CD4041UB Types

Data sheet acquired from Harris Semiconductor
SCHS039C – Revised September 2003

CMOS Quad True/Complement Buffer

High Voltage Types (20-Volt Rating)

■ CD4041UB types are quad true/complement buffers consisting of n- and p-channel units having low channel resistance and high current (sourcing and sinking) capability. The CD4041UB is intended for use as a buffer, line driver, or CMOS-to-TTL driver. It can be used as an ultra-low power resistor-network driver for A/D and D/A conversion, as a transmission-line driver, and in other applications where high noise immunity and low power dissipation are primary design requirements.

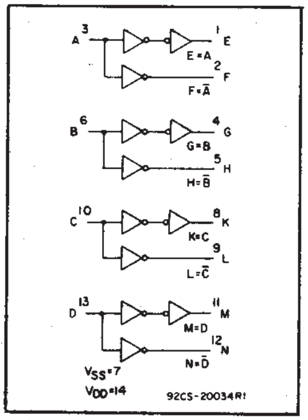
The CD4041UB types are supplied in 14-lead hermetic dual-in-line ceramic packages (F3A suffix), 14-lead dual-in-line plastic packages (E suffix), 14-lead small-outline packages (M, MT, M96, and NSR suffixes), and 14-lead thin shrink small-outline packages (PW and PWR suffixes).

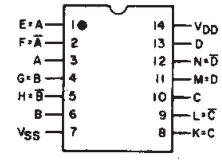
Features:

- Balanced sink and source current; approximately 4 times standard "B" drive
- Equalized delay to true and complement outputs
- 100% tested for quiescent current at 20 V
- Maximum input current of 1 μA at 18 V over full package temperature range; 100 nA at 18 V and 25°C
- 5-V, 10-V, and 15-V parametric ratings
- Meets all requirements of JEDEC Tentative Standard No. 13B, "Standard Specifications for Description of 'B' Series CMOS Devices"

Applications:

- High current source/sink driver
- CMOS-to-DTL/TTL Converter Buffer
- Display driver
- MOS clock driver
- Resistor network driver (Ladder or weighted R)
- Buffer
- Transmission line driver





92CS-20755R1

TOP VIEW
TERMINAL ASSIGNMENT

MAXIMUM RATINGS, *Absolute-Maximum Values:*

DC SUPPLY-VOLTAGE RANGE, (V_{DD})	
Voltages referenced to V_{SS} Terminal)	-0.5V to +20V
INPUT VOLTAGE RANGE, ALL INPUTS	-0.5V to V_{DD} +0.5V
DC INPUT CURRENT, ANY ONE INPUT	±10mA
POWER DISSIPATION PER PACKAGE (P_D):	
For T_A = -55°C to +100°C	500mW
For T_A = +100°C to +125°C	Derate Linearity at 12mW/°C to 200mW
DEVICE DISSIPATION PER OUTPUT TRANSISTOR	
FOR T_A = FULL PACKAGE-TEMPERATURE RANGE (All Package Types)	100mW
OPERATING-TEMPERATURE RANGE (T_A)	-55°C to +125°C
STORAGE TEMPERATURE RANGE (T_{stg})	-65°C to +150°C
LEAD TEMPERATURE (DURING SOLDERING):	
At distance 1/16 ± 1/32 inch (1.59 ± 0.79mm) from case for 10s max	+265°C

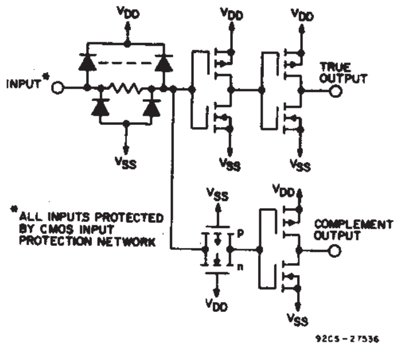


Fig.1 – Schematic diagram 1 of 4 buffers.

