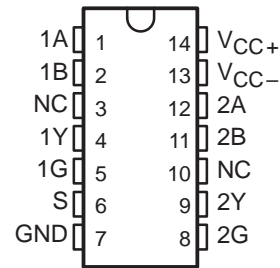


SN75207B DUAL SENSE AMPLIFIER FOR MOS MEMORIES OR DUAL HIGH-SENSITIVITY LINE RECEIVERS

SLLS096C – JULY 1973 – REVISED MARCH 1997

- Plug-In Replacement for SN75107A and SN75107B With Improved Characteristics
- ± 10 -mV Input Sensitivity
- TTL-Compatible Circuitry
- Standard Supply Voltages . . . ± 5 V
- Differential Input Common-Mode Voltage Range of ± 3 V
- Strobe Inputs for Channel Selection
- Totem-Pole Outputs
- SN75207B Has Diode-Protected Input Stage for Power-Off Condition
- Sense Amplifier for MOS Memories
- Dual Comparator
- High-Sensitivity Line Receiver

N PACKAGE
(TOP VIEW)

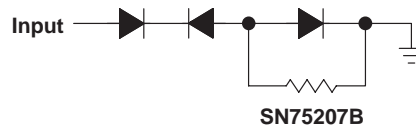


NC – No internal connection

description

The SN75207B is a terminal-for-terminal replacement for the SN75107B. The improved input sensitivity makes it more suitable for MOS memory sense amplifiers and can result in faster memory cycles. Improved sensitivity also makes it more useful in line-receiver applications by allowing use of longer transmission line lengths. The SN75207B features a TTL-compatible, active-pullup output.

Input protection diodes are in series with the collectors of the differential-input transistors of the SN75207B. These diodes are useful in certain party-line systems that may have multiple V_{CC+} power supplies and may be operated with some of the V_{CC+} supplies turned off. In such a system, if a supply is turned off and allowed to go to ground, the equivalent input circuit connected to that supply would be as follows:



This would be a problem in specific systems that might have the transmission lines biased to some potential greater than 1.4 V.

This device is characterized for operation from 0°C to 70°C.

FUNCTION TABLE

DIFFERENTIAL INPUTS A-B	STROBES		OUTPUT Y
	G	S	
$V_{ID} \geq 10$ mV	X	X	H
-10 mV $< V_{ID} < 10$ mV	X	L	H
	L	X	H
	H	H	Indeterminate
$V_{ID} \leq -10$ mV	X	L	H
	L	X	H
	H	H	L

H = high level, L = low level, X = irrelevant



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.

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**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

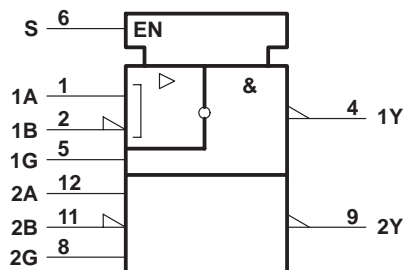
Copyright © 1997, Texas Instruments Incorporated

SN75207B

DUAL SENSE AMPLIFIER FOR MOS MEMORIES OR DUAL HIGH-SENSITIVITY LINE RECEIVERS

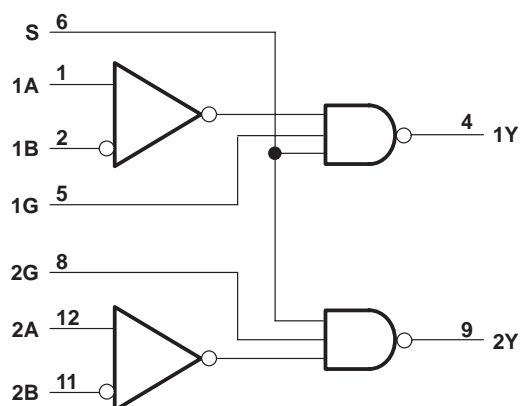
SLLS096C – JULY 1973 – REVISED MARCH 1997

