TEXAS INSTRUMENTS

SN75ALS192
SLLS007E – JULY 1985 – REVISED MARCH 2024

SN75ALS192 Quadruple Differential Line Driver

1 Features

- Meets or Exceeds the Requirements of ANSI Standard EIA/TIA-422-B and ITU Recommendation V.11
- Designed to Operate up to 20 Mbaud
- 3-State TTL Compatible
- Single 5V Supply Operation
- High Output Impedance in Power-Off Condition
- Complementary Output-Enable Inputs
- Improved Replacement for the AM26LS31

2 Applications

- Factory automation
- ATM and cash counters
- Smart grid
- AC and servo motor drives

3 Description

The four differential line drivers are designed for data transmission over twisted-pair or parallel-wire transmission lines. They meet the requirements of ANSI Standard EIA/TIA-422-B and ITU Recommendations V.11 and are compatible with 3-state TTL circuits. Advanced low-power Schottky technology provides high speed without the usual power penalties. Standby supply current is typically only 26mA, while typical propagation delay time is less than 10ns.

High-impedance inputs maintain low input currents, less than µA for a high level and less than 100µA for a low level. Complementary output-enable inputs (G and $\overline{G}$) allow these devices to be enabled at either a high input level or low input level. The SN75ALS192 is capable of data rates in excess of 20 Mbit/s and is designed to operate with the SN75ALS193 quadruple line receiver.
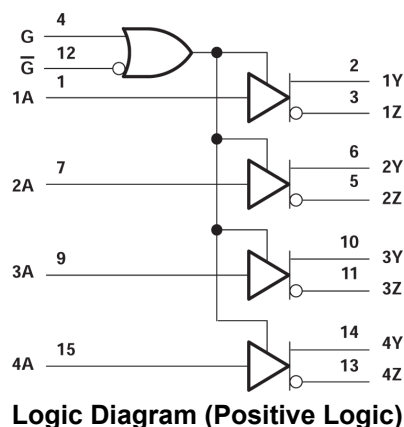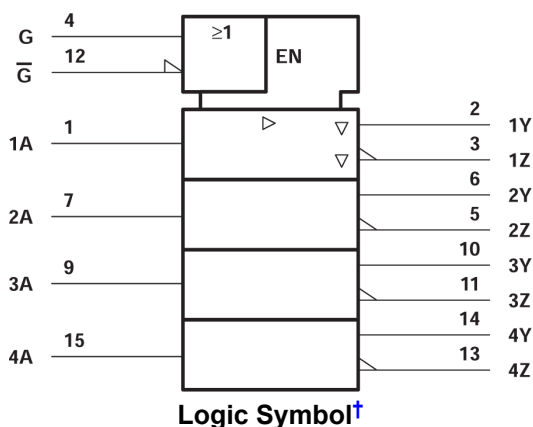
The SN75ALS192 is characterized for operation from 0°C to 70°C.

Package Information

PART NUMBER	PACKAGE[1]	PACKAGE SIZE[2]
SN75ALS192	SOIC (D, 16)	9.9mm × 6mm
	SO (NS, 16)	10.2mm × 7.8mm

(1) For more information, see Section 10.
(2) The package size (length × width) is a nominal value and includes pins, where applicable.

Logic Symbol†

Logic Diagram (Positive Logic)

