EXAR

...the analog plus company™

ST34C87
QUAD RS-422 CMOS Differential Line Driver

June 1997-3

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
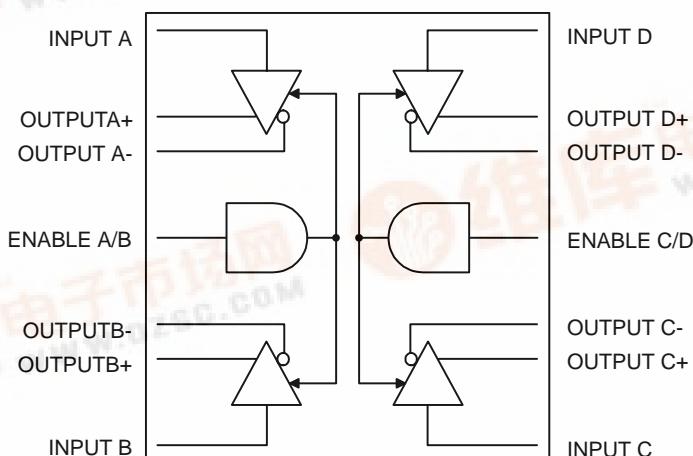
Figure 1. Block Diagram

ST34C87

PIN CONFIGURATION

INPUT A	1	16	V_CC
OUTPUT A+	2	15	INPUT D
OUTPUT A-	3	14	OUTPUT D+
ENABLE A/B	4	13	OUTPUT D-
OUTPUT B-	5	12	ENABLE C/D
OUTPUT B+	6	11	OUTPUT C-
INPUT B	7	10	OUTPUT C+
GND	8	9	INPUT C

16 Lead PDIP (0.300")

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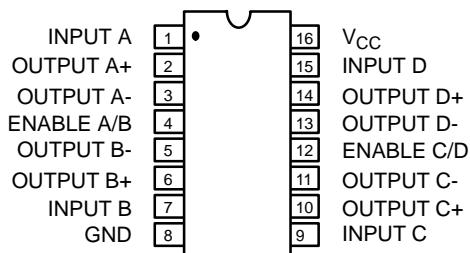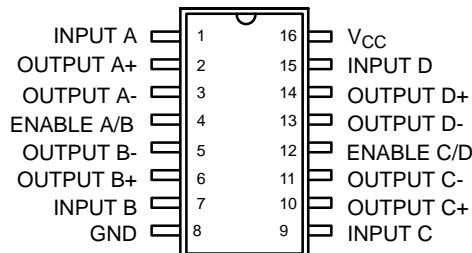
16 Lead SOIC (Jedec, 0.150")

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_CC	I	Power supply pin.

AC ELECTRICAL CHARACTERISTICS
Test Conditions: -40°C - +85°C, V_{CC} = 5.0V $\pm$ 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:

[1] *Skew is defined as the difference in propagation delays between complementary outputs at the 50% point.*

DC ELECTRICAL CHARACTERISTICS
Test Conditions: T_A = -40°C - +85°C, V_{CC} = 5.0V $\pm$ 10% unless otherwise specified.

Symbol	Parameter	Min.	Typ.	Max.	Unit	Conditions
I_{IN}	Input Current			+1.0	µA	
I_{CC}	Operating Current		600		µA	
I_{OZ}	Three-State Output Leakage		+2.0		µA	
V_{IH}	Input High Level	2.0			V	
V_{IL}	Input Low Level			0.8	V	
V_{OH}	Output High Level	2.5			V	
V_{OL}	Output Low Level			0.5	V	
V_{OS}	Differential Output Level	2.0			V	R_L=100Ω
V_{OC}	Common Mode Output Voltage			3.0	V	R_L=100Ω
V_{OD}	Difference in Common Mode Output			0.4		R_L=100Ω
C_{IN}	Input Capacitance	7	10	15	pF	
C_{PD}	Power Dissipation Capacitance		100		pF	
I_{OS}	Output Short Current	-200		-30	mA	V_{IN}=V_{CC} or GND
I_{OFF}	Output Leakage Current Power Off			100	µA	V_{OUT}=6V
				-100	µA	V_{OUT}=0.25V
I_{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°C to +85°C

Storage Temperature . . . . -60°C to +160°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
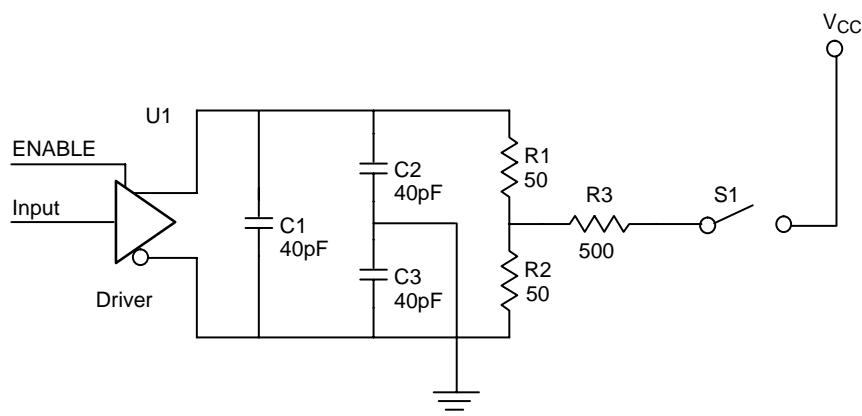
Figure 2. Test Condition

