SGS-THOMSON MICROELECTRONICS

L2720/2/4

LOW DROP DUAL POWER OPERATIONAL AMPLIFIERS

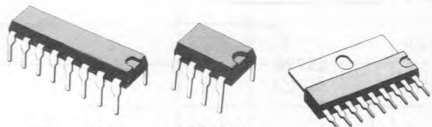
PRELIMINARY DATA

- OUTPUT CURRENT TO 1A
- 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

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.



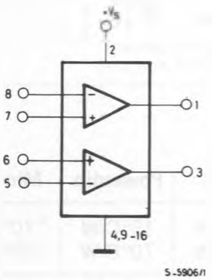
Powerdip (8 + 8) | Minidip Plastic | SIP-9

ORDERING NUMBERS: L2720 | L2722 | L2724

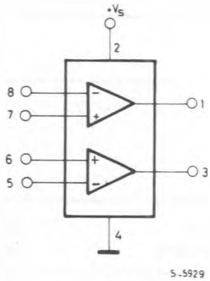
ABSOLUTE MAXIMUM RATINGS

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_o	Peak output current (non repetitive)	1.5	A
P_{tot}	Power dissipation at $T_{amb} = 80°C$ (L2720), $T_{amb} = 50°C$ (L2722)	1	W
	$T_{case} = 75°C$ (L2720)	5	W
	$T_{case} = 50°C$ (L2724)	10	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

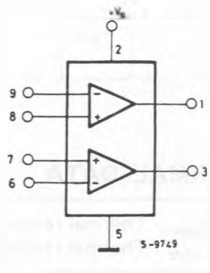
BLOCK DIAGRAMS



L2720



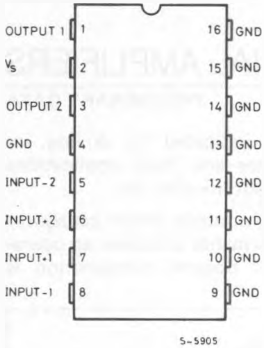
L2722



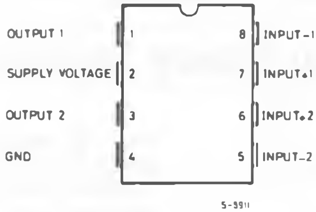
L2724

June 1988

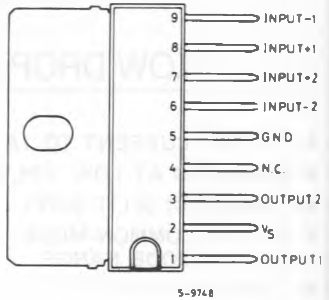
CONNECTION DIAGRAMS
(Top view)



L2720

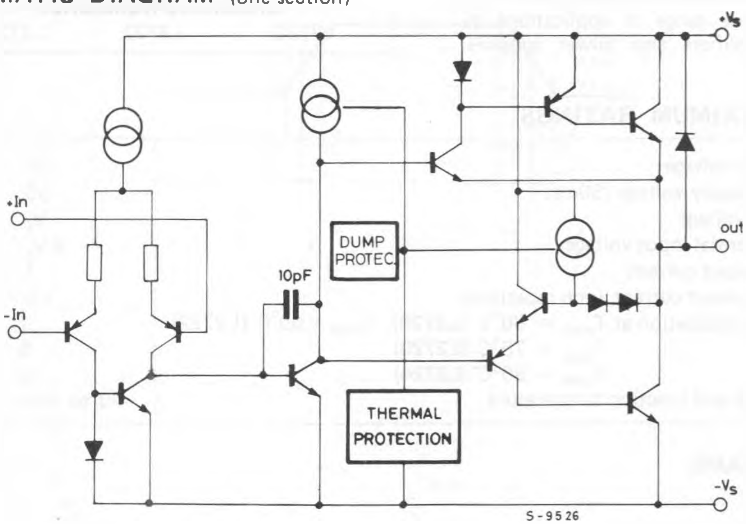


L2722



L2724

SCHEMATIC DIAGRAM (one section)



THERMAL DATA

			SIP-9	Powerdip	Minidip
$R_{th\ j-case}$	Thermal resistance junction-pins	max	10°C/W	15°C/W	*70°C/W
$R_{th\ j-amb}$	Thermal resistance junction-albient	max	70°C/W	70°C/W	100°C/W

* Thermal resistance junction-pin 4.

