18-Line SCSI Terminator (Reverse Disconnect)

FEATURES

- Complies with SCSI, SCSI-2, SCSI-3, SPI and FAST-20 Standards
- 2pF Channel Capacitance During Disconnect
- 50mA Supply Current in Disconnect Mode
- 110Ω Termination
- SCSI Hot Plugging Compliant, 10nA Typical
- +400mA Sinking Current for Active Negation
- –650mA Sourcing Current for Termination
- Trimmed Impedance to 5%
- Thermal Shutdown
- Current Limit

DESCRIPTION

The UCC5617 provides 18 lines of active termination for a SCSI (Small Computers Systems Interface) parallel bus. The SCSI standard recommends and Fast-20 (Ultra) requires active termination at both ends of the cable.

Pin for pin compatible with the UC5609, the UCC5617 is ideal for high performance 5V SCSI systems, Termpwr 4.0-5.25V. During disconnect the supply current is only 50μA typical, which makes the IC attractive for lower powered systems.

The UCC5617 is designed with a low channel capacitance of 2pF, which eliminates effects on signal integrity from disconnected terminators at interim points on the bus.

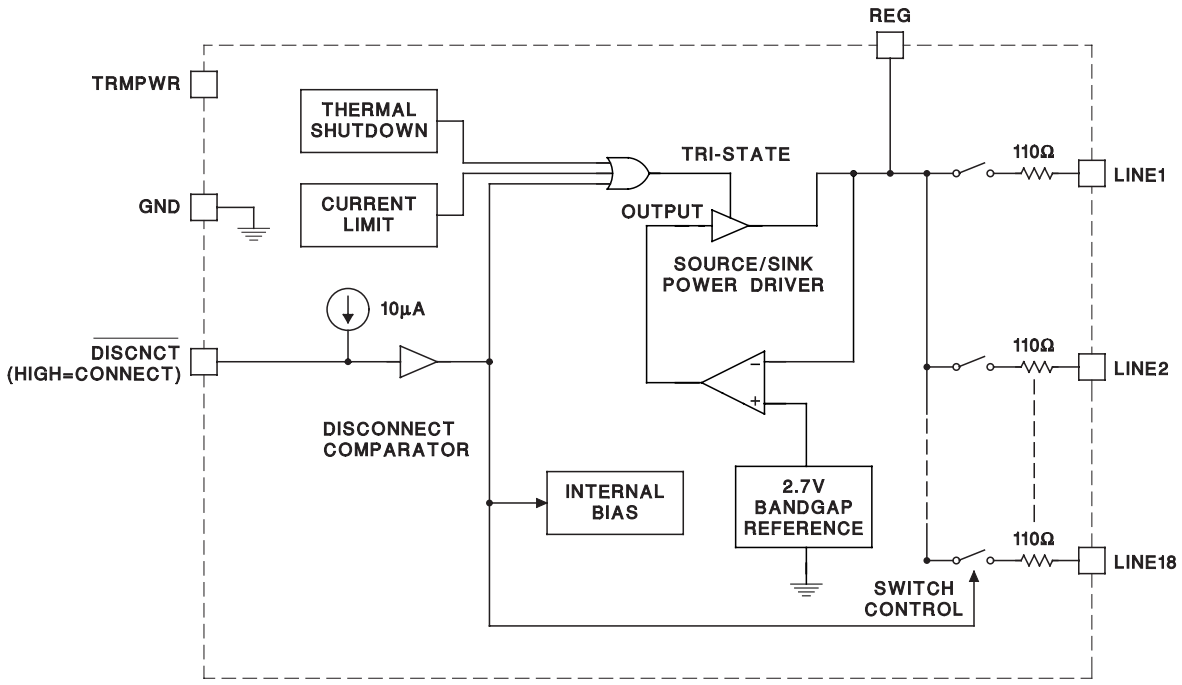
The power amplifier output stage allows the UCC5617 to source full termination current and sink active negation current when all termination lines are actively negated.

The UCC5617, as with all Unitrode terminators, is completely hot pluggable and appears as high impedance at the terminating channels with TRMPWR = 0V or open.

