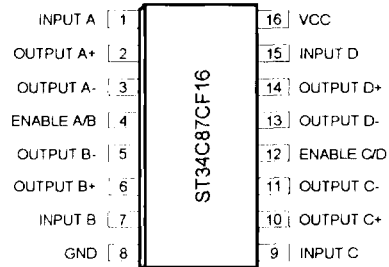# STARTECH

An ☰ EXAR Company

QUAD RS-422 CMOS DIFFERENTIAL LINE DRIVER

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.
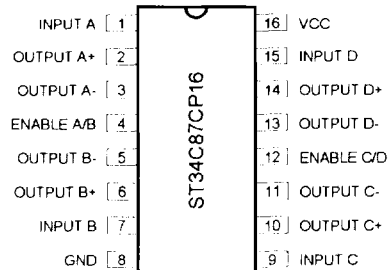
SOIC package

```
INPUT A    [ 1          16 ]  VCC
OUTPUT A+  [ 2          15 ]  INPUT D
OUTPUT A-  [ 3          14 ]  OUTPUT D+
ENABLE A/B [ 4   ST34C87CF16   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
```

2

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
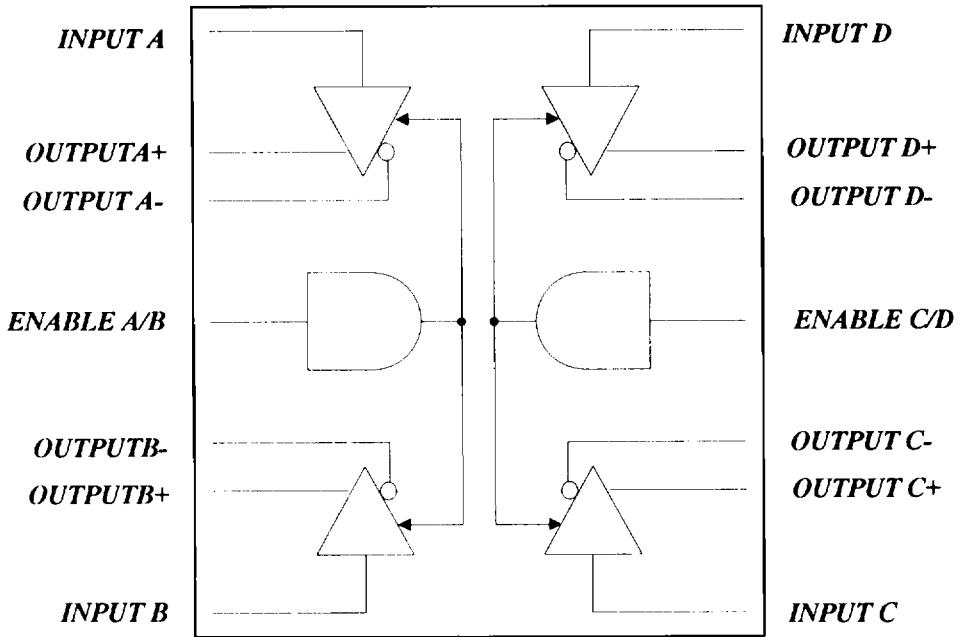• High speed

Plastic-DIP package

```
INPUT A    [ 1          16 ]  VCC
OUTPUT A+  [ 2          15 ]  INPUT D
OUTPUT A-  [ 3          14 ]  OUTPUT D+
ENABLE A/B [ 4   ST34C87CP16   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
```

ORDERING INFORMATION

Part number	Package	Operating temperature
ST34C87CP16	Plastic-DIP	0° C to + 70° C
ST34C87CF16	SOIC	0° C to + 70° C
ST34C87IP16	Plastic-DIP	-40° C to + 85° C
ST34C87IF16	SOIC	-40° C to + 85° C

Rev. 1.0

BLOCK DIAGRAM

INPUT A			INPUT D
OUTPUTA+			OUTPUT D+
OUTPUT A-			OUTPUT D-
ENABLE A/B			ENABLE C/D
OUTPUTB-			OUTPUT C-
OUTPUTB+			OUTPUT C+
INPUT B			INPUT C

SYMBOL DESCRIPTION

Symbol	Pin	Signal Type	Pin Description
INPUT A	1	I	Driver A input pin.
OUTPUT A+	2	O	Driver A differential non-inverting output pin.
OUTPUT A-	3	O	Driver A differential inverting output pin.
ENABLE A/B	4	I	Gate control (active high). This pin is one of the two control pins which enables or disables two/four drivers.
OUTPUT B-	5	O	Driver B differential inverting output pin.
OUTPUT B+	6	O	Driver B differential non-inverting output pin.
INPUT B	7	I	Driver B input pin.
GND	8	O	Signal and power ground.
INPUT C	9	I	Driver C input pin.
OUTPUT C+	10	O	Driver C differential non-inverting output pin.
OUTPUT C-	11	O	Driver C differential inverting output pin.
ENABLE C/D	12	I	Gate control (active high). See ENABLE A/B pin description.
OUTPUT D-	13	O	Driver D differential inverting output pin.
OUTPUT D+	14	O	Driver D differential non-inverting output pin.
INPUT D	15	I	Driver D input pin.
VCC	16	I	Power supply pin.

