

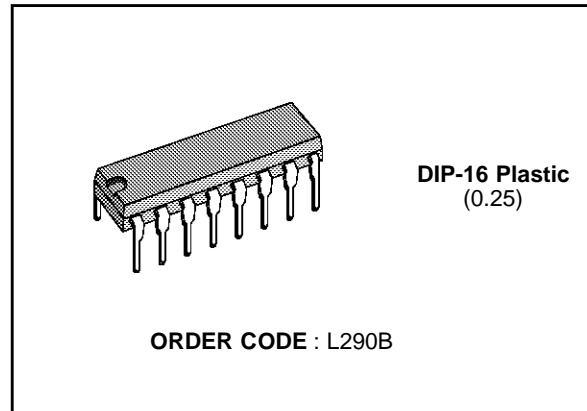
**TACHOMETER CONVERTER**

**DESCRIPTION**

The L290, a monolithic LSI circuit in 16-lead inline plastic package, is intended for user with the L291 and L292 which together form a complete **3-chip DC motor positioning system** for applications such as carriage/daisy-wheel position control in typewriters.

The L290/1/2 system can be directly controlled by a microprocessor. The L290 integrates the following functions:

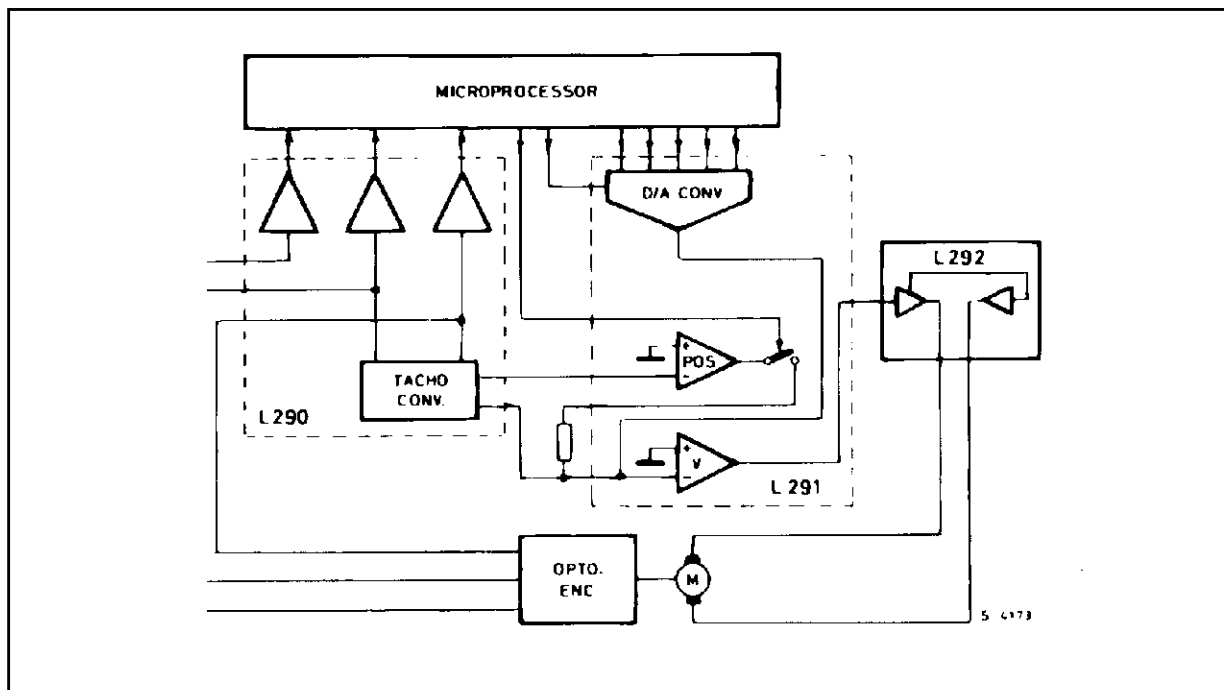
- tacho voltage generator (F/V converter)
- reference voltage generator
- position pulse generator



