捷多邦,专业PCB**·SN54AH©T873章SN**74AHCT373 OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

SCLS239M - OCTOBER 1995 - REVISED JULY 2003

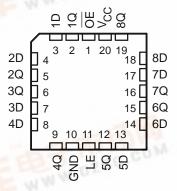
- Inputs Are TTL-Voltage Compatible
- Latch-Up Performance Exceeds 250 mA Per JESD 17

SN54AHCT373 . . . J OR W PACKAGE SN74AHCT373 . . . DB, DGV, DW, N, NS, OR PW PACKAGE (TOP VIEW)

		_		•
OE	1	U	20] v _{cc}
1Q	2		19	8Q
1D	3		18	8D
2D	4		17] 7D
2Q	5		16] 7Q
3Q	6		15] 6Q
3D [7		14] 6D
4D [13] 5D
4Q	9		12] 5Q
GND [10		11	LE

- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

SN54AHCT373 . . . FK PACKAGE (TOP VIEW)



description/ordering information

The 'AHCT373 devices are octal-transparent D-type latches. When the latch-enable (LE) input is high, the Q outputs follow the data (D) inputs. When LE is low, the Q outputs are latched at the logic levels of the D inputs.

A buffered output-enable (\overline{OE}) input can be used to place the eight outputs in either a normal logic state (high or low) or the high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and increased drive provide the capability to drive bus lines without interface or pullup components.

OE does not affect the internal operations of the latches. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

ORDERING INFORMATION

TA	PACK	AGE†	ORDERABLE PART NUMBER	TOP-SIDE MARKING
12	PDIP – N	Tube	SN74AHCT373N	SN74AHCT373N
	SOIC - DW	Tube	SN74AHCT373DW	AHCT373
	30IC = DW	Tape and reel	SN74AHCT373DWR	AIIC1373
–40°C to 85°C	SOP - NS	Tape and reel	SN74AHCT373NSR	AHCT373
-40 C to 65 C	SSOP – DB	Tape and reel	SN74AHCT373DBR	HB373
	TSSOP - PW	Tube	SN74AHCT373PW	HB373
100	1330F = FW	Tape and reel	SN74AHCT373PWR	прэгэ
- FB	TVSOP - DGV	Tape and reel	SN74AHCT373DGVR	HB373
When the	CDIP – J	Tube	SNJ54AHCT373J	SNJ54AHCT373J
– <mark>55°C to 1</mark> 25°C	CFP – W	Tube	SNJ54AHCT373W	SNJ54AHCT373W
	LCCC – FK	Tube	SNJ54AHCT373FK	SNJ54AHCT373FK

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

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

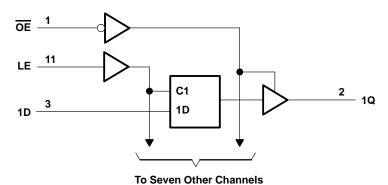


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FUNCTION TABLE (each latch)

	INPUTS	OUTPUT	
OE	LE	D	Q
L	Н	Н	Н
L	Н	L	L
L	L	Χ	Q_0
Н	X	Χ	Z

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
Output voltage range, VO (see Note 1)		$1.000 \times 10^{-2} = 0.5 \times 10^{$
Input clamp current, I_{IK} ($V_I < 0$)		
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CO}$		
Continuous output current, $I_O(V_O = 0 \text{ to } V_{CC})$		
Continuous current through V _{CC} or GND		
Package thermal impedance, θ_{JA} (see Note 2)		
,	DGV package	
	DW package	
	N package	
	NS package	
	PW package	
Storage temperature range, T _{stg}		

[†] 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.

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recommended operating conditions (see Note 3)

		SN54AH	SN54AHCT373		CT373	UNIT
		MIN	MAX	MIN	MAX	UNIT
Vcc	Supply voltage	4.5	5.5	4.5	5.5	V
VIH	High-level input voltage	2		2		V
V_{IL}	Low-level input voltage		0.8		0.8	V
٧ _I	Input voltage	0	5.5	0	5.5	V
Vo	Output voltage	0	VCC	0	VCC	V
loh	High-level output current		-8		-8	mA
loL	Low-level output current		8		8	mA
Δt/Δν	Input transition rise or fall rate		20		20	ns/V
T _A	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.

