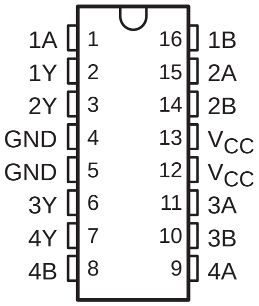
74AC11132
QUADRUPLE 2-INPUT POSITIVE-NAND SCHMITT-TRIGGER

SCAS113 – D3482, MARCH 1990 – REVISED APRIL 1993

- **Operation From Very Slow Input Transitions**
- **Temperature-Compensated Threshold Levels**
- **High Noise Immunity**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise**
- ***EPIC*™ (Enhanced-Performance Implanted CMOS) 1-μm Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Both Plastic Small-Outline Packages and Standard Plastic 300-mil DIPs**

D OR N PACKAGE
(TOP VIEW)



description

Each circuit functions as a NAND gate, but because of the Schmitt action, it has different input threshold levels for positive- and negative-going signals. It performs the Boolean function $Y = \overline{A \bullet B}$ or $Y = \overline{A} + \overline{B}$ in positive logic.

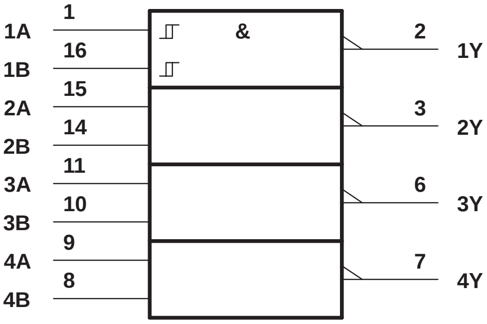
These circuits are temperature compensated and can be triggered from the slowest of input ramps and still give clean jitter-free output signals.

The 74AC11132 is characterized for operation from – 40°C to 85°C.

FUNCTION TABLE

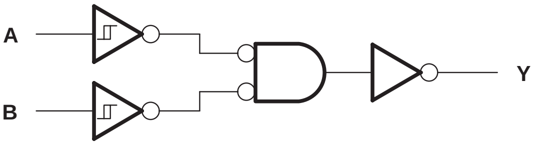
INPUTS		OUTPUT Y
A	B	
H	H	L
L	X	H
X	L	H

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



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TEXAS INSTRUMENTS

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

Supply voltage range, V_{CC} . . . . – 0.5 V to 7 V
Input voltage range, V_I (see Note 1) . . . . – 0.5 V to V_{CC} + 0.5 V
Output voltage range, V_O (see Note 1) . . . . – 0.5 V to V_{CC} + 0.5 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) . . . . ± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$) . . . . ± 50 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC}) . . . . ± 50 mA
Continuous current through V_{CC} or GND . . . . ± 100 mA
Storage temperature range . . . . – 65°C to 150°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.

NOTE 1: The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

recommended operating conditions

			MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		3	5	5.5	V
V_{IH}	High-level input voltage	V_{CC} = 3 V	2.2			V
		V_{CC} = 4.5 V	3.2			
		V_{CC} = 5.5 V	3.9			
V_{IL}	Low-level input voltage	V_{CC} = 3 V			0.5	mA
		V_{CC} = 4.5 V			0.9	
		V_{CC} = 5.5 V			1.1	
V_I	Input voltage				– 24	mA
V_O	Output voltage				– 24	
I_{OH}	High-level output current	V_{CC} = 3 V	0		V_{CC}	V
		V_{CC} = 4.5 V	0		V_{CC}	
		V_{CC} = 5.5 V			–4	
I_{OL}	Low-level output current	V_{CC} = 3 V			12	mA
		V_{CC} = 4.5 V			24	
		V_{CC} = 5.5 V			24	
$\Delta t/\Delta v$	Input transition rise or fall rate		0		100	ns/V
T_A	Operating free-air temperature		– 40		85	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	V_{CC}	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
V_{T+}		3 V			2.2		2.2	V
		4.5 V			3.2		3.2	
		5.5 V			3.9		3.9	
V_{T-}		3 V	0.5			0.5		V
		4.5 V	0.9			0.9		
		5.5 V	1.1			1.1		
V_{hys} ($V_{T+} - V_{T-}$)		3 V	0.3		1.2	0.3	1.2	V
		4.5 V	0.4		1.4	0.4	1.4	
		5.5 V	0.5		1.6	0.5	1.6	
V_{OH}	I_{OH} = – 50 µA	3 V	2.9			2.9		V
		4.5 V	4.4			4.4		
		5.5 V	5.4			5.4		
	I_{OH} = – 4 mA	3 V	2.58			2.48		
	I_{OH} = – 24 mA	4.5 V	3.94			3.8		
		5.5 V	4.94			4.8		
	I_{OH} = – 75 mA†	5.5 V				3.85		
V_{OL}	I_{OL} = 50 µA	3 V			0.1		0.1	V
		4.5 V			0.1		0.1	
		5.5 V			0.1		0.1	
	I_{OL} = 12 mA	3 V			0.36		0.44	
	I_{OL} = 24 mA	4.5 V			0.36		0.44	
		5.5 V			0.36		0.44	
	I_{OL} = 75 mA†	5.5 V					1.65	
I_I	$V_I = V_{CC}$ or GND	5.5 V			± 0.1		± 1	µA
I_{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			4		40	µA
C_i	$V_I = V_{CC}$ or GND	5 V		3.5				pF