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

Table of Contents

[†]   Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

4 Pin Configuration and Functions

```
        ┌───∪───┐
   1A ──┤ 1   16 ├── V_CC
   1Y ──┤ 2   15 ├── 4A
   1Z ──┤ 3   14 ├── 4Y
    G ──┤ 4   13 ├── 4Z
   2Z ──┤ 5   12 ├── G̅
   2Y ──┤ 6   11 ├── 3Z
   2A ──┤ 7   10 ├── 3Y
  GND ──┤ 8    9 ├── 3A
        └───────┘
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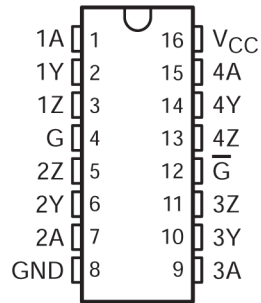
Figure 4-1. D or NS Package
(Top View)

Table 4-1. Pin Functions

PIN		TYPE[1]	DESCRIPTION
NAME	NO.		
1A	1	I	Single Ended Data Input for Channel 1
1Y	2	O	Non-Inverting Output for Differential Driver on Channel 1
1Z	3	O	Inverting Output of Differential Driver on Channel 1
G	4	I	Active High Enable Input (OR'd with G̅)
2Z	5	O	Inverting Output of Differential Driver on Channel 2
2Y	6	O	Non-Inverting Output for Differential Driver on Channel 2
2A	7	I	Single Ended Data Input for Channel 2
GND	8	GND	Device Ground
3A	9	I	Single Ended Data Input for Channel 3
3Y	10	O	Non-Inverting Output for Differential Driver on Channel 3
3Z	11	O	Inverting Output of Differential Driver on Channel 3
G̅	12	I	Active Low Enable Input (OR'd with G)
4Z	13	O	Inverting Output of Differential Driver on Channel 4
4Y	14	O	Non-Inverting Output for Differential Driver on Channel 4
4A	15	I	Single Ended Data Input for Channel 4
V_CC	16	P	5V Power Supply Positive Terminal Connection

(1)   Signal Types: I = Input, O = Output, I/O = Input or Output, P = Power, GND = Ground.

5 Specifications

5.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted) [1]

		MIN	MAX	UNIT
V_{CC}	Supply voltage (see Note [2])		7	V
V_I	Input voltage		7	V
	Off-state output voltage		6	V
	Continuous total dissipation	See Dissipation Rating Table		
T_{stg}	Storage temperature range	–65	150	°C
	Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds		260	°C

(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 except differential output voltage, V_{OD}, are with respect to network ground terminal.

5.2 Dissipation Rating Table

PACKAGE	$T_A \le 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING	$T_A = 125°C$ POWER RATING
