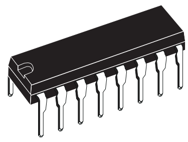
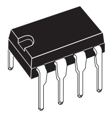
# L272

## DUAL POWER OPERATIONAL AMPLIFIERS

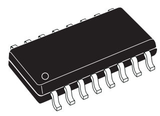
- OUTPUT CURRENT TO 1 A
- OPERATES AT LOW VOLTAGES
- SINGLE OR SPLIT SUPPLY
- LARGE COMMON-MODE AND DIFFEREN-TIAL MODE RANGE
- GROUND COMPATIBLE INPUTS
- LOW SATURATION VOLTAGE
- THERMAL SHUTDOWN



**Powerdip**
(8 + 8)



**Minidip**



**SO16 (Narrow)**

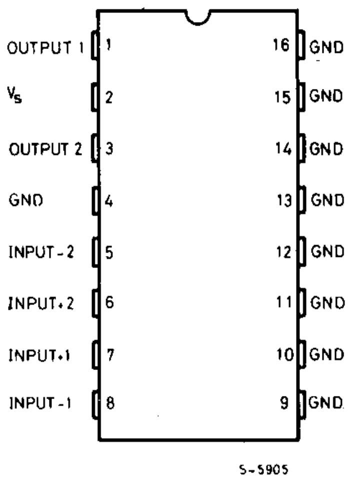
**ORDERING NUMBERS** : L272 (Powerdip)
L272M (Minidip)
L272D (SO16 Narrow)

### DESCRIPTION

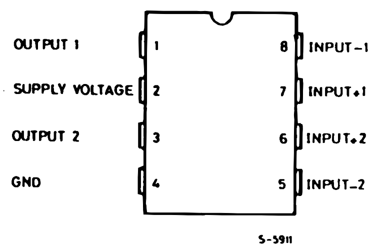
The L272 is a monolithic integrated circuits in Powerdip, Minidip and SO packages intended for use as power operational amplifiers in a wide range of applications including servo amplifiers and power supplies, compacts disc, VCR, etc.

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

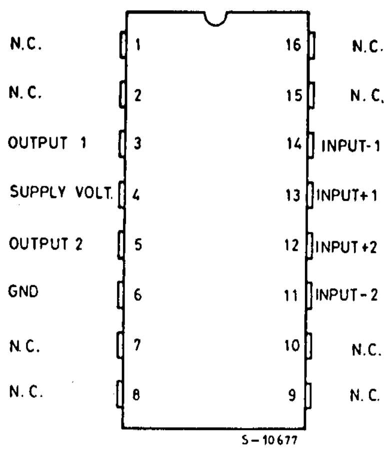
### PIN CONNECTIONS (top view)




