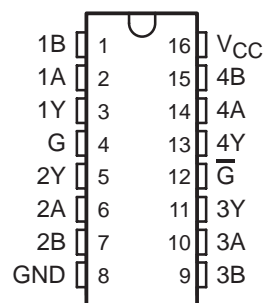


# SN65LBC173A, SN75LBC173A QUADRUPLE RS-485 DIFFERENTIAL LINE RECEIVERS

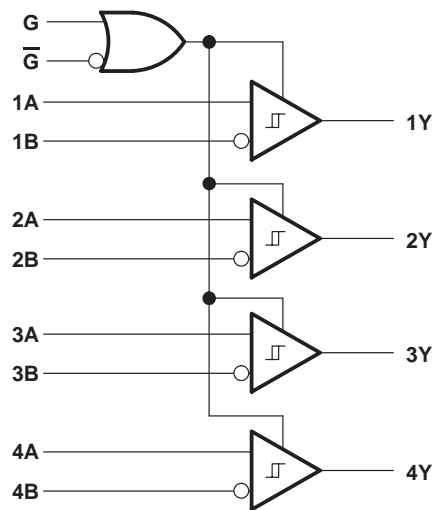
SLLS456B – NOVEMBER 2000 – REVISED APRIL 2005

- Designed for TIA/EIA-485, TIA/EIA-422, and ISO 8482 Applications
- Signaling Rate† Exceeding 50 Mbps
- Fail-Safe in Bus Short-Circuit, Open-Circuit, and Idle-Bus Conditions
- ESD Protection on Bus Inputs Exceeds 6 kV
- Common-Mode Bus Input Range –7 V to 12 V
- Propagation Delay Times <16 ns
- Low Standby Power Consumption <20  $\mu$ A
- Pin-Compatible Upgrade for AM26LS32, DS96F173, LTC488, and SN75173

SN65LBC173A (Marked as 65LBC173A)  
SN75LBC173A (Marked as 75LBC173A)  
D or N PACKAGE  
(TOP VIEW)



logic diagram



## description

The SN65LBC173A and SN75LBC173A are quadruple differential line receivers with 3-state outputs, designed for TIA/EIA-485 (RS-485), TIA/EIA-422 (RS-422), and ISO 8482 (Euro RS-485) applications.

These devices are optimized for balanced multipoint bus communication at data rates up to and exceeding 50 million bits per second. The transmission media may be twisted-pair cables, printed-circuit board traces, or backplanes. The ultimate rate and distance of data transfer is dependent upon the attenuation characteristics of the media and the noise coupling to the environment.

Each receiver operates over a wide range of positive and negative common-mode input voltages, and features ESD protection to 6 kV, making it suitable for high-speed multipoint data transmission applications in harsh environments. These devices are designed using LinBiCMOS™, facilitating low power consumption and robustness.

The G and  $\bar{G}$  inputs provide enable control logic for either positive- or negative-logic enabling all four drivers. When disabled or powered off, the receiver inputs present a high-impedance to the bus for reduced system loading.

The SN75LBC173A is characterized for operation over the temperature range of 0°C to 70°C. The SN65LBC173A is characterized over the temperature range from –40°C to 85°C.



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.

LinBiCMOS is a trademark of Texas Instruments.

†The signaling rate of a line is the number of voltage transitions that are made per second expressed in the units bps (bits per second).

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 © 2001, Texas Instruments Incorporated

# SN65LBC173A, SN75LBC173A QUADRUPLE RS-485 DIFFERENTIAL LINE RECEIVERS

SLLS456B – NOVEMBER 2000 – REVISED APRIL 2005

**FUNCTION TABLE**  
(each receiver)

DIFFERENTIAL INPUTS A – B ( $V_{ID}$ )	ENABLES		OUTPUT Y
	G	$\bar{G}$	
$V_{ID} \leq -0.2$ V	H	X	L
	X	L	
$-0.2$ V $< V_{ID} < -0.01$ V	H	X	?
	X	L	
$-0.01$ V $\leq V_{ID}$	H	X	H
	X	L	
X	L	H	Z
	OPEN	OPEN	
Short circuit	H	X	H
	X	L	
Open circuit	H	X	H

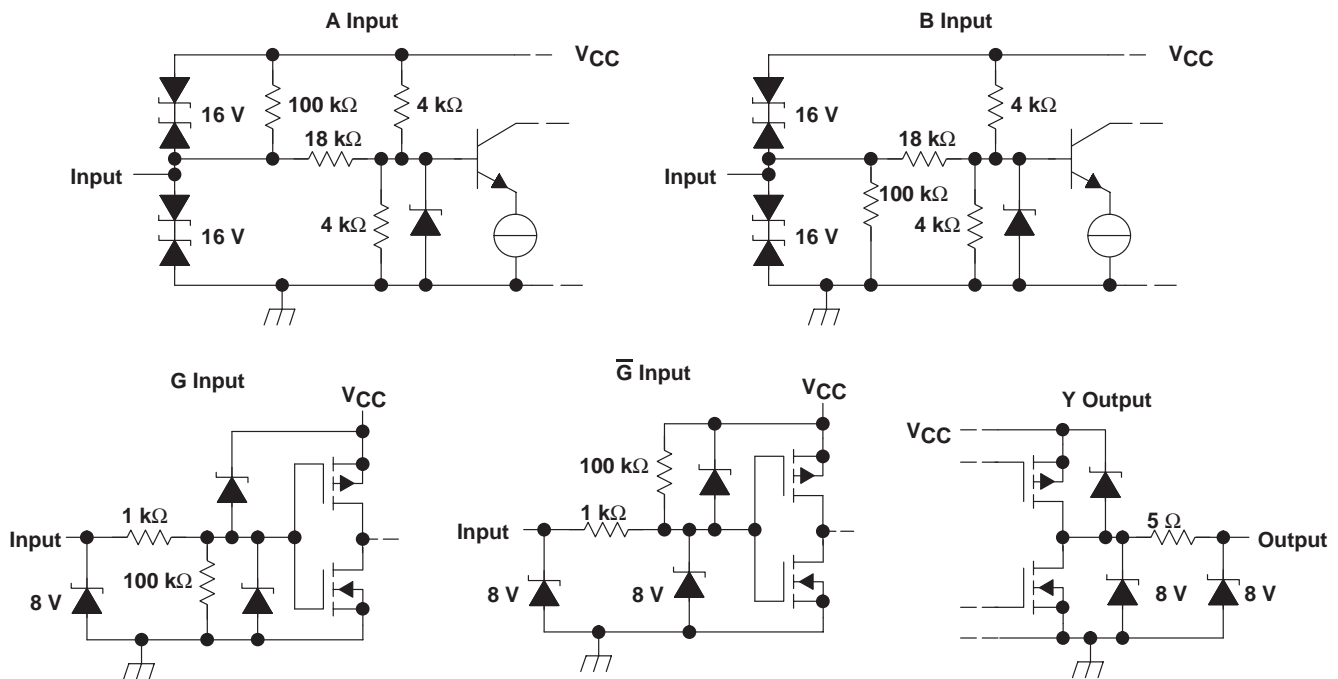
H = high level, L = low level, X = irrelevant, Z = high impedance (off),  
? = indeterminate