RECOMMENDED OPERATING CONDITIONS

For maximum reliability, nominal operating conditions should be selected so that operation is always within the following range:

CHARACTERISTIC	LIMITS		UNITS
	Min.	Max.	
Supply-Voltage Range (For T_A=Full Package-Temperature Range)	3	18	V

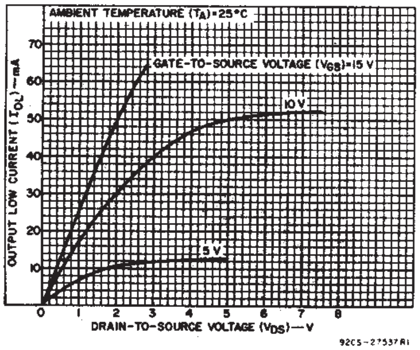


Fig.2 – Typical output low (sink) current characteristics.

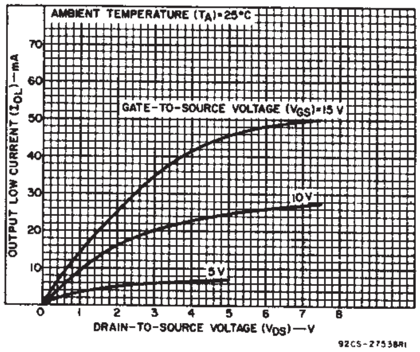


Fig.3 – Minimum low (sink) current characteristics.

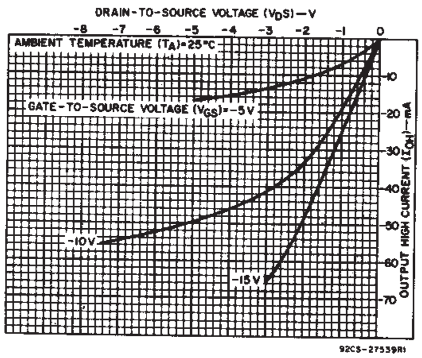


Fig.4 – Typical output high (source) current characteristics.

STATIC ELECTRICAL CHARACTERISTICS

CHARACTERISTIC	CONDITIONS V_O (V)	CONDITIONS V_{IN} (V)	CONDITIONS V_{DD} (V)	LIMITS AT INDICATED TEMPERATURES (°C) −55	−40	+85	+125	+25 Min.	+25 Typ.	+25 Max.	UNITS
Quiescent Device Current I_{DD} Max.	–	0,5	5	1	1	30	30	–	0.02	1	μA
	–	0,10	10	2	2	60	60	–	0.02	2	
	–	0,15	15	4	4	120	120	–	0.02	4	
	–	0,20	20	20	20	600	600	–	0.04	20	
Output Low (Sink) Current, I_{OL} Min.	0.4	0,5	5	2.1	1.8	1.3	1.2	1.6	3.2	–	mA
	0.5	0,10	10	6.25	5.6	4	3.5	5	10	–	
	1.5	0,15	15	24	23	15.5	13	19	38	–	
Output High (Source) Current, I_{OH} Min.	4.6	0,5	5	−2.1	−1.8	−1.3	−1.2	−1.6	−3.2	–	
	2.5	0,5	5	−8.4	−6.7	−5.3	−4.6	−6.4	−12.8	–	
	9.5	0,10	10	−6.25	−5.6	−4	−3.5	−5	−10	–	
	13.5	0,15	15	−24	−23	−15.5	−13	−19	−38	–	
Output Voltage: Low-Level, V_{OL} Max.	–	0,5	5	0.05				–	0	0.05	V
	–	0,10	10	0.05				–	0	0.05	
	–	0,15	15	0.05				–	0	0.05	
Output Voltage: High-Level, V_{OH} Min.	–	0,5	5	4.95				4.95	5	–	
	–	0,10	10	9.95				9.95	10	–	
	–	0,15	15	14.95				14.95	15	–	
Input Low Voltage, V_{IL} Max.	0.5,4.5	–	5	1				–	–	1	V
	1,9	–	10	2				–	–	2	
	1.5,13.5	–	15	2.5				–	–	2.5	
Input High Voltage, V_{IH} Min.	0.5,4.5	–	5	4				4	–	–	
	1,9	–	10	8				8	–	–	
	1.5,13.5	–	15	12.5				12.5	–	–	
Input Current, I_{IN} Max.	–	0,18	18	±0.1	±0.1	±1	±1	–	$\pm10^{-5}$	±0.1	μA

