

FEATURES

- Meets or Exceeds the Requirements of IBM® 360/370 Input/Output Interface Specification for 4.5-Mb/s Operation
- Single 5-V Supply
- Uncommitted Emitter-Follower Output Structure for Party-Line Operation
- Driver Output Short-Circuit Protection
- Driver Input/Receiver Output Compatible With TTL
- Receiver Input Resistance . . . 7.4 kΩ to 20 kΩ
- Ratio Specification for Propagation Delay Time, Low to High/High to Low

DESCRIPTION/ ORDERING INFORMATION

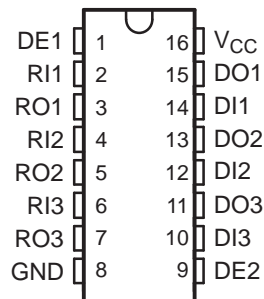
The SN751730 triple line driver/receiver is specifically designed to meet the input/output interface specifications for IBM System 360/370. It also is compatible with standard TTL logic and supply voltage levels.

The low-impedance emitter-follower driver outputs of the SN751730 drive terminated lines, such as coaxial cable or twisted pair. Having the outputs uncommitted allows wired-OR logic to be performed in party-line applications. Output short-circuit protection is provided by an internal clamping network that turns on when the output voltage drops below approximately 2.5 V.

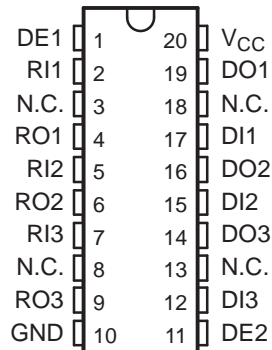
An open line affects the receiver input as does a low-level input voltage.

All the driver inputs and receiver outputs are in conventional TTL configuration and the gating can be used during power-up and power-down sequences to ensure that no noise is introduced to the line by pulling either DE1 or DE2 to a low level.

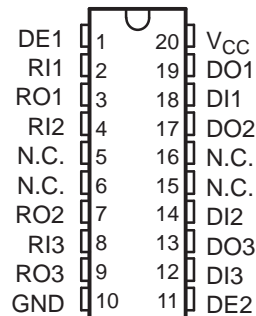
D OR N PACKAGE
(TOP VIEW)



DW PACKAGE
(TOP VIEW)



NS PACKAGE
(TOP VIEW)



N.C. – No internal connection



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.

IBM is a registered trademark of International Business Machines Corporation.

ORDERING INFORMATION

T _A	PACKAGE ⁽¹⁾⁽²⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	PDIP – N	Tube	SN751730N	SN751730N
	SOIC – D	Tube	SN751730D	SN751730
		Tape and reel	SN751730DR	
	SOIC – DW	Tube	SN751730DW	SN751730
		Tape and reel	SN751730DWR	
	SOP – NS	Tape and reel	SN751730NSR	SN751730

- (1) Package drawings, thermal data, and symbolization are available at www.ti.com/packaging.
(2) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at www.ti.com.

FUNCTION TABLES

EACH DRIVER

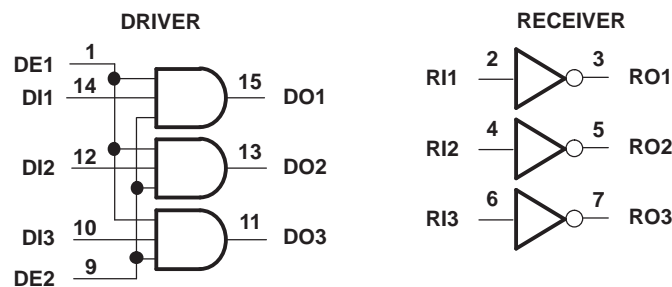
INPUTS			OUTPUT DO
DI	DE1	DE2	
L	X	X	L
X	L	X	L
X	X	L	L
H	H	H	H

