June 1997-3

#### **FEATURES**

- Pin-to-Pin Compatible with National DS26C31C
- Low Power CMOS Design
- Three-State Outputs with Enable Pin

- Meets the EIA RS-422 Requirements
- Low Propagation Delays
- High Speed

#### **GENERAL DESCRIPTION**

The ST26C31 is a CMOS quad differential line driver designed to meet the standard RS-422 requirements and digital data transmission over balanced lines. To improve noise margin and output stability for slow changing input signals, special hysteresis is built in the ST26C31 circuit.

The ST26C31 is a high speed CMOS line driver designed to operate with MFM / RLL controllers and hard disk drives as well as RS-422 digital data transmission applications. ST26C31 is suitable for low power 5V operation with high input voltage protection devices.

# **ORDERING INFORMATION**

Part No.	Package	Operating Temperature Range
ST26C31CP16	16 Lead 300 Mil PDIP	0°C to +70°C
ST26C31CF16	16 Lead 150 Mil JEDEC SOIC	0°C to +70°C
ST26C31IP16	16 Lead 300 Mil PDIP	-40°C to +85°C
ST26C31IF16	16 Lead 150 Mil JEDEC SOIC	-40°C to +85°C

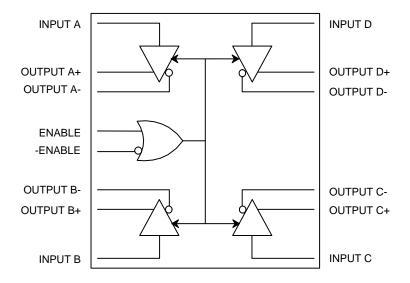
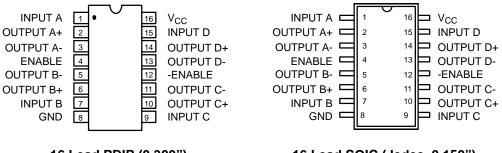


Figure 1. Block Diagram





## **PIN CONFIGURATION**



16 Lead PDIP (0.300")

16 Lead SOIC (Jedec, 0.150")

### **PIN DESCRIPTION**

Pin #	Symbol	Type	Description			
1	INPUT A	I	Driver A input pin.			
2	OUTPUT A+	0	Oriver A differential non-inverting output pin.			
3	OUTPUT A-	0	Driver A differential inverting output pin.			
4	ENABLE	I	Gate control (active high). This pin is one of the two control pins which enables or disables all four drivers. All four drivers are gated with two input or gate.			
5	OUTPUT B-	0	Driver B differential inverting output pin.			
6	OUTPUT B+	0	Driver B differential non-inverting output pin.			
7	INPUT B	ı	Oriver B input pin.			
8	GND	0	Signal and power ground.			
9	INPUT C	I	Priver C input pin.			
10	OUTPUT C+	0	Driver C differential non-inverting output pin.			
11	OUTPUT C-	0	Driver C differential inverting output pin.			
12	-ENABLE	I	Gate control (active low). See ENABLE pin description.			
13	OUTPUT D-	0	Driver D differential inverting output pin.			
14	OUTPUT D+	0	Driver D differential non-inverting output pin.			
15	INPUT D	I	Driver D input pin.			
16	V <sub>CC</sub>	ı	Power supply pin.			



# **AC ELECTRICAL CHARACTERISTICS**

Test Conditions:  $T_A = -40^{\circ}\text{C} - +85^{\circ}\text{C}$ ,  $V_{CC} = 5.0\text{V} \pm 10\%$  unless otherwise specified.

Symbol	Parameter	Min.	Тур.	Max.	Unit	Conditions
T <sub>1</sub>	Propagation Delay, Input to Output		8	10	ns	S1 open
T <sub>2</sub>	Differential Output Rise and Fall Time		8	10	ns	S1 open
T <sub>3</sub>	Output Enable Time		18	20	ns	S1 close
T <sub>4</sub>	Output Disable Time		18	20	ns	S1 close
T <sub>5</sub> <sup>1</sup>	Skew			2	ns	S1 open

Note

# DC ELECTRICAL CHARACTERISTICS

Test Conditions:  $T_A = -40^{\circ}\text{C} - +85^{\circ}\text{C}$ ,  $V_{CC} = 5.0\text{V} + 10\%$  unless otherwise specified.

Symbol	Parameter	Min.	Тур.	Max.	Unit	Conditions
I <sub>IN</sub>	Input Current			+1.0	μΑ	
I <sub>CC</sub>	Operating Current		600		μΑ	
I <sub>OZ</sub>	Three-State Output Leakage		+2.0		μΑ	
$V_{IH}$	Input High Level	2.0			V	
$V_{IL}$	Input Low Level			0.8	V	
V <sub>OH</sub>	Output High Level	2.5			V	
$V_{OL}$	Output Low Level			0.5	V	
Vos	Differential Output Level	2.0			V	$R_L$ =100 $\Omega$
V <sub>OC</sub>	Common Mode Output Voltage			3.0	V	$R_L$ =100 $\Omega$
V <sub>OD</sub>	Difference in Common Mode Output			0.4		$R_L=100\Omega$
C <sub>IN</sub>	Input Capacitance	7	10	15	pF	
C <sub>PD</sub>	Power Dissipation Capacitance		100		pF	
Ios	Output Short Current	-200		-30	mA	V <sub>IN</sub> =V <sub>CC</sub> or GND
I <sub>OFF</sub>	Output Leakage Current Power Off			100	μΑ	V <sub>OUT</sub> =6V
				-100	μΑ	V <sub>OUT</sub> =0.25V
I <sub>DC</sub>	Output Current			<u>+</u> 150	mA	

Specifications are subject to change without notice



<sup>&</sup>lt;sup>1</sup> Skew is defined as the difference in propagation delays between complementary outputs at the 50% point.



