

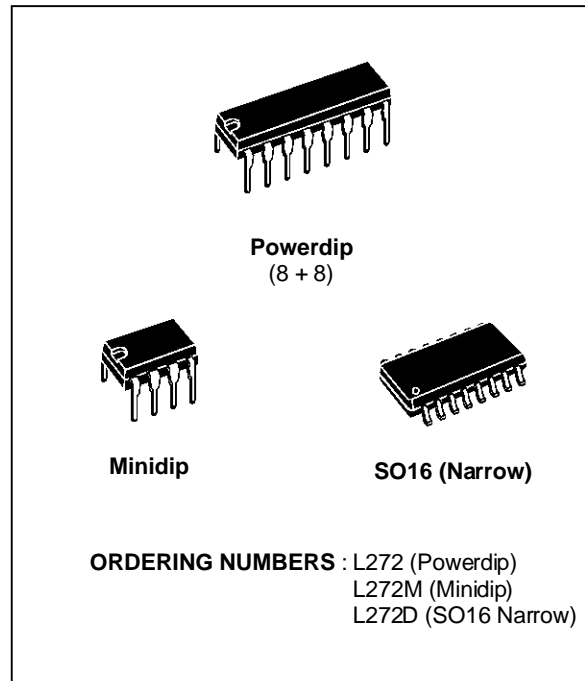
## DUAL POWER OPERATIONAL AMPLIFIERS

- OUTPUT CURRENT TO 1 A
- OPERATES AT LOW VOLTAGES
- SINGLE OR SPLIT SUPPLY
- LARGE COMMON-MODE AND DIFFERENTIAL MODE RANGE
- GROUND COMPATIBLE INPUTS
- LOW SATURATION VOLTAGE
- THERMAL SHUTDOWN

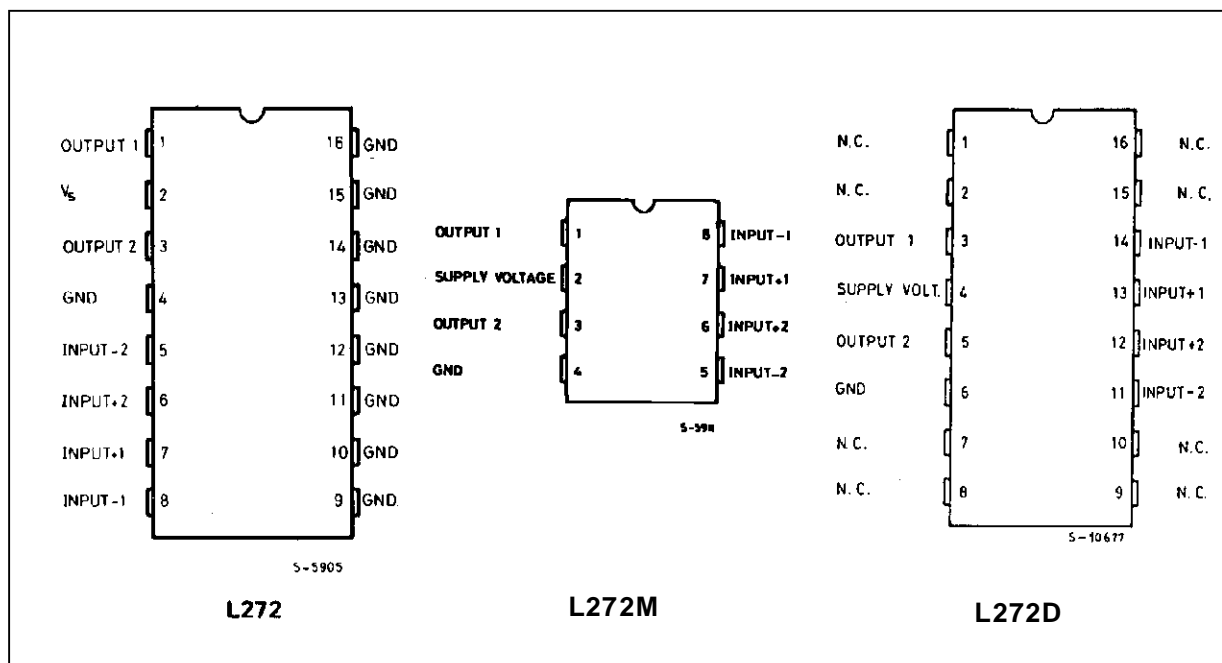
### DESCRIPTION

The L272 is a monolithic integrated circuits in Powerdip, Minidip and SO packages intended for use as power operational amplifiers in a wide range of applications including servo amplifiers and power supplies, compact disc, VCR, etc.

