

钍地半导体
Tudi Semiconductor

Product Specification

TUDI-SN75ALS174A

Quad differential line driver

网址 www.sztdbdt.com

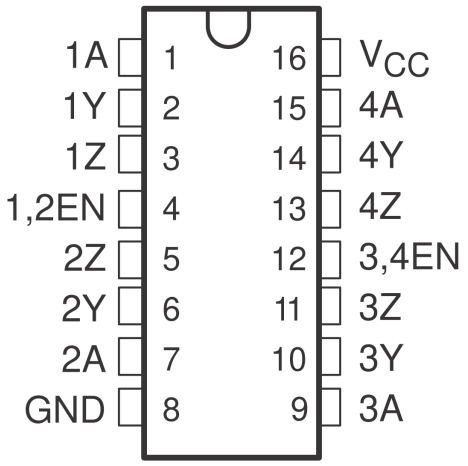
用芯智造·卓越品质

semiconductor device manufacturer

- Design
- research and development
- production
- and sales

Features

● Complies with or exceeds ANSI EIA/TIA-422-B and RS-485 requirements
● High-speed, low-power Schottky circuitry
●Designed to achieve 20 Mbit/s operating speeds in serial and parallel applications
●Suitable for multi-point transmission on long buses in noisy
●Low supply current, up to 55 mA
● Wide positive and negative input/output bus voltage range
● Driver output capability: 60 mA
● Thermal protection
● Driver positive and negative current limiting
●Functionally interchangeable with SN75174



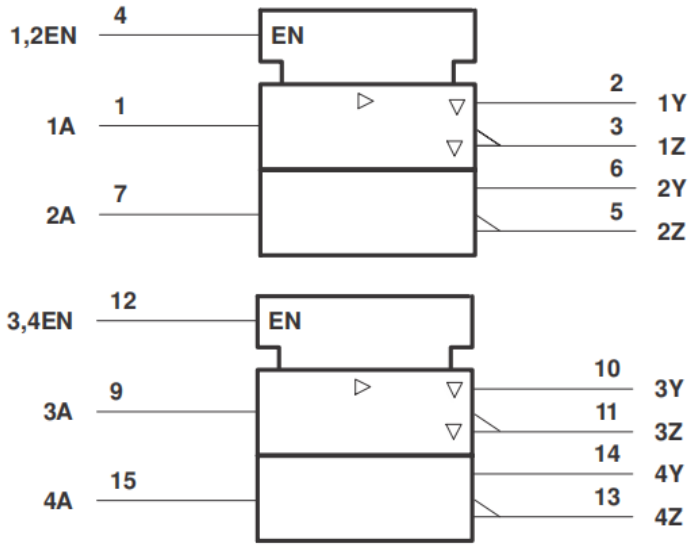
N Package (Top View)

Applications

●Motor drives
●Factory automation and control

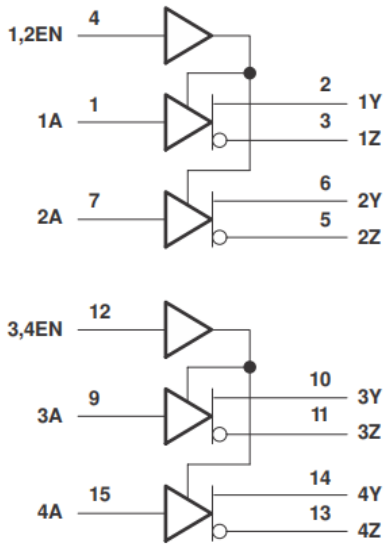
Description

The SN75ALS174A is a quad-line driver with three-state differential outputs, designed to meet the requirements of standards EIA/TIA-422-B and RS-485. This device is optimized to achieve balanced multi-point bus transmission at rates up to 20 Mbits.Each driver has a wide positive and negative common-mode output voltage range, making it suitable for twisted-pair applications in noisy environments.
The SN75ALS74A provides positive and negative current limiting and thermal shutdown functions to prevent line fault conditions on the transmission bus. Shutdown occurs at a junction temperature of approximately 150 ° .
The operating temperature range of the SN75ALS174A is 0 ° C to 70 ° C.



