

SN54ALS30A, SN54AS30, SN74ALS30A, SN74AS30 8-INPUT POSITIVE-NAND GATES

SDAS010C – MARCH 1984 – REVISED NOVEMBER 2000

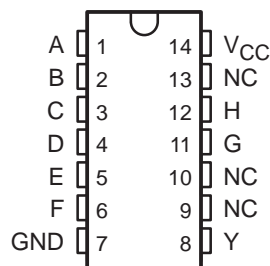
description

These devices contain an 8-input positive-NAND gate and perform the following Boolean functions in positive logic:

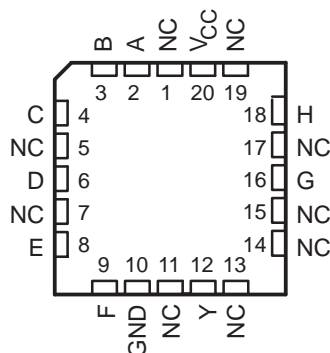
$$Y = \overline{A \cdot B \cdot C \cdot D \cdot E \cdot F \cdot G \cdot H} \text{ or}$$

$$Y = \overline{A} + \overline{B} + \overline{C} + \overline{D} + \overline{E} + \overline{F} + \overline{G} + \overline{H}$$

SN54ALS30A, SN54AS30 . . . J PACKAGE
SN74ALS30A, SN74AS30 . . . D OR N PACKAGE
SN74AS30 . . . DB PACKAGE
(TOP VIEW)



SN54ALS30A, SN54AS30 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

ORDERING INFORMATION

T _A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	PDIP – N	Tube	SN74ALS30AN	SN74ALS30AN
			SN74AS30N	SN74AS30N
	SOIC – D	Tube	SN74ALS30AD	ALS30A
		Tape and reel	SN74ALS30AD	
		Tube	SN74AS30D	AS30
		Tape and reel	SN74AS30D	
–55°C to 125°C	SSOP – DB	Tape and reel	SN74AS30DBR	AS30
	CDIP – J	Tube	SNJ54ALS30AJ	SNJ54ALS30AJ
			SNJ54AS30J	SNJ54AS30J
	LCCC – FK	Tube	SNJ54ALS30AFK	SNJ54ALS30AFK
			SNJ54AS30FK	SNJ54AS30FK

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

**TEXAS
INSTRUMENTS**

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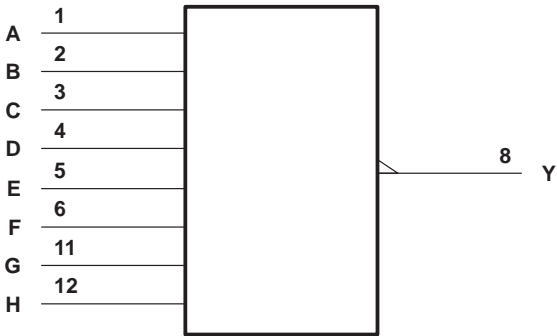
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FUNCTION TABLE

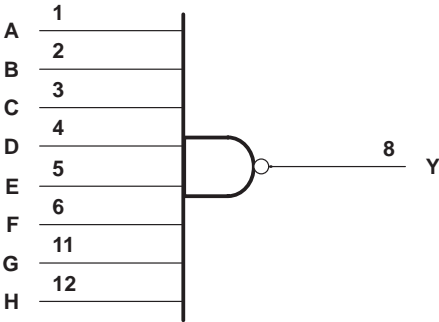
INPUTS A–H	OUTPUT Y
All inputs H	L
One or more inputs L	H

logic symbol†



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

logic diagram (positive logic)



Pin numbers shown are for the D, DB, 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, V_I	–0.5 V to 7 V
Package thermal impedance, θ_{JA} (see Note 1): D package	86°C/W
DB package	96°C/W
N package	80°C/W
Storage temperature range, T_{stg}	–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 package thermal impedance is calculated in accordance with JESD 51-7.

