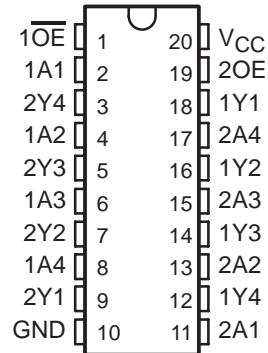- **State-of-the-Art BiCMOS Design Significantly Reduces I_{CCZ}**

- **ESD Protection Exceeds 2000 V Per MIL-STD-883C, Method 3015**

- **3-State Outputs Drive Bus Lines or Buffer Memory Address Registers**

- **Package Options Include Plastic Small-Outline (DW) and Shrink Small-Outline (DB) Packages, Ceramic Chip Carriers (FK) and Flatpacks (W), and Standard Plastic and Ceramic 300-mil DIPs (J, N)**

SN54BCT241 . . . J OR W PACKAGE
SN74BCT241 . . . DB, DW OR N PACKAGE
(TOP VIEW)

Pin		Pin	
1OE	1	20	V_CC
1A1	2	19	2OE
2Y4	3	18	1Y1
1A2	4	17	2A4
2Y3	5	16	1Y2
1A3	6	15	2A3
2Y2	7	14	1Y3
1A4	8	13	2A2
2Y1	9	12	1Y4
GND	10	11	2A1

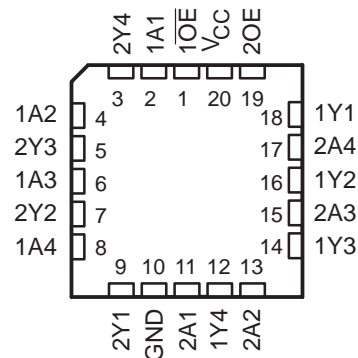**SN54BCT241 . . . FK PACKAGE**
(TOP VIEW)

description

These octal buffers and line drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. Taken together with the ′BCT240 and ′BCT244, these devices provide the choice of selected combinations of inverting and noninverting outputs, symmetrical $\overline{OE}$ (active-low output-enable) inputs, and complementary OE and $\overline{OE}$ inputs.

The SN54BCT241 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74BCT241 is characterized for operation from 0°C to 70°C.

FUNCTION TABLES

INPUTS		OUTPUT
1$\overline{OE}$	1A	1Y
L	H	H
L	L	L
H	X	Z

INPUTS		OUTPUT
2OE	2A	2Y
H	H	H
H	L	L
L	X	Z

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POST OFFICE BOX 1443 ● HOUSTON, TEXAS 77251−1443
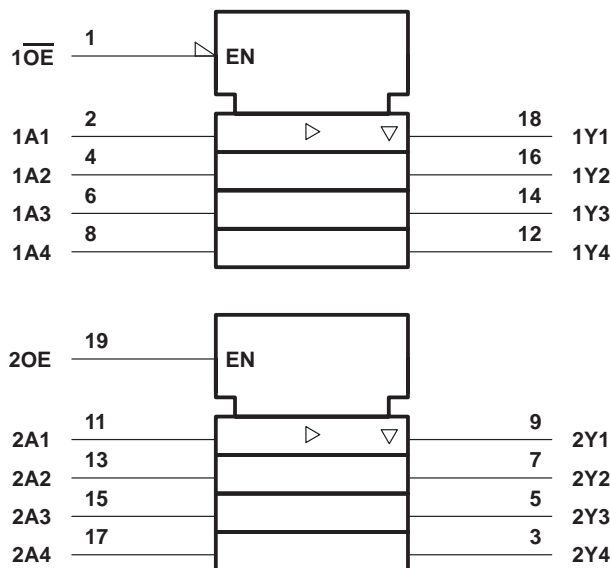
logic symbol†

