

- Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers and Flat Packages, and Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

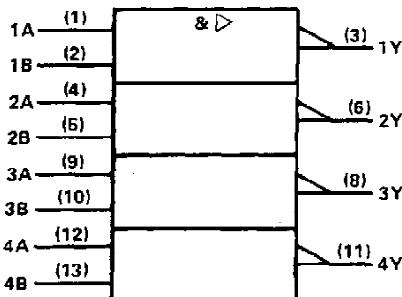
These devices contain four independent 2-input NAND buffer gates.

The SN5437, SN54LS37 and SN54S37 are characterized for operation over the full military range of -55°C to 125°C . The SN7437, SN74LS37 and SN74S37 are characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

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

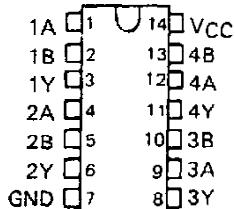
logic symbol[†]



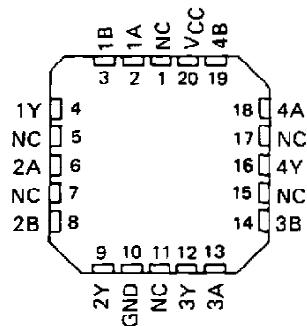
[†]This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

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

SN5437, SN54LS37, SN54S37 . . . J OR W PACKAGE
SN7437 . . . N PACKAGE
SN74LS37, SN74S37 . . . D OR N PACKAGE
(TOP VIEW)

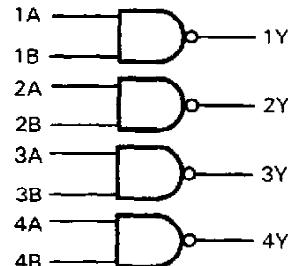


SN54LS37, SN54S37 . . . FK PACKAGE
(TOP VIEW)