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recommended operating conditions

			MIN	NOM	MAX	UNIT
V _{CC}	Supply voltage		4.5	5	5.5	V
V _{IH}	High-level input voltage		2			V
V _{IL}	Low-level input voltage				0.8†	V
					0.7‡	V
I _{OH}	High-level output current	'ALS30A			–0.4	mA
		'AS30			–2	mA
I _{OL}	Low-level output current	SN54ALS30A			4	mA
		SN74ALS30A			8	mA
		'AS30			20	mA
T _A	Operating free-air temperature	SN54ALS30A	–55		125	°C
		SN54AS30	–55		125	°C
		SN74ALS30A	0		70	°C
		SN74AS30	0		70	°C

† Applies to the 'AS30 and SN74ALS30A across the full operating temperature range, and SN54ALS30A over the temperature range of –55°C to 70°C.

‡ Applies to the SN54ALS30A over the temperature range of 70°C to 125°C.

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

PARAMETER	TEST CONDITIONS			MIN	TYP§	MAX	UNIT
V _{IK}	V _{CC} = 4.5 V,	I _I = –18 mA	'ALS30A			–1.5	V
			'AS30			–1.2	V
V _{OH}	V _{CC} = 4.5 V to 5.5 V	I _{OH} = –0.4 mA	'ALS30A	V _{CC} –2			V
		I _{OH} = –2 mA	'AS30	V _{CC} –2			V
V _{OL}	V _{CC} = 4.5 V	I _{OL} = 4 mA	'ALS30A		0.25	0.4	V
		I _{OL} = 8 mA	SN74ALS30A		0.35	0.5	V
		I _{OL} = 20 mA	'AS30		0.35	0.5	V
I _I	V _{CC} = 5.5 V,	V _I = 7 V				0.1	mA
I _{IH}	V _{CC} = 5.5 V,	V _I = 2.7 V				20	µA
I _{IL}	V _{CC} = 5.5 V,	V _I = 0.4 V	'ALS30A			–0.1	mA
			'AS30			–0.5	mA
I _O ¶	V _{CC} = 5.5 V,	V _O = 2.25 V	SN54ALS30A	–20		–112	mA
			SN74ALS30A	–30		–112	mA
			'AS30	–30		–112	mA
I _{CCH}	V _{CC} = 5.5 V,	V _I = 0	'ALS30A		0.22	0.36	mA
			'AS30		0.9	1.5	mA
I _{CCL}	V _{CC} = 5.5 V,	V _I = 4.5 V	'ALS30A		0.54	0.9	mA
			'AS30		3	4.9	mA

§ All typical values are at V_{CC} = 5 V, T_A = 25°C.

¶ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.