# **ABSOLUTE MAXIMUM RATINGS**

Supply Range7V	Storage Temperature	60°C to +160°C
Voltage at Any Pin GND-0.3V to V <sub>CC</sub> + 0.3V	Package Dissipation	500mW
Operating Temperature –40°C to +85°C		

Enable	-Enable	Input	Differential Non-Inverting Output	Differential Inverting Output
L	Н	X	Z	Z
L	L	L	L	Н
L	L	Н	Н	L
Н	L	L	L	Н
Н	L	Н	Н	L
Н	Н	L	L	Н
Н	Н	Н	Н	L

### Notes

X = Don't care Z = Three-State (high impedance)

**Table 1. Functional Table** 

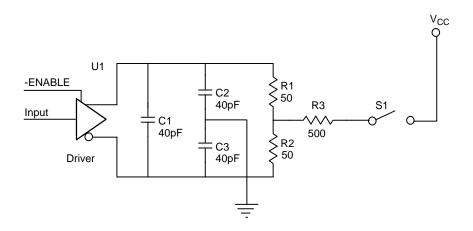
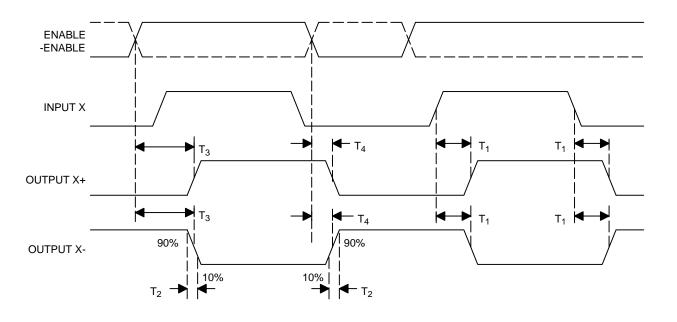


Figure 2. Test Condition





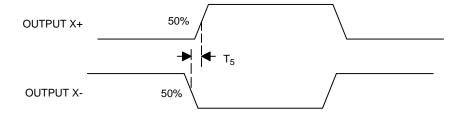
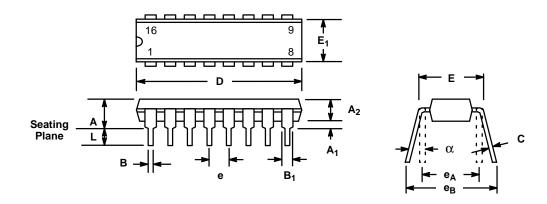


Figure 3. Differential Line Driver Timing



# 16 LEAD PLASTIC DUAL-IN-LINE (300 MIL PDIP)

Rev. 1.00



	INC	HES	MILLIN	METERS
SYMBOL	MIN	MAX	MIN	MAX
А	0.145	0.210	3.68	5.33
A <sub>1</sub>	0.015	0.070	0.38	1.78
A <sub>2</sub>	0.115	0.195	2.92	4.95
В	0.014	0.024	0.36	0.56
B <sub>1</sub>	0.030	0.070	0.76	1.78
С	0.008	0.014	0.20	0.38
D	0.745	0.840	18.92	21.34
Е	0.300	0.325	7.62	8.26
E <sub>1</sub>	0.240	0.280	6.10	7.11
е	0.1	00 BSC	2.5	4 BSC
e <sub>A</sub>	0.3	00 BSC	7.6	2 BSC
e <sub>B</sub>	0.310	0.430	7.87	10.92
L	0.115	0.160	2.92	4.06
α	0°	15°	0°	15°

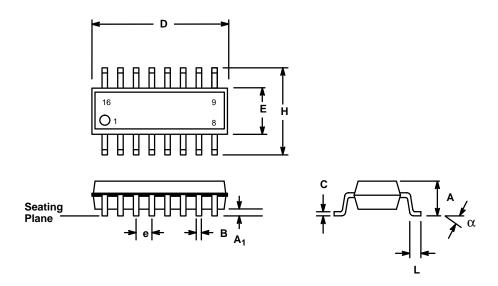
Note: The control dimension is the inch column





# 16 LEAD SMALL OUTLINE (150 MIL JEDEC SOIC)

Rev. 1.00



	INC	HES	MILLIN	METERS
SYMBOL	MIN	MAX	MIN	MAX
Α	0.053	0.069	1.35	1.75
A <sub>1</sub>	0.004	0.010	0.10	0.25
В	0.013	0.020	0.33	0.51
С	0.007	0.010	0.19	0.25
D	0.386	0.394	9.80	10.00
Е	0.150	0.157	3.80	4.00
е	0.0	50 BSC	1.2	7 BSC
Н	0.228	0.244	5.80	6.20
L	0.016	0.050	0.40	1.27
α	0°	8°	0°	8°

Note: The control dimension is the millimeter column





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