**L272**

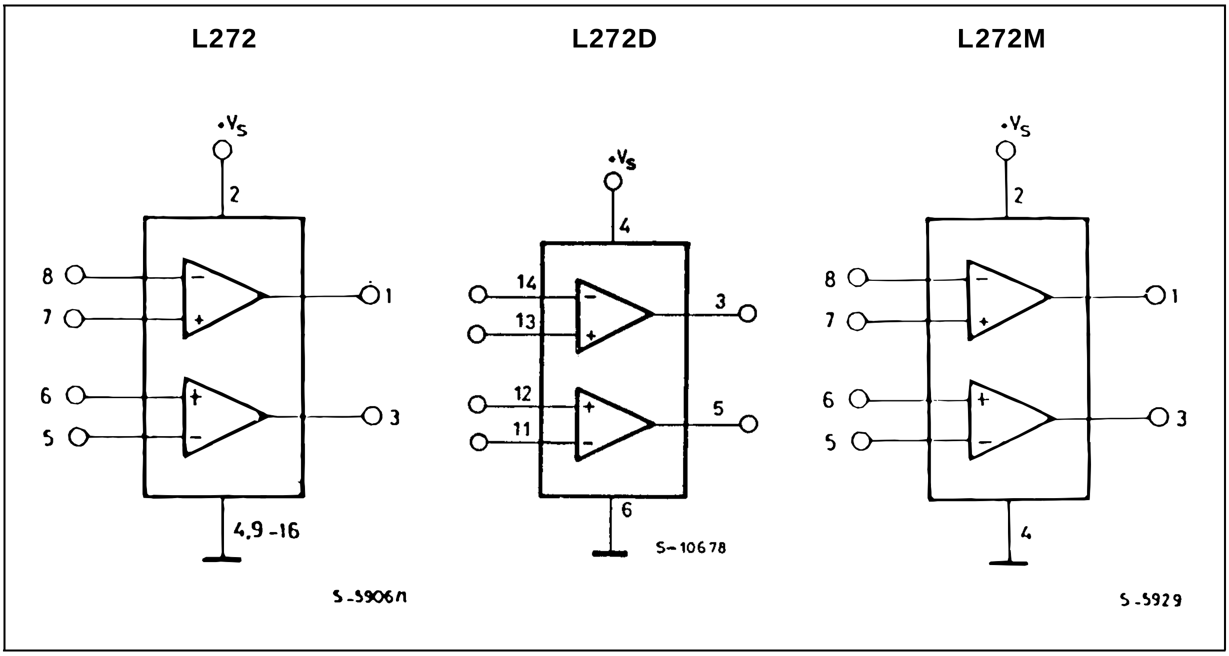



**L272M**

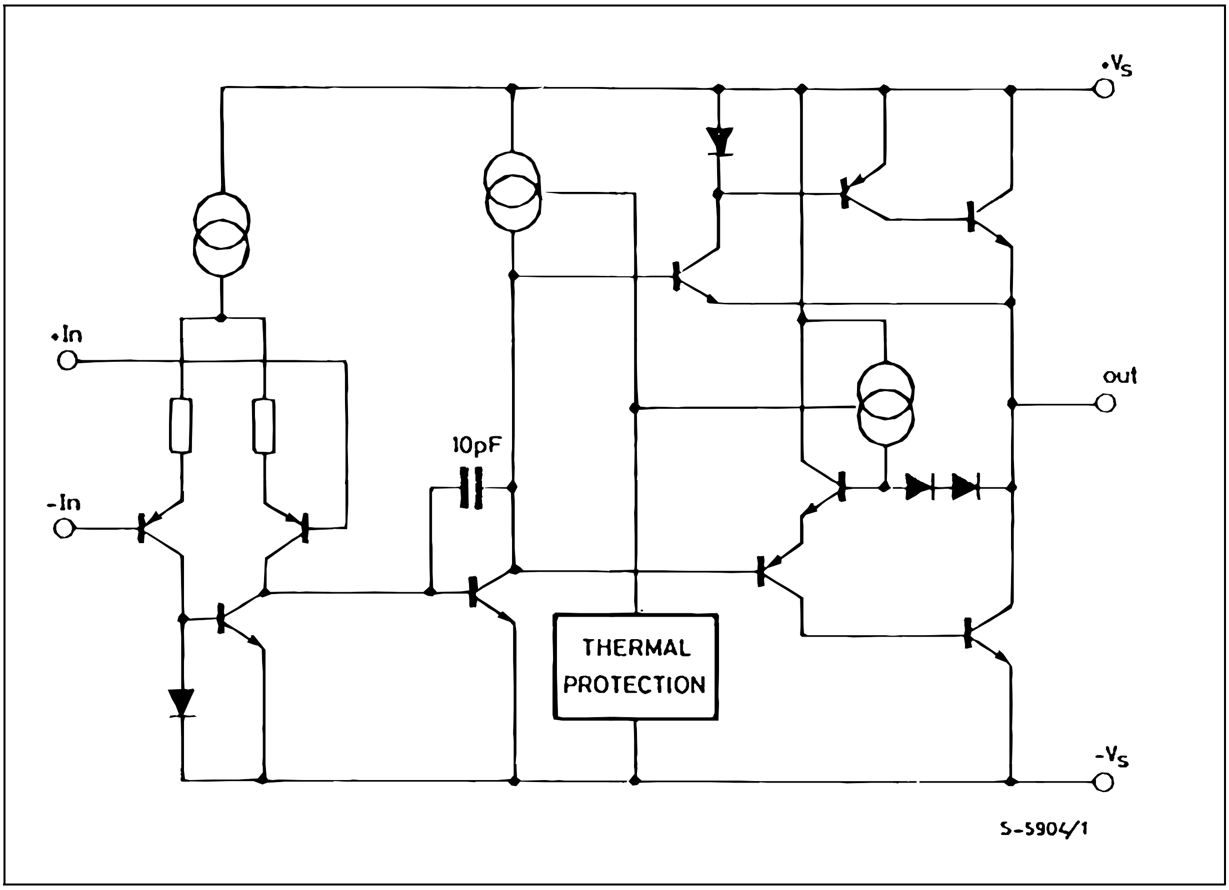



**L272D**

## 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 | $\pm V_s$ | |
| $I_o$ | DC Output Current | 1 | A |
| $I_p$ | Peak Output Current (non repetitive) | 1.5 | A |
| $P_{tot}$ | Power Dissipation at:<br>$T_{amb}$ = 80°C (L272), $T_{amb}$ = 50°C (L272M), $T_{case}$ = 90 °C (L272D)<br>$T_{case}$ = 75 °C (L272) | <br>1.2<br>5 | <br>W<br>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<br>$V_s$ = 12V | | 8<br>7.5 | 12<br>11 | mA<br>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<br>f = 1kHz | 60 | 70<br>50 | | dB<br>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<br>$V_s$ = 24V<br>$V_s$ = ± 12V<br>$V_s$ = ± 6V | <br><br>54<br> | <br>70<br>62<br>56 | | dB |
| $V_o$ | Output Voltage Swing | $I_p$ = 0.1A<br>$I_p$ = 0.5A | <br>21 | 23<br>22.5 | | V<br>V |
| $C_s$ | Channel Separation | f = 1 kHz; $R_L$ =10Ω, $G_v$ = 30dB<br>$V_s$ = 24V<br>$V_s$ = ± 6V | | <br>60<br>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

