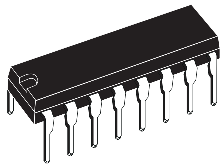
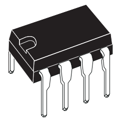
L2720/2/4

LOW DROP DUAL POWER OPERATIONAL AMPLIFIERS

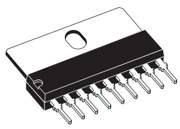
- OUTPUT CURRENT TO 1 A
- OPERATES AT LOW VOLTAGES
- SINGLE OR SPLIT SUPPLY
- LARGE COMMON-MODE AND DIFFERENTIAL MODE RANGE
- LOW INPUT OFFSET VOLTAGE
- GROUND COMPATIBLE INPUTS
- LOW SATURATION VOLTAGE
- THERMAL SHUTDOWN
- CLAMP DIODE



POWERDIP
(8 + 8)



MINIDIP
(Plastic)



SIP9

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

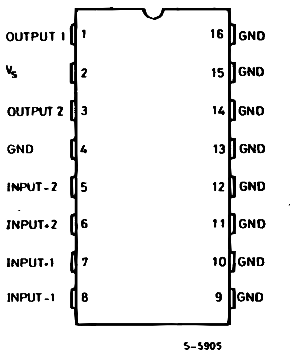
DESCRIPTION

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.

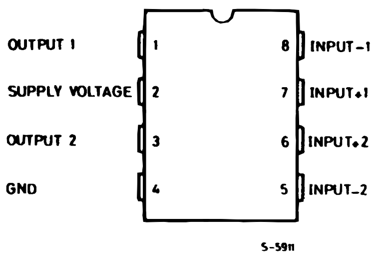
They are particularly indicated for driving, inductive loads, as motor and finds applications in compact-disc VCR automotive, etc.

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

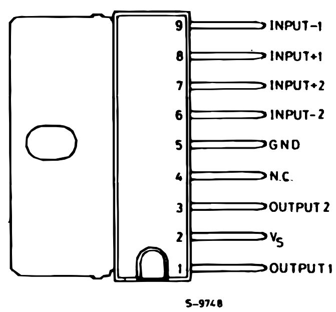
PIN CONNECTIONS (top views)