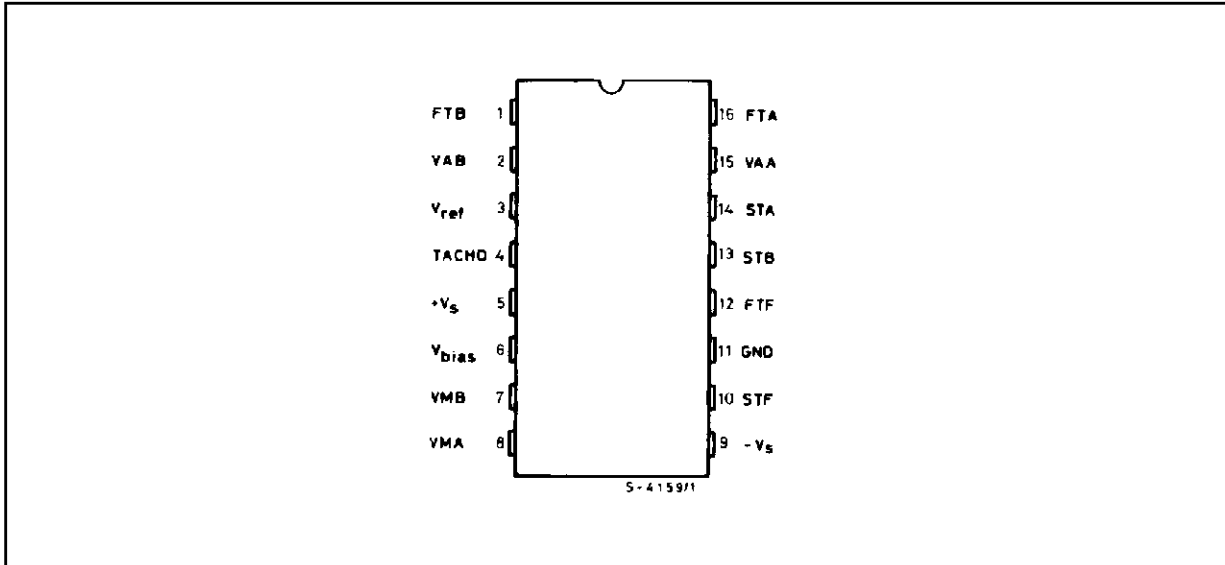
**ABSOLUTE MAXIMUM RATING**

Symbol	Parameter	Value	Unit
$V_s$	Supply Voltage	$\pm 15$	V
$V_i$ (FTA, FTB, FTF)	Input Signals	$\pm 7$	V
$P_{tot}$	Total Power Dissipation ( $T_{amb} = 70^\circ C$ )	1	W
$T_{stg}, T_j$	Storage and Junction Temperature	- 40 to + 150	$^\circ C$

