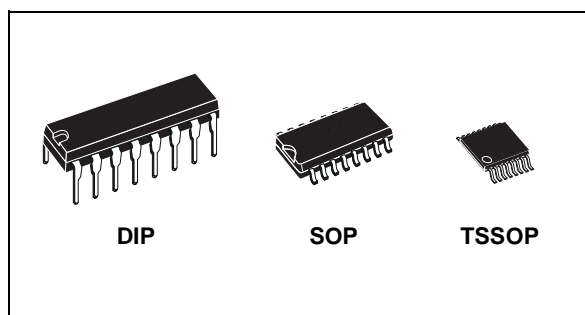




## ST34C86

### CMOS QUAD 3-STATE DIFFERENTIAL LINE RECEIVER

- SUPPLY VOLTAGE RANGE 4.5V TO 5.5V
- MINIMUM DIFFERENTIAL INPUT VOLTAGE  $\pm 200\text{mV}$
- TYPICAL PROPAGATION DELAYS: 19ns
- TYPICAL INPUT HYSTERESIS: 60mV
- INPUT RESISTANCE 10K $\Omega$
- OPEN INPUT FAIL SAFE FEATURE
- OPERATING TEMPERATURE RANGE -40°C TO 85°C



#### DESCRIPTION

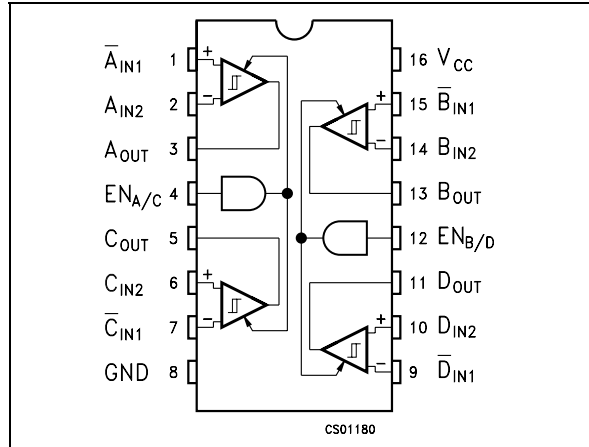
The ST34C86 is a quad differential line receiver designed to meet the RS-422, RS-423, and Federal Standard 1020 and 1030 for balanced and unbalanced digital data transmission, while retaining the low power characteristics of CMOS. The ST34C86 has an input sensitivity of 200mV over the common mode input voltage range of  $\pm 7\text{V}$ . Hysteresis is provided to improve noise

margin and discourage output instability for slowly changing input waveforms. The ST34C86 internal pull-up and pull-down resistors prevent output oscillation on unused channels. Separate enable pins allow independent control of receiver pairs. The 3-STATE outputs have 6mA source and sink capability.

#### ORDERING CODES

Type	Temperature Range	Package	Comments
ST34C86BN	-40 to 85 °C	DIP-16	25parts per tube / 40tube per box
ST34C86BD	-40 to 85 °C	SO-16 (Tube)	50parts per tube / 20tube per box
ST34C86BDR	-40 to 85 °C	SO-16 (Tape & Reel)	1000 parts per reel
ST34C86BTR	-40 to 85 °C	TSSOP-16 (Tape & Reel)	2500 parts per reel

## PIN CONFIGURATION



## TRUTH TABLE

Enable	Input	Output
L	X	Z
H	$V_{ID} \geq V_{TH} \text{ (Max)}$	H
H	$V_{ID} \leq V_{TH} \text{ (Min)}$	L
H	Open *	H

X= Don't Care; Z=High Impedance, \* Open=Not terminated

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}$	Supply Voltage	7	V
$V_{CM}$	Input Common Mode Range	$\pm 14$	V
$V_{DIFF}$	Differential Input Voltage	$\pm 14$	V
$V_{IN}$	Enable Input Voltage	7	V
$I_{OUT}$	Current per Output	$\pm 25$	mA
$T_{stg}$	Storage Temperature Range	-65 to 150	°C
$T_{op}$	Operating Junction Temperature Range	-40 to 85	°C
ESD	HBM (1.5KΩ 100pF)	2000	V

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

Unless otherwise specified, all voltage are referenced to ground.

