

**FEATURES**

- Pin-to-Pin Compatible with National DS34C87
- Low Power CMOS Design
- Three-State Outputs with Enable Pin
- Meets the EIA RS-422 Requirements
- Low Propagation Delays
- High Speed

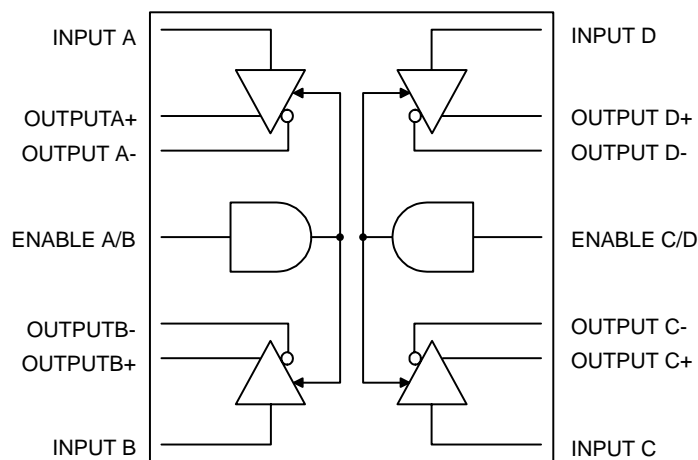
**GENERAL DESCRIPTION**

The ST34C87 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 ST34C87 circuit.

The ST34C87 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. ST34C87 is suitable for low power 5V operation with high input voltage protection devices.

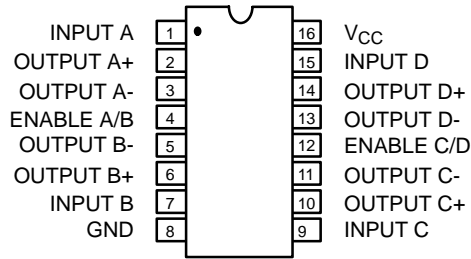
**ORDERING INFORMATION**

Part No.	Package	Operating Temperature Range
ST34C87CP16	16 Lead 300 Mil PDIP	0°C to +70°C
ST34C87CF16	16 Lead 150 Mil JEDEC SOIC	0°C to +70°C
ST34C87IP16	16 Lead 300 Mil PDIP	-40°C to +85°C
ST34C87IF16	16 Lead 150 Mil JEDEC SOIC	-40°C to +85°C

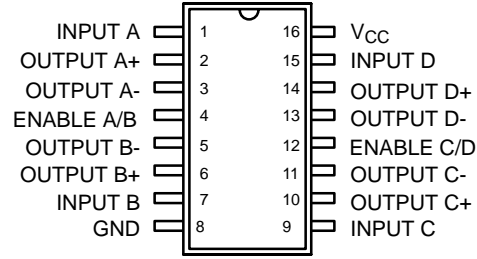


**Figure 1. Block Diagram**

## 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+	O	Driver A differential non-inverting output pin.
3	OUTPUT A-	O	Driver A differential inverting output pin.
4	ENABLE A/B	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-	O	Driver B differential inverting output pin.
6	OUTPUT B+	O	Driver B differential non-inverting output pin.
7	INPUT B	I	Driver B input pin.
8	GND	O	Signal and power ground.
9	INPUT C	I	Driver C input pin.
10	OUTPUT C+	O	Driver C differential non-inverting output pin.
11	OUTPUT C-	O	Driver C differential inverting output pin.
12	ENABLE C/D	I	Gate control (active low). See ENABLE A/B pin description.
13	OUTPUT D-	O	Driver D differential inverting output pin.
14	OUTPUT D+	O	Driver D differential non-inverting output pin.
15	INPUT D	I	Driver D input pin.
16	V <sub>CC</sub>	I	Power supply pin.

## AC ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Conditions
$T_1$	Propagation Delay, Input to Output		8	10	ns	S1 open
$T_2$	Differential Output Rise and Fall Time		8	10	ns	S1 open
$T_3$	Output Enable Time		18	20	ns	S1 close
$T_4$	Output Disable Time		18	20	ns	S1 close
$T_5^1$	Skew			2	ns	S1 open

Note:

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

## DC ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Min.	Typ.	Max.	Unit	Conditions
$I_{\text{IN}}$	Input Current			+1.0	$\mu\text{A}$	
$I_{\text{CC}}$	Operating Current		600		$\mu\text{A}$	
$I_{\text{OZ}}$	Three-State Output Leakage		+2.0		$\mu\text{A}$	
$V_{\text{IH}}$	Input High Level	2.0			V	
$V_{\text{IL}}$	Input Low Level			0.8	V	
$V_{\text{OH}}$	Output High Level	2.5			V	
$V_{\text{OL}}$	Output Low Level			0.5	V	
$V_{\text{OS}}$	Differential Output Level	2.0			V	$R_L=100\Omega$
$V_{\text{OC}}$	Common Mode Output Voltage			3.0	V	$R_L=100\Omega$
$V_{\text{OD}}$	Difference in Common Mode Output			0.4		$R_L=100\Omega$
$C_{\text{IN}}$	Input Capacitance	7	10	15	pF	
$C_{\text{PD}}$	Power Dissipation Capacitance		100		pF	
$I_{\text{OS}}$	Output Short Current	-200		-30	mA	$V_{\text{IN}}=V_{\text{CC}}$ or GND
$I_{\text{OFF}}$	Output Leakage Current Power Off			100	$\mu\text{A}$	$V_{\text{OUT}}=6\text{V}$
				-100	$\mu\text{A}$	$V_{\text{OUT}}=0.25\text{V}$
$I_{\text{DC}}$	Output Current			$\pm 150$	mA	