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

PARAMETER	TEST CONDITIONS	vcc	T,	չ = 25°C	;	SN54AHCT373		SN74AHCT373		UNIT
PARAMETER	TEST CONDITIONS	VCC VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
Vo.,	I _{OH} = -50 μA	4.5 V	4.4	4.5		4.4		4.4		V
Voн	I _{OH} = -8 mA	4.5 V	3.94			3.8		3.8		V
Vo.	I _{OL} = 50 μA	4.5 V			0.1		0.1		0.1	V
VOL	I _{OL} = 8 mA	4.5 V			0.36		0.44		0.44	V
loz	$V_O = V_{CC}$ or GND	5.5 V			±0.25		±2.5		±2.5	μΑ
lį	V _I = 5.5 V or GND	0 V to 5.5 V			±0.1		±1*		±1	μΑ
lcc	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			4		40		40	μΑ
ΔI _{CC} †	One input at 3.4 V, Other inputs at V _{CC} or GND	5.5 V			1.35		1.5		1.5	mA
C _i	V _I = V _{CC} or GND	5 V		4	10				10	pF
Co	$V_O = V_{CC}$ or GND	5 V		9					·	pF

 $[\]star$ On products compliant to MIL-PRF-38535, this parameter is not production tested at $V_{CC} = 0 \text{ V}$.

timing requirements over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

		T _A = 2	25°C	SN54AH	CT373	SN74AH	CT373	UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	UNIT
t _W	Pulse duration, LE high	6.5		6.5		6.5		ns
t _{su}	Setup time, data before $\overline{LE} \downarrow$	1.5		1.5		1.5		ns
th	Hold time, data after LE↓	3.5		3.5		3.5		ns



[†] This is the increase in supply current for each input at one of the specified TTL voltage levels rather than 0 V or VCC.

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switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V \pm 0.5 V (unless otherwise noted) (see Figure 1)

DARAMETER	FROM	то	LOAD	TA	\ = 25°C	;	SN54AH	CT373	SN74AH	CT373	LINUT
PARAMETER	(INPUT)	(OUTPUT)	CAPACITANCE	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
t _{PLH}	D	Q	C _I = 15 pF		5.1*	8.5*	1*	9.5*	1	9.5	ns
t _{PHL}	D	ч	GL = 13 pr		5.1*	8.5*	1*	9.5*	1	9.5	115
^t PLH	LE	Q	C _L = 15 pF		7.7*	12.3*	1*	13.5*	1	13.5	ns
tPHL	LL	ď	OL = 13 pi		7.7*	12.3*	1*	13.5*	1	13.5	115
^t PZH	ŌĒ	Q	C _I = 15 pF		6.3*	10.9*	1*	12.5*	1	12.5	ns
^t PZL	ÜE	Q	C[= 15 pr		6.3*	10.9*	1*	12.5*	1	12.5	115
^t PHZ	ŌĒ	Q	C _L = 15 pF		6*	10.2*	1*	11*	1	11	ns
t _{PLZ}	OL		OL = 13 pi		6*	10.2* 1	1*	11*	1	11	113
^t PLH	D	Q	C 50 pE		5.9	9.5	1	10.5	1	10.5	ns
^t PHL	D	ď	C _L = 50 pF		5.9	9.5	1	10.5	1	10.5	115
^t PLH	LE	Q	C _L = 50 pF		8.5	13.3	1	14.5	1	14.5	nc
^t PHL	LL	ч	CL = 30 pr		8.5	13.3	1	14.5	1	14.5	ns
^t PZH	ŌĒ	Q	C _L = 50 pF		7.1	11.9	1	13.5	1	13.5	nc
^t PZL	OE .	Q	CL = 30 pr		7.1	11.9	1	13.5	1	13.5	3.5 ns
^t PHZ		Q	C _L = 50 pF		6.8	11.2	1	12	1	12	ns
t _{PLZ}	ŌE	Q	CL = 50 pr		6.8	11.2	1	12	1	12	115
tsk(o)			C _L = 50 pF		•	1**				1	ns

^{*} On products compliant to MIL-PRF-38535, this parameter is not production tested.

noise characteristics, V_{CC} = 5 V, C_L = 50 pF, T_A = 25°C (see Note 4)