**AVAILABLE OPTIONS**

$T_A$	PACKAGE	
	PLASTIC SMALL OUTLINE† (JEDEC MS-012)	PLASTIC DUAL-IN-LINE (JEDEC MS-001)
0°C to 70°C	SN75LBC173AD	SN75LBC173AN
-40°C to 85°C	SN65LBC173AD	SN65LBC173AN

† Add an R suffix for taped and reeled

## equivalent input and output schematic diagrams



# SN65LBC173A, SN75LBC173A QUADRUPLE RS-485 DIFFERENTIAL LINE RECEIVERS

SLLS456B – NOVEMBER 2000 – REVISED APRIL 2005

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

Supply voltage range, $V_{CC}$ (see Note 1)	–0.3 V to 6 V
Voltage range at any bus input (DC)	–10 V to 15 V
Voltage range at any bus input (transient pulse through 100 $\Omega$ , see Figure 5)	–30 V to 30 V
Voltage input range at G and $\bar{G}$ , $V_I$	–0.5 V to $V_{CC} + 0.5$ V
Receiver output current, $I_O$	$\pm 10$ mA
Electrostatic discharge:	
Human body model (see Note 2):	A and B to GND      6 kV
	All pins      5 kV
Charged-device model (see Note 3):	All pins      2 kV
Continuous power dissipation	See Power Dissipation Rating Table

† 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. All voltage values, except differential I/O bus voltages, are with respect to GND, and are steady-state (unless otherwise specified).  
 2. Tested in accordance with JEDEC Standard 22, Test Method A114-A.  
 3. Tested in accordance with JEDEC Standard 22, Test Method C101.

**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	$T_A = 85^\circ\text{C}$ POWER RATING
D	1080 mW	8.7 mW/°C	690 mW	560 mW
N	1150 mW	9.2 mW/°C	736 mW	598 mW

‡ This is the inverse of the junction-to-ambient thermal resistance when board-mounted and with no air flow.

## recommended operating conditions

		MIN	NOM	MAX	UNIT
Supply voltage, $V_{CC}$		4.75	5	5.25	V
Voltage at any bus terminal	A, B	–7		12	V
High-level input voltage, $V_{IH}$	G, $\bar{G}$	2		$V_{CC}$	V
Low-level input voltage, $V_{IL}$		0		0.8	
Output current	Y	–8		8	mA
Operating free-air temperature, $T_A$	SN75LBC173A	0		70	°C
	SN65LBC173A	–40		85	

# SN65LBC173A, SN75LBC173A QUADRUPLE RS-485 DIFFERENTIAL LINE RECEIVERS

SLLS456B – NOVEMBER 2000 – REVISED APRIL 2005

## electrical characteristics over recommended operating conditions

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
$V_{IT+}$	Positive-going differential input voltage threshold	$-7\text{ V} \leq V_{CM} \leq 12\text{ V}$ ( $V_{CM} = (V_A + V_B)/2$ )	-80	-10		mV
$V_{IT-}$	Negative-going differential input voltage threshold		-200	-120		
$V_{HYS}$	Hysteresis voltage ( $V_{IT+} - V_{IT-}$ )		40			mV
$V_{IK}$	Input clamp voltage	$I_I = -18\text{ mA}$	-1.5	-0.8		V
$V_{OH}$	High-level output voltage	$V_{ID} = 200\text{ mV}$ , $I_{OH} = -8\text{ mA}$	2.7	4.8		V
$V_{OL}$	Low-level output voltage	$V_{ID} = -200\text{ mV}$ , $I_{OL} = 8\text{ mA}$				
$I_{OZ}$	High-impedance-state output current	$V_O = 0\text{ V to } V_{CC}$	-1		1	$\mu\text{A}$
$I_I$	Line input current	Other input at 0 V, $V_{CC} = 0\text{ V or } 5\text{ V}$	$V_I = 12\text{ V}$		0.9	mA
			$V_I = -7\text{ V}$		-0.7	
$I_{IH}$	High-level input current	Enable inputs G, $\bar{G}$			100	$\mu\text{A}$
$I_{IL}$	Low-level input current				-100	$\mu\text{A}$
$R_I$	Input resistance	A, B inputs	12			$\text{k}\Omega$
$I_{CC}$	Supply current	$V_{ID} = 5\text{ V}$	G at 0 V, $\bar{G}$ at $V_{CC}$		20	$\mu\text{A}$
		No load	G at $V_{CC}$ , $\bar{G}$ at 0 V		11 16	mA