A. 所示引脚编号适用于 N 封装。

逻辑符号 [1]



A. 所示引脚编号适用于 N 封装。

逻辑图（正逻辑）

5 Specifications

5.1 Absolute Maximum Ratings

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

	MIN	MAX	UNIT
Supply voltage, V_{CC} (2)	-0.5	7	V
Input voltage, V_I	-0.5	7	V
Output voltage range, V_O	– 9	14	V
Continuous total dissipation	See the *Dissipation Rating* table		
Storage temperature, T_{stg}	– 65	150	°C

(1) Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) All voltage values are with respect to network GND.

5.2 Dissipation Rating Table

PACKAGE	$T_A \leqslant 25°C$ POWER RATING	DERATING FACTOR	$T_A = 70°C$ POWER RATING	$T_A = 85°C$ POWER RATING
DW	1125 mW	9.0 mW/°C	720 mW	596 mW
N	1150 mW	9.2 mW/°C	736 mW	598 mW

5.3 Recommended Operating Conditions

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

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	4.75	5	5.25	V
V_{IH}	High-level input voltage	2		V_{cc}	V
V_{IL}	Low-level input voltage	0		0.8	V
V_{OC}	Common-mode output voltage	-7		12	V
I_{OH}	High-level output current	0		- 60	mA
I_{OL}	Low-level output current	0		60	mA
T_A	Operating free-air temperature	0		70	°C

5.4 Thermal Information

THERMAL METRIC(1)		SN75ALS174A			UNIT
		N (PDIP)	DW (SOIC)	PW	
		16 PINS	20 PINS	20 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	60.6	66.8	107.5	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	48.1	34.4	38.4	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	40.6	39.7	53.7	°C/W
ψ_{JT}	Junction-to-top characterization parameter	27.5	8.9	3.2	°C/W
ψ_{JB}	Junction-to-board characterization parameter	40.3	39	53.1	°C/W
$R_{\theta JC(bot)}$	Junction-to-case (bottom) thermal resistance	n/a	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 operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS		MIN	TYP(1)	MAX	UNIT
V_{IK}	Input clamp voltage	I_I = －18mA				－1.5	V
V_O	Output voltage	I_O = 0		0		6	V
$\|V_{OD1}\|$	Differential output voltage	I_O = 0		1.5		6	V
$\|V_{OD2}\|$	Differential output voltage	R_L = 100 Ω	See Note 图 6-1	1/2 V_{OD1} or 2(2)			V
		R_L = 54 Ω		1.5	2.5	5	V
$\|V_{OD3}\|$	Differential output voltage	See (5)		1.5		5	V
$\Delta\|V_{OD}\|$	Change in magnitude of differential output voltage(3)	R_L = 54 Ω or 100 Ω	See 图 6-1			±0.2	V
V_{OC}	Common-mode output voltage(4)	R_L = 54 Ω or 100 Ω	See 图 6-1			3	V
						－1	V
$\Delta\|V_{OC}\|$	Change in magnitude of common-mode output voltage(3)	R_L = 54 Ω or 100 Ω	See 图 6-1			±0.2	V
I_O	Output current with power off	V_{CC} = 0, V_O = －7V to 12V				±100	μA
I_{OZ}	High-impedance-state output current	V_O = －7V to 12V				±100	μA
I_{IH}	High-level input current	V_I = 2.7V				20	μA
I_{IL}	Low-level input current	V_I = 0.4V				－100	μA
I_{OS}	Short-circuit output current	V_O = －7V to 12V				±250	mA
I_{CC}	Supply current (all drivers)	No load	Outputs enabled		36	55	mA
			Outputs disabled		16	30	mA

