SDFS063A – D2932, MARCH 1987 – REVISED OCTOBER 1993

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

- **Package Options Include Plastic Small-Outline (SOIC) and Shrink Small-Outline (SSOP) Packages, Ceramic Chip Carriers, and Plastic and Ceramic DIPs**
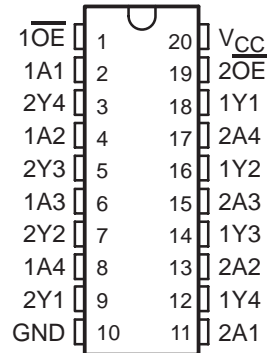
description

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 ′F240 and ′F241, 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 ′F244 is organized as two 4-bit buffers/line drivers with separate output enable ($\overline{OE}$) inputs. When $\overline{OE}$ is low, the device passes data from the A inputs to the Y outputs. When $\overline{OE}$ is high, the outputs are in the high-impedance state.
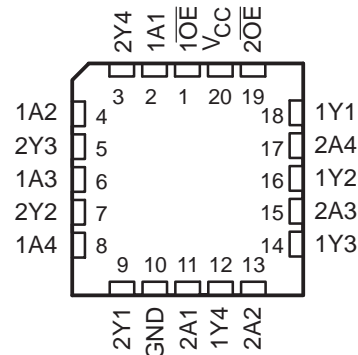
The SN74F244 is available in TI's shrink small-outline package (DB), which provides the same I/O pin count and functionality of standard small-outline packages in less than half the printed-circuit-board area.

The SN54F244 is characterized for operation over the full military temperature range of −55°C to 125°C. The SN74F244 is characterized for operation from 0°C to 70°C.

SN54F244 . . . J PACKAGE
SN74F244 . . . DB, DW, OR N PACKAGE
(TOP VIEW)

1$\overline{OE}$	1		20	V$_{CC}$
1A1	2		19	2$\overline{OE}$
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

SN54F244 . . . FK PACKAGE
(TOP VIEW)

Top pins (left to right): 2Y4, 1A1, 1$\overline{OE}$, V$_{CC}$, 2$\overline{OE}$ (pins 3, 2, 1, 20, 19)

Left pins: 1A2 (4), 2Y3 (5), 1A3 (6), 2Y2 (7), 1A4 (8)

Right pins: 1Y1 (18), 2A4 (17), 1Y2 (16), 2A3 (15), 1Y3 (14)

Bottom pins (left to right): 2Y1 (9), GND (10), 2A1 (11), 1Y4 (12), 2A2 (13)

FUNCTION TABLE
(each buffer)

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

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POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

