

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 *Tempwr* applied.

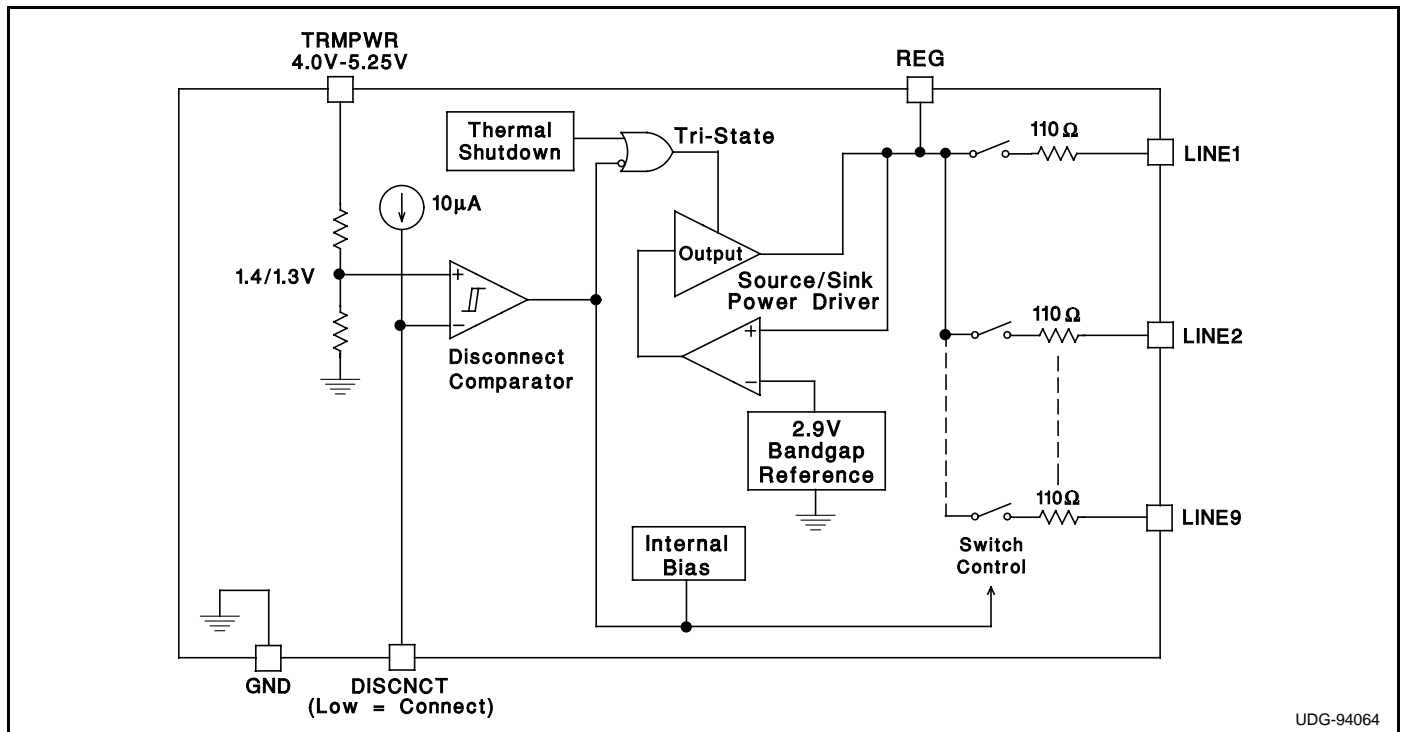
The UC5604 is pin-for-pin compatible with its predecessor, the UC5603 - 9 line Active Terminator. The only functional difference between the UC5604 and UC5603 is the absence of the negative clamps. Parametrically, the UC5604 has a 7% tolerance on impedance and current compared to a 3% tolerance on the 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

| | |
|---|-----------------|
| Tempwr 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.

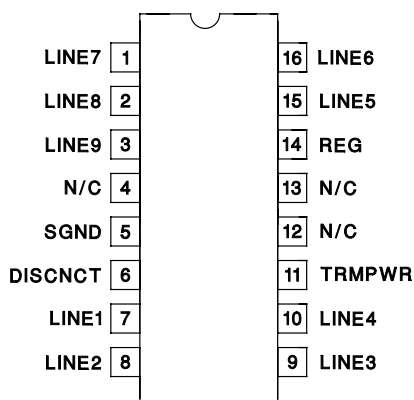
Consult Packaging Section of Unitrode Integrated Circuits databook for thermal limitations and considerations of packages.