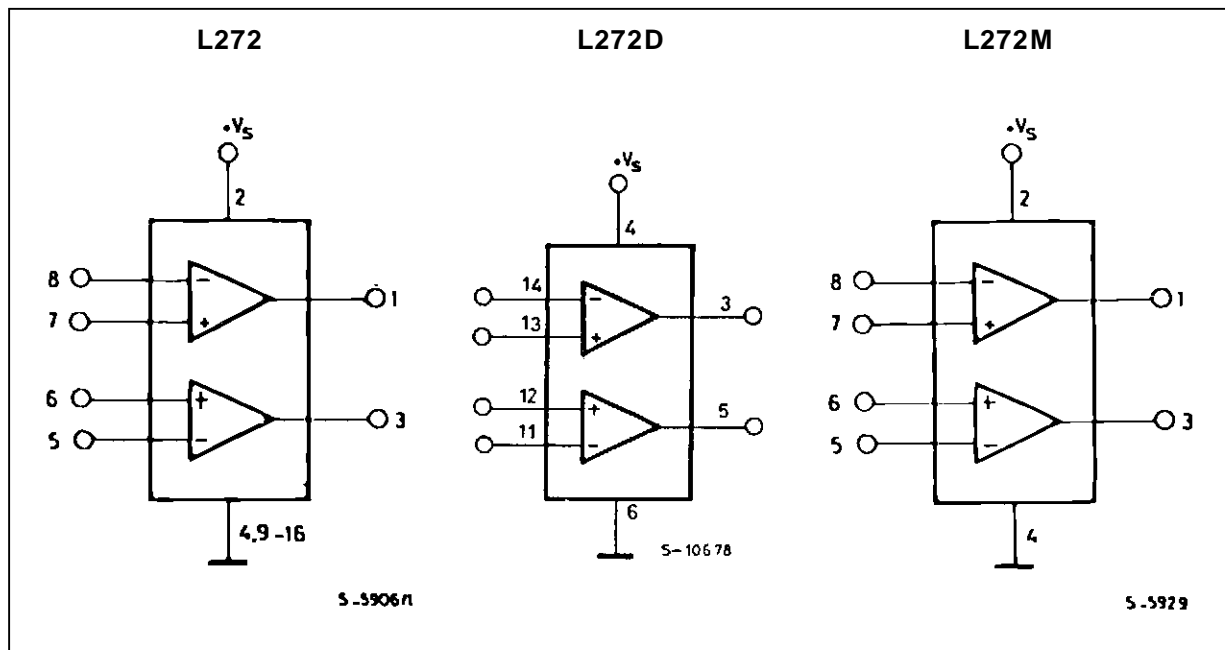
The high gain and high output power capability provide superior performance whatever an operational amplifier/power booster combination is required.



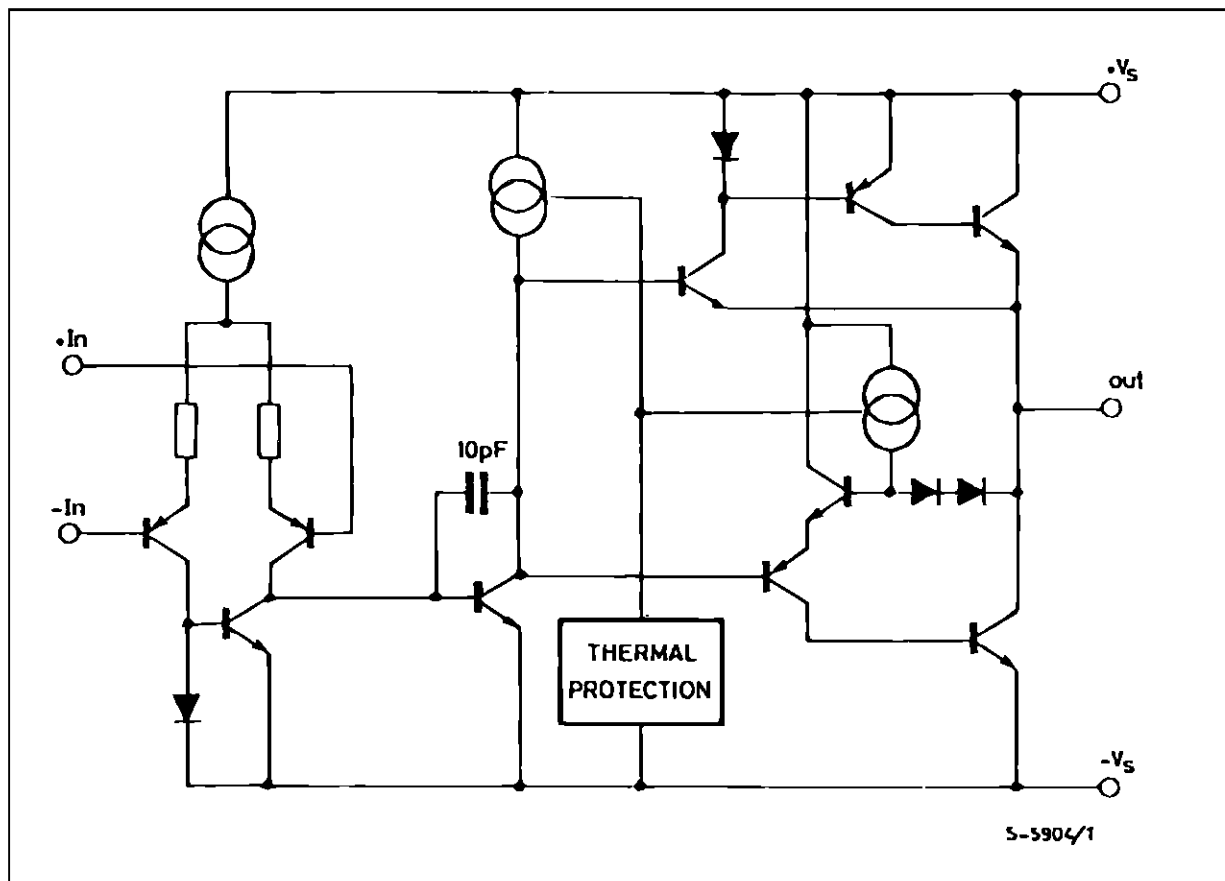
### PIN CONNECTIONS (top view)



