

LOW VOLTAGE DIFFERENTIAL (LVD) SCSI 9-LINE TERMINATOR

FEATURES

- Complies with SCSI, SCSI-2 and SPI-2 Standards
- 5-pF Channel Capacitance During Disconnect
- Meets SCSI Hot Plugging
- –400-mA Sourcing Current for Termination
- +100-mA Sinking Current for Active Negation
- 1-V Dropout Voltage Regulator
- Logic High Command Disconnects all Termination Lines
- 100- μ A Supply Current In Disconnect Mode
- Trimmed Termination Current to 5%
- Trimmed Impedance to 5%
- Low Thermal Resistance Surface Mount Packages

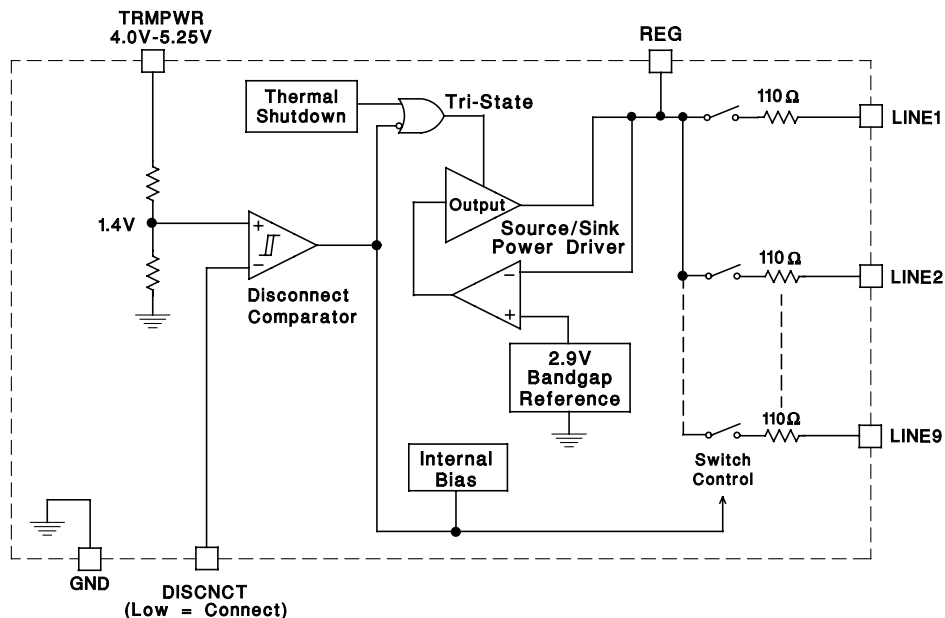
DESCRIPTION

The UC5612 provides 9 lines of active termination for a small computer systems interface (SCSI) parallel bus. The SCSI standard recommends active termination at both ends of the cable segment.

The only functional differences between the UC5603 and UC5612 is the absence of the negative clamps on the output lines. Parametrically, the UC5612 has a 5% tolerance on impedance and current compared to a 3% tolerance on the UC5603. Custom power packages are utilized to allow normal operation at full power at 2 W.

The UC5612 provides a disconnect feature which, when opened or driven high, disconnects all terminating resistors, disables the regulator and greatly reduces standby power consumption. The output channels remain high impedance even without TERMPWR applied. A low channel capacitance of 5 pF allows interim points of the bus to have little to no effect on the signal integrity.

BLOCK DIAGRAM



UDG-94133



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

DESCRIPTION (CONT.)

Internal circuit trimming is utilized, first to trim the impedance to a 5% tolerance, and then most importantly, to trim the output current to a 5% tolerance, as close to the maximum SCSI specification as possible. This maximizes the noise margin in fast SCSI operation. Other features include thermal shutdown and current limit.