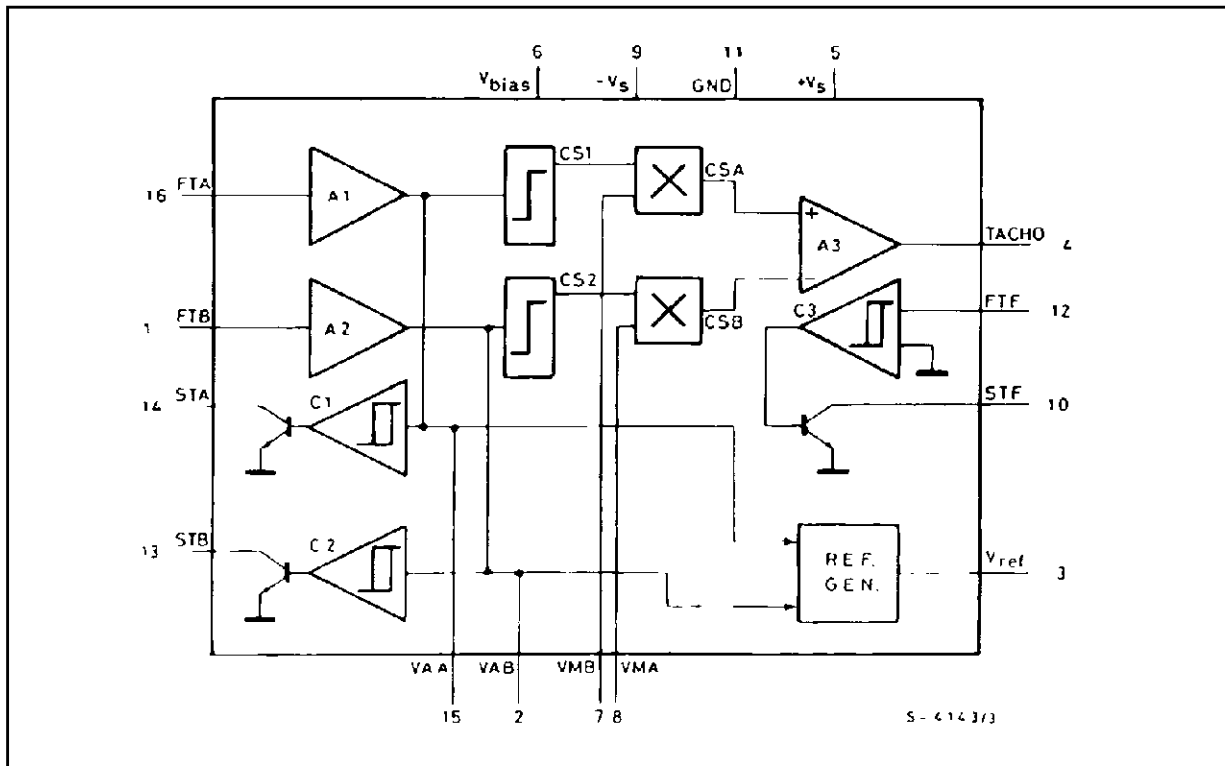
**SYSTEM BLOCK DIAGRAM**



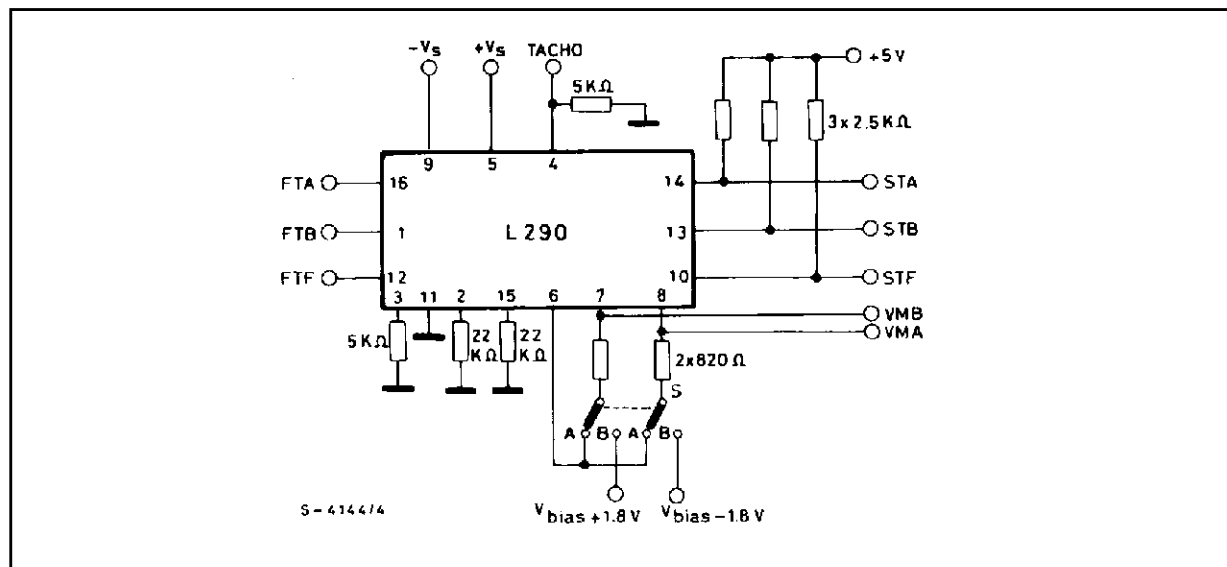
CONNECTION DIAGRAM (top view)