## BLOCK DIAGRAMS



## SCHEMATIC DIAGRAM (one only)



## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_s$	Supply Voltage	28	V
$V_i$	Input Voltage	$V_s$	
$V_i$	Differential Input Voltage	$\pm V_s$	
$I_o$	DC Output Current	1	A
$I_p$	Peak Output Current (non repetitive)	1.5	A
$P_{tot}$	Power Dissipation at: $T_{amb} = 80^\circ\text{C}$ (L272), $T_{amb} = 50^\circ\text{C}$ (L272M), $T_{case} = 90^\circ\text{C}$ (L272D) $T_{case} = 75^\circ\text{C}$ (L272)	1.2 5	W W
$T_{op}$	Operating Temperature Range (L272D)	- 40 to 85	$^\circ\text{C}$
$T_{stg}, T_j$	Storage and Junction Temperature	- 40 to 150	$^\circ\text{C}$

## THERMAL DATA

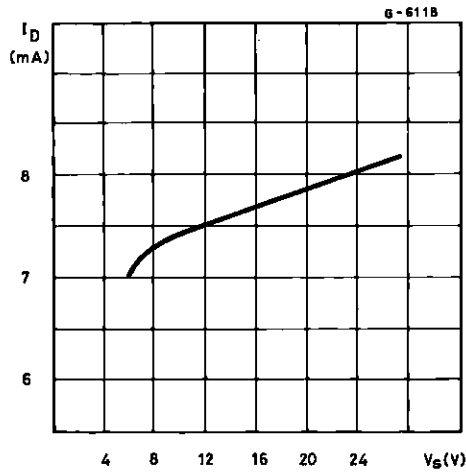
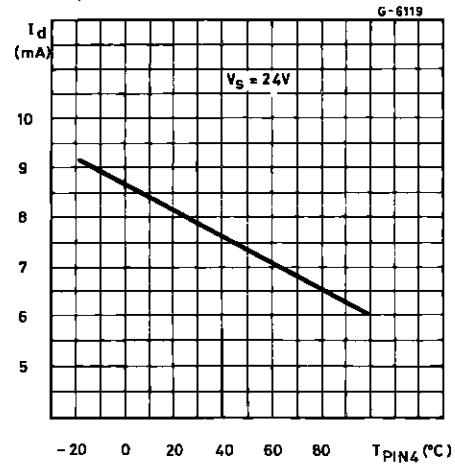
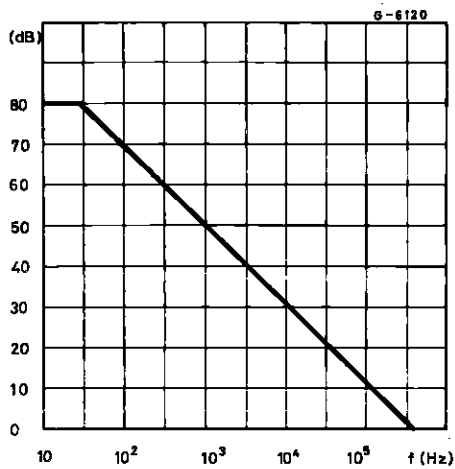
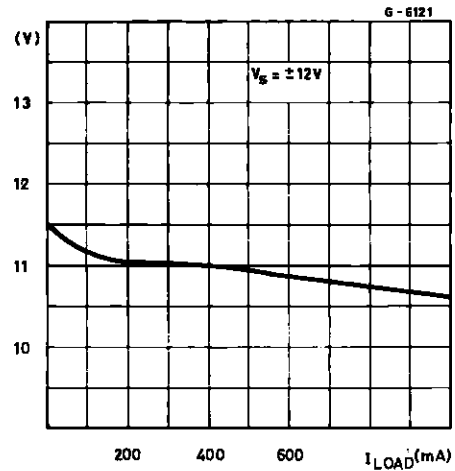
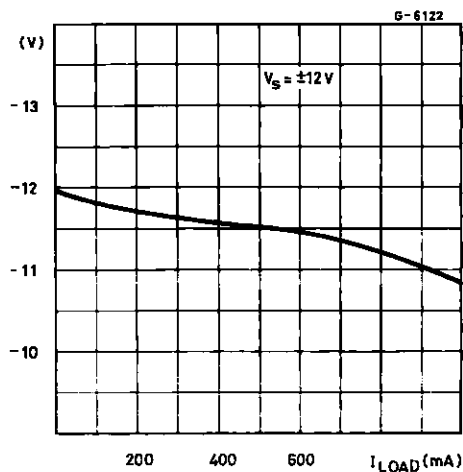
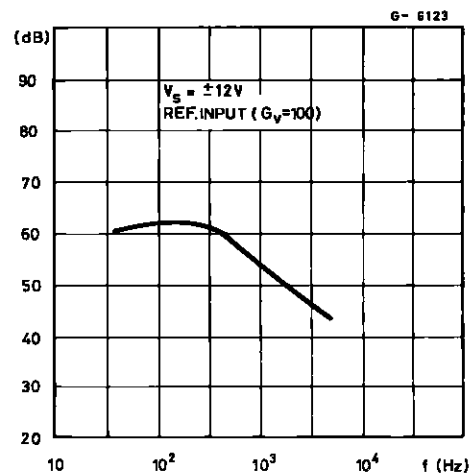
Symbol	Parameter	Powerdip	SO16	Minidip	Unit
$R_{th\ j-case}$	Thermal Resistance Junction-pins Max.	15	—	* 70	$^\circ\text{C/W}$
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient Max.	70	—	100	$^\circ\text{C/W}$
$R_{th\ j-alumina}$	Thermal Resistance Junction-alumina Max.	—	** 50	—	$^\circ\text{C/W}$