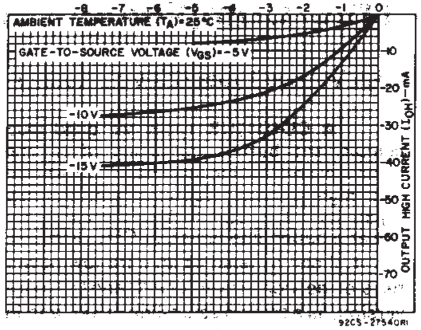


Fig.5 – Minimum output high (source) current characteristics.

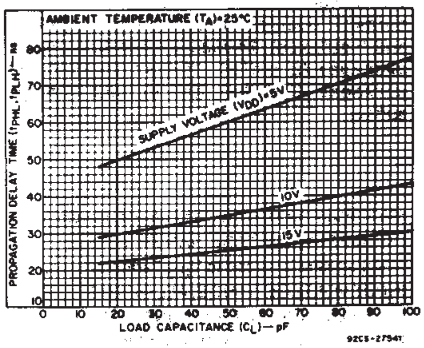


Fig.6 – Typical propagation delay time vs. load capacitance.

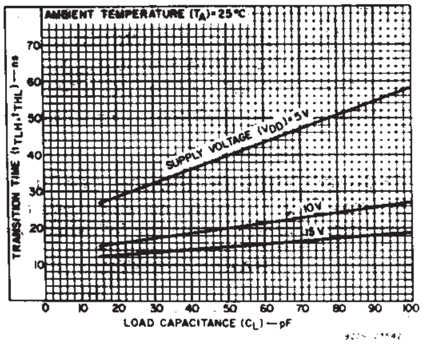


Fig.7 – Typical transition time vs. load capacitance.

DYNAMIC ELECTRICAL CHARACTERISTICS at T_A = 25°C, Input t_r,t_f = 20 ns, C_L = 50 pF, R_L = 200 kΩ

CHARACTERISTIC		CONDITIONS	CONDITIONS V_{DD} Volts	LIMITS Typ.	LIMITS Max.	UNITS
Propagation Delay Time:	t_{PHL}, t_{PLH}		5	60	120	ns
			10	35	70	
			15	25	50	
Transition Time	t_{THL}, t_{TLH}		5	40	80	ns
			10	20	40	
			15	15	30	
Input Capacitance	C_{IN}	Any Input		15	22.5	pF

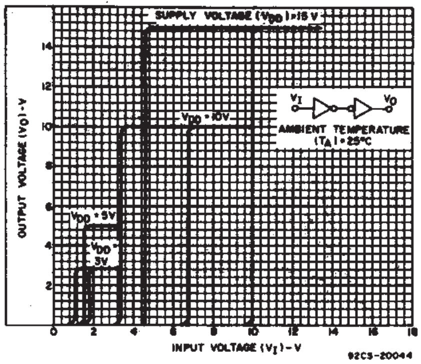


Fig.8 – Minimum and maximum transfer characteristics – true output.

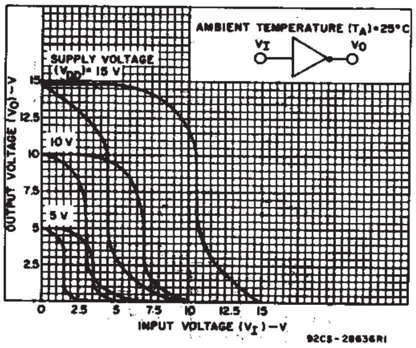


Fig.9 — Minimum and maximum transfer characteristics — complement output.