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2–1

SN54F244, SN74F244
OCTAL BUFFERS/DRIVERS
WITH 3-STATE OUTPUTS

SDFS063A – D2932, MARCH 1987 – REVISED OCTOBER 1993

logic symbol†

logic diagram (positive logic)
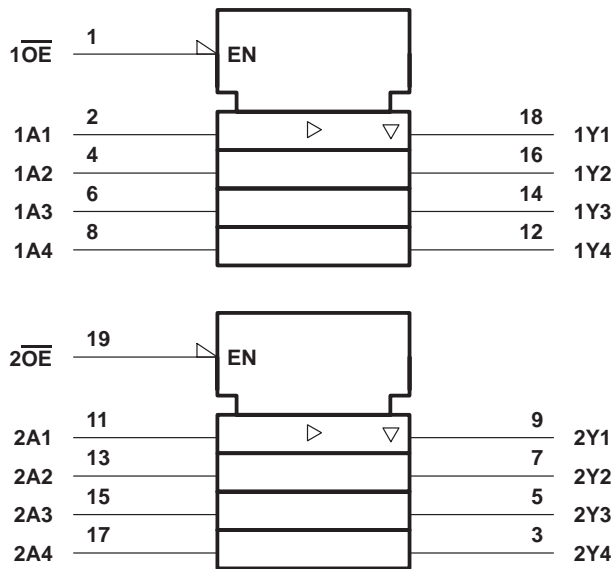
† This symbol is in accordance with ANSI/IEEE Std 91-1984
and IEC Publication 617-12.
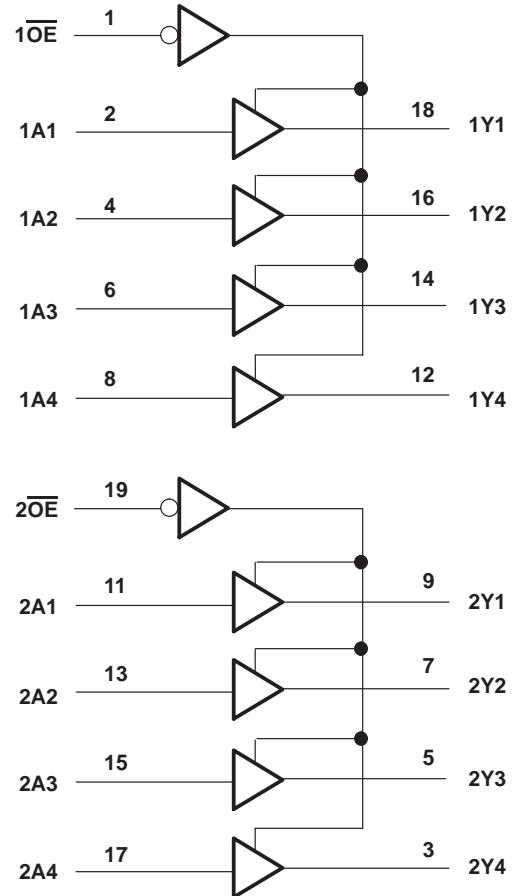
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

Supply voltage range, V_{CC} .... −0.5 V to 7 V
Input voltage range, V_I (see Note 1) .... −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: SN54F244 .... 96 mA
                SN74F244 .... 128 mA
Operating free-air temperature range: SN54F244 .... −55°C to 125°C
                SN74F244 .... 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

		SN54F244			SN74F244			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		SN54F244			SN74F244			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		
		$V_{CC} = 4.75$ V,	$I_{OH} = −3$ mA				2.7			
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_{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}	$\overline{OE}$	$V_{CC} = 5.5$ V,	$V_I = 0.5$ V			−1			−1	mA
	Any A					−1.6			−1.6	
I_{OS}[‡]		$V_{CC} = 5.5$ V,	$V_O = 0$	−100		−225	−100		−225	mA
I_{CC}		$V_{CC} = 5.5$ V, Outputs open	Outputs high		40	60		40	60	mA
			Outputs low		60	90		60	90	
			Outputs disabled		60	90		60	90	

[†] 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.

SN54F244, SN74F244
OCTAL BUFFERS/DRIVERS
WITH 3-STATE OUTPUTS

SDFS063A – D2932, MARCH 1987 – REVISED OCTOBER 1993

switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R_L = 500 Ω, T_A = 25°C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX[†]				UNIT
			'F244			SN54F244		SN74F244		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	1.7	3.6	5.2	2	6.5	1.7	6.2	ns
t_{PHL}			1.7	3.6	5.2	2	7	1.7	6.5	
t_{PZH}	$\overline{OE}$	Y	1.2	3.9	5.7	2	7	1.2	6.7	ns
t_{PZL}			1.2	5	7	2	8.5	1.2	8	
t_{PHZ}	$\overline{OE}$	Y	1.2	4.1	6	2	7	1.2	7	ns
t_{PLZ}			1.2	4.1	6	2	7.5	1.2	7	

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

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PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
5962-9758601Q2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
5962-9758601QRA	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type
5962-9758601QRA	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type
5962-9758601QSA	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type
5962-9758601QSA	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type
JM38510/33203B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
JM38510/33203B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
JM38510/33203BRA	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type
JM38510/33203BRA	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type
JM38510/33203BSA	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type
JM38510/33203BSA	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type
SN54F244J	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type
SN54F244J	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type
SN74F244DBLE	OBSOLETE	SSOP	DB	20		TBD	Call TI	Call TI
SN74F244DBLE	OBSOLETE	SSOP	DB	20		TBD	Call TI	Call TI
SN74F244DBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DBRE4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DBRE4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244DWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74F244N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
SN74F244N3	OBSOLETE	PDIP	N	20		TBD	Call TI	Call TI
SN74F244N3	OBSOLETE	PDIP	N	20		TBD	Call TI	Call TI
SN74F244NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74F244NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74F244NSLE	OBSOLETE	SO	NS	20		TBD	Call TI	Call TI
SN74F244NSLE	OBSOLETE	SO	NS	20		TBD	Call TI	Call TI
SN74F244NSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244NSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244NSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244NSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244NSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74F244NSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SNJ54F244FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54F244FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type
SNJ54F244J	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type
SNJ54F244J	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type
SNJ54F244W	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type
SNJ54F244W	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type