Internal circuit trimming is utilized, first to trim the 110Ω impedance, and then most importantly, to trim the output current as close to the maximum SCSI-3 specification as possible, which maximizes noise margin in fast SCSI operation.

This device is offered in low thermal resistance versions of the industry standard 28 pin wide body SOIC.

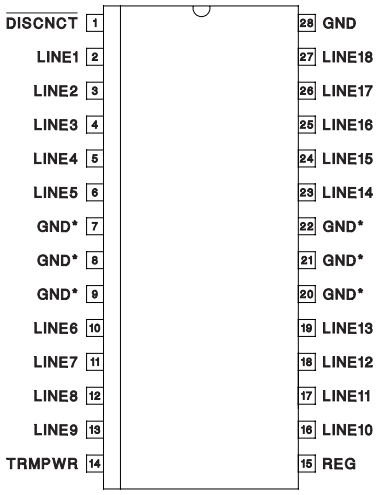
BLOCK DIAGRAM



Patented Circuit Design

CONNECTION DIAGRAMS

SOIC-28 (Top View)
DWP Package



** DWP package pin 28 serves as signal ground; pins 7, 8, 9, 20, 21, 22 serve as heatsink/ground.*

ABSOLUTE MAXIMUM RATINGS

TEMPWR. . . . . +7V
Signal Line Voltage . . . . . 0V to +7V
Regulator Output Current 1A
Storage Temperature . . . . . –65°C to +150°C
Operating Junction Temperature . . . . . –55°C to +150°C
Lead Temperature (Soldering, 10 Seconds) . . . . . 300°C

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

ELECTRICAL CHARACTERISTICS: Unless otherwise stated these specifications apply for T_A = 0°C to 70°C, TRMPWR = 4.75V, DISCNCT = 0V, $T_A = T_J$.

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current Section					
TERMPWR Supply Current	All Termination Lines = Open		1	2	mA
	All Termination Lines = 0.2V		420	440	mA
Power Down Mode	$\overline{\text{DISCNCT}}$ = 0V		50	100	µA
Output Section (Termination Lines)					
Termination Impedance	(Note 3)	104.5	110	115.5	Ω
Output High Voltage	V_{TRMPWR} = 4V (Note 1)	2.6	2.8	3	V
Max Output Current	V_{LINE} = 0.2V, T_J = 25°C	–22.1	–23.3	–24	mA
	V_{LINE} = 0.2V	–20.7	–23.3	–24	mA
	V_{LINE} = 0.2V, TERMPWR = 4V, T_J = 25°C (Note 1)	–21	–23.3	–24	mA
	V_{LINE} = 0.2V, TRMPWR = 4V (Note 1)	–20	–23	–24	mA
	V_{LINE} = 0.5V			–22.4	mA
Output Leakage	$\overline{\text{DISCNCT}}$ = 2.4V, TRMPWR = 0V to 5.25V, REG = 0.2V, V_{LINE} = 5.25V		10	400	nA
Output Capacitance	$\overline{\text{DISCNCT}}$ = 2.4V (Note 2)		2	3.5	pF
Regulator Section					
Regulator Output Voltage		2.6	2.8	3	V
Drop Out Voltage	All Termination Lines = 0.2V		0.4	0.8	V
Short Circuit Current	V_{REG} = 0V	–475	–650	–850	mA
Sinking Current Capability	V_{REG} = 3.5V	200	400	800	mA
Thermal Shutdown			170		°C
Thermal Shutdown Hysteresis			10		°C
Disconnect Section					
Disconnect Threshold		0.8	1.5	2	V
Input Current	$\overline{\text{DISCNCT}}$ = 0V		–10	–30	µA

Note 1: Measuring each termination line while other 17 are low (0.2V).
Note 2: Guaranteed by design. Not 100% tested in production.
Note 3: Tested by measuring I_{OUT} with V_{OUT} = 0.2V and V_{OUT} with no load, then calculating: $Z = \frac{V_{OUT}\ N.L. - 0.2V}{I_{OUT}\ at\ 0.2V}$

PIN DESCRIPTIONS

$\overline{\text{DISCNCT}}$: Taking this pin low causes the 18 channels to become high impedance and the chip to go into low-power mode; a high or open state allows the channels to provide normal termination.