D	950 mW	7.6 mW/°C	608 mW	N/A
N	1150 mW	9.2 mW/°C	736 mW	N/A

5.3 Recommended Operating Conditions

		MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}		4.75	5	5.25	V
High level input voltage, V_{IH}		2			V
Low-level input voltage, V_{IL}				0.8	V
High-level output current, I_{OH}				–20	mA
Low-level output current, I_{OL}				20	mA
Operating free-air temperature, T_A		0		70	°C

5.4 Thermal Information

THERMAL METRIC[1]		D (SOIC)	NS (SOP)	UNIT
		16-PINS		
$R_{\theta JA}$	Junction-to-ambient thermal resistance	84.6	88.5	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	43.5	46.2	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	43.	50.	°C/W
Ψ_{JT}	Junction-to-top characterization parameter	10.4	13.5	°C/W
Ψ_{JB}	Junction-to-board characterization parameter	42.8	50.3	°C/W
$R_{\theta JC(bot)}$	Junction-to-case (bottom) thermal resistance	N/A	N/A	°C/W

(1) For more information about traditional and new thermal metrics, see the *Semiconductor and IC package thermal metrics* application report.

5.5 Electrical Characteristics

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

PARAMETER		TEST CONDITIONS[1]		MIN TYP[2]	MAX	UNIT
V_{IK}	Input clamp voltage	V_{CC} = MIN,	I_I = –18mA		−1.5	V
V_{OH}	High-level output voltage	V_{CC} = MIN,	I_{OH} = –20mA	2.5		V
V_{OL}	Low-level output voltage	V_{CC} = MIN,	I_{OL} = 20mA		0.5	V
V_O	Output voltage	V_{CC} = MAX,	I_O = 0	0 6		V
$|V_{OD1}|$	Differential output voltage	V_{CC} = MIN,	I_O = 0	1.5 6		V
$|V_{OD2}|$	Differential output voltage	R_L = 100Ω,	See Figure 6-1	1/2 V_{OD1} or 2[3]		V
$\Delta|V_{OD}|$	Change in magnitude of differential output voltage[4]	R_L = 100Ω,	See Figure 6-1		±0.2	V
V_{OC}	Common-mode output voltage[5]	R_L = 100Ω,	See Figure 6-1		±3	V
$\Delta|V_{OC}|$	Change in magnitude of common-mode output voltage[4]	R_L = 100Ω,	See Figure 6-1		±0.2	V
I_O	Output current with power off	V_{CC} = 0	V_O = 6V		100	
			V_O = −0.25V		−100	µA
I_{OZ}	Off state (high impedance state) output current	V_{CC} = MAX	V_O = 0.5V		−20	
			V_O = 2.5V		20	µA
I_I	Input current at maximum input voltage	V_{CC} = MAX,	V_I = 7V		100	µA