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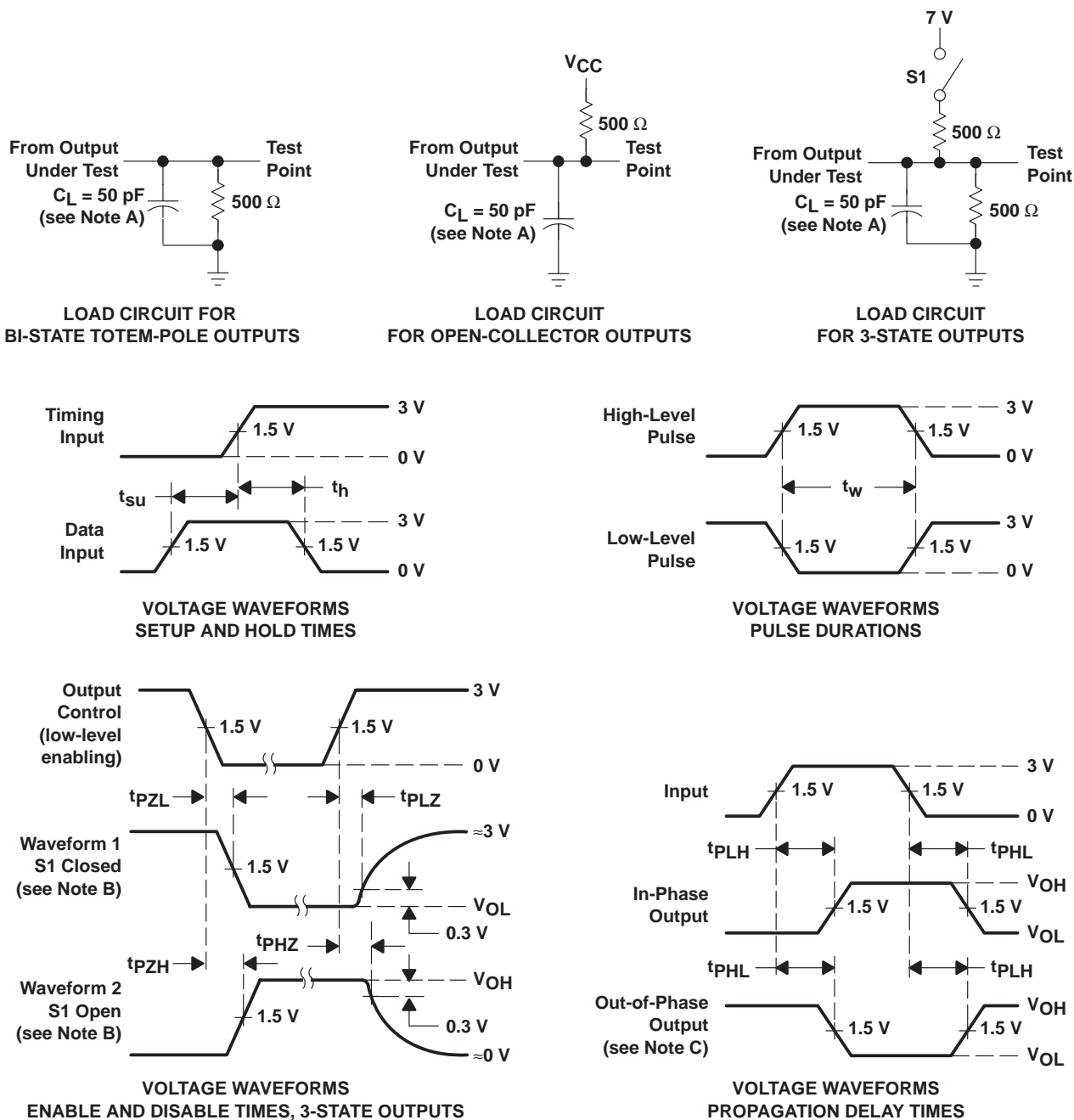
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switching characteristics over recommended operating free-air temperature range (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)		MIN	MAX	UNIT
tPLH	A, B, C, D, E, F, G, or H	Y	SN54ALS30A	3	15	ns
			SN74ALS30A	3	10	
			SN54AS30	1	5.5	
			SN74AS30	1	5	
tPHL	A, B, C, D, E, F, G, or H	Y	SN54ALS30A	3	15	ns
			SN74ALS30A	3	12	
			SN54AS30	1	5	
			SN74AS30	1	4.5	



PARAMETER MEASUREMENT INFORMATION
SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- NOTES: A. C_L includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
C. When measuring propagation delay items of 3-state outputs, switch S1 is open.
D. All input pulses have the following characteristics: $PRR \leq 1$ MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
E. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuits 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⁾
5962-86837012A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	N / A for Pkg Type
5962-8683701DA	ACTIVE	CFP	W	14	1	TBD	Call TI	N / A for Pkg Type
5962-9755801Q2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	N / A for Pkg Type
5962-9755801QCA	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
JM38510/37004B2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	N / A for Pkg Type
JM38510/37004BCA	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SN54ALS30AJ	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SN54AS30J	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SN74ALS30AD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS30ADE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS30ADR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS30ADRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS30AN	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74ALS30AN3	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI
SN74ALS30ANE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74ALS30ANSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74ALS30ANSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS30D	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS30DBR	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS30DBRE4	ACTIVE	SSOP	DB	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS30DE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS30DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS30DRE4	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS30N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN74AS30NSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AS30NSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SNJ54ALS30AFK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	N / A for Pkg Type
SNJ54ALS30AJ	ACTIVE	CDIP	J	14	1	TBD	Call TI	N / A for Pkg Type
SNJ54ALS30AW	ACTIVE	CFP	W	14	1	TBD	Call TI	N / A for Pkg Type
SNJ54AS30FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	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⁾
SNJ54AS30J	ACTIVE	CDIP	J	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

