LINEAR INTEGRATED CIRCUITS

L465A

HIGH EFFICIENCY POWER OPERATIONAL AMPLIFIER

- OUTPUT CURRENT TO 4A
- SUPPLY VOLTAGE TO ± 20V
- LARGE COMMON-MODE RANGE
- LARGE DIFFERENTIAL MODE RANGE
- LARGE BANDWIDTH
- LOW SATURATION
- SOA PROTECTION
- SHORT CIRCUIT PROTECTION
- THERMAL PROTECTION

The L465A is a monolithic integrated circuit in PENTAWATT package, intended for use as power operational amplifier in a wide range of applications, including servo amplifiers and power supplies.
The high gain and high output power capability provide superior performance wherever an operational amplifier/power booster combination is required.

ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage	± 20	V
V_i	Input voltage	V_s	
V_i	Differential input voltage	± 15	V
I_o	Peak output current (internally limited)	4	A
P_{tot}	Power dissipation at T_{case} = 90°C	20	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

ORDERING NUMBER: L465

MECHANICAL DATA

Dimensions in mm

L465A
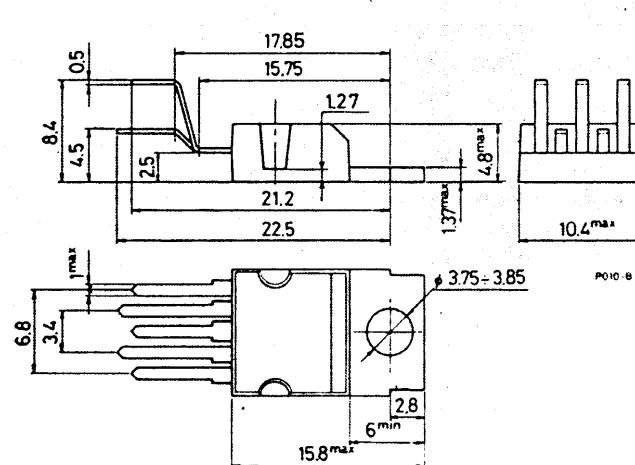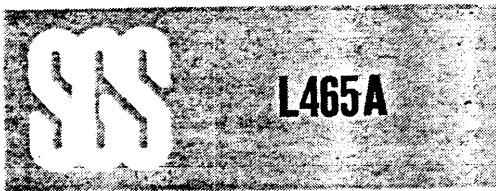
CONNECTION DIAGRAM
(top view)

Pin	
5	•V$_S$
4	OUTPUT
3	-V$_S$
2	INVERTING INPUT
1	NON INVERTING INPUT

S-2628/1
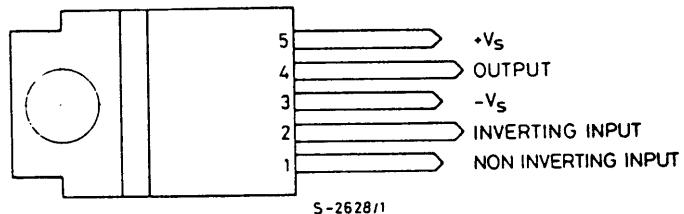
Fig. 1 - Application circuit (G$_V$ > 20 dB)

S-5900/1
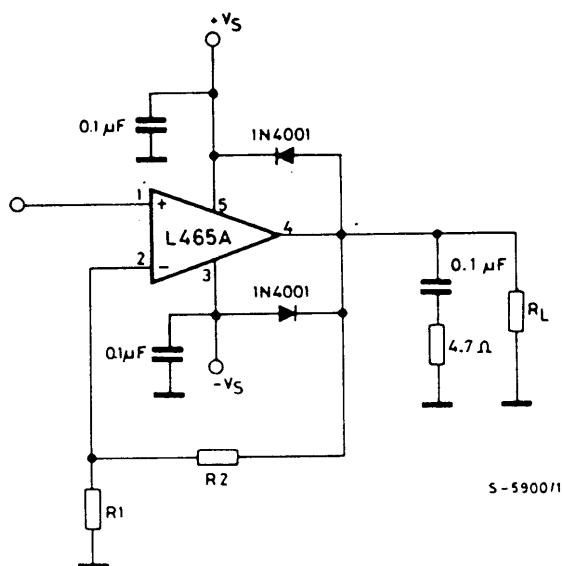
Fig. 2 - Application circuit (Unity gain)

S-5901/1
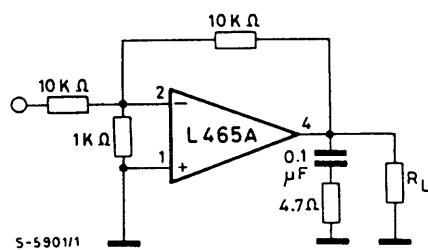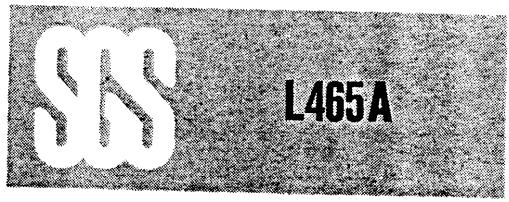
THERMAL DATA

$R_{th\ j-case}$	Thermal resistance junction-case		max	3	°C/W

ELECTRICAL CHARACTERISTICS ($V_s = \pm\ 15V$, $T_{amb} = 25°C$ unless otherwise specified)