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		10	15	mA
			V_s = 8V		9	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		70	80		dB
		f = 1KHz			60		dB
e_N	Input noise voltage	B = 22Hz to 22KHz			10		µV
I_N	Input noise current	B = 22Hz to 22KHz			200		pA
CMR	Common Mode rejection	f = 1KHz		66	84		dB
SVR	Supply voltage rejection	f = 100Hz R_G = 10KΩ V_R = 0.5V	V_s = 24V V_s = ±12V V_s = ± 6V	60	70 75 80		dB dB dB
$V_{DROP\ (HIGH)}$		V_s = ±2.5V to ±12V	I_p = 100mA		0.7		V
			I_p = 500mA		1.0	1.5	V
$V_{DROP\ (LOW)}$		V_s = ±2.5V to ±12V	I_p = 100mA		0.3		V
			I_p = 500mA		0.5	1.0	V
C_s	Channel separation	f = 1KHz R_L = 10Ω G_v = 30dB	V_s = 24V		60		dB
			V_s = 6V		60		dB
T_{sd}	Thermal shutdown junction temperature				145		°C

Fig. 1 - Quiescent current vs. supply voltage

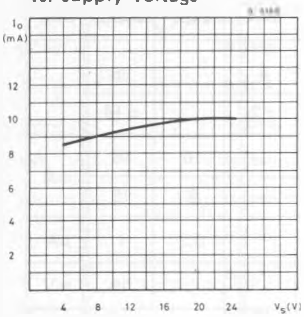


Fig. 2 - Open loop gain vs. frequency

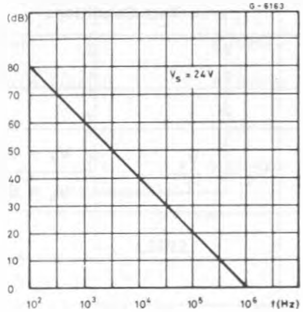


Fig. 3 - Common mode rejection vs. frequency

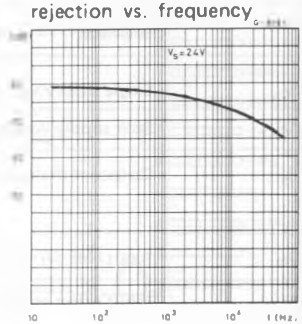


Fig. 4 - Output swing vs. load current (V_s = ± 5V)

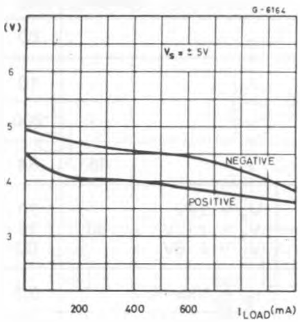


Fig. 5 - Output swing vs load current (V_s = ± 12V)

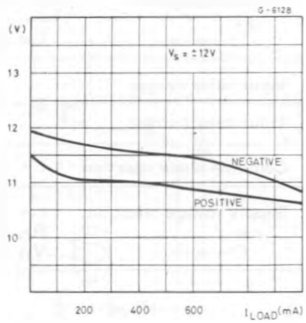


Fig. 6 - Supply voltage rejection vs. frequency

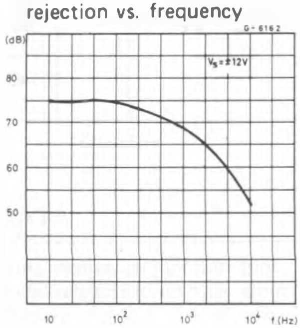
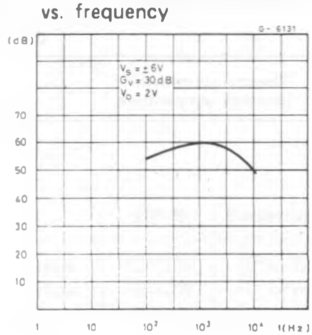