GND: Ground reference for the IC.

LINE1–LINE18: 110Ω termination channels.

REG: Output of the internal 2.8V regulator.

TRMPWR: Power for the IC.

APPLICATION INFORMATION

Procedure:

1) Measure V_{REG} N.L.

2) Set V_L = 0.2V

3) Measure I_{MAX} at 0.2V

4) Impedance = $\frac{V_{REG}\ N.L. - 0.2V}{I_{MAX}}$

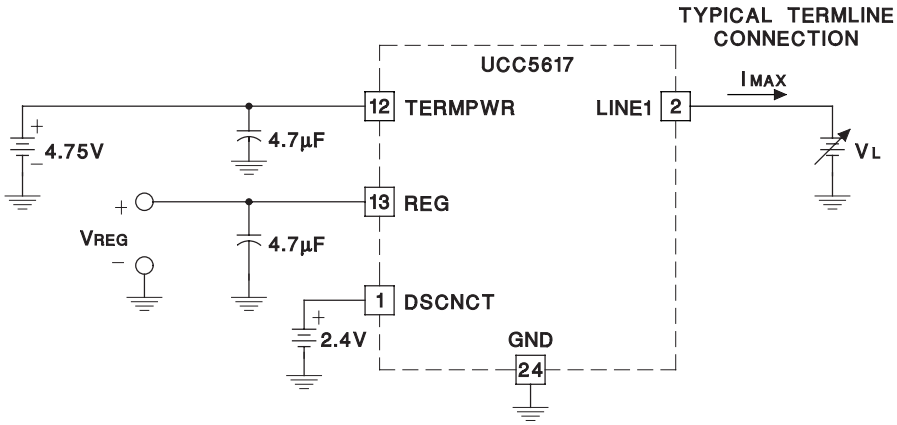
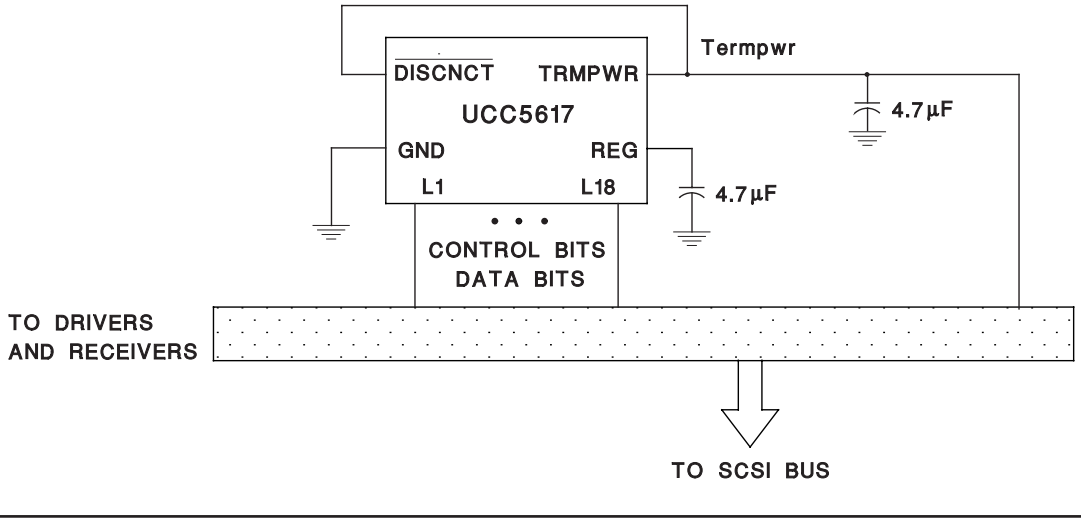


Figure 1. Termline Impedance Measurement Circuit



PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
UCC5617DWP	LIFEBUY	SOIC	DW	28	20	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	0 to 70	UCC5617DWP	
UCC5617DWPG4	LIFEBUY	SOIC	DW	28	20	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	0 to 70	UCC5617DWP	
UCC5617DWPTR	LIFEBUY	SOIC	DW	28	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	0 to 70	UCC5617DWP	
UCC5617DWPTRG4	LIFEBUY	SOIC	DW	28	1000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	0 to 70	UCC5617DWP	