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

switching characteristics over recommended operating free-air temperature range, V_{CC} = 3.3 V ± 0.3 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	Y	2.2	6.2	9.2	2.2	10.3	ns
t_{PHL}			2.8	6.8	9.8	2.8	10.5	

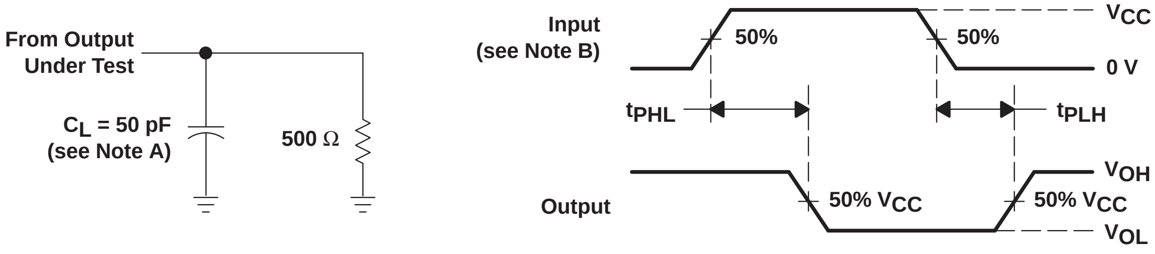
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	Y	1.8	4.2	6.9	1.8	7.5	ns
t_{PHL}			2.3	4.8	7.3	2.3	8	

operating characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance	C_L = 50 pF,	f = 1 MHz	27	pF