L2720

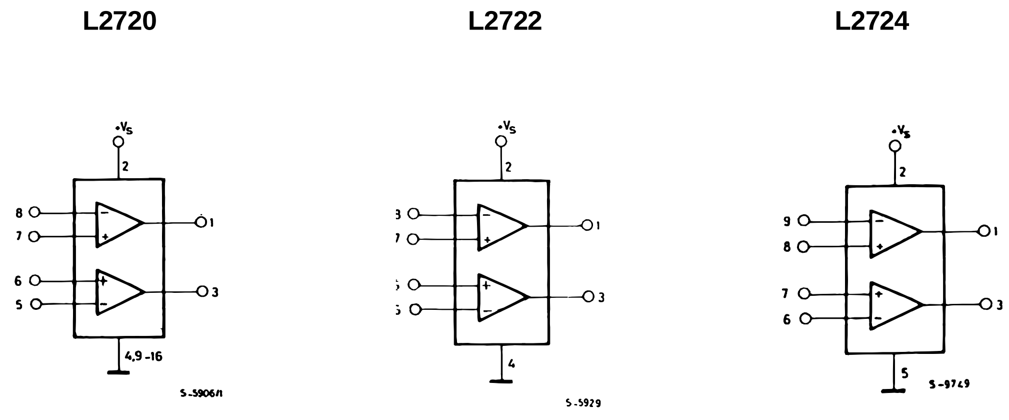


L2722

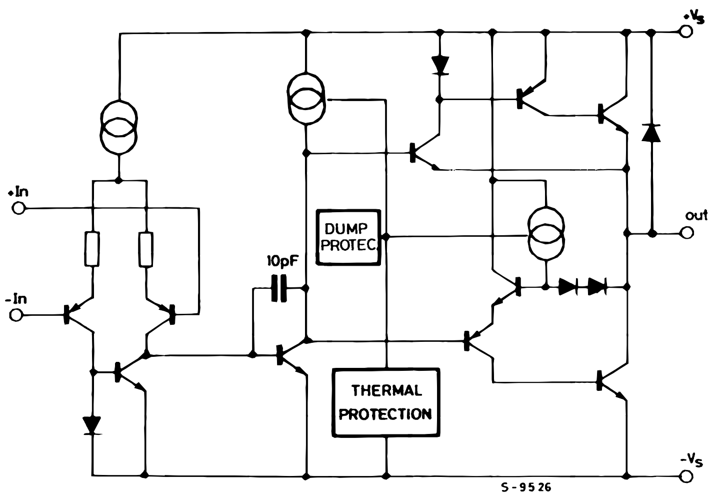


L2724

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.	$10^oC/W$	$15^oC/W$	$70^oC/W$
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient Max.	$70^oC/W$	$70^oC/W$	$100^oC/W$

ELECTRICAL CHARACTERISTICS

$V_s = 24V$, $T_{amb} = 25^oC$ 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 $V_s = 24V$ $R_G = 10k\Omega$ $V_s = \pm12V$ $V_R = 0.5V$ $V_s = \pm6V$	60	70 75 80		dB
$V_{DROP(HIGH)}$		$V_s = \pm2.5V$ to $\pm12V$ $I_p = 100mA$ $I_p = 500mA$		0.7 1	 1.5	V
$V_{DROP(LOW)}$		$V_s = \pm2.5V$ to $\pm12V$ $I_p = 100mA$ $I_p = 500mA$		0.3 0.5	 1	V
C_s	Channel Separation	f = 1KHz $V_s = 24V$ $R_L = 10\Omega$ $V_s = 6V$ $G_v = 30dB$		60 60		dB
T_{sd}	Thermal Shutdown Junction Temperature			145		^oC

Figure 1 : Quiescent Current vs. Supply Voltage

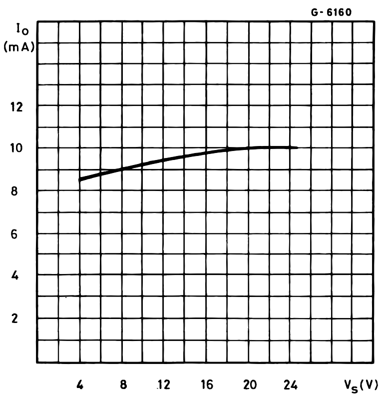


FIgure 2 : Open Loop Gain vs. Frequency

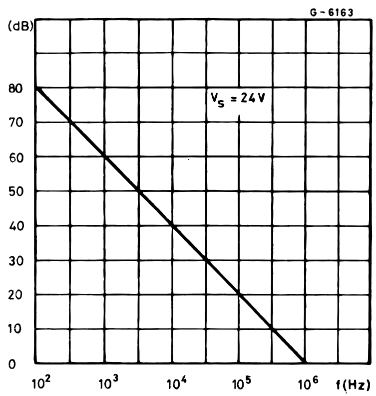


Figure 3 : Common Mode Rejection vs. Frequency

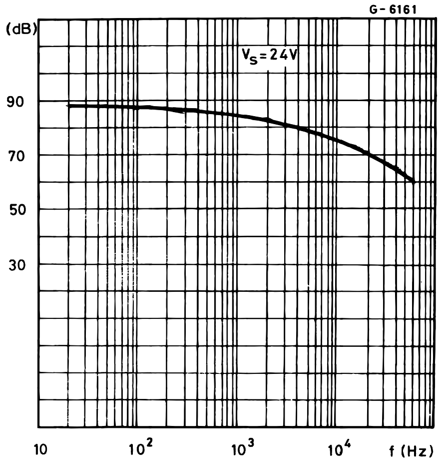


Figure 4 : Output Swing vs. Load Current (V_S = ± 5 V.

