UC5603
9-LINE SCSI ACTIVE TERMINATOR

SLUS195B − MARCH 1997 − REVISED NOVEMBER 2003

- **Complies with SCSI, SCSI−2 and SPI−2 Standards**
- **6-pF Channel Capacitance during Disconnect**
- **100-μA Supply Current in Disconnect Mode**
- **Meets SCSI Hot Plugging**
- **−400-mA Sourcing Current for Termination**
- **+400-mA Sinking Current for Active Negation Drivers**
- **Logic Command Disconnects all Termination Lines**
- **Trimmed Termination Current to 3%**
- **Trimmed Impedance to 3%**
- **Negative Clamping on all Signal Lines**
- **Current Limit and Thermal Shutdown Protection**

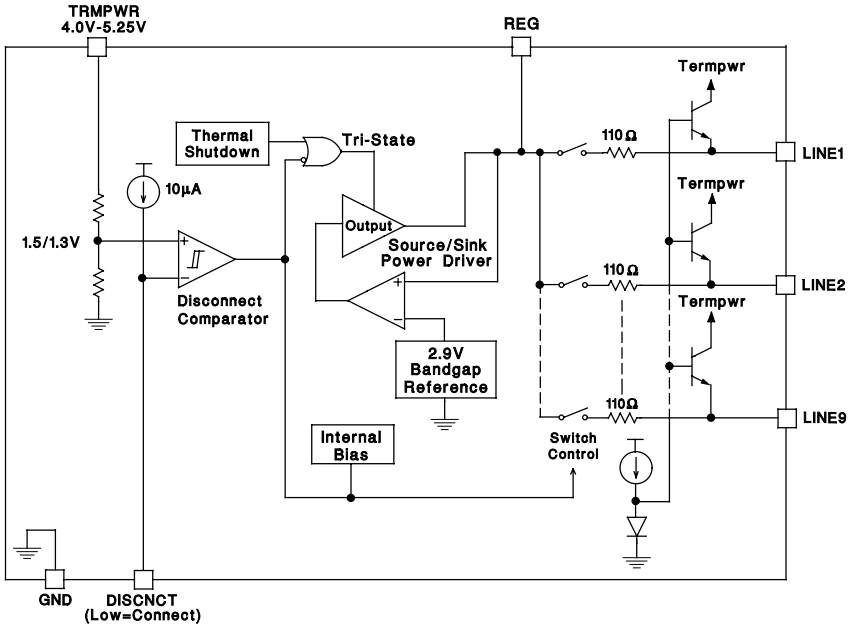
description

The UC5603 provides 9 lines of active termination for a SCSI (Small Computers Systems Interface) parallel bus. The SCSI standard recommends active termination at both ends of the cable segment.

The UC5603 provides a disconnect feature which, when opened or driven high, will disconnect all terminating resistors, and disables the regulator; greatly reducing standby power. The output channels remain high impedance even without Termpwr applied. A low channel capacitance of 6 pF allows units at interim points of the bus to have little to no effect on the signal integrity.

Functionally the UC5603 is similar to its predecessor, the UC5601 − 18 line Active Terminator. Several electrical enhancements were incorporated in the UC5603, such as a sink/source regulator output stage to accommodate all signal lines at 5 V, while the regulator remains at its nominal value, reduced channel capacitance to 6 pF typical, and as with the UC5601, custom power packages are utilized to allow normal operation at full power conditions (1.2 watts).

functional block diagram



UDG-94049

description (continued)

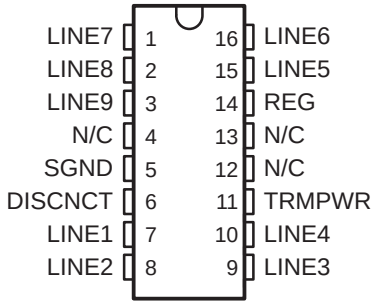
Internal circuit trimming is utilized, first to trim the impedance to a 3% tolerance, and then most importantly, to trim the output current to a 3% tolerance, as close to the max SCSI spec as possible, which maximizes noise margin in fast SCSI operation.

Other features include negative clamping on all signal lines to protect external circuitry from latch-up, thermal shutdown and current limit.

