SN54F253, SN74F253
DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS
WITH 3-STATE OUTPUTS

- **3-State Versions of SN54F153 and SN74F153**
- **Permits Multiplexing From N Lines to One Line**
- **Performs Parallel-to-Serial Conversion**
- **Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**
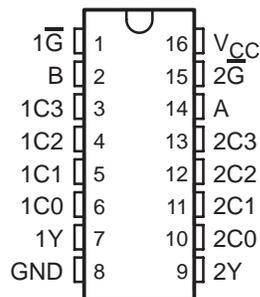
description

These data selectors/multiplexers contain inverters and drivers to supply full binary decoding data selection to the AND-OR gates. Separate output-control inputs are provided for each of the two 4-line sections.
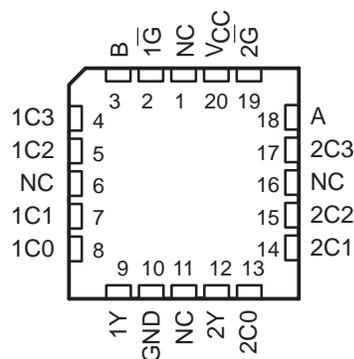
The 3-state outputs can interface with and drive data lines of bus-organized systems. With all but one of the common outputs disabled (at a high-impedance state), the low impedance of the single enabled output will drive the bus line to a high or low logic level. Each output has its own strobe ($\overline{G}$) inputs. The output is disabled when its strobe is high.

The SN54F253 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74F253 is characterized for operation from 0°C to 70°C.

SN54F253 . . . J PACKAGE
SN74F253 . . . D OR N PACKAGE
(TOP VIEW)

```
        ┌───┐ ┌───┐
1G   [ 1      16 ] V_CC
 B   [ 2      15 ] 2G
1C3  [ 3      14 ] A
1C2  [ 4      13 ] 2C3
1C1  [ 5      12 ] 2C2
1C0  [ 6      11 ] 2C1
1Y   [ 7      10 ] 2C0
GND  [ 8       9 ] 2Y
        └──────────┘
```

SN54F253 . . . FK PACKAGE
(TOP VIEW)

```
          B  1G  NC  V_CC  2G
          3   2   1   20   19
1C3  [ 4                18 ] A
1C2  [ 5                17 ] 2C3
NC   [ 6                16 ] NC
1C1  [ 7                15 ] 2C2
1C0  [ 8                14 ] 2C1
          9  10  11  12   13
         1Y  GND NC  2Y  2C0
```

NC – No internal connection

FUNCTION TABLE

INPUTS						STROBE	OUTPUT
SELECT		DATA				$\overline{G}$	Y
B	A	C0	C1	C2	C3		
X	X	X	X	X	X	H	Z
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

Select inputs A and B are common to both sections.