	PARAMETER	SN7	UNIT		
	PARAMETER	MIN	TYP	MAX	UNIT
V _{OL(P)}	Quiet output, maximum dynamic V _{OL}		0.8	1.2	V
V _{OL(V)}	Quiet output, minimum dynamic V _{OL}		-0.8	-1.2	V
VOH(V)	Quiet output, minimum dynamic VOH	4.1			V
VIH(D)	High-level dynamic input voltage	2			V
V _{IL(D)}	Low-level dynamic input voltage			0.8	V

NOTE 4: Characteristics are for surface-mount packages only.

operating characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$

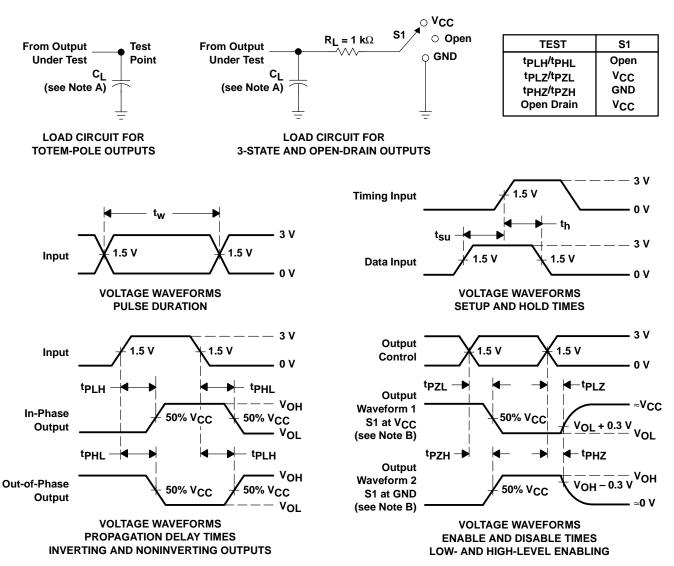
	PARAMETER	TEST CO	ONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance	No load,	f = 1 MHz	17	pF

^{**} On products compliant to MIL-PRF-38535, this parameter does not apply.

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PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_I 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. All input pulses are supplied by generators having the following characteristics: PRR \leq 1 MHz, $Z_O = 50 \Omega$, $t_f \leq$ 3 ns.
- D. The outputs are measured one at a time with one input transition per measurement.
- E. All parameters and waveforms are not applicable to all devices.

Figure 1. Load Circuit and Voltage Waveforms







26-Sep-2005

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
5962-9686701Q2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
5962-9686701QRA	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
5962-9686701QSA	ACTIVE	CFP	W	20	1	TBD	Call TI	Level-NC-NC-NC
SN74AHCT373DBLE	OBSOLETE	SSOP	DB	20		TBD	Call TI	Call TI
SN74AHCT373DBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373DBRE4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373DWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373DWRE4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74AHCT373NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74AHCT373NSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373NSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373PW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373PWE4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373PWLE	OBSOLETE	TSSOP	PW	20		TBD	Call TI	Call TI
SN74AHCT373PWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373PWRE4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74AHCT373PWRG4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SNJ54AHCT373FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54AHCT373J	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54AHCT373W	ACTIVE	CFP	W	20	1	TBD	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.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) 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.



PACKAGE OPTION ADDENDUM

26-Sep-2005

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.

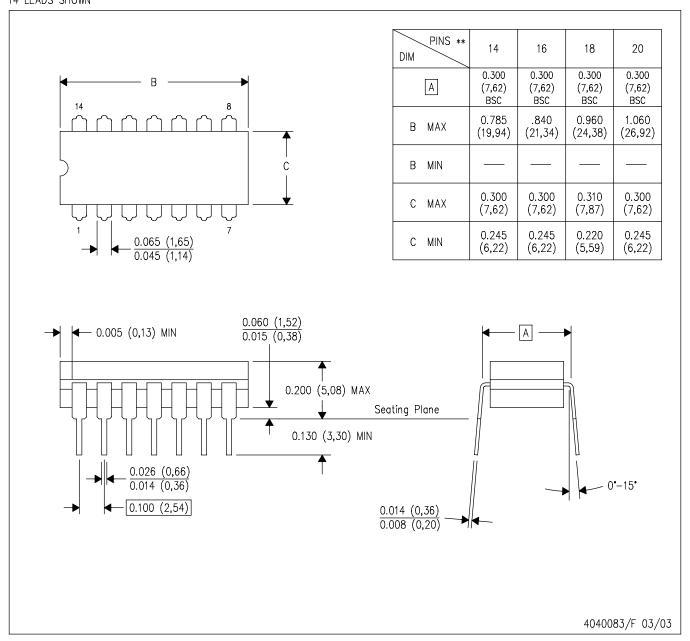
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

