

LOW DROP DUAL POWER OPERATIONAL AMPLIFIERS

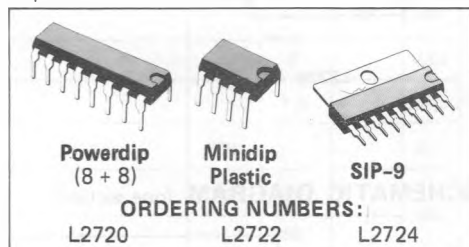
PRELIMINARY DATA

- 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.

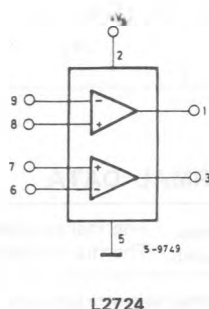
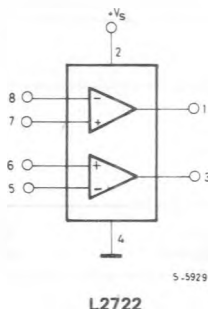
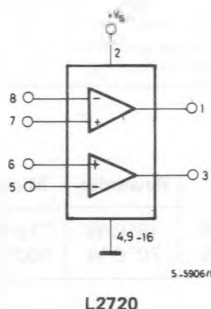
The high gain and high output power capability provide superior performance whatever an operational amplifier/power booster combination is required.



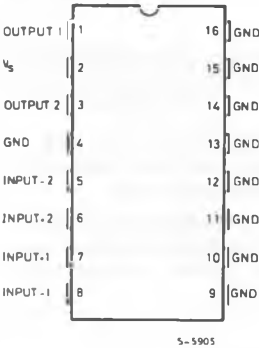
ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage	28	V
V_{sP}	Peak supply voltage (50ms)	50	V
V_i	Input voltage	V_s	
V_{iD}	Differential input voltage	$\pm V_s$	
I_o	DC output current	1	A
I_{pP}	Peak output current (non repetitive)	1.5	A
P_{tot}	Power dissipation at $T_{amb} = 80^\circ\text{C}$ (L2720), $T_{amb} = 50^\circ\text{C}$ (L2722)	1	W
	$T_{case} = 75^\circ\text{C}$ (L2720)	5	W
	$T_{case} = 50^\circ\text{C}$ (L2724)	10	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	$^\circ\text{C}$

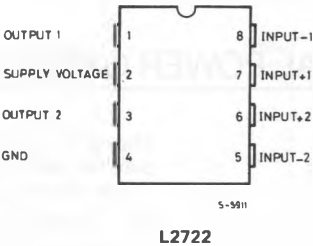
BLOCK DIAGRAMS



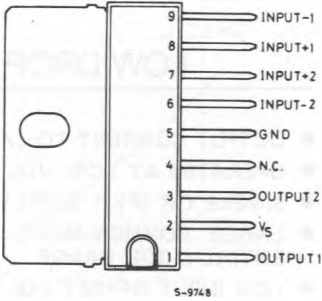
CONNECTION DIAGRAMS
(Top view)



L2720

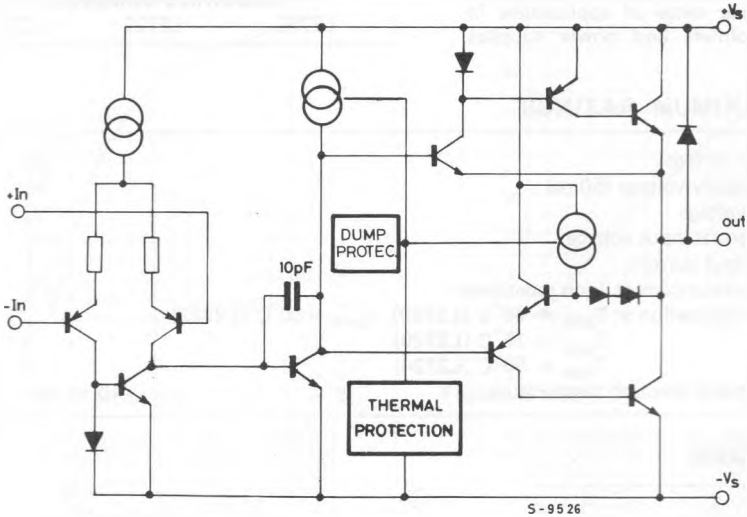


L2722



L2724

SCHEMATIC DIAGRAM (one section)



THERMAL DATA

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

* Thermal resistance junction-pin 4.