TEXAS INSTRUMENTS

logic symbol†

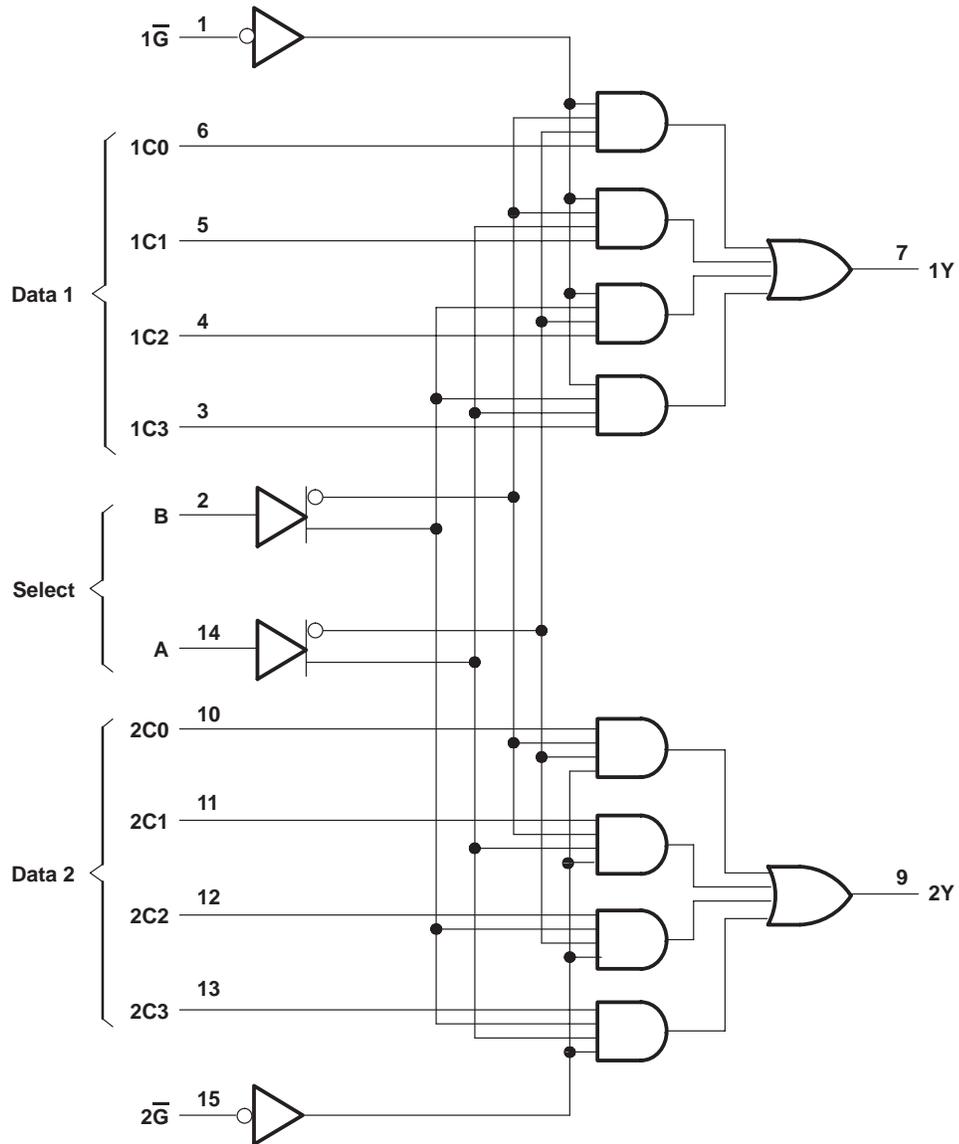† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the D, J, and N packages.

logic diagram (positive logic)

Pin numbers shown are for the D, J, and N packages.

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 (see Note 1)	−1.2 V to 7 V
Input current range	−30 mA to 5 mA
Voltage range applied to any output in the disabled or power-off state	−0.5 V to 5.5 V
Voltage range applied to any output in the high state	−0.5 V to V_{CC}
Current into any output in the low state: SN54F253	40 mA
SN74F253	48 mA
Operating free-air temperature range: SN54F253	−55°C to 125°C
SN74F253	0°C to 70°C
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 voltage ratings may be exceeded provided the input current ratings are observed.

recommended operating conditions

		SN54F253			SN74F253			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{IK}	Input clamp current			−18			−18	mA
I_{OH}	High-level output current			−3			−3	mA
I_{OL}	Low-level output current			20			24	mA
T_A	Operating free-air temperature	−55		125	0		70	°C

