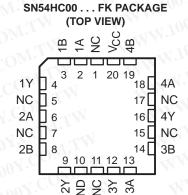
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- Wide Operating Voltage Range of 2 V to 6 V
- **Outputs Can Drive Up To 10 LSTTL Loads**
- Low Power Consumption, 20-µA Max ICC

SN54HC00 . . . J OR W PACKAGE SN74HC00 . . . D, DB, N, NS, OR PW PACKAGE (TOP VIEW)



- Typical $t_{pd} = 8 \text{ ns}$
- ±4-mA Output Drive at 5 V
- Low Input Current of 1 µA Max



NC - No internal connection

description/ordering information

The 'HC00 devices contain four independent 2-input NAND gates. They perform the Boolean function $Y = \overline{A \bullet B}$ or $Y = \overline{A} + \overline{B}$ in positive logic.

ORDERING INFORMATION

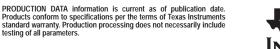
TA	PACK	AGET	ORDERABLE PART NUMBER	TOP-SIDE MARKING	
	PDIP – N	Tube of 25	SN74HC00N	SN74HC00N	
	1007	Tube of 50	SN74HC00D	COMIT	
	SOIC - D	Reel of 2500	SN74HC00DR	HC00	
	MWW.IO	Reel of 250	SN74HC00DT	ON CONT	
–40°C to 85°C	SOP - NS	Reel of 2000	SN74HC00NSR	HC00	
	SSOP – DB	Reel of 2000	SN74HC00DBR	HC00	
	MM	Tube of 90	SN74HC00PW	1100 Y.	
	TSSOP - PW	Reel of 2000	SN74HC00PWR	HC00	
	WW	Reel of 250	SN74HC00PWT	A Trace COL	
	CDIP – J	Tube of 25	SNJ54HC00J	SNJ54HC00J	
–55°C to 125°C	CFP – W	Tube of 150	SNJ54HC00W	SNJ54HC00W	
	LCCC - FK	Tube of 55	SNJ54HC00FK	SNJ54HC00FK	

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

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SN54HC00, SN74HC00 QUADRUPLE 2-INPUT POSITIVE-NAND GATES

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FUNCTION TABLE (each gate)

INP	JTS	OUTPUT
Α	В	Y
Н	Н	MILL
L	X	HCO
X	LV	H

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 clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) (see		
Output clamp current, IOK (VO < 0 or VO > VC	c) (see Note 1)	±20 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})		±25 mA
Continuous current through V _{CC} or GND		±50 mA
Package thermal impedance, θ _{JA} (see Note 2)	: D package	86°C/W
M.In. COM	DB package	96°C/W
	N package	80°C/W
	NS package	76°C/W
	PW package	113°C/W
Storage temperature range, T _{sta}		-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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions (see Note 3)

	W	WWW.100Y.COM.T		N54HC0	0	SN74HC00			UNIT	
				MIN NOM MAX		MIN NOM MAX		MAX		
Vcc	Supply voltage	100 r. COM.	2	5	6	2	5	6	V	
		V _{CC} = 2 V	1.5		MA.	1.5) Y.	αM^{Λ}	NA.	
V_{IH}	High-level input voltage	V _{CC} = 4.5 V	3.15		WW	3.15	001.0	21	V	
		V _{CC} = 6 V	4.2		*XI*	4.2		$\mathbb{C}\Omega_{M_{p}}$	TV	
V _{IL}	Low-level input voltage	V _{CC} = 2 V	$M_{T,T}$	-1	0.5	www.	Ina	0.5	1.V	
		V _{CC} = 4.5 V	TIM		1.35	-147	1001	1.35		
		V _{CC} = 6 V	1	WT	1.8	MM	- 100	1.8		
٧ _I	Input voltage	MW.Io	0 0	TIN	Vcc	0	M.r.	VCC	V	
۷o	Output voltage	W.100	0		Vcc	0		Vcc	V	
		V _{CC} = 2 V		V.LA	1000			1000		
Δt/Δν	Input transition rise/fall time	V _{CC} = 4.5 V	I.Co.		500			500	ns	
		V _{CC} = 6 V			400			400		
TA	Operating free-air temperature		-55		125	-40		85	°C	

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, Implications of Slow or Floating CMOS Inputs, literature number SCBA004.