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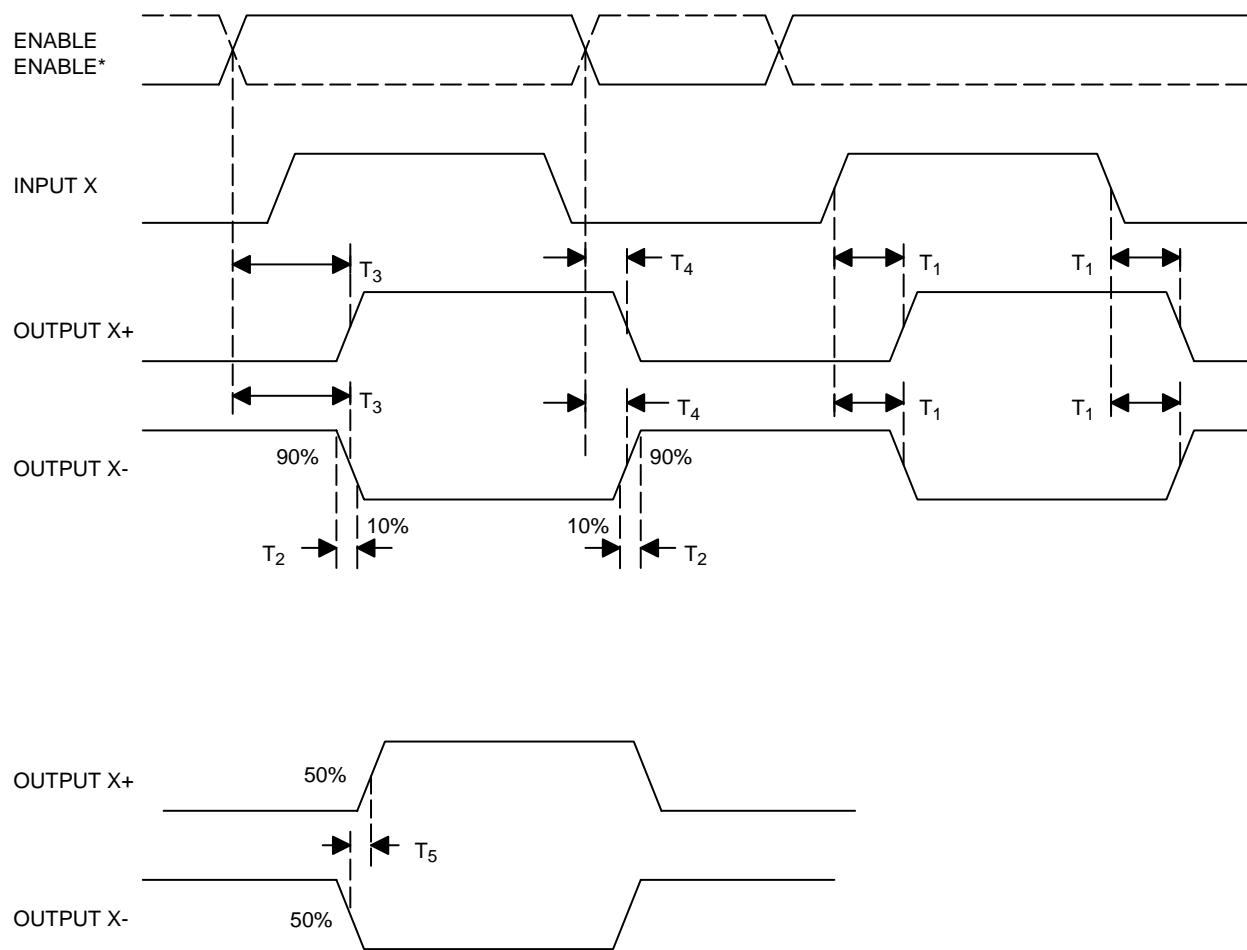
Figure 4. Differential Line Driver Timing

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

Rev. 1.00
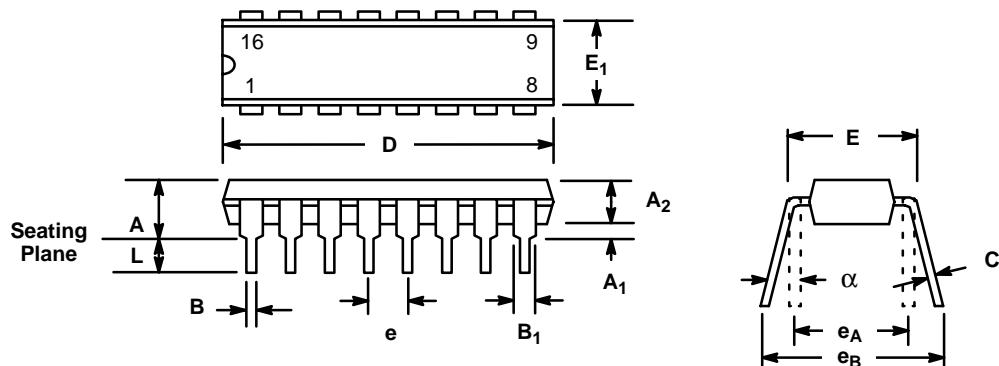
SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.145	0.210	3.68	5.33
A_1	0.015	0.070	0.38	1.78
A_2	0.115	0.195	2.92	4.95
B	0.014	0.024	0.36	0.56
B_1	0.030	0.070	0.76	1.78
C	0.008	0.014	0.20	0.38
D	0.745	0.840	18.92	21.34
E	0.300	0.325	7.62	8.26
E_1	0.240	0.280	6.10	7.11
e	0.100 BSC		2.54 BSC	
e_A	0.300 BSC		7.62 BSC	
e_B	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

	INCHES		MILLIMETERS	
SYMBOL	**MIN**	**MAX**	**MIN**	**MAX**
A	0.053	0.069	1.35	1.75
A_1	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

NOTICE

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