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

Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_s	Single supply voltage		4		28	V
V_s	Split supply voltage		± 2		± 14	
I_s	Quiescent drain current	$V_o = \frac{V_s}{2}$	$V_s = 24V$	10	15	mA
			$V_s = 8V$	9	15	
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			K Ω
G_v	O.L. voltage gain	$f = 100Hz$	70	80		dB
		$f = 1KHz$		60		
e_N	Input noise voltage	$B = 22Hz \text{ to } 22KHz$		10		μV
I_N	Input noise current			200		pA
CMR	Common Mode rejection	$f = 1KHz$	66	84		dB
SVR	Supply voltage rejection	$f = 100Hz$ $R_G = 10K\Omega$ $V_R = 0.5V$	$V_s = 24V$ $V_s = \pm 12V$ $V_s = \pm 6V$	60	70 75 80	dB dB dB
$V_{DROP (HIGH)}$	$V_s = \pm 2.5V \text{ to } \pm 12V$	$I_p = 100mA$		0.7		V
		$I_p = 500mA$		1.0	1.5	
$V_{DROP (LOW)}$		$I_p = 100mA$		0.3		V
		$I_p = 500mA$		0.5	1.0	
C_s	Channel separation	$f = 1KHz$ $R_L = 10\Omega$ $G_v = 30dB$	$V_s = 24V$	60		dB
			$V_s = 6V$	60		
T_{sd}	Thermal shutdown junction temperature			145		$^\circ C$

Fig. 1 - Quiescent current vs. supply voltage

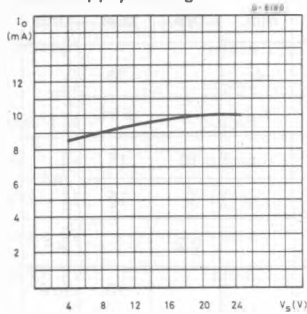


Fig. 2 - Open loop gain vs. frequency

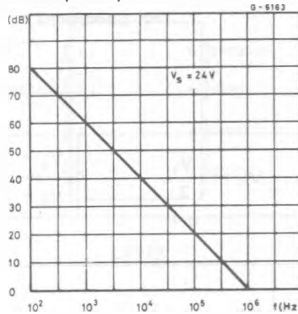


Fig. 3 - Common mode rejection vs. frequency

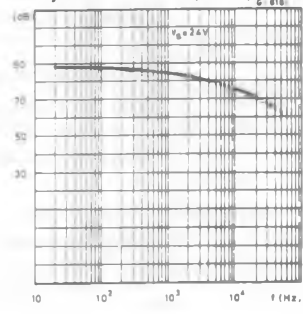


Fig. 4 - Output swing vs. load current ($V_S = \pm 5$ V)

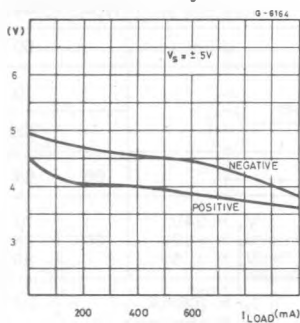


Fig. 5 - Output swing vs. load current ($V_S = \pm 12$ V)

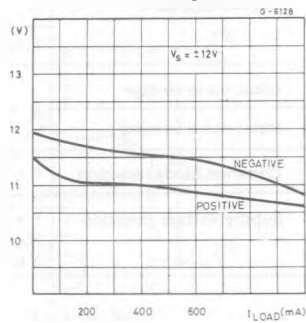


Fig. 6 - Supply voltage rejection vs. frequency

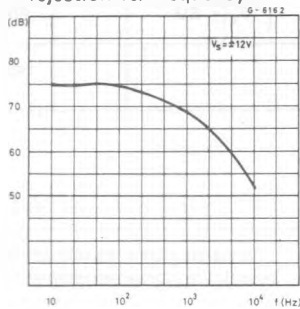
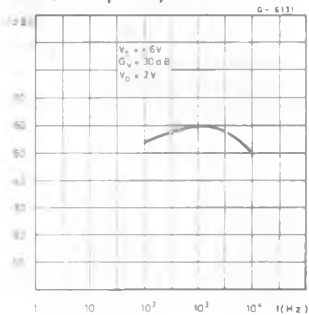


Fig. 7 - Channel separation vs. frequency



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 $0.2 \mu\text{F} + 1\Omega$ series) between outputs and ground or across the load. With single supply operation, a resistor ($1\text{K}\Omega$) between the output and supply pin can be necessary for stability.