(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.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

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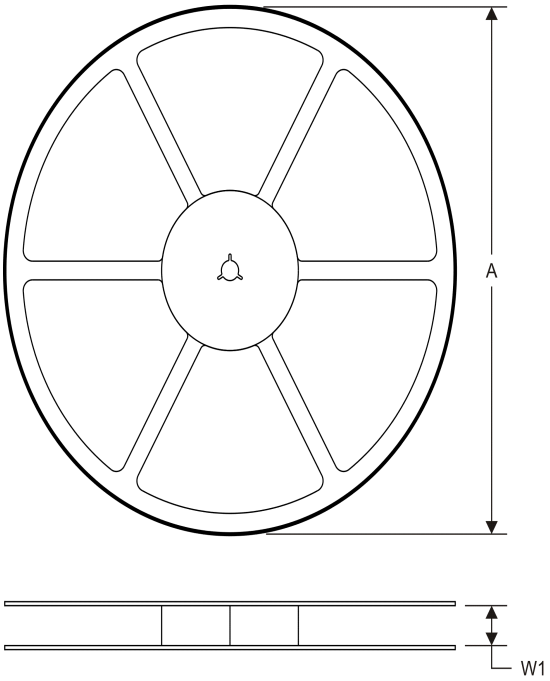
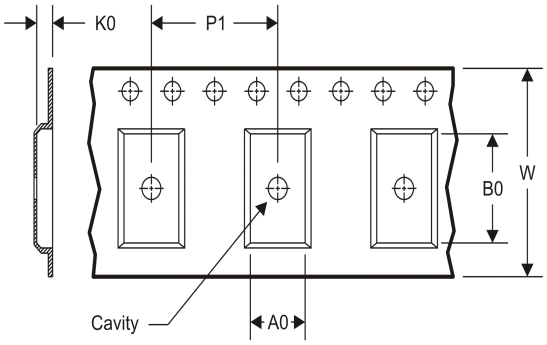
TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



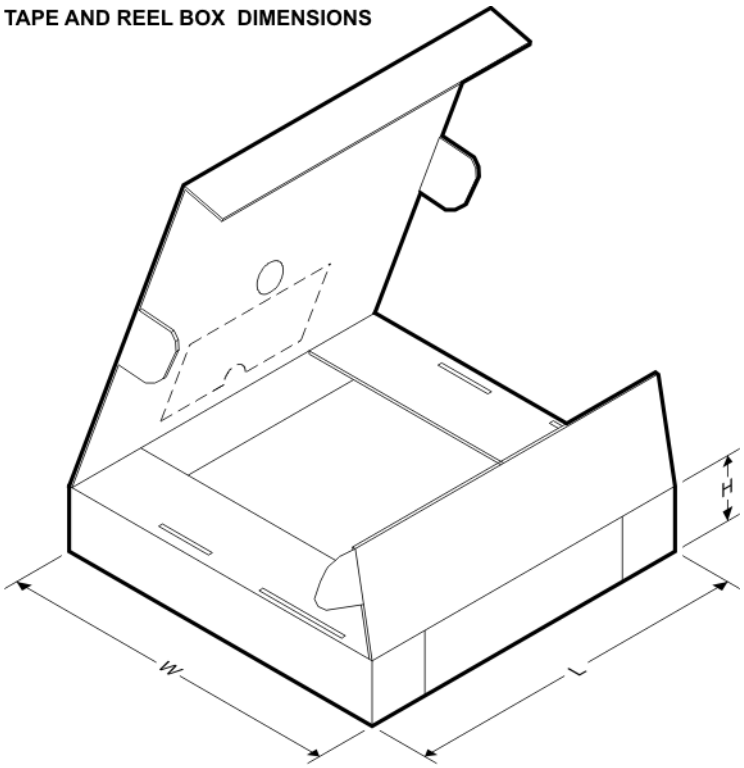
A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

TAPE AND REEL INFORMATION

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
UCC5617DWPTR	SOIC	DW	28	1000	330.0	32.4	11.35	18.67	3.1	16.0	32.0	Q1

