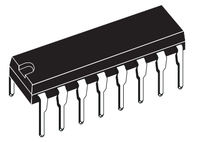
SGS-THOMSON MICROELECTRONICS

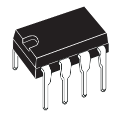
L272

DUAL POWER OPERATIONAL AMPLIFIERS

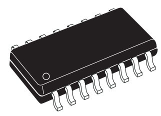
- OUTPUT CURRENT TO 1 A
- OPERATES AT LOW VOLTAGES
- SINGLE OR SPLIT SUPPLY
- LARGE COMMON-MODE AND DIFFERENTIAL MODE RANGE
- GROUND COMPATIBLE INPUTS
- LOW SATURATION VOLTAGE
- THERMAL SHUTDOWN



Powerdip
(8 + 8)



Minidip



SO16 (Narrow)

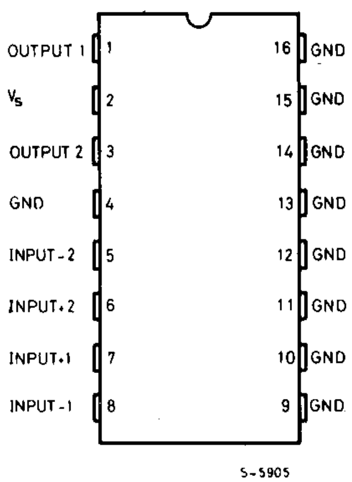
ORDERING NUMBERS : L272 (Powerdip)
L272M (Minidip)
L272D (SO16 Narrow)

DESCRIPTION

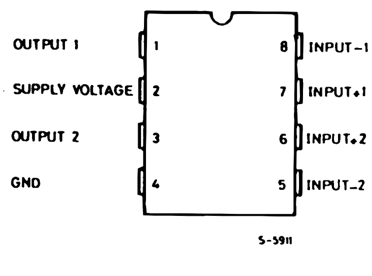
The L272 is a monolithic integrated circuits in Powerdip, Minidip and SO packages intended for use as power operational amplifiers in a wide range of applications including servo amplifiers and power supplies, compacts disc, VCR, etc.

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

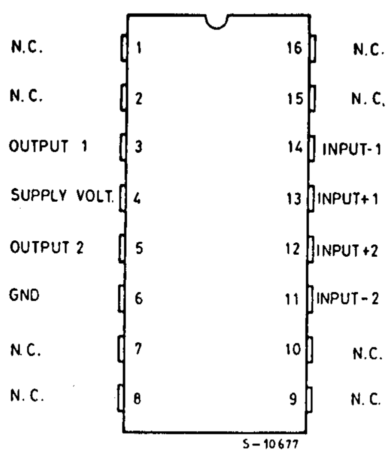
PIN CONNECTIONS (top view)