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

## switching characteristics over recommended operating conditions

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
$t_r$	Output rise time	$V_{ID} = -3\text{ V to } 3\text{ V}$ , See Figure 2		2	4	ns
$t_f$	Output fall time			2	4	ns
$t_{PLH}$	Propagation delay time, low-to-high level output		9	12	16	ns
$t_{PHL}$	Propagation delay time, high-to-low level output		9	12	16	ns
$t_{PZH}$	Propagation delay time, high-impedance to high-level output	See Figure 3		27	38	ns
$t_{PHZ}$	Propagation delay time, high-level to high-impedance output			7	16	ns
$t_{PZL}$	Propagation delay time, high-impedance to low level output	See Figure 4		29	38	ns
$t_{PLZ}$	Propagation delay time, low-level to high-impedance output			12	16	ns
$t_{sk(p)}$	Pulse skew ( $ t_{PLH} - t_{PHL} $ )			0.2	1	ns
$t_{sk(o)}$	Output skew (see Note 4)				2	ns
$t_{sk(pp)}$	Part-to-part skew (see Note 5)				2	ns

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

- NOTES:
- Outputs skew ( $t_{sk(o)}$ ) is the magnitude of the time delay difference between the outputs of a single device with all of the inputs connected together.
  - Part-to-part skew ( $t_{sk(pp)}$ ) is the magnitude of the difference in propagation delay times between any specified terminals of two devices when both devices operate with the same input signals, the same supply voltages, at the same temperature, and have identical packages and test circuits.

## PARAMETER MEASUREMENT INFORMATION

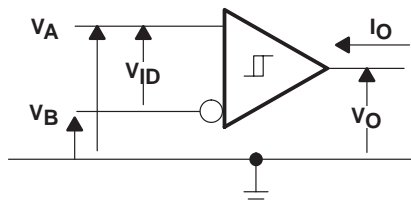


Figure 1. Voltage and Current Definitions

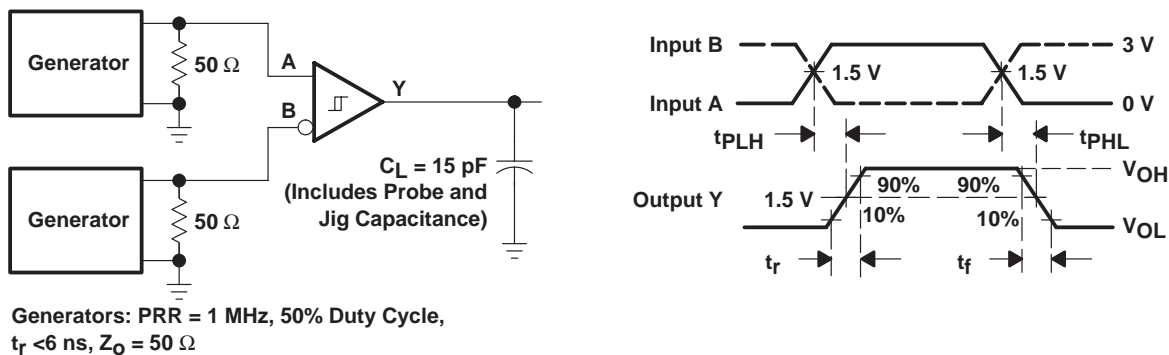


Figure 2. Switching Test Circuit and Waveforms

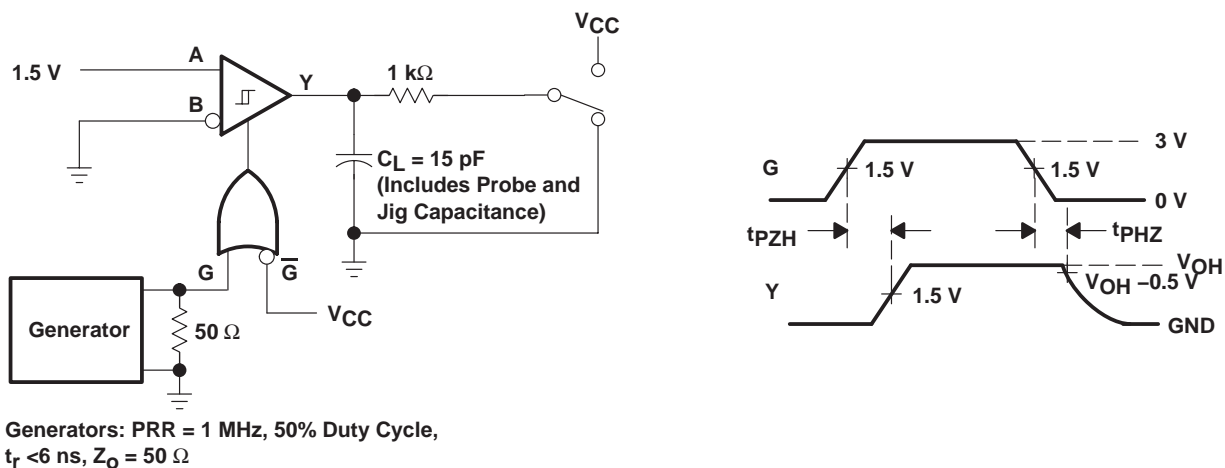
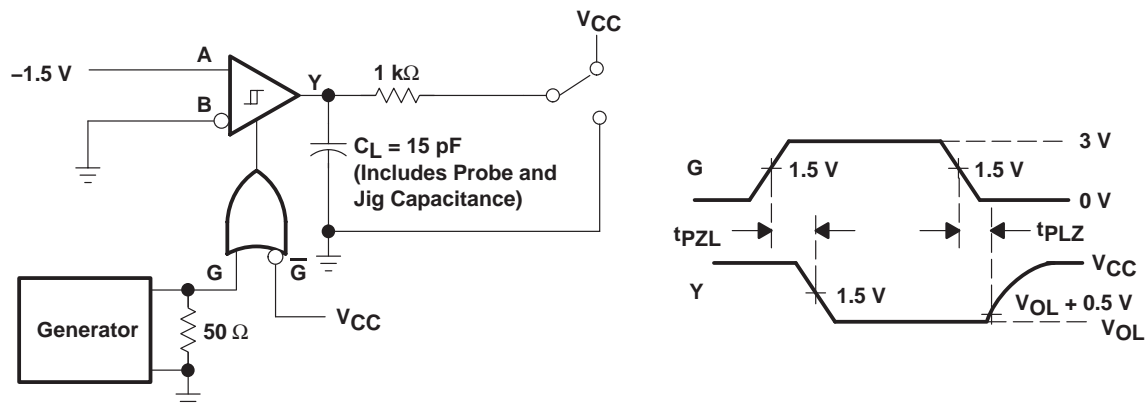


