPWR:** Supply voltage pin. The pin should be decoupled with at least a 2.2μF low ESR output capacitor. For best perfomance, a 4.7μF low ESR capacitor is recommended. Lead lengths should be kept at a minimum.
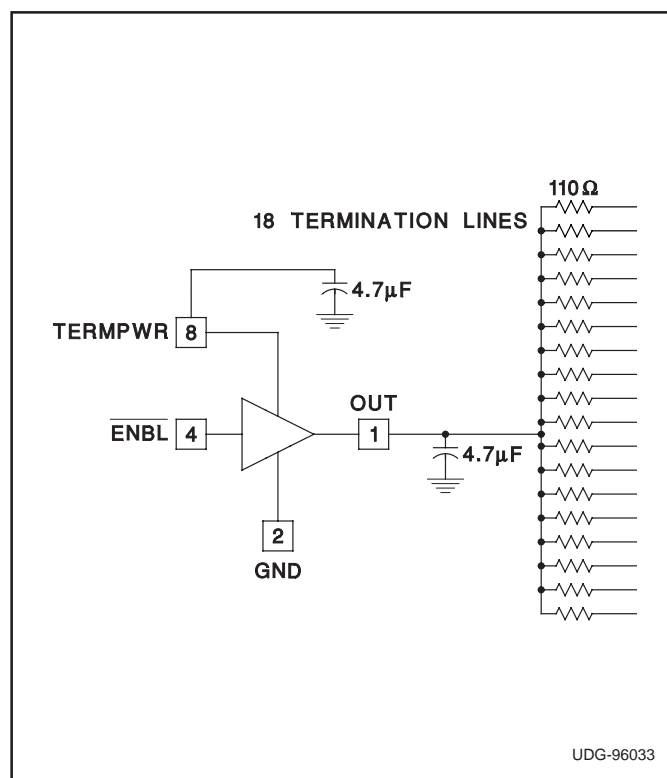
## APPLICATIONS INFORMATION



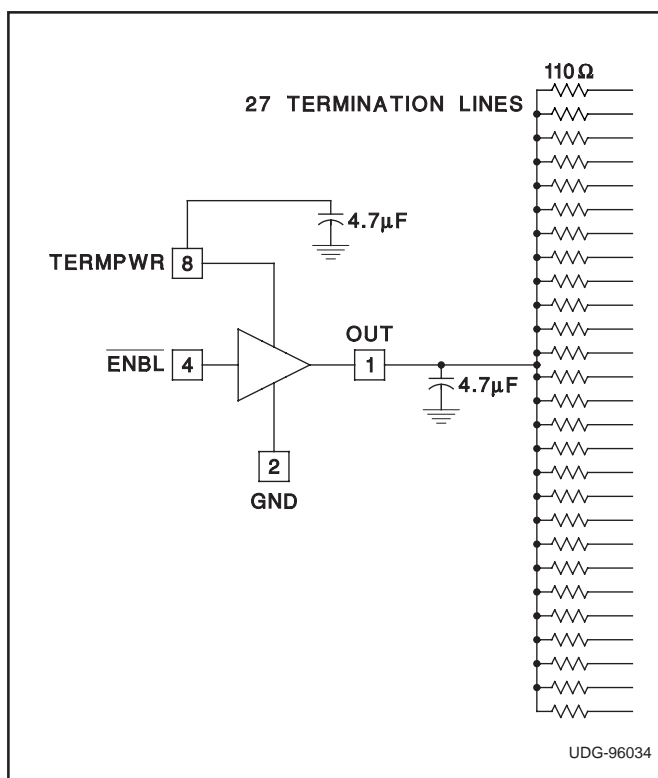**Figure 1. Typical SCSI Bus Configuration Utilizing UC560 Device**