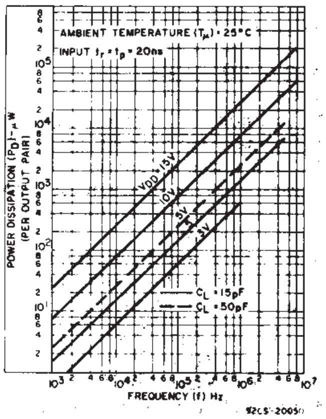


Fig.11 — Typical power dissipation vs frequency per output pair.

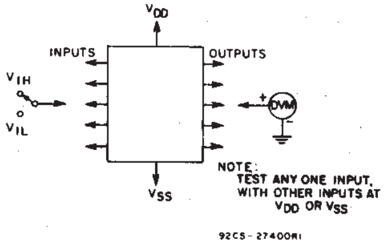


Fig.13 — Input voltage test circuit.

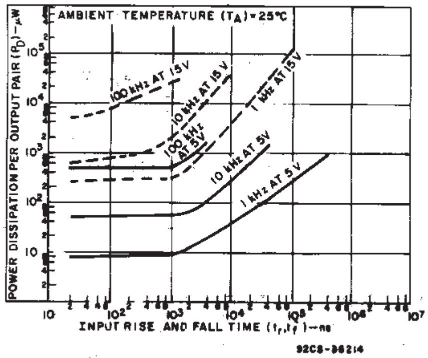


Fig.10 — Typical power dissipation vs. input rise & fall time per output pair.

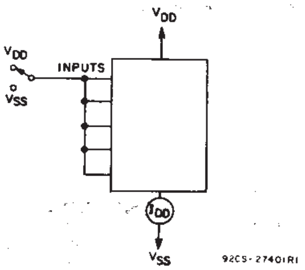


Fig.12 — Quiescent device current test circuit.

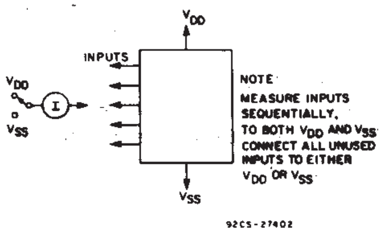
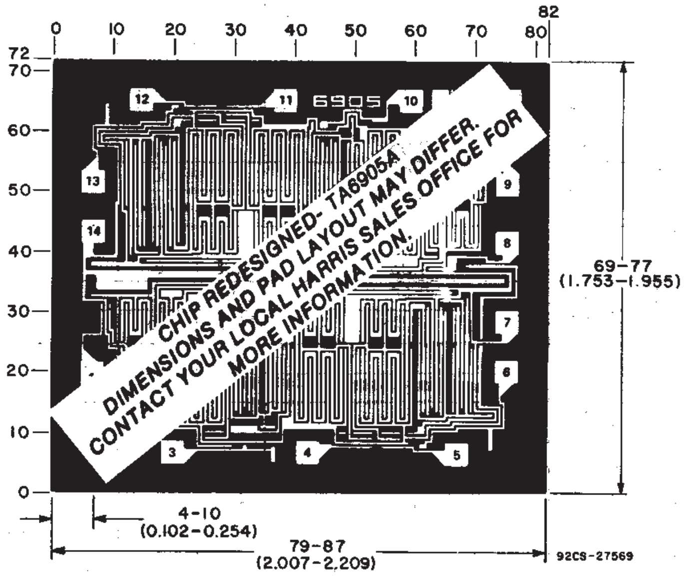


Fig.14 — Input-leakage-current test circuit.