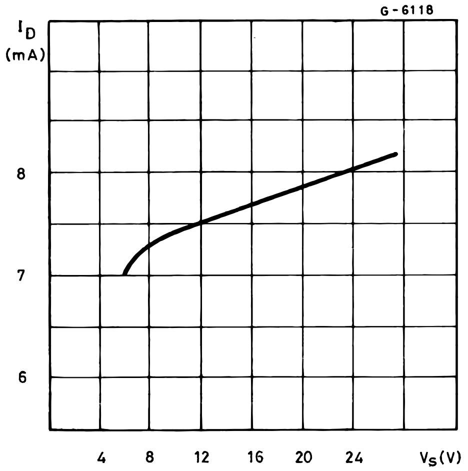



**Figure 2 :** Quiescent Drain Current versus Temperature

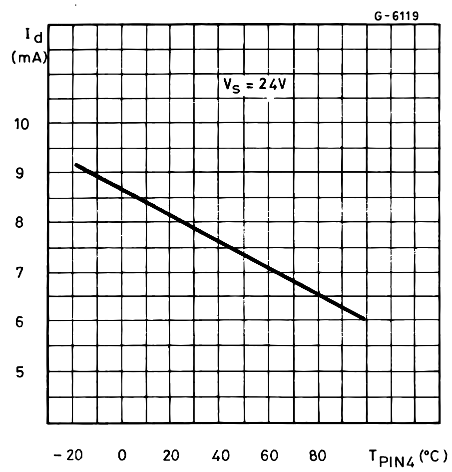



**Figure 3 :** Open Loop Voltage Gain

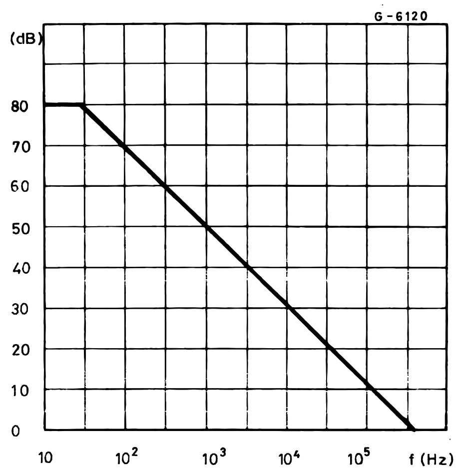



**Figure 4 :** Output Voltage Swing versus Load Current

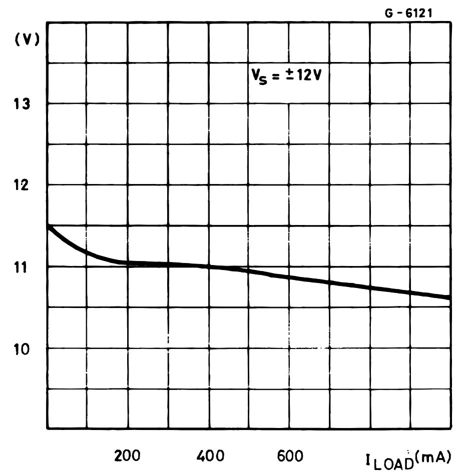



**Figure 5 :** Output Voltage Swing versus Load Current

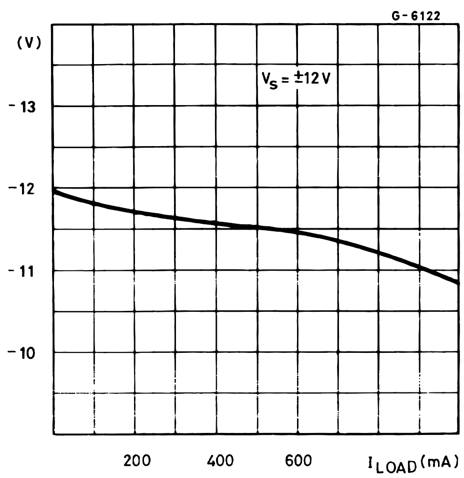



**Figure 6 :** Supply Voltage Rejection versus Frequency

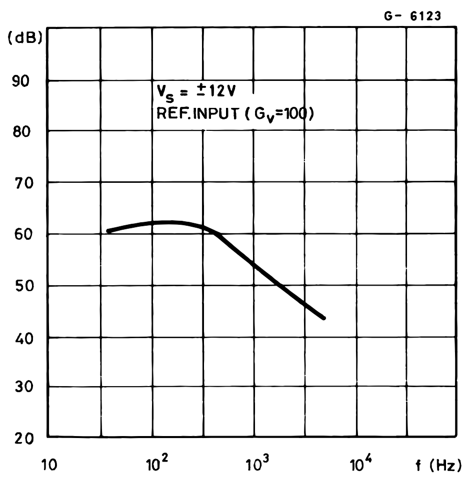


**Figure 7 :** Channel Separation versus Frequency

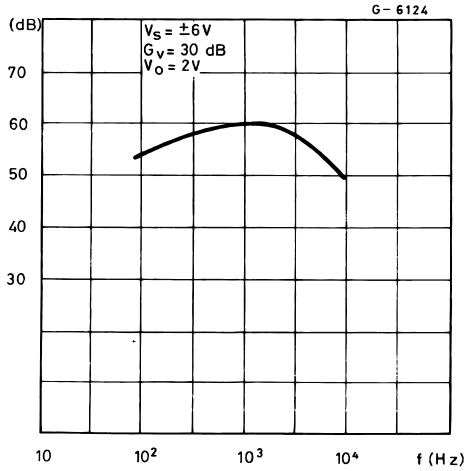
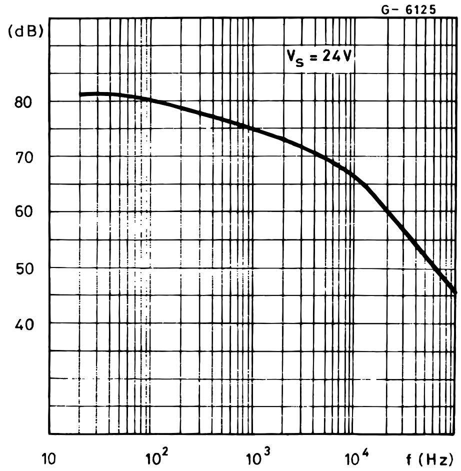