EACH DRIVER⁽¹⁾

INPUT RI	OUTPUT RO
L	H
H	L
Open	H

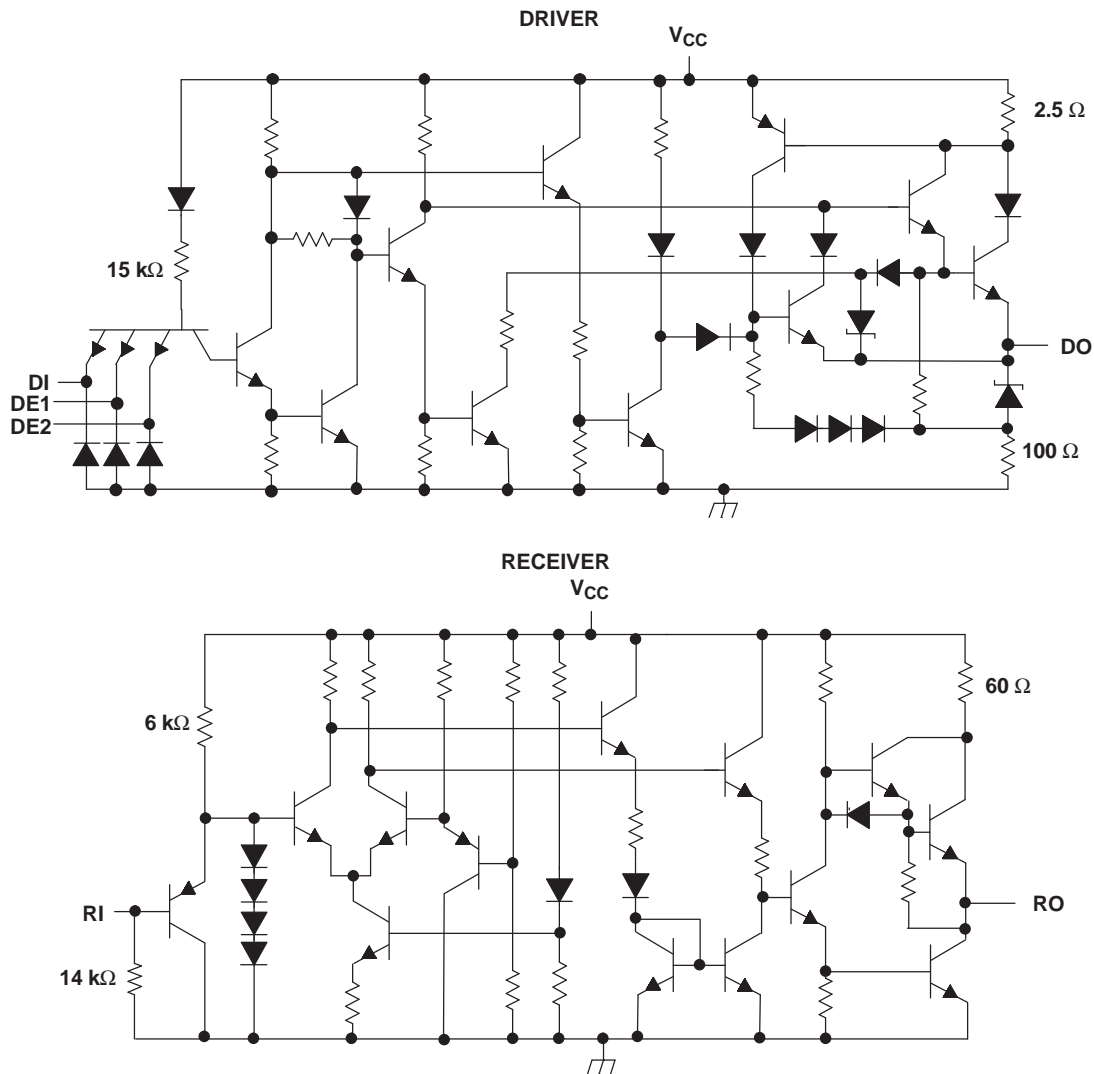
- (1) H = high level, L = low level, X = irrelevant

LOGIC DIAGRAM (POSITIVE LOGIC)



Pin numbers shown are for the D and N package only.

EQUIVALENT SCHEMATICS OF DRIVER AND RECEIVER⁽¹⁾



(1) All resistor values are nominal.