L272

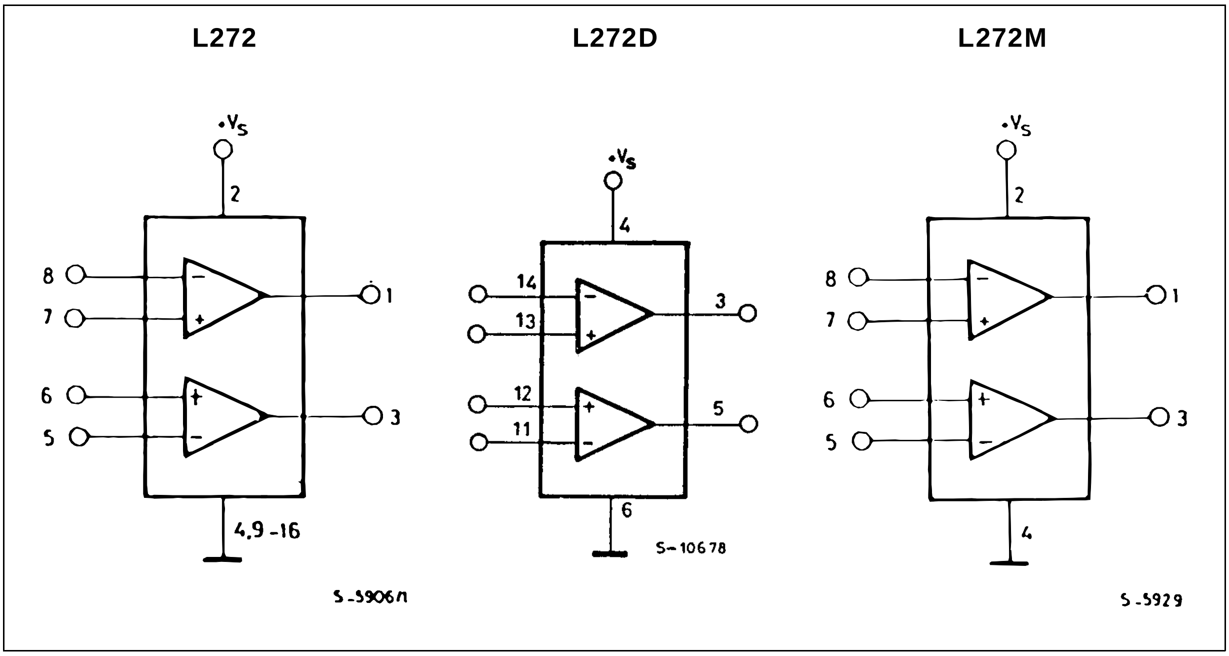


L272M

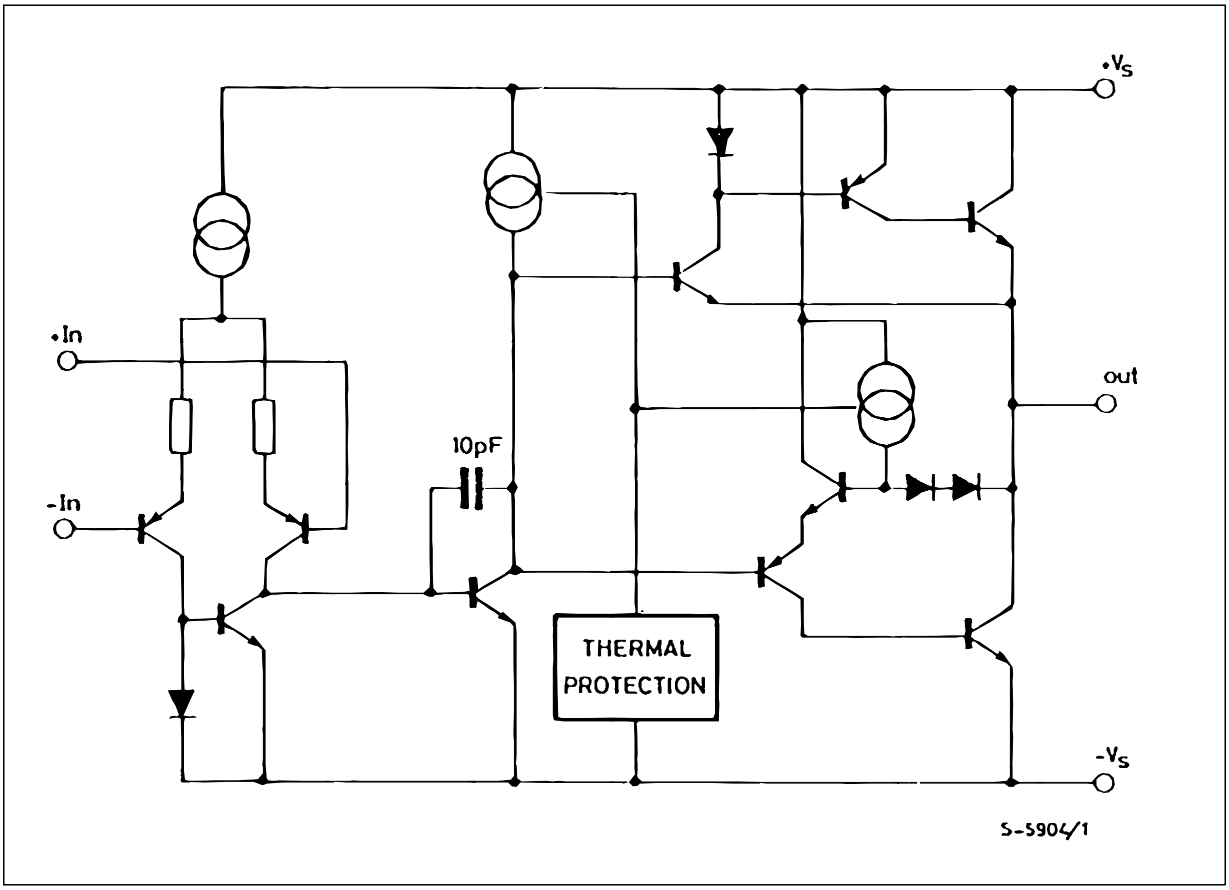


L272D

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	± 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°C (L272), T_{amb} = 50°C (L272M), T_{case} = 90 °C (L272D) T_{case} = 75 °C (L272)	 1.2 5	 W W
T_{op}	Operating Temperature Range (L272D)	– 40 to 85	°C
T_{stg}, T_j	Storage and Junction Temperature	– 40 to 150	°C

THERMAL DATA

Symbol	Parameter		Powerdip	SO16	Minidip	Unit
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-pins	Max.	15	–	* 70	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max.	70	–	100	°C/W
$R_{th\ j\text{-}alumina}$	Thermal Resistance Junction-alumina	Max.	–	** 50	–	°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 = 24V, T_{amb} = 25°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 = 24V V_s = 12V		8 7.5	12 11	mA mA
I_b	Input Bias Current			0.3	2.5	µA
V_{os}	Input Offset Voltage			15	60	mV
I_{os}	Input Offset Current			50	250	nA
SR	Slew Rate			1		V/µs
B	Gain-bandwidth Product			350		kHz
R_i	Input Resistance		500			kΩ
G_v	O. L. Voltage Gain	f = 100Hz f = 1kHz	60	70 50		dB dB
e_N	Input Noise Voltage	B = 20kHz		10		µV
I_N	Input Noise Current	B = 20kHz		200		pA
CRR	Common Mode Rejection	f = 1kHz	60	75		dB
SVR	Supply Voltage Rejection	f = 100Hz, R_G = 10kΩ, V_R = 0.5V V_s = 24V V_s = ± 12V V_s = ± 6V	 54	 70 62 56		dB
V_o	Output Voltage Swing	I_p = 0.1A I_p = 0.5A	 21	23 22.5		V V
C_s	Channel Separation	f = 1 kHz; R_L =10Ω, G_v = 30dB V_s = 24V V_s = ± 6V		 60 60		dB
d	Distortion	f = 1kHz, G_v = 3 dB, V_s = 24V, R_L = ∞		0.5		%
T_{sd}	Thermal Shutdown Junction Temperature			145		°C