TEXAS
INSTRUMENTS

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

PARAMETER	TEST CONDITIONS		SN54F253			SN74F253			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5$ V,	$I_I = -18$ mA			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5$ V	$I_{OH} = -1$ mA	2.5	3.4		2.5	3.4		V
		$I_{OH} = -3$ mA	2.4	3.3		2.4	3.3		
	$V_{CC} = 4.75$ V,	$I_{OH} = -1$ mA to -3 mA				2.7			
V_{OL}	$V_{CC} = 4.5$ V	$I_{OL} = 20$ mA		0.3	0.5				V
		$I_{OL} = 24$ mA					0.35	0.5	
I_{OZH}	$V_{CC} = 5.5$ V,	$V_O = 2.7$ V			50			50	μA
I_{OZL}	$V_{CC} = 5.5$ V,	$V_O = 0.5$ V			-50			-50	μA
I_I	$V_{CC} = 5.5$ V,	$V_I = 7$ V			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5$ V,	$V_I = 2.7$ V			20			20	μA
I_{IL}	$V_{CC} = 5.5$ V,	$V_I = 0.5$ V			-0.6			-0.6	mA
I_{OS}‡	$V_{CC} = 5.5$ V,	$V_O = 0$	-60		-150	-60		-150	mA
I_{CCH}	$V_{CC} = 5.5$ V, See Note 2	Condition A		11.5	16		11.5	16	mA
I_{CCL}		Condition B		16	23		16	23	
I_{CCZ}		Condition C		16	23		16	23	

† All typical values are at $V_{CC} = 5$ V, $T_A = 25°$C.
‡ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.
NOTE 2: I_{CC} is measured with the outputs open under the following conditions:
      A. Inputs A, B, 1C3, and 2C3 at 4.5 V, other inputs grounded
      B. All inputs grounded
      C. Inputs 1$\overline{G}$ and 2$\overline{G}$ at 4.5 V, other inputs grounded

switching characteristics (see Note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5$ V, $C_L = 50$ pF, $R1 = 500\ \Omega$, $R2 = 500\ \Omega$, $T_A = 25°$C			$V_{CC} = 4.5$ V to 5.5 V, $C_L = 50$ pF, $R1 = 500\ \Omega$, $R2 = 500\ \Omega$, T_A = MIN to MAX§				UNIT
			′F253			SN54F253		SN74F253		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Any Y	3.7	8.1	11.5	2.7	15	3.7	13	ns
t_{PHL}			2.2	6.1	9	1.7	11	2.2	10	
t_{PLH}	Any C	Any Y	2.2	5.1	7	1.7	9	2.2	8	ns
t_{PHL}			1.7	4.1	6	1.7	8	1.7	7	
t_{PZH}	$\overline{G}$	Any Y	2.2	5.6	8	1.7	10	2.2	9	ns
t_{PZL}			2.2	5.6	8	1.7	10	2.2	9	
t_{PHZ}	$\overline{G}$	Any Y	1.2	3.3	5	1.2	6.5	1.2	6	ns
t_{PLZ}			1.2	4	6	1.2	8	1.2	7	

§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
NOTE 3:   Load circuit and waveforms are shown in Section 1.

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package | Pins	Package qty | Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
SN74F253D	Obsolete	Production	SOIC (D) | 16	-	-	Call TI	Call TI	0 to 70	F253
SN74F253DR	Active	Production	SOIC (D) | 16	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	F253
SN74F253DR.A	Active	Production	SOIC (D) | 16	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	F253
SN74F253DRG4	Active	Production	SOIC (D) | 16	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	F253
SN74F253N	Active	Production	PDIP (N) | 16	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74F253N
SN74F253N.A	Active	Production	PDIP (N) | 16	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74F253N

(1) Status: For more details on status, see our product life cycle.

(2) Material type: When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

(3) RoHS values: Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

(4) Lead finish/Ball material: Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(5) MSL rating/Peak reflow: The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

(6) Part marking: There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.
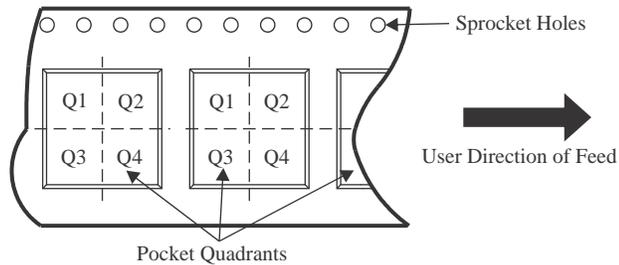
Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

