

- Supports a 9-Pin GeoPort™ Host Interface Standard for the Intelligent Network Port
- Designed to Operate up to 4-Mbit/s Full Duplex
- ±5 V Supply Operation
- Has Driver Short-Circuit Protection
- Includes Failsafe Mechanism for Open Inputs
- Is Backward Compatible with AppleTalk™ and LocalTalk™
- Combines Multiple Components into a Single Chip Solution
- Complements the SN75LBC772 9-Pin GeoPort Peripheral (DCE) Interface Device
- Uses LinBiCMOS™ Process Technology

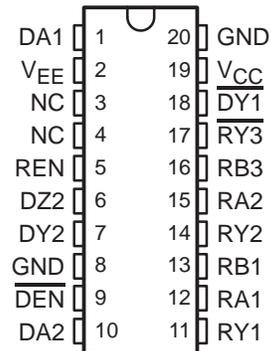
## description

The SN75LBC773 is a low-power LinBiCMOS device that incorporates the drivers and receivers for a 9-pin GeoPort host interface. GeoPort combines hybrid EIA/TIA-422-B and EIA/TIA-423-B drivers and receivers to transmit data up to four-Mbit/s full duplex. GeoPort is a serial communications standard that is intended to replace the RS-232, AppleTalk, and printer ports all in one connector in addition to providing real-time data transfer capability. The SN75LBC773 provides point-to-point connections between GeoPort-compatible devices with data transmission rates up to 4-Mbit/s full duplex featuring a hot-plug capability. Applications include connection to telephone, ISDN, digital sound and imaging, fax-data modems, and other traditional serial and parallel connections. The GeoPort is backwardly compatible to both LocalTalk and AppleTalk.

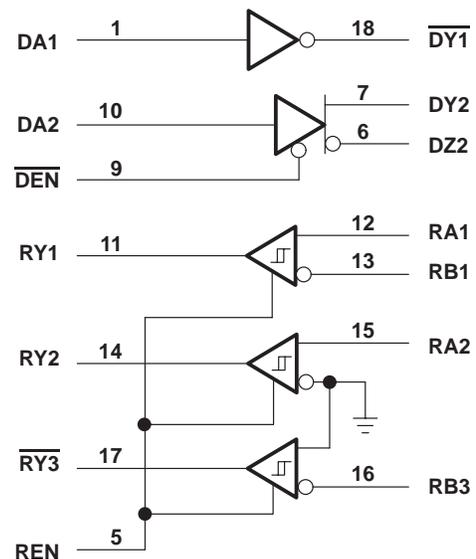
While the SN75LBC773 is powered off ( $V_{CC}$  and  $V_{EE} = 0$ ), the outputs are in a high-impedance state. A logic high on the driver enable ( $\overline{DEN}$ ) or logic low on the receive enable (REN) terminals places the outputs of the differential driver and receivers, respectively, into a high-impedance state. All drivers and receivers have fail-safe mechanisms that ensure a high output state when the inputs are left open.

The SN75LBC773 is characterized for operation over the 0°C to 70°C temperature range.

DW PACKAGE  
(TOP VIEW)



logic diagram (positive logic)



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 **TEXAS  
INSTRUMENTS**

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# SN75LBC773 GEOPORT™ TRANSCEIVER

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## FUNCTION TABLES†

SINGLE-ENDED DRIVER	
INPUT (DA1)	OUTPUT (DY1)
H	L
L	H
OPEN	L

DIFFERENTIAL DRIVER			
INPUT (DA2)	ENABLE (DEN)	OUTPUT (DY2) (DZ2)	
H	L	H	L
L	L	L	H
OPEN	L	H	L
X	H	Z	Z
X	OPEN	Z	Z

SINGLE-ENDED RECEIVER			
INPUT (RA2, RA3)	ENABLE (REN)	OUTPUT (RY2) (RY3)	
H	H	H	L
L	H	L	H
OPEN	H	H	H
SHORT‡	H	?	?
X	L	Z	Z
X	OPEN	Z	Z

DIFFERENTIAL RECEIVER			
INPUT (RA1) (RB1)	ENABLE (REN)	OUTPUT (RY1)	
H L	H	H	
L H	H	L	
OPEN	H	H	
SHORT‡	H	?	
X X	L	Z	
X X	OPEN	Z	