NC = No internal connection

logic diagram

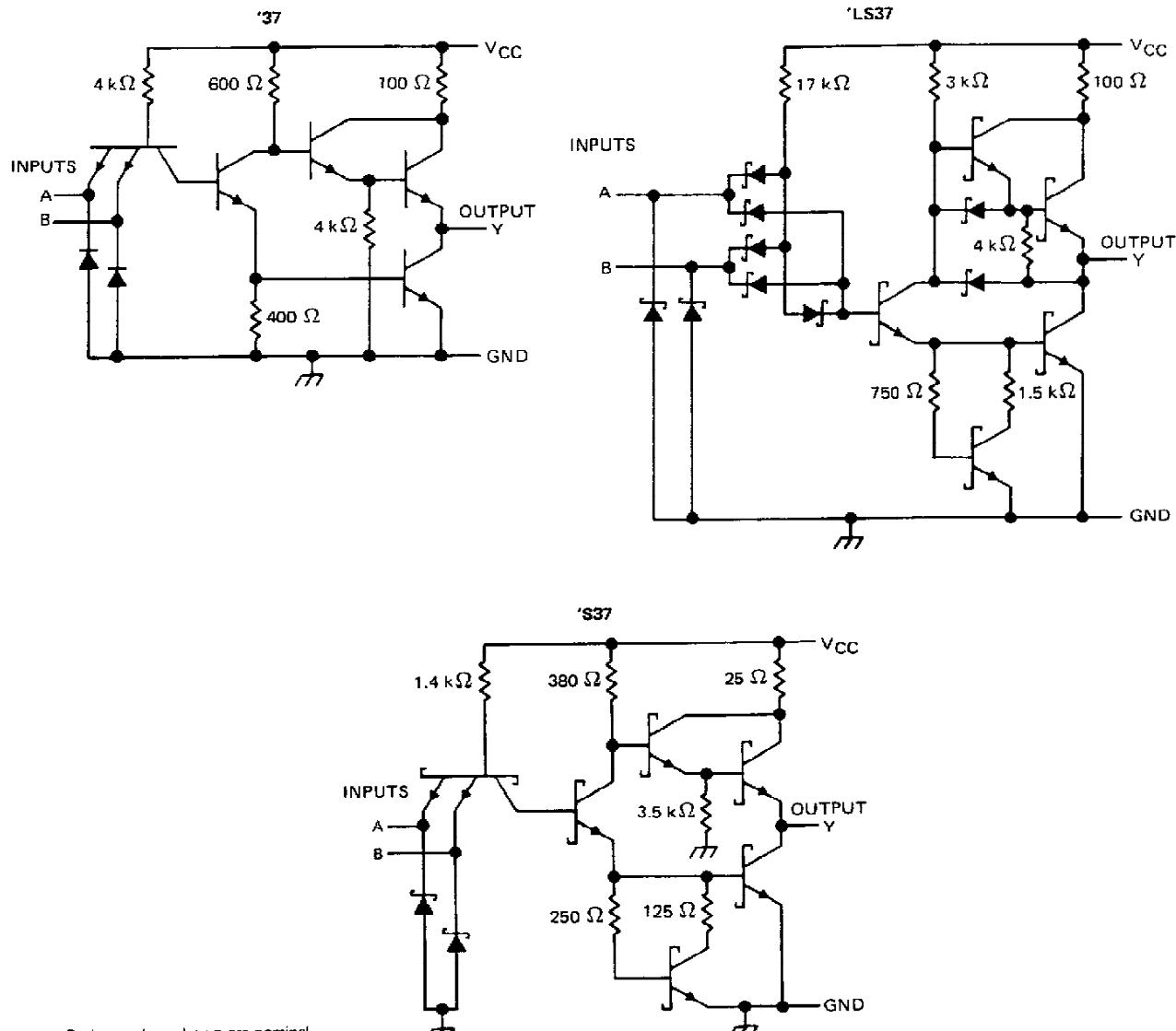


positive logic

$$Y = \overline{A} \cdot \overline{B} \text{ or } Y = \overline{A} + \overline{B}$$

**SN5437, SN54LS37, SN437
SN7437, SN74LS37, SN7437
QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS**

schematics (each gate)



Resistor values shown are nominal.

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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: '37, 'S37	5.5 V
'LS37	7 V
Operating free-air temperature: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.



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SN5437, SN7437
QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS

recommended operating conditions

		SN5437			SN7437			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High-level input voltage		2			2		V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{OH}	High-level output current			-1.2			-1.2	mA
I_{OL}	Low-level output current			48			48	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 [†]	SN5437			SN7437			UNIT
		MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IK}	$V_{CC} = \text{MIN}$, $I_I = -12 \text{ mA}$			-1.5			-1.5	V
V_{OH}	$V_{CC} = \text{MIN}$, $V_{IL} = 0.8 \text{ V}$, $I_{OH} = -1.2 \text{ mA}$	2.4	3.3		2.4	3.3		V
V_{OL}	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $I_{OL} = 48 \text{ mA}$		0.2	0.4		0.2	0.4	V
I_I	$V_{CC} = \text{MAX}$, $V_I = 6.5 \text{ V}$			1			1	mA
I_{IH}	$V_{CC} = \text{MAX}$, $V_I = 2.4 \text{ V}$			40			40	μA
I_{IL}	$V_{CC} = \text{MAX}$, $V_I = 0.4 \text{ V}$			-1.6			-1.6	mA
$I_{OS\$}$	$V_{CC} = \text{MAX}$	-20		-70	-18		-70	mA
I_{CCH}	$V_{CC} = \text{MAX}$, $V_I = 0 \text{ V}$		9	15.5		9	15.5	mA
I_{CCL}	$V_{CC} = \text{MAX}$, $V_I = 4.5 \text{ V}$		34	54		34	54	mA

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

\$ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	A or B	Y	$R_L = 133 \Omega$, $C_L = 45 \text{ pF}$		13	22	ns
t_{PHL}					8	15	ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.