Figure 1 : Quiescent Current versus Supply Voltage

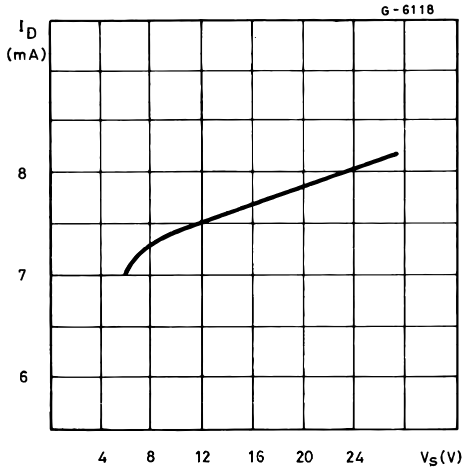


Figure 2 : Quiescent Drain Current versus Temperature

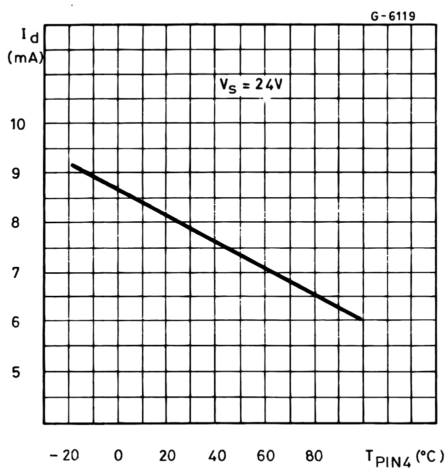


Figure 3 : Open Loop Voltage Gain

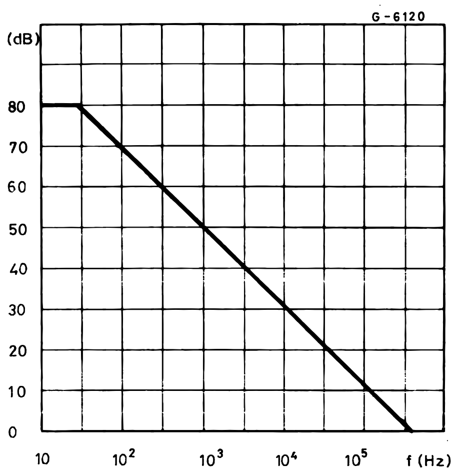


Figure 4 : Output Voltage Swing versus Load Current

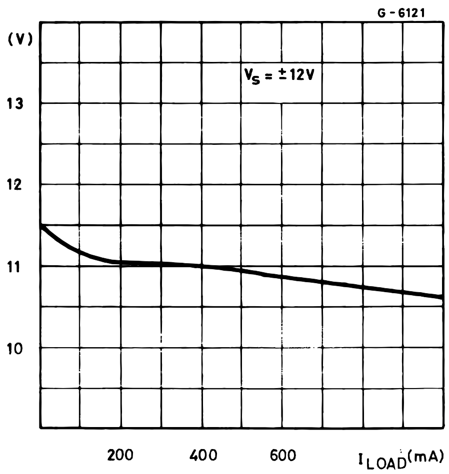


Figure 5 : Output Voltage Swing versus Load Current

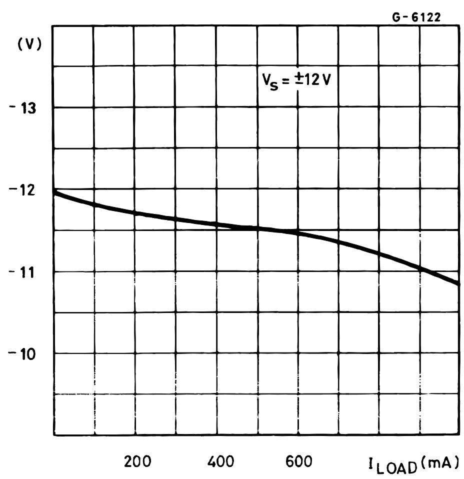


Figure 6 : Supply Voltage Rejection versus Frequency

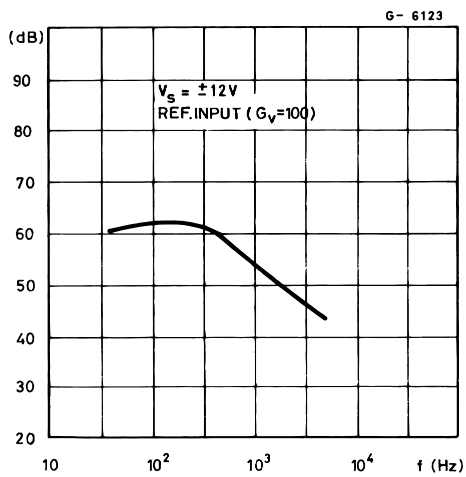


Figure 7 : Channel Separation versus Frequency

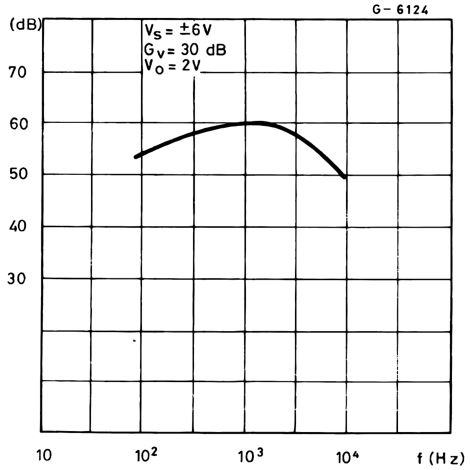
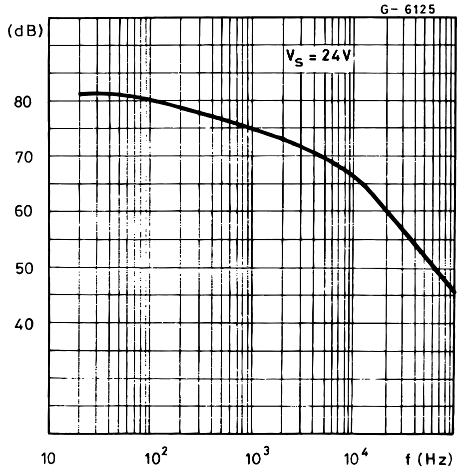


Figure 8 : Common Mode Rejection versus Frequency



APPLICATION SUGGESTION

NOTE

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

- layout accuracy ;
- a 100nF capacitor corrected between supply pins and ground ;
- boucherot cell (0.1 to 0.2 μF + 1 Ω series) between outputs and ground or across the load.