logic symbol†

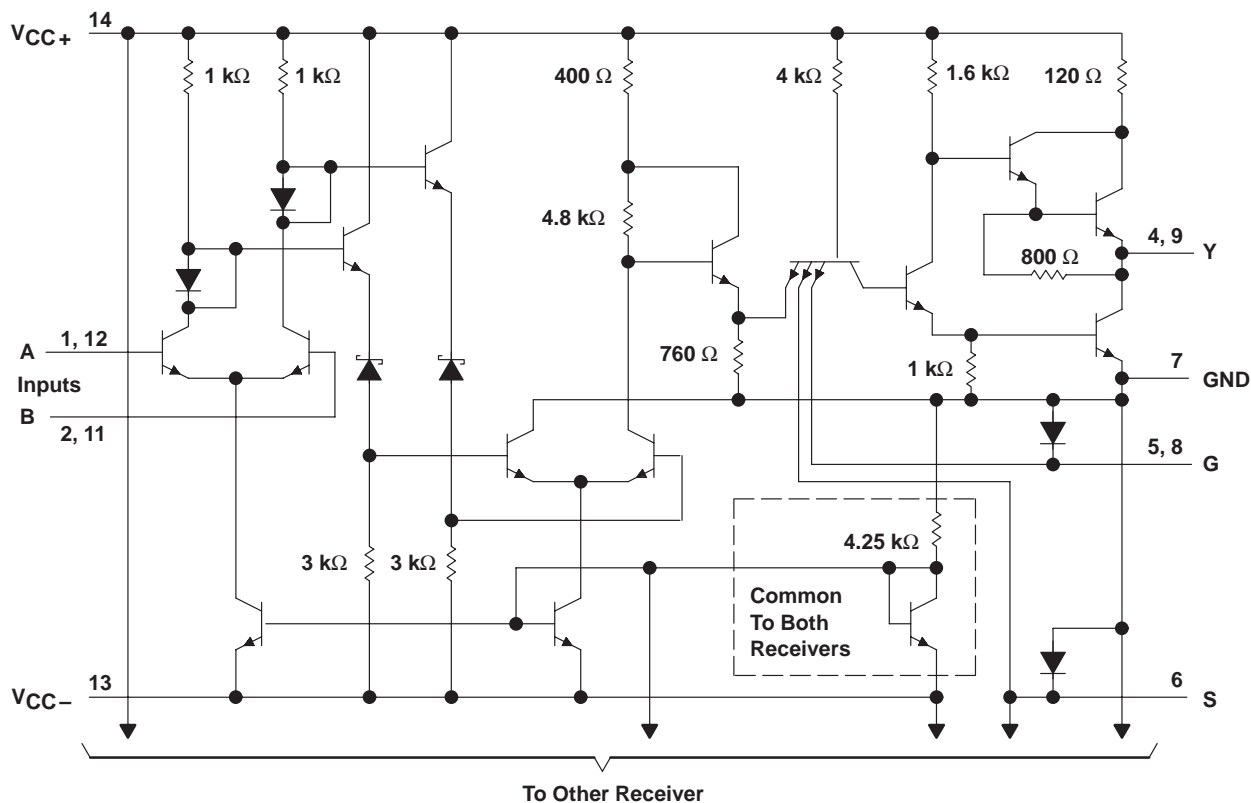


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



schematic (each receiver)



Resistor values shown are nominal.

design characteristics

The SN75207B line receivers/sense amplifiers are TTL-compatible, dual circuits intended for use in high-speed, data-transmission systems or MOS memory systems. They are designed to detect low-level differential signals in the presence of common-mode noise and variations of temperature and supplies. The dc specifications reflect worst-case conditions of temperature, supply voltages, and input voltages.

The input common-mode voltage range is ± 3 V. This is adequate for application in most systems. In systems with requirements for greater common-mode voltage range, input attenuators may be used to decrease the noise to an acceptable level at the receiver-input terminals.

The circuits feature individual strobe inputs for each channel and a strobe input common to both channels for logic versatility. The strobe inputs are tested to ensure 400 mV of dc noise margin when interfaced with Series 54/74 TTL.