ESD Rating:HBM Inputs  $\geq 2000V$ , All other pins  $\geq 1000V$ , EIAJ (0Ω, 200pF)  $\geq 350V$

## PIN DESCRIPTION

PIN N°	SYMBOL	NAME AND FUNCTION
1	$\bar{A}_{IN1}$	Input A1
2	$A_{IN2}$	Input A2
3	$A_{OUT}$	Channel A Output
4	$EN_{A/C}$	Enable A/C
5	$C_{OUT}$	Channel C Output
6	$C_{IN2}$	Input C2
7	$\bar{C}_{IN1}$	Input C1
8	GND	Ground
9	$D_{IN1}$	Input D1
10	$D_{IN2}$	Input D2
11	$D_{OUT}$	Channel D Output
12	$EN_{B/D}$	Enable B/D
13	$B_{OUT}$	Channel B Output
14	$B_{IN2}$	Input B2
15	$\bar{B}_{IN1}$	Input B1
16	$V_{CC}$	Supply Voltage

**DC ELECTRICAL CHARACTERISTICS**

( $V_{CC} = 5V \pm 10\%$ ,  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$ , unless otherwise specified. Typical values are referred to  $V_{CC}=5V$ ,  $T_A = 25^\circ\text{C}$ )

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_{TH}$	Minimum Differential Driver Input Voltage	$V_O = V_{OH}$ or $V_{OL}$ $V_{CM} = -7V$ to $+7V$	-200	35	200	mV
$R_{IN}$	Input Resistance	$V_{IN} = -7V$ to $+7V$ Other Input = GND	5	6.8	10	$K\Omega$
$I_{IN}$	Input Current (under test)	$V_{IN} = +10V$ Other Input = GND $V_{IN} = -10V$ Other Input = GND		1.1 -2.0	2 -2.5	mA mA
$V_{OH}$	High Level Output Voltage	$V_{CC} = \text{Min}$ $V_{DIFF} = 1V$ $I_O = -6mA$	3.8	4.2		V
$V_{OL}$	Low Level Output Voltage	$V_{CC} = \text{Min}$ $V_{DIFF} = 1V$ $I_O = -6mA$		0.2	0.3	V
$V_{IH}$	Minimum Enable High Input Voltage		2.0			V
$V_{IL}$	Minimum Enable Low Input Voltage				0.8	V
$I_{OZ}$	Maximum 3-STATE Output Leakage Current	$V_O = V_{CC}$ or GND $V_{EN}=V_{IL}$		$\pm 0.5$	$\pm 5$	$\mu A$
$I_I$	Maximum Enable Input Current	$V_i = V_{CC}$ or GND			$\pm 1$	$\mu A$
$I_{CC}$	Quiescent Power Supply Current	$V_{CC} = \text{Max}$ $V_{DIFF} = 1V$		16	23	mA
$V_{HYST}$	Input Hysteresis	$V_{CM} = 0V$		60		mV

**AC SWITCHING CHARACTERISTICS**

( $V_{CC} = 5V \pm 10\%$ ,  $T_A = -40^\circ\text{C}$  to  $85^\circ\text{C}$ , unless otherwise specified. Typical values are referred to  $V_{CC}=5V$ ,  $T_A = 25^\circ\text{C}$ ) (See figure 1)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$t_{PLH}$ $t_{PHL}$	Propagation Delay Input to Output	$V_{DIFF} = 2.5V$ $V_{CM} = 0V$ $C_L = 50pF$ (See Fig. 2)		19	30	ns
$t_{RISE}$ $t_{FALL}$	Output Rise and Fall Time	$V_{DIFF} = 2.5V$ $V_{CM} = 0V$ $C_L = 50pF$ (See Fig. 4)		4	9	ns
$t_{PLZ}$ $t_{PHZ}$	Propagation Delay Enable to Output	$V_{DIFF} = 2.5V$ $R_L = 1K\Omega$ $C_L = 50pF$ (See Fig. 3)		13	18	ns
$t_{PZL}$ $t_{PZH}$	Propagation Delay Enable to Output	$V_{DIFF} = 2.5V$ $R_L = 1K\Omega$ $C_L = 50pF$ (See Fig. 3)		13	21	ns