Dimensions and pad layout for the CD4041UBH

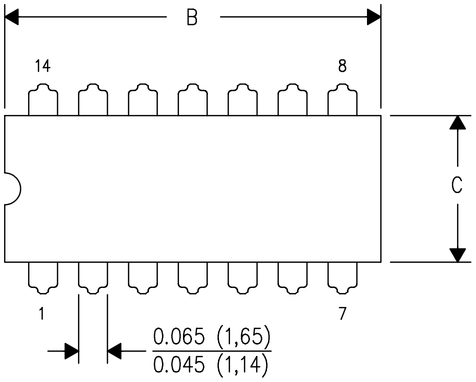


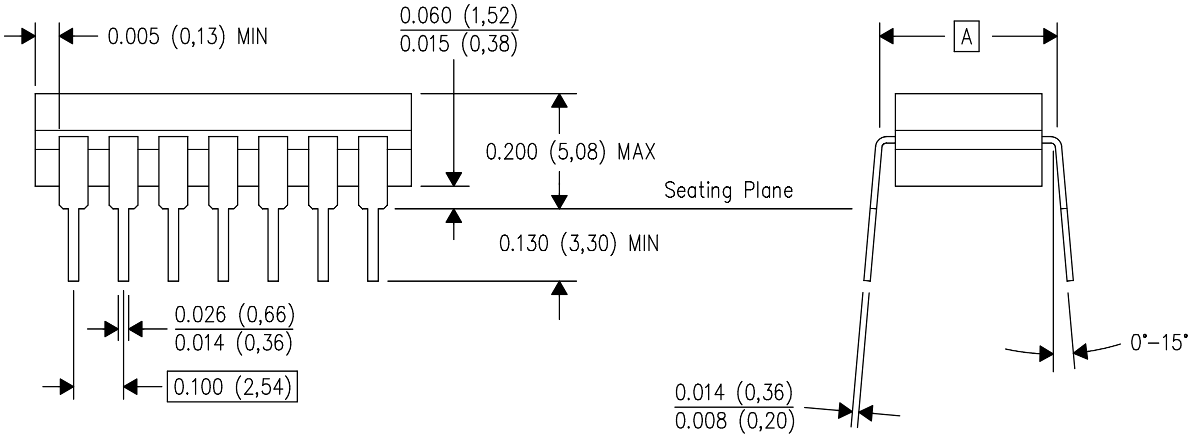
Dimensions in parentheses are in millimeters and are derived from the basic inch dimensions as indicated. Grid graduations are in mils (10^{-3} inch).

J (R-GDIP-T**) CERAMIC DUAL IN-LINE PACKAGE

14 LEADS SHOWN

DIM \ PINS **	14	16	18	20
$\boxed{A}$	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)