Specifications are subject to change without notice

## ABSOLUTE MAXIMUM RATINGS

Supply Range ..... 7V  
 Voltage at Any Pin ..... GND-0.3V to  $V_{CC} + 0.3V$   
 Operating Temperature .....  $-40^{\circ}C$  to  $+85^{\circ}C$

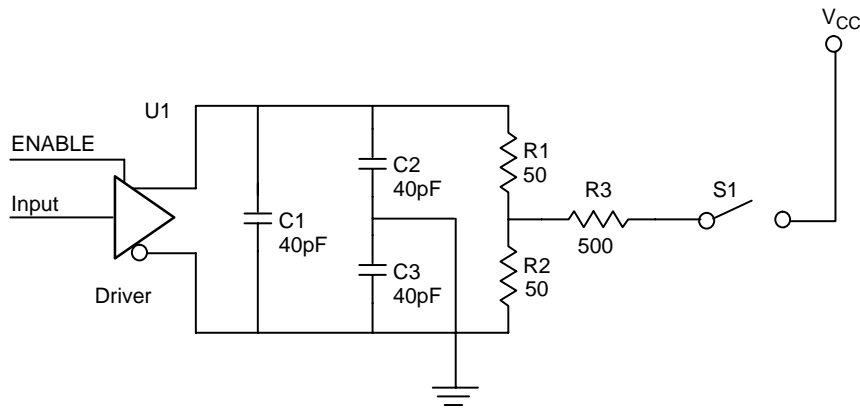
Storage Temperature .....  $-60^{\circ}C$  to  $+160^{\circ}C$   
 Package Dissipation ..... 500mW

Enable A/B C/D	Output	Differential Non-Inverting Output	Differential Inverting Output
L	X	Z	Z
H	L	L	H
H	H	H	L