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

logic diagram (positive logic)
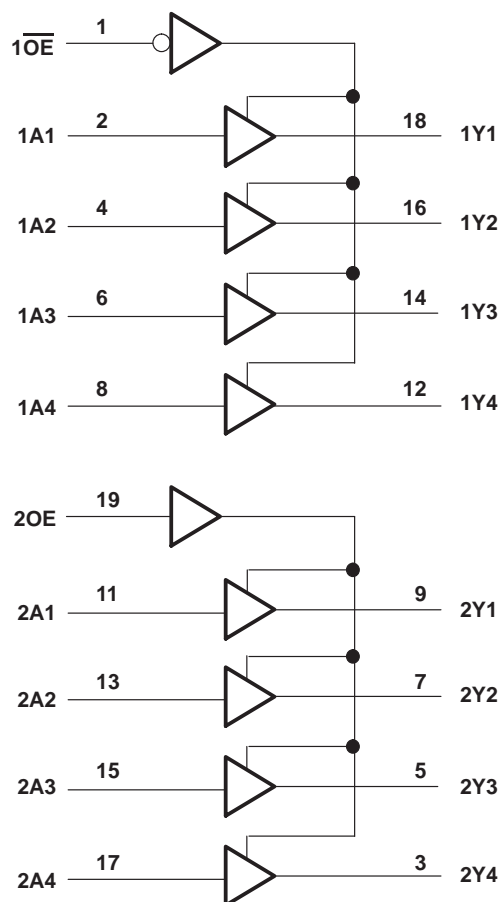
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

Supply voltage range, V_{CC}	– 0.5 V to 7 V
Input voltage range, V_I (see Note 1)	– 0.5 V to 7 V
Voltage range applied to any output in the disabled or power-off state, V_O	– 0.5 V to 5.5 V
Voltage range applied to any output in the high state, V_O	– 0.5 V to V_{CC}
Input clamp current, I_{IK}	–30 mA
Current into any output in the low state: SN54BCT241	96 mA
SN74BCT241	128 mA
Operating free-air temperature range: SN54BCT241	– 55°C to 125°C
SN74BCT241	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 and output voltage ratings may be exceeded if the input and output current ratings are observed.

recommended operating conditions

			SN54BCT241		SN74BCT241			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			−12			−15	mA
I_{OL}	Low-level output current			48			64	mA
T_A	Operating free-air temperature	−55		125	0		70	°C

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

PARAMETER		TEST CONDITIONS		SN54BCT241			SN74BCT241			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} = −3 mA	2.4	3.3		2.4	3.3		V
			I_{OH} = −12 mA	2	3.2					
			I_{OH} = −15 mA				2	3.1		
V_{OL}		V_{CC} = 4.5 V	I_{OL} = 48 mA		0.38	0.55				V
			I_{OL} = 64 mA					0.42	0.55	
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}	1$\overline{OE}$ or 2$\overline{OE}$	V_{CC} = 5.5 V,	V_I = 0.5 V			−1			−1	mA
	Any A input					−1.6			−1.6	
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_{OS}‡		V_{CC} = 5.5 V,	V_O = 0	−100		−225	−100		−225	mA
I_{CCH}		V_{CC} = 5.5 V,	Outputs open		23	43		23	43	mA
I_{CCL}		V_{CC} = 5.5 V,	Outputs open		53	85		53	85	mA
I_{CCZ}		V_{CC} = 5.5 V,	Outputs open		4	10		4	10	mA
C_i		V_{CC} = 5 V,	V_I = 2.5 V or 0.5 V		6			6		pF
C_o		V_{CC} = 5 V,	V_O = 2.5 V or 0.5 V		11			11		pF

† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = 25°C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX†				UNIT
			′BCT241			SN54BCT241		SN74BCT241		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	0.5	2.5	4.5	0.5	5.2	0.5	4.9	ns
t_{PHL}			1	3	5.4	1	6.3	1	5.9	
t_{PZH}	$\overline{OE}$ or OE	Y	1	5.7	7.8	1	9.1	1	8.7	ns
t_{PZL}			1	5.2	8.6	1	10	1	9.4	
t_{PHZ}	$\overline{OE}$ or OE	Y	1	5.8	6.8	1	8.4	1	8.1	ns
t_{PLZ}			1	7	8.1	1	11	1	9.9	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
NOTE 2:   Load circuits and voltage waveforms are shown in Section 1.

