LINEAR INTEGRATED CIRCUIT

TDA3410

DUAL LOW NOISE TAPE PREAMPLIFIER WITH AUTOREVERSE

The TDA 3410 is a dual preamplifier with tape autoreverse facility for the amplification of low level signals in applications requiring very low noise performance, as stereo cassette players. Each channel consists of two independent amplifiers. The first has a fixed gain of 30 dB while the second one is an operational amplifier optimized for high quality audio application.
The TDA 3410 is a monolithic integrated circuit in a 16-lead dual in-line plastic package and its main features are:

- Very low noise
- High gain
- Low distortion
- Single supply operation
- Wide supply range
- SVR = 120 dB
- Large output voltage swing
- Tape autoreverse facility
- Short circuit protection

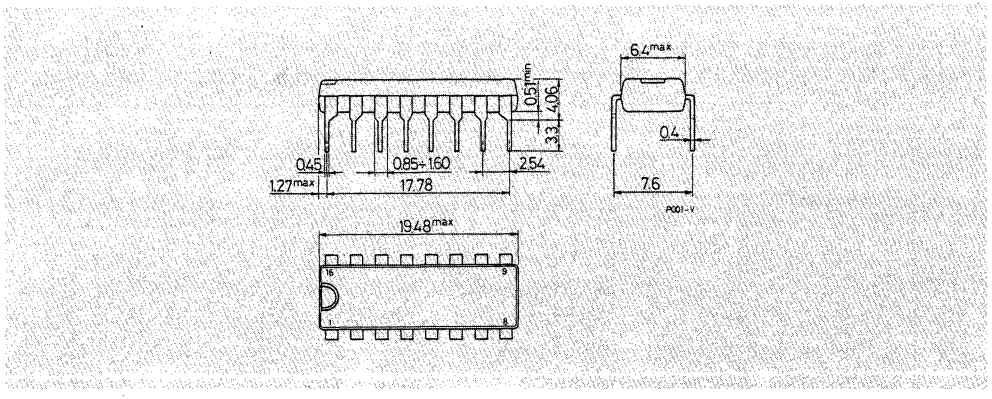
ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage	36	V
P_{tot}	Total power dissipation at T_{amb} = 60°C	600	mW
T_j, T_{stg}	Storage and junction temperature	-40 to 150	°C

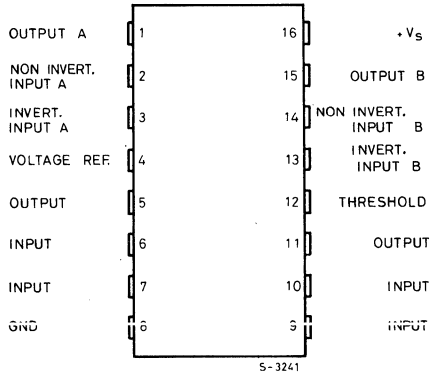
ORDERING NUMBER: TDA 3410

MECHANICAL DATA

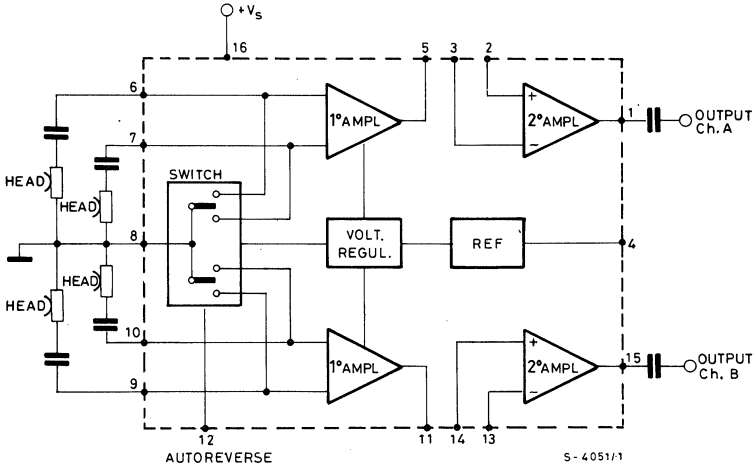
Dimensions in mm



CONNECTION DIAGRAM (top view)



