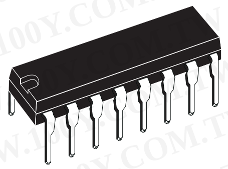
SGS-THOMSON
MICROELECTRONICS

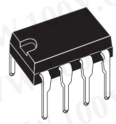
L2720/2/4

LOW DROP DUAL POWER OPERATIONAL AMPLIFIERS

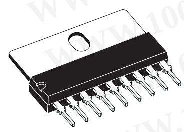
- OUTPUT CURRENT TO 1 A
- OPERATES AT LOW VOLTAGES
- SINGLE OR SPLIT SUPPLY
- LARGE COMMON-MODE AND DIFFERENTIAL MODE RANGE
- LOW INPUT OFFSET VOLTAGE
- GROUND COMPATIBLE INPUTS
- LOW SATURATION VOLTAGE
- THERMAL SHUTDOWN
- CLAMP DIODE



POWERDIP
(8 + 8)



MINIDIP
(Plastic)



SIP9

ORDERING NUMBERS : L2720 (Powerdip)
L2722 (Minidip)
L2724 (SIP9)

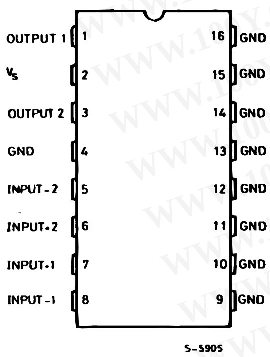
DESCRIPTION

The L2720, L2722 and L2724 are monolithic integrated circuits in powerdip, minidip and SIP-9 packages, intended for use as power operational amplifiers in a wide range of applications including servo amplifiers and power supplies.

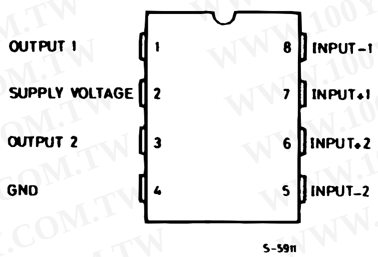
They are particularly indicated for driving, inductive loads, as motor and finds applications in compact-disc VCR automotive, etc.

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

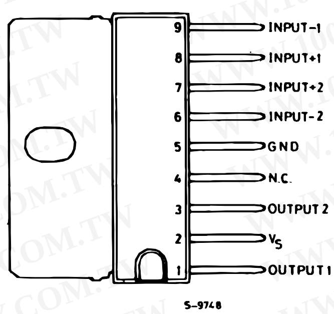
PIN CONNECTIONS (top views)