![Texas Instruments logo] **PACKAGE MATERIALS INFORMATION**

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

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

*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
SN74F253DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74F253DR	SOIC	D	16	2500	340.5	336.1	32.0

PACKAGE MATERIALS INFORMATION

TUBE

T - Tube height

L - Tube length

W - Tube width

B - Alignment groove width
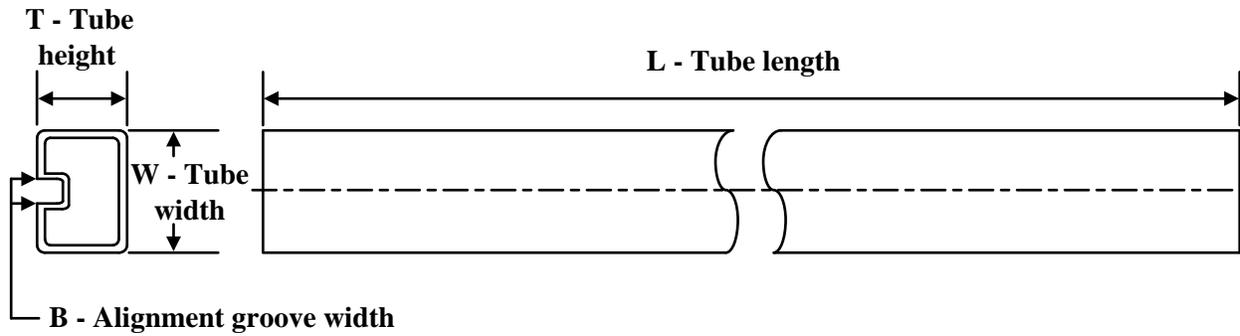
*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
SN74F253N	N	PDIP	16	25	506	13.97	11230	4.32
SN74F253N	N	PDIP	16	25	506	13.97	11230	4.32
SN74F253N.A	N	PDIP	16	25	506	13.97	11230	4.32
SN74F253N.A	N	PDIP	16	25	506	13.97	11230	4.32