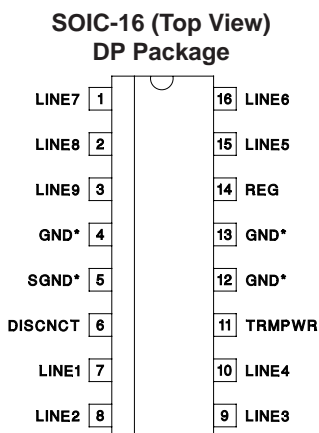
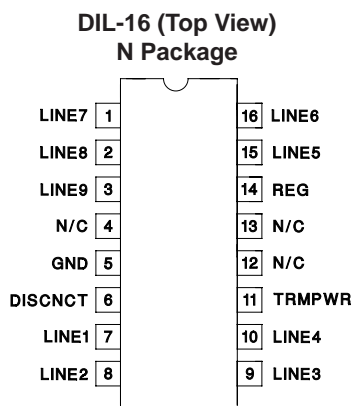
This device is offered in low thermal resistance versions of the industry standard 16-pin narrow body SOIC, 16-pin DIL and 24-pin TSSOP.

ORDERING INFORMATION

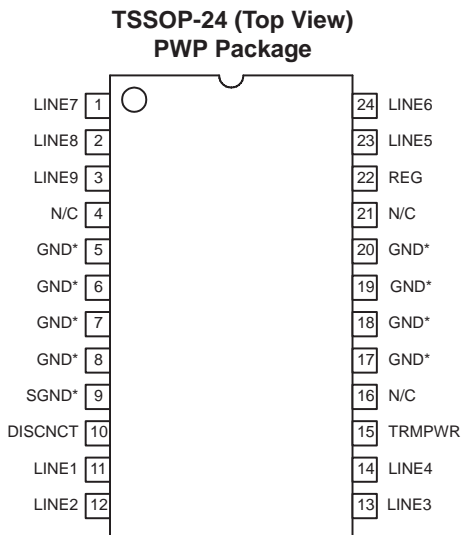
T _A	PACKAGED DEVICE†	PACKAGED DEVICE†	PACKAGED DEVICE†
	DIL-16 (N)	SOIC-16 (DP)	TSSOP-24 (PWP)
0°C to 70°C	UC5612N	UC5612DP	UC5612PWP

† The TSSOP packages are available taped and reeled. Add TR suffix to device type (e.g. UC5612PWPTR) to order quantities of 2,000 devices per reel.

CONNECTION DIAGRAM



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



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

RECOMMENDED OPERATING CONDITIONS

	MIN	NOM	MAX	UNIT
TRMPWR voltage	3.8		5.25	V
Signal line voltage	0		5.0	
Disconnect input voltage	0		6.0	

ABSOLUTE MAXIMUM RATINGS

over operating free-air temperature range unless otherwise noted†‡

	UCC5640	UNIT
TRMPWR voltage	7	V
Signal line voltage	0 to 7.0	
Regulator output current	0.6	A
Storage temperature, T_{stg}	-65 to 150	°C
Operating junction temperature, T_J	-55 to 150	
Lead temperature (soldering, 10 sec.)	300	

† 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. All voltages are with respect to GND. Currents are positive into and negative out of, the specified terminal.

‡ Currents are positive into, negative out of the specified terminal. Consult Packaging Section of Databook for thermal limitations and considerations of packages.

ELECTRICAL CHARACTERISTICST_A = 0°C to 70°C, TRMPWR = 4.75 V, T_A = T_J, (unless otherwise noted)