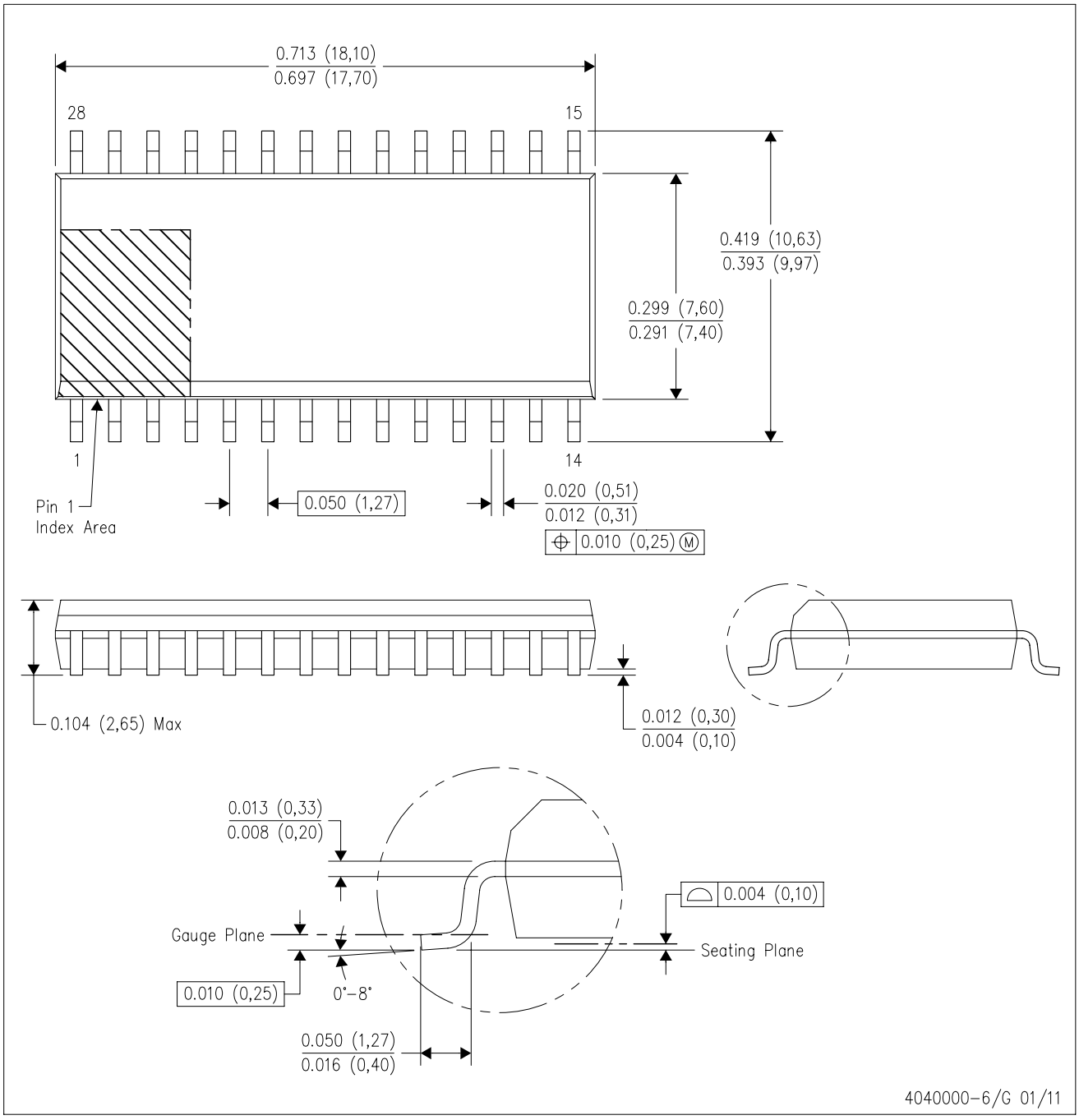
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