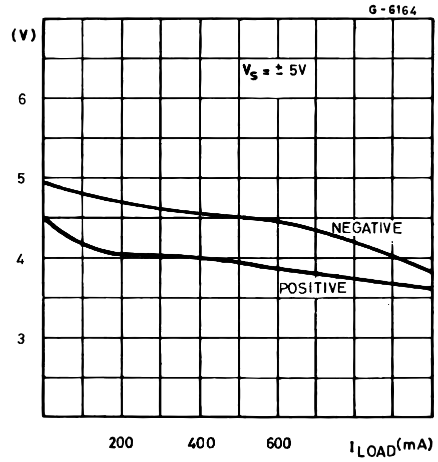


Figure 5 : Output Swing vs. Load Current (V_S = ± 12 V.

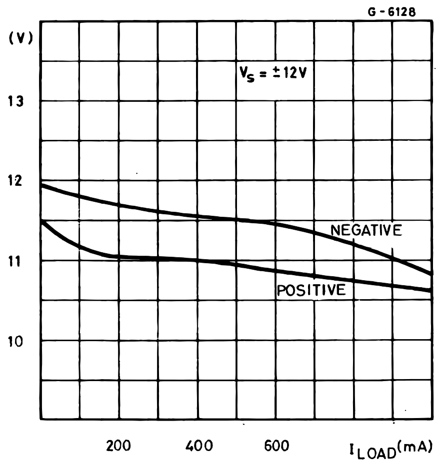


Figure 6 : Supply Voltage rejection vs. Frequency

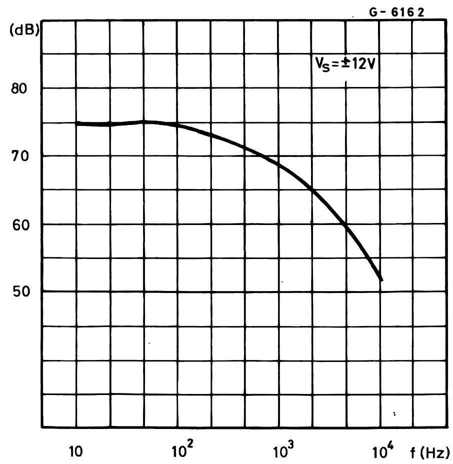
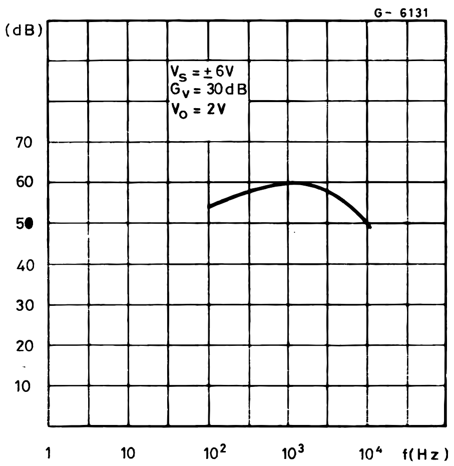