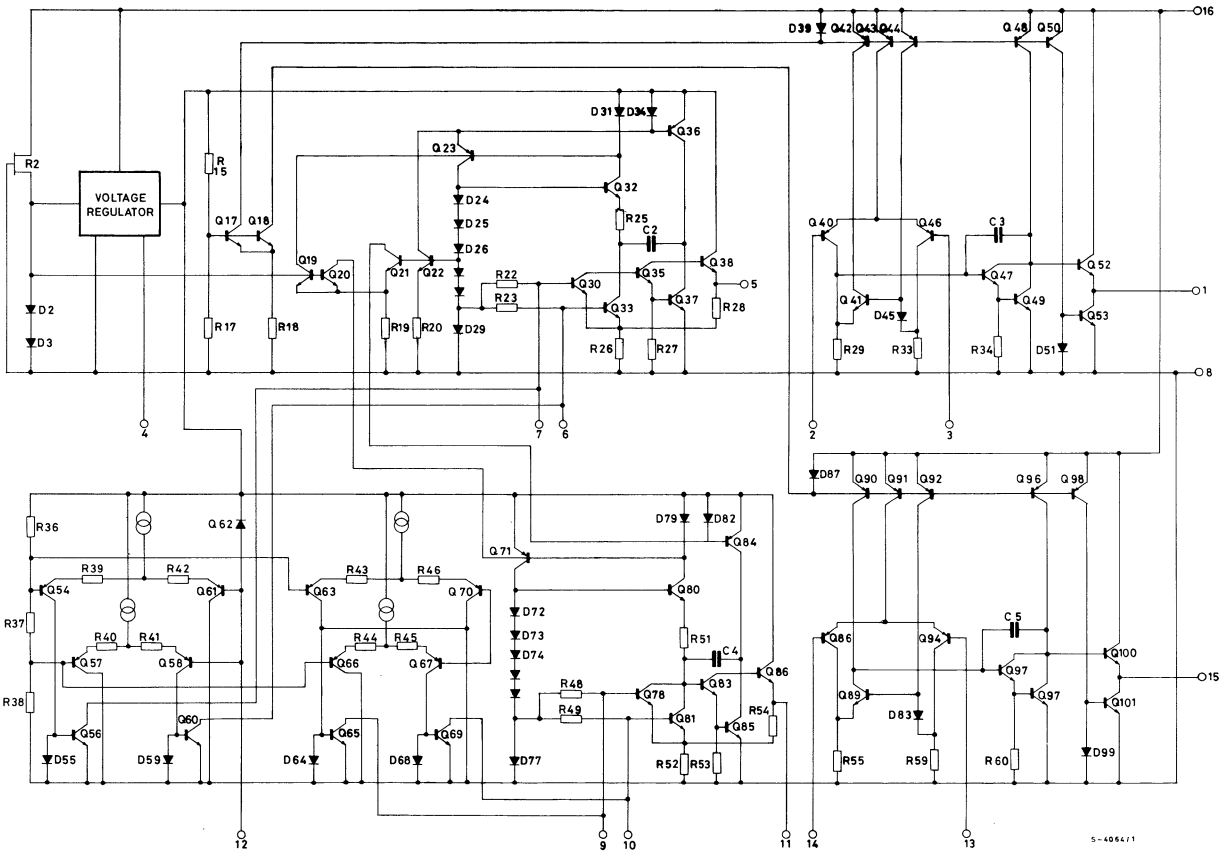
BLOCK DIAGRAM



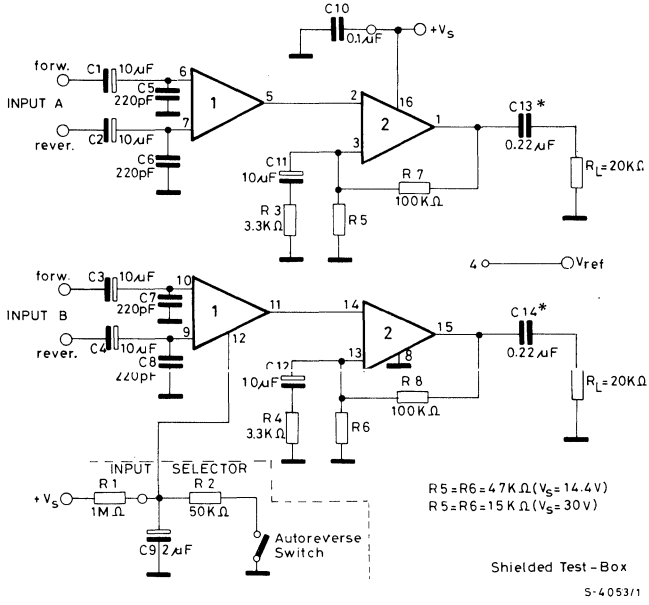
THERMAL DATA

$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	150	°C/W

SCHEMATIC DIAGRAM



TEST CIRCUIT (Flat Gain - G_v= 60 dB)



* Mylar or polycarbonate capacitors.

ELECTRICAL CHARACTERISTICS (T_{amb}= 25°C, V_s= 14.4V, G_v= 60 dB, refer to the test circuit, unless otherwise specified)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
I_s	Supply current	V_s= 8V to 30V		10		mA
I_o	Output current (pins 1-15)	Source V_s= 8V to 30V		10		mA
		Sink		1		mA
G_v	Closed loop gain	f = 20 Hz to 20 KHz		60		dB
R_i	Input resistance	f = 1 KHz	50	80		KΩ
R_o	Output resistance (pins 1-15)	f = 1 KHz		50		Ω
THD	Total harmonic distortion	V_o= 300 mV f = 1 KHz		0.05		%
		f = 10 KHz		0.05		%

ELECTRICAL CHARACTERISTICS (continued)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
V_o	Output voltage swing (pins 1-15)	Peak to Peak V_s= 14.4V V_s= 30V		12 28		.V V
V_o	Output voltage (pins 1-15)	d = 0.5% V_s= 14.4V f = 1 KHz V_s= 30V		4 8		V_{rms} V_{rms}
e_n	Total input noise (°)	R_g= 50Ω R_g= 600Ω R_g= 5KΩ		0.25 0.4 1.3	0.6	μV μV μV
S/N	Signal to noise ratio (°)	V_{in}= 0.3 mV R_g= 600Ω V_{in}= 1 mV R_g= 0		57 73		dB dB
CS	Channel separation	f = 1 KHz		60		dB
CT(°°°)	Cross-talk (differential input)