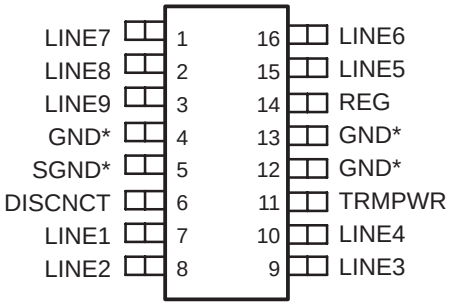
This device is offered in low thermal resistance versions of the industry standard 16 pin narrow body SOIC.

connection diagrams

N PACKAGE
(TOP VIEW)



DP PACKAGE
(TOP VIEW)



* DP package pin 5 serves as signal ground; pins 4, 12, 13 serve as heatsink/ground.

ORDERING INFORMATION

$T_A = T_J$	Packaged Devices	
	DIL -16(N)	SOIC-16 (DP)†
0°C to 70°C	UC5603N	UCUC5603DP

† DP (SOIC−16) packages are available taped and reeled. Add TR suffix to device type (e.g. UC5603DPTR) to order quantities of 2000 devices per reel.

absolute maximum ratings over operating free-air temperature (unless otherwise noted)†‡

Termpwr voltage . . . . . 7 V
Signal line voltage . . . . . 0V to 7 V
Regulator output current . . . . . 0.5 A
Storage temperature . . . . . −65°C to 150°C
Operating temperature . . . . . −55°C to 150°C
Lead temperature (soldering, 10 sec.) . . . . . 300°C

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

‡ 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 . . . . . 3.8 V to 5.25 V
Signal line voltage . . . . . 0 V to 5 V
Disconnect input voltage . . . . . 0 V to Termpwr

electrical characteristics, these specifications apply for T_A = 0°C to 70°C. TRMPWR = 4.75 V DISCNCT = 0 V, $T_A = T_J$, (unless otherwise stated)

supply current section

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Termpwr supply current	All termination lines = Open		12	18	mA
	All termination lines = 0.5 V		200	220	mA
Power down mode	DISCNCT = Open		100	150	µA

output section (terminator lines)

PARAMETER	TEST CONDITIONS			MIN	TYP	MAX	UNITS
Terminator impedance	ΔI_{LINE} = −5 mA to −15 mA			107	110	113	Ω
Output high voltage	V_{TRMPWR} = 4 V, See Note 1			2.7	2.9		V
Max output current	V_{LINE} = 0.5 V		T_J = 25°C	−21.1	−21.9	−22.4	mA
			0°C < T_J < 70°C	−20.5	−21.9	−22.4	mA
Max output current	V_{LINE} = 0.5 V, See Note 1	TRMPWR = 4 V,	T_J = 25°C	−20.3	−21.9	−22.4	mA
			0°C < T_J < 70°C	−19.8	−21.9	−22.4	mA
	V_{LINE} = 0.2 V,	TRMPWR = 4.0 V to 5.25 V	0°C < T_J < 70°C	−22.0	−24.0	−25.4	mA
Output clamp level	I_{LINE} = −30 mA			−0.2	−0.05	0.1	V
Output leakage	DISCNCT = 4 V	TRMPWR = 0 V to 5.25, VREG = 0 V	V_{LINE} = 0 to 4 V		10	400	nA
			V_{LINE} = 5.25 V			100	µA
		TRMPWR = 0 V to 5.25 V, V_{LINE} = 0 V to 5.25 V	REG = Open		10	400	nA
Output capacitance	DISCNCT = Open	See Note 2	DP Package		6	8	pF

NOTES: 1. Measuring each termination line while other 8 are low (0.5 V).
2. Ensured by design. Not production tested.

regulator section

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Regulator output voltage		2.8	2.9	3	V
Regulator output voltage	All termination lines = 5 V	2.8	2.9	3	V
Line regulation	TRMPWR = 4 V to 6 V		10	20	mV
Load regulation	I_{REG} = 100 mA to −100 mA		20	50	mV
Drop out voltage	All termination lines = 0.5 V		0.7	1	V
Short circuit current	V_{REG} = 0 V	−200	−400	−600	mA
Sinking current capability	V_{REG} = 3.5 V	200	400	600	mA
Thermal shutdown			170		°C
Thermal shutdown hysteresis			10		°C

disconnect section

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Disconnect threshold		1.3	1.5	1.7	V
Threshold hysteresis		100	160	250	mV
Input current	DISCNCT = 0 V		10	15	mA