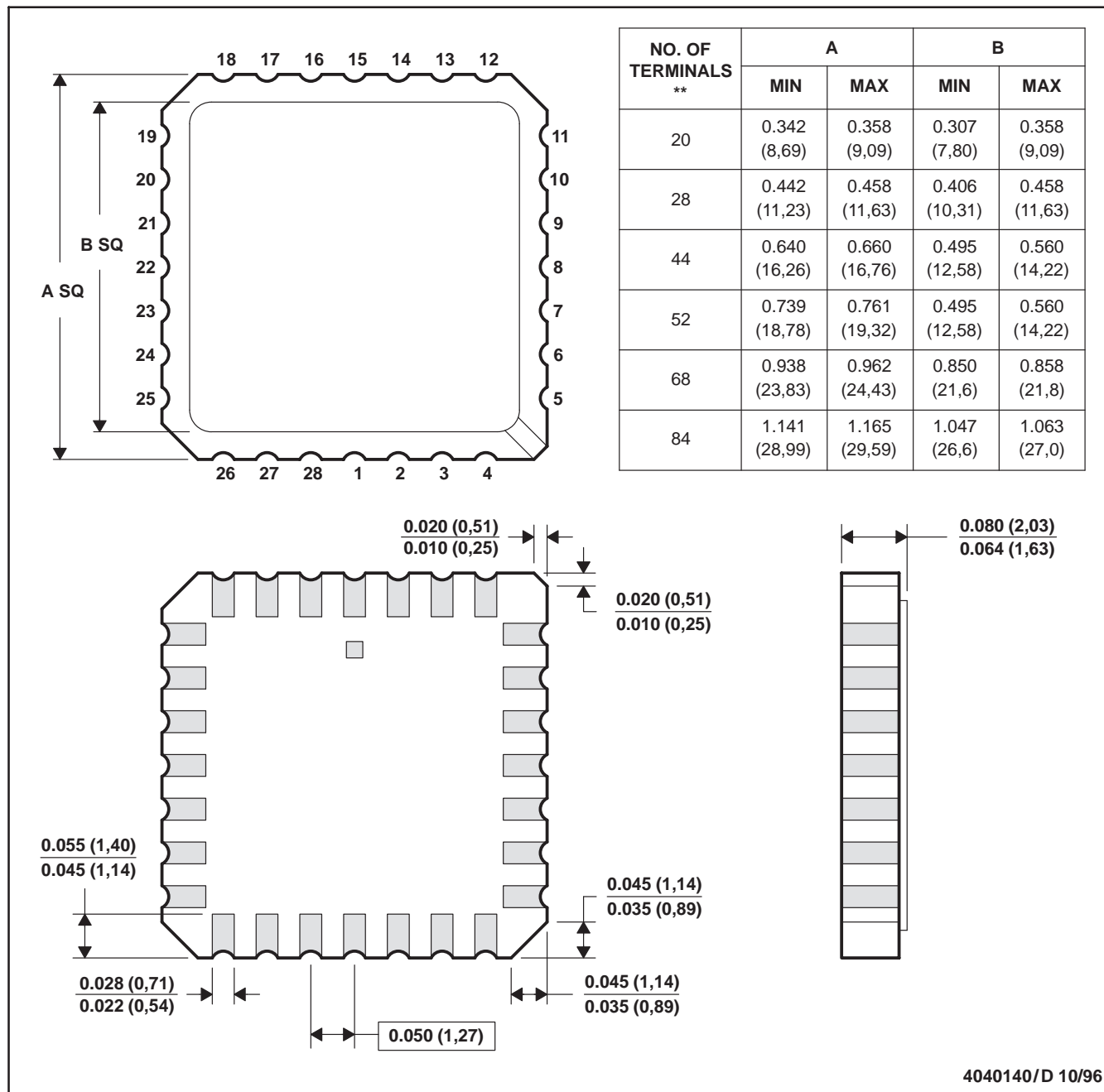


- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package can be hermetically sealed with a ceramic lid using glass frit.
 - Index point is provided on cap for terminal identification only.
 - Falls within MIL STD 1835 GDFP1-F14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

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package can be hermetically sealed with a metal lid.
 - The terminals are gold plated.
 - Falls within JEDEC MS-004

N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



PINS **	14	16	18	20
DIM				
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



14/18 Pin Only
20 Pin vendor option

4040049/E 12/2002

- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - The 20 pin end lead shoulder width is a vendor option, either half or full width.