Figure 3. Test Circuit Waveforms,  $t_{PZH}$  and  $t_{PHZ}$

# SN65LBC173A, SN75LBC173A QUADRUPLE RS-485 DIFFERENTIAL LINE RECEIVERS

SLLS456B – NOVEMBER 2000 – REVISED APRIL 2005

## PARAMETER MEASUREMENT INFORMATION



Generators: PRR = 1 MHz, 50% Duty Cycle,  
 $t_r < 6 \text{ ns}$ ,  $Z_o = 50 \Omega$

Figure 4. Test Circuit Waveforms,  $t_{pZL}$  and  $t_{pLZ}$

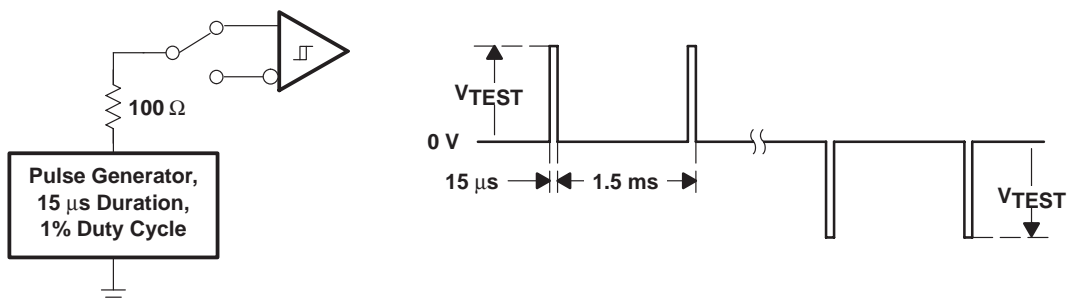


Figure 5. Test Circuit and Waveform, Transient Over-Voltage Test