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

DADAMETED	TEST CONDITIONS		Way.	T _A = 25°C		SN54HC00		SN74HC00		W				
PARAMETER			VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT			
WW = 110	O. M.T		2 V	1.9	1.998		1.9	atvi 1	1.9	coM				
	OX.CO	I _{OH} = -20 μA	4.5 V	4.4	4.499		4.4	VV .	4.4	.01				
VOH	VI = VIH or VIL	IN V	6 V	5.9	5.999	W	5.9	11/1/1/	5.9	i.Co.	VV			
	Ton r. COM	I _{OH} = -4 mA	4.5 V	3.98	4.3		3.7	WIW	3.84	A CO				
	100Y.	$I_{OH} = -5.2 \text{ mA}$	6 V	5.48	5.8	LA	5.2	V 1	5.34	-1 (1				
WW	W.100Y.CO	WT	2 V	OOX.	0.002	0.1		0.1	-x110	0.1	Mo.			
		$I_{OL} = 20 \mu A$	4.5 V	· on V	0.001	0.1		0.1	1	0.1				
V _{OL}	$V_I = V_{IH}$ or V_{IL}	OM.1	6 V	Too	0.001	0.1	N.	0.1	MW.	0.1	CV			
	1007.0	I _{OL} = 4 mA	4.5 V	N.100	0.17	0.26	- 7	0.4	Wixe	0.33				
	MM. TOOX.	MM. TOOX!	MM. TOUX	MAN. TOUX.C	I _{OL} = 5.2 mA	6 V	-110	0.15	0.26	W	0.4	N.A.	0.33	
I _I	$V_I = V_{CC}$ or 0	COM	6 V	111.	±0.1	±100	TW	±1000	WW	±1000	nA			
Icc	$V_I = V_{CC}$ or 0,	I _O = 0	6 V	WW.		CO 2	- TI	40	WW	20	μΑ			
Ci	W 1 100	T. OM.TW	2 V to 6 V	- TVI	3	10	I'r	10		10	pF			

switching characteristics over recommended operating free-air temperature range, C_L = 50 pF (unless otherwise noted) (see Figure 1)

DADAMETED	FROM	TO (OUTPUT)	- V	T,	T _A = 25°C		SN54HC00		SN74HC00		11.70
PARAMETER	(INPUT)		√ vcc	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
	MMM	OUX.CO.	2 V	W	45	90	- 1	135		115	- 1
^t pd	A or B	100X.YOM.	4.5 V	*	9	18	1.COF	27	N .	23	ns
·			6 V		8	15	-1 CO	23		20	TWV
	M. A.	1100Y.	2 V		38	75	11.	110	44	95	- 1
t _t	WW WALLOW	Y. CO	4.5 V		8	15	10 Y.C	22	UN	19	ns
		6 V		6	13	any.	19	TW	16	W	

operating characteristics, T_A = 25°C

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	PARAMETER	TEST CONDITIONS	TYP	UNIT	
C _{pd}	Power dissipation capacitance per gate	No load	20	pF	
	WWW. COM. TW	AM M. CO.	TW		
	MM 100X. TW				
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	13 14 75 14 11 555				

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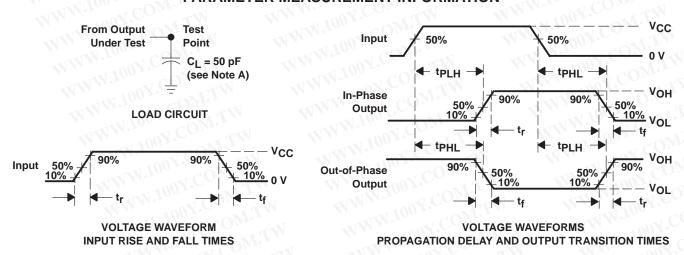
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PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_L includes probe and test-fixture capacitance.

- B. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, $Z_O = 50 \Omega$, $t_f = 6$ ns, $t_f = 6$ ns.
- C. The outputs are measured one at a time with one input transition per measurement.
- D. tpLH and tpHL are the same as tpd.