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POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265
POST OFFICE BOX 1443 ● HOUSTON, TEXAS 77251–1443

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
5962-9074301M2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Call TI	-55 to 125	5962-9074301M2A SNJ54BCT 241FK	Samples
5962-9074301MRA	ACTIVE	CDIP	J	20	1	TBD	Call TI	Call TI	-55 to 125	5962-9074301MR A SNJ54BCT241J	Samples
5962-9074301MSA	ACTIVE	CFP	W	20	1	TBD	Call TI	Call TI	-55 to 125	5962-9074301MS A SNJ54BCT241W	Samples
SN74BCT241DBLE	OBSOLETE	SSOP	DB	20		TBD	Call TI	Call TI	0 to 70		
SN74BCT241DW	ACTIVE	SOIC	DW	20		TBD	Call TI	Call TI	0 to 70	BCT241	Samples
SN74BCT241DWE4	ACTIVE	SOIC	DW	20		TBD	Call TI	Call TI	0 to 70	BCT241	Samples
SN74BCT241DWG4	ACTIVE	SOIC	DW	20		TBD	Call TI	Call TI	0 to 70	BCT241	Samples
SN74BCT241N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	SN74BCT241N	Samples
SN74BCT241NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	SN74BCT241N	Samples
SN74BCT241NSR	OBSOLETE	SO	NS	20		TBD	Call TI	Call TI	0 to 70	BCT241	
SN74BCT241NSRE4	OBSOLETE	SO	NS	20		TBD	Call TI	Call TI	0 to 70		
SN74BCT241NSRG4	OBSOLETE	SO	NS	20		TBD	Call TI	Call TI	0 to 70		
SNJ54BCT241FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962-9074301M2A SNJ54BCT 241FK	Samples
SNJ54BCT241J	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9074301MR A SNJ54BCT241J	Samples
SNJ54BCT241W	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type	-55 to 125	5962-9074301MS A SNJ54BCT241W	Samples

(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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OTHER QUALIFIED VERSIONS OF SN54BCT241, SN74BCT241 :

- Catalog: SN74BCT241

- Military: SN54BCT241

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product

- Military - QML certified for Military and Defense Applications

DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)

B

14   8

1   7

$\dfrac{0.065\ (1,65)}{0.045\ (1,14)}$

C

0.005 (0,13) MIN

$\dfrac{0.060\ (1,52)}{0.015\ (0,38)}$

0.200 (5,08) MAX

Seating Plane

0.130 (3,30) MIN

$\dfrac{0.026\ (0,66)}{0.014\ (0,36)}$

0.100 (2,54)