SN751730 TRIPLE LINE DRIVER/RECEIVER

SLLS062E – MAY 1990 – REVISED AUGUST 2007

Absolute Maximum Ratings⁽¹⁾

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

		MIN	MAX	UNIT	
V _{CC}	Supply voltage ⁽²⁾		7	V	
V _I	Input voltage range	Driver	-0.5	7	V
		Receiver	-0.5	7	V
V _O	Output voltage range	Driver	-0.5	7	V
	Enable input voltage range		-0.5	7	V
θ _{JA}	Package thermal impedance ⁽³⁾	D package		73	°C/W
		DW package		58	
		N package		67	
		NS package		60	
T _J	Operating virtual junction temperature		150	°C	
	Lead temperature 1,6 mm (1/16 inch) from case for 10 s		260	°C	
T _{stg}	Storage temperature range	-65	150	°C/W	

- (1) 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.
- (2) All voltage values are with respect to network ground terminal.
- (3) The package thermal impedance is calculated in accordance with JESD 51-7.

Recommended Operating Conditions

		MIN	NOM	MAX	UNIT
V _{CC}	Supply voltage	4.75	5	5.25	V
V _{IH}	High-level input voltage	Driver, Enable	2		V
		Receiver	1.55		
V _{IL}	Low-level input voltage	Driver, Enable		0.8	V
		Receiver		1.15	
T _A	Operating free-air temperature	0		70	°C

DRIVER SECTION

Electrical Characteristics

over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	MAX	UNIT
V_{IK}	Input clamp voltage	$V_{CC} = 4.75 \text{ V}$,	$I_{IL} = -18 \text{ mA}$		-1.5	V
V_{OH}	High-level output voltage	$V_{CC} = 4.75 \text{ V}$,	$V_{IH} = 2 \text{ V}$,	3.11		V
		$I_{OH} = -59.3 \text{ mA}$	$T_A = 25^\circ\text{C}$			
		$V_{CC} = 5.25 \text{ V}$,	$V_{IH} = 2 \text{ V}$,		4.1	
		$I_{OH} = -78.1 \text{ mA}$				
		$V_{CC} = 4.75 \text{ V}$,	$V_{IH} = 2 \text{ V}$,	3.05		
		$R_L = 51.4 \Omega$				
		$V_{CC} = 5.25 \text{ V}$,	$V_{IH} = 2 \text{ V}$,		4.2	
		$R_L = 56.9 \Omega$				
V_{ODH}	Differential high-level output voltage	$R_L = 46.3 \Omega$ or 56.9Ω			0.5	V
V_{OL}	Low-level output voltage	$V_{CC} = 5.25 \text{ V}$,	$I_{OL} = -0.24 \text{ mA}$		0.15	V
			$V_{IL} = 0.8 \text{ V}$,	$R_L = 56.9 \Omega$		
		$V_{IH} = 4.5 \text{ V}$				
I_{IH}	High-level input current	$V_{CC} = 5.25 \text{ V}$,	$V_{IH} = 2.7 \text{ V}$		20	μA
				DE	60	
I_{IL}	Low-level input current	$V_{CC} = 5.25 \text{ V}$,	$V_{IH} = 0.4 \text{ V}$		-400	μA
				DE	-1200	
I_{OH}	High-level output current	$V_{CC} = 4.75 \text{ V}$,	$V_{IL} = 0$		100	μA
		$V_{OH} = 5 \text{ V}$	$V_{IH} = 4.5 \text{ V}$		100	
I_{OS}	Short-circuit output current ⁽¹⁾	$V_{CC} = 5.25 \text{ V}$	$V_{IH} = 4.5 \text{ V}$		-30	mA
I_{CCH}	Supply current (total package)	$V_{CC} = 5.25 \text{ V}$,	$V_{I(D)} = 4.5 \text{ V}$,		47	mA
I_{CCL}			$V_{I(R)} = 0$			
		No load	$V_{I(D)} = 0$,		80	
			$V_{I(R)} = 4.5 \text{ V}$			

(1) Not more than one output should be shorted at a time, and duration of the short circuit should not exceed one second.