L2720

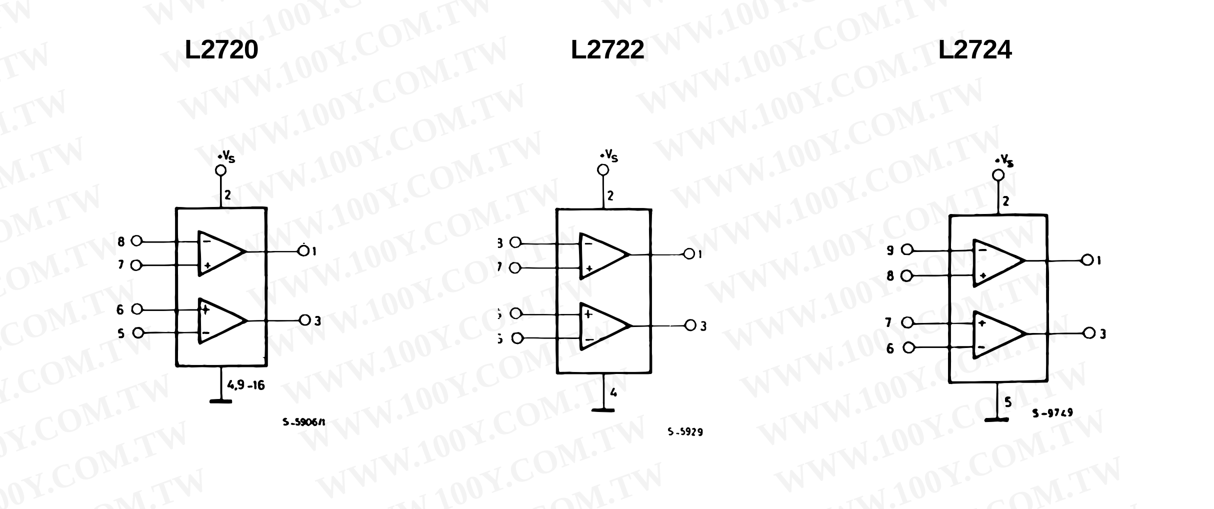


L2722

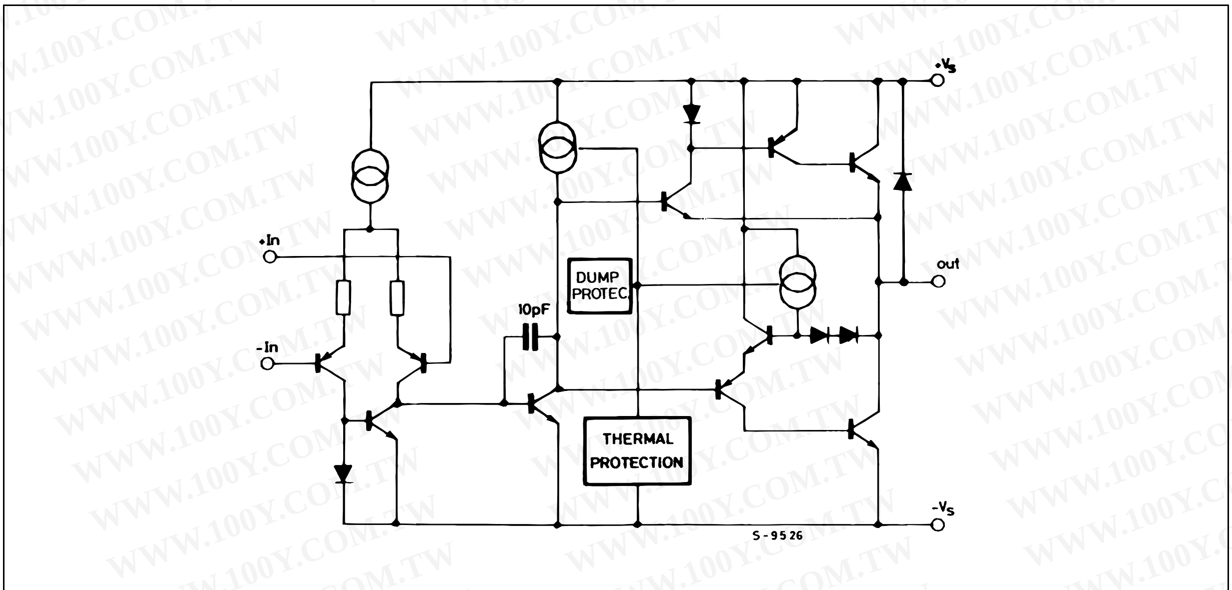


L2724

BLOCK DIAGRAM



SCHEMATIC DIAGRAM (one section)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	Supply Voltage	28	V
V_S	Peak Supply Voltage (50ms)	50	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°C (L2720), T_{amb} = 50°C (L2722) T_{case} = 75°C (L2720) T_{case} = 50°C (L2724)	1 5 10	W
T_{stg}, T_j	Storage and Junction Temperature	–40 to 150	°C

THERMAL DATA

			SIP-9	Powerdip	Minidip
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max.	10°C/W	15°C/W	70°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max.	70°C/W	70°C/W	100°C/W