APPLICATION INFORMATION

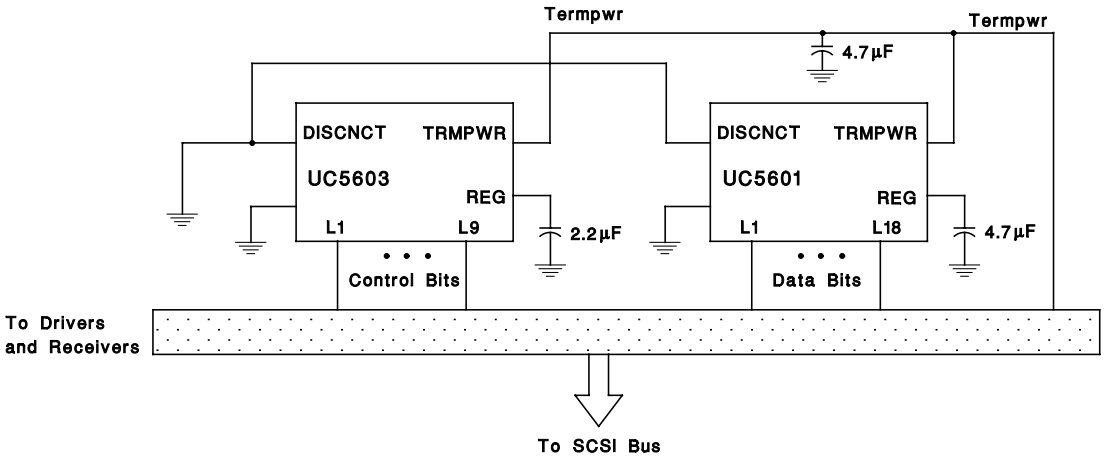


Figure 1. Typical Wide SCSI Bus Configurations Utilizing 1 UC5601 and 1 UC5603 Device

