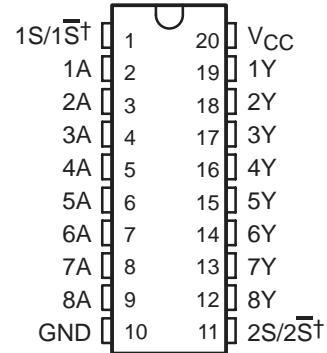


SN75128, SN75129 EIGHT-CHANNEL LINE RECEIVERS

SLLS076B – JANUARY 1977 – REVISED MAY 1995

- Meets or Exceeds the Requirements of IBM™ System 360/370 Input/Output Specification
- Input Resistance . . . 7 kΩ to 20 kΩ
- Output Compatible With TTL
- Schottky-Clamped Transistors
- Operates From a Single 5-V Supply
- High Speed . . . Low Propagation Delay
- Ratio Specification . . . t_{PLH}/t_{PHL}
- Common Strobe for Each Group of Four Receivers
- SN75128 . . . Active-High Strobes
SN75129 . . . Active-Low Strobes

N PACKAGE
(TOP VIEW)



† S and \bar{S} for SN75128 and SN75129, respectively

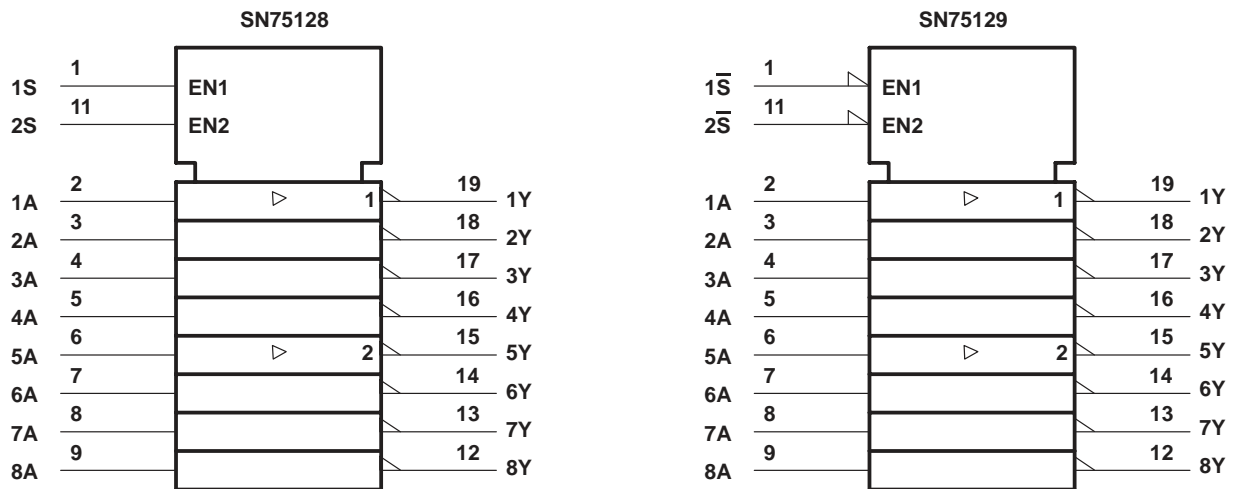
description

The SN75128 and SN75129 are eight-channel line receivers designed to satisfy the requirements of the input-output interface specification for IBM 360/370. Both devices feature common strobes for each group of four devices. The SN75128 has active-high strobes; the SN75129 has active-low strobes. Special low-power design and Schottky-diode-clamped transistors allow low supply-current requirements while maintaining fast switching speeds and high-current TTL outputs.

For new IBM 360/370 interface designs, see the SN751730.

The SN75128 and SN75129 are characterized for operation from 0°C to 70°C.

logic symbols†



† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

IBM is a trademark of International Business Machines Corp.

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.