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SN54LS37, SN74LS37 QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS

recommended operating conditions

	SN54LS37			SN74LS37			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH} High-level input voltage		2			2		V
V_{IL} Low-level input voltage				0.7		0.8	V
I_{OH} High-level output current				-1.2		-1.2	mA
I_{OL} Low-level output current				12		24	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 [†]	SN54LS37			SN74LS37			UNIT
		MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IK}	$V_{CC} = \text{MIN}$, $I_I = -18 \text{ mA}$				-1.5		-1.5	V
V_{OH}	$V_{CC} = \text{MIN}$, $V_{IL} = \text{MAX}$, $I_{OH} = -1.2 \text{ mA}$	2.5	3.4		2.7	3.4		V
V_{OL}	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $I_{OL} = 12 \text{ mA}$		0.25	0.4	0.25	0.4		V
	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $I_{OL} = 24 \text{ mA}$				0.35	0.5		
I_I	$V_{CC} = \text{MAX}$, $V_I = 7 \text{ V}$			0.1		0.1		mA
I_{IH}	$V_{CC} = \text{MAX}$, $V_I = 2.7 \text{ V}$			20		20		μA
I_{IL}	$V_{CC} = \text{MAX}$, $V_I = 0.4 \text{ V}$			-0.4		-0.4		mA
$I_{OS\$}$	$V_{CC} = \text{MAX}$	-30	-130		-30	-130		mA
I_{CCH}	$V_{CC} = \text{MAX}$, $V_I = 0 \text{ V}$		0.9	2	0.9	2		mA
I_{CCL}	$V_{CC} = \text{MAX}$, $V_I = 4.5 \text{ V}$		6	12	6	12		mA

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

[§] Not more than one output should be shorted at a time, and the duration of the short-circuit should not exceed one second.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	A or B	Y	$R_L = 667 \Omega$, $C_L = 45 \text{ pF}$	12	24		ns
				12	24		ns

NOTE 2: Load circuits and voltage waveforms are shown in Section 1.

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SN54S37, SN74S37
QUADRUPLE 2-INPUT POSITIVE-NAND BUFFERS

recommended operating conditions

		SN54S37			SN74S37			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{OH}	High-level output current			-3			-3	mA
I_{OL}	Low-level output current			60			60	mA
T_A	Operating free-air temperature	-55		125	0		70	$^{\circ}\text{C}$

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

PARAMETER	TEST CONDITIONS [†]	SN54S37			SN74S37			UNIT
		MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IK}	$V_{CC} = \text{MIN}$, $I_I = -18 \text{ mA}$			-1.2			-1.2	V
V_{OH}	$V_{CC} = \text{MIN}$, $V_{IL} = 0.8 \text{ V}$, $I_{OH} = -3 \text{ mA}$	2.5	3.4		2.7	3.4		V
V_{OL}	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $I_{OL} = 60 \text{ mA}$			0.5			0.5	V
I_I	$V_{CC} = \text{MAX}$, $V_I = 5.5 \text{ V}$			1			1	mA
I_{IH}	$V_{CC} = \text{MAX}$, $V_I = 2.7 \text{ V}$			0.1			0.1	mA
I_{IL}	$V_{CC} = \text{MAX}$, $V_I = 0.5 \text{ V}$			-4			-4	mA
$I_{OS\$}$	$V_{CC} = \text{MAX}$	-50		-225	-50		-225	mA
I_{CCH}	$V_{CC} = \text{MAX}$, $V_I = 0 \text{ V}$		20	36		20	36	mA
I_{CCL}	$V_{CC} = \text{MAX}$, $V_I = 4.5$		46	80		46	80	mA

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡] All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$.