ST34C87

Functional table

Enable A/B C/D	Input	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)

AC ELECTRICAL CHARACTERISTICS

$T_A=0° - 70°$ C, Vcc=5.0 V ± 10% unless otherwise specified.

Symbol	Parameter	Limits			Units	Conditions
		Min	Typ	Max		
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	Skew			2	ns	S1 open

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

ABSOLUTE MAXIMUM RATINGS

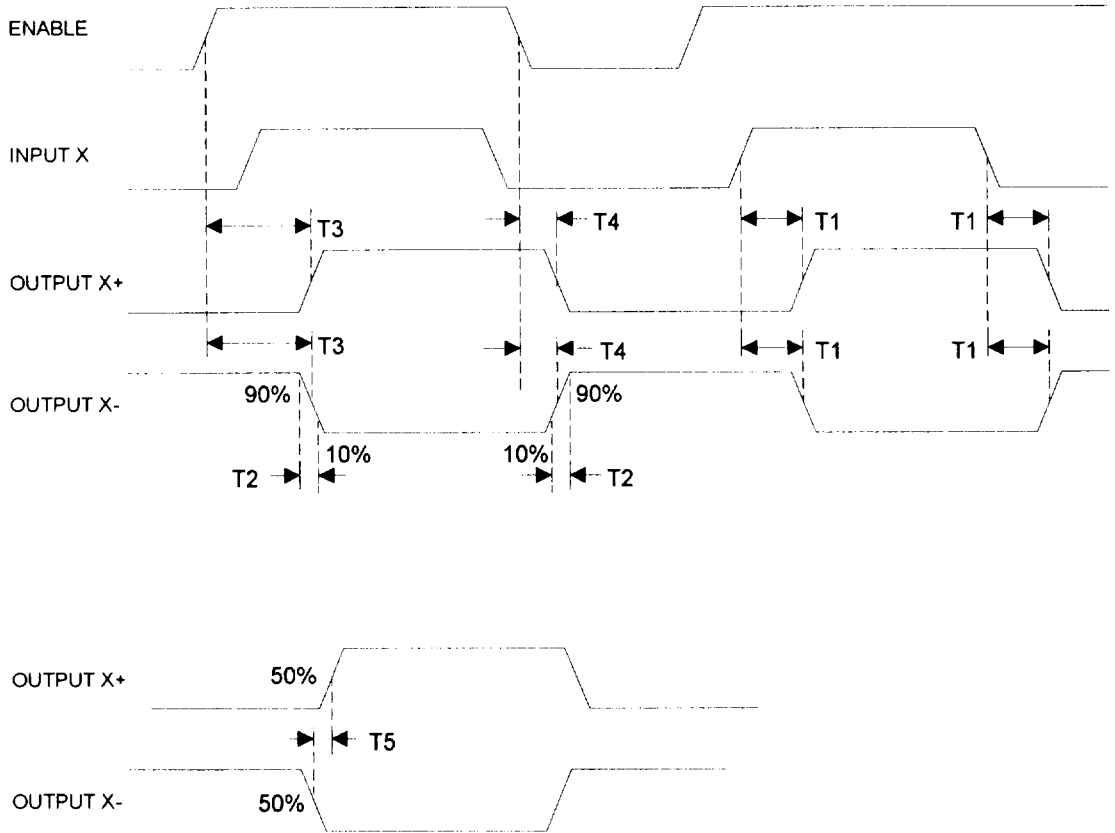|	
Supply range	7 Volts
Voltage at any pin	GND-0.3 V to VCC+0.3 V
Operating temperature	0° C to +70° C
Storage temperature	-40° C to +150° C
Package dissipation	500 mW

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DC ELECTRICAL CHARACTERISTICS

T_A=0° - 70° C, Vcc=5.0 V ± 10% unless otherwise specified.

Symbol	Parameter	Limits			Units	Conditions
		Min	Typ	Max		
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	V	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}=VCC or GND
I_{OFF}	Output leakage current power off			100	μA	Vout=6V
				-100	μA	Vout=0.25V
I_{DC}	Output current			±150	mA	

ST34C87

DIFFERENTIAL LINE DRIVER TIMING

3487-CK-1