The circuits feature high input impedance and low input currents, which induce very little loading on the transmission line. This makes these devices especially useful in party-line systems. The excellent input sensitivity (3 mV typical) is particularly important when data is to be detected at the end of a long transmission line and the amplitude of the data has deteriorated due to cable losses. The circuits are designed to detect input signals of 10-mV (or greater) amplitude and convert the polarity of the signal into appropriate TTL-compatible output logic levels.

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

Supply voltage, V_{CC+} (see Note 1)	7 V
Supply voltage, V_{CC-} (see Note 1)	–7 V
Differential input voltage, V_{ID} (see Note 2)	± 6 V
Common-mode input voltage, V_{IC} (see Note 3)	± 5 V
Strobe input voltage	5.5 V
Continuous total dissipation	See Dissipation Rating Table
Operating free-air temperature range, T_A	0°C to 70°C
Storage temperature range, T_{stg}	–65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	260°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: A. All voltage values, except differential voltages, are with respect to GND terminal.

1. Differential input voltage values are at the noninverting (A) terminal with respect to the inverting (B) terminal.
2. Common-mode input voltage is the average of the voltages at the A and B inputs.

DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING
N	1050 mW	9.2 mW/°C	636 mW

SN75207B

DUAL SENSE AMPLIFIER FOR MOS MEMORIES

OR DUAL HIGH-SENSITIVITY LINE RECEIVERS

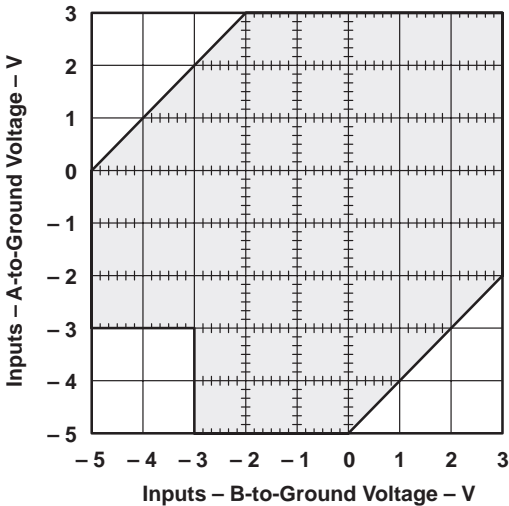
SLLS096C – JULY 1973 – REVISED MARCH 1997

recommended operating conditions (see Note 4)

	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC+}	4.75	5	5.25	V
Supply voltage, V_{CC-}	-4.75	-5	-5.25	V
High-level differential input voltage, $V_{ID(H)}$ (see Note 5)	0.01		5	V
Low-level differential input voltage, $V_{ID(L)}$	-5 [†]		-0.01	V
Common-mode input voltage, V_{IC} (see Notes 5 and 6)	-3 [†]		3	V
Input voltage, any differential input to ground (see Note 5)	-5 [†]		3	V
High-level input voltage at strobe inputs, $V_{IH(S)}$	2		5.5	V
Low-level input voltage at strobe inputs, $V_{IL(S)}$	0		0.8	V
Low-level output current, I_{OL}			-16	mA
Operating free-air temperature, T_A	0		70	°C

[†] The algebraic convention, in which the less positive (more negative) limit is designated as minimum, is used in this data sheet for logic voltage levels only.

- NOTES: B. When using only one channel of the line receiver, the strobe G of the unused channel should be grounded and at least one of the differential inputs of the unused receiver should be terminated at some voltage between -3 V and 3 V.
3. The recommended combinations of input voltages fall within the shaded area of the figure shown.
4. The common-mode voltage may be as low as -4 V provided that the more positive of the two inputs is not more negative than -3 V.