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT

VOLTAGE WAVEFORMS

NOTES:
- A. C_L includes probe and jig capacitance.
- B. Input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
- C. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
74AC11132D	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI
74AC11132N	OBSOLETE	PDIP	N	16		TBD	Call TI	Call TI
74AC11132N	OBSOLETE	PDIP	N	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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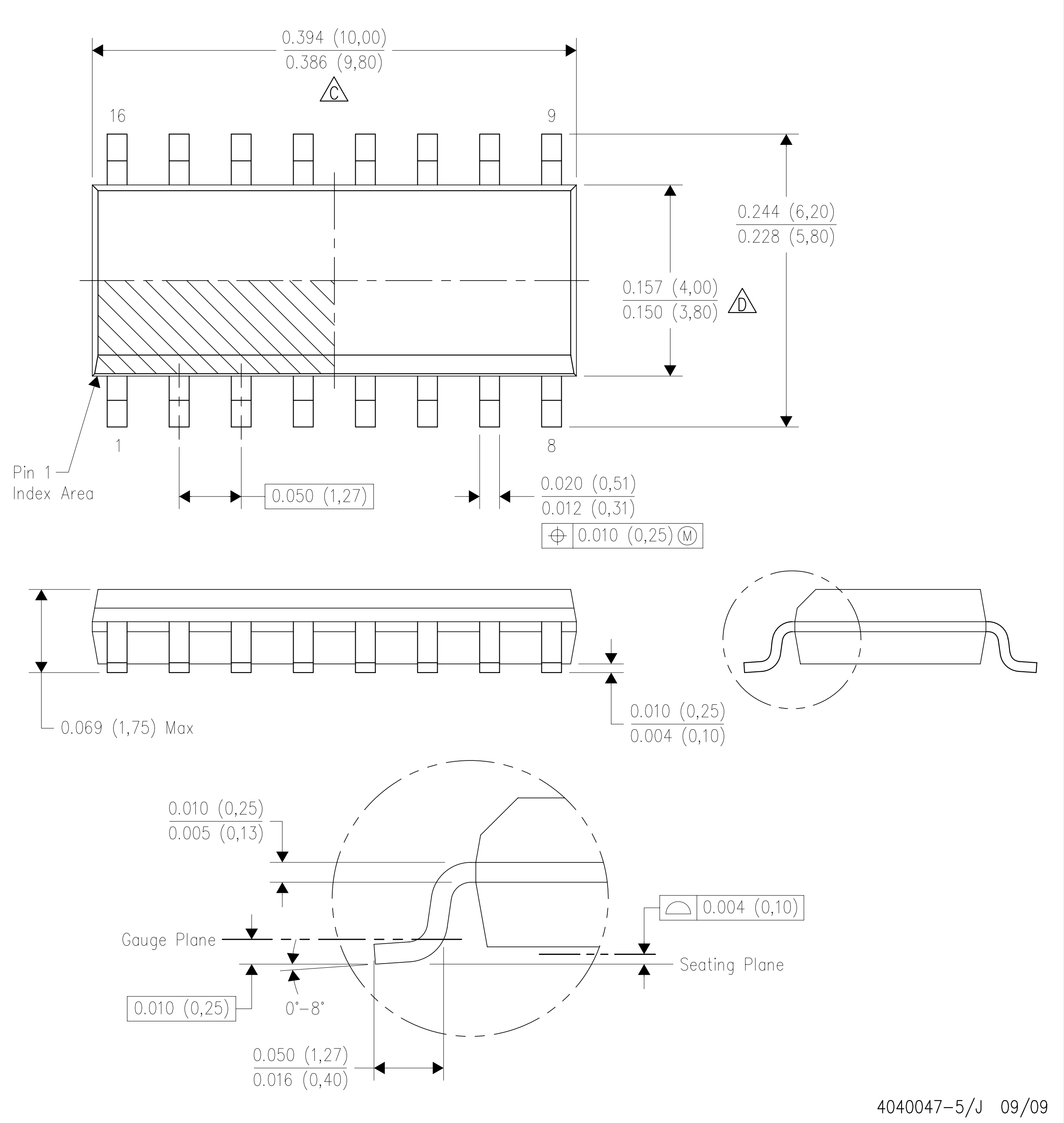
D (R-PDSO-G16) PLASTIC SMALL-OUTLINE PACKAGE

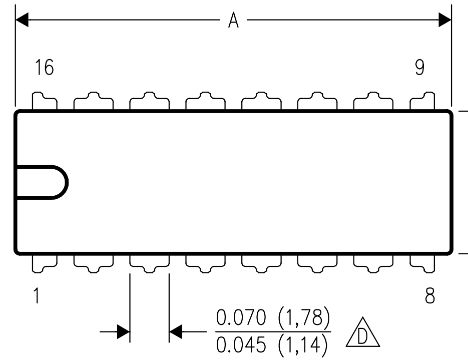


NOTES:
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
- D. Body width does not include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