N (R−PDIP−T**)   PLASTIC DUAL−IN−LINE PACKAGE
16 PINS SHOWN
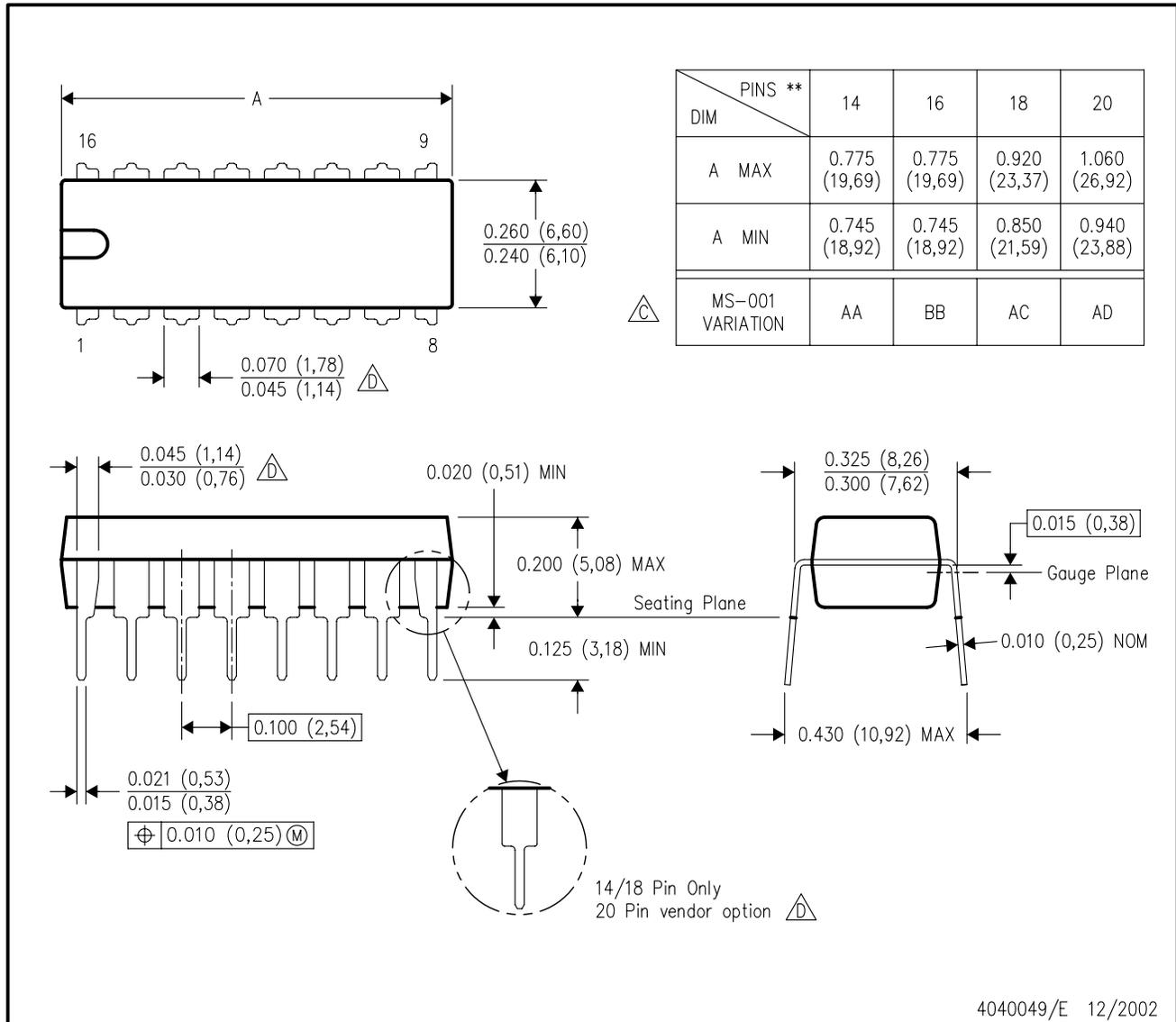
DIM ＼ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS−001 VARIATION	AA	BB	AC	AD

0.260 (6,60) / 0.240 (6,10)

0.070 (1,78) / 0.045 (1,14) △D

0.045 (1,14) / 0.030 (0,76) △D

0.020 (0,51) MIN

0.325 (8,26) / 0.300 (7,62)

0.015 (0,38)

Gauge Plane

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.010 (0,25) NOM

0.100 (2,54)

0.021 (0,53) / 0.015 (0,38)

⊕ 0.010 (0,25) Ⓜ

0.430 (10,92) MAX

14/18 Pin Only
20 Pin vendor option △D

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.

D (R−PDSO−G16)   PLASTIC SMALL OUTLINE

0.394 (10,00)
0.386 (9,80)
/C\

16   9

0.244 (6,20)
0.228 (5,80)

0.157 (4,00)
0.150 (3,80)   /D\

1   8

Pin 1
Index Area

0.050 (1,27)

0.020 (0,51)
0.012 (0,31)

⊕ 0.010 (0,25) Ⓜ

0.069 (1,75) Max

0.010 (0,25)
0.004 (0,10)

0.010 (0,25)
0.005 (0,13)

0.004 (0,10)