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS	
Supply Current Section						
Tempwr supply current	All termination lines = Open		17	23	mA	
	All termination lines = 0.5 V		200	225		
Power down mode	DISCNCT = Open		100	150	μA	
Output Section (Termination Lines)						
Terminator impedance	ΔI _{LINE} = -5 mA to -15 mA	104.5	110	115.5	Ω	
Output high voltage		2.65	2.9	3.1	V	
Max output current	V _{LINE} = 0.5 V	T _J = 25°C	-20.3	-21.5	-22.4	mA
		0°C < T _J < 70°C	-19.8	-21.5	-22.4	
Max output current	V _{LINE} = 0.5 V, TRMPWR = 4 V (1)	T _J = 25°C	-19.5	-21.5	-22.4	
		0°C < T _J < 70°C	-19.0	-21.5	-22.4	
Max output current	V _{LINE} = 0.2V, TRMPWR = 4 V to 5.25 V	0°C < T _J < 70°C	-21.6	-24.0	-25.4	
		Output leakage	DISCNCT = 4 V, REG = 0 V, TRMPWR = 0 V to 5.25 V	V _{LINE} = 0 V to 4 V	10	400
Output leakage	REG = Open	V _{LINE} = 5.25 V		100	μA	
		V _{LINE} = 0 V to 5.25 V	10	400	nA	
Output capacitance	DISCNCT = Open, (DP package) ⁽²⁾		5	6	pF	
Regulator Section						
Regulator output voltage		2.7	2.9	3.1	V	
	All termination lines = 4 V	2.7	2.9	3.1		
Line regulation	TRMPWR = 4 V to 6 V		10	20	mV	
Drop out voltage	All termination lines = 0.5 V		1.0	1.2	V	
Short circuit current	REG = 0 V	-200	-400	-600	mA	
Sinking current capability	REG = 3.5 V	75	100	400		
Thermal shutdown			170		°C	
Thermal shutdown hysteresis			10			
Disconnect Section						
Disconnect threshold		1.1	1.4	1.7	V	
Input current	DISCNCT = 0 V		-10	-20	μA	

NOTE: (1) Measuring each termination line while other eight are low.

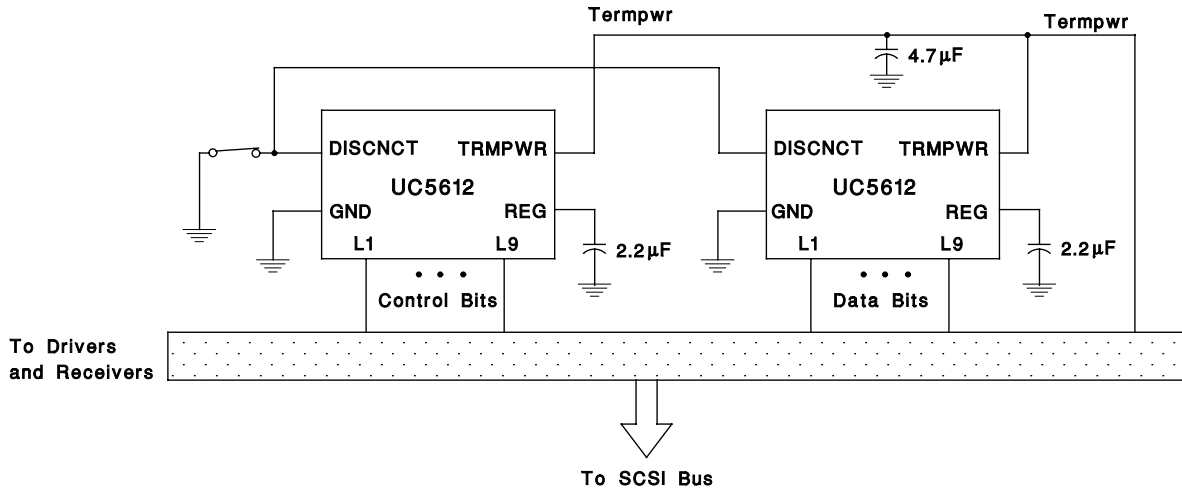
(2) Ensured by design. Not production tested.