Figure 9 : Bidirectional DC Motor Control with μP Compatible Inputs

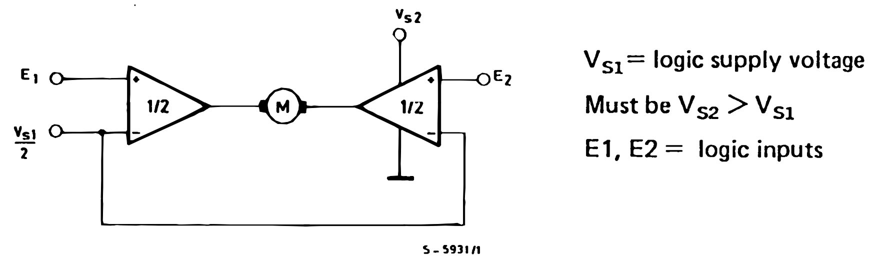


Figure 10 : Servocontrol for Compact-disc

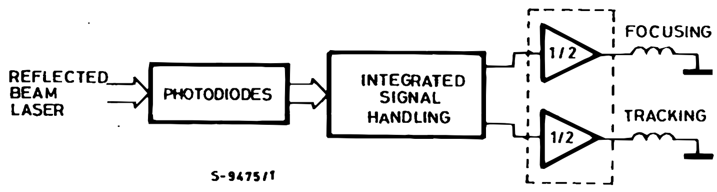


Figure 11 : Capstan Motor Control in Video Recorders

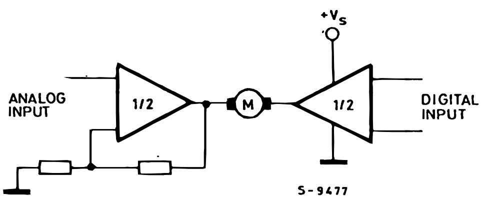
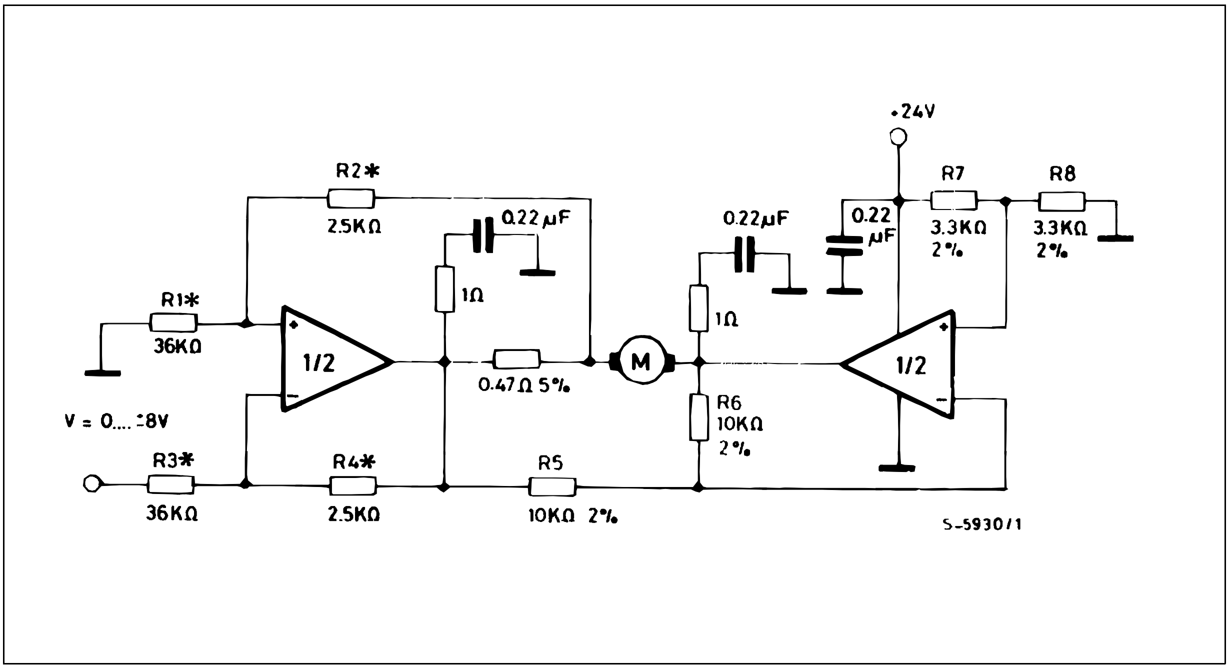