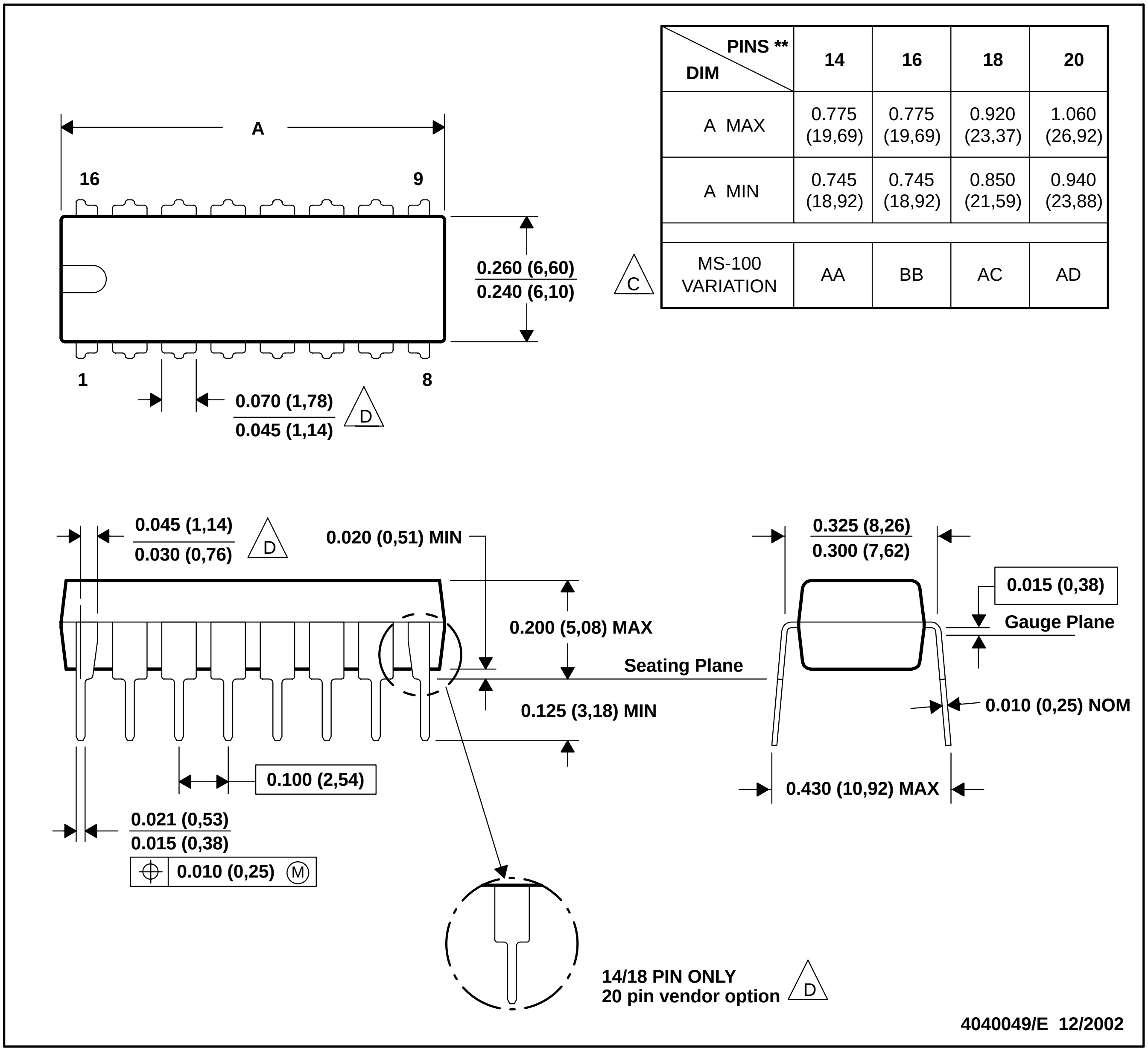
4040083/F 03/03

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.

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