RECOMMENDED OPERATING CONDITIONS

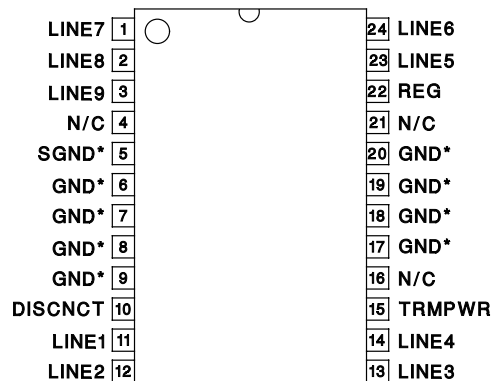
| | |
|--------------------------------|---------------|
| Tempwr Voltage | 3.8V to 5.25V |
| Signal Line Voltage | 0V to +5V |
| Disconnect Input Voltage | 0V to Tempwr |

CONNECTION DIAGRAMS

DIL-16 (Top View)
N or J Package

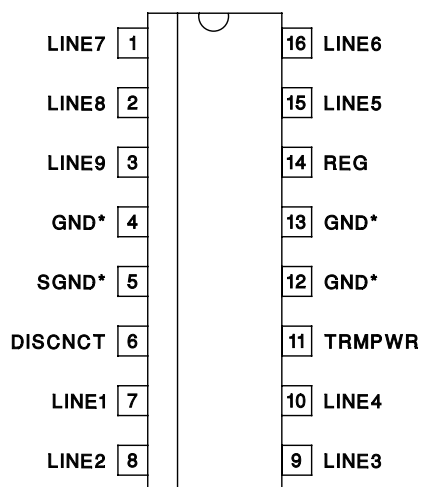


TSSOP-24 (Top View)
PWP Package



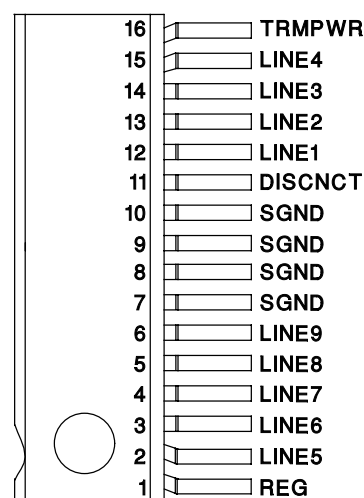
* PWP package pin 5 serves as signal ground; pins 6, 7, 8, 9, 17, 18, 19, and 20 serve as heatsink/ground.

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 TA = 0°C to 70°C.
 TRMPWR = 4.75V, DISCNCT = 0V. TA = TJ.

| PARAMETER | TEST CONDITIONS | | MIN | TYP | MAX | UNITS | |
|--|------------------------------------|----------------------------------|---------------------|-------|-------|-------|----|
| Supply Current Section | | | | | | | |
| Tempwr 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 | ΔLINE = -5mA to -15mA | | 97 | 110 | 129 | Ohms | |
| Output High Voltage | TRMPWR = 4V (Note 1) | | 0°C < TJ < 70°C | 2.55 | | 3.2 | V |
| | | | TJ = 25°C | 2.6 | 2.9 | 3.1 | V |
| Max Output Current | VLINE = 0.5V | | TJ = 25°C | -19.5 | -21.9 | -22.4 | mA |
| | | | 0°C < TJ < 70°C | -18.5 | -21.9 | -22.4 | mA |
| Max Output Current | VLINE = 0.5V, TRMPWR = 4V (Note 1) | | TJ = 25°C | -18.0 | -21.9 | -22.4 | mA |
| | | | 0°C < TJ < 70°C | -17.0 | -21.9 | -22.4 | mA |
| Output Clamp Level | ILINE = -30mA | | -0.2 | -0.05 | 0.1 | V | |
| Output Leakage | DISCNCT = 4V | TRMPWR = 0V to 5.25V | VLINE = 0 to 4V | | 10 | 400 | nA |
| | | REG = 0V | VLINE = 5.25V | | | 100 | μA |
| | | TRMPWR = 0V to 5.25V, REG = Open | VLINE = 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 | IREG = +100mA to -100mA | | | 20 | 50 | mV | |
| Drop Out Voltage | All Termination Lines = 0.5V | | | 1.0 | 1.2 | V | |
| Short Circuit Current | VREG = 0V | | -200 | -400 | -600 | mA | |
| Sinking Current Capability | VREG = 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