APPLICATION INFORMATION

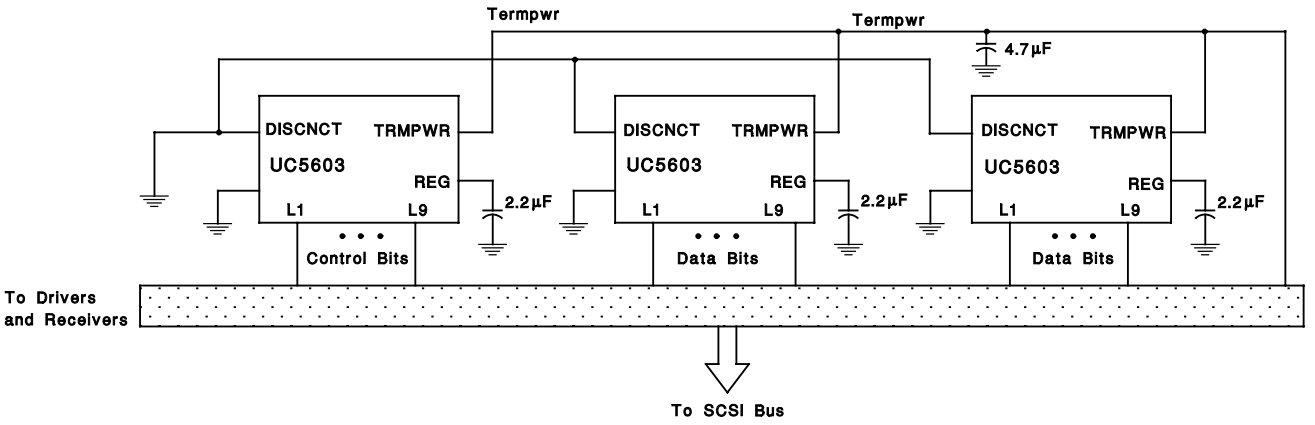
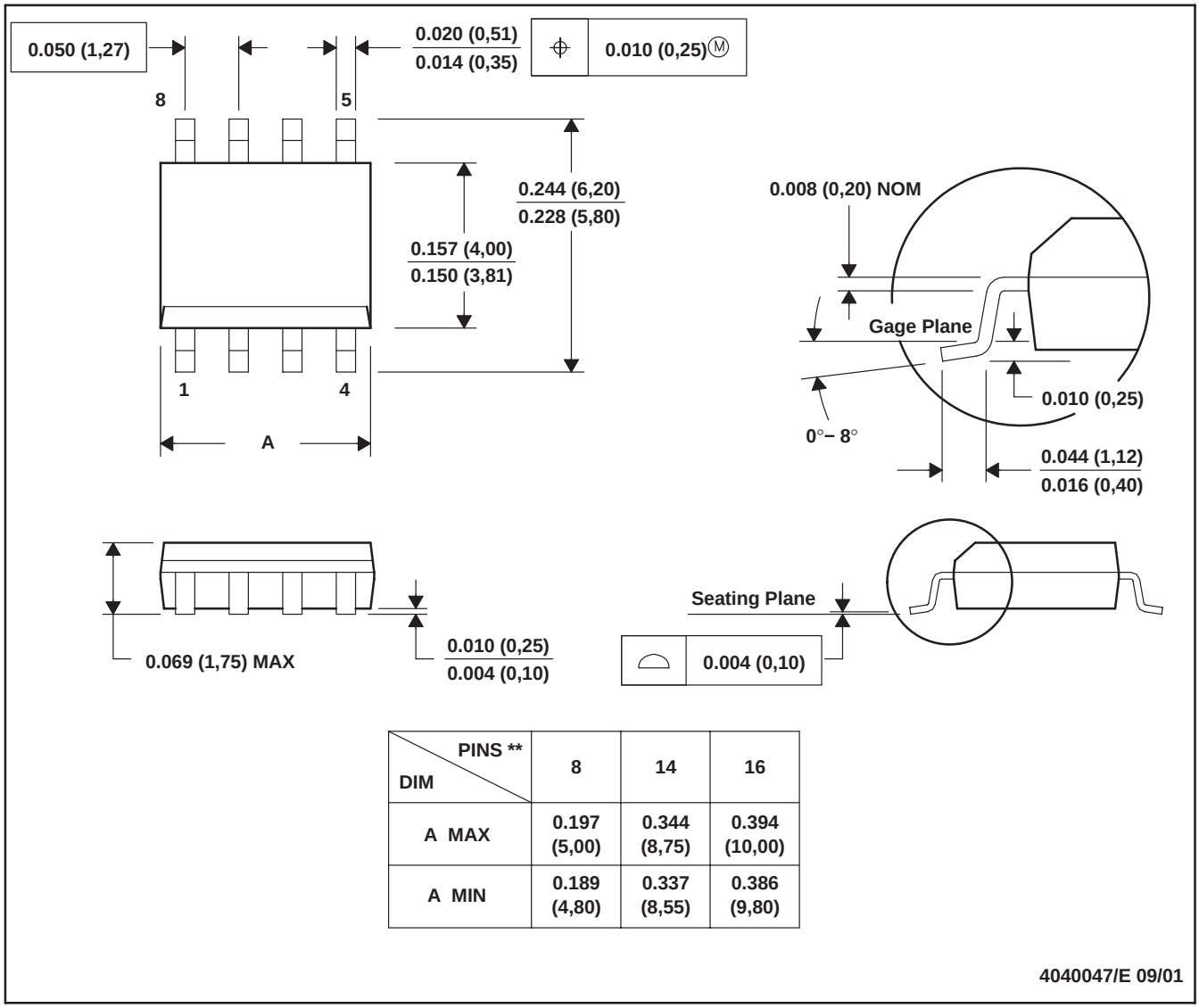


Figure 2. Typical Wide SCSI Bus Configurations Utilizing 3 UC5603 Devices

MECHANICAL DATA

D (R-PDSO-G)** **PLASTIC SMALL-OUTLINE PACKAGE**

8 PINS SHOWN



DIM \ PINS **	8	14	16
A MAX	0.197 (5,00)	0.344 (8,75)	0.394 (10,00)
A MIN	0.189 (4,80)	0.337 (8,55)	0.386 (9,80)