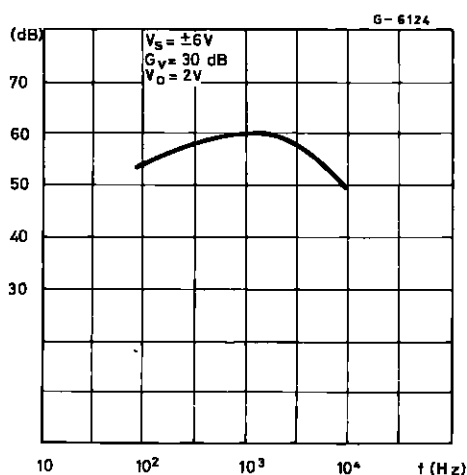
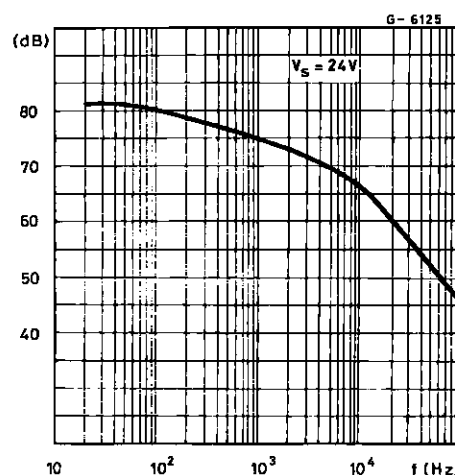
\* Thermal resistance junction-pin 4

\*\* Thermal resistance junctions-pins with the chip soldered on the middle of an alumina supporting substrate measuring 15x 20mm; 0.65mm thickness and infinite heatsink.

ELECTRICAL CHARACTERISTICS ( $V_s = 24\text{V}$ ,  $T_{amb} = 25^\circ\text{C}$  unless otherwise specified)