BLOCK DIAGRAM



## TEST CIRCUIT



## THERMAL DATA

Symbol	Parameter	Value	Unit
$R_{th-j-amb}$	Thermal resistance junction-case Max	80	°C/W

**ELECTRICAL CHARACTERISTICS** (Refer to the test circuit, S in (A),  $V_s = \pm 12$  V,  $T_{amb} = 25$  °C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$V_s$	Supply Voltage		$\pm 10$		$\pm 15$	V
$I_d$	Quiescent Drain Current	$V_s = \pm 15$ V		13	20	mA

INPUT AMPLIFIERS ( $A_1$  and  $A_2$ )

FTA, FTB	Input Signal from Encoder (pin 1, 16)	$f_{max} = 20$ KHz	$\pm 0.4$		$\pm 0.6$	$V_p$
$V_{os}$	Output Offset Voltage (pin 2, 15)	FTA = FTB = 0 V			$\pm 55$	mV
$I_b$	Input Bias Current (pin 1, 16)			0.15		$\mu$ A
$G_v$	Voltage Gain	$f = 10$ KHz FTA = FTB = $\pm 0.6 V_p$	22	23	24	dB
$V_0$	Output Voltage Swing (pin 2, 15)	FTA = FTB = $\pm 1V_p$	$\pm 9.5$			V

**ELECTRICAL CHARACTERISTICS** (continued)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
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**COMPARATORS WITH HYSTERESIS** (C<sub>1</sub>, C<sub>2</sub>, and C<sub>3</sub>)


V <sub>THP</sub> (°)	Positive Threshold Voltage (pin 2, 12, 15)	C <sub>1</sub> and C <sub>2</sub>	550		850	mV
		C <sub>3</sub>	700		900	mV
V <sub>THN</sub> (° °)	Negative Threshold Voltage (pin 2, 12, 15)	C <sub>1</sub> and C <sub>2</sub>	55		175	mV
		C <sub>3</sub>	570		830	mV
ΔFTF	Threshold Hysteresis	C <sub>3</sub>	72		120	mV
V <sub>L</sub>	Output Voltage (low level) (pin 10, 13, 14)	I <sub>o</sub> = 2 mA FTA = FTB = FTF = 0 V		0.2	0.4	V
I <sub>leak</sub>	(pins 10, 13, 14)	FTA = FTB = 0.5 V V <sub>CE</sub> = 5 V FTF = 1 V			1	μA

**REFERENCE GENERATOR**

V <sub>ref</sub>	DC Reference Voltage (pin 3)	FTA = FTB = ± 0.5 V <sub>p</sub> (*) I <sub>ref</sub> = 1 mA	4.5	5	5.5	V
I <sub>ref</sub>	Output Current (pin 3)				1.4	mA