Parameter		Test conditions		Min.	Typ.	Max.	Unit
V_s	Supply voltage			± 3		± 20	V
I_d	Quiescent drain current				45		mA
I_b	Input bias current	$V_s \pm 18V$			0.3	1	μA
V_{os}	Input offset voltage				± 2	± 20	mV
I_{os}	Input offset current					± 200	nA
SR	Slew-Rate				14		$V/\mu s$
V_o	Output voltage swing	$f = 1\ kHz$	$I_p = 0.5A$ $I_p = 4A$	26	27 25		Vpp
		$f = 10\ kHz$	$I_p = 0.5A$ $I_p = 4A$		27 24		Vpp
B_W	Power bandwidth	$P_o = 1V$	$R_L = 4\Omega$		100		kHz
R_i	Input resistance (pin 1)	$f = 1\ KHz$		100	500		$K\Omega$
G_v	Voltage gain (open loop)				80		dB
e_N	Input noise voltage	$B = 10\ to\ 10\ 000\ Hz$			2	6	μV
i_N	Input noise current				100		pA
CMR	Common mode rejection	$R_g \leqslant 10\ K\Omega$	$G_v = 30\ dB$		70		dB
SVR	Supply voltage rejection	$R_g = 22\ k\Omega$ $V_{ripple} = 0.5\ V_{rms}$ $f_{ripple} = 100\ Hz$	$G_v = 10$		60		dB
			$G_v = 100$		40		dB
η	Efficiency	$f = 1\ kHz$ $R_L = 4\Omega$	$I_p = 3A$		66		%
T_{sd}	Thermal shutdown junction temperature				145		°C
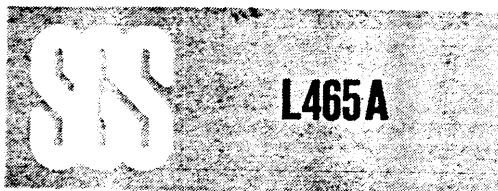
APPLICATION INFORMATION

This circuit carries out bidirectional speed control of DC motors (fig. 3).
The motor runs in one direction or in another according to whether the input voltage is higher or lower than $V_s/2$. The output impedance of the circuit seen by the motor is $R_o = \dfrac{-2\ R4\ R1}{R_x}$ so by imposing that the equation $R_M = R_o$ (R_M = internal resistance of motor) is checked the maximum load regulation condition is obtained. For circuit stability it should be $R_M > |R_o|$ hence we get

$$R_X > \frac{2\ R4 \cdot R1}{R_M}$$

The voltage available at the terminals of the motor is

$$V_M = 2\ (V_{in} - \frac{V_s}{2}) + |\ R_o\ | \cdot I$$

Fig. 3 – Bidirectional speed control of DC motors
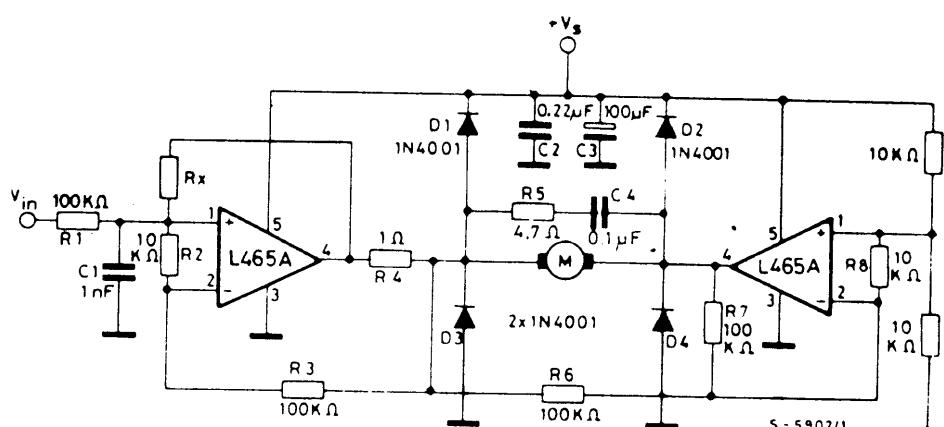
Fig. 4 – Bidirectional DC motor control with TTL/C-MOS/µP compatible inputs
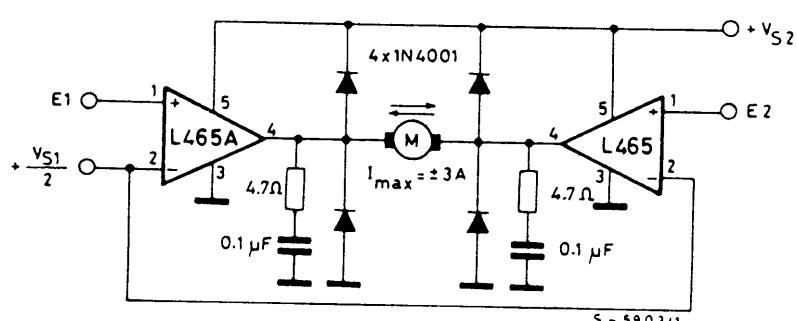
V_{S1} = logic supply voltage   Must be $V_{S2} \geqslant V_{S1}$ E1, E2 = logic inputs