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

‡  $-0.2\text{ V} < V_{ID} < 0.2\text{ V}$

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

Positive supply voltage range, $V_{CC}$ (see Note 1)	-0.5 to 7 V
Negative supply voltage range, $V_{EE}$ (see Note 1)	-7 to 0.5 V
Receiver input voltage range (RA, RB)	-15 V to 15 V
Receiver differential input voltage range, $V_{ID}$	-12 V to 12 V
Receiver output voltage range (RY)	-0.5 V to 5.5 V
Driver output voltage range (Power Off) ( $\overline{DY1}$ , DY2, DZ2)	-15 V to 15 V
Driver output voltage range (Power On) ( $\overline{DY1}$ , DY2, DZ2)	-11 V to 11 V
Driver input voltage range (DA, REN, $\overline{DEN}$ )	-0.5 V to $V_{CC} + 0.4\text{ V}$
Electrostatic Discharge (All pins) Human Body Model (see Note 2)	6 kV
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.

NOTES: 1. All voltage values are with respect to network ground terminal unless otherwise noted.

2. This rating is per MIL-PRF-38535, Method 3015.7.



**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
DW	1125 mW	9.0 mW/°C	720 mW

**recommended operating conditions**

	MIN	NOM	MAX	UNIT
Positive supply voltage, $V_{CC}$	4.75	5	5.25	V
Negative supply voltage, $V_{EE}$	-5.25	-5	-4.75	V
High-level input voltage, $V_{IH}$ (DA, REN, $\overline{DEN}$ )	2			V
Low-level input voltage, $V_{IL}$ (DA, REN, $\overline{DEN}$ )			0.8	V
Receiver common-mode input voltage, $V_{IC}$	-7		7	V
Receiver differential input voltage, $V_{ID}$	-12		12	V
Operating free-air temperature, $T_A$	0		70	°C

**driver 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	$R_L = 12\text{ k}\Omega$	3.6	4.5		V
		$R_L = 120\ \Omega$	2	3.6		V
$V_{OL}$	Low-level output voltage	$R_L = 12\text{ k}\Omega$		-4.5	-3.6	V
		$R_L = 120\ \Omega$		-3.6	-2	V
$ V_{OD} $	Magnitude of differential output voltage $ V_{DY} - V_{DZ} $	$R_L = 120\ \Omega$ , See Figure 2	4			V
$\Delta V_{OD} $	Change in differential voltage magnitude				250	mV
$V_{OC}$	Common-mode output voltage		-2		2	V
$ \Delta V_{OC(SS)} $	Magnitude of change, common-mode steady-state output voltage	See Figure 3			200	mV
$ \Delta V_{OC(PP)} $	Magnitude of change, common-mode peak-to-peak output voltage			700		mV
$I_{CC}$	Positive supply current	REN = 5 V, No Load		4	10	mA
$I_{EE}$	Negative supply current	$\overline{DEN} = 0\text{ V}$ , No Load		-2	-5	mA
$I_{CC}$	Positive supply current	REN = 0 V, No Load			100	$\mu\text{A}$
$I_{EE}$	Negative supply current	$\overline{DEN} = 5\text{ V}$ , No Load			-100	$\mu\text{A}$
$I_{OZ}$	High-impedance output current	$V_{CC} = 0\text{ or }5\text{ V}$ , $-10 \leq V_O \leq 10\text{ V}$				$\pm 100$ $\mu\text{A}$
$I_{OS}$	Short-circuit output current	$V_{CC} = 5.25\text{ V}$ , See Note 3		$\pm 170$	$\pm 450$	mA

NOTE 3: Not more than one output should be shorted at one time.

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## driver switching characteristics over operating free-air temperature range