**”TACHO” AMPLIFIER (A3)**

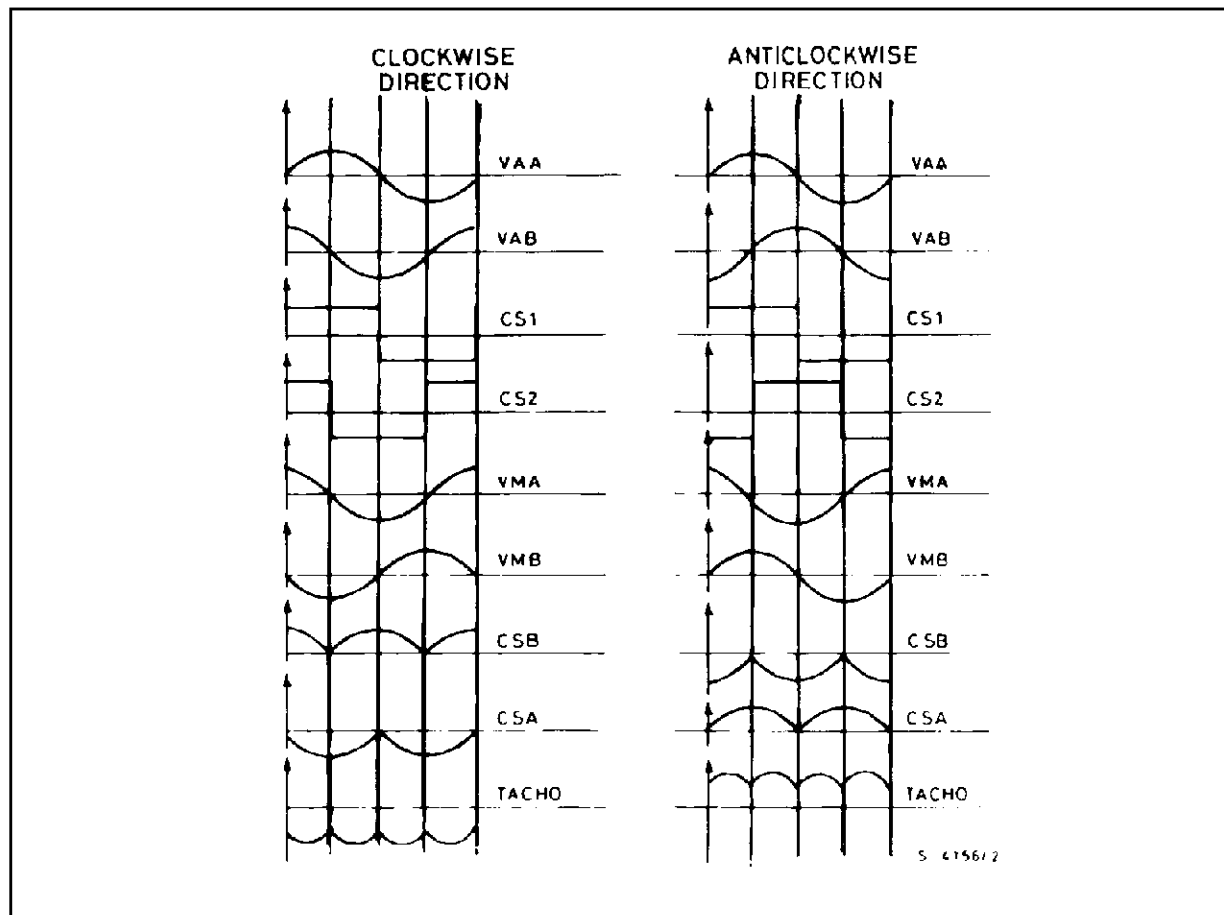
V <sub>os</sub>	Output Offset Voltage (pin 4)	FTA = ± 15 mV FTB = 0.5V			± 80	mV	
V <sub>o</sub>	DC Output Voltage (pin 4)	FTA = FTB = ± 0.5 V <sub>p</sub>	(**) V <sub>01</sub>	5.4	6	6.6	V
		V <sub>MA</sub> = V <sub>MB</sub> = ± 1.25 V <sub>p</sub>	(***) V <sub>02</sub>	- 5.4	- 6	- 6.6	
ΔV <sub>0</sub>		V <sub>01</sub> + V <sub>02</sub>		- 150		+ 150	mV
V <sub>0</sub>	Output Voltage Swing (pin 4)		FTA = FTB = 0.5V	9			V
		Sin (B)	FTA = FTB = -0.5 V	- 9			
V <sub>MA</sub> V <sub>MB</sub>	Multiplier Input Voltage (pin 7, 8)			± 1.25	± 1.7	V <sub>p</sub>	
V <sub>bias</sub>	Bias Voltage (pin 6)	FTA and FTB Floating	- 6.5		- 8	V	