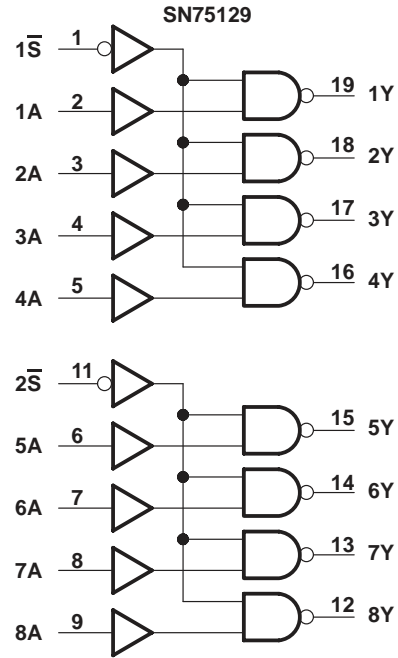
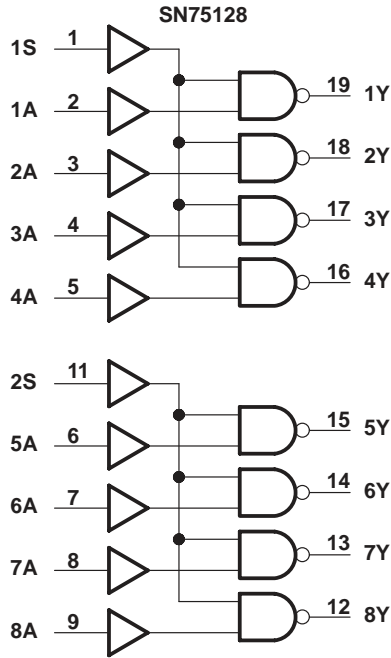


Copyright © 1995, Texas Instruments Incorporated

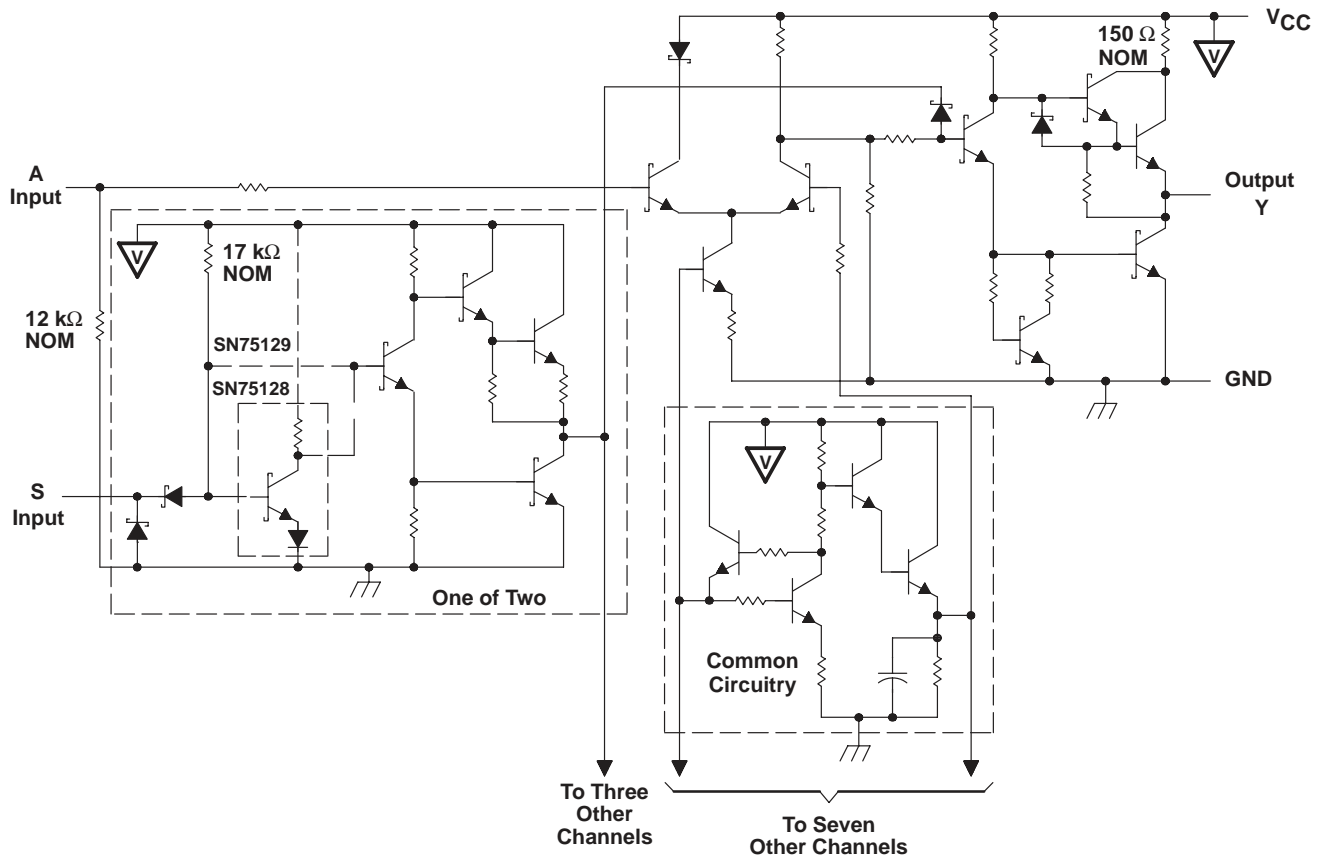
SN75128, SN75129 EIGHT-CHANNEL LINE RECEIVERS