I_{IH}	High-level input current	V_{CC} = MAX,	V_I = 2.7V		20	µA
I_{IL}	Low-level input current	V_{CC} = MAX,	V_I = 0.4V		−200	µA
I_{OS}	Short-circuit output current[6]	V_{CC} = MAX		−30 −150		mA
I_{CC}	Supply current (all drivers)	V_{CC} = MAX,	All outputs disabled	26	45	mA

(1)   For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
(2)   All typical values are at V_{CC} = 5 V and T_A = 25°C.
(3)   The minimum V_{OD2} with a 100-Ω load is either 1/2 V_{OD1} or 2 V, whichever is greater.
(4) $|V_{OD}|$ and $|V_{OC}|$ are the changes in magnitude of V_{OD} and V_{OC}, respectively, that occur when the input is changed from a high level to a low level.
(5)   In ANSI Standard EIA/TIA-422-B, V_{OC}, which is the average of the two output voltages with respect to ground, is called output offset voltage, V_{OS}.
(6)   Not more than one output should be shorted at a time, and duration of the short circuit should not exceed one second.

5.6 Switching Characteristics

V_{CC} = 5 V, T_A = 25°C (see Figure 6-2)

| PARAMETER		TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	S1 and S2 open,	C_L = 30 pF		6	13	ns
t_{PHL}	Propagation delay time, high-to-low-level output	S1 and S2 open,	C_L = 30 pF		9	14	ns
	Output-to-output skew	S1 and S2 open,	C_L = 30 pF		3	6	ns
t_{PZH}	Output enable time to high level	S1 open and S2 closed			11	15	ns
t_{PZL}	Output enable time to low level	S1 closed and S2 open			16	20	ns
t_{PHZ}	Output disable time from high level	S1 open and S2 closed,	C_L = 10 pF		8	15	ns
t_{PLZ}	Output disable time from low level	S1 and S2 closed,	C_L = 10 pF		18	20	ns

Product Folder Links: SN75ALS192

5.7 Typical Characteristics†
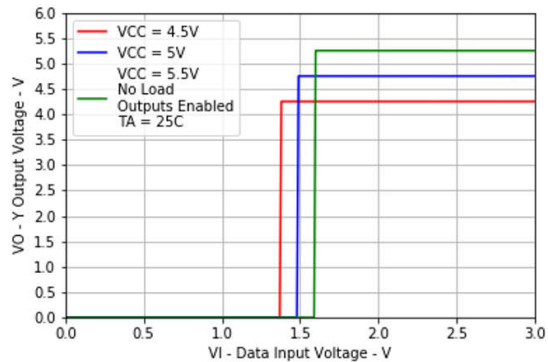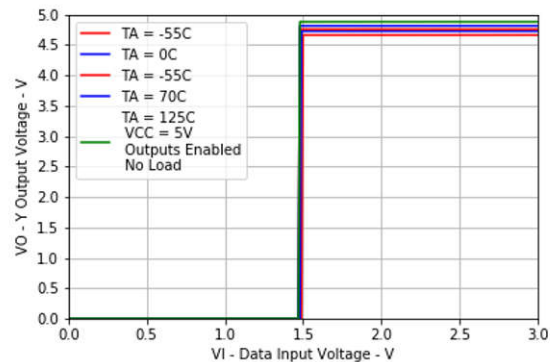

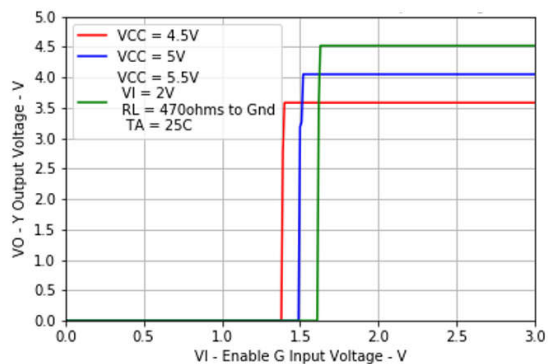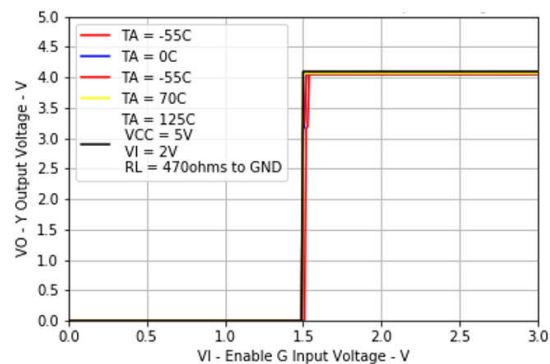Figure 5-1. Y Output Voltage vs Data Input Voltage

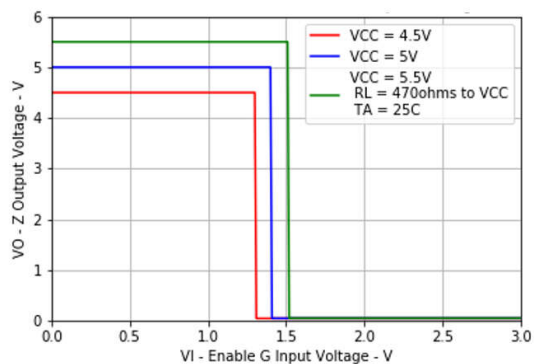Figure 5-2. Y Output Voltage vs Data Input Voltage

The A input is connected to V_{CC} during the testing of the Y outputs and to ground during the testing of the Z outputs.
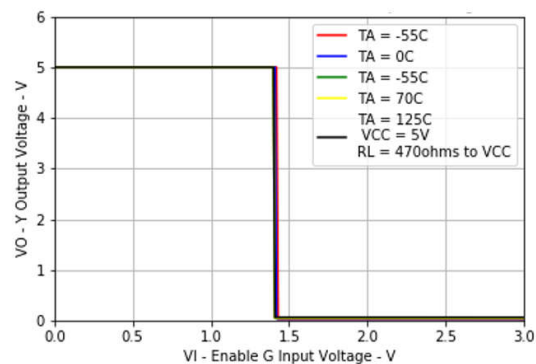Figure 5-3. Y Output Voltage vs Enable G Input Voltage