ELECTRICAL CHARACTERISTICS

V_S = 24V, T_{amb} = 25°C unless otherwise specified

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_S	Single Supply Voltage		4		28	V
V_S	Split Supply Voltage		± 2		± 14	V
I_S	Quiescent Drain Current	$V_O = \frac{V_S}{2}$ V_S = 24V V_S = 8V		10 9	15 15	mA
I_b	Input Bias Current			0.2	1	µA
V_{OS}	Input Offset Voltage				10	mV
I_{OS}	Input Offset Current				100	nA
SR	Slew Rate			2		V/µs
B	Gain-bandwidth Product			1.2		MHz
R_i	Input Resistance		500			kΩ
G_V	O.L. Voltage Gain	f = 100Hz f = 1kHz	70	80 60		dB
e_N	Input Noise Voltage	B = 22Hz to 22kHz		10		µV
I_N	Input Noise Voltage	B = 22Hz to 22kHz		200		pA
CMR	Common Mode Rejection	f = 1kHz	66	84		dB
SVR	Supply Voltage Rejection	f = 100Hz V_S = 24V R_G = 10kΩ V_S = ±12V V_R = 0.5V V_S = ±6V	60	70 75 80		dB
$V_{DROP(HIGH)}$		V_S = ±2.5V to ±12V I_p = 100mA I_p = 500mA		0.7 1	1.5	V
$V_{DROP(LOW)}$		V_S = ±2.5V to ±12V I_p = 100mA I_p = 500mA		0.3 0.5	1	V
C_S	Channel Separation	f = 1KHz V_S = 24V R_L = 10Ω V_S = 6V G_V = 30dB		60 60		dB
T_{sd}	Thermal Shutdown Junction Temperature			145		°C

Figure 1 : Quiescent Current vs. Supply Voltage

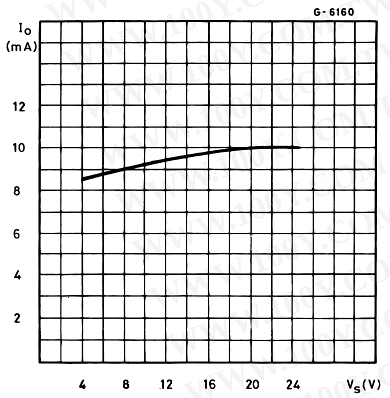


FIgure 2 : Open Loop Gain vs. Frequency

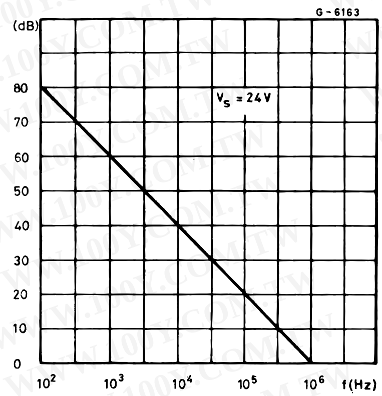


Figure 3 : Common Mode Rejection vs. Frequency

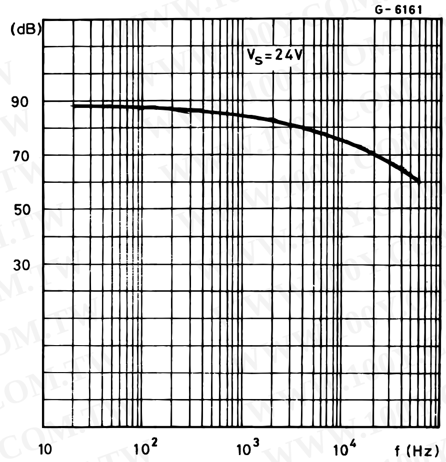


Figure 4 : Output Swing vs. Load Current (V_S = ± 5 V.

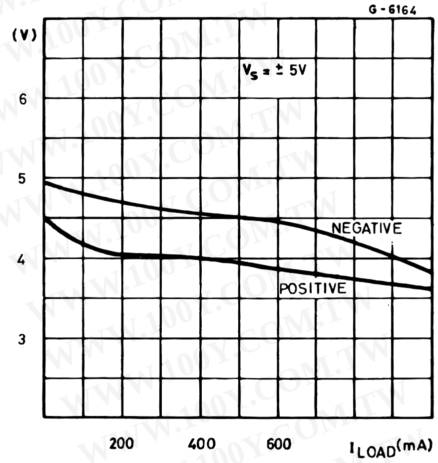


Figure 5 : Output Swing vs. Load Current (V_S = ± 12 V.