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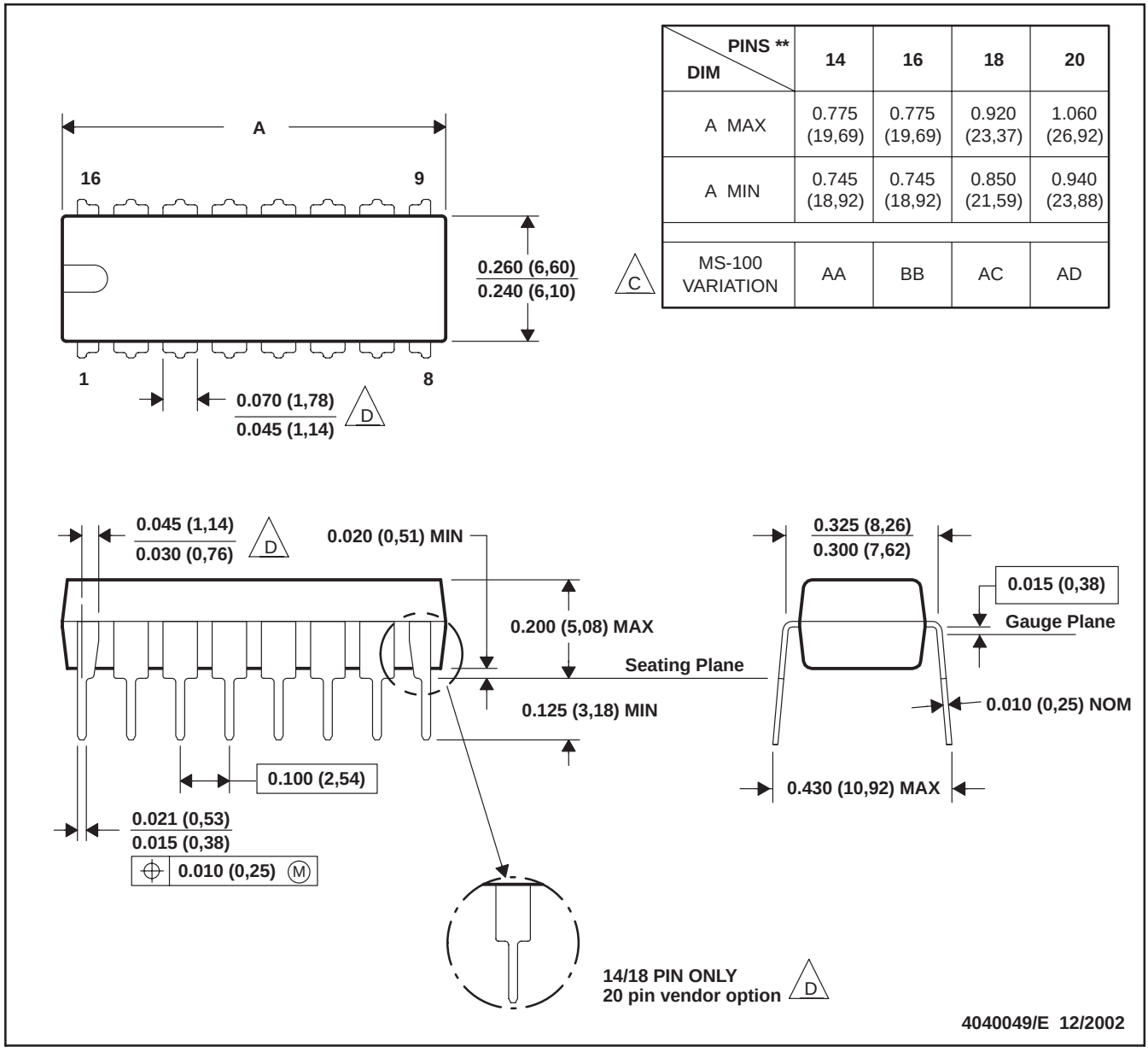
NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0.006 (0,15).
D. Falls within JEDEC MS-012

MECHANICAL DATA

N (R-PDIP-T)** **PLASTIC DUAL-IN-LINE PACKAGE**

16 PINS SHOWN



DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-100 VARIATION	AA	BB	AC	AD

NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS-001, except 18 and 20 pin minimum body lrngth (Dim A).
D. The 20 pin end lead shoulder width is a vendor option, either half or full width.

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