SLLS076B – JANUARY 1977 – REVISED MAY 1995

logic diagrams (positive logic)



schematic (each driver)



SN75128, SN75129 EIGHT-CHANNEL LINE RECEIVERS

SLLS076B – JANUARY 1977 – REVISED MAY 1995

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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage range, V_I (A)	–0.15 V to 7 V
Input voltage, V_I (S)	7 V
Continuous total power 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.

NOTE 1: All voltage values are with respect to network ground terminal.

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	1150 mW	9.2 mW/°C	736 mW

recommended operating conditions

		MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}		4.5	5	5.5	V
High-level input voltage, V_{IH}	A	1.7			V
	S	2			
Low-level input voltage, V_{IL}	A			0.7	V
	S			0.7	
High-level output current, I_{OH}				–0.4	mA
Low-level output current, I_{OL}				16	mA
Operating free-air temperature, T_A		0		70	°C

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

PARAMETER		TEST CONDITIONS			MIN	TYP†	MAX	UNIT
V_{OH}	High-level output voltage	$V_{CC} = 4.5\text{ V}$,	$V_{IL} = 0.7\text{ V}$,	$I_{OH} = -0.4\text{ mA}$	2.4	3.1		V
V_{OL}	Low-level output voltage	$V_{CC} = 4.5\text{ V}$,	$V_{IH} = 1.7\text{ V}$,	$I_{OL} = 16\text{ mA}$		0.4	0.5	V
V_{IK}	Input clamp voltage	S	$V_{CC} = 4.5\text{ V}$,	$I_I = -18\text{ mA}$			–1.5	V
I_{IH}	High-level input current	A	$V_{CC} = 5.5\text{ V}$,	$V_I = 3.11\text{ V}$		0.3	0.42	mA
		S	$V_{CC} = 5.5\text{ V}$,	$V_I = 2.7\text{ V}$			20	µA
I_{IL}	Low-level input current	A	$V_{CC} = 5.5\text{ V}$,	$V_I = 0.15\text{ V}$			30	µA
		S	$V_{CC} = 5.5\text{ V}$,	$V_I = 0.4\text{ V}$			–0.4	mA
I_{OS}	Short-circuit output current‡	$V_{CC} = 5.5\text{ V}$,	$V_O = 0$		–18		–60	mA
r_I	Input resistance	$V_{CC} = 4.5\text{ V}$,	0 V or open,	$\Delta V_I = 0.15\text{ V to } 4.15\text{ V}$	7		20	kΩ
I_{CC}	Supply current	SN75128	$V_{CC} = 5.5\text{ V}$,	Strobe at 2.4 V, All A inputs at 0.7 V		19	31	mA
		SN75129	$V_{CC} = 5.5\text{ V}$,	Strobe at 0.4 V, All A inputs at 0.7 V		19	31	
		SN75128	$V_{CC} = 5.5\text{ V}$,	Strobe at 2.4 V, All A inputs at 4 V		32	53	
		SN75129	$V_{CC} = 5.5\text{ V}$,	Strobe at 0.4 V, All A inputs at 4 V		32	53	