**Figure 8 :** Common Mode Rejection versus Frequency




**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

**Figure 9** : Bidirectional DC Motor Control with µP Compatible Inputs

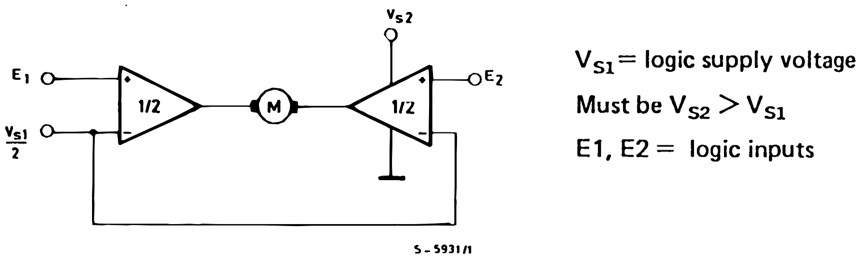



**Figure 10** : Servocontrol for Compact-disc

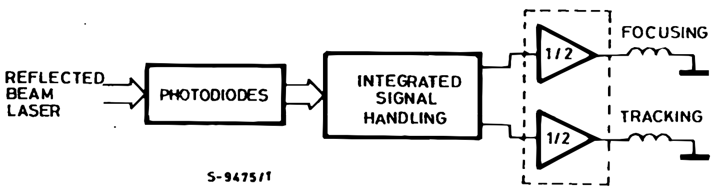



**Figure 11 :** Capstan Motor Control in Video Recorders

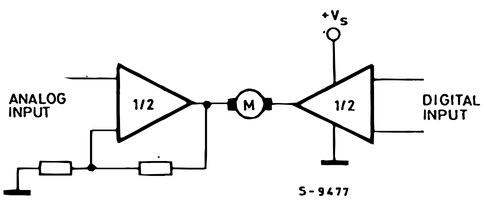
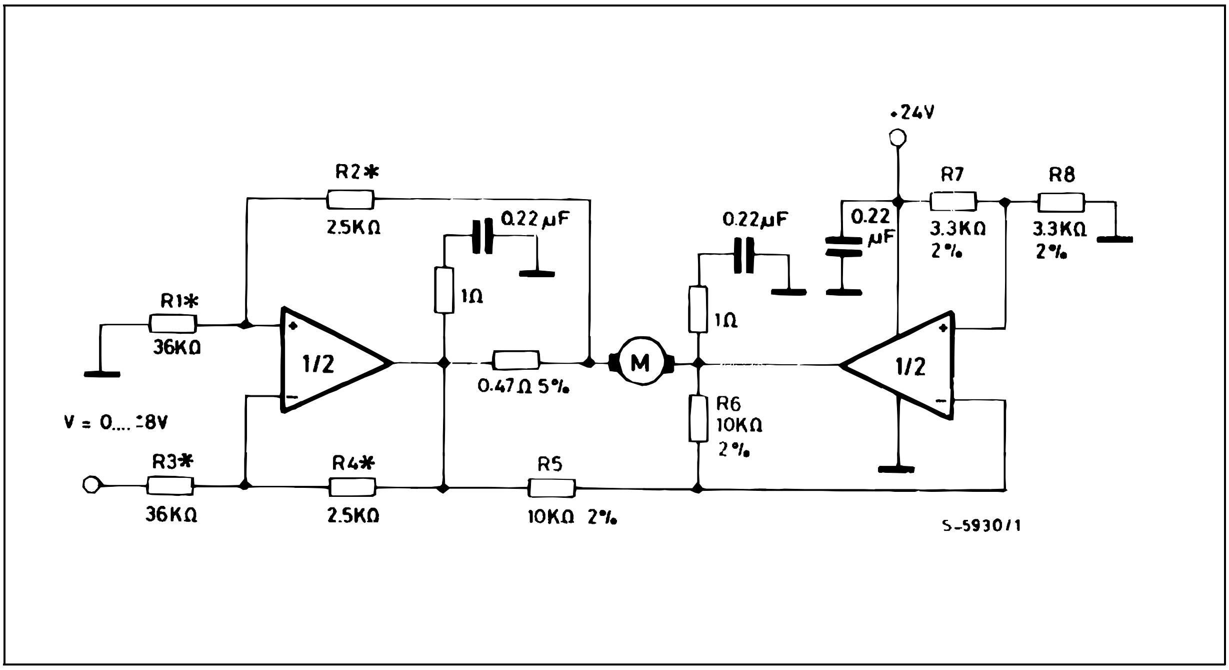