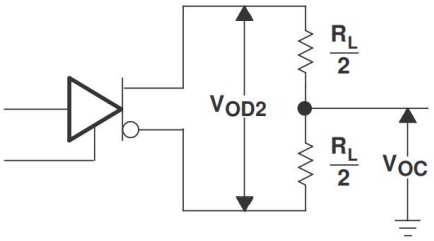
(1) All typical values are at V_{CC} = 5V and T_A = 25°C.
(2) The minimum V_{OD2} with a 100 Ω load is either 1/2V_{OD1} or 2V, whichever is greater.
(3) $\Delta|V_{OD}|$ and $\Delta|V_{OC}|$ are the changes in magnitude of V_{OD} and V_{OC}, respectively, that occur when the input is changed from a high level to a low level.
(4) 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}.
(5) See EIA Standard RS-485, Figures 3-5, Test Termination Measurement 2.

5.6 Switching Characteristics

over operating free-air temperature range (unless otherwise noted), C_L = 50pF

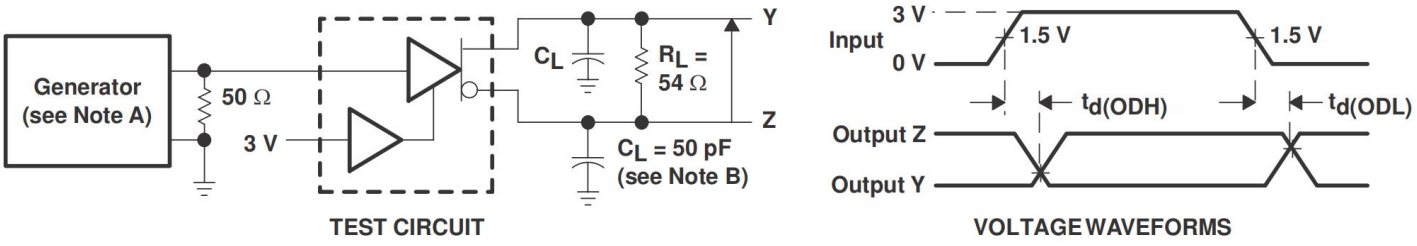
PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{d(OD)}$	Differential output delay time	R_L = 54 Ω, See 图 6-2	9	15	22	ns
t_{PZH}	Output enable time to high level	R_L = 110 Ω, See 图 6-3	30	45	70	ns
t_{PZL}	Output enable time to low level	R_L = 110 Ω, See 图 6-4	25	40	65	ns
t_{PHZ}	Output disable time from high level	R_L = 110 Ω, See 图 6-3	10	20	35	ns
t_{PLZ}	Output disable time from low level	R_L = 110 Ω, See 图 6-4	10	30	45	ns

6 Parameter Measurement Information



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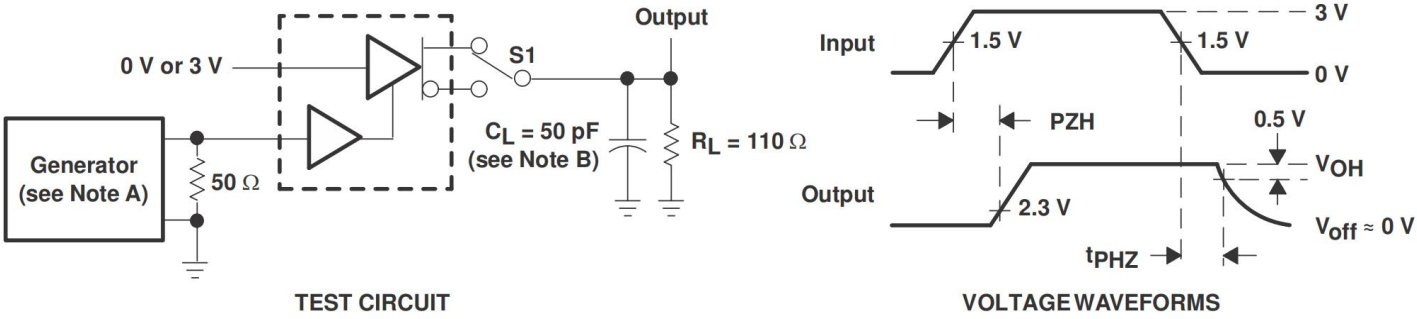
图 6-1. Differential and Common-Mode Output Voltages



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A. The input pulse is supplied by a generator having the following characteristics: PRR = 1MHz, Z_O = 50 Ω, duty cycle = 50%, t_f 5ns, t_r 5ns.
B. C_L includes probe and stray capacitance.