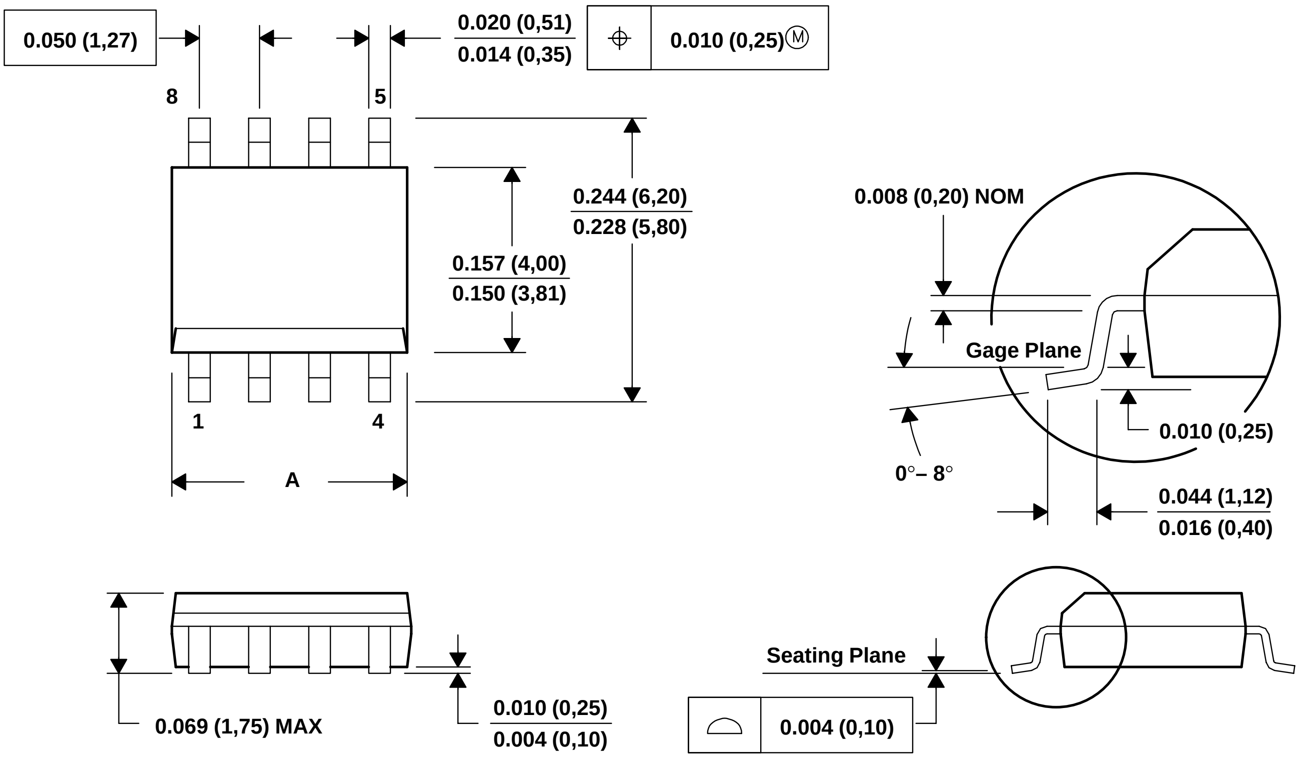
DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS-100 VARIATION	AA	BB	AC	AD

