L290

LINEAR INTEGRATED CIRCUIT

TACHOMETER CONVERTER

The L290, a monolithic LSI circuit in a 16-lead dual in-line plastic package, is intended for use 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.

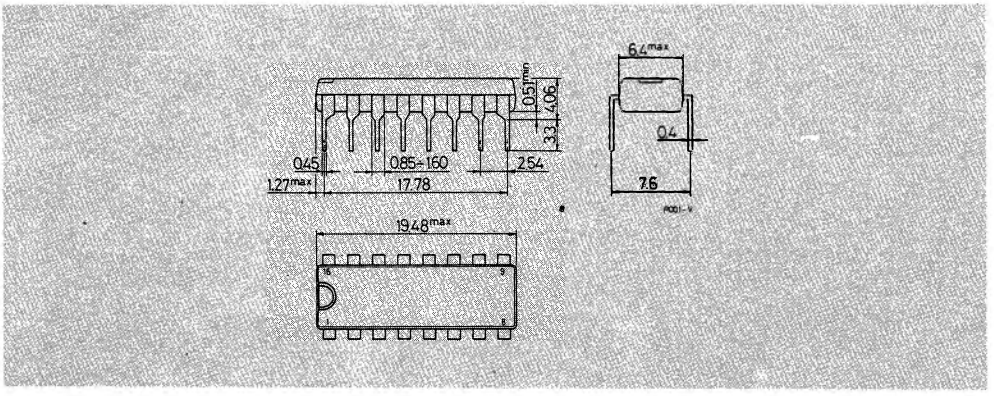
ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage	± 15	V
V_i (FTA, FTB, FTF)	Input signals	± 7	V
P_{tot}	Total power dissipation T_{amb} = 70°C	1	W
T_{stg}, T_j	Storage and junction temperature	-40 to +150	°C

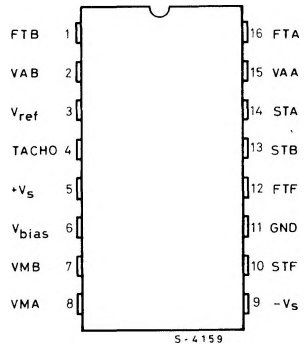
ORDERING NUMBER: L290 B

MECHANICAL DATA

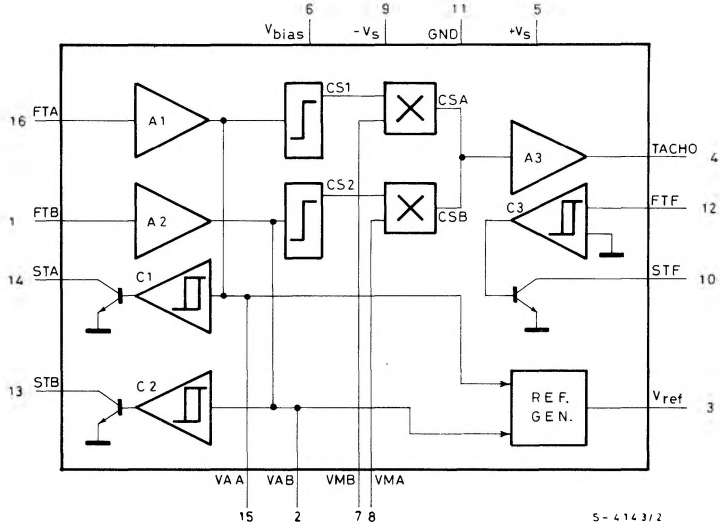
Dimensions in mm



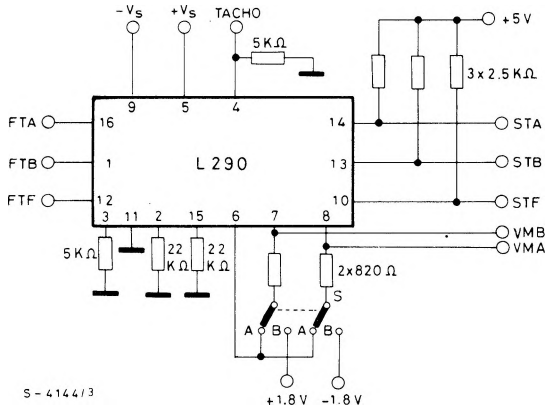
CONNECTION DIAGRAM
(top view)