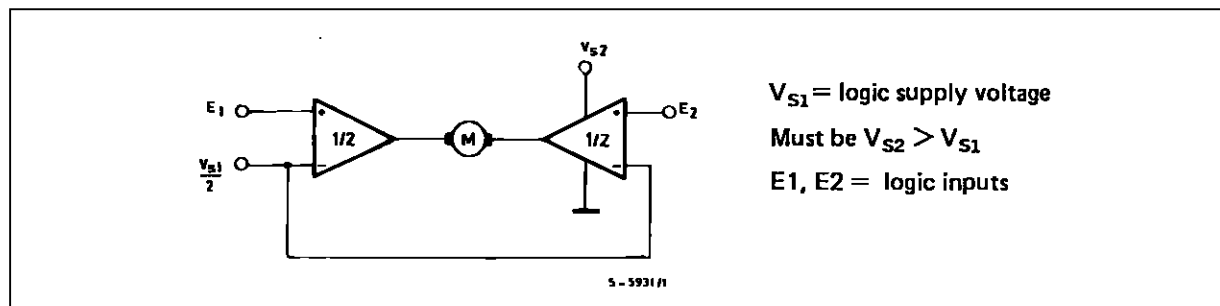
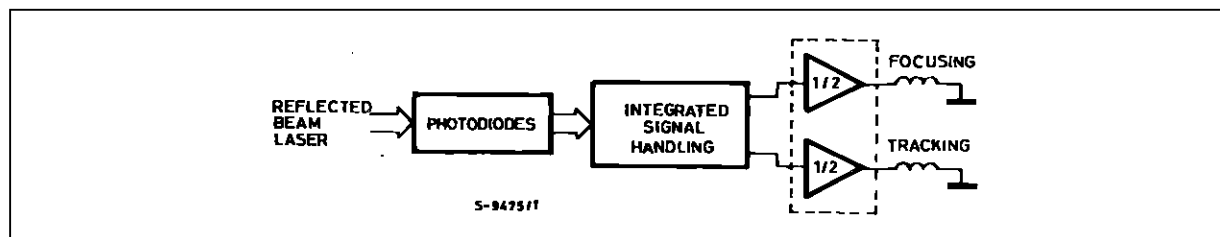
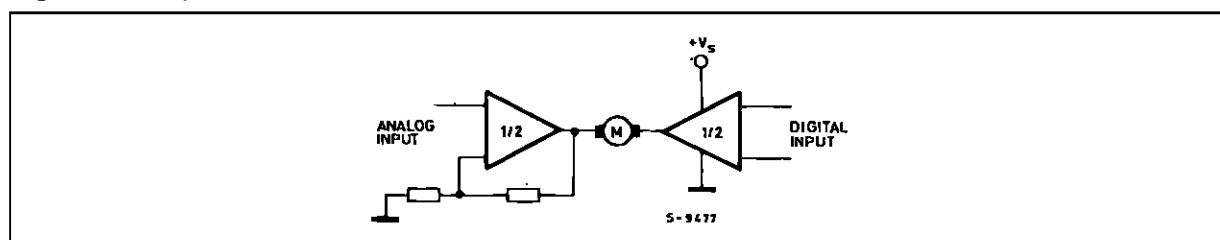
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$V_s$	Supply Voltage		4		28	V
$I_s$	Quiescent Drain Current	$V_O = \frac{V_s}{2}$ $V_s = 24\text{V}$ $V_s = 12\text{V}$		8 7.5	12 11	mA mA
$I_b$	Input Bias Current			0.3	2.5	$\mu\text{A}$
$V_{os}$	Input Offset Voltage			15	60	mV
$I_{os}$	Input Offset Current			50	250	nA
SR	Slew Rate			1		V/ $\mu\text{s}$
B	Gain-bandwidth Product			350		kHz
$R_i$	Input Resistance		500			k $\Omega$
$G_v$	O. L. Voltage Gain	$f = 100\text{Hz}$ $f = 1\text{kHz}$	60	70 50		dB dB
$e_N$	Input Noise Voltage	$B = 20\text{kHz}$		10		$\mu\text{V}$
$I_N$	Input Noise Current	$B = 20\text{kHz}$		200		pA
CRR	Common Mode Rejection	$f = 1\text{kHz}$	60	75		dB
SVR	Supply Voltage Rejection	$f = 100\text{Hz}$ , $R_G = 10\text{k}\Omega$ , $V_R = 0.5\text{V}$ $V_s = 24\text{V}$ $V_s = \pm 12\text{V}$ $V_s = \pm 6\text{V}$	54	70 62 56		dB
$V_o$	Output Voltage Swing	$I_p = 0.1\text{A}$ $I_p = 0.5\text{A}$	21	23 22.5		V V
$C_s$	Channel Separation	$f = 1\text{kHz}$ ; $R_L = 10\Omega$ , $G_v = 30\text{dB}$ $V_s = 24\text{V}$ $V_s = \pm 6\text{V}$		60 60		dB
d	Distortion	$f = 1\text{kHz}$ , $G_v = 3\text{dB}$ , $V_s = 24\text{V}$ , $R_L = \infty$		0.5		%
$T_{sd}$	Thermal Shutdown Junction Temperature			145		$^\circ\text{C}$

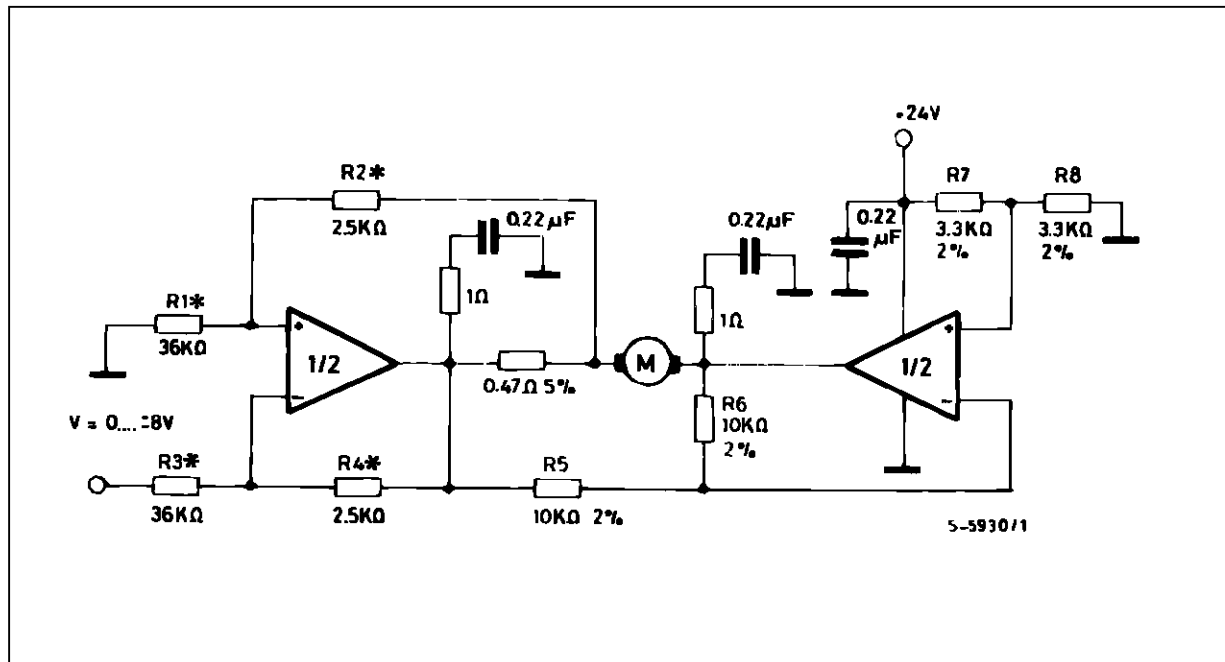
**Figure 1 :** Quiescent Current versus Supply Voltage**Figure 2 :** Quiescent Drain Current versus Temperature**Figure 3 :** Open Loop Voltage Gain**Figure 4 :** Output Voltage Swing versus Load Current**Figure 5 :** Output Voltage Swing versus Load Current**Figure 6 :** Supply Voltage Rejection versus Frequency