**Figure 2. Typical Wide SCSI Bus Configuration Utilizing UC560 Device**
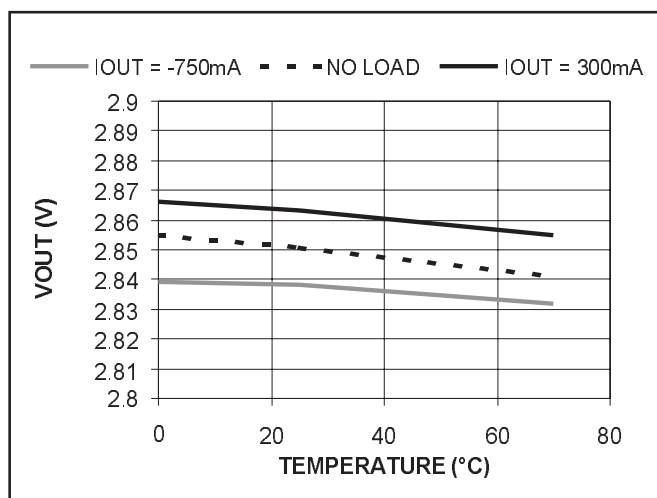
## TYPICAL CHARACTERISTICS
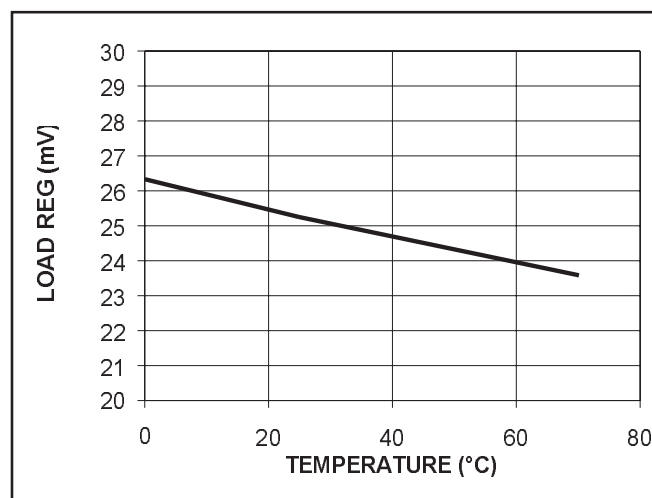


Figure 3. V$_{OUT}$ vs Temperature



Figure 5. Load Regulation vs. Temperature
(I$_{OUT}$ = 300mA to −750mA)

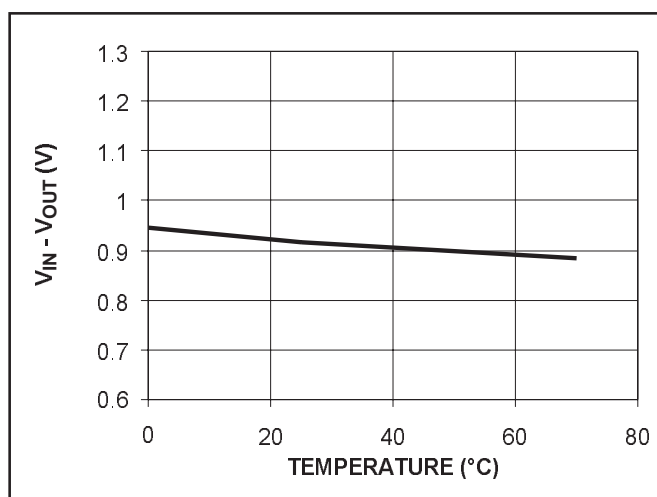

Figure 4. Dropout Voltage vs. Temperature
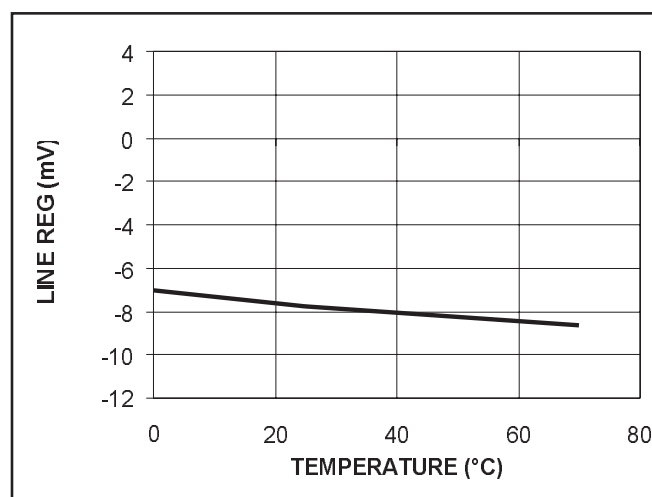(I$_{OUT}$ = −750mA, V$_{OUT}$ = 2.75V)



Figure 6. Line Regulation vs Temperature
(TERMPWR = 4.0V to 6.0V)

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