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

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



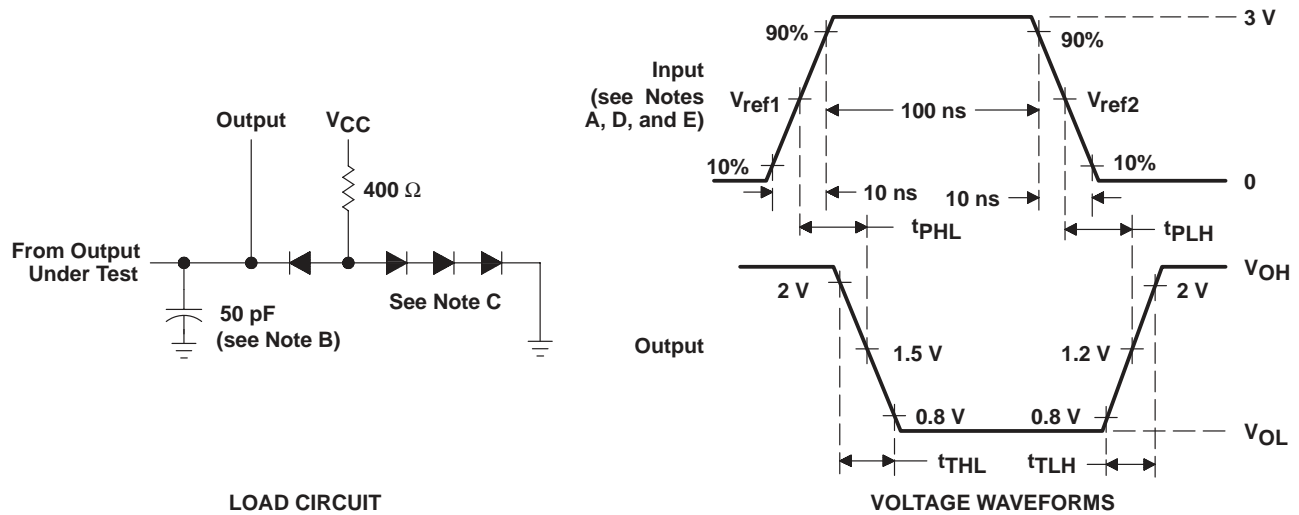
SN75128, SN75129 EIGHT-CHANNEL LINE RECEIVERS

SLLS076B – JANUARY 1977 – REVISED MAY 1995

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

PARAMETER	FROM	TEST CONDITIONS	SN75128			SN75129			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
t_{PLH} Propagation delay time, low-to-high-level output	A	$R_L = 400\ \Omega$, $C_L = 50\ \text{pF}$, See Figure 1	7	14	25	7	14	25	ns
t_{PHL} Propagation delay time, high-to-low-level output			10	18	30	10	18	30	ns
t_{PLH} Propagation delay time, low-to-high-level output	S		26	40		20	35	ns	
t_{PHL} Propagation delay time, high-to-low-level output			22	35		16	30	ns	
$\frac{t_{PLH}}{t_{PHL}}$ Ratio of propagation delay times	A		0.5	0.8	1.3	0.5	0.8	1.3	
t_{TLH} Transition time, low-to-high-level output			1	7	12	1	7	12	ns
t_{THL} Transition time, high-to-low-level output		1	3	12	1	3	12	ns	

PARAMETER MEASUREMENT INFORMATION



- NOTES: A. Input pulses are supplied by a generator having the following characteristics: $Z_O = 50\ \Omega$, $PRR \leq 5\ \text{MHz}$.
 B. Includes probe and jig capacitance
 C. All diodes are 1N3064 or equivalent.
 D. The strobe inputs of SN75129 are in phase with the output.
 E. $V_{ref1} = 0.7\ \text{V}$ and $V_{ref2} = 1.7\ \text{V}$ for testing data (A) inputs, $V_{ref1} = V_{ref2} = 1.3\ \text{V}$ for strobe inputs.