[§] Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed 100 milliseconds.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	A or B	Y	$R_L = 93 \Omega$, $C_L = 50 \text{ pF}$	4	6.5		ns
t_{PHL}			$R_L = 93 \Omega$, $C_L = 50 \text{ pF}$	4	6.5		ns
t_{PLH}		Y	$R_L = 93 \Omega$, $C_L = 150 \text{ pF}$	6			ns
t_{PHL}			$R_L = 93 \Omega$, $C_L = 150 \text{ pF}$	6			ns

NOTE 2: Load circuits and voltage 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⁾
5962-9754101Q2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	N / A for Pkg Type
5962-9754101QCA	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
5962-9754101QCA	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
5962-9754101QDA	ACTIVE	CFP	W	14	1	TBD	Call TI	N / A for Pkg Type
5962-9754101QDA	ACTIVE	CFP	W	14	1	TBD	Call TI	N / A for Pkg Type
SN5437J	OBsolete	CDIP	J	14		TBD	Call TI	Call TI
SN5437J	OBsolete	CDIP	J	14		TBD	Call TI	Call TI
SN54LS37J	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SN54LS37J	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SN54S37J	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SN54S37J	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SN7437N	OBsolete	PDIP	N	14		TBD	Call TI	Call TI
SN7437N	OBsolete	PDIP	N	14		TBD	Call TI	Call TI
SN7437N3	OBsolete	PDIP	N	14		TBD	Call TI	Call TI
SN7437N3	OBsolete	PDIP	N	14		TBD	Call TI	Call TI
SN74LS37D	OBsolete	SOIC	D	14		TBD	Call TI	Call TI
SN74LS37D	OBsolete	SOIC	D	14		TBD	Call TI	Call TI
SN74LS37N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS37N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS37N3	OBsolete	PDIP	N	14		TBD	Call TI	Call TI
SN74LS37N3	OBsolete	PDIP	N	14		TBD	Call TI	Call TI
SN74LS37NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS37NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74LS37NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS37NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS37NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74LS37NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
no Sb/Br)								
SN74S37DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74S37N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74S37N3	OBsolete	PDIP	N	14		TBD	Call TI	Call TI
SN74S37N3	OBsolete	PDIP	N	14		TBD	Call TI	Call TI
SN74S37NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74S37NE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74S37NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74S37NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SNJ5437J	OBsolete	CDIP	J	14		TBD	Call TI	Call TI
SNJ5437J	OBsolete	CDIP	J	14		TBD	Call TI	Call TI
SNJ5437W	OBsolete	CFP	W	14		TBD	Call TI	Call TI
SNJ5437W	OBsolete	CFP	W	14		TBD	Call TI	Call TI
SNJ54LS37FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	N / A for Pkg Type
SNJ54LS37FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	N / A for Pkg Type
SNJ54LS37J	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SNJ54LS37J	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SNJ54LS37W	ACTIVE	CFP	W	14	1	TBD	Call TI	N / A for Pkg Type
SNJ54LS37W	ACTIVE	CFP	W	14	1	TBD	Call TI	N / A for Pkg Type
SNJ54S37FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	N / A for Pkg Type
SNJ54S37FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	N / A for Pkg Type
SNJ54S37J	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SNJ54S37J	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SNJ54S37W	ACTIVE	CFP	W	14	1	TBD	Call TI	N / A for Pkg Type
SNJ54S37W	ACTIVE	CFP	W	14	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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J (R-GDIP-T**)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



PINS ** DIM	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)