## TEST CIRCUITS AND TYPICAL CHARACTERISTICS

Figure 1 : Test Circuit for Switching Characteristics

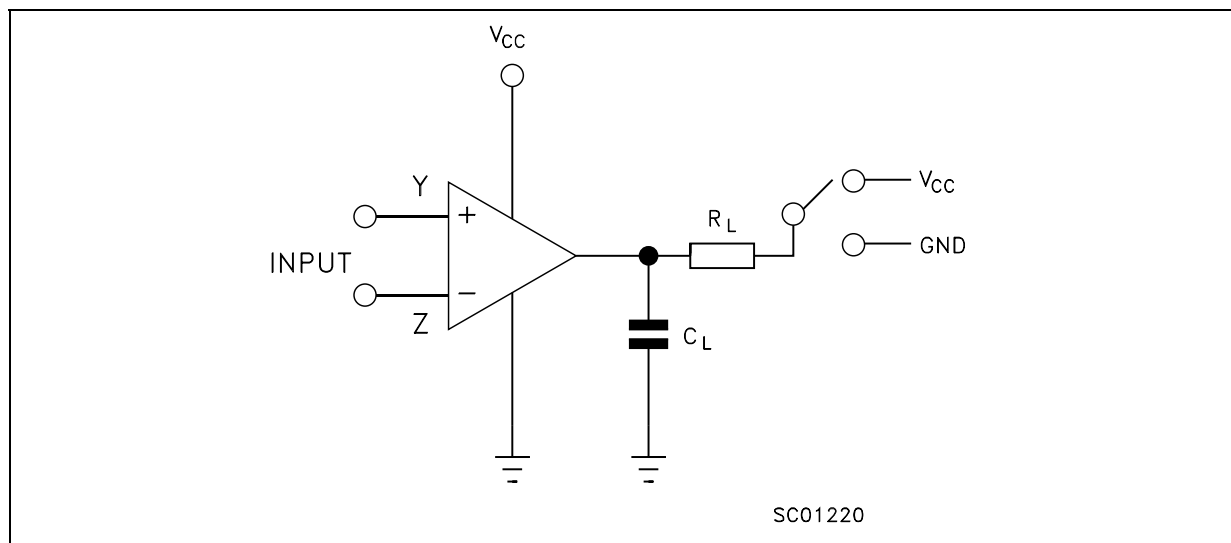