BLOCK DIAGRAM



TEST CIRCUIT



THERMAL DATA

$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	80	°C/W

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

Parameters		Test conditions	Min.	Typ.	Max.	Unit
V_s	Supply voltage		±10		±15	V
I_d	Quiescent drain current	$V_s = \pm 15V$		13	20	mA

INPUT AMPLIFIERS (A_1 and A_2)

FTA, FTB	Input signal from encoder (pin 1, 16)	f_{max}= 20 KHz	±0.4		±0.6	V_p
V_{os}	Output offset voltage (pin 2, 15)	FTA = FTB = 0V			± 55	mV
I_b	Input bias current (pin 1, 16)			0.15		μA
G_v	Voltage gain	f = 10 KHz FTA=FTB=±0.6V_p	22	23	24	dB
V_o	Output voltage swing (pin 2, 15)	FTA= FTB= ± 1 V_p	±9.5			V

ELECTRICAL CHARACTERISTICS (continued)

Parameters	Test conditions	Min.	Typ.	Max.	Unit
COMPARATORS WITH HYSTERESIS (C_1, C_2 and C_3)					
V_{THP}(°) Positive Threshold voltage (pin 2, 12, 15)	C_1 and C_2	550		850	mV
	C_3	700		900	mV
V_{THN}(°°) Negative Threshold voltage (pin 2, 12, 15)	C_1 and C_2	55		175	mV
	C_3	570		830	mV
V_L Output voltage (low level) (pin 10, 13, 14)	I_o = 2 mA FTA= FTB= FTF= 0V		0.2	0.4	V
I_{leak} (pins 10, 13, 14)	FTA= FTB= 0.5V V_{CE}= 5V FTF= 1V			1	μA
REFERENCE GENERATOR					
V_{ref} DC reference voltage (pin 3)	FTA= FTB= ± 0.5V_p(*) I_{ref}= 1 mA	4.5	5	5.5	V
I_{ref} Output current (pin 3)				1.4	mA
"TACHO" AMPLIFIER (A_3)					
V_{os} Output offset voltage (pin 4)	FTA= ± 15 mV FTB= 0.5V			± 80	mV
V_o DC output voltage (pin 4)	FTA= FTB= ±0.5Vp (**) V_{o1}	5.4	6	6.6	V
	V_{MA}= V_{MB}= ±1.25V_p (***) V_{o2}	-5.4	-6	-6.6	
ΔV_o	V_{o1} + V_{o2}	-150		+150	mV
V_o Output voltage swing (pin 4)	S in (B) FTA= FTB= 0.5V	9			V
	S in (B) FTA= FTB= -0.5V	-9			
V_{MA} V_{MB} Multiplier input voltage (pin 7, 8)			± 1.25	± 1.7	Vp
V_{bias} Bias voltage (pin 6)	FTA and FTB floating	-6.5		-8	V

(°) : FTA = FTB = FTF = $\int_0^{1V}$ (°°) : FTA = FTB = FTF = $\sqcup_0^{1V}$

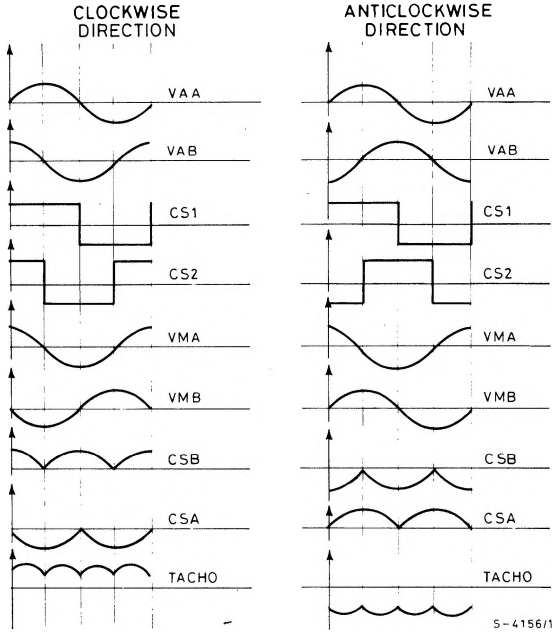
Note : Phase relationship between the signals:

* FTA : 0° FTB : 90°

** FTA : 0° FTB : -90° V_{MA}= 90° V_{MB}= 0°

*** FTA : 0° FTB : 90° V_{MA}= 90° V_{MB}= 180°

WAVEFORMS (Neglecting threshold voltage level of the comparators)



SYSTEM DESCRIPTION : refer to the L292 data sheet

Fig. 1 – Complete application circuit