**Figure 12** : Motor Current Control Circuit.

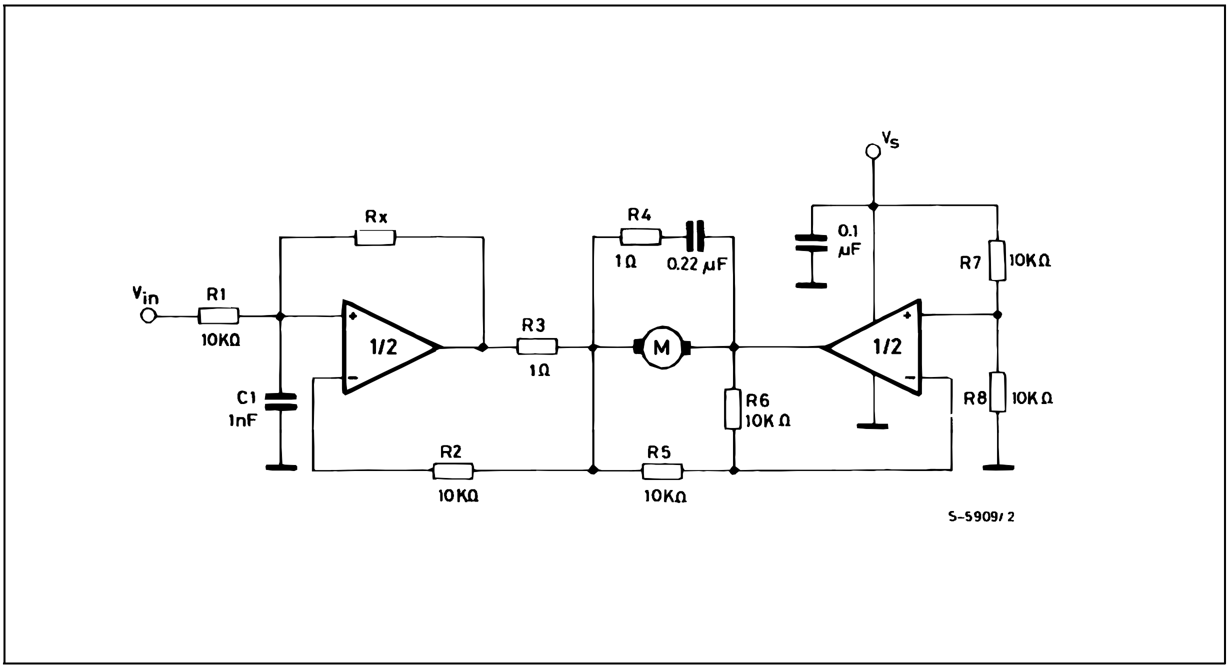



**Note** : The input voltage level is compatible with L291 (5-BIT D/A converter).

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

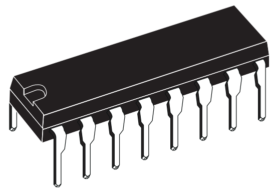
For circuit stability ensure that $R_X > \frac{2R3 \circ R1}{R_M}$ where $R_M$ = internal resistance of motor.