Switching Characteristics

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

PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low- to high-level output	$R_L = 47.5 \Omega$,	See Figure 1	6.5	12	18.5	ns
t_{PHL}	Propagation delay time, high- to low-level output			6.5	12	18.5	ns
Δt_{pd}	Differential propagation delay time ⁽¹⁾					10	ns
t_r	Output rise time	$V_{CC} = 5 \text{ V}$,	$V_O = 0.15 \text{ V}$ to 3.05 V ,	5	10		ns
		$R_L = 47.5 \Omega$,	V_i				
t_f	Output fall time	See Figure 1	$C_L = 10.2 \text{ pF}$,	5	13		ns
SR	Slew rate	$V_O = 1 \text{ V}$ to 3 V average,	$C_L = 10.2 \text{ pF}$,			0.65	V/ns
		$R_L = 47.5 \Omega$,	See Figure 1				

(1) $\Delta t_{pd} = |t_{PLH} - t_{PHL}|$

RECEIVER SECTION

Electrical Characteristics

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

PARAMETER		TEST CONDITIONS		MIN	MAX	UNIT
V_{OH}	High-level output voltage	$V_{CC} = 4.75\text{ V}$, $I_{OH} = -400\ \mu\text{A}$	$V_I = 1.15\text{ V}$,	2.7		V
V_{OL}	Low-level output voltage	$V_{CC} = 4.75\text{ V}$, $V_{IH} = 1.55\text{ V}$	$I_{OL} = 8\text{ mA}$		0.5	V
			$I_{OL} = 4\text{ mA}$		0.4	
r_i	Input resistance	$V_{CC} = 0$,	$V_I = 0.15\text{ V to }3.9\text{ V}$	7.4	20	k Ω
I_{IH}	High-level input current	$V_{CC} = 4.75\text{ V}$,	$V_{IH} = 3.11\text{ V}$		0.42	mA
I_{IL}	Low-level input current	$V_{CC} = 5.25\text{ V}$,	$V_{IL} = 0.15\text{ V}$	-0.24	0.04	mA
$I_{OS}^{(1)}$	Short-circuit output current	$V_{CC} = 5.25\text{ V}$,	$V_{IL} = 0$	-20	-100	mA
I_{CCH}	Supply current (total package)	$V_{CC} = 5.25\text{ V}$, No load	$V_{I(D)} = 4.5\text{ V}$, $V_{I(R)} = 0$		47	mA
I_{CCL}			$V_{I(D)} = 0$, $V_{I(R)} = 4.5\text{ V}$		80	

(1) Not more than one output should be shorted at a time, and duration of the short circuit should not exceed one second.

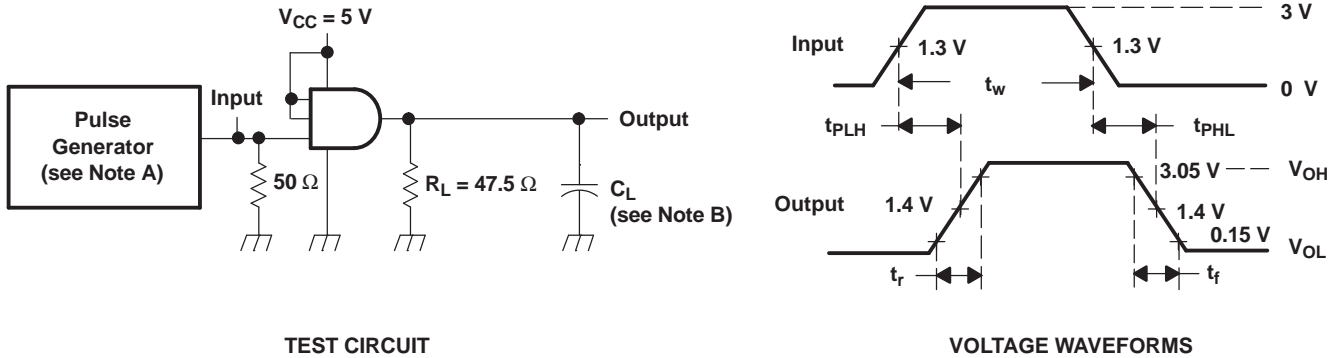
Switching Characteristics

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

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low- to high-level output	$R_L = 2\text{ k}\Omega$, $C_L = 15\text{ pF}$, See Figure 2	7.5	12	19.5	ns
t_{PHL}	Propagation delay time, high- to low-level output		7.5	12	19.5	ns
$\Delta t_{pd}^{(1)}$	Differential propagation delay time				10	ns