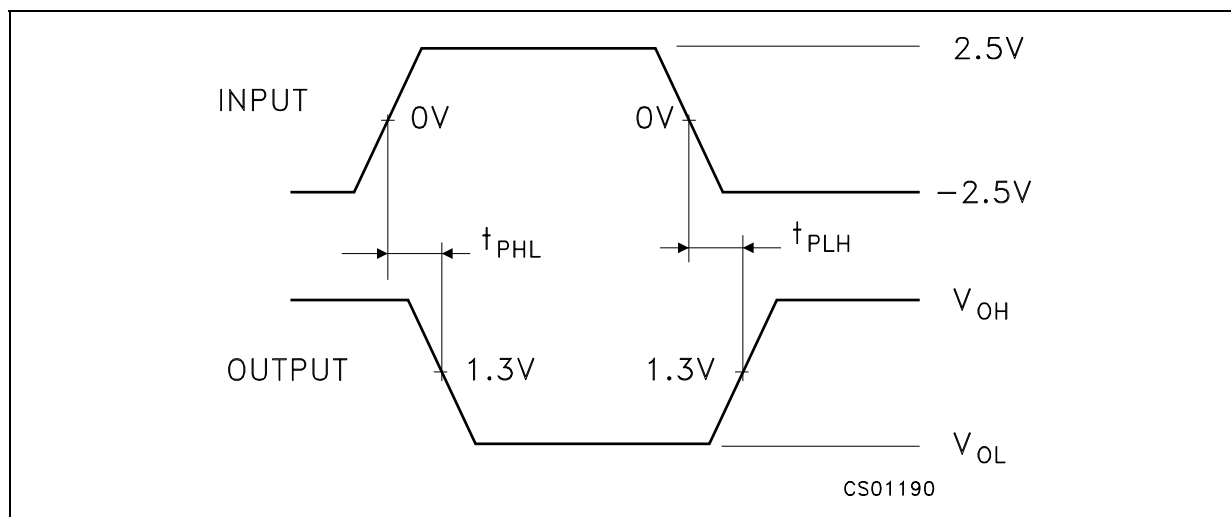
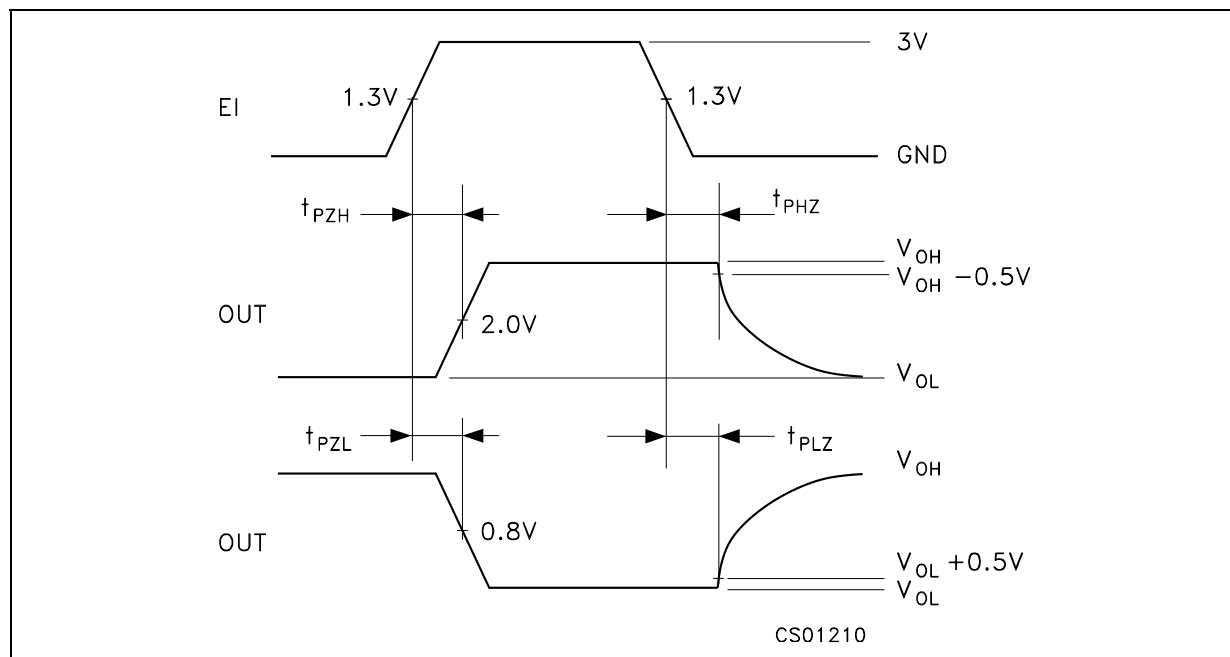
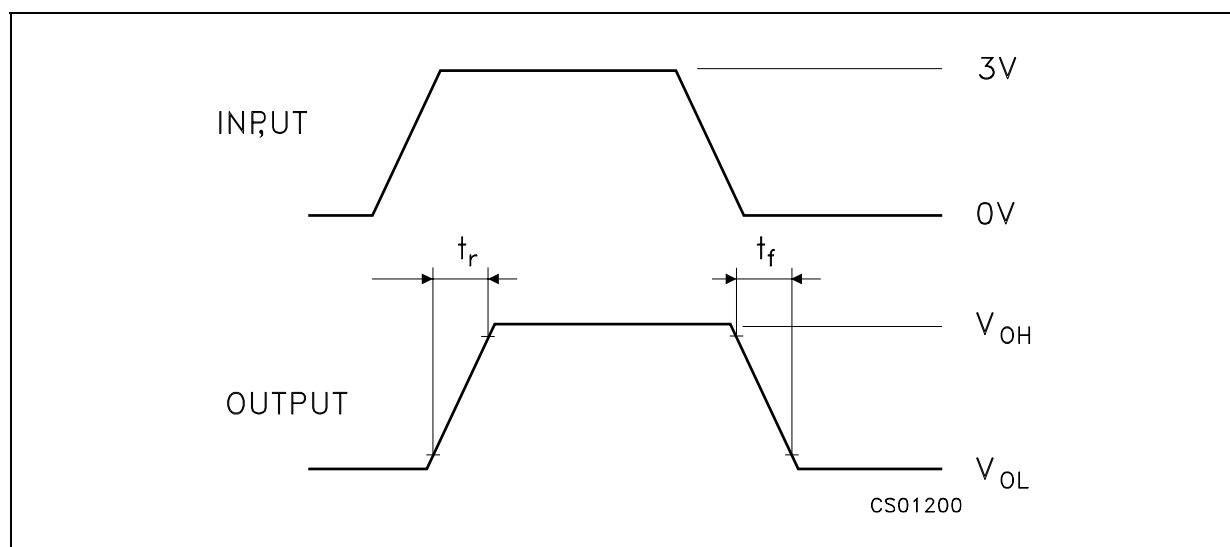
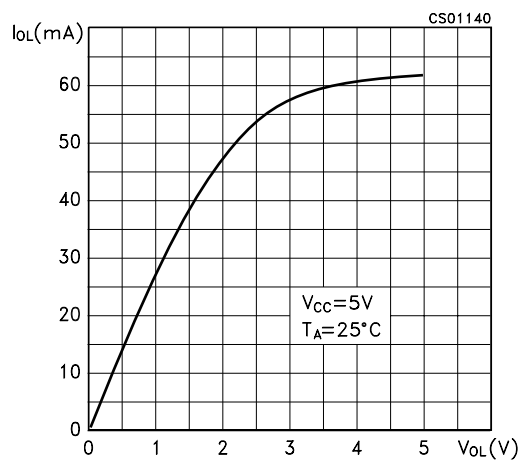