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

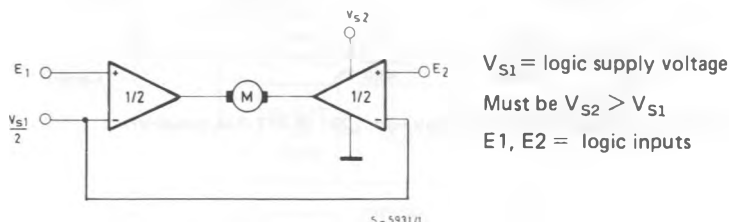


Fig. 9 - Servocontrol for compact-disc

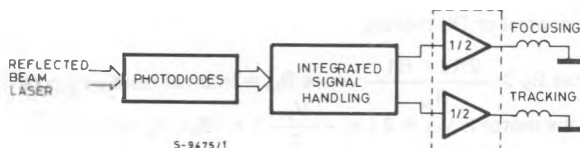


Fig. 10 - Capstan motor control in video recorders

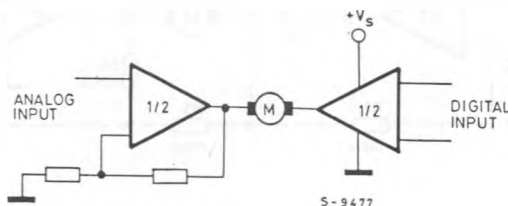
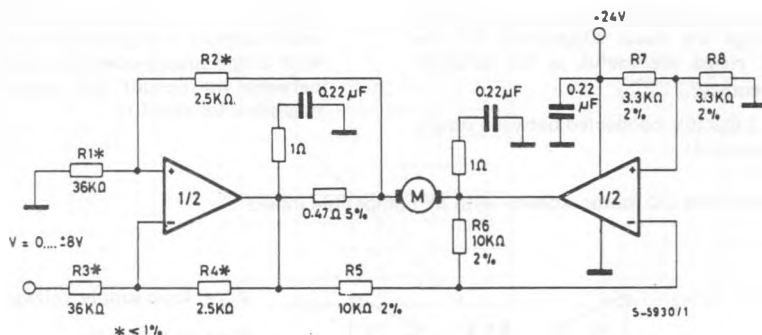


Fig. 11 - Motor current control circuit



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 $R_X > \frac{2R_3 \cdot R_1}{R_M}$ where R_M = internal resistance of motor. The voltage available at the terminals of the motor is $V_M = 2 \left(V_1 - \frac{V_s}{2} \right) + |R_o| \cdot I_M$ where $|R_o| = \frac{2R \cdot R_1}{R_X}$ and I_M is the motor current.

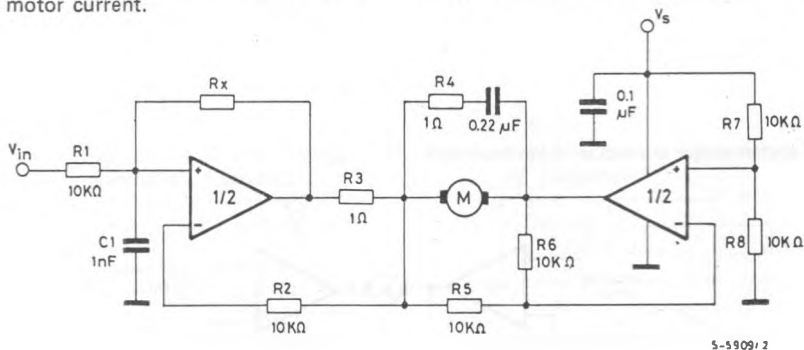


Fig. 13 - VHS-VCR Motor control circuit