**Figure 7 :** Channel Separation versus Frequency**Figure 8 :** Common Mode Rejection versus Frequency**APPLICATION SUGGESTION****NOTE**

In order to avoid possible instability occurring into final stage the usual suggestions for the linear power stages are useful, as for instance :

- layout accuracy ;
- a 100nF capacitor connected between supply pins and ground ;
- boucherot cell (0.1 to 0.2  $\mu F$  + 1  $\Omega$  series) between outputs and ground or across the load.

**Figure 9 :** Bidirectional DC Motor Control with  $\mu P$  Compatible Inputs**Figure 10 :** Servocontrol for Compact-disc**Figure 11 :** Capstan Motor Control in Video Recorders

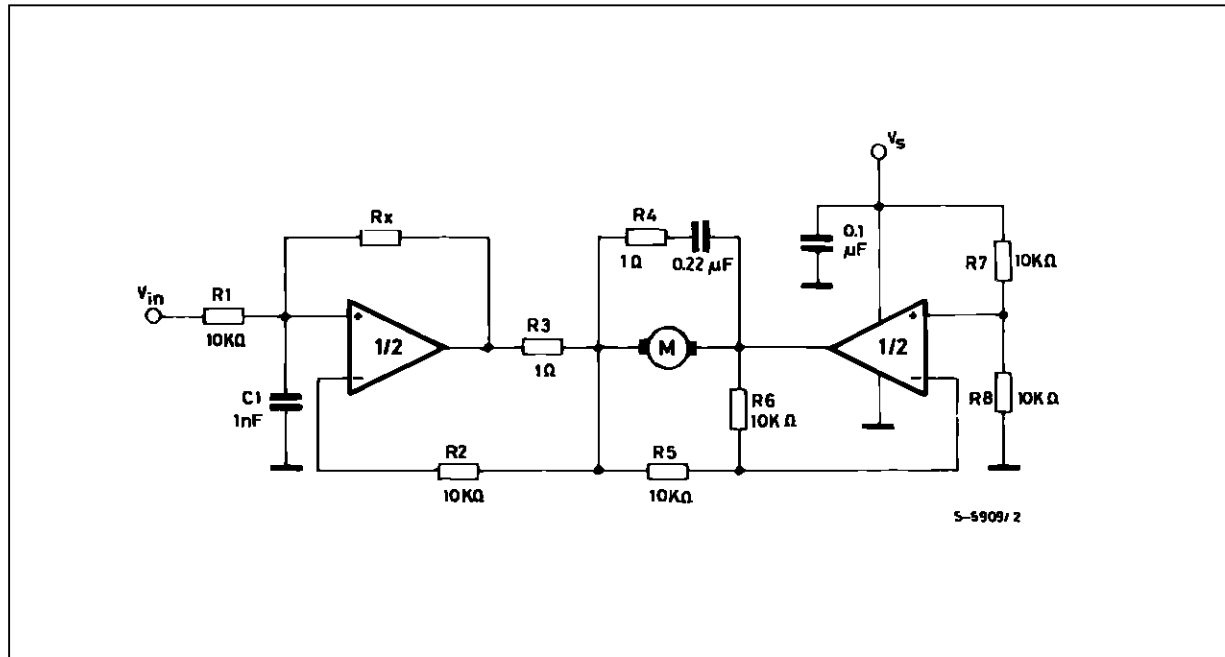
**Figure 12** : Motor Current Control Circuit.