TERMINAL FUNCTIONS(1)

TERMINAL		I/O	DESCRIPTION
NAME	NO.		
DISCNCT	6		Taking this pin high or leaving it open causes the nine channels to become high impedance and the chip to go into low-power mode; a low state allows the channels to provide normal termination.
GND	5		Ground reference for the device
LINE1 – LINE9	1, 2, 3, 7, 8, 9, 10, 15, 16		110-Ω termination channels.
REG	14		Output of the internal 2.8-V regulator.
TRMPWR	11		Power for the device.

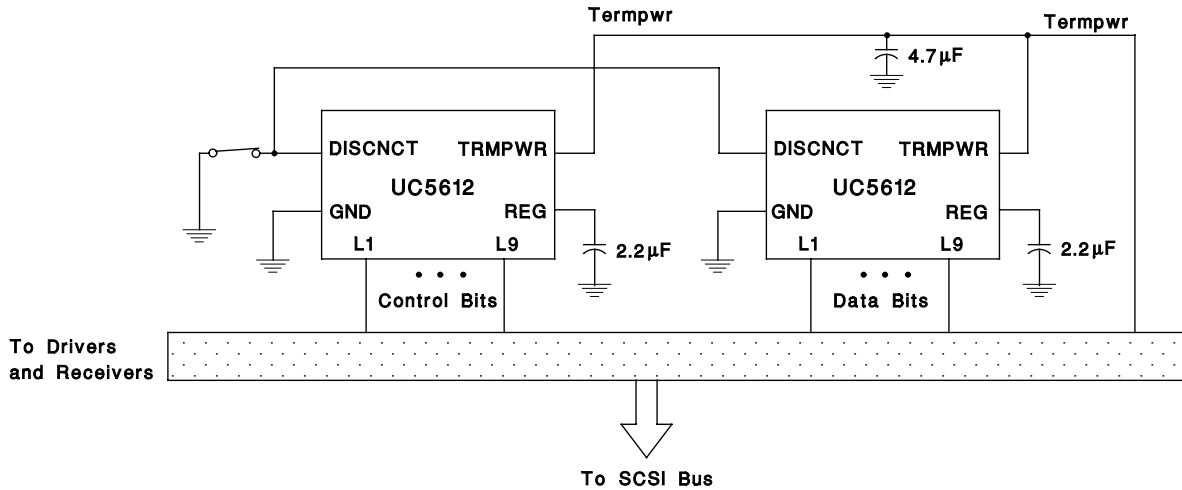
NOTE: (1) N package.