Fig. 7 - Channel separation vs. frequency

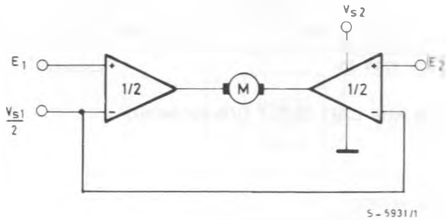


APPLICATION SUGGESTION

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 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.

Fig. 8 - Bidirectional DC motor control with μP compatible inputs



V_{S1} = logic supply voltage

Must be $V_{S2} > V_{S1}$

E1, E2 = logic inputs

Fig. 9 - Servocontrol for compact-disc

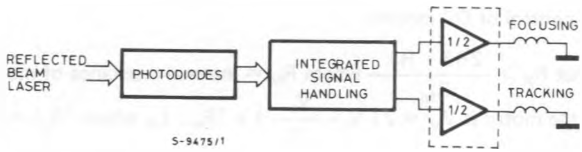


Fig. 10 - Capstan motor control in video recorders

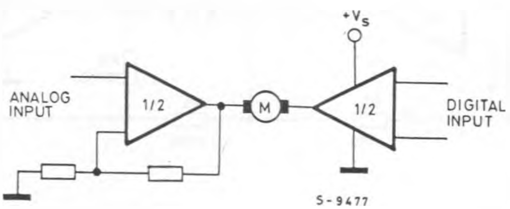
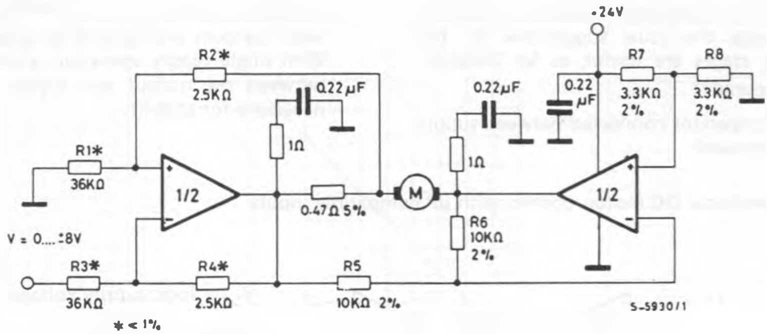


Fig. 11 - Motor current control circuit



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

Fig. 12 - 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 $V_M = 2\,(V_I - \frac{V_s}{2}) + |R_o|.\,I_M$ where $|R_o| = \frac{2R \circ R1}{R_X}$ and I_M is the motor current.

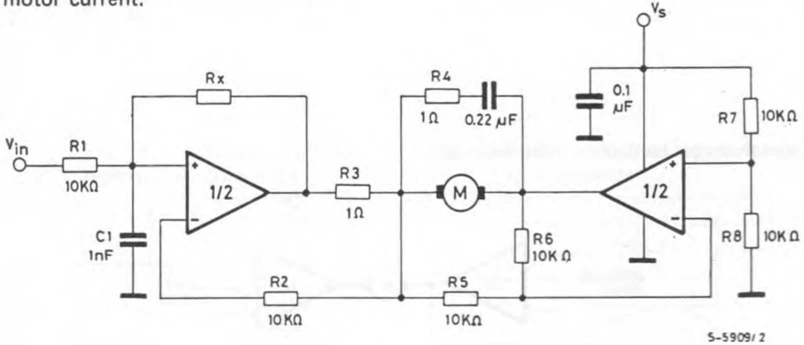


Fig. 13 - VHS-VCR Motor control circuit