The A input is connected to V_{CC} during the testing of the Y outputs and to ground during the testing of the Z outputs.
Figure 5-4. Y Output Voltage vs Enable G Input Voltage

The A input is connected to V_{CC} during the testing of the Y outputs and to ground during the testing of the Z outputs.
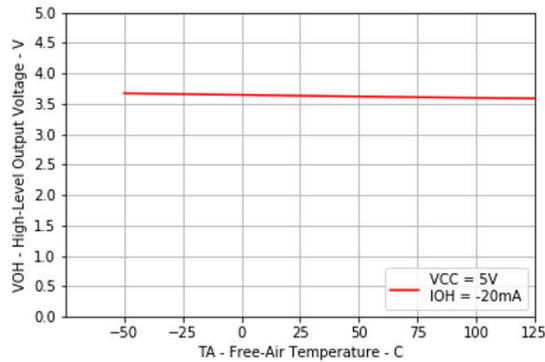Figure 5-5. Z Output Voltage vs Enable G Input Voltage

The A input is connected to GND during the testing of the Y outputs and to V_{CC} during the testing of the Z outputs.
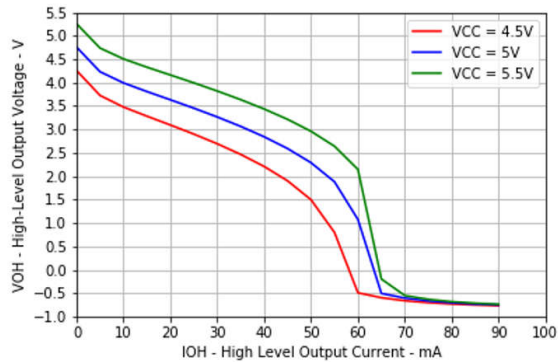Figure 5-6. Z Output Voltage vs Enable G Input Voltage

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† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.
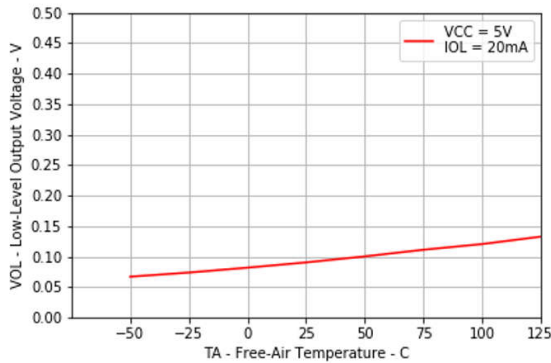
Product Folder Links: *SN75ALS192*

5.7 Typical Characteristics† (continued)

The A input is connected to V_{CC} during the testing of the Y outputs and to ground during the testing of the Z outputs.

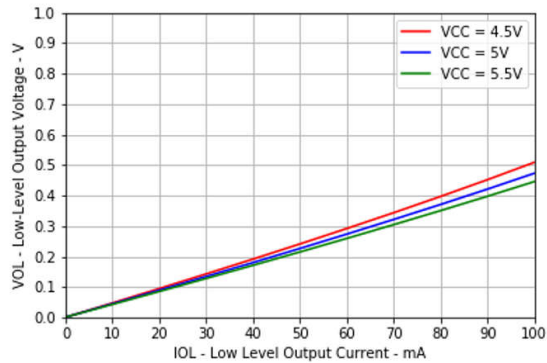**Figure 5-7. High-level Output Voltage vs Free-air Temperature**

The A input is connected to V_{CC} during the testing of the Y outputs and to ground during the testing of the Z outputs.

Figure 5-8. High-level Output Voltage vs Output Current

The A input is connected to GND during the testing of the Y outputs and to V_{CC} during the testing of the Z outputs.

Figure 5-9. Low-level Output Voltage vs Free-air Temperature

The A input is connected to GND during the testing of the Y outputs and to V_{CC} during the testing of the Z outputs.

Figure 5-10. Low-level Output Voltage vs Low-level Output Current

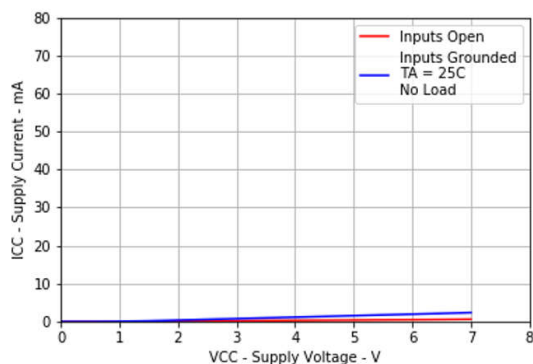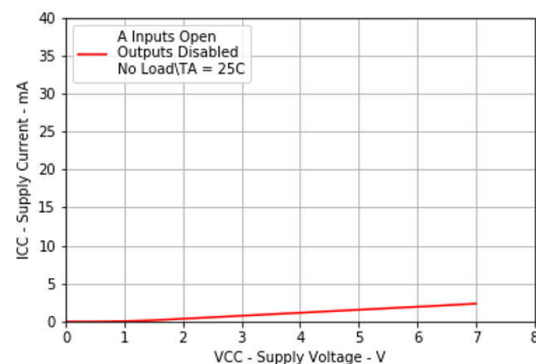**Figure 5-11. Supply Current vs Supply Voltage**

Figure 5-12. Supply Current vs Supply Voltage

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† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

5.7 Typical Characteristics† (continued)
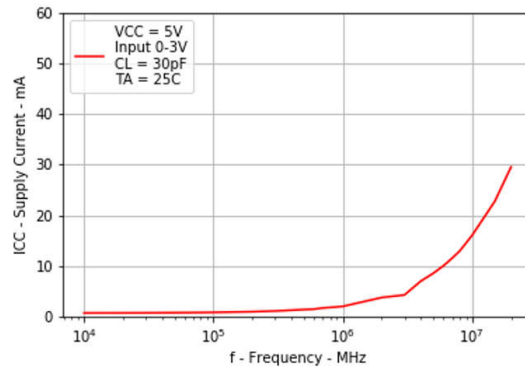
Figure 5-13. Supply Current vs Frequency

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† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.
† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.
† Operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied.

6 Parameter Measurement Information
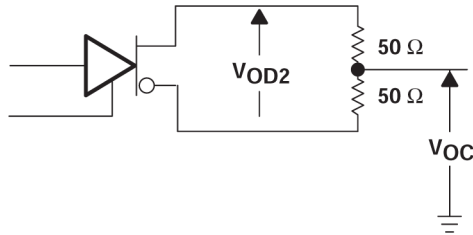
Figure 6-1. Differential and Common-Mode Output Voltages

VOLTAGE WAVEFORMS
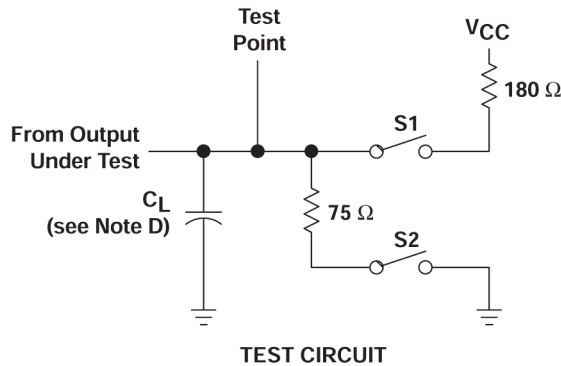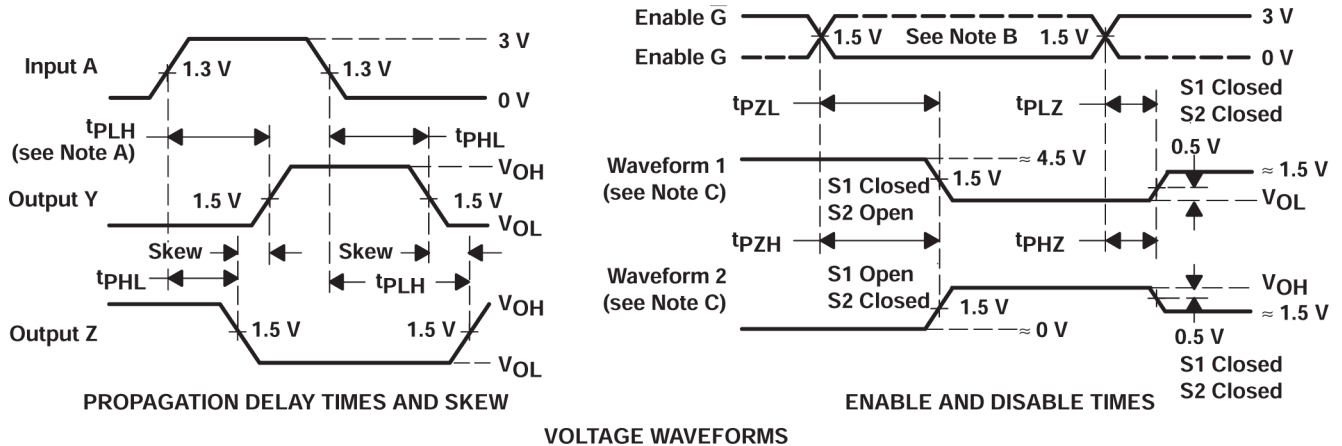
TEST CIRCUIT

A. When measuring propagation delay times and skew, switches S1 and S2 are open.
B. Each enable is tested separately.
C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
D. C_L includes probe and jig capacitance.
E. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, $Z_O ≈ 50\ \Omega$, $t_r ≤ 15$ ns, and $t_f ≤ 6$ ns.

Figure 6-2. Test Circuit and Voltage Waveforms

7 Device Functional Modes

Table 7-1. Function Table (Each Driver)

INPUT[1]	ENABLES		OUTPUTS	
A	G	$\overline{G}$	Y	Z
H	H	X	H	L
L	H	X	L	H
H	X	L	H	L
L	X	L	L	H
X	L	H	Z	Z

(1)   H = high level, L = low level, X = irrelevant, Z = high impedance (off)
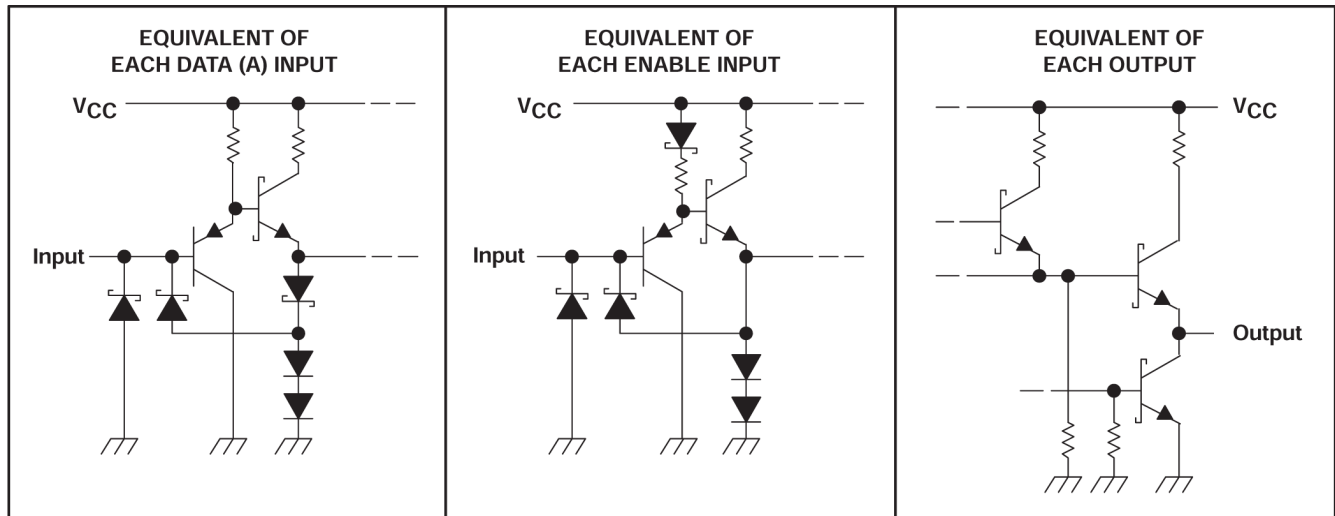
Figure 7-1. Schematics of Inputs and Outputs

Product Folder Links: *SN75ALS192*

8 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

8.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. Click on *Notifications* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

8.2 Support Resources

TI E2E™ support forums are an engineer's go-to source for fast, verified answers and design help — straight from the experts. Search existing answers or ask your own question to get the quick design help you need.

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8.3 Trademarks

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All trademarks are the property of their respective owners.

8.4 Electrostatic Discharge Caution

This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

8.5 Glossary

TI Glossary   This glossary lists and explains terms, acronyms, and definitions.

9 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Revision D (April 1998) to Revision E (March 2024)	Page
• Changed the numbering format for tables, figures, and cross-references throughout the document................ 1	