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

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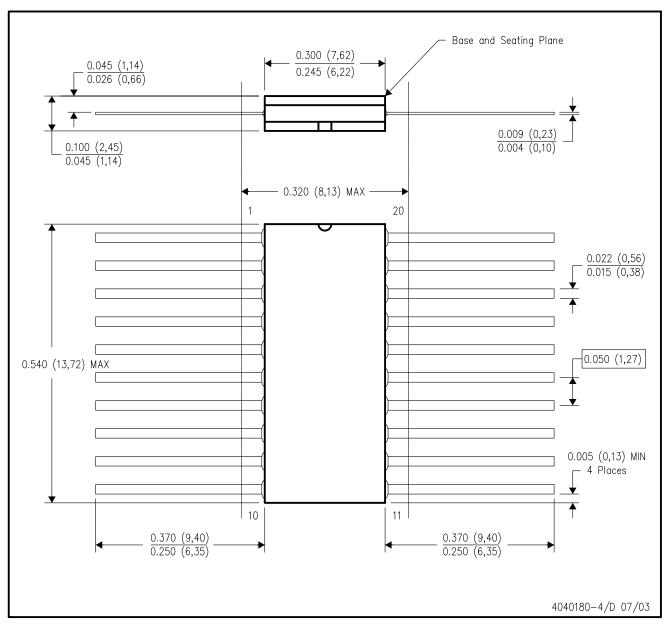
14 LEADS SHOWN



- 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



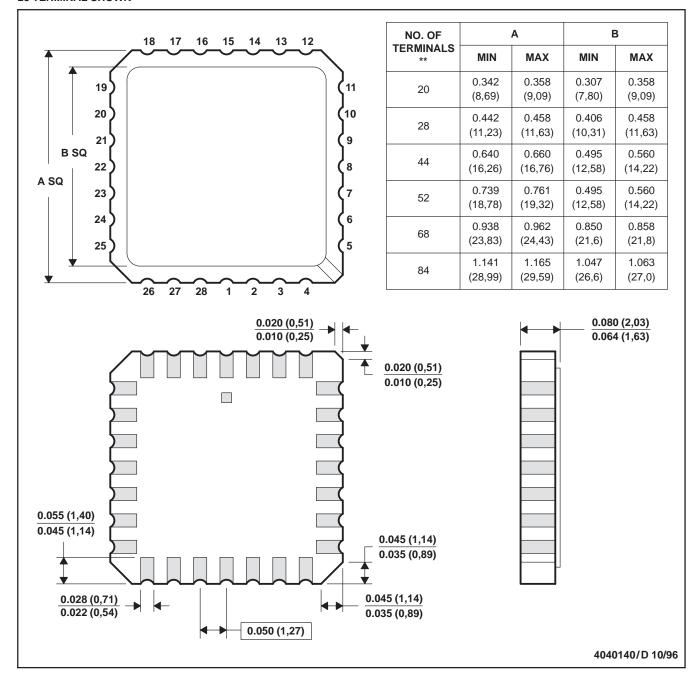
- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only.
- E. Falls within Mil-Std 1835 GDFP2-F20



FK (S-CQCC-N**)