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT	
t <sub>PHL</sub>	Propagation delay time, high-to-low level output	Single ended, See Figure 4		42	75	ns	
t <sub>PLH</sub>	Propagation delay time, low-to-high level output			41	75	ns	
t <sub>PZL</sub>	Driver output enable time to low-level output		$\overline{\text{DEN}}$		25	100	ns
t <sub>PZH</sub>	Driver output enable time to high-level output				25	100	ns
t <sub>PLZ</sub>	Driver output disable time from low-level output				28	100	ns
t <sub>PHZ</sub>	Driver output disable time from high-level output				37	100	ns
t <sub>r</sub>	Rise time			10	25	75	ns
t <sub>f</sub>	Fall time			10	23	75	ns
t <sub>PHL</sub>	Propagation delay time, high-to-low level output		Differential, See Figure 5		40	75	ns
t <sub>PLH</sub>	Propagation delay time, low-to-high level output				42	75	ns
t <sub>PZL</sub>	Driver output enable time to low-level output	$\overline{\text{DEN}}$			29	150	ns
t <sub>PZH</sub>	Driver output enable time to high-level output				35	150	ns
t <sub>PLZ</sub>	Driver output disable time from low-level output				34	100	ns
t <sub>PHZ</sub>	Driver output disable time from high-level output				34	100	ns
t <sub>r</sub>	Rise time			10	27	75	ns
t <sub>f</sub>	Fall time			10	26	75	ns
t <sub>SK(p)</sub>	Pulse skew,  t <sub>PLH</sub> - t <sub>PHL</sub>					22	ns



**receiver electrical characteristics over recommended operating conditions (unless otherwise noted)**

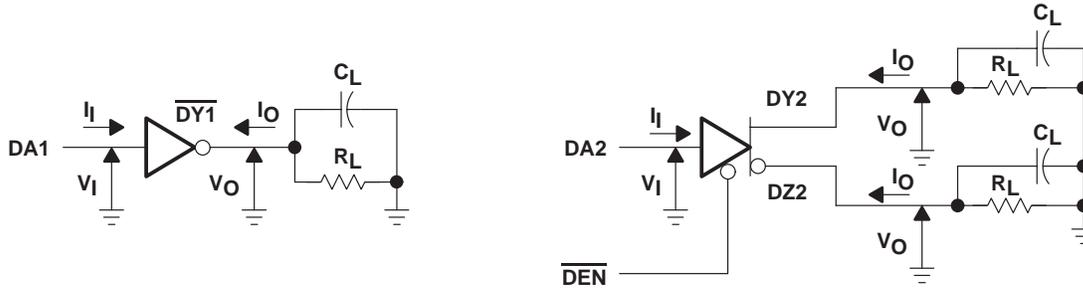
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
V <sub>IT+</sub>	Positive-going input threshold voltage	See Figure 6			200	mV
V <sub>IT-</sub>	Negative-going input threshold voltage		-200			mV
V <sub>hys</sub>	Differential input voltage hysteresis (V <sub>IT+</sub> - V <sub>IT-</sub> )			50		mV
V <sub>OH</sub>	High-level output voltage (see Note 4)	V <sub>IC</sub> = 0, See Figure 6	I <sub>OH</sub> = -2 mA,	2	4.5	V
V <sub>OL</sub>	Low-level output voltage	V <sub>IC</sub> = 0, See Figure 6	I <sub>OL</sub> = 2 mA,		0.4 0.8	V
I <sub>OS</sub>	Short-circuit output current	V <sub>O</sub> = 0		-45	-85	mA
		V <sub>O</sub> = 5.25 V		45	85	mA
R <sub>IN</sub>	Input resistance	V <sub>CC</sub> = 0 or 5.25 V, -12 V ≤ V <sub>I</sub> ≤ 12 V		6	30	kΩ

NOTE 4: If the inputs are left unconnected, receivers one and two interpret this as a high-level input and receiver three interprets this as a low-level input so that all outputs are at the high level.