Gauge Plane

Seating Plane

0.010 (0,25)   0°−8°

0.050 (1,27)
0.016 (0,40)
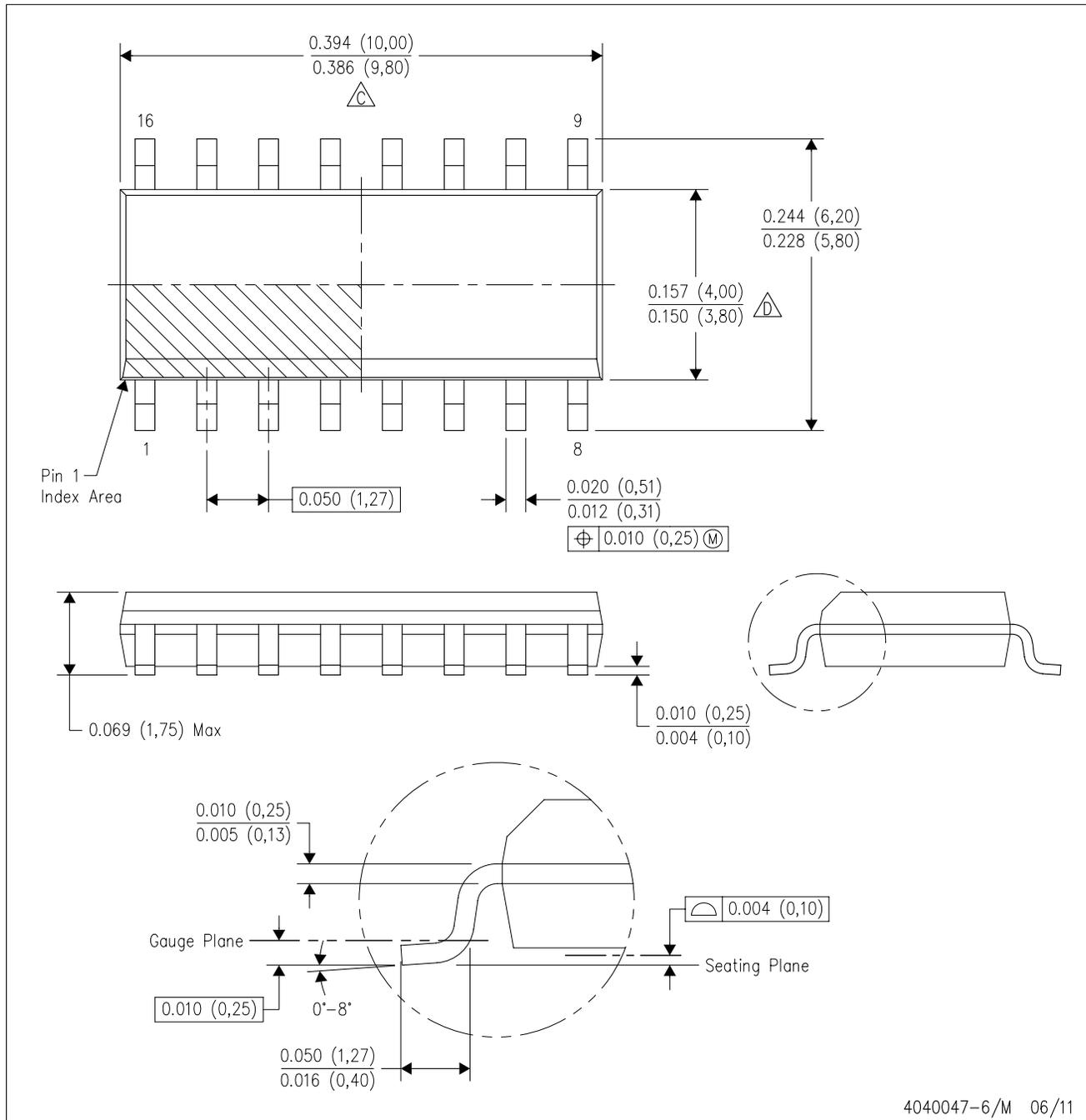
4040047-6/M   06/11

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 0.006 (0,15) each side.
       /D\ Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
         E. Reference JEDEC MS−012 variation AC.

TEXAS
INSTRUMENTS
www.ti.com

IMPORTANT NOTICE AND DISCLAIMER