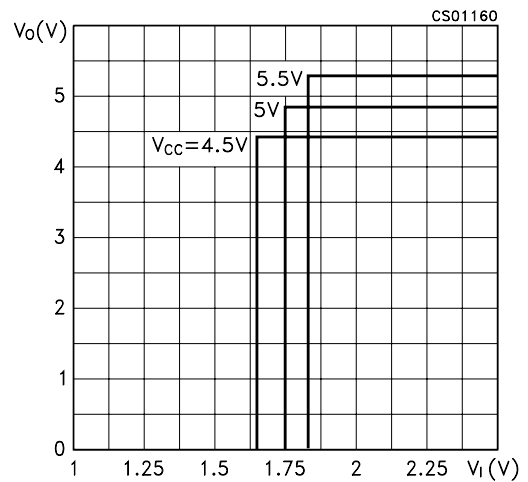
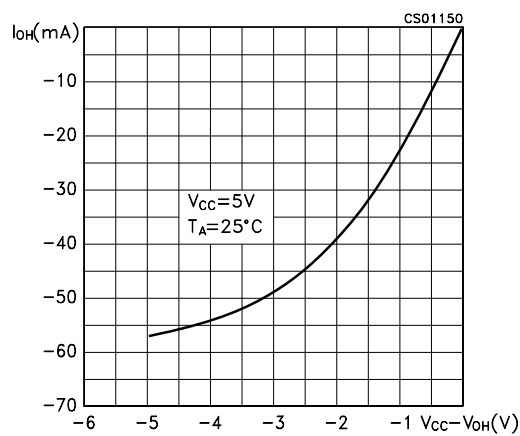
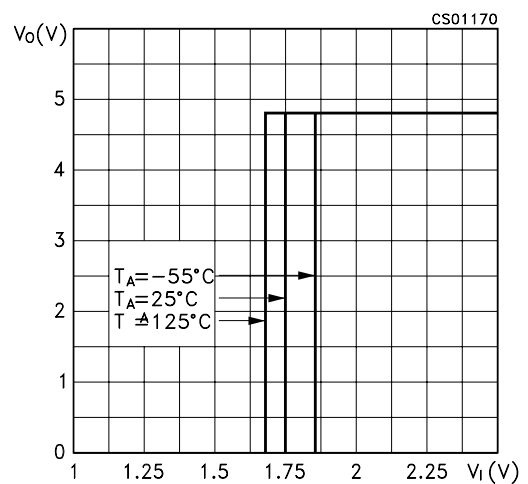