D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



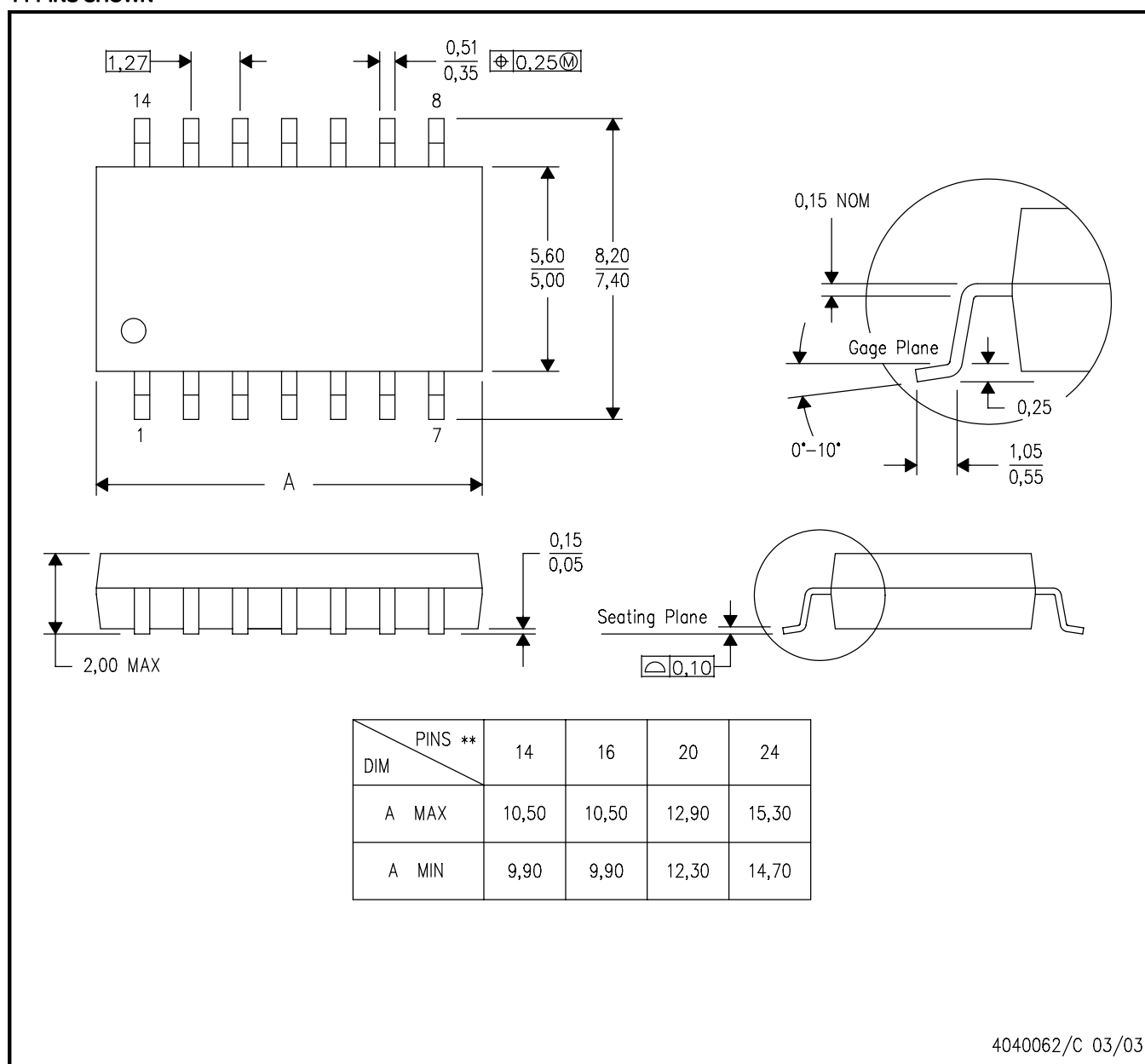
4040047-3/F 07/2004

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- All linear dimensions are in millimeters.
 - This drawing is subject to change without notice.
 - Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

DB (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

28 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.
 D. Falls within JEDEC MO-150

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