Figure 1. Load Circuit and Voltage Waveforms

TYPICAL CHARACTERISTICS

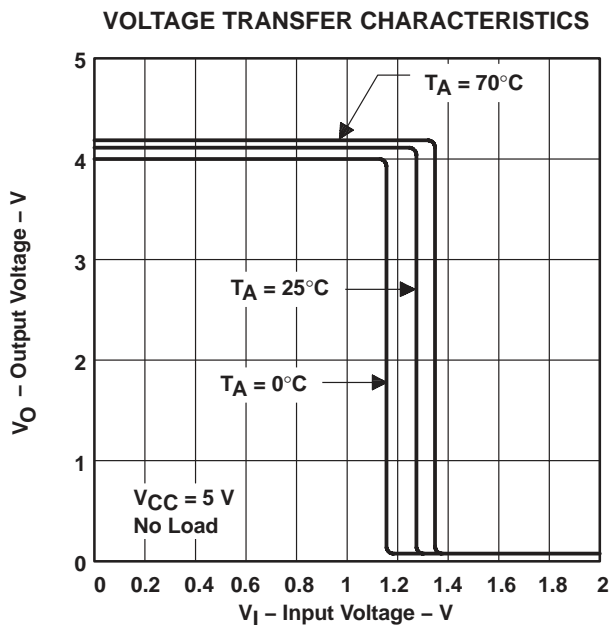


Figure 2

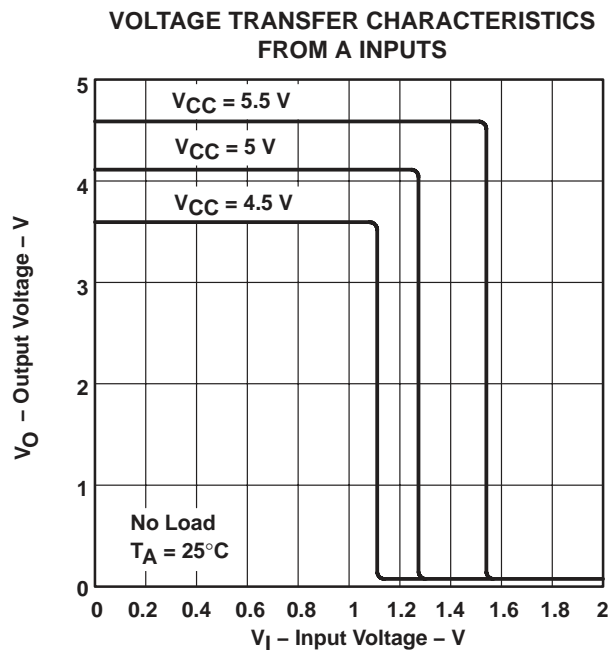


Figure 3

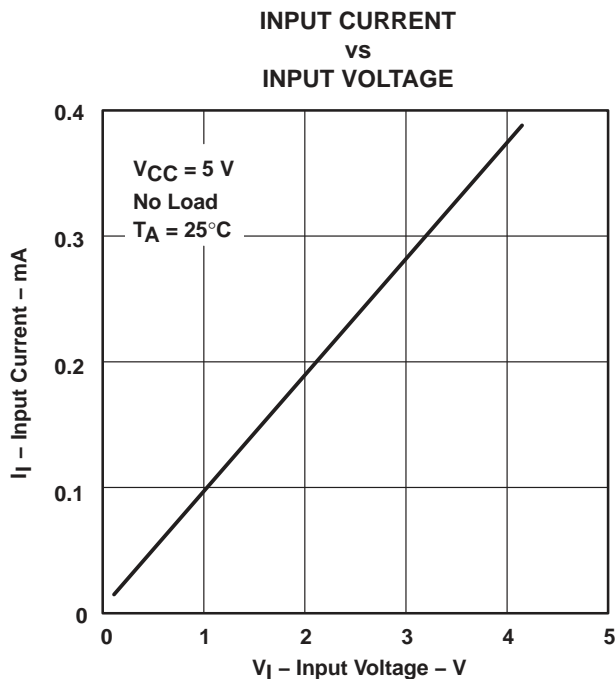


Figure 4

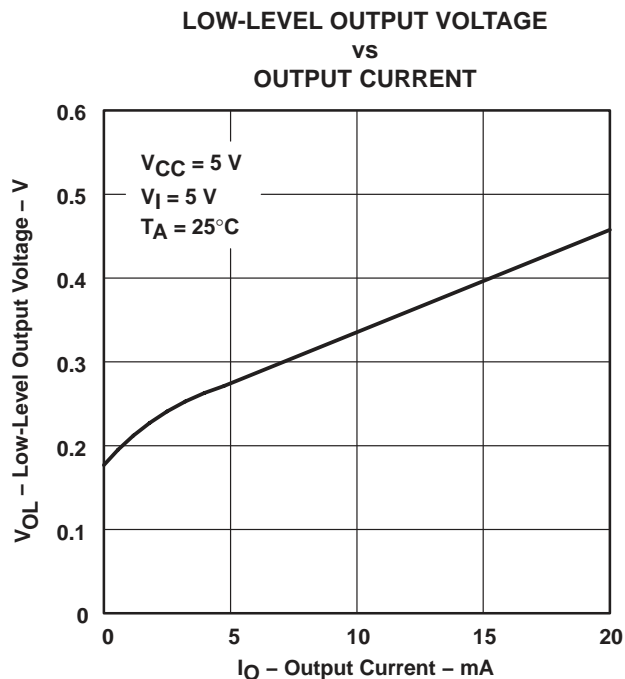


Figure 5

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN75128N	OBSOLETE	PDIP	N	20		TBD	Call TI	Call TI
SN75129DW	OBSOLETE	SOIC	DW	20		TBD	Call TI	Call TI
SN75129N	OBSOLETE	PDIP	N	20		TBD	Call TI	Call TI

⁽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.