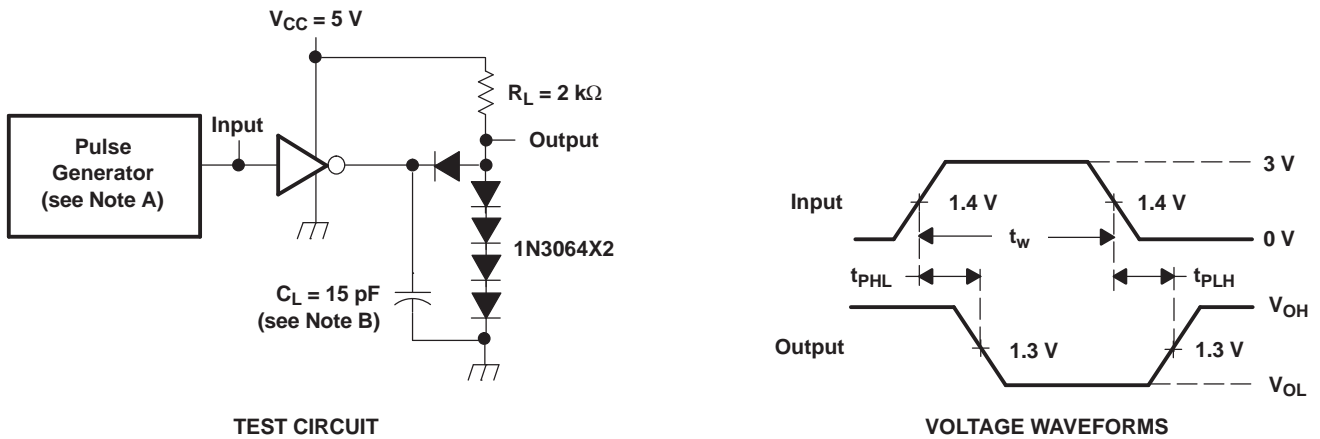
(1) $\Delta t_{pd} = |t_{PLH} - t_{PHL}|$

PARAMETER MEASUREMENT INFORMATION



NOTES: A. The pulse generator has the following characteristics: $Z_O \approx 50 \Omega$, $t_w \leq 500$ ns, $PRR \leq 1$ MHz, $t_f \leq 6$ ns, $t_r \leq 15$ ns.
B. C_L includes probe and jig capacitance.

Figure 1. Driver Test Circuit and Voltage Waveforms



NOTES: A. The pulse generator has the following characteristics: $Z_O \approx 50 \Omega$, $t_w \leq 500$ ns, $PRR \leq 1$ MHz, $t_f \leq 10$ ns, $t_r \leq 10$ ns.
B. C_L includes probe and jig capacitance.

Figure 2. Receiver Test Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN751730D	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN751730DE4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN751730DG4	ACTIVE	SOIC	D	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN751730DR	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN751730DRE4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN751730DRG4	ACTIVE	SOIC	D	16	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN751730N	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN751730NE4	ACTIVE	PDIP	N	16	25	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
SN751730NSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN751730NSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN751730NSRG4	ACTIVE	SO	NS	20	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), 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)

⁽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.

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
SN751730DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN751730NSR	SO	NS	20	2000	330.0	24.4	8.2	13.0	2.5	12.0	24.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN751730DR	SOIC	D	16	2500	333.2	345.9	28.6
SN751730NSR	SO	NS	20	2000	346.0	346.0	41.0