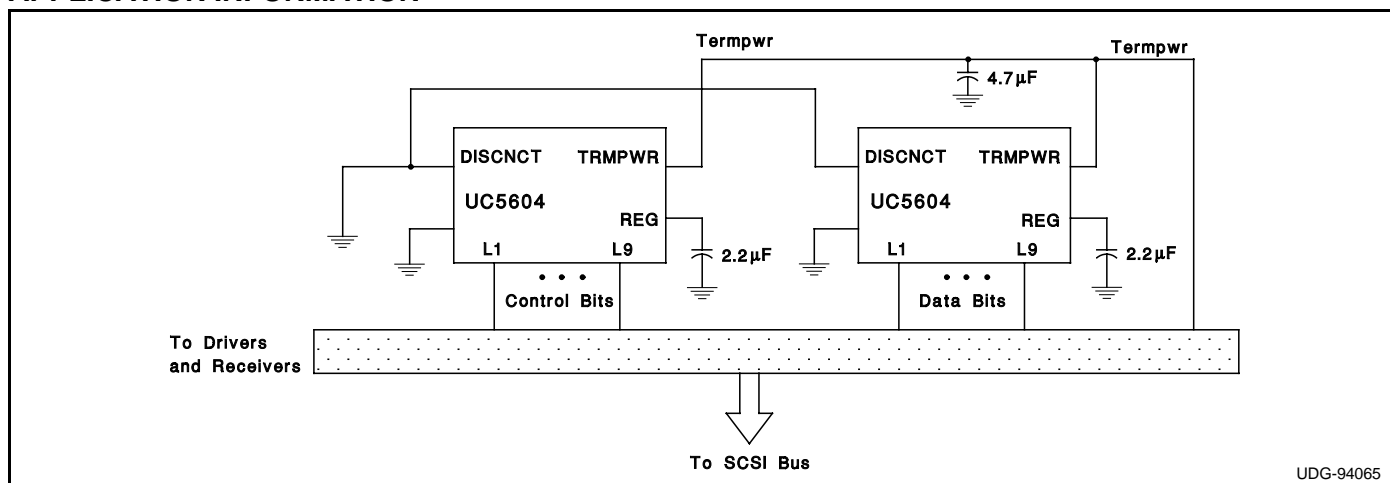


Figure 1: Typical SCSI Bus Configurations Utilizing 2 UC5604 Devices

APPLICATION INFORMATION (cont.)

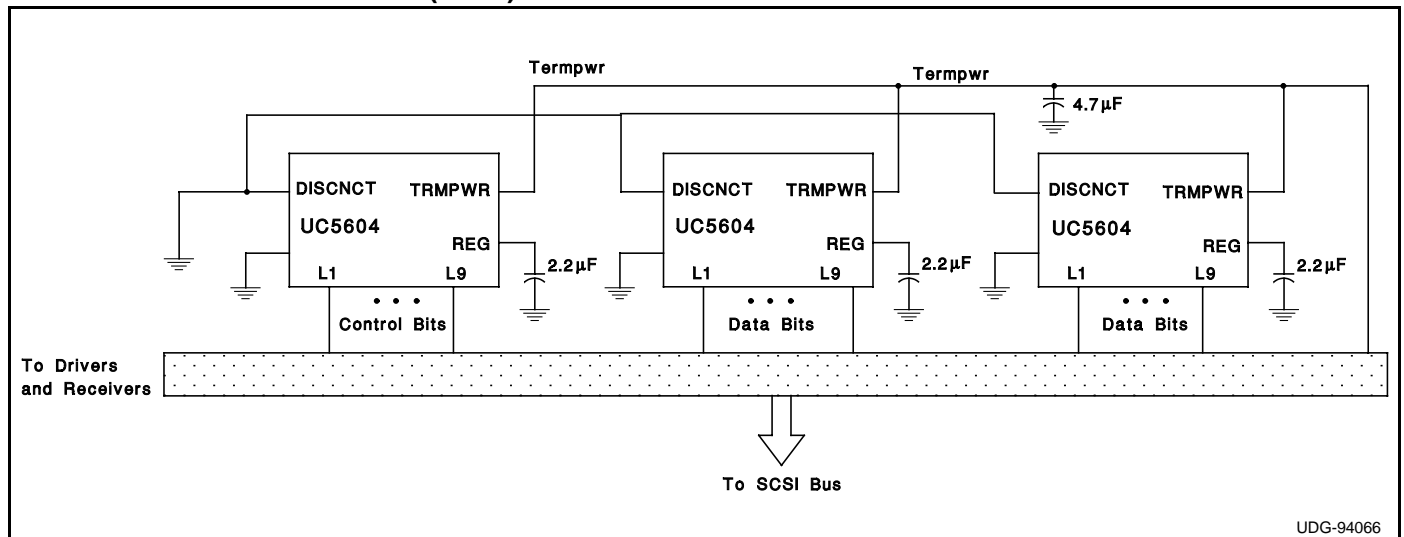


Figure 2: Typical Wide SCSI Bus Configurations Utilizing 3 UC5604 Devices.

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PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| UC5604DP | OBSOLETE | SOIC | D | 16 | | TBD | Call TI | Call TI |
| UC5604DPTR | OBSOLETE | SOIC | D | 16 | | TBD | Call TI | Call TI |
| UC5604J | OBSOLETE | | UTR | 16 | | TBD | Call TI | Call TI |
| UC5604N | OBSOLETE | PDIP | N | 16 | | TBD | Call TI | Call TI |
| UC5604QP | OBSOLETE | PLCC | FN | 28 | | TBD | Call TI | Call TI |
| UC5604QPTR | OBSOLETE | PLCC | FN | 28 | | TBD | Call TI | Call TI |
| UC5604Z | OBSOLETE | | UTR | 16 | | TBD | Call TI | Call TI |

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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