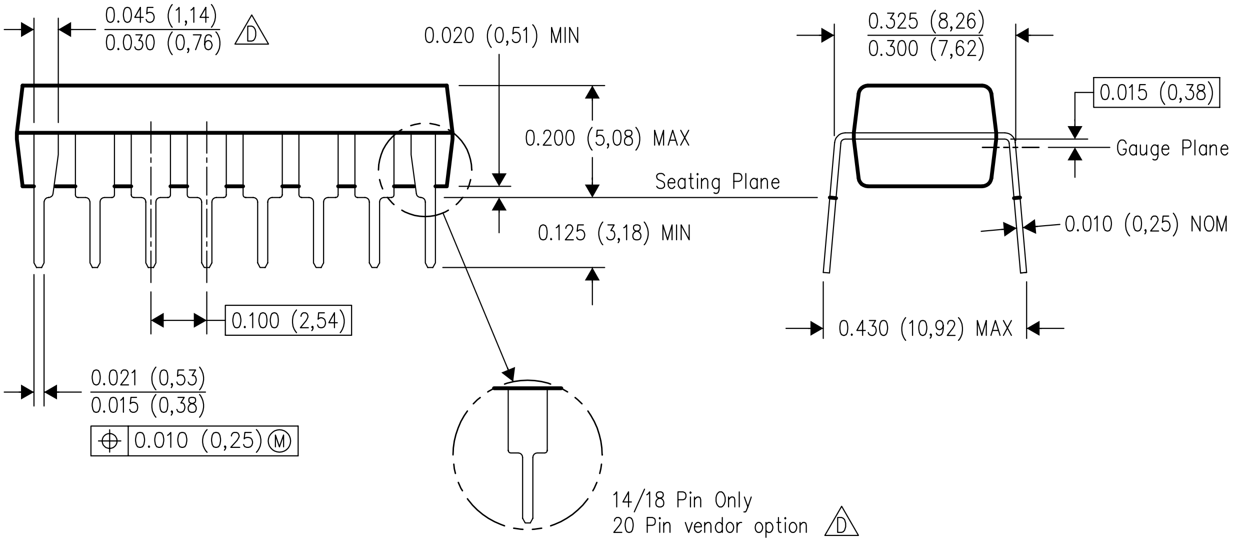
N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN



PINS ** / DIM	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)
△C MS–001 VARIATION	AA	BB	AC	AD



4040049/E 12/2002

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 length (Dim A).
△D The 20 pin end lead shoulder width is a vendor option, either half or full width.

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

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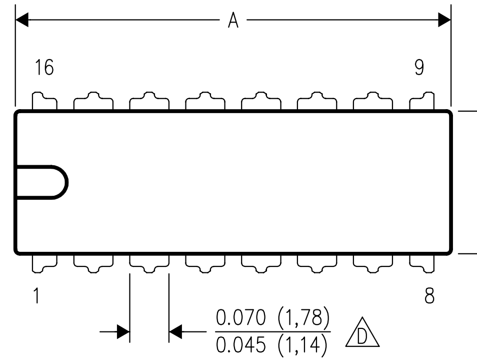
N (R-PDIP-T**) PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



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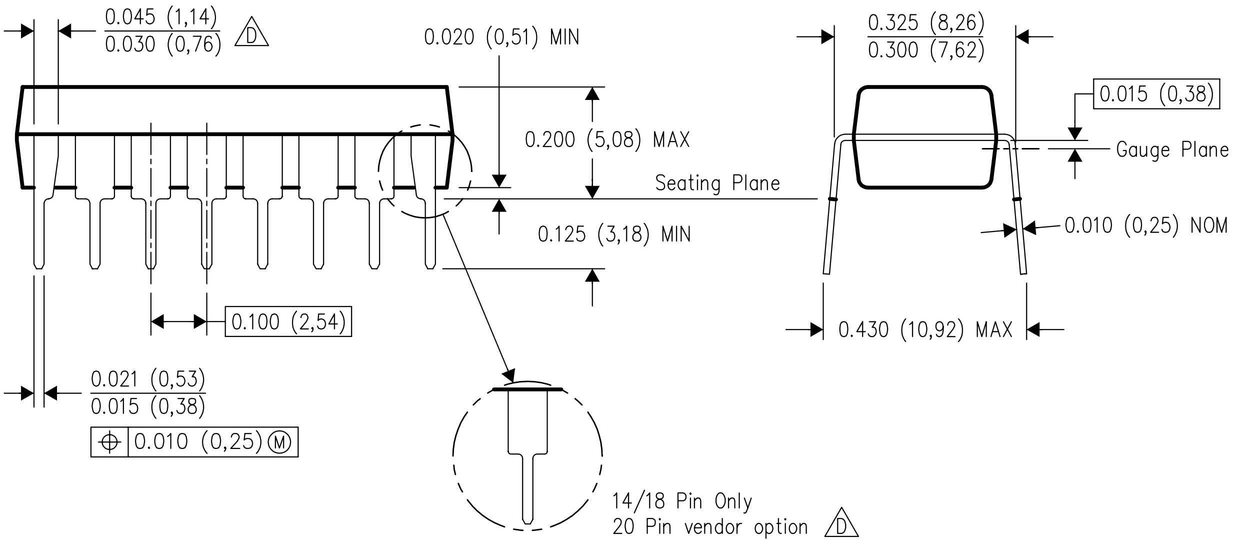