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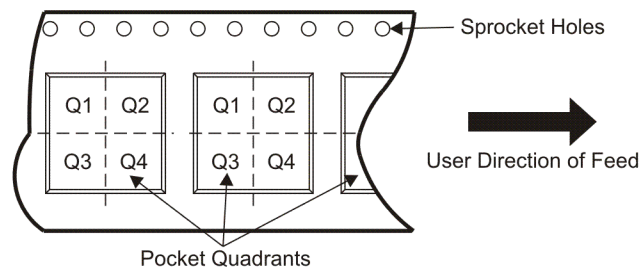
[3] MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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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
SN74F244DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74F244DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
SN74F244NSR	SO	NS	20	2000	330.0	24.4	8.2	13.0	2.5	12.0	24.0	Q1

TAPE AND REEL BOX DIMENSIONS

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74F244DBR	SSOP	DB	20	2000	346.0	346.0	33.0
SN74F244DWR	SOIC	DW	20	2000	346.0	346.0	41.0
SN74F244NSR	SO	NS	20	2000	346.0	346.0	41.0

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

0.065 (1,65)
0.045 (1,14)

C

0.005 (0,13) MIN

0.060 (1,52)
0.015 (0,38)

0.200 (5,08) MAX

Seating Plane

0.130 (3,30) MIN

0.026 (0,66)
0.014 (0,36)

0.100 (2,54)

A

0°−15°

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)

0.100 (2,45)
―――――――
0.045 (1,14)

0.009 (0,23)
―――――――
0.004 (0,10)

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**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN

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	0.739 (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)

0.020 (0,51) / 0.010 (0,25)

0.020 (0,51) / 0.010 (0,25)

0.080 (2,03) / 0.064 (1,63)

0.055 (1,40) / 0.045 (1,14)

0.045 (1,14) / 0.035 (0,89)

0.028 (0,71) / 0.022 (0,54)

0.045 (1,14) / 0.035 (0,89)

0.050 (1,27)

4040140 / D 10/96

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. The terminals are gold plated.
E. Falls within JEDEC MS-004

N (R−PDIP−T**)

16 PINS SHOWN

PLASTIC DUAL−IN−LINE PACKAGE

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

△C

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) Ⓜ

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

0.015 (0,38)

Gauge Plane

0.010 (0,25) NOM

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.

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DW (R−PDSO−G20)   PLASTIC SMALL OUTLINE

0.512 (13,00)
―――――――――
0.496 (12,60)

20   11

0.419 (10,63)
―――――――――
0.393 (9,97)

0.299 (7,60)
―――――――――
0.291 (7,40)

1   10

Pin 1
Index Area

0.050 (1,27)

0.020 (0,51)
―――――――――
0.012 (0,31)

⊕ | 0.010 (0,25) | Ⓜ

0.104 (2,65) Max

0.012 (0,30)
―――――――――
0.004 (0,10)

0.013 (0,33)
―――――――――
0.008 (0,20)

▱ | 0.004 (0,10)