Figure 7 : Channel Separation vs. Frequency

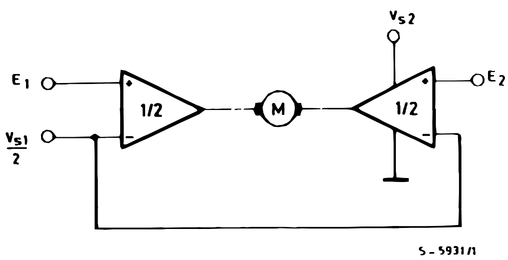


APPLICATION SUGGESTION

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

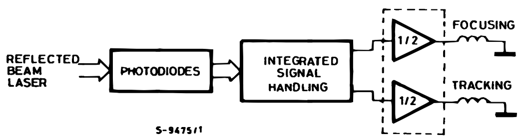


Figure 10 : Capstan Motor Control in Video Recorders

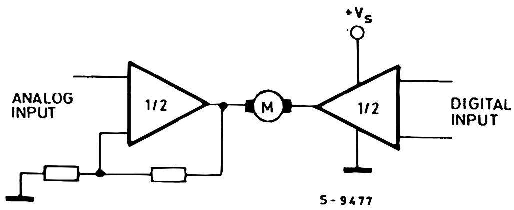
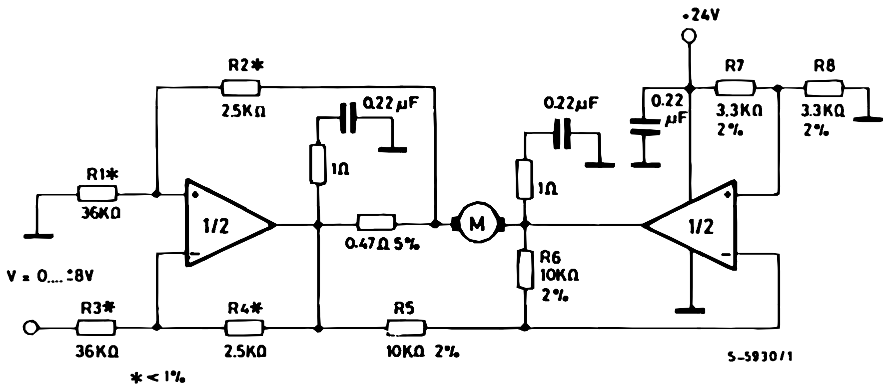