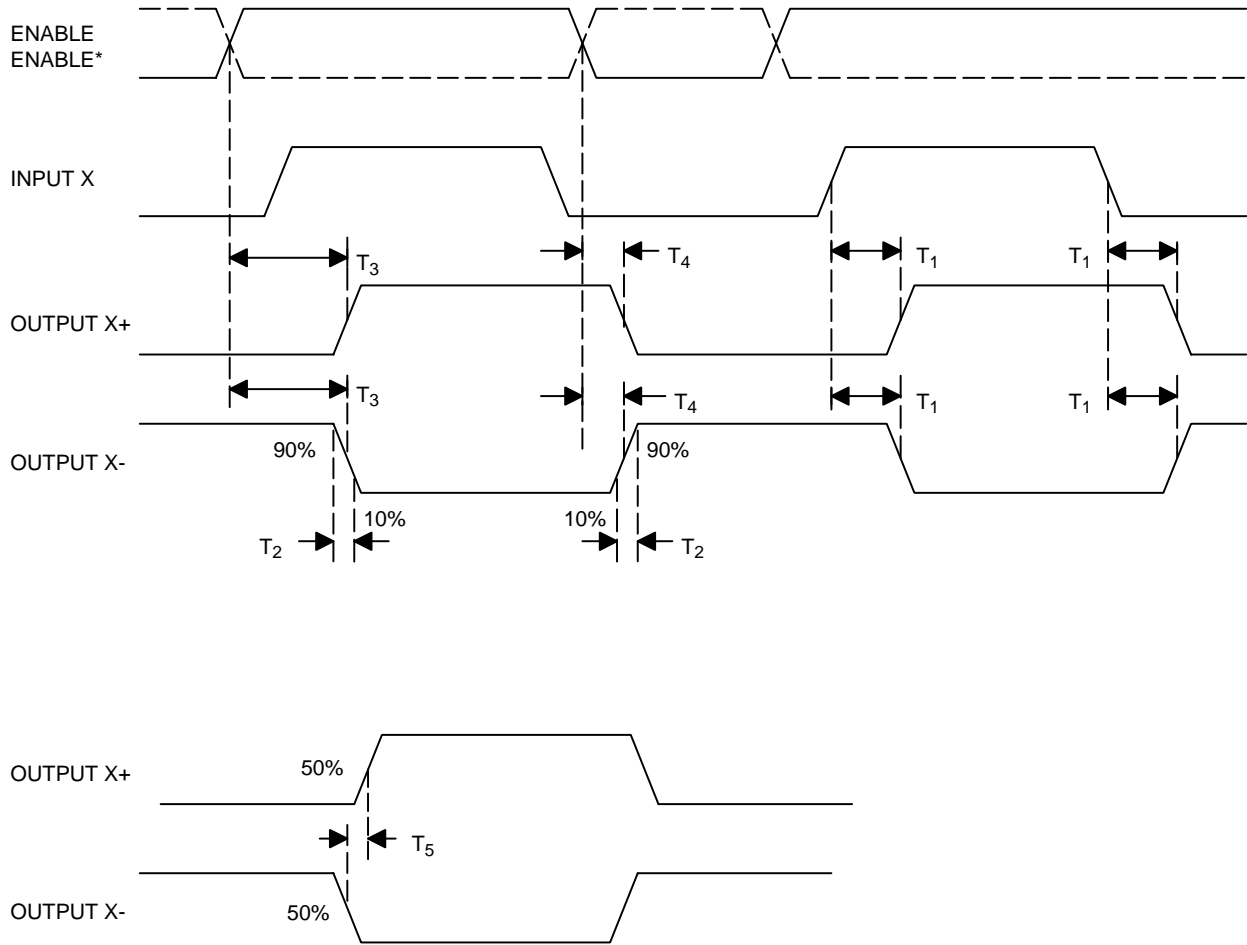
*X = Don't care*

*Z = Three-State (high impedance)*

**Table 1. Functional Table**



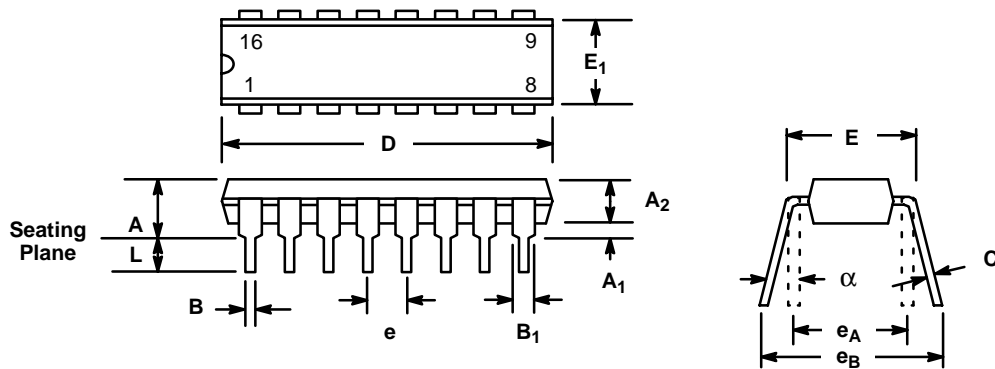
**Figure 2. Test Condition**



**Figure 4. Differential Line Driver Timing**

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

Rev. 1.00

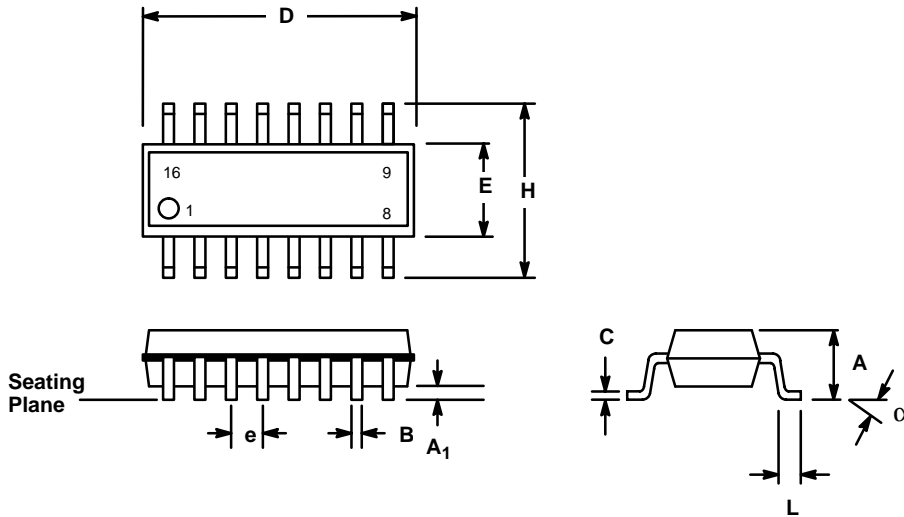


SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.145	0.210	3.68	5.33
A <sub>1</sub>	0.015	0.070	0.38	1.78
A <sub>2</sub>	0.115	0.195	2.92	4.95
B	0.014	0.024	0.36	0.56
B <sub>1</sub>	0.030	0.070	0.76	1.78
C	0.008	0.014	0.20	0.38
D	0.745	0.840	18.92	21.34
E	0.300	0.325	7.62	8.26
E <sub>1</sub>	0.240	0.280	6.10	7.11
e	0.100 BSC		2.54 BSC	
e <sub>A</sub>	0.300 BSC		7.62 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



SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.053	0.069	1.35	1.75
A <sub>1</sub>	0.004	0.010	0.10	0.25
B	0.013	0.020	0.33	0.51
C	0.007	0.010	0.19	0.25
D	0.386	0.394	9.80	10.00
E	0.150	0.157	3.80	4.00
e	0.050 BSC		1.27 BSC	
H	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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