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

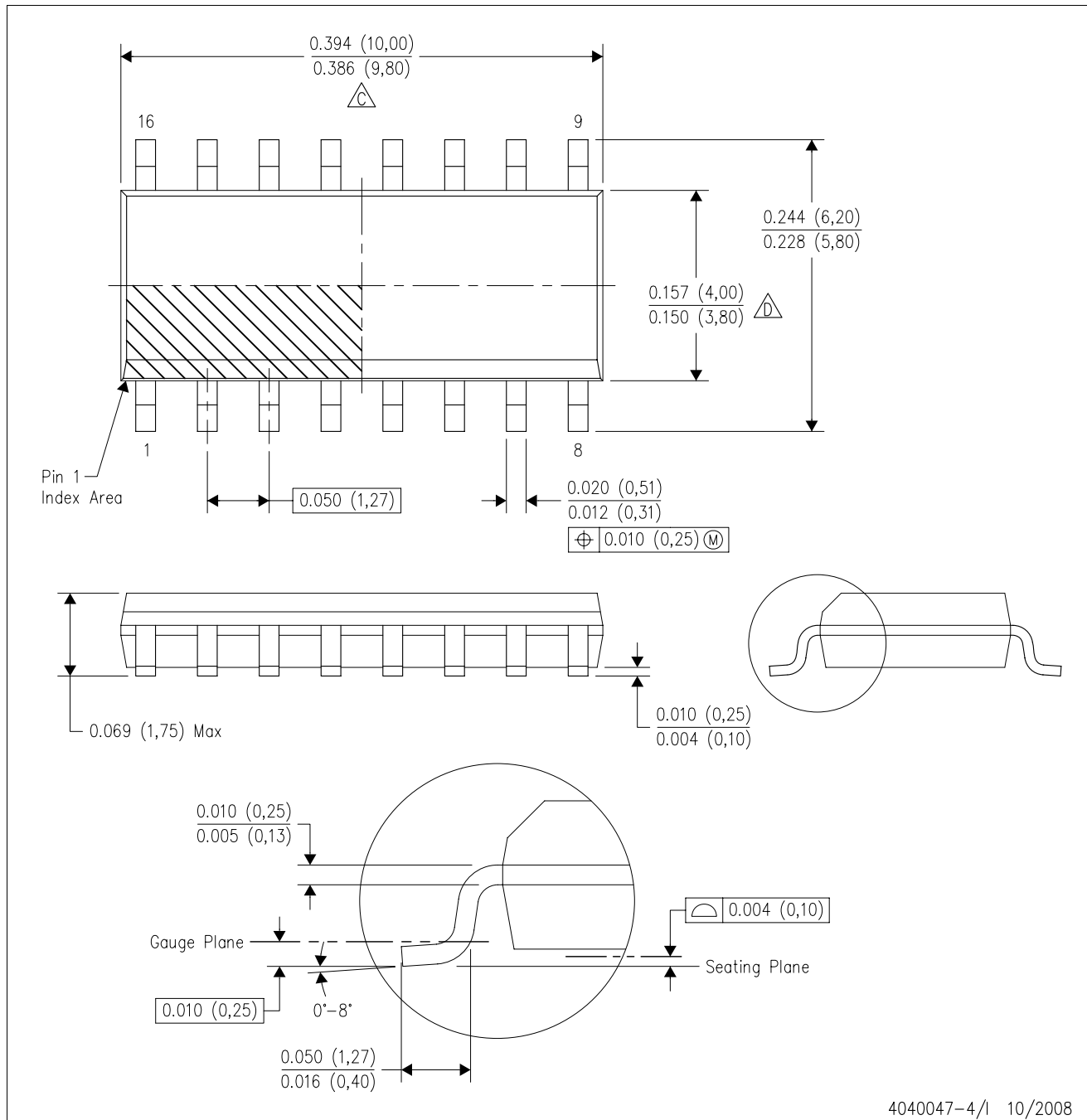
14-PINS SHOWN



- 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 (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.

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.
 - 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.

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	amplifier.ti.com
Data Converters	dataconverter.ti.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
RF/IF and ZigBee® Solutions	www.ti.com/lprf

Applications

Audio	www.ti.com/audio
Automotive	www.ti.com/automotive
Broadband	www.ti.com/broadband
Digital Control	www.ti.com/digitalcontrol
Medical	www.ti.com/medical
Military	www.ti.com/military
Optical Networking	www.ti.com/opticalnetwork
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 © 2008, Texas Instruments Incorporated