APPLICATION INFORMATION



UDG-94134

Figure 1. Typical SCSI Bus Configurations Utilizing Two UC5612 Devices



UDG-94135

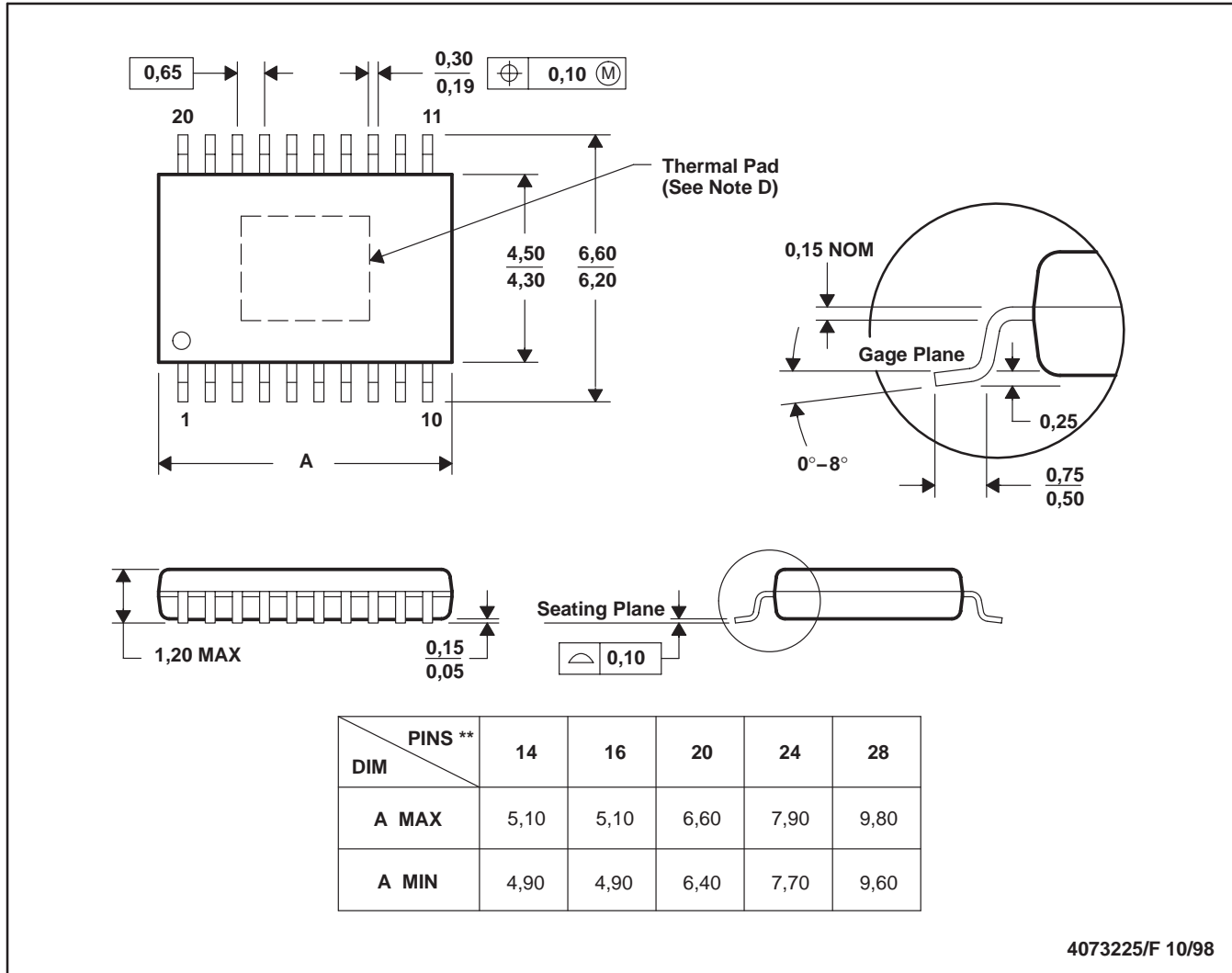
Figure 2. Typical Wide SCSI Bus Configurations Utilizing Three UC5612 Devices

MECHANICAL DATA

PWP (R-PDSO-G**)

PowerPAD™ PLASTIC SMALL-OUTLINE

20 PINS SHOWN



4073225/F 10/98

- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusions.
 D. The package thermal performance may be enhanced by bonding the thermal pad to an external thermal plane. This pad is electrically and thermally connected to the backside of the die and possibly selected leads.
 E. Falls within JEDEC MO-153

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
UC5612DP	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI
UC5612DPG4	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI
UC5612DPTR	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI
UC5612DPTRG4	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI
UC5612PWP	OBSOLETE	TSSOP	PW	24		TBD	Call TI	Call TI
UC5612PWPG4	OBSOLETE	TSSOP	PW	24		TBD	Call TI	Call TI
UC5612PWPTR	OBSOLETE	TSSOP	PW	24		TBD	Call TI	Call TI
UC5612PWPTRG4	OBSOLETE	TSSOP	PW	24		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), Pb-Free (RoHS Exempt), 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.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

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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PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN