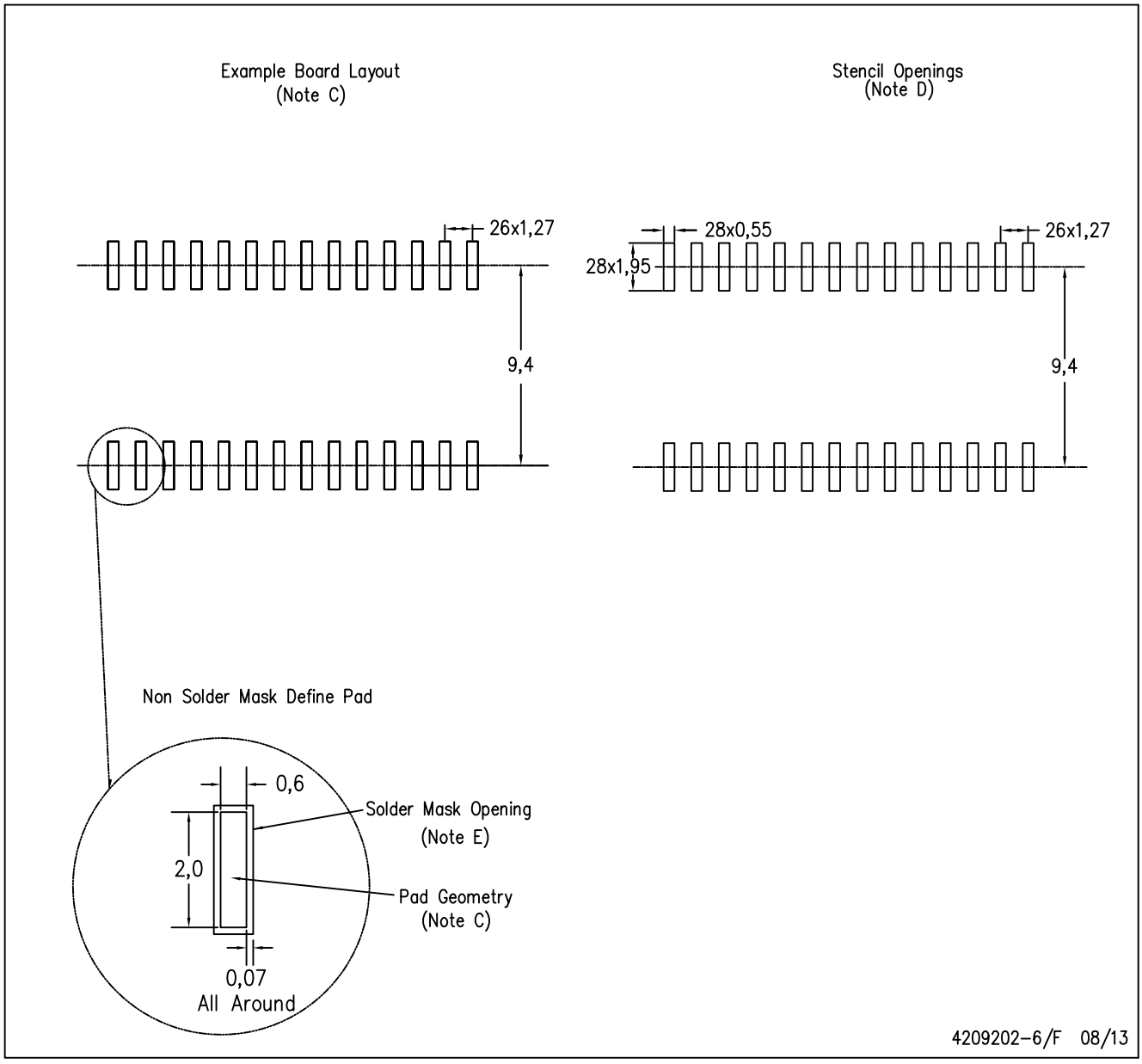
Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
UCC5617DWPTR	SOIC	DW	28	1000	367.0	367.0	55.0

DW (R–PDSO–G28) PLASTIC SMALL OUTLINE



NOTES:
A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M–1994.
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–013 variation AE.

DW (R–PDSO–G28) PLASTIC SMALL OUTLINE



NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Refer to IPC7351 for alternate board design.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC–7525
E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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