Figure 2 : Propagation Delays

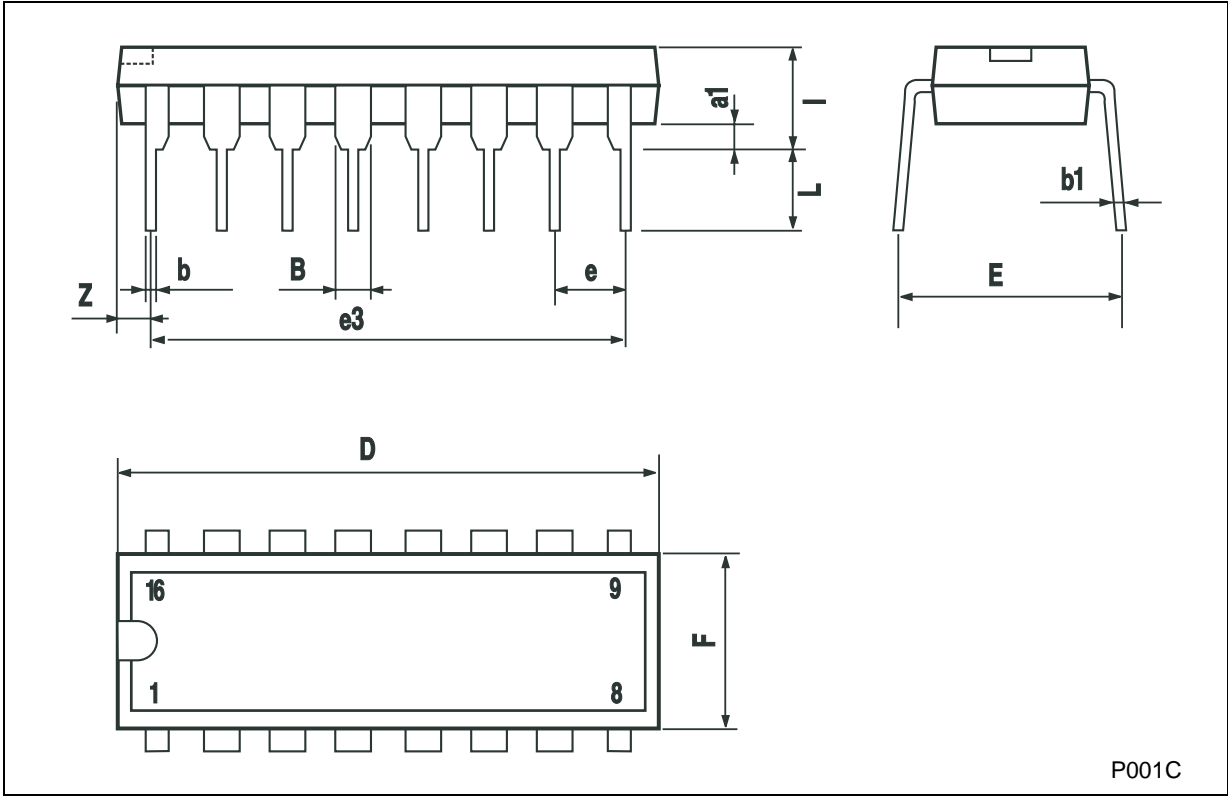


**Figure 3 : Enable and Disable Propagation Delay Time****Figure 4 : Differential Rise and Fall Time**

**Figure 5 : Output Current vs Output Low Voltage****Figure 7 : EnableThreshold vs Supply Voltage****Figure 6 : Output Current vs Output High Voltage****Figure 8 : Enable Threshold vs Temperature**

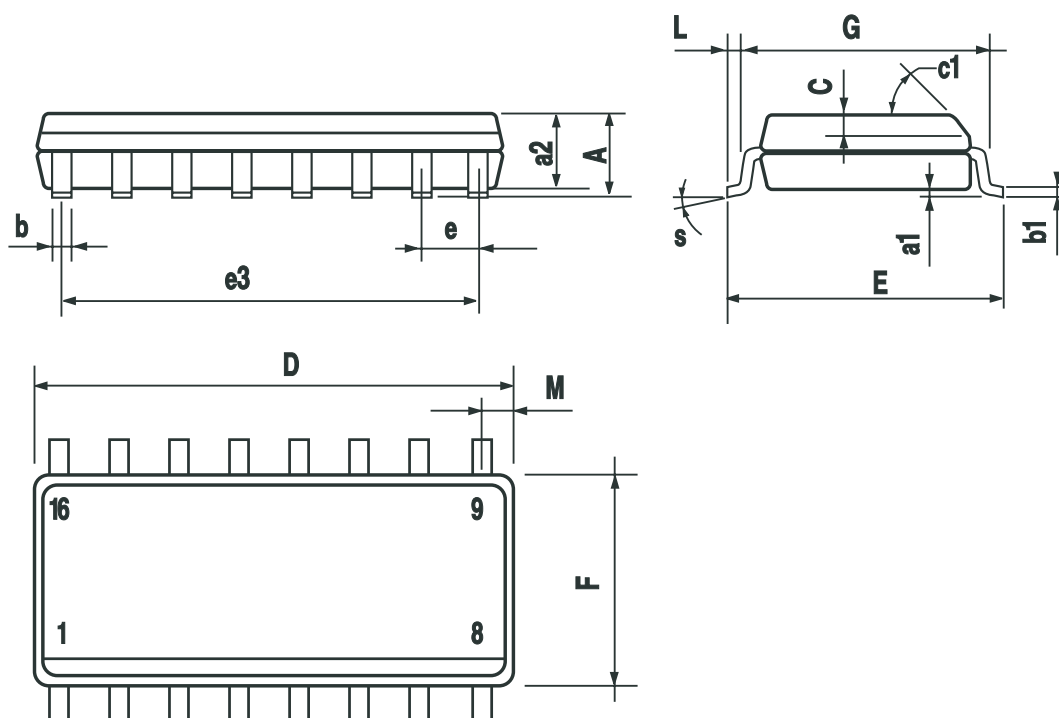
Plastic DIP-16 (0.25) MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050