A

0°−15°

$\dfrac{0.014\ (0,36)}{0.008\ (0,20)}$

4040083/F 03/03

NOTES: A. All linear dimensions are in inches (millimeters).
         B. This drawing is subject to change without notice.
         C. This package is hermetically sealed with a ceramic lid using glass frit.
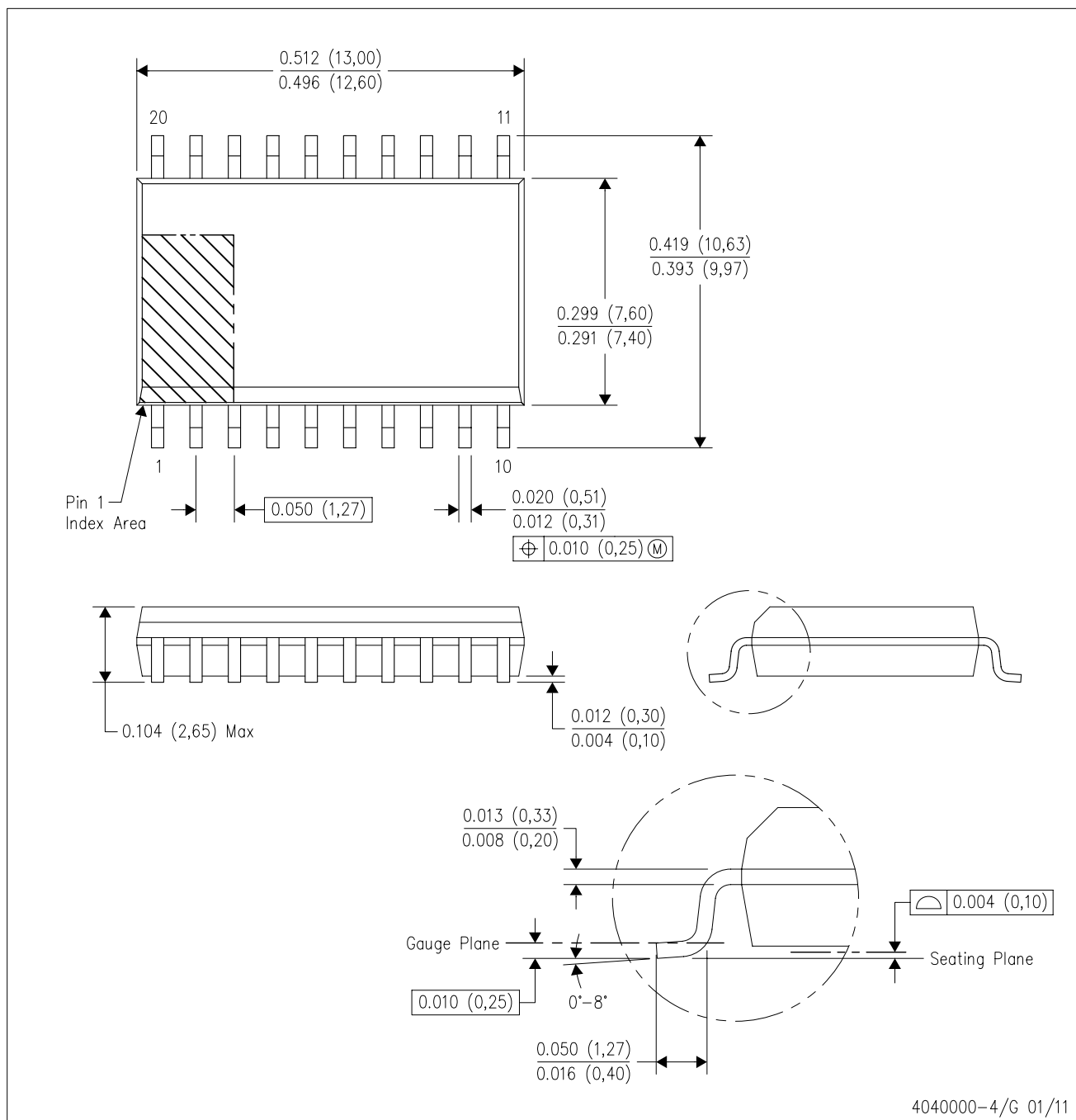   D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
         E. Falls within MIL STD 1835 GDIP1−T14, GDIP1−T16, GDIP1−T18 and GDIP1−T20.

W (R–GDFP–F20) CERAMIC DUAL FLATPACK

Base and Seating Plane

0.300 (7,62)
0.245 (6,22)

0.045 (1,14)
0.026 (0,66)

0.009 (0,23)
0.004 (0,10)

0.100 (2,45)
0.045 (1,14)

0.320 (8,13) MAX

1   20

0.540 (13,72) MAX

0.022 (0,56)
0.015 (0,38)

0.050 (1,27)

0.005 (0,13) MIN
4 Places

10   11

0.370 (9,40)
0.250 (6,35)

0.370 (9,40)
0.250 (6,35)

4040180–4/D 07/03

NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within Mil–Std 1835 GDFP2–F20

FK (S−CQCC−N**)
28 TERMINAL SHOWN

LEADLESS CERAMIC CHIP CARRIER

NO. OF TERMINALS **	A		B	
	MIN	MAX	MIN	MAX
20	0.342 (8,69)	0.358 (9,09)	0.307 (7,80)	0.358 (9,09)
28	0.442 (11,23)	0.458 (11,63)	0.406 (10,31)	0.458 (11,63)
44	0.640 (16,26)	0.660 (16,76)	0.495 (12,58)	0.560 (14,22)
52	0.740 (18,78)	0.761 (19,32)	0.495 (12,58)	0.560 (14,22)
68	0.938 (23,83)	0.962 (24,43)	0.850 (21,6)	0.858 (21,8)
84	1.141 (28,99)	1.165 (29,59)	1.047 (26,6)	1.063 (27,0)

4040140/D 01/11

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a metal lid.
D. Falls within JEDEC MS−004

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

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.100 (2,54)

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

⊕ 0.010 (0,25) Ⓜ

14/18 Pin Only
20 Pin vendor option /D\

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

0.015 (0,38)