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

PARAMETER		TEST CONDITIONS		MIN	TYP [†]	MAX	UNIT
I_{IH}	High-level input current	$V_{CC\pm} = \pm 5.25$ V	$V_{ID} = -5$ V		30	75	μ A
I_{IL}	Low-level input current	$V_{CC\pm} = \pm 5.25$ V	$V_{ID} = 5$ V			-10	μ A
I_{IH}	High-level input current into 1G or 2G	$V_{CC\pm} = \pm 5.25$ V, $V_{IH(S)} = 2.4$ V				40	μ A
		$V_{CC\pm} = \pm 5.25$ V, $V_{IH(S)} = \pm 5.25$ V				1	mA
I_{IL}	Low-level input current into 1G or 2G	$V_{CC\pm} = \pm 5.25$ V, $V_{IL(S)} = 0.4$ V				-1.6	mA
I_{IH}	High-level input current into S	$V_{CC\pm} = \pm 5.25$ V, $V_{IH(S)} = 2.4$ V				80	μ A
		$V_{CC\pm} = \pm 5.25$ V, $V_{IH(S)} = \pm 5.25$ V				2	mA
I_{IL}	Low-level input current into S	$V_{CC\pm} = \pm 5.25$ V, $V_{IL(S)} = 0.4$ V				-3.2	mA
V_{OH}	High-level output voltage	$V_{CC\pm} = \pm 4.75$ V, $I_{OH} = -400$ μ A, $V_{IL(S)} = 0.8$ V, $V_{IC} = -3$ V to 3 V	$V_{ID(H)} = 10$ mV,	2.4			V
V_{OL}	Low-level output voltage	$V_{CC\pm} = \pm 4.75$ V, $I_{OL} = 16$ mA, $V_{IH(S)} = 2$ V, $V_{IC} = -3$ V to 3 V	$V_{ID(L)} = -10$ mV,			0.4	V
I_{OH}	High-level output current	$V_{CC\pm} = \pm 4.75$ V, $V_{OH} = \pm 5.25$ V				400	μ A
I_{OS}	Short-circuit output current [‡]	$V_{CC\pm} = \pm 5.25$ V		-18		-70	mA
I_{CC+}	Supply current from V_{CC+}	$V_{CC\pm} = \pm 5.25$ V, $T_A = 25^\circ\text{C}$,	Outputs high		18	30	mA
I_{CC-}	Supply current from V_{CC-}	$V_{CC\pm} = \pm 5.25$ V, $T_A = 25^\circ\text{C}$,	Outputs high	-8.4		-15	mA

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

[‡] Not more than one output should be shorted at a time.