Figure 11 : Motor Current Control Circuit



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 $R_X > \frac{2R3 \,.\, R1}{RM}$ 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 $|R_O| = \frac{2R3 \cdot R1}{R_X}$ and I_M is the motor current.

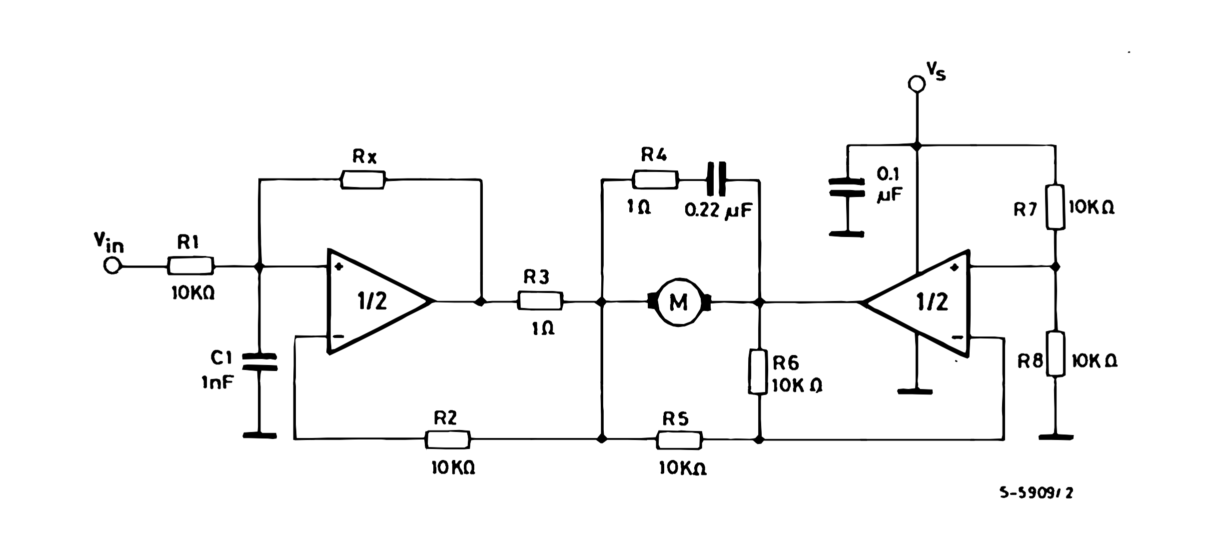
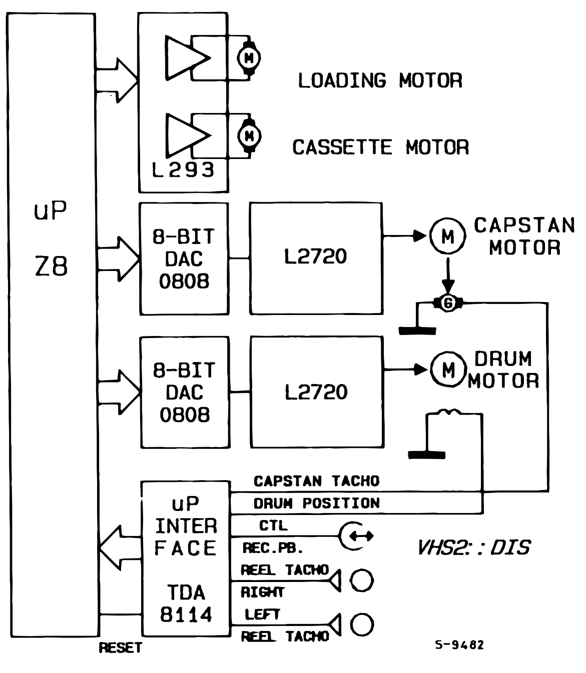
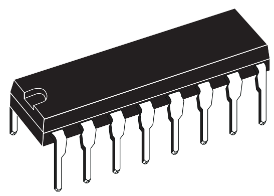