**receiver switching characteristics over recommended conditions (unless otherwise noted)**

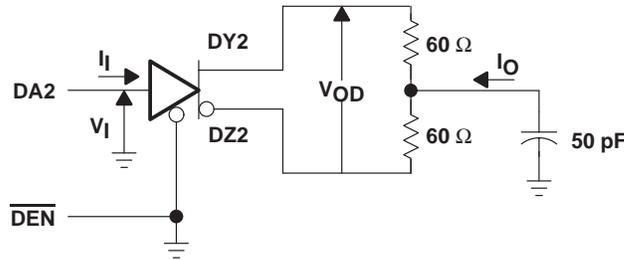
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT	
t <sub>PHL</sub>	Propagation delay time, high-to-low level output	R <sub>L</sub> = 2 kΩ, C <sub>L</sub> = 15 pF, See Figure 6		30	75	ns	
t <sub>PLH</sub>	Propagation delay time, low-to-high level output			30	75	ns	
t <sub>r</sub>	Rise time			15	30	ns	
t <sub>f</sub>	Fall time			15	30	ns	
t <sub>SK(P)</sub>	Pulse skew  t <sub>PLH</sub> - t <sub>PHL</sub>				20	ns	
t <sub>PZL</sub>	Receiver output enable time to low-level output	C <sub>L</sub> = 50 pF, See Figure 7	Differential		35	100	ns
t <sub>PZH</sub>	Receiver output enable time to high-level output				35	100	ns
t <sub>PLZ</sub>	Receiver output disable time from low-level output				20	100	ns
t <sub>PHZ</sub>	Receiver output disable time from high-level output				20	100	ns
t <sub>PZL</sub>	Receiver output enable time to low-level output		Single-ended		12	25	μs
t <sub>PZH</sub>	Receiver output enable time to high-level output				12	25	μs
t <sub>PLZ</sub>	Receiver output disable time from low-level output				25	100	ns
t <sub>PHZ</sub>	Receiver output disable time from high-level output				125	400	ns

**PARAMETER MEASUREMENT INFORMATION**

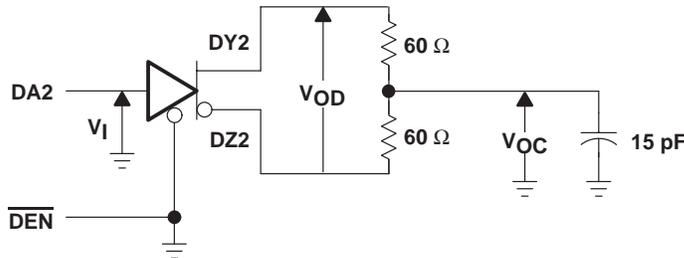


NOTE A:  $C_L = 50 \text{ pF}$

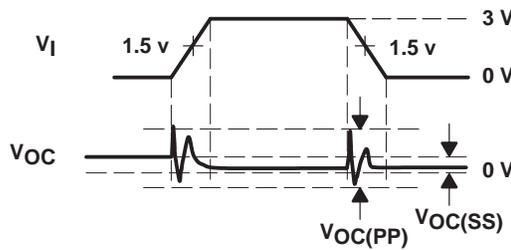
**Figure 1. Single-Ended Driver DC Parameter Test Circuits**