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

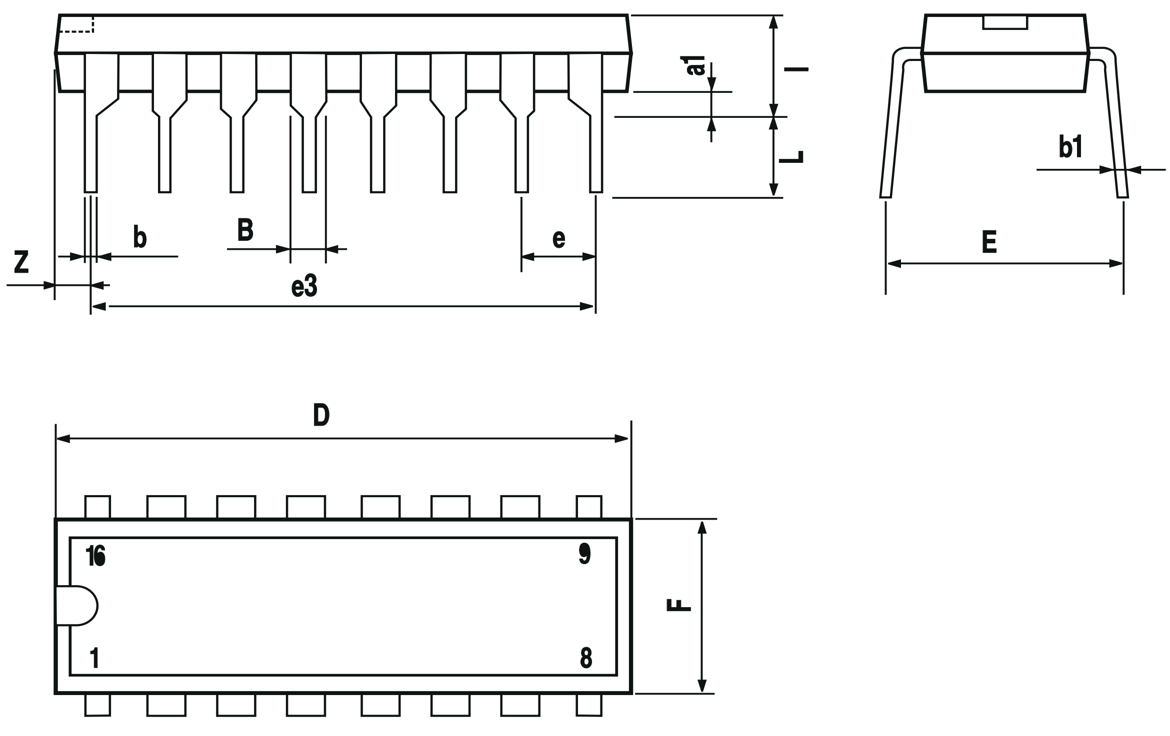


| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| a1 | 0.51 | | | 0.020 | | |
| B | 0.85 | | 1.40 | 0.033 | | 0.055 |
| b | | 0.50 | | | 0.020 | |
| b1 | 0.38 | | 0.50 | 0.015 | | 0.020 |
| D | | | 20.0 | | | 0.787 |
| E | | 8.80 | | | 0.346 | |
| 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 |