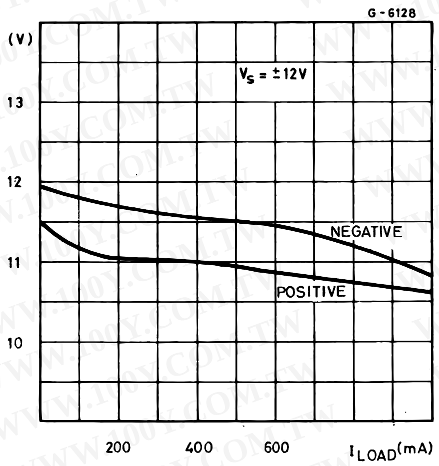


Figure 6 : Supply Voltage rejection vs. Frequency

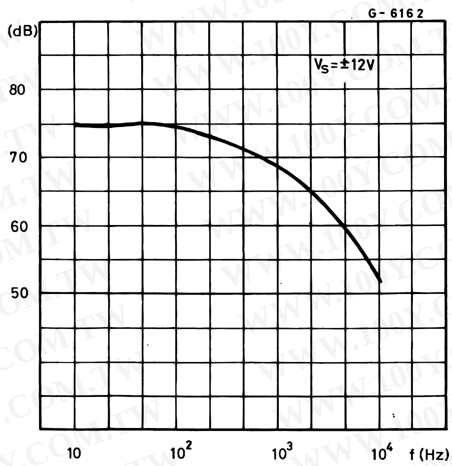
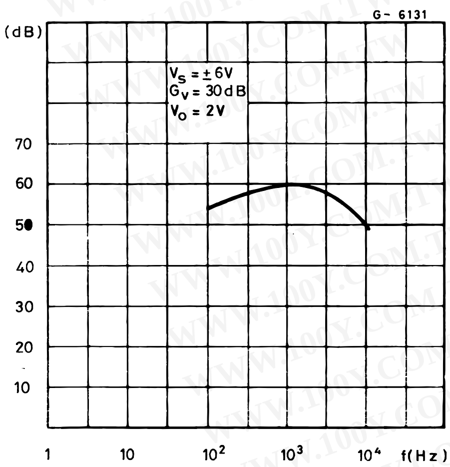


Figure 7 : Channel Separation vs. Frequency

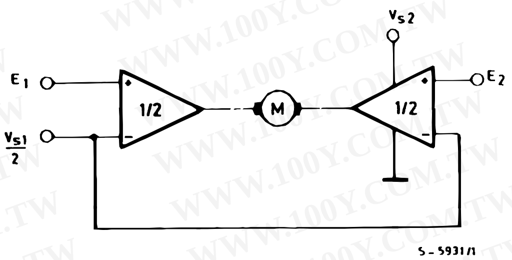


APPLICATION SUGGESTION

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 connected between supply pins and ground ;
- boucherot cell (0.1 to 0.2 μF + 1Ω series) between outputs and ground or across the load. With single supply operation, a resistor (1kΩ) between the output and supply pin can be necessary for stability.

Figure 8 : Bidirectional DC Motor Control with μP Compatible Inputs



V_{S1} = logic supply voltage
Must be $V_{S2} > V_{S1}$
E1, E2 = logic inputs

Figure 9 : Servocontrol for Compact-disc

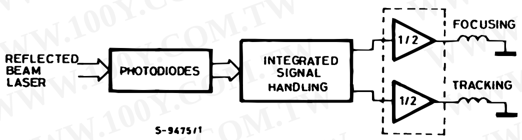


Figure 10 : Capstan Motor Control in Video Recorders

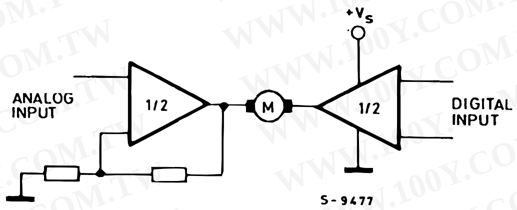
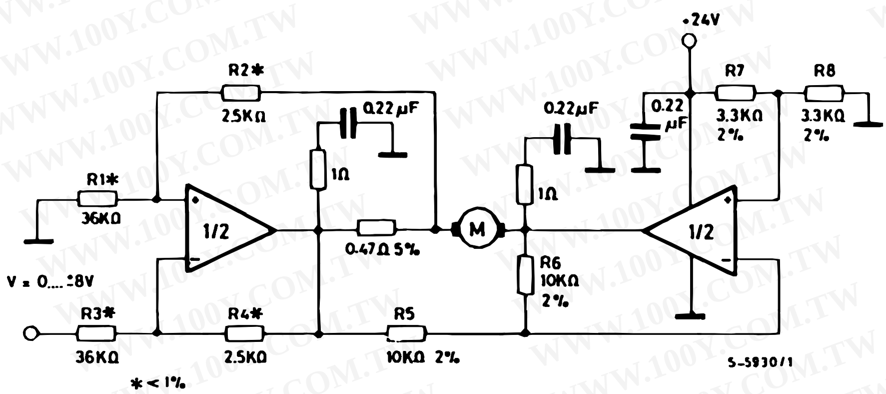