**Figure 2. Differential Driver DC Parameter Test Circuit**



**TEST CIRCUIT**

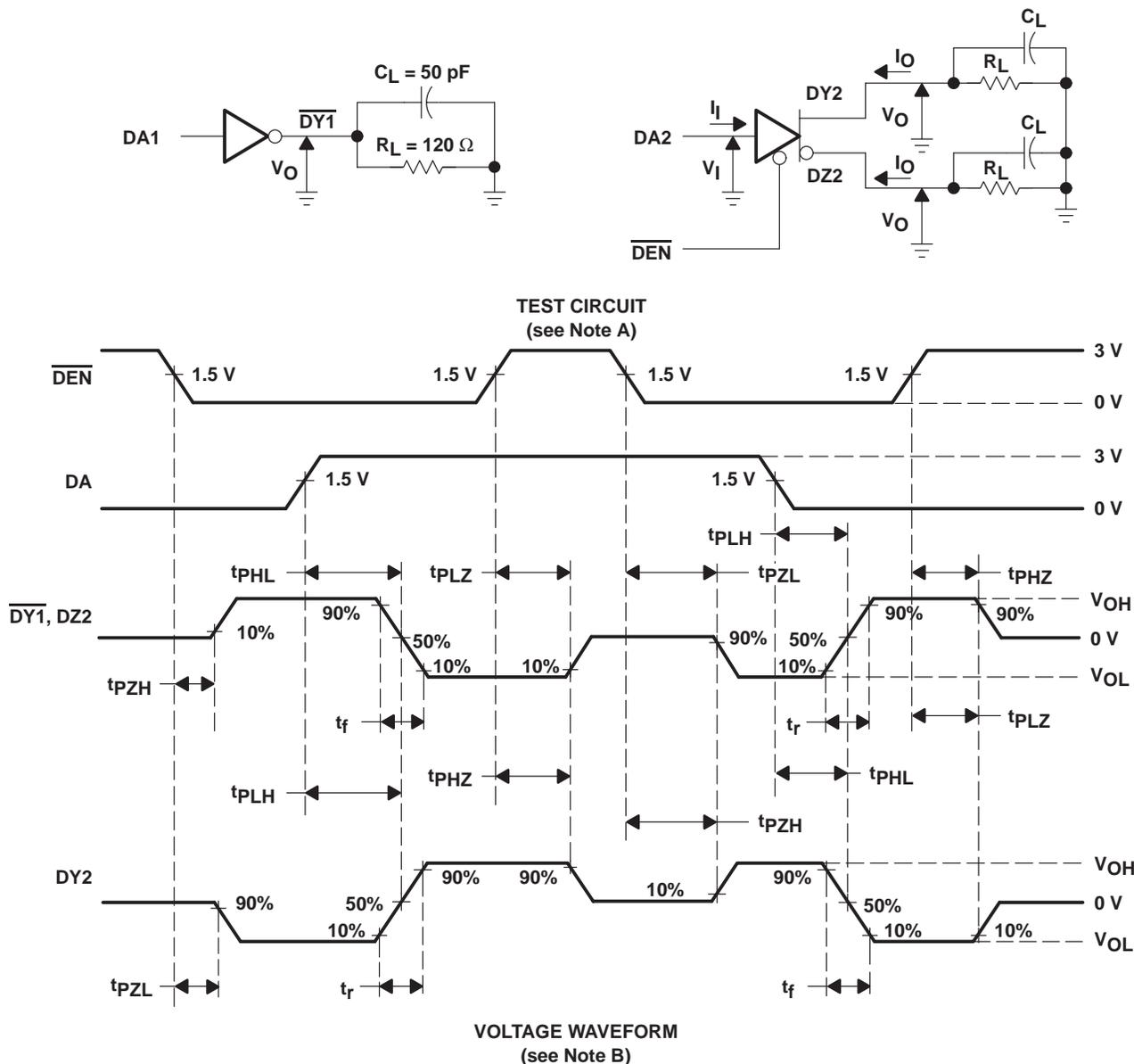


**VOLTAGE WAVEFORM**

NOTE A: Measured 3dB Bandwidth = 300 MHz

**Figure 3. Differential Driver Common-Mode Output Voltage Test Circuit**

PARAMETER MEASUREMENT INFORMATION



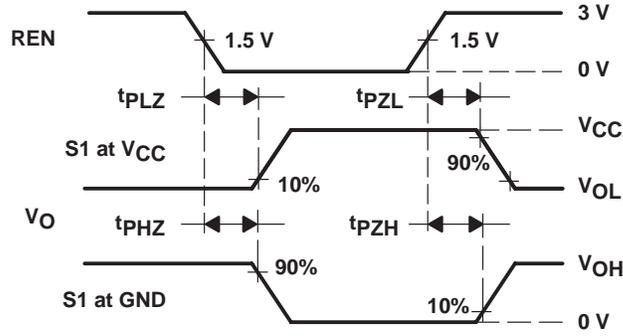
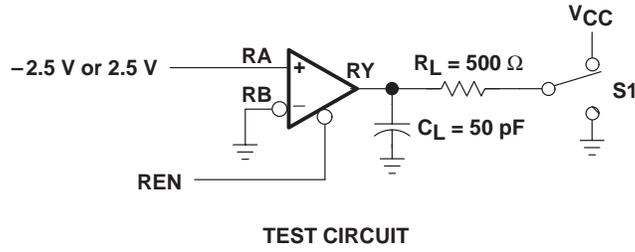
NOTES: A.  $C_L = 50 \text{ pF}$ ,  $R_L = 120 \Omega$   
B. The input waveform  $t_r$ ,  $t_f \leq 10 \text{ ns}$ .