## TYPICAL CHARACTERISTICS

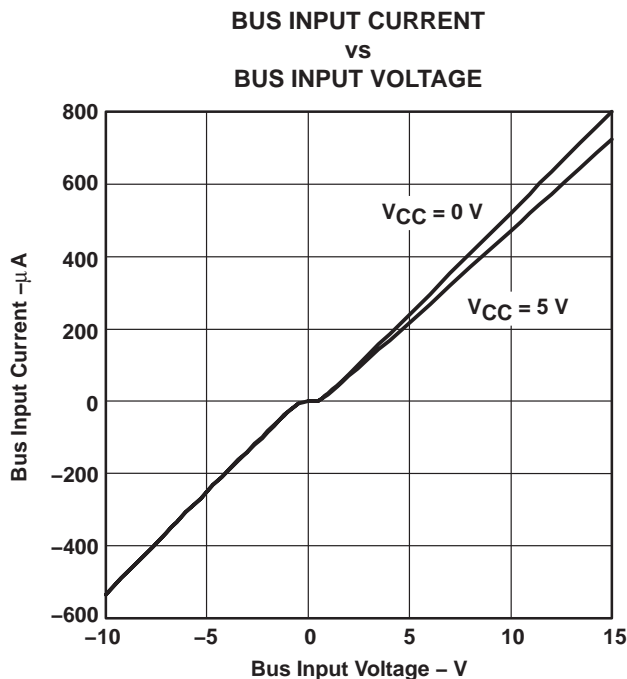


Figure 6

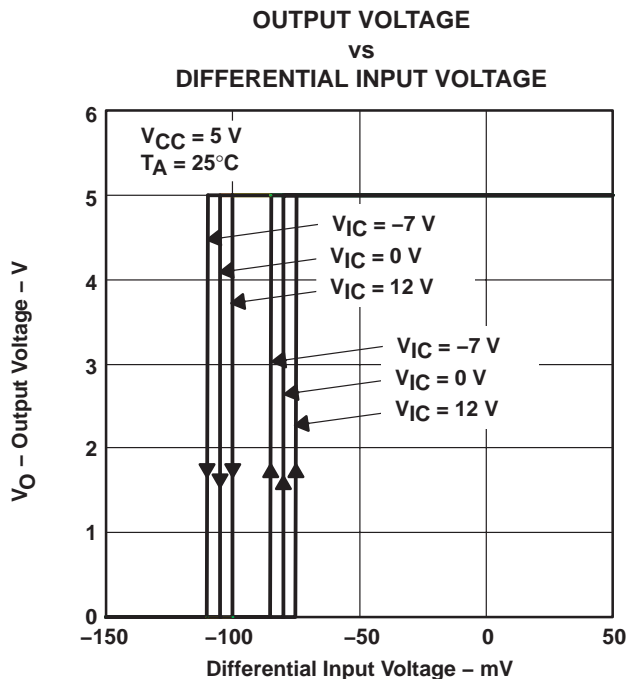


Figure 7

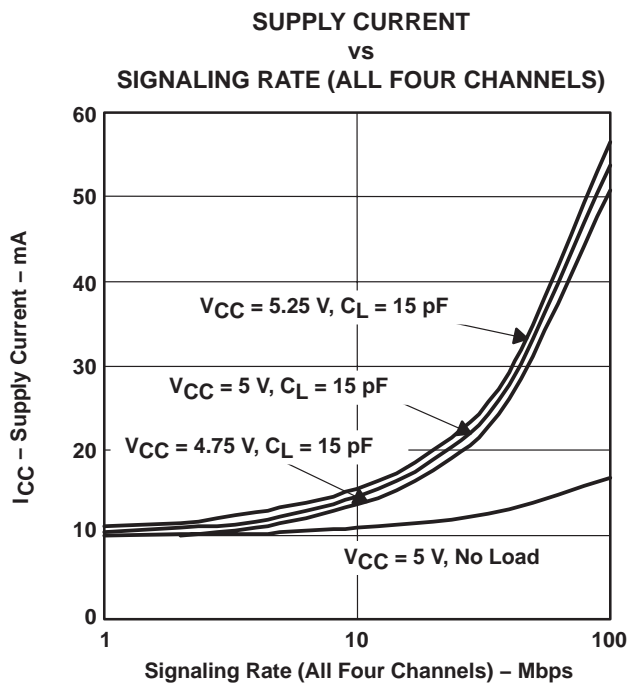


Figure 8

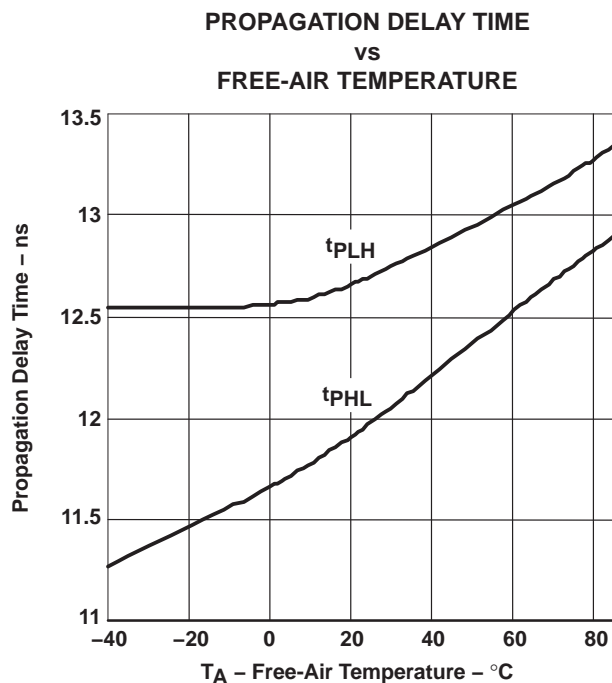


Figure 9

# SN65LBC173A, SN75LBC173A QUADRUPLE RS-485 DIFFERENTIAL LINE RECEIVERS

SLLS456B – NOVEMBER 2000 – REVISED APRIL 2005

## TYPICAL CHARACTERISTICS

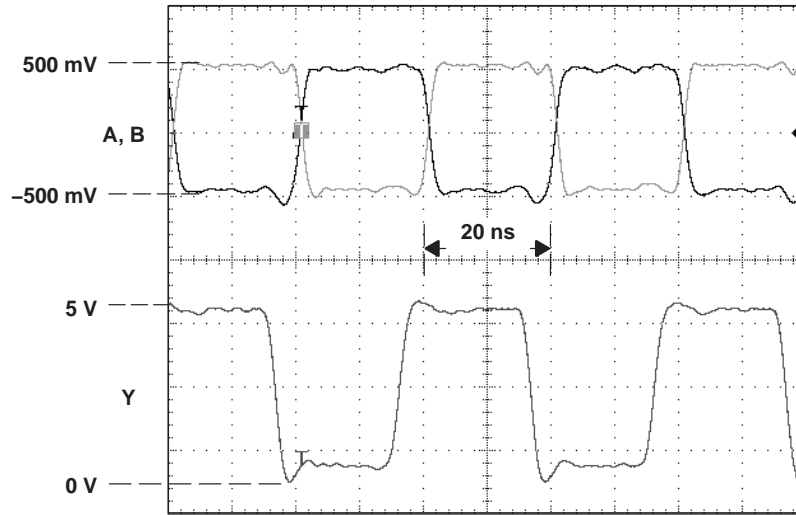


Figure 10. Receiver Inputs and Outputs, 50 Mbps Signaling Rate