**Note** : The input voltage level is compatible with L291 (5-BIT D/A converter).

**Figure 13** : Bidirectional Speed Control of DC Motors.

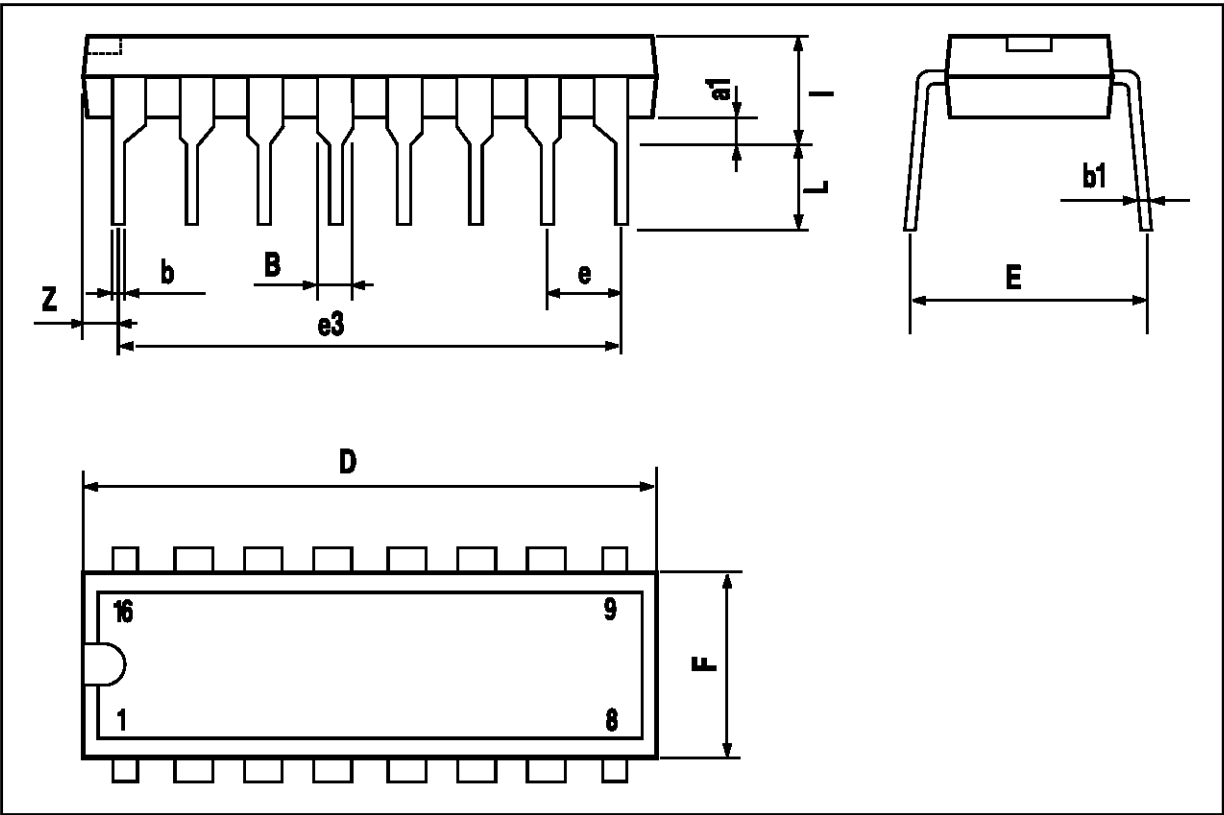
For circuit stability ensure that  $R_X > \frac{2R_3 \cdot R_1}{R_M}$  where  $R_M$  = internal resistance of motor.

The voltage available at the terminals of the motor is  $V_M = 2 \left( V_i \cdot \frac{V_s}{2} \right) + |R_o| \cdot I_M$  where  $|R_o| = \frac{2R \cdot R_1}{R_X}$  and  $I_M$  is the motor current.



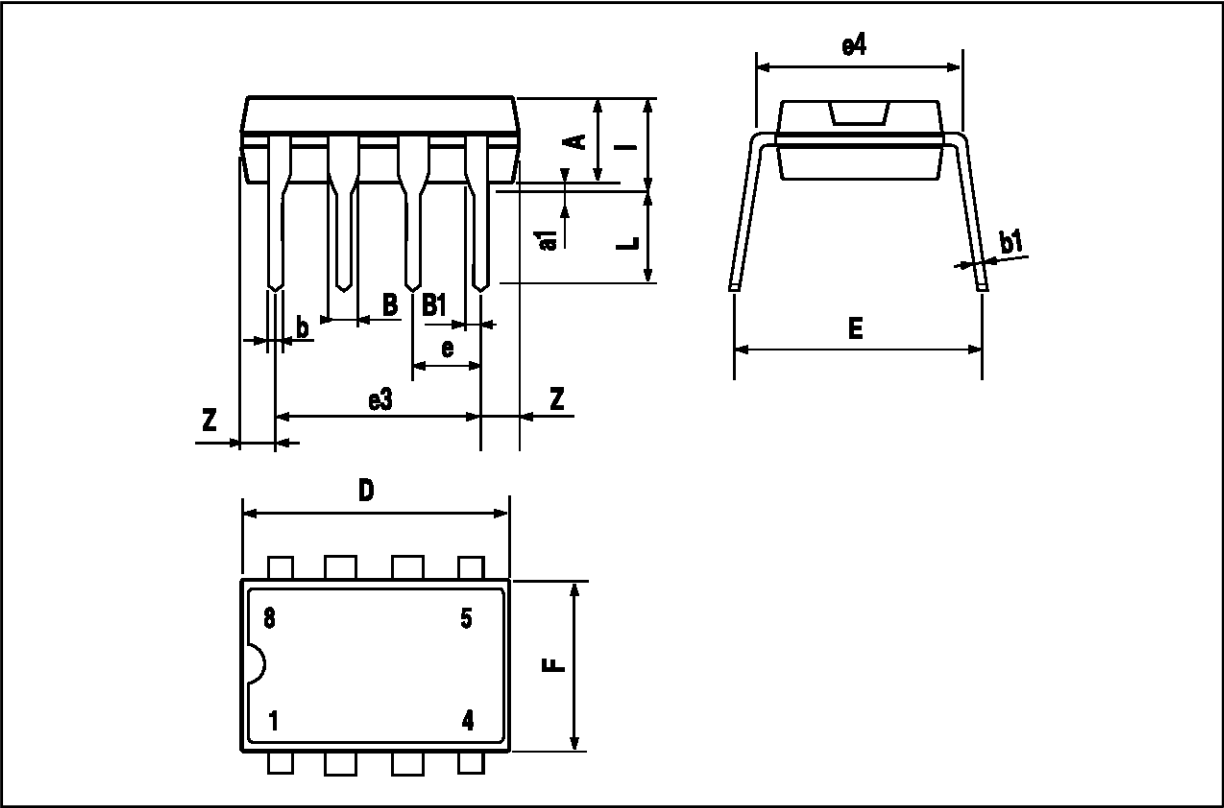
POWERDIP 16 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.85		1.40	0.033		0.055
b		0.50			0.020	
b1	0.38		0.50	0.015		0.020
D			20.0			0.787
E		8.80			0.346	
e		2.54			0.100	
e3		17.78			0.700	
F			7.10			0.280
I			5.10			0.201
L		3.30			0.130	
Z			1.27			0.050