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

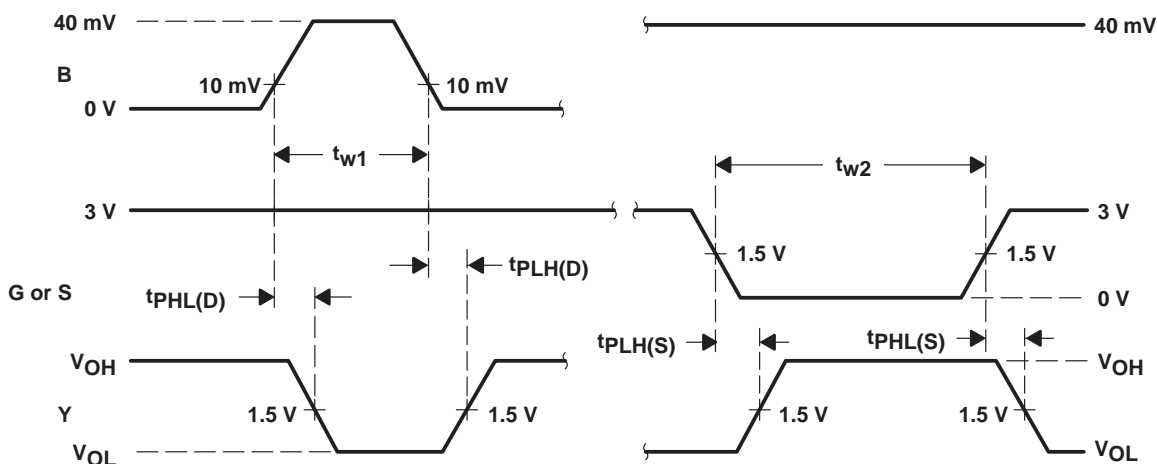
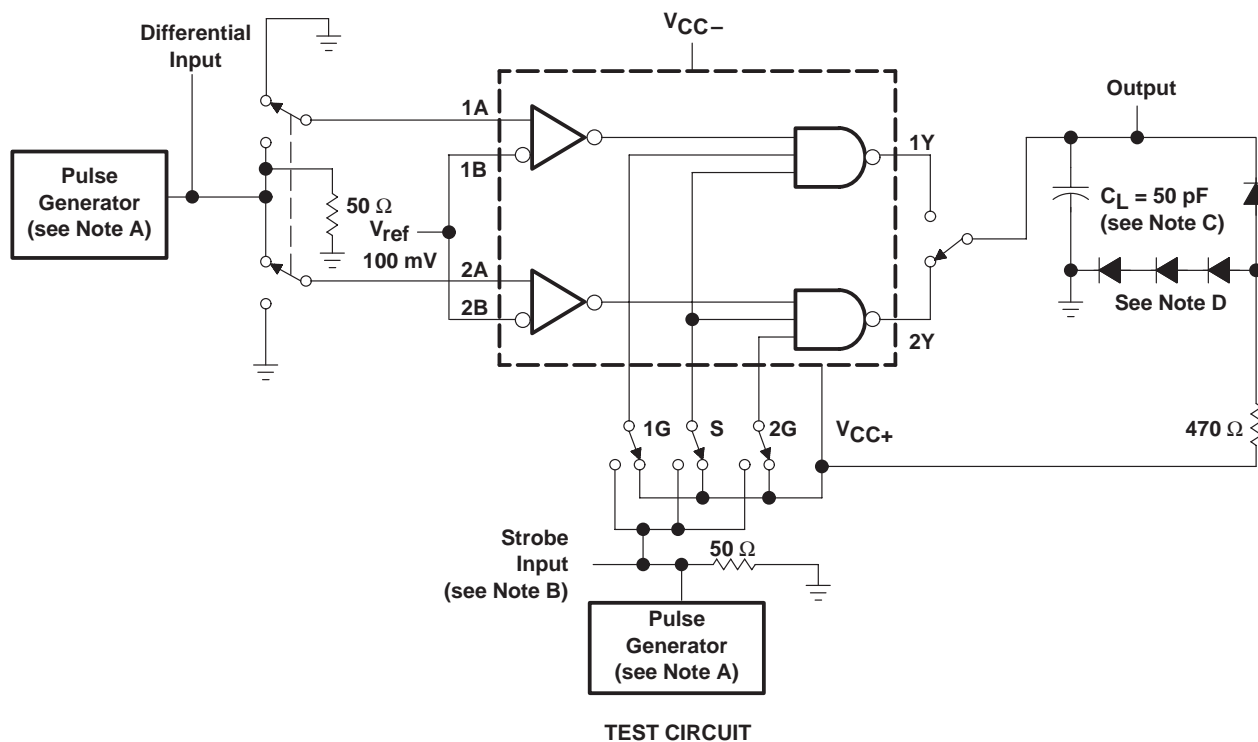
PARAMETER		TEST CONDITIONS		MIN	MAX	UNIT
$t_{PLH(D)}$	Propagation delay time, low- to high-level output, from differential inputs A and B	$R_L = 470$ Ω , See Figure 1	$C_L = 50$ pF,		35	ns
$t_{PHL(D)}$	Propagation delay time, high- to low-level output, from differential inputs A and B				20	ns
$t_{PLH(S)}$	Propagation delay time, low- to high-level output, from strobe input G or S				17	ns
$t_{PHL(S)}$	Propagation delay time, high- to low-level output, from strobe input G or S				17	ns

SN75207B

DUAL SENSE AMPLIFIER FOR MOS MEMORIES OR DUAL HIGH-SENSITIVITY LINE RECEIVERS

SLLS096C – JULY 1973 – REVISED MARCH 1997

PARAMETER MEASUREMENT INFORMATION



- NOTES: A. The pulse generators have the following characteristics: $Z_O = 50\ \Omega$, $t_r \leq 5\ \text{ns}$, $t_f \leq 5\ \text{ns}$, $t_{W1} = 500\ \text{ns}$ with $\text{PRR} = 1\ \text{MHz}$, $t_{W2} = 1\ \mu\text{s}$ with $\text{PRR} = 500\ \text{kHz}$.
- B. Strobe input pulse is applied to Strobe 1G when inputs 1A–1B are being tested, to Strobe S when inputs 1A–1B or 2A–2B are being tested, and to Strobe 2G when inputs 2A–2B are being tested.
- C. C_L includes probe and jig capacitance.
- D. All diodes are 1N916.