# SN65LBC173A, SN75LBC173A QUADRUPLE RS-485 DIFFERENTIAL LINE RECEIVERS

SLLS456B – NOVEMBER 2000 – REVISED APRIL 2005

## APPLICATION INFORMATION

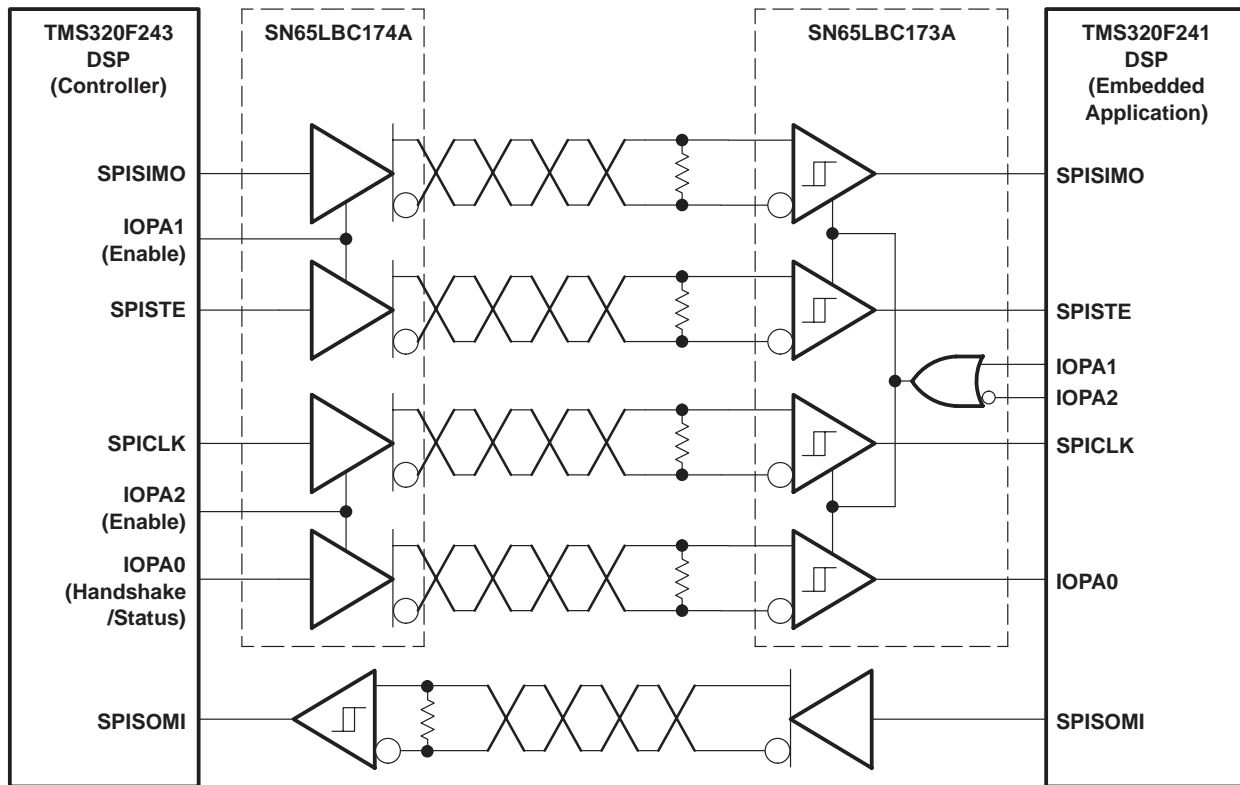


Figure 11. Typical Application Circuit, DSP-to-DSP Link via Serial Peripheral Interface

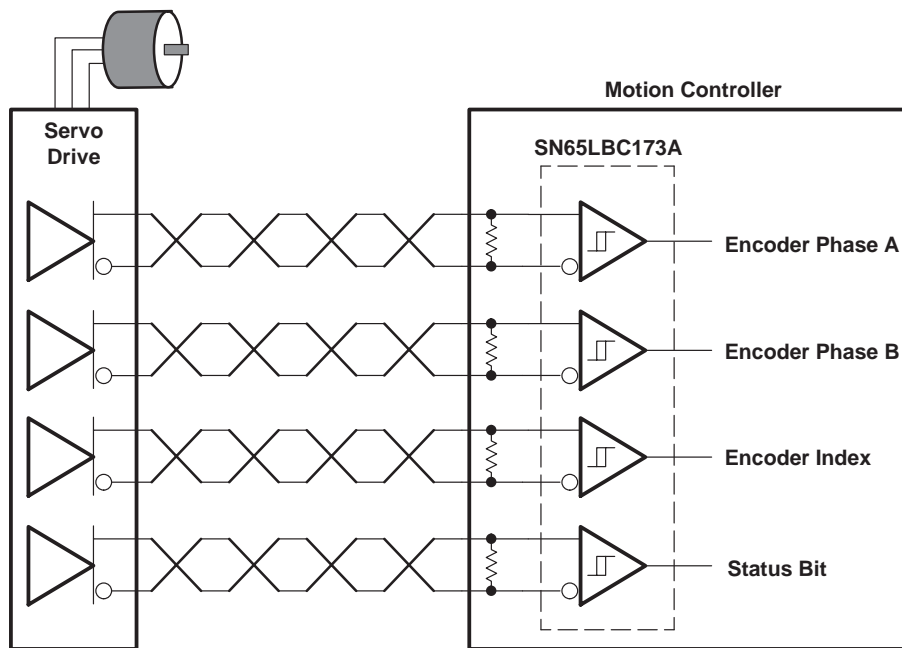


Figure 12. Typical Application Circuit, High-Speed Servomotor Encoder Interface

# SN65LBC173A, SN75LBC173A QUADRUPLE RS-485 DIFFERENTIAL LINE RECEIVERS

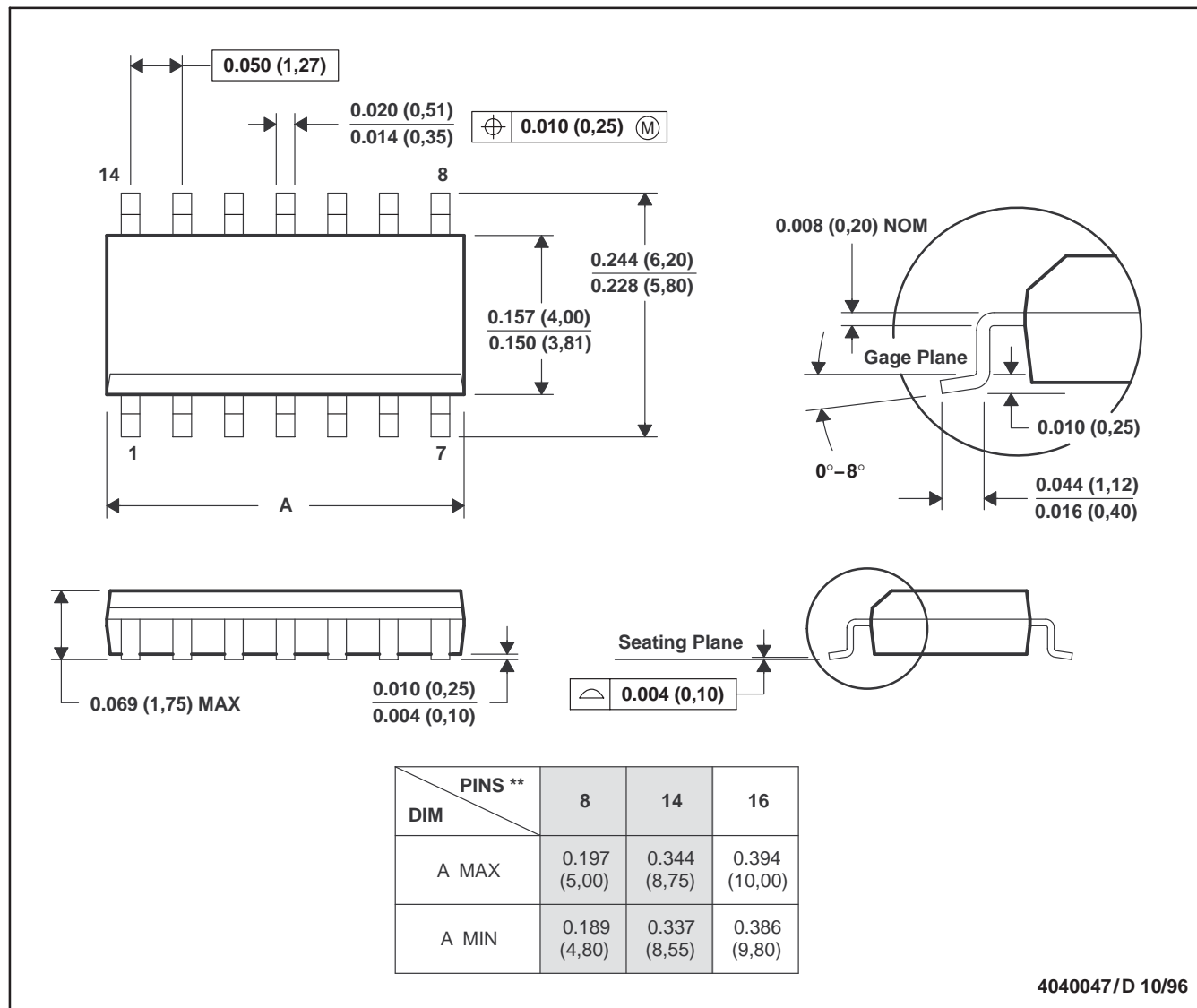
SLLS456B – NOVEMBER 2000 – REVISED APRIL 2005