Figure 12 : Motor Current Control Circuit.

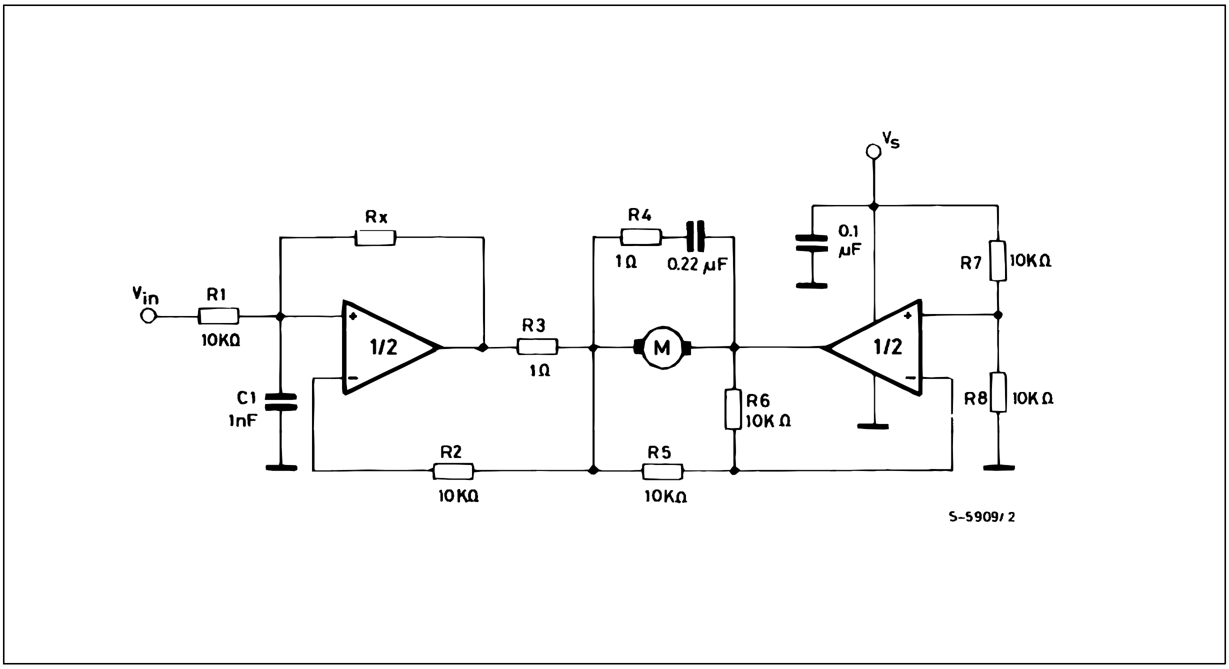


Note : The input voltage level is compatible with L291 (5-BIT D/A converter).

Figure 13 : Bidirectional Speed Control of DC Motors.