Figure 1. Test Circuit and Voltage Waveforms

APPLICATION INFORMATION

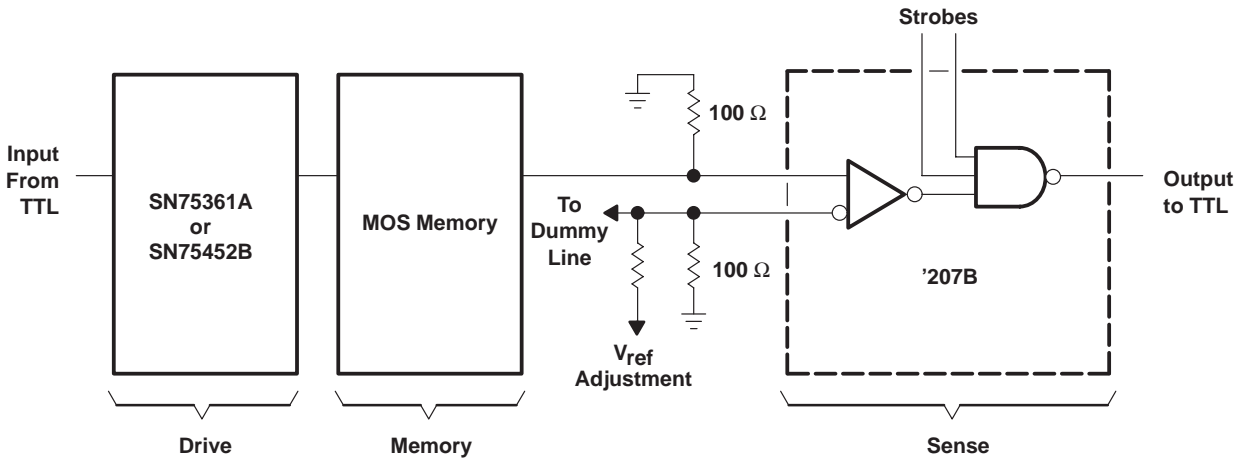
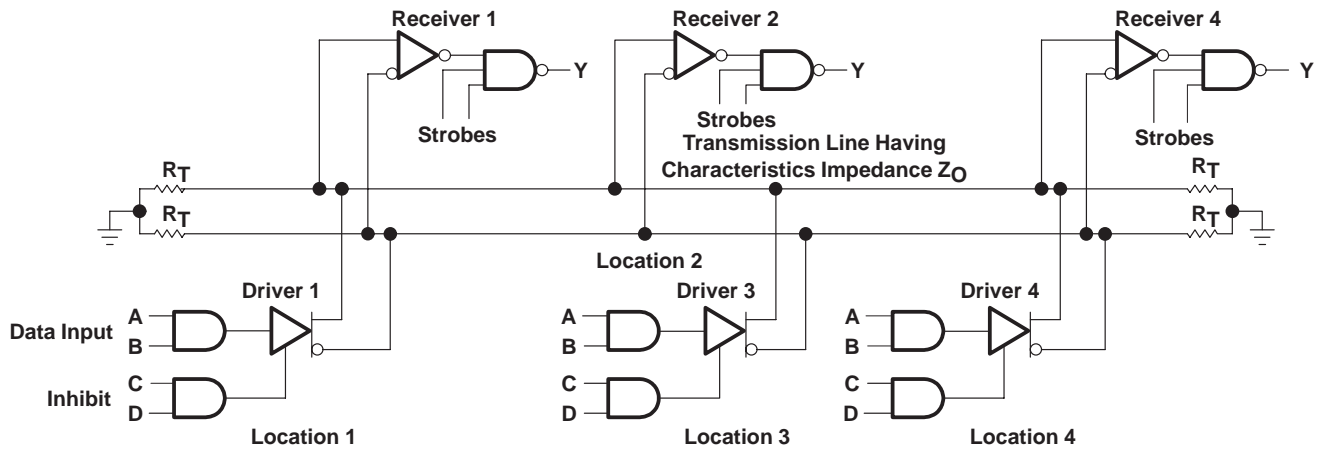


Figure 2. MOS Memory Sense Amplifier



Receivers are SN75207B; drivers are SN55109A, SN55110A, SN75110A, or SN75112.