## MECHANICAL DATA

D (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



- 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

# SN65LBC173A, SN75LBC173A QUADRUPLE RS-485 DIFFERENTIAL LINE RECEIVERS

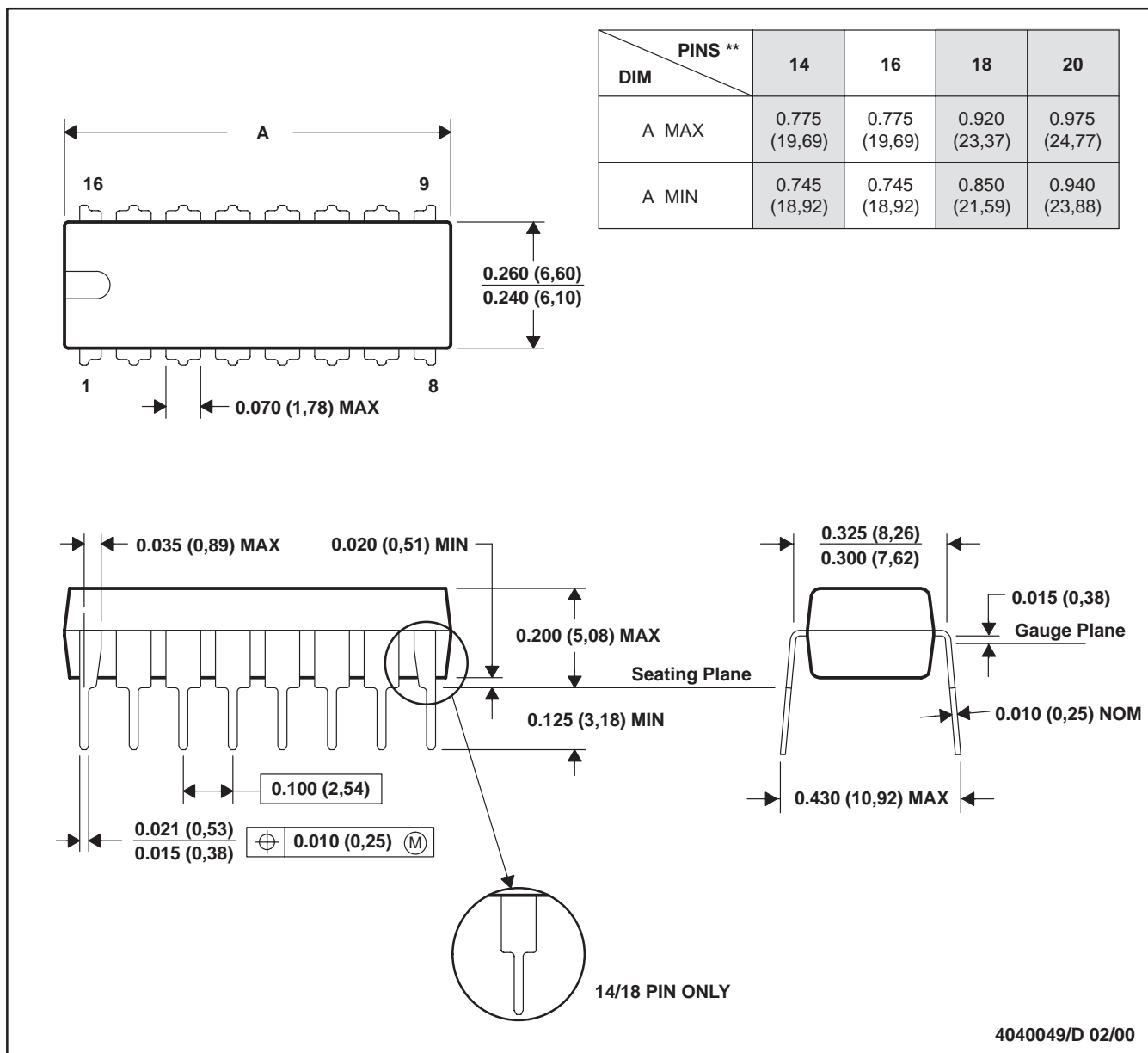
SLLS456B – NOVEMBER 2000 – REVISED APRIL 2005

## MECHANICAL DATA

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.  
 C. Falls within JEDEC MS-001 (20-pin package is shorter than MS-001).