Figure 13 : VHS-VCR Motor Control Circuit

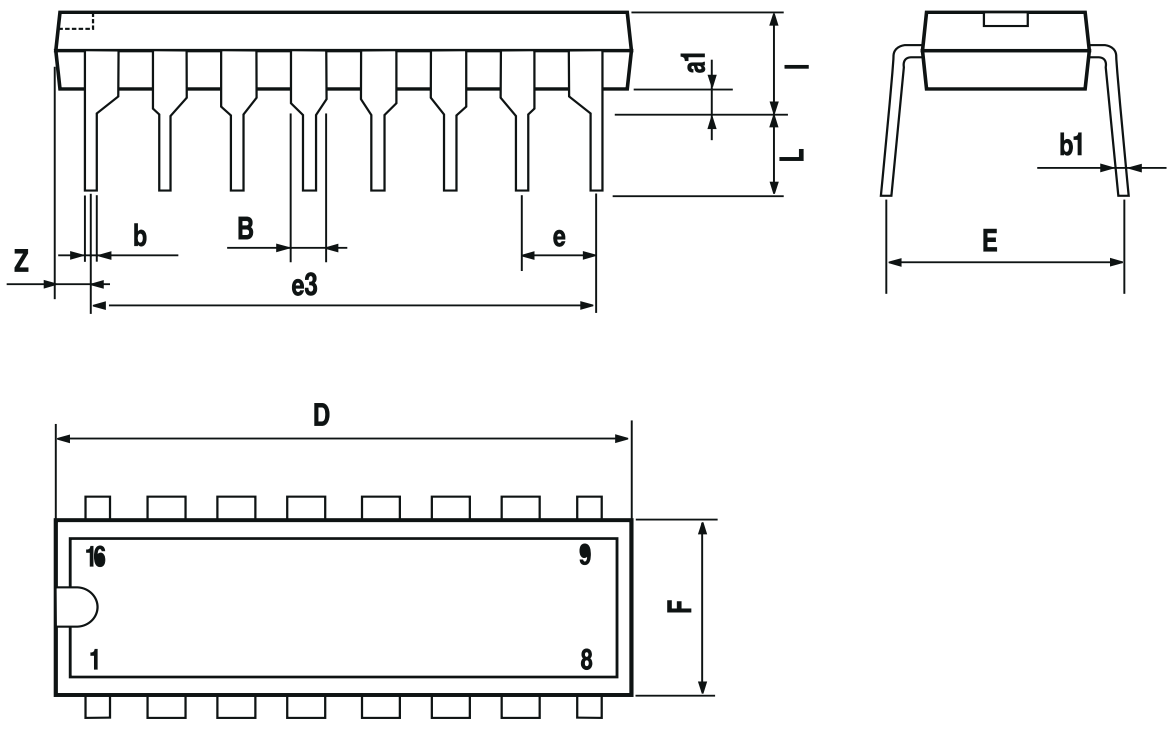


DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.85		1.40	0.033		0.055
b		0.50			0.020	
b1	0.38		0.50	0.015		0.020
D			20.0			0.787
E		8.80			0.346	
e		2.54			0.100	
e3		17.78			0.700	
F			7.10			0.280
I			5.10			0.201
L		3.30			0.130	
Z			1.27			0.050

OUTLINE AND MECHANICAL DATA

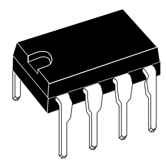


Powerdip 16

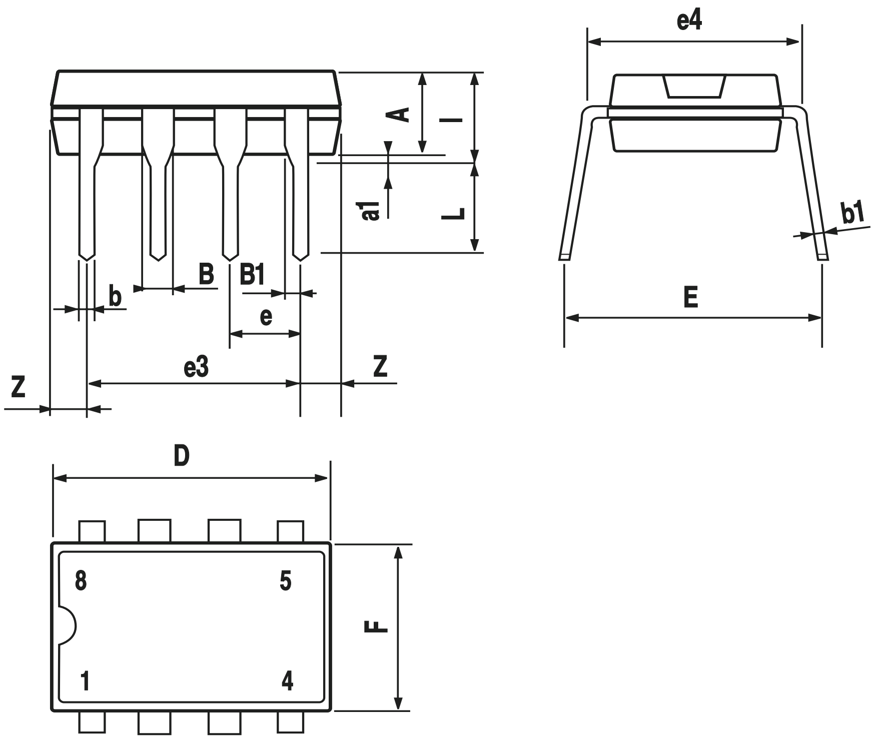


DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
I			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

OUTLINE AND MECHANICAL DATA

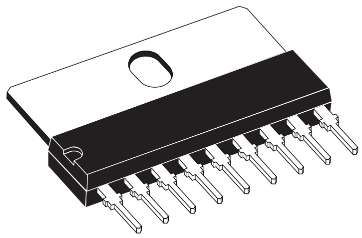


Minidip



DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			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

OUTLINE AND MECHANICAL DATA



SIP9