Figure 3. Data-Bus or Parity-Line System

PRECAUTIONS: When only one receiver in a package is being used, at least one of the differential inputs of the unused receiver should be terminated at some voltage between -3 V and 3 V , preferably at GND. Failure to do so will cause improper operation of the unit being used because of common bias circuitry for the current sources of the two receivers. Strobe G of the unused channel should be grounded.

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN75207BD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75207BDE4	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75207BN	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN75207BNE4	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN75207BNSR	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75207BNSRE4	ACTIVE	SO	NS	14	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

⁽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.

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.

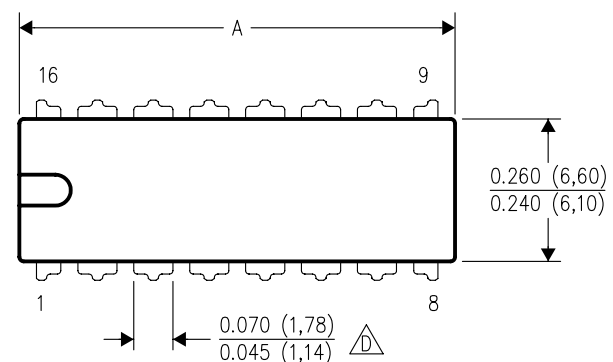
Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

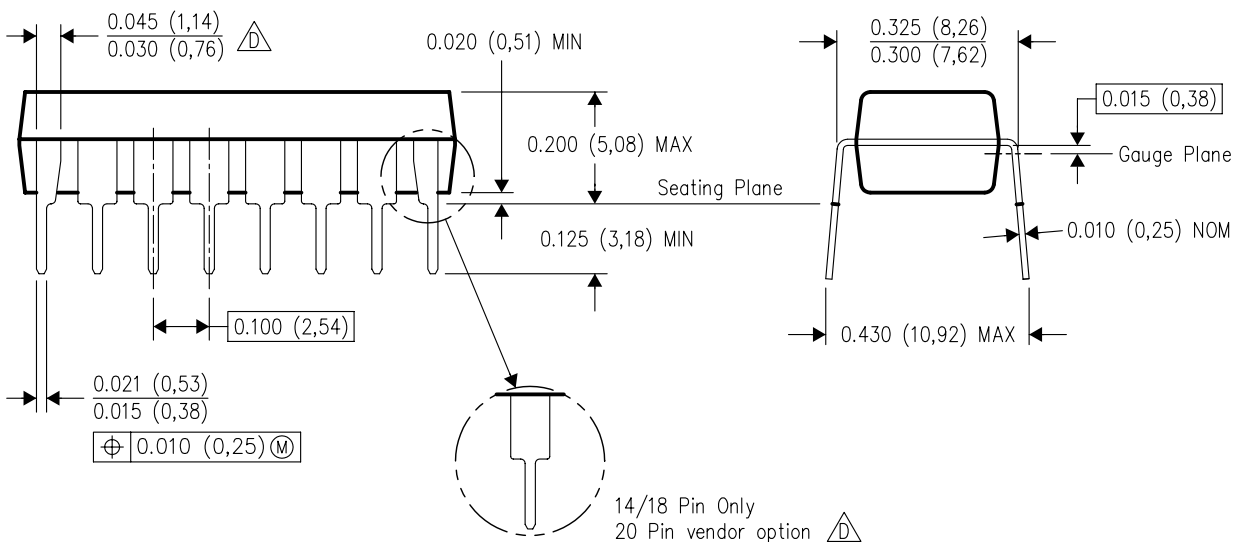
N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE





PINS ** DIM	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-001 VARIATION	AA	BB	AC	AD