MINIDIP PACKAGE MECHANICAL DATA

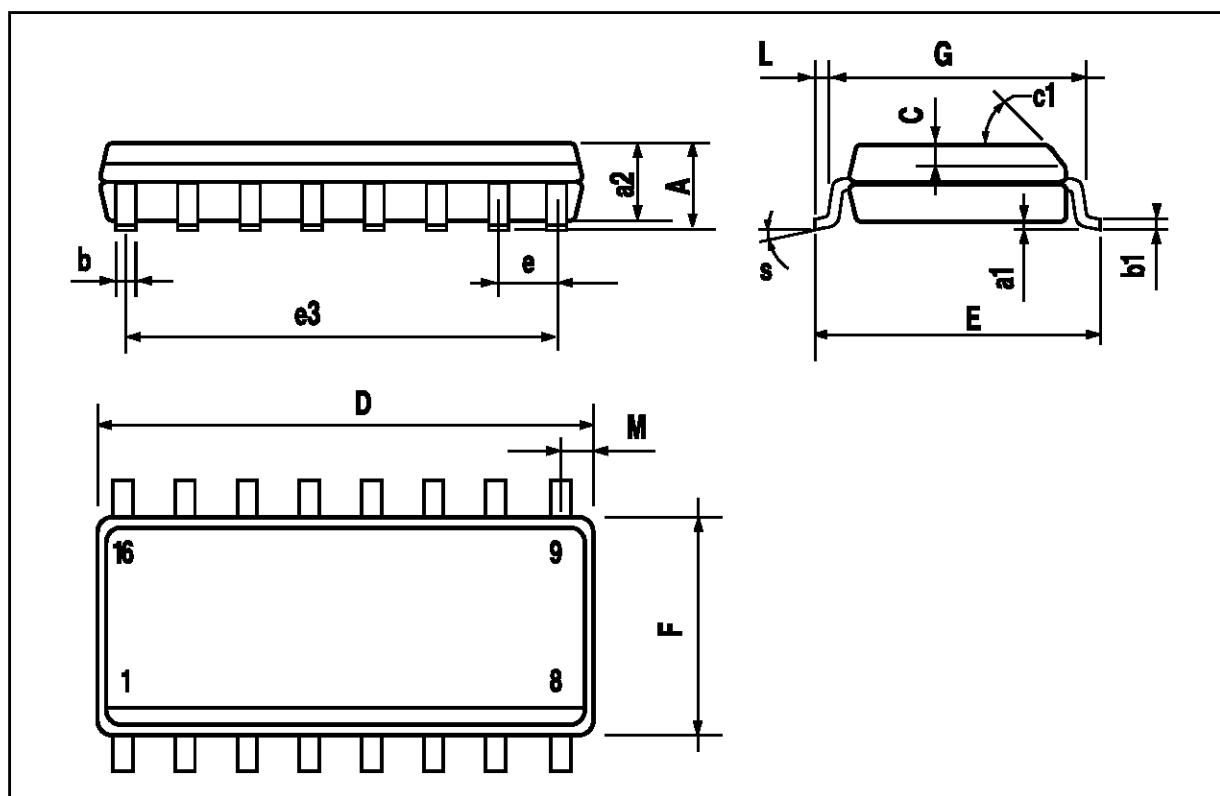
DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
I			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060





## SO16 NARROW PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.069
a1	0.1		0.25	0.004		0.009
a2			1.6			0.063
b	0.35		0.46	0.014		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.020	
c1	45° (typ.)					
D	9.8		10	0.386		0.394
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.150		0.157
L	0.4		1.27	0.150		0.050
M			0.62			0.024
S	8° (max.)					



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