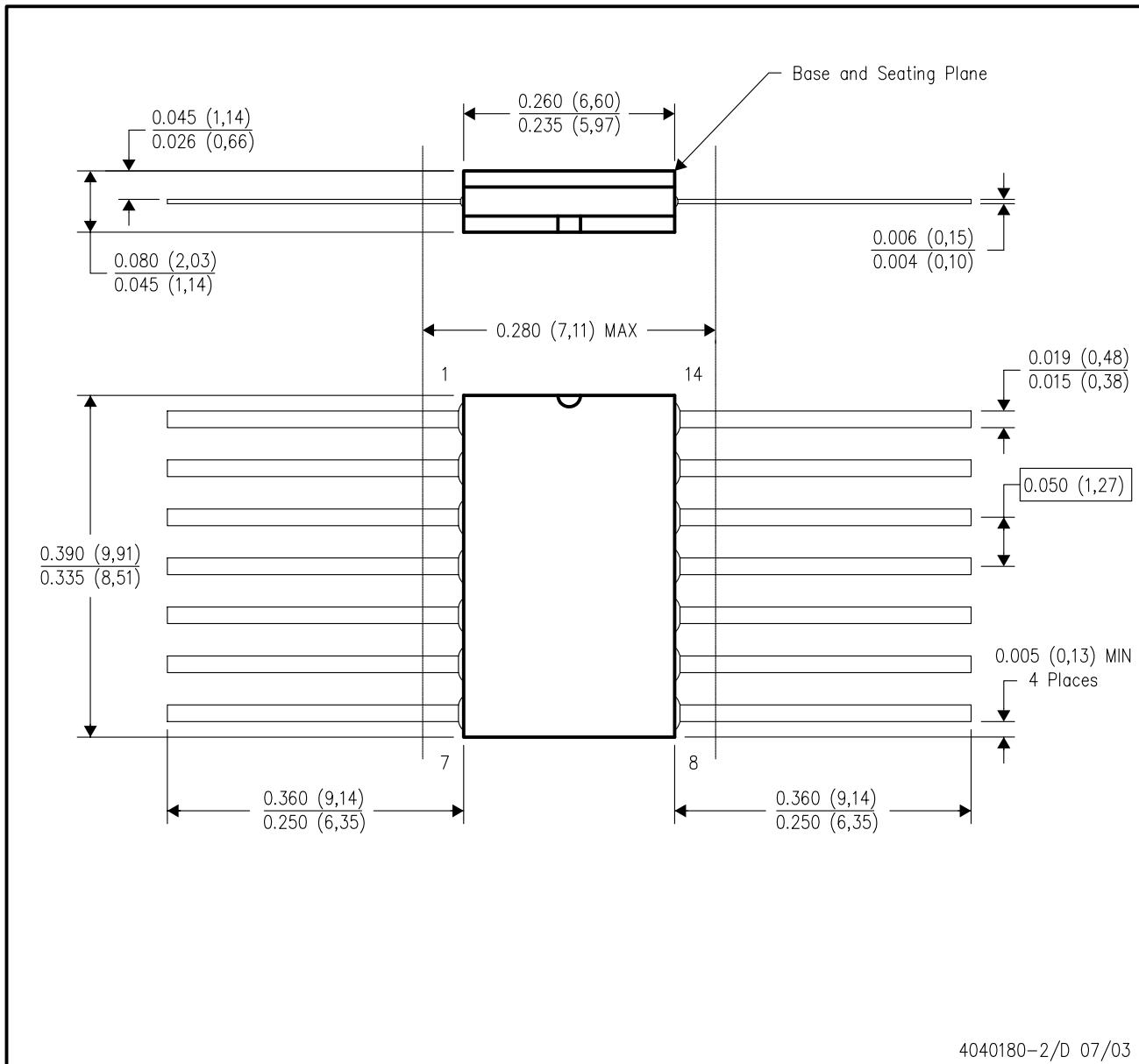


4040083/F 03/03

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-F14)

CERAMIC DUAL FLATPACK



NOTES:

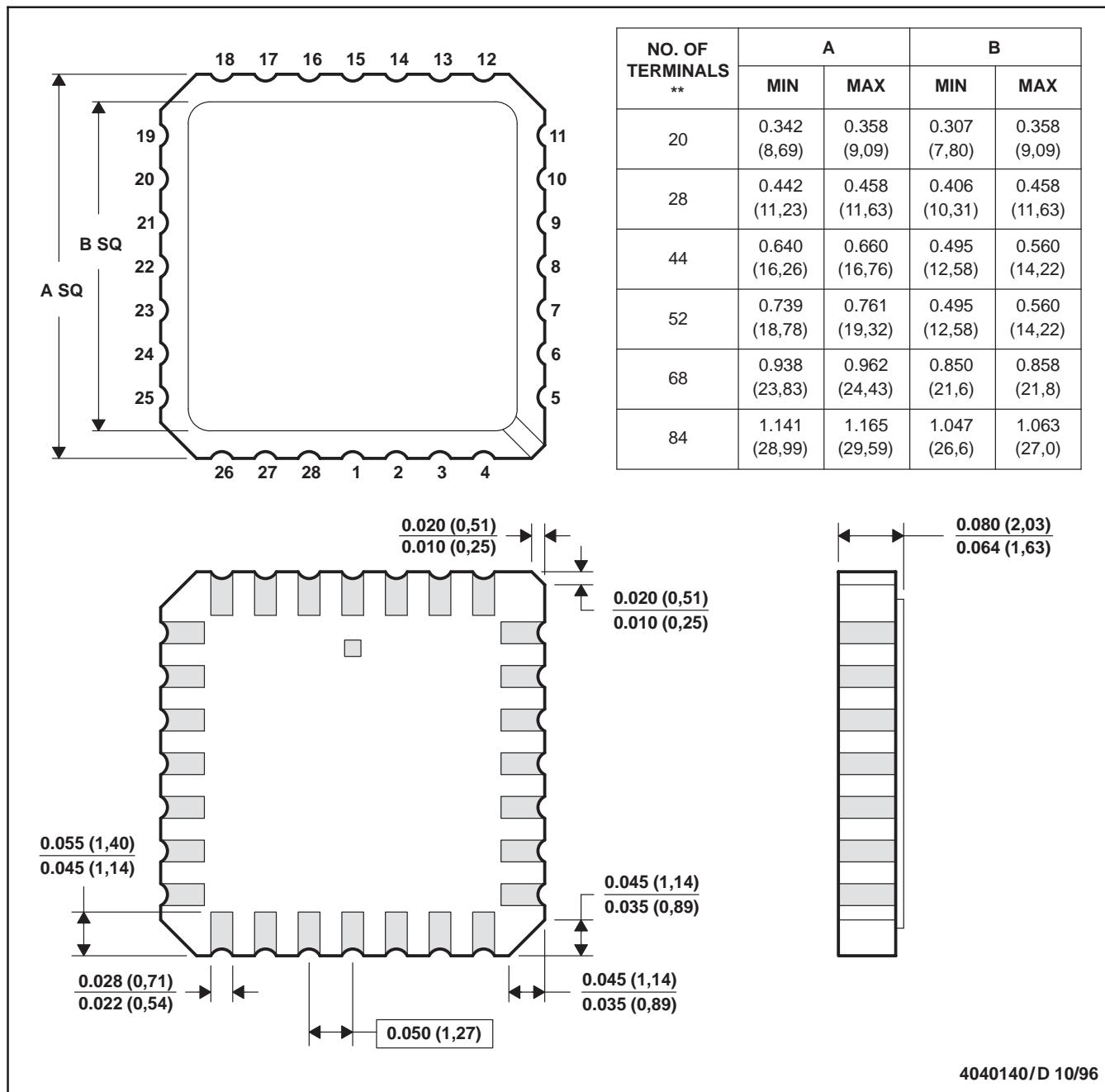
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within MIL STD 1835 GDFP1-F14 and JEDEC MO-092AB

4040180-2/D 07/03

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



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**)