Figure 4. Single-Ended Driver Propagation and Transition Times Test Circuits and Waveform





PARAMETER MEASUREMENT INFORMATION



VOLTAGE WAVEFORM  
 (see Note A)

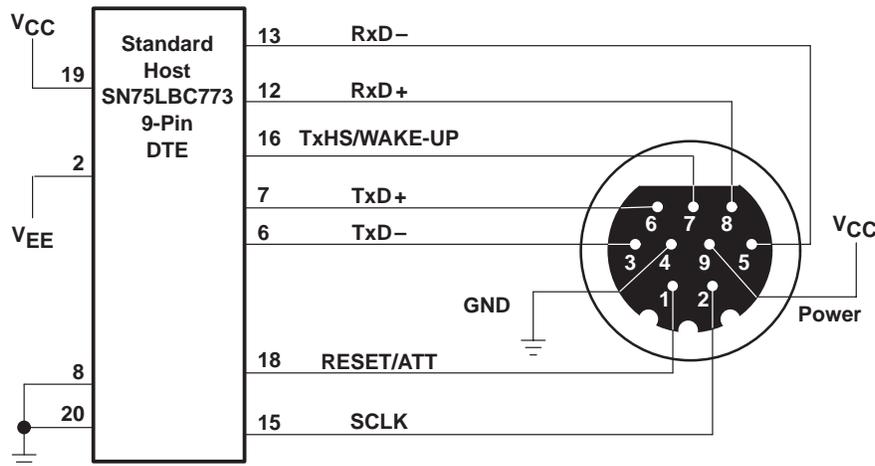
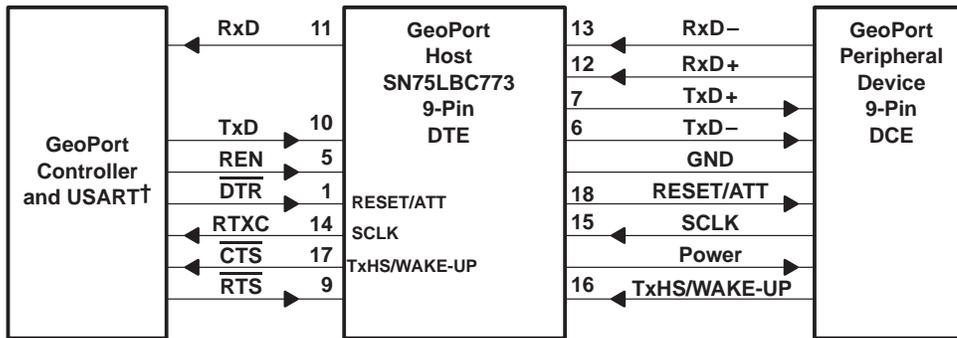
NOTE A: For the input waveform  $t_r, t_f \leq 10 \text{ ns}$

Figure 7. Receiver Enable and Disable Test Circuit and Waveforms

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## APPLICATION INFORMATION



† USART = universal synchronous asynchronous receiver transmitter

Figure 8. GeoPort 9-Pin DTE Connection Application

### generator characteristics

PARAMETER	TEST CONDITIONS	232/V.28		423/V.10		562		UNIT	
		MIN	MAX	MIN	MAX	MIN	MAX		
V <sub>O</sub>	Output voltage magnitude	Open circuit		25		4 6		13.2	V
		3 kΩ ≤ R <sub>L</sub> ≤ 7 kΩ		5 15		NA		3.7	V
		R <sub>L</sub> = 450 Ω		NA		3.6		NA	V
I <sub>OS</sub>	Short-circuit output current	V <sub>O</sub> = 0		100		150		60	mA
R <sub>(OFF)</sub>	Power-off source resistance	V <sub>CC</sub> = 0,  V <sub>O</sub>   < 2 V		300		NA		300	Ω
I <sub>O(OFF)</sub>	Power-off output current	V <sub>CC</sub> = 0,  V <sub>O</sub>   < 6 V		NA		±100		NA	μA
SR	Output voltage slew rate			30		NA		4 30	V/μs
t <sub>t</sub>	Output transition time	±3.3 V to ±3.3 V		NA		NA		0.22 2.1	μs
		±3 V to ±3 V		0.04		NA		NA	ui <sup>‡</sup>
		10% to 90%		NA		0.3		NA	ui <sup>‡</sup>
V <sub>O(RING)</sub>	Output voltage ring			NA		10%		5%	

‡ ui is the unit interval and is the inverse of the signaling rate (bit time).