Figure 1. Load Circuit and Voltage Waveforms





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PACKAGE OPTION ADDENDUM

8-Mar-2005

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp (3)
5962-8403701VCA	ACTIVE	CDIP	J	14	CO1	None	Call TI	Level-NC-NC-NC
5962-8403701VDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
84037012A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
8403701CA	ACTIVE	CDIP	J	14	1.9	None	Call TI	Level-NC-NC-NC
8403701DA	ACTIVE	CFP	W	14	100	None	Call TI	Level-NC-NC-NC
JM38510/65001B2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
JM38510/65001BCA	ACTIVE	CDIP	J	14	001	None	Call TI	Level-NC-NC-NC
JM38510/65001BDA	ACTIVE	CFP	W	14	17.	None	Call TI	Level-NC-NC-NC
SN54HC00J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN74HC00ADBLE	OBSOLETE	SSOP	DB	14	N.100 x	None	Call TI	Call TI
SN74HC00D	ACTIVE	SOIC	D ¹	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR Level-1-235C-UNLIM
SN74HC00DR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HC00DT	ACTIVE	SOIC	TWD	14	250	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR Level-1-235C-UNLIM
SN74HC00N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74HC00N3	OBSOLETE	PDIP	N	14	MAA.	None	Call TI	Call TI
SN74HC00NS	ACTIVE	so	NS	14	WW	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR Level-1-235C-UNLIM
SN74HC00NSLE	OBSOLETE	so	NS	14	W	None	Call TI	Call TI
SN74HC00NSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAF Level-1-235C-UNLIM
SN74HC00PW	ACTIVE	TSSOP	PW	14	90	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74HC00PWLE	OBSOLETE	TSSOP	PW	14		None	Call TI	Call TI
SN74HC00PWR	ACTIVE	TSSOP	PW	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74HC00PWT	ACTIVE	TSSOP	PW	14	250	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SNJ54HC00FK	ACTIVE	LCCC	FK.	20	1	None	Call TI	Level-NC-NC-NC
SNJ54HC00J	ACTIVE	CDIP	100,	14	1	None	Call TI	Level-NC-NC-NC
SNJ54HC00W	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC

⁽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.

None: Not yet available Lead (Pb-Free).

Pb-Free (RoHS): Tl'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.

⁽²⁾ Eco Plan - May not be currently available - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.



PACKAGE OPTION ADDENDUM

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Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDECindustry standard classifications, and peak solder temperature.

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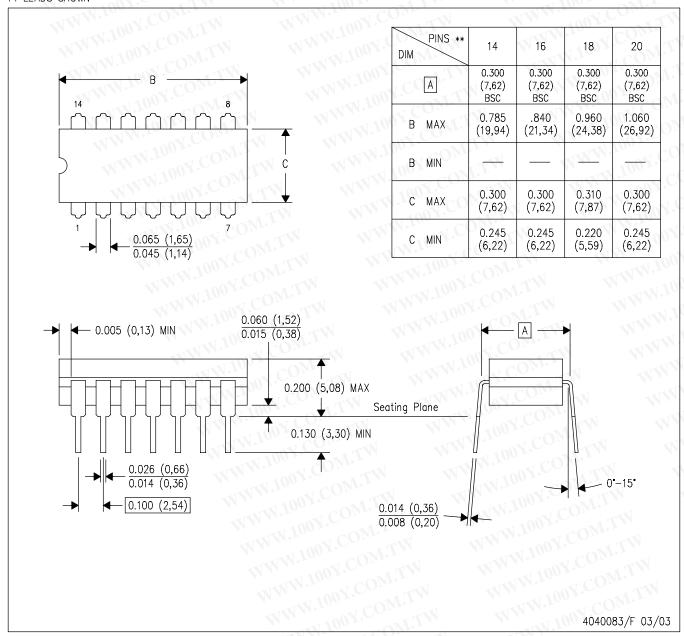
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J(R-GDIP-T**)

CERAMIC DUAL IN-LINE PACKAGE

14 LEADS SHOWN

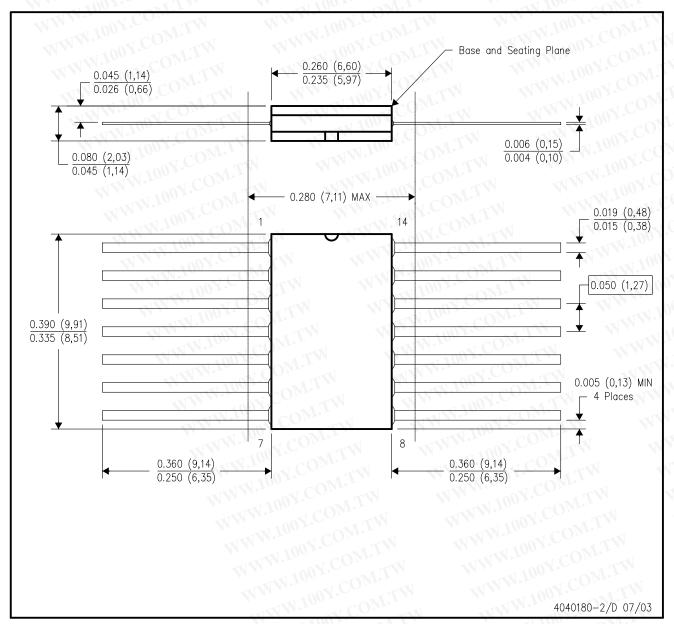


NOTES:

- 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:

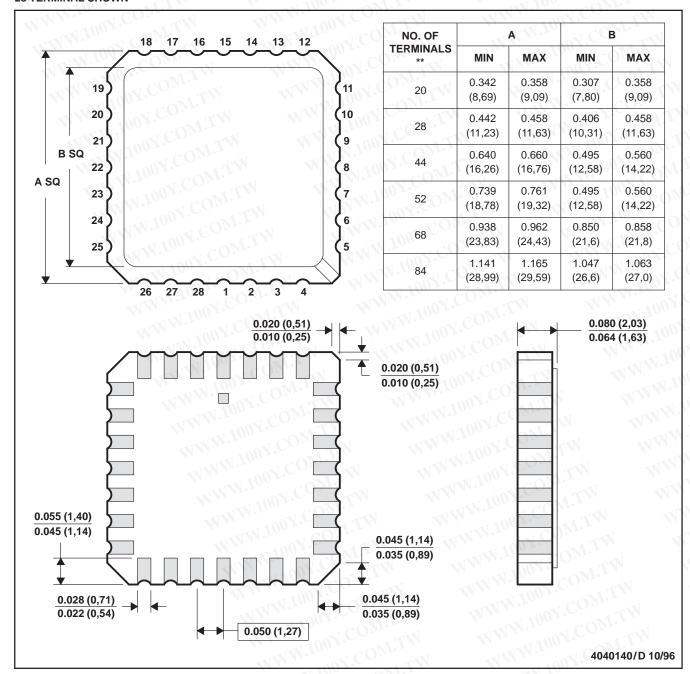
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within MIL STD 1835 GDFP1-F14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



FK (S-CQCC-N**)

28 TERMINAL SHOWN

LEADLESS CERAMIC CHIP CARRIER



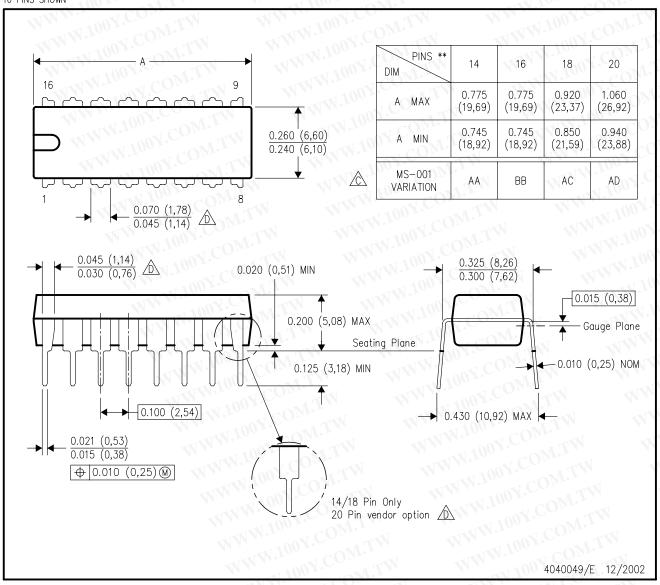
- NOTES: A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a metal lid.
 - D. The terminals are gold plated.
 - E. Falls within JEDEC MS-004



N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



NOTES:

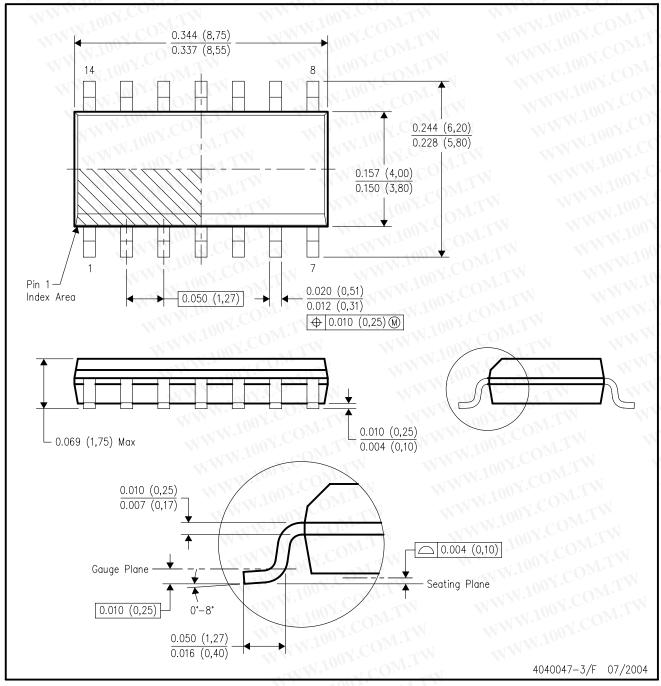
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- 放 The 20 pin end lead shoulder width is a vendor option, either half or full width.