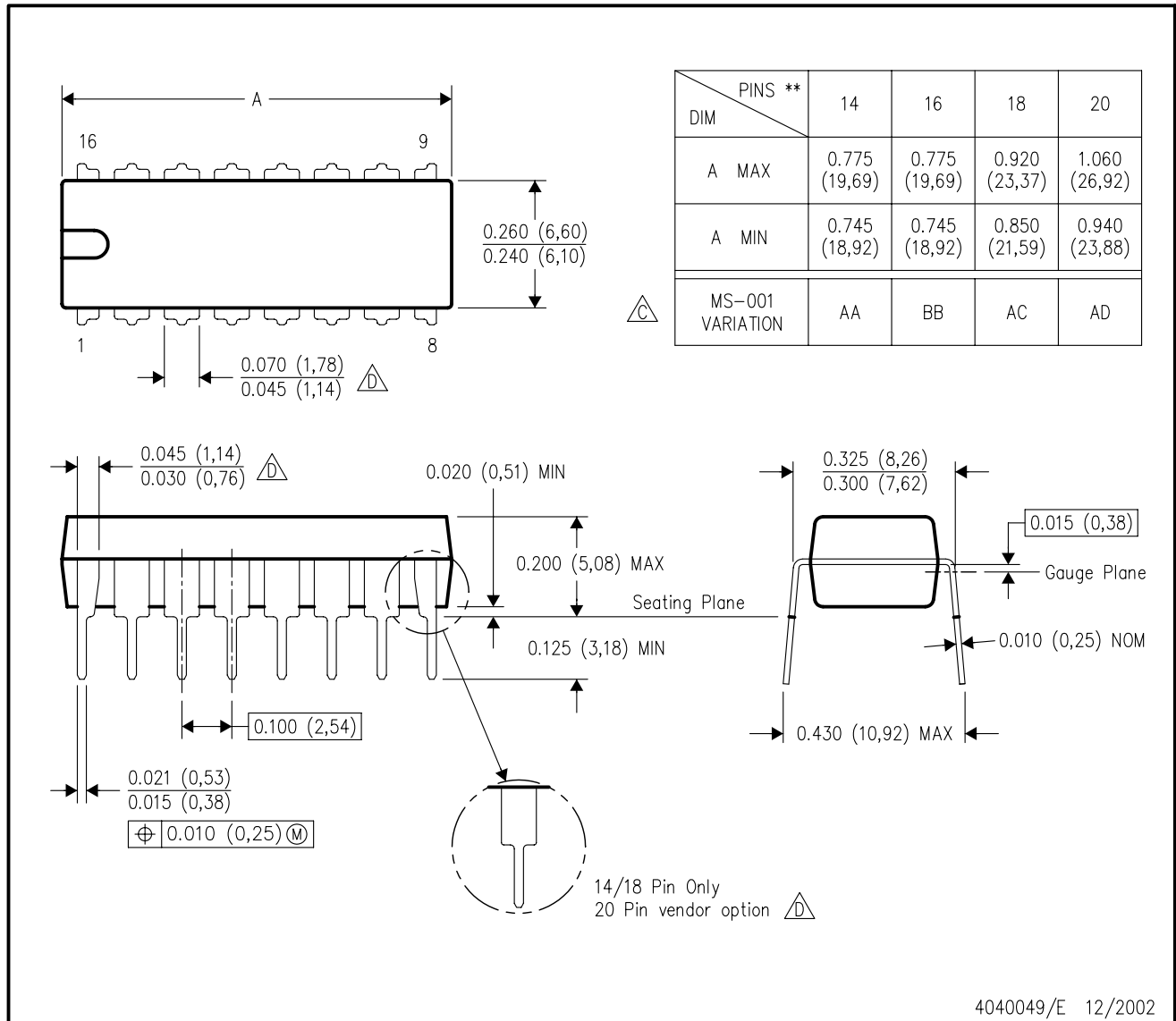
Important Information and Disclaimer:The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. 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**)

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.
 - $\triangle C$ Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - $\triangle D$ The 20 pin end lead shoulder width is a vendor option, either half or full width.