10 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SN75ALS192D	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI	0 to 70	75ALS192	
SN75ALS192DR	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	75ALS192	Samples
SN75ALS192N	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	SN75ALS192N	Samples
SN75ALS192NE4	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	SN75ALS192N	Samples
SN75ALS192NSR	ACTIVE	SO	NS	16	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	75ALS192	Samples

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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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.

PACKAGE MATERIALS INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS

TAPE DIMENSIONS

A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

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
SN75ALS192DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN75ALS192NSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	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)
SN75ALS192DR	SOIC	D	16	2500	340.5	336.1	32.0
SN75ALS192NSR	SO	NS	16	2000	356.0	356.0	35.0

TUBE

T - Tube height

L - Tube length

W - Tube width

B - Alignment groove width

*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
SN75ALS192D	D	SOIC	16	40	507	8	3940	4.32
SN75ALS192N	N	PDIP	16	25	506	13.97	11230	4.32
SN75ALS192NE4	N	PDIP	16	25	506	13.97	11230	4.32

D (R−PDSO−G16)   PLASTIC SMALL OUTLINE

0.394 (10,00)
0.386 (9,80)
△C

16   9

0.244 (6,20)
0.228 (5,80)

0.157 (4,00)
0.150 (3,80)   △D

1   8

Pin 1
Index Area

0.050 (1,27)

0.020 (0,51)
0.012 (0,31)

⊕ 0.010 (0,25) Ⓜ

0.069 (1,75) Max

0.010 (0,25)
0.004 (0,10)

0.010 (0,25)
0.005 (0,13)

0.004 (0,10)

Gauge Plane

Seating Plane

0.010 (0,25)   0°–8°

0.050 (1,27)
0.016 (0,40)

4040047-6/M   06/11
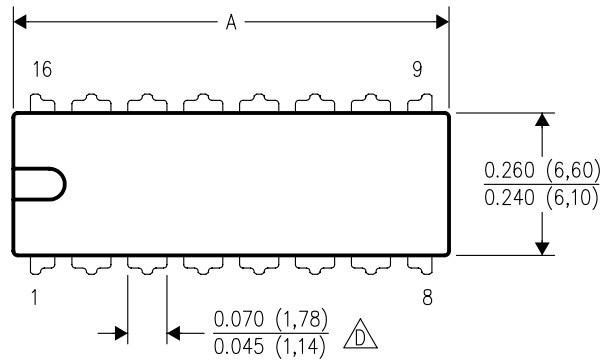
NOTES: A. All linear dimensions are in inches (millimeters).
         B. This drawing is subject to change without notice.
        △C Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall
             not exceed 0.006 (0,15) each side.
        △D Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
         E. Reference JEDEC MS−012 variation AC.