Figure 11 : Motor Current Control Circuit



Note : The input voltage level is compatible with L291 (8 - BIT D/A converter)

Figure 12 : Bidirectional Speed Control of DC Motors

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

The voltage available at the terminals of the motor is $V_M = 2\left(V_I - \frac{V_S}{2}\right) + |R_O| \cdot I_M$ where $|R_O| = \frac{2R3 \cdot R1}{R_X}$

and I_M is the motor current.

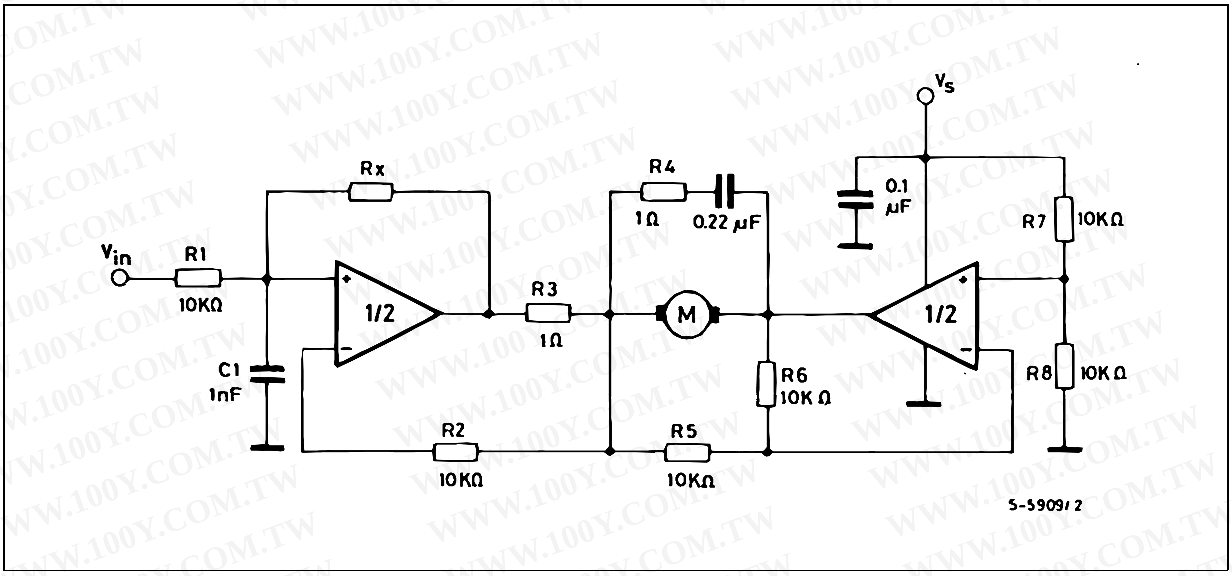
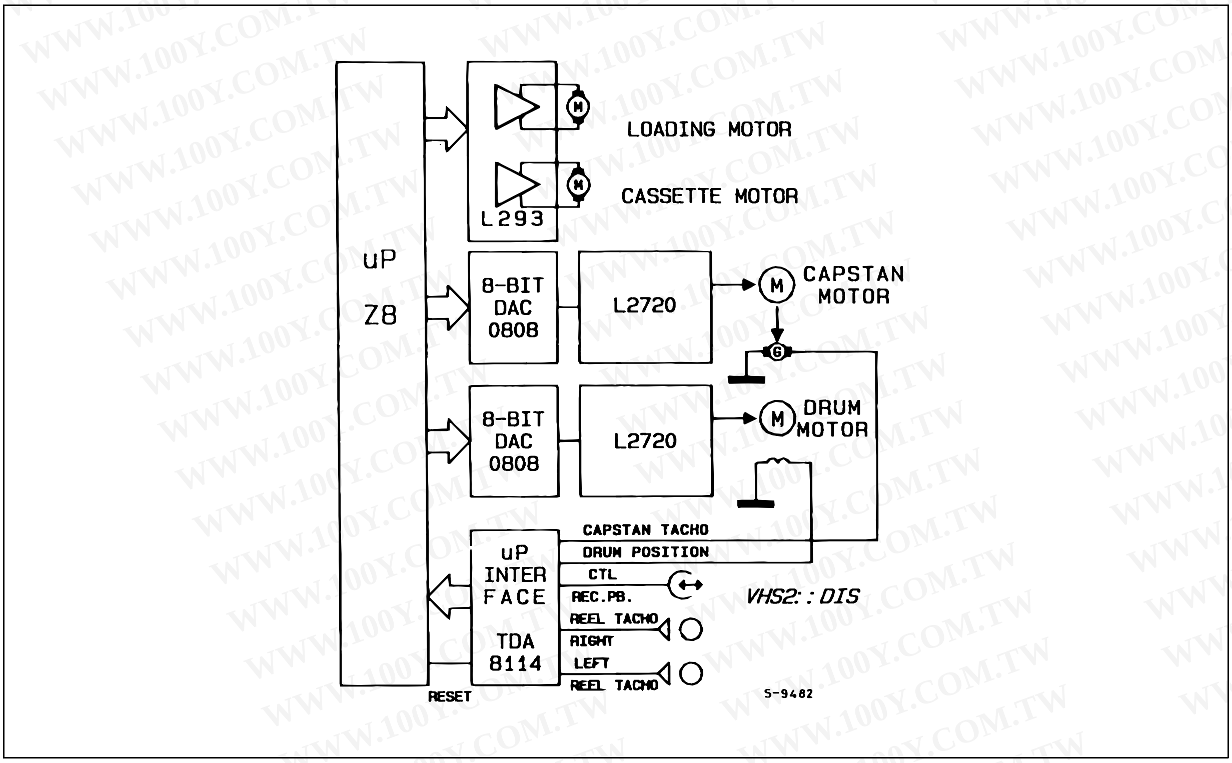
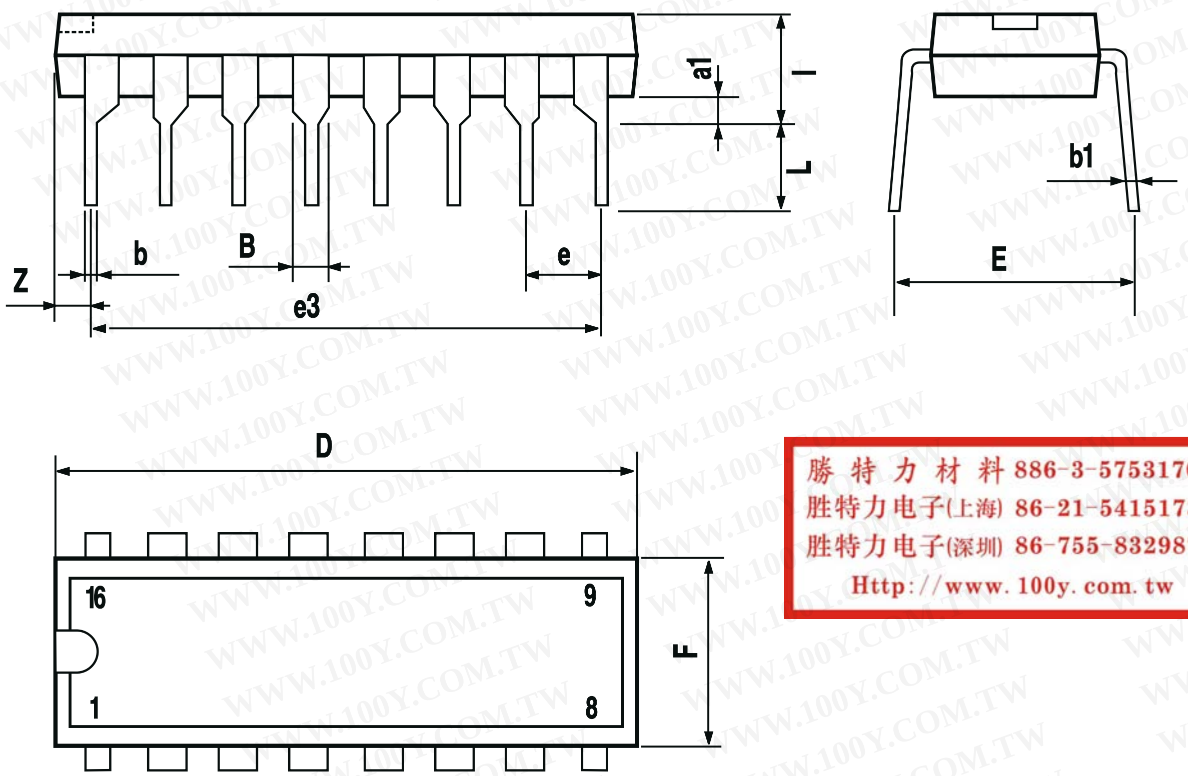