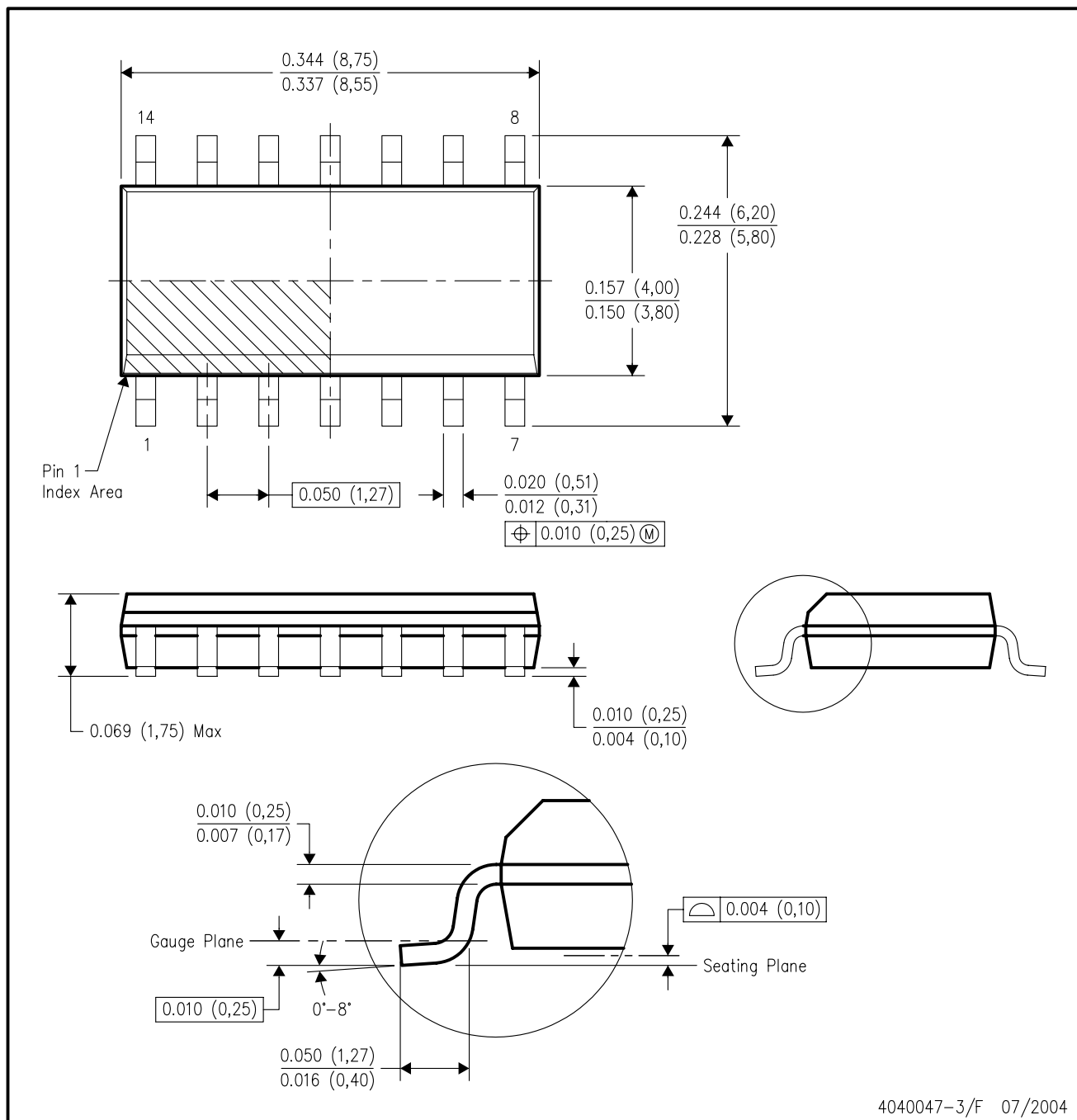
4040049/E 12/2002

NOTES:

- A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
-  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



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.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DSP	dsp.ti.com	Broadband	www.ti.com/broadband
Interface	interface.ti.com	Digital Control	www.ti.com/digitalcontrol
Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

Copyright © 2005, Texas Instruments Incorporated