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NOTES:
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- B. This drawing is subject to change without notice.
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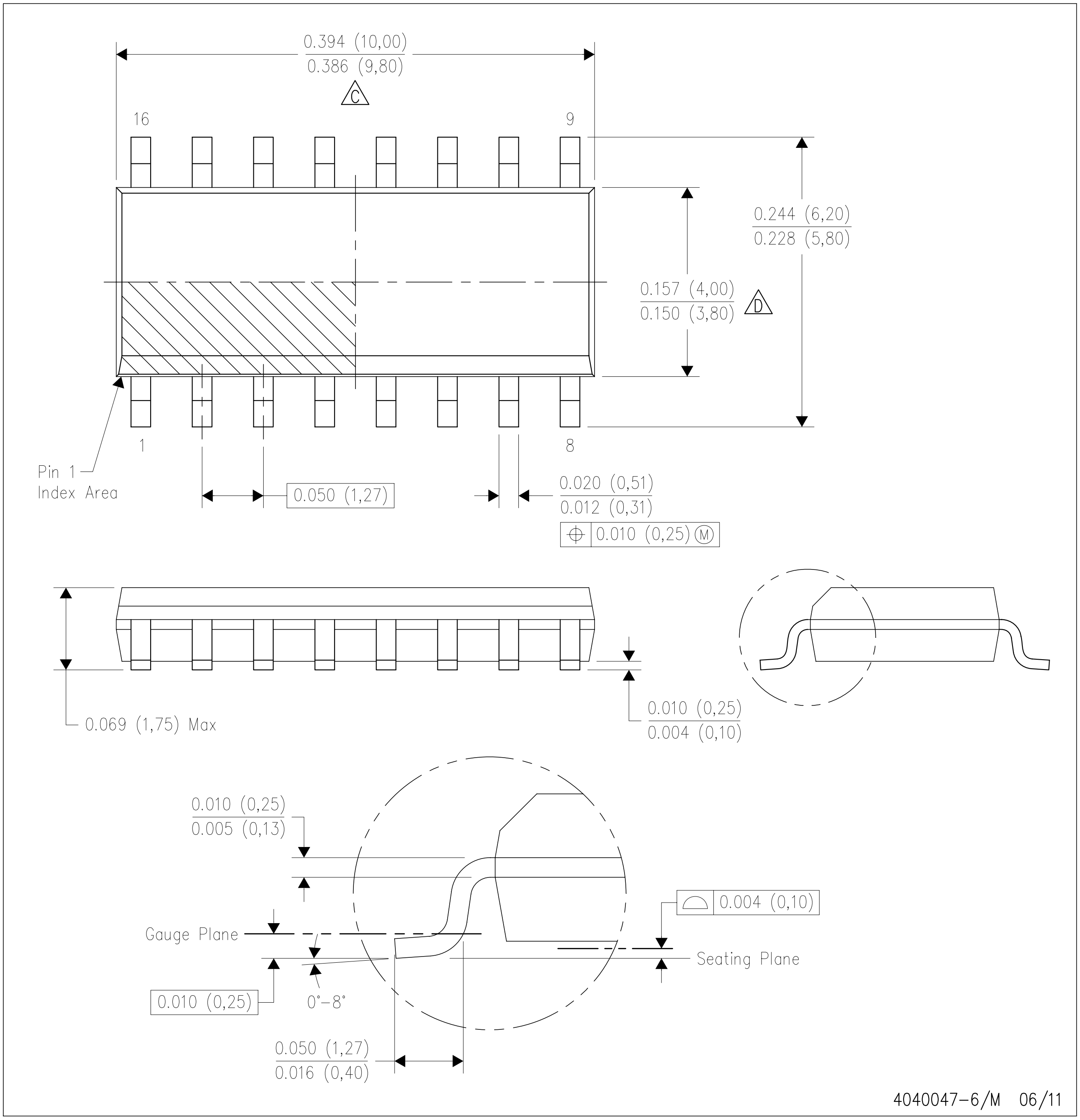
D (R–PDSO–G16) PLASTIC SMALL OUTLINE



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