**APPLICATION INFORMATION**

**receiver characteristics**

PARAMETER	TEST CONDITIONS	232/V.28		423/V.10		562		UNIT	
		MIN	MAX	MIN	MAX	MIN	MAX		
V <sub>I</sub>	Input voltage		25		10		25	V	
V <sub>IT</sub>	Input voltage threshold	V <sub>I</sub>   < 15 V		-3	3	NA	-3	3	V
		V <sub>I</sub>   < 10 V		NA		-0.2	0.2	NA	V
R <sub>I</sub>	Input resistance	3 V <  V <sub>I</sub>   < 15 V		3	7	NA	3	7	kΩ
		V <sub>I</sub>   < 10 V		NA		4	NA		kΩ

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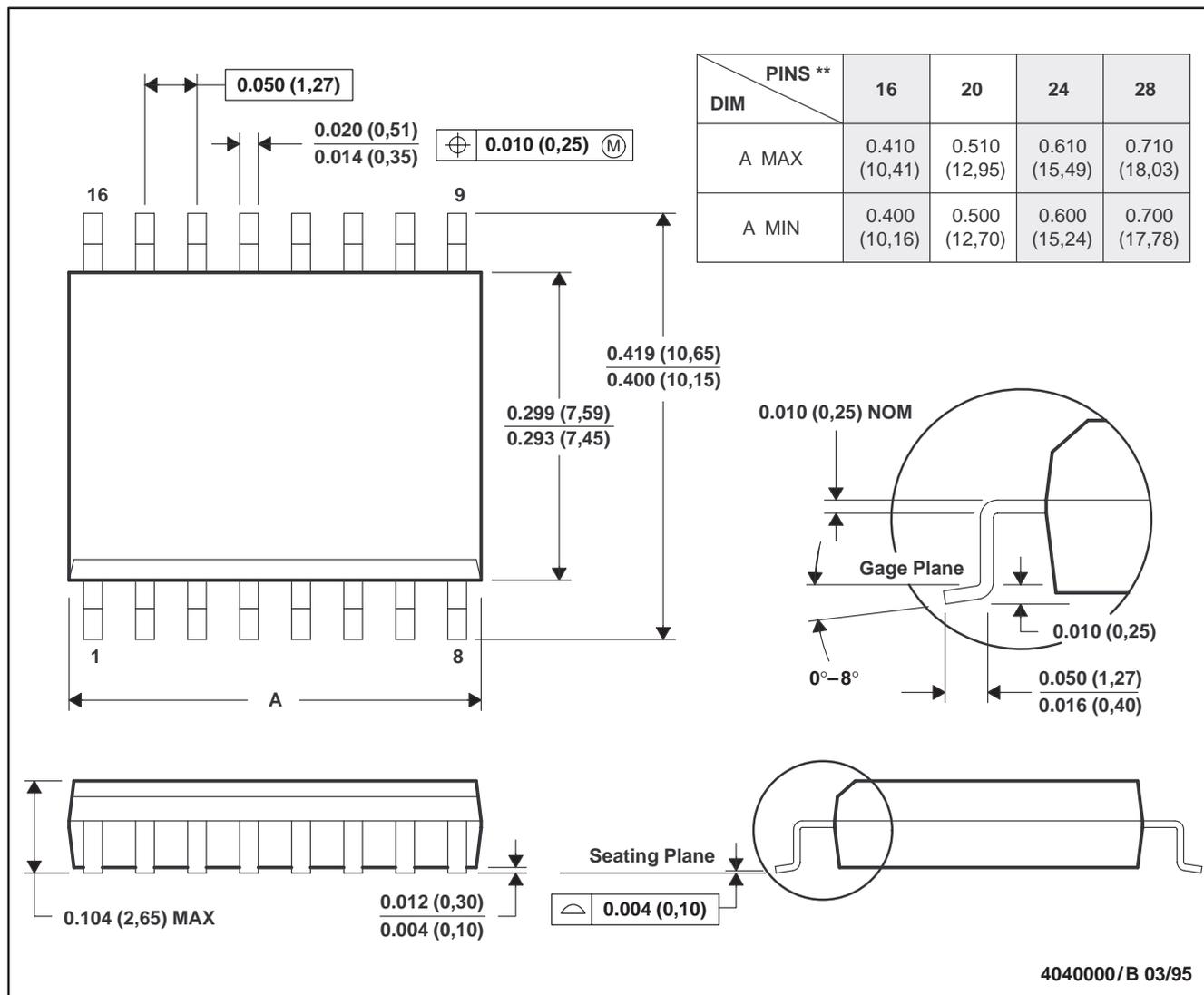
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## MECHANICAL INFORMATION

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

PLASTIC SMALL-OUTLINE PACKAGE

16 PIN 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-013

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