Figure 13 : VHS-VCR Motor Control Circuit



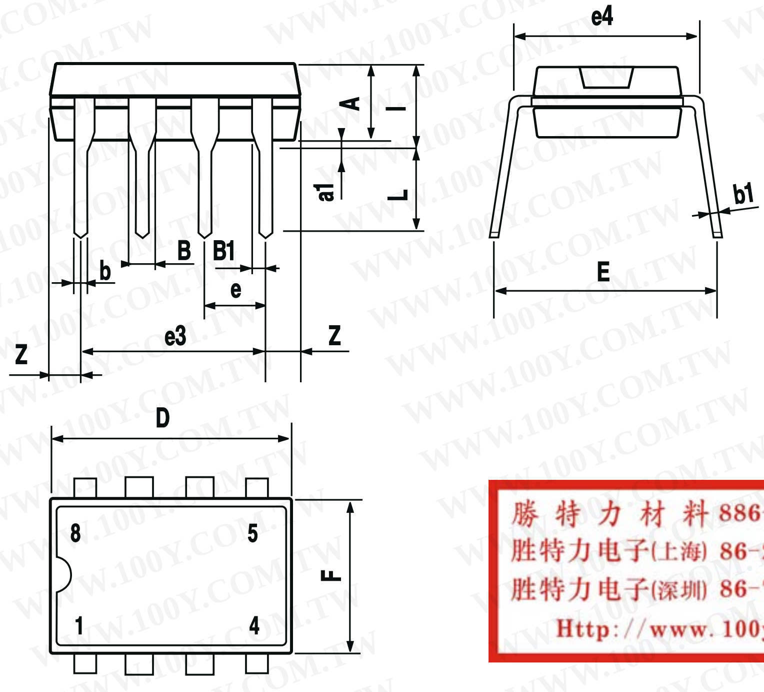
POWERDIP 16 PACKAGE MECHANICAL DATA

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		3.3			0.130	
a1	0.7			0.028		
B	1.39		1.65	0.055		0.065
B1	0.91		1.04	0.036		0.041
b		0.5			0.020	
b1	0.38		0.5	0.015		0.020
D			9.8			0.386
E		8.8			0.346	
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			7.1			0.280
I			4.8			0.189
L		3.3			0.130	
Z	0.44		1.6	0.017		0.063



SIP9 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			7.1			0.280
a1	2.7		3	0.106		0.118
B			23			0.90
B3			24.8			0.976
b1		0.5			0.020	
b3	0.85		1.6	0.033		0.063
C		3.3			0.130	
c1		0.43			0.017	
c2		1.32			0.052	
D			21.2			0.835
d1		14.5			0.571	
e		2.54			0.100	
e3		20.32			0.800	
L	3.1			0.122		
L1		3			0.118	
L2		17.6			0.693	
L3			0.25			0.010
L4	17.4		17.85	0.685		0,702
M		3.2			0.126	
N		1			0.039	
P			0.15			0.006