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D (R-PDSO-G14)

PLASTIC SMALL-OUTLINE PACKAGE



NOTES:

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

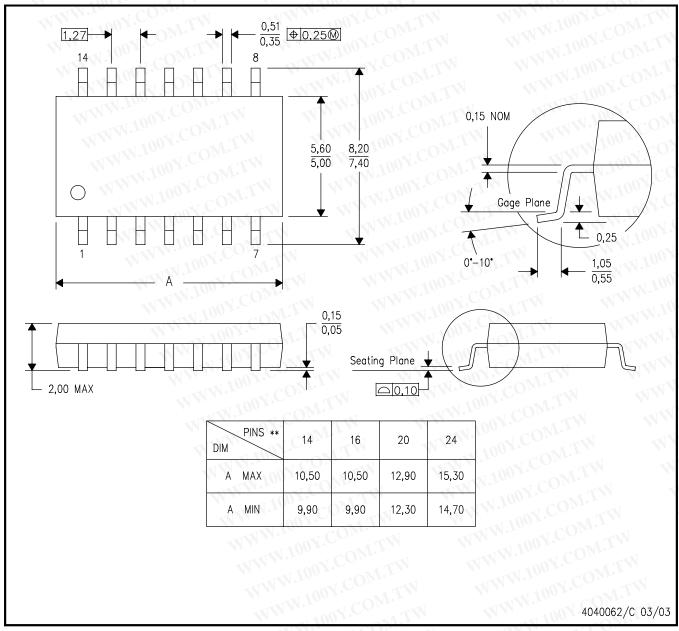


MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



NOTES:

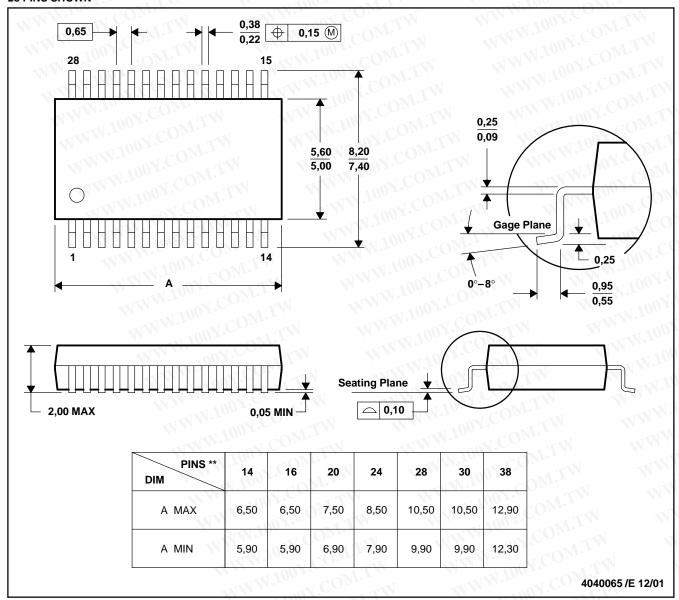
- A. All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



DB (R-PDSO-G**)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



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.

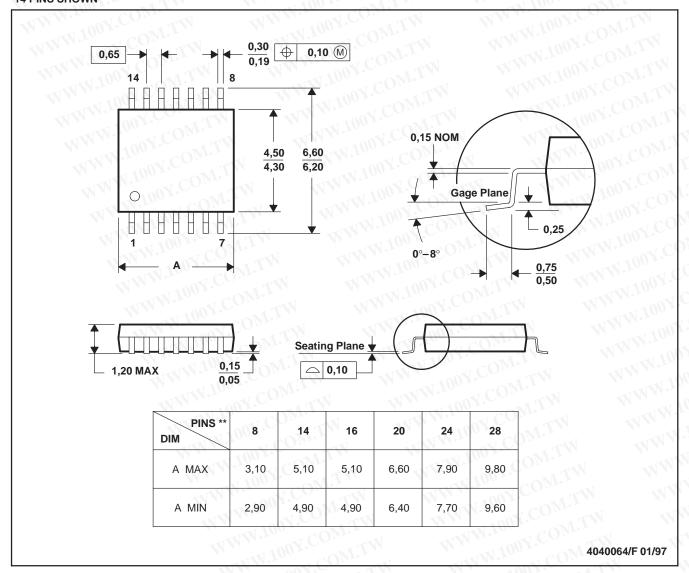
D. Falls within JEDEC MO-150



PW (R-PDSO-G**)

14 PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



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-153

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