(°) : FTA = FTB = FTF  1V (° °) : FTA = FTB = FTF =  1V

**Note** : Phase relationship between the signals :

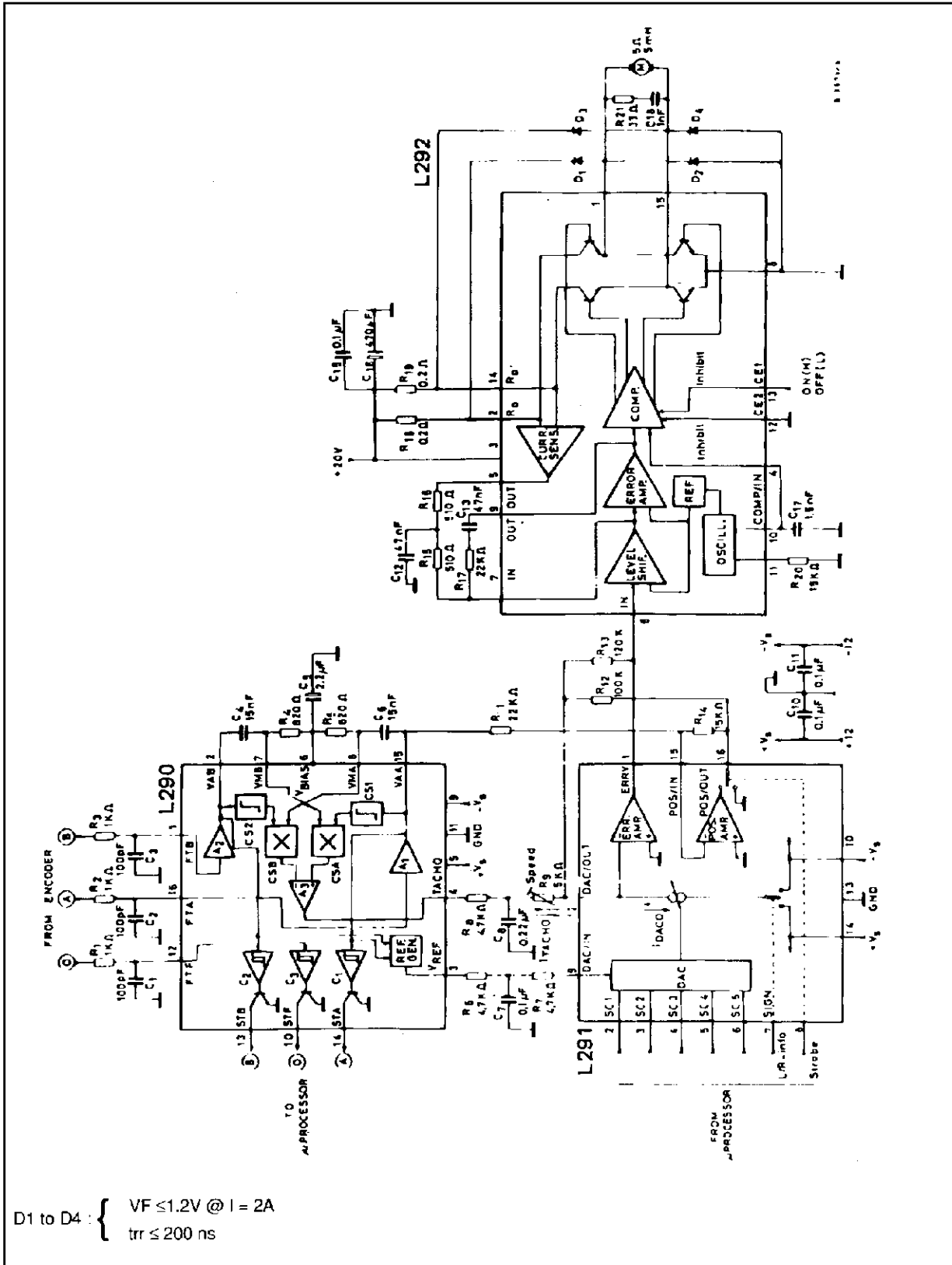
- \* FTA : 0° FTB : 90°
- \*\* FTA : 0° FTB : - 90° V<sub>MA</sub> = 90° V<sub>MB</sub> = 0°
- \*\*\* FTA : 0° FTB : 90° V<sub>MA</sub> = 90° V<sub>MB</sub> = 180°