## SO-16 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.003		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8° (max.)					

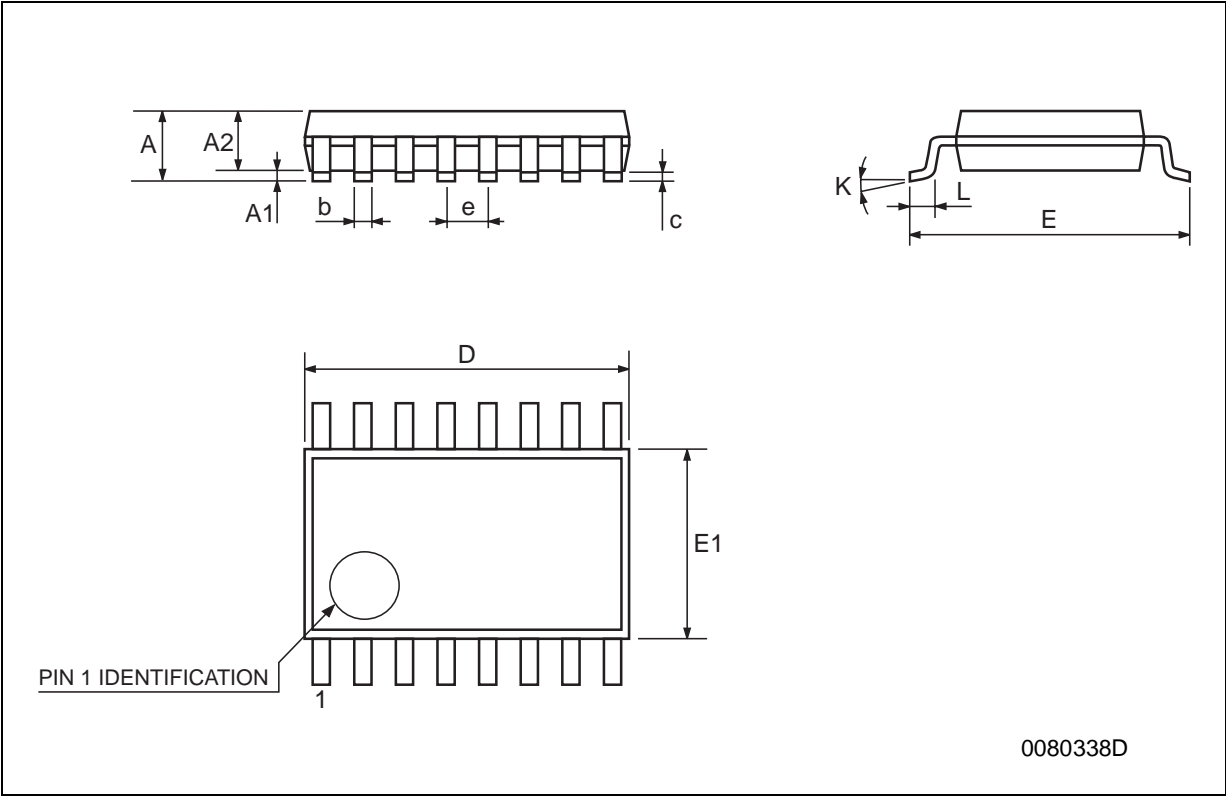


PO13H



TSSOP16 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030



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