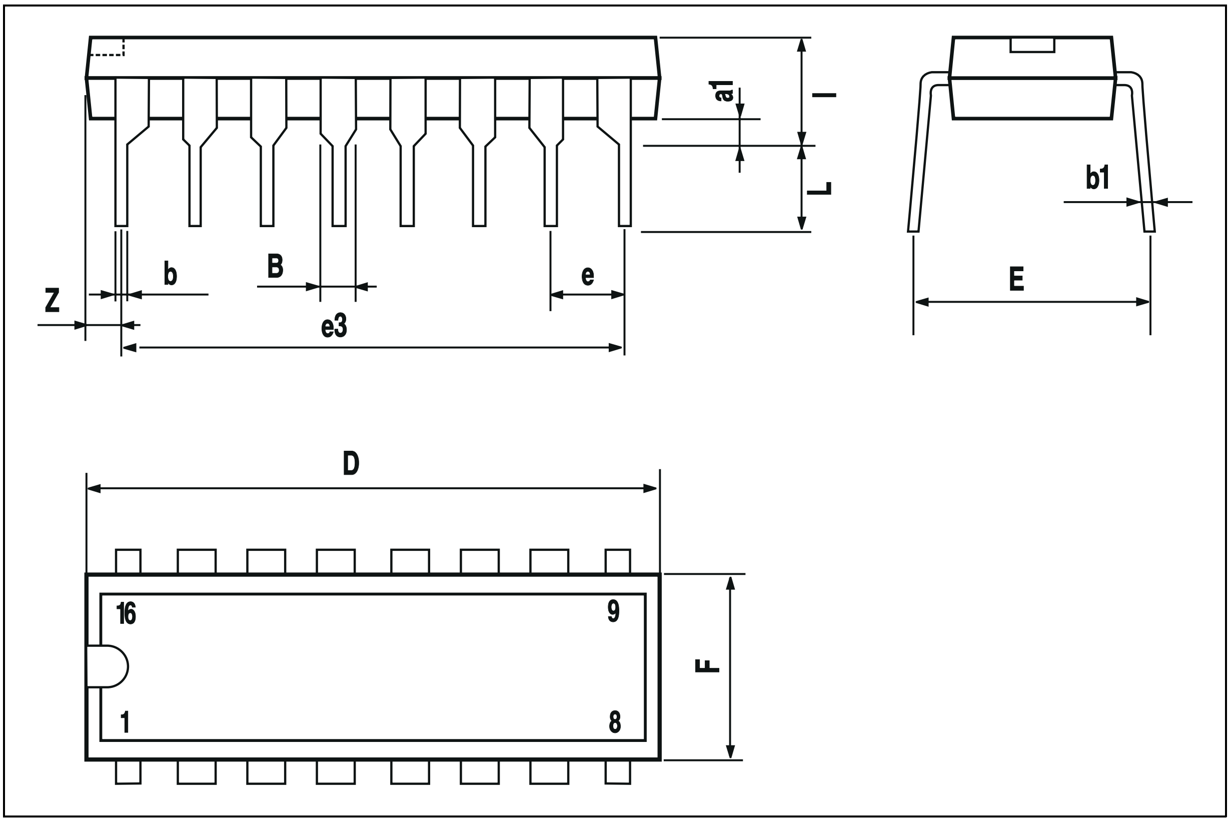
For circuit stability ensure that $R_X > \dfrac{2R3 \circ R1}{R_M}$ where R_M = internal resistance of motor.

The voltage available at the terminals of the motor is $V_M = 2\,(V_i \cdot \dfrac{V_S}{2}) + |R_o| \cdot I_M$ where $|R_o| = \dfrac{2R \circ R1}{R_X}$ and I_M is the motor current.