**WAVEFORMS** (Neglecting threshold voltage level of the comparators).



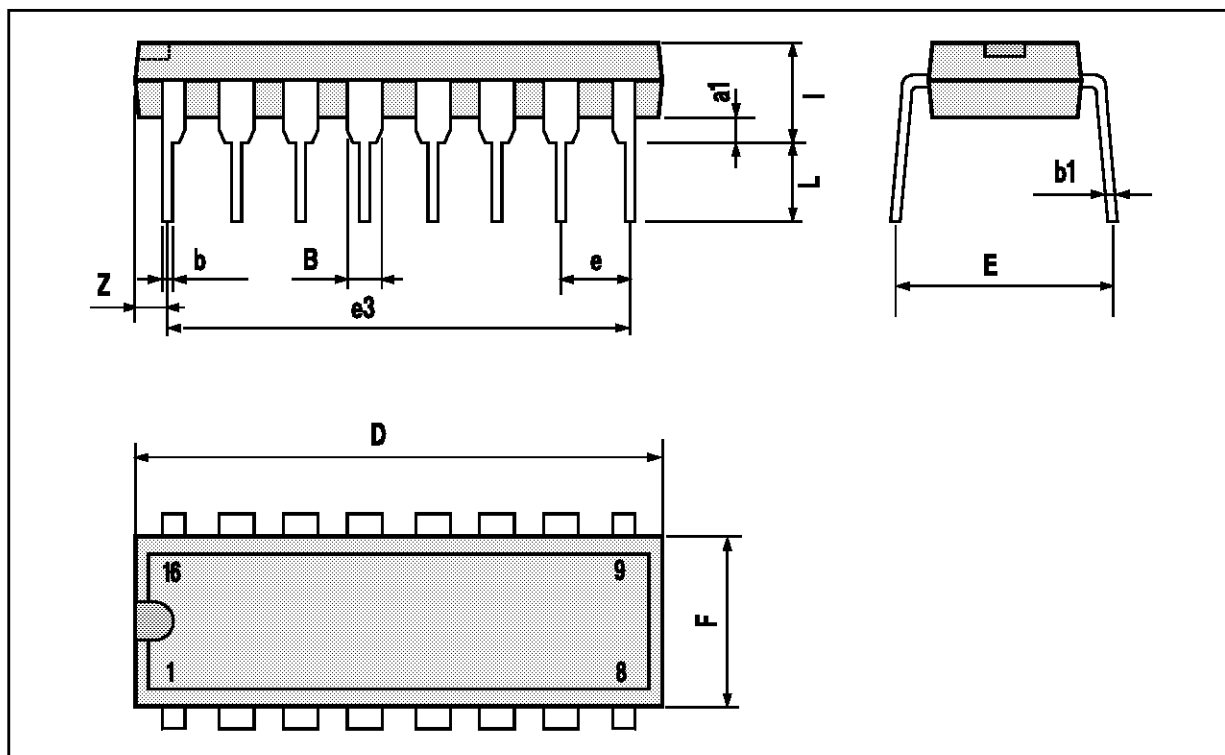
**SYSTEM DESCRIPTION** : refer to the L292 data sheet.

Figure 1. Complete application circuit.



## DIP-16 PLASTIC PACKAGE 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



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