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 lrngth (Dim A).
- D. The 20 pin end lead shoulder width is a vendor option, either half or full width.

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

8 PINS SHOWN



PINS ** DIM	8	14	16
A MAX	0.197 (5,00)	0.344 (8,75)	0.394 (10,00)
A MIN	0.189 (4,80)	0.337 (8,55)	0.386 (9,80)

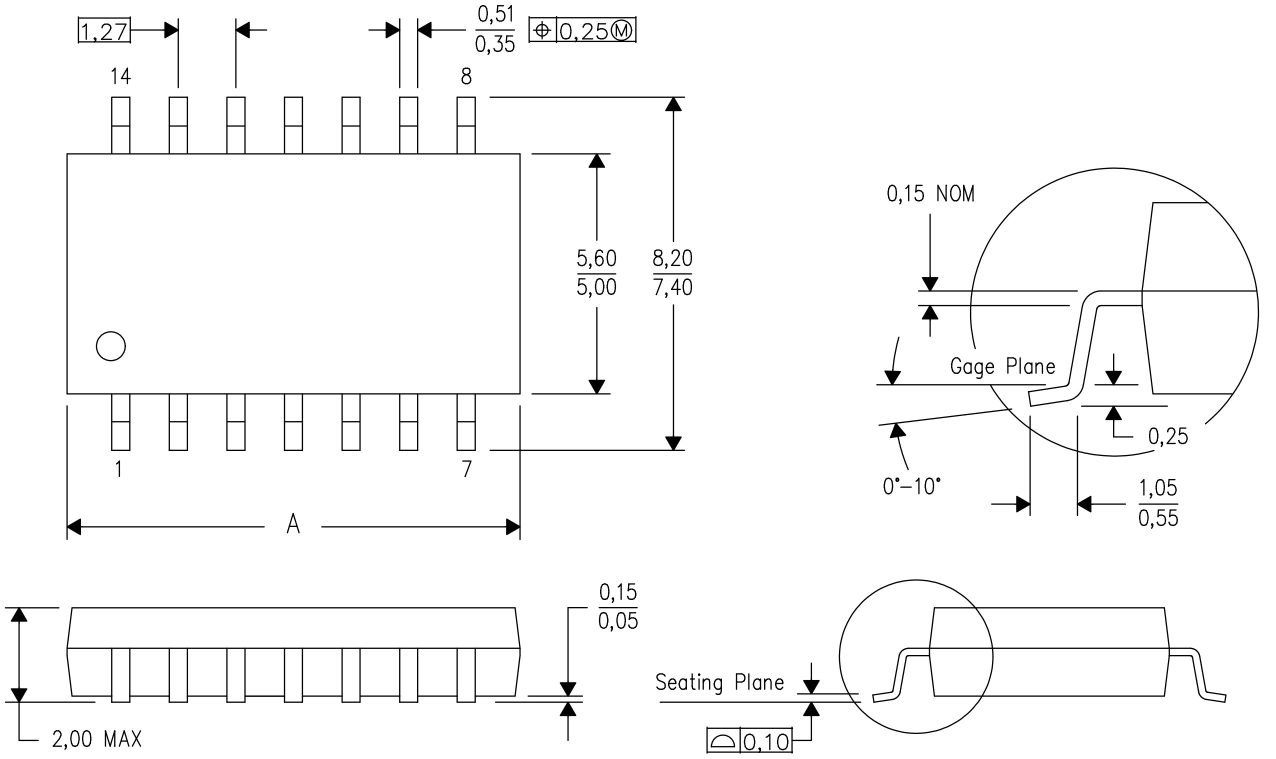
4040047/E 09/01

NOTES:
- 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-012

MECHANICAL DATA

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

14-PINS SHOWN



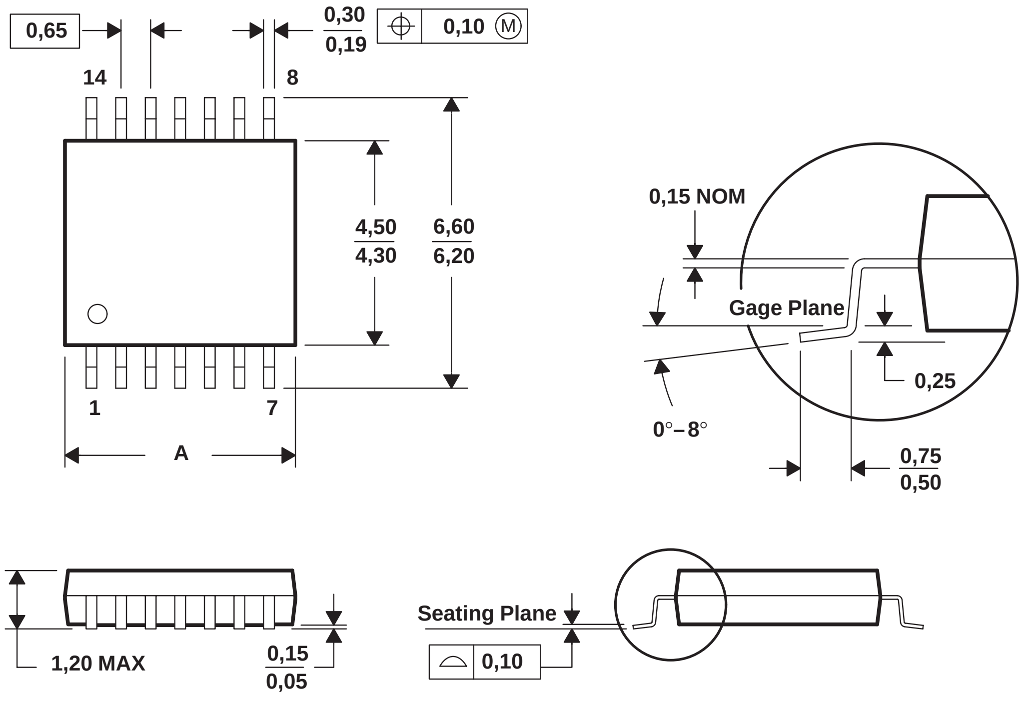
DIM \ PINS **	14	16	20	24
A MAX	10,50	10,50	12,90	15,30
A MIN	9,90	9,90	12,30	14,70

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.

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

14 PINS SHOWN



PINS ** DIM	8	14	16	20	24	28
A MAX	3,10	5,10	5,10	6,60	7,90	9,80
A MIN	2,90	4,90	4,90	6,40	7,70	9,60

4040064/F 01/97

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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