Gauge Plane

0.010 (0,25) NOM

0.430 (10,92) MAX
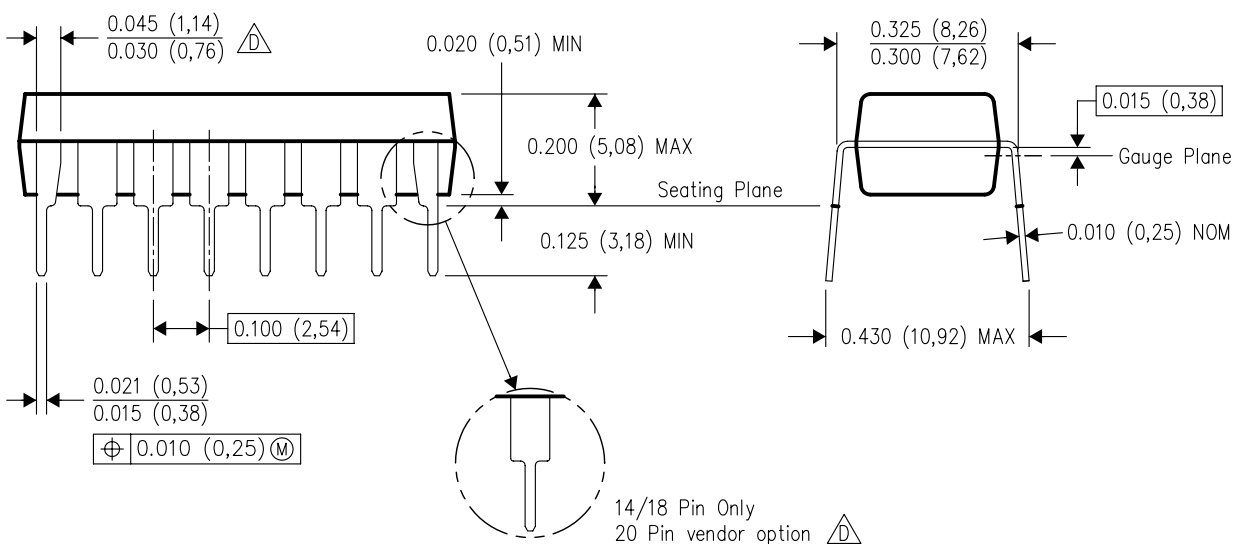
4040049/E 12/2002

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.

DW (R−PDSO−G20)   PLASTIC SMALL OUTLINE

$\dfrac{0.512\ (13,00)}{0.496\ (12,60)}$

20   11

$\dfrac{0.419\ (10,63)}{0.393\ (9,97)}$

$\dfrac{0.299\ (7,60)}{0.291\ (7,40)}$

1   10

Pin 1
Index Area

0.050 (1,27)

$\dfrac{0.020\ (0,51)}{0.012\ (0,31)}$

⊕ | 0.010 (0,25) Ⓜ

0.104 (2,65) Max

$\dfrac{0.012\ (0,30)}{0.004\ (0,10)}$

$\dfrac{0.013\ (0,33)}{0.008\ (0,20)}$

⌒ | 0.004 (0,10)

Gauge Plane

Seating Plane

0.010 (0,25)   0°–8°

$\dfrac{0.050\ (1,27)}{0.016\ (0,40)}$

4040000−4/G 01/11

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 AC.

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

14-PINS SHOWN

1,27

0,51
0,35

⌖ 0,25 Ⓜ

14　　　　8

5,60
5,00

8,20
7,40

1　　　7

A

0,15 NOM

Gage Plane

0°–10°

0,25

1,05
0,55

0,15
0,05

2,00 MAX

Seating Plane

⌐ 0,10

DIM \ PINS **	14	16	20	24
A　MAX	10,50	10,50	12,90	15,30
A　MIN	9,90	9,90	12,30	14,70

4040062/C 03/03

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.

DB (R-PDSO-G**)   **PLASTIC SMALL-OUTLINE**

28 PINS SHOWN

PINS ** DIM	14	16	20	24	28	30	38
A MAX	6,50	6,50	7,50	8,50	10,50	10,50	12,90
A MIN	5,90	5,90	6,90	7,90	9,90	9,90	12,30

4040065 /E 12/01

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-150

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OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		