**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
SN65LBC173AD	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN65LBC173ADG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN65LBC173ADR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN65LBC173ADRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN65LBC173AN	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN65LBC173ANE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN75LBC173AD	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75LBC173ADG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75LBC173ADR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75LBC173ADRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN75LBC173AN	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN75LBC173ANE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type

<sup>(1)</sup> 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.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), 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.

**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**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)

<sup>(3)</sup> 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.

**TAPE AND REEL INFORMATION**



**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN65LBC173ADR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN75LBC173ADR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1

**TAPE AND REEL BOX DIMENSIONS**

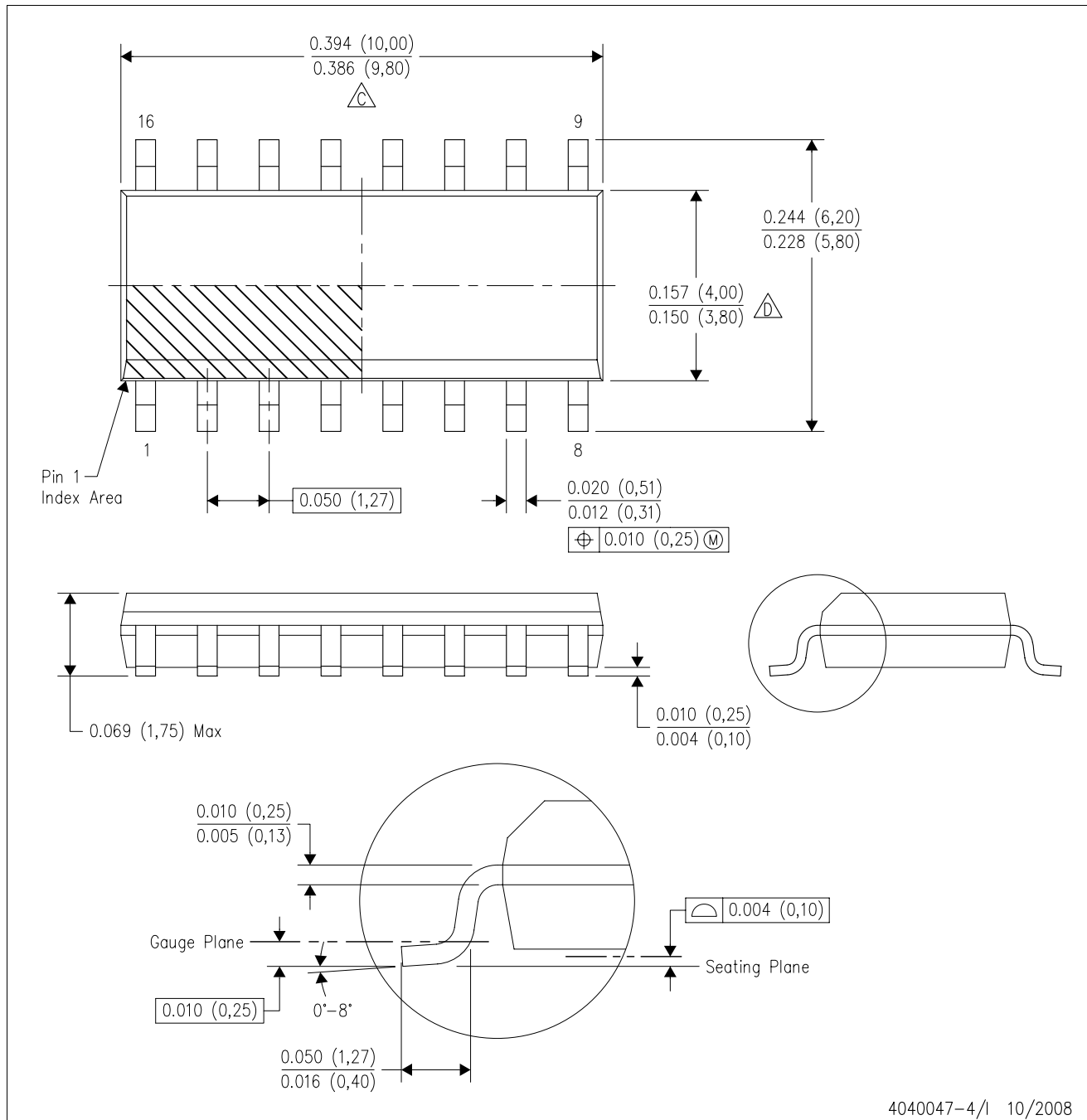


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN65LBC173ADR	SOIC	D	16	2500	333.2	345.9	28.6
SN75LBC173ADR	SOIC	D	16	2500	333.2	345.9	28.6

D (R-PDSO-G16)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed .006 (0,15) per end.
  - D. Body width does not include interlead flash. Interlead flash shall not exceed .017 (0,43) per side.
  - E. Reference JEDEC MS-012 variation AC.



D(R-PDSO-G16)



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Refer to IPC7351 for alternate board design.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

## 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 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. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

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.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

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

### Products

Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>
Clocks and Timers	<a href="http://www.ti.com/clocks">www.ti.com/clocks</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>
RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>
RF/IF and ZigBee® Solutions	<a href="http://www.ti.com/lprf">www.ti.com/lprf</a>

### Applications

Audio	<a href="http://www.ti.com/audio">www.ti.com/audio</a>
Automotive	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
Broadband	<a href="http://www.ti.com/broadband">www.ti.com/broadband</a>
Digital Control	<a href="http://www.ti.com/digitalcontrol">www.ti.com/digitalcontrol</a>
Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Military	<a href="http://www.ti.com/military">www.ti.com/military</a>
Optical Networking	<a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a>
Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
Telephony	<a href="http://www.ti.com/telephony">www.ti.com/telephony</a>
Video & Imaging	<a href="http://www.ti.com/video">www.ti.com/video</a>
Wireless	<a href="http://www.ti.com/wireless">www.ti.com/wireless</a>

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2008, Texas Instruments Incorporated