## OUTLINE AND MECHANICAL DATA

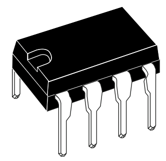


**Powerdip 16**

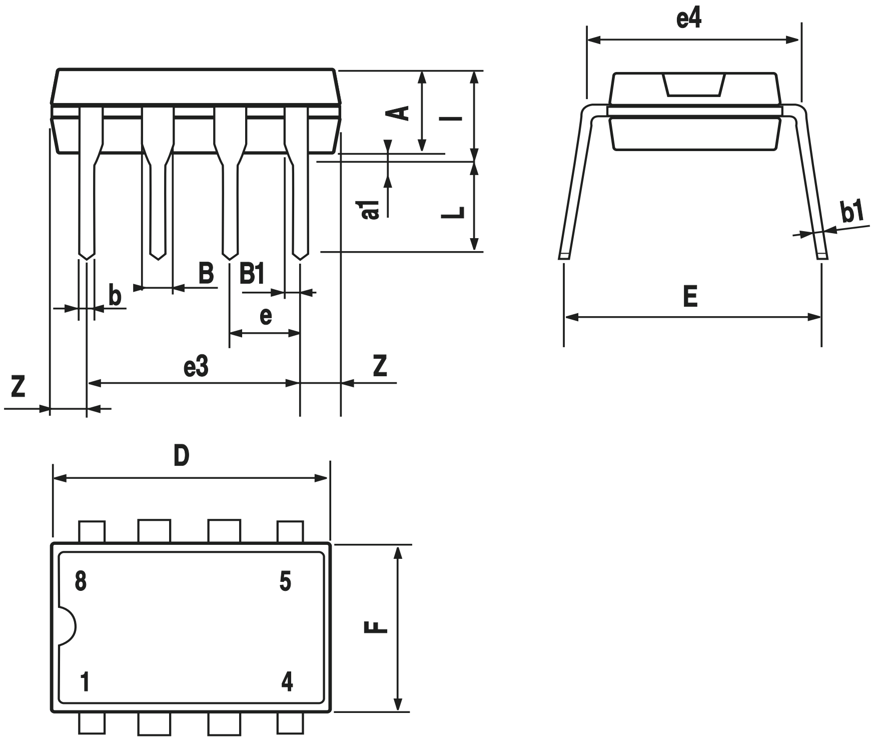


| DIM. | mm | | | inch | | |
|---|---|---|---|---|---|---|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | 3.32 | | | 0.131 | |
| a1 | 0.51 | | | 0.020 | | |
| B | 1.15 | | 1.65 | 0.045 | | 0.065 |
| b | 0.356 | | 0.55 | 0.014 | | 0.022 |
| b1 | 0.204 | | 0.304 | 0.008 | | 0.012 |
| D | | | 10.92 | | | 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 |

## OUTLINE AND MECHANICAL DATA



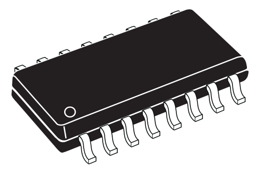
## Minidip



| 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 (1) | 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 (1) | 3.8 | | 4 | 0.150 | | 0.157 |
| G | 4.6 | | 5.3 | 0.181 | | 0.209 |
| L | 0.4 | | 1.27 | 0.016 | | 0.050 |
| M | | | 0.62 | | | 0.024 |
| S | 8°(max.) | | | | | |

## OUTLINE AND MECHANICAL DATA

**Weight:** 0.20gr



## SO16 Narrow

(1) D and F do not include mold flash or protrusions. Mold flash or potrusions shall not exceed 0.15mm (.006inch).