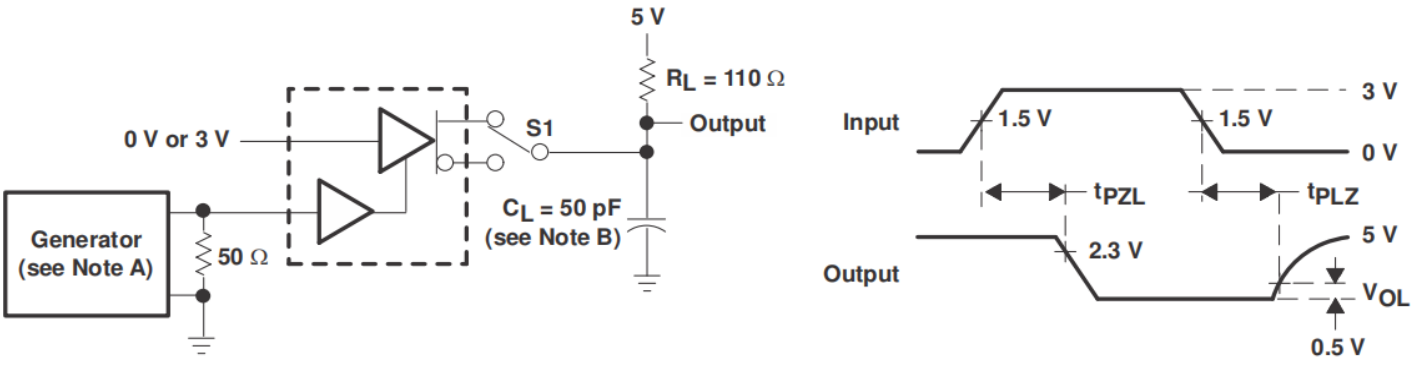
图 6-2. Differential-Output Test Circuit and Delay and Transition Times Voltage Waveforms



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A. The input pulse is supplied by a generator having the following characteristics: PRR = 1MHz, Z_O = 50 Ω, duty cycle = 50%, t_f 10ns, t_r 10ns.
B. C_L includes probe and stray capacitance.

图 6-3. Test Circuit and Voltage Waveforms, t_{PZH} and t_{PHZ}



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A. The input pulse is supplied by a generator having the following characteristics: PRR = 1MHz, Z_O = 50 Ω, duty cycle = 50%, t_f 5ns, t_r 5ns.
B. C_L includes probe and stray capacitance.