MECHANICAL DATA

1,27

0,51 / 0,35   ⊕ 0,25 Ⓜ

14

8

5,60 / 5,00   8,20 / 7,40

1

7

A

0,15 NOM

Gage Plane

0,25

0°–10°

1,05 / 0,55

0,15 / 0,05

2,00 MAX

Seating Plane

△ 0,10

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.

N (R−PDIP−T**)   PLASTIC DUAL−IN−LINE PACKAGE

16 PINS SHOWN

DIM \ PINS **	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 △C	AA	BB	AC	AD

A

16   9

0.260 (6,60)
0.240 (6,10)

1   8

0.070 (1,78)
0.045 (1,14) △D

0.045 (1,14)
0.030 (0,76) △D

0.020 (0,51) MIN

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.100 (2,54)

0.021 (0,53)
0.015 (0,38)

⊕ 0.010 (0,25) Ⓜ

14/18 Pin Only
20 Pin vendor option △D

0.325 (8,26)
0.300 (7,62)

0.015 (0,38)

Gauge Plane

0.010 (0,25) NOM

0.430 (10,92) MAX
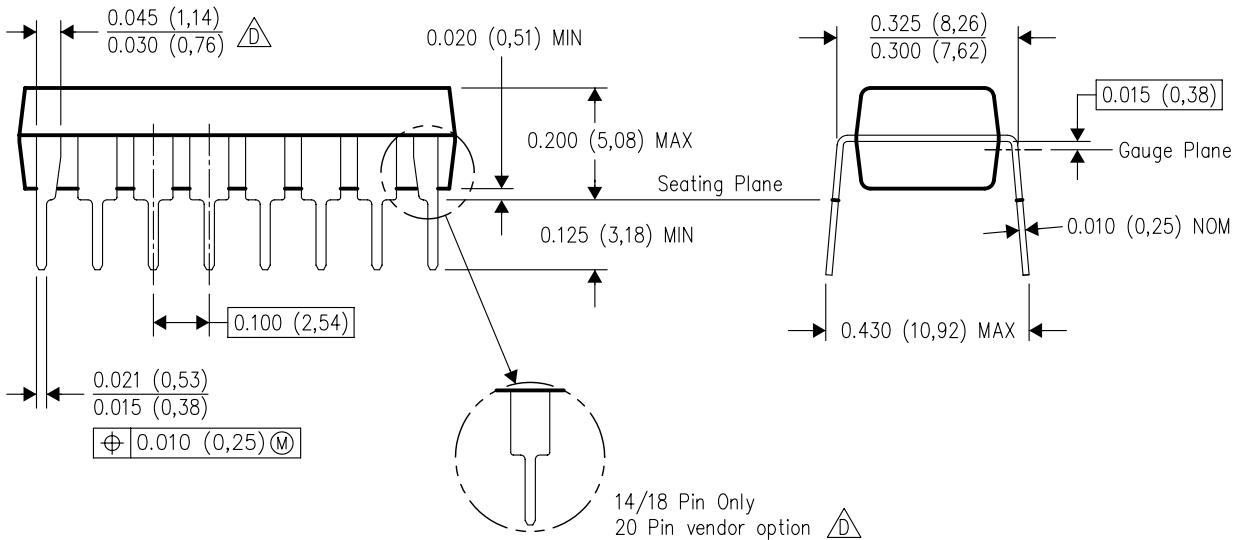
4040049/E 12/2002

NOTES: A. All linear dimensions are in inches (millimeters).
        B. This drawing is subject to change without notice.
        △C Falls within JEDEC MS−001, except 18 and 20 pin minimum body length (Dim A).
        △D The 20 pin end lead shoulder width is a vendor option, either half or full width.

8.2
7.4 TYP

A

PIN 1 ID
AREA

1

16

14X 1.27

10.4
10.0
NOTE 3

2X
8.89

8

9

B

5.4
5.2
NOTE 4

16X 0.51
0.35

⊕ 0.25Ⓜ C A B

C

SEATING PLANE

⌒ 0.1 C

2.00 MAX

SEE DETAIL A

0.15 TYP

0.25
GAGE PLANE

0.3
0.1

0° - 10°

1.05
0.55

(1.25)

DETAIL A
TYPICAL

4220735/A   12/2021

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 0.25 mm, per side.

16X (1.85)

SYMM

SEE DETAILS

1

16

16X (0.6)

SYMM

14X (1.27)

8

9

(R0.05) TYP

(7)

LAND PATTERN EXAMPLE
SCALE:7X

METAL

SOLDER MASK OPENING

SOLDER MASK OPENING

METAL

0.07 MAX ALL AROUND

0.07 MIN ALL AROUND

NON SOLDER MASK DEFINED

SOLDER MASK DEFINED

SOLDER MASK DETAILS

4220735/A   12/2021

NOTES: (continued)

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

16X (1.85)

1

16X (0.6)

SYMM ℄

SYMM ℄

16

9

14X (1.27)

8

(R0.05) TYP

(7)

SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:7X

4220735/A   12/2021

NOTES: (continued)

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

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