28 TERMINAL SHOWN

LEADLESS CERAMIC CHIP CARRIER



- 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

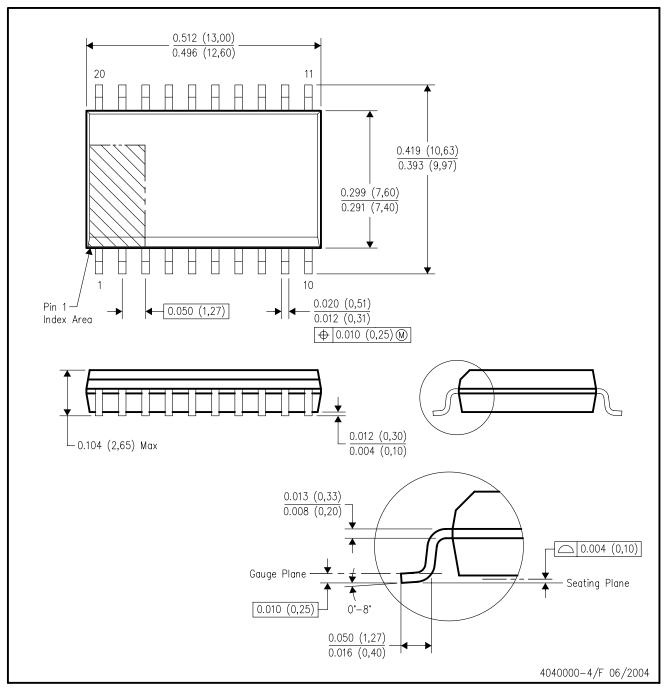
16 PINS SHOWN



- 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.

DW (R-PDSO-G20)

PLASTIC SMALL-OUTLINE PACKAGE



- A. All linear dimensions are in inches (millimeters).
- 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.

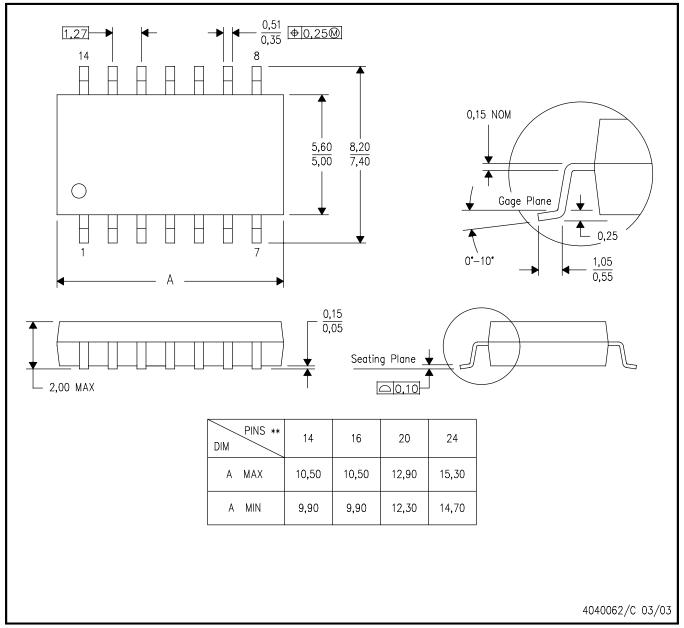


MECHANICAL DATA

NS (R-PDSO-G**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



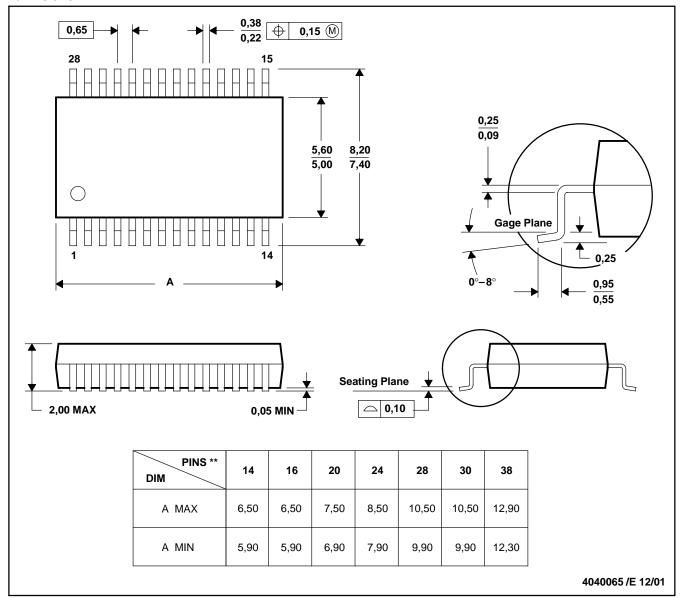
- . All linear dimensions are in millimeters.
- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



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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