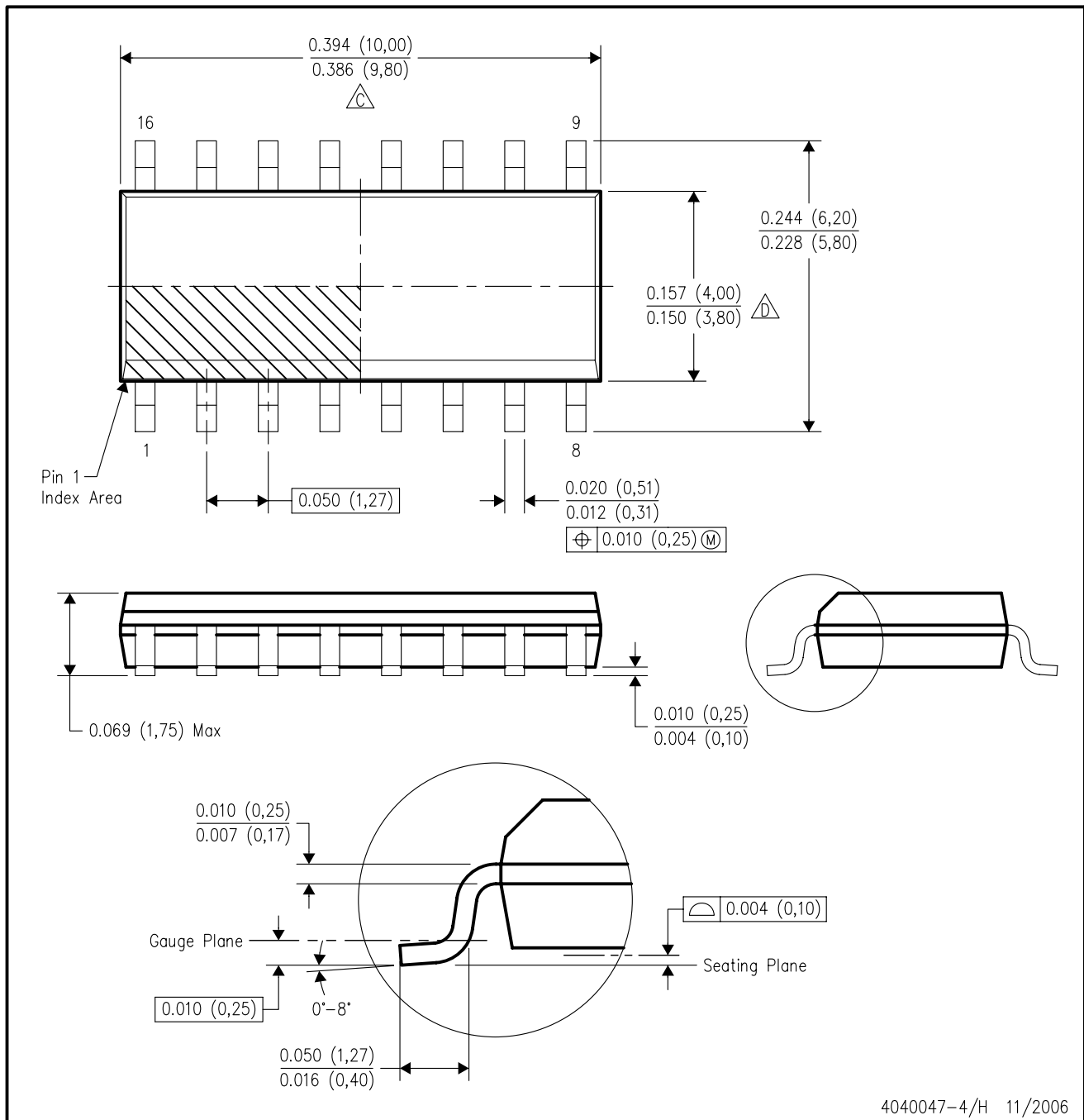


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- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
 D. Falls within JEDEC MO-153

D (R-PDSO-G16)

PLASTIC SMALL-OUTLINE PACKAGE



4040047-4/H 11/2006

- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
 - D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
 - E. Reference JEDEC MS-012 variation AC.

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