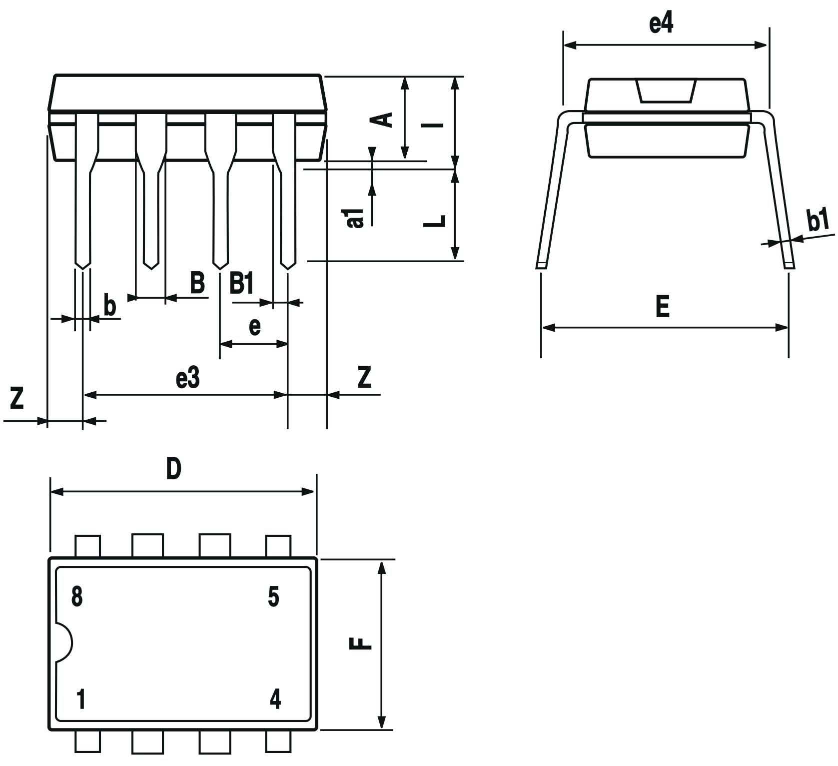
POWERDIP 16 PACKAGE MECHANICAL DATA

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



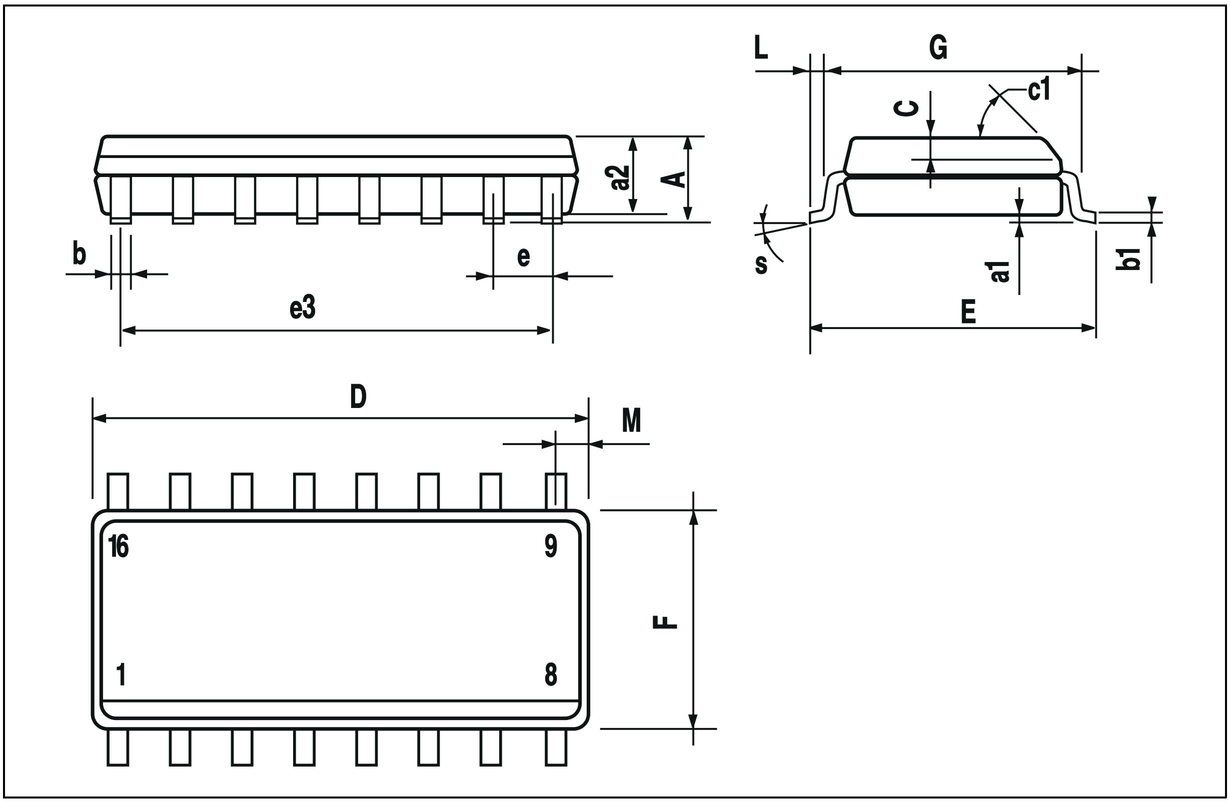
MINIDIP PACKAGE MECHANICAL DATA

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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