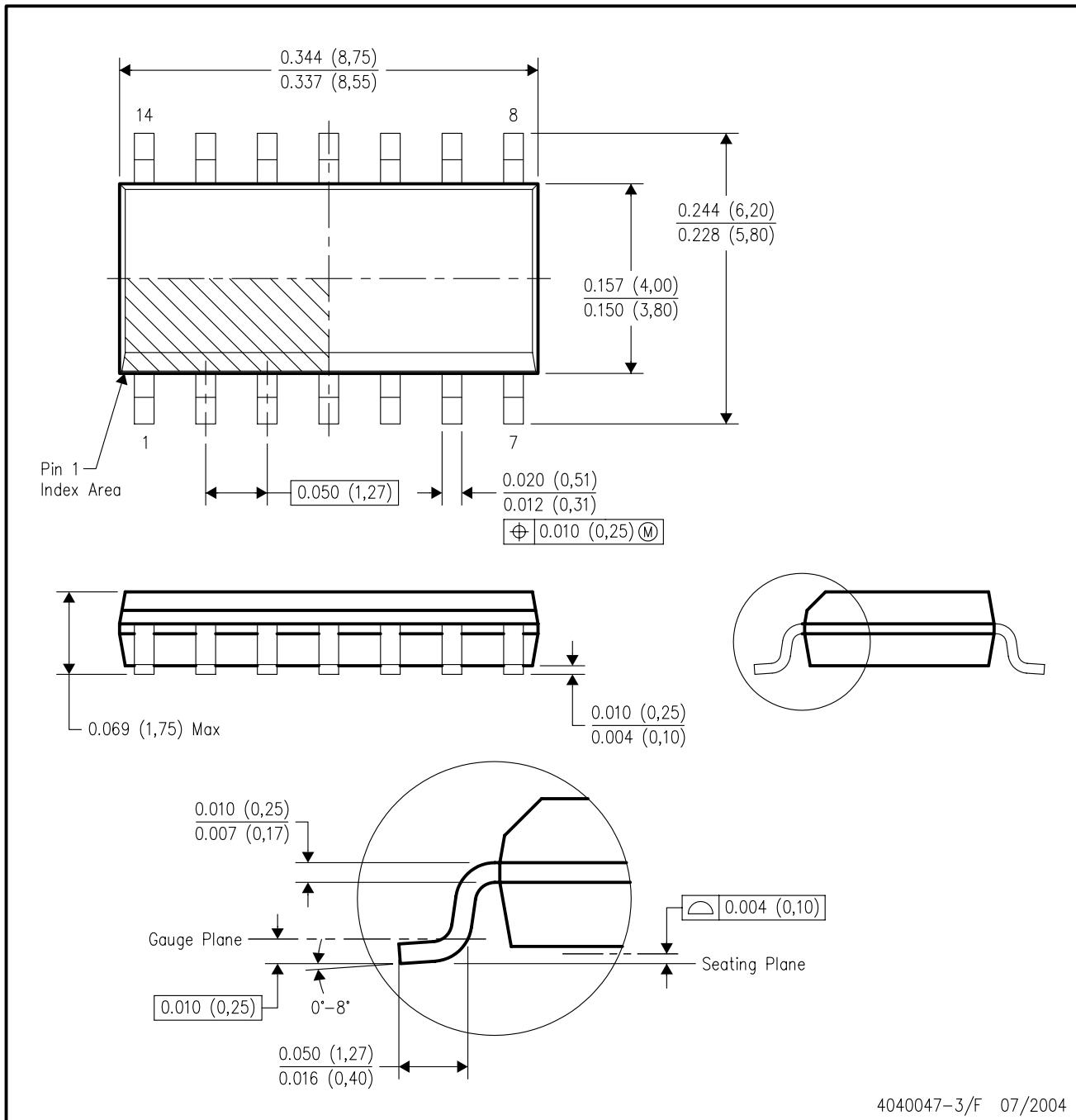
16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



NOTES:

- All linear dimensions are in inches (millimeters).
- This drawing is subject to change without notice.
- Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
- Falls within JEDEC MS-012 variation AB.

MECHANICAL DATA

NS (R-PDSO-G)**

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



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.

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