Gauge Plane

Seating Plane

0.010 (0,25)   0°−8°

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.
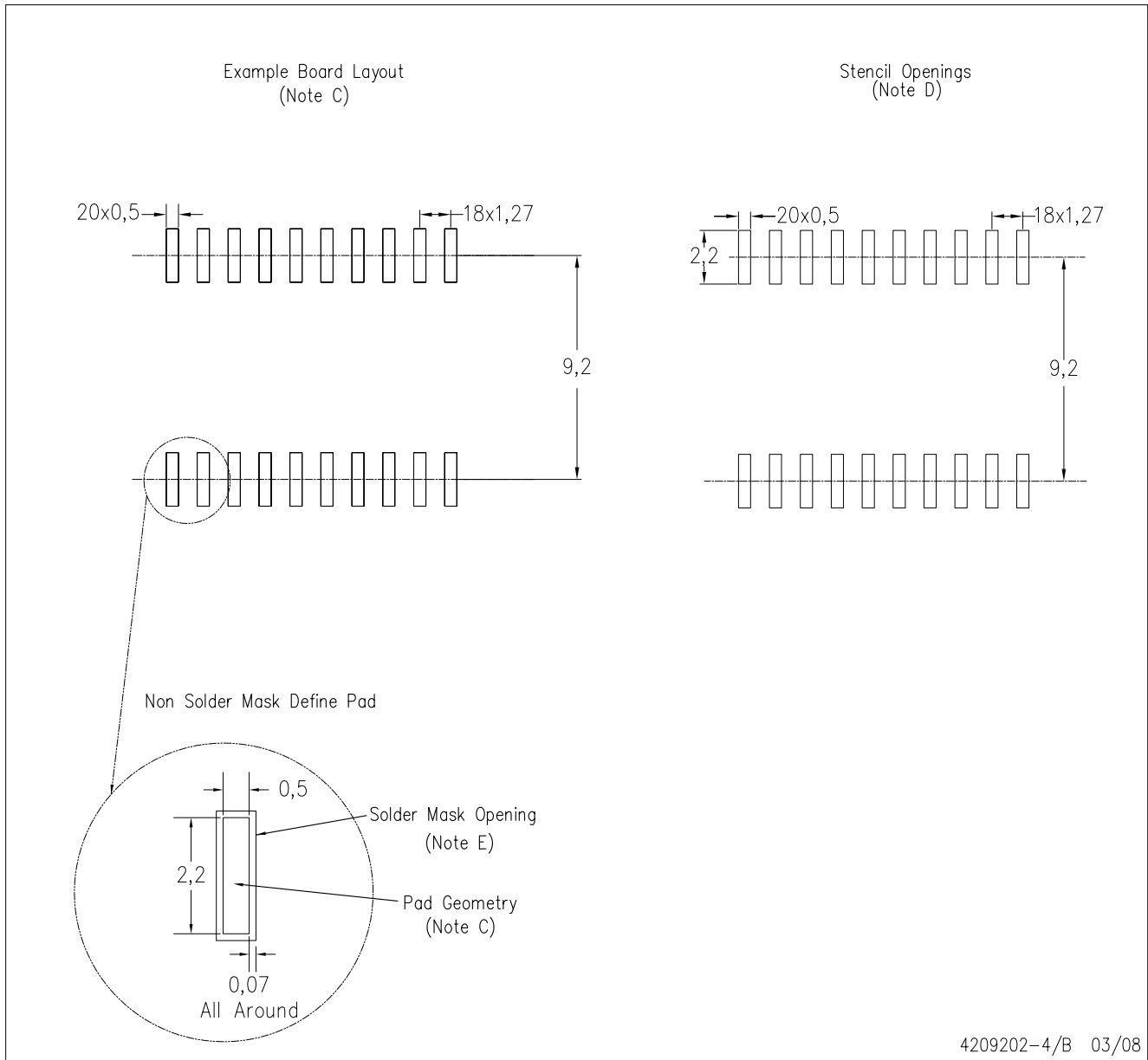
TEXAS
INSTRUMENTS
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DW (R−PDSO−G20)

Example Board Layout
(Note C)

Stencil Openings
(Note D)

20x0,5

18x1,27

20x0,5

18x1,27

2,2

9,2

9,2

Non Solder Mask Define Pad

0,5

Solder Mask Opening
(Note E)

2,2

Pad Geometry
(Note C)

0,07
All Around

4209202−4/B 03/08

NOTES: A. All linear dimensions are in millimeters.
        B. This drawing is subject to change without notice.
        C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
        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.

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

14-PINS SHOWN

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

IMPORTANT NOTICE