图 6-4. Test Circuit and Voltage Waveforms, t_{PZL} and t_{PLZ}

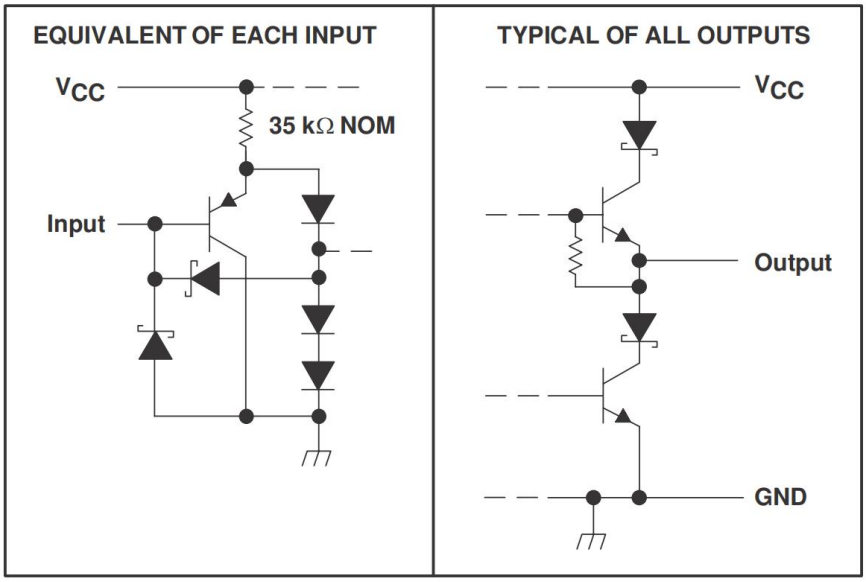
7 Detailed Description

7.1 Device Functional Modes

Function Table (each driver)

INPUT A(1) (2)	ENABLES	OUTPUTS	
		Y	Z
H	H	H	L
L	H	L	H
X	L	Z	Z

(1) H = high level, L = low level, X = irrelevant.
(2) Z = high impedance (off)



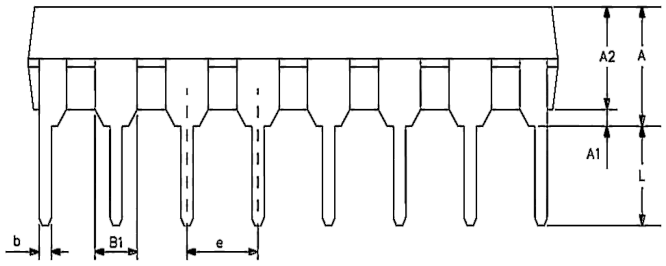
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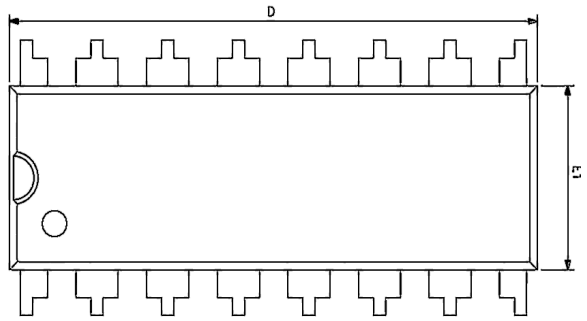
图 7-1. Schematics of Inputs and Outputs

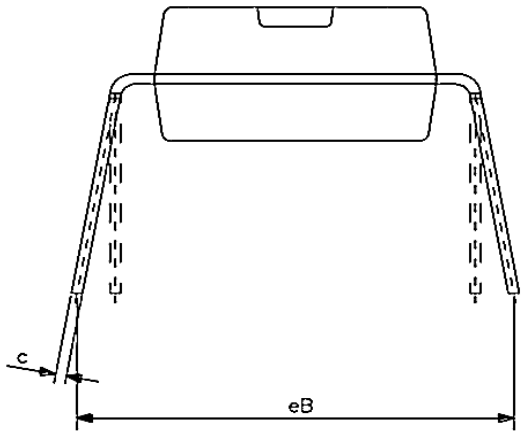
Order information

Order Number	Package	Package Quantity	Marking On The park
SN75ALS174AN-TUDI	DIP16	Tube,25,A box of 1000	SN75ALS174AN

Package DIP16







SIZE / SYMBOL	MIN./mm	MAX./mm
A2	3.20	3.60
A1	0.51	___
A	3.60	5.33
L	3.00	3.60
b	0.36	0.56
B1	1.52	
D	18.80	19.94
E1	6.20	6.60
e	2.54	
C	0.20	0.36
eB	7.62	9.30
R	0.20TYP	
R1	0.30TYP	
θ	0°	8°
θ1	45°TYP	
02	12°TYP	
03	0°	8°
04	0°	10°

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