4040049/E 12/2002

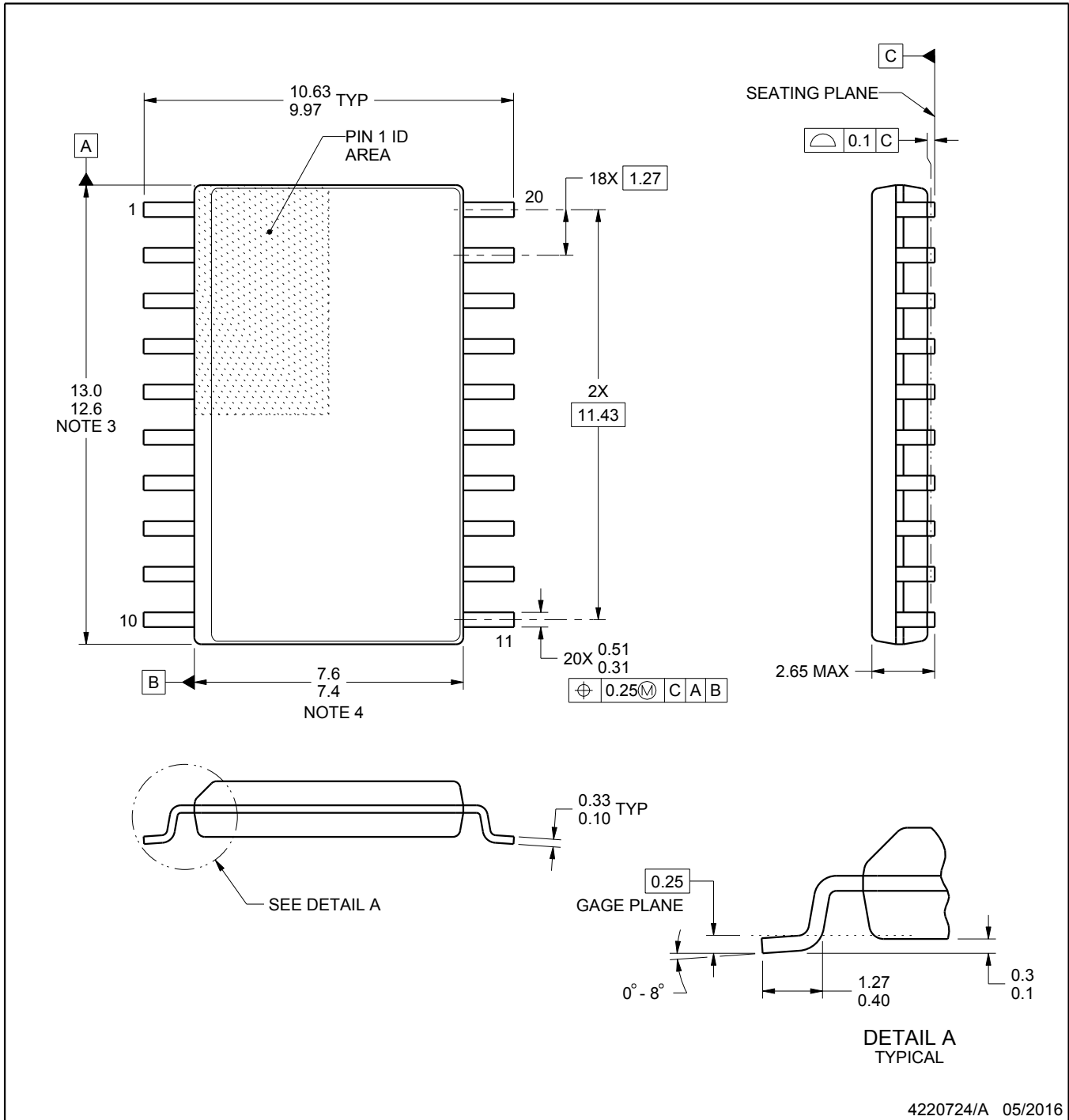
DW0020A



PACKAGE OUTLINE

SOIC - 2.65 mm max height

SOIC



4220724/A 05/2016

NOTES:

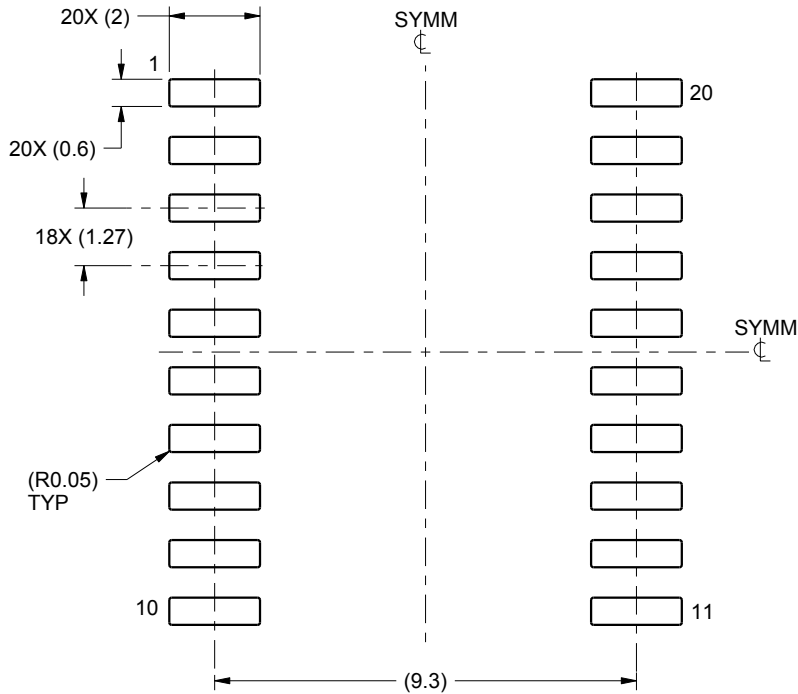
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
5. Reference JEDEC registration MS-013.

EXAMPLE BOARD LAYOUT

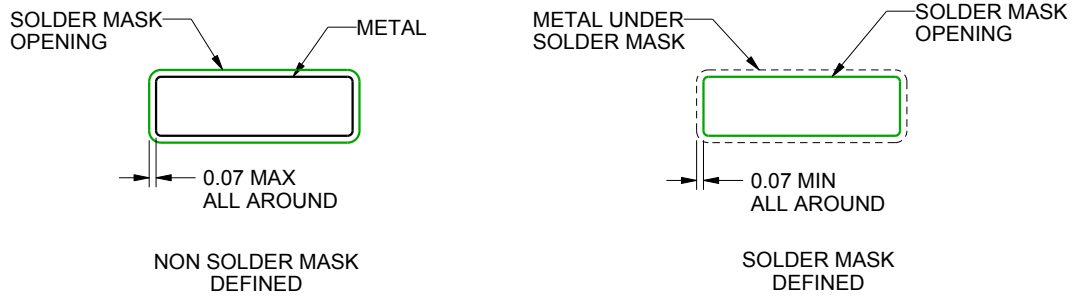
DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

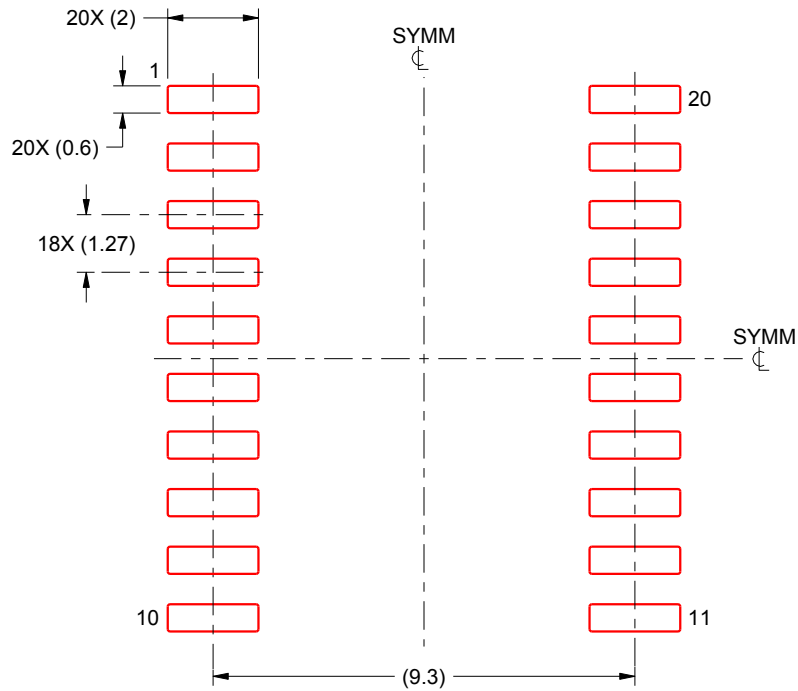
- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

4220724/A 05/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as "components") are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

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

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

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license 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 significant portions of TI 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. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

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

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI's goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or "enhanced plastic" are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have **not** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Applications Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Automotive and Transportation	www.ti.com/automotive
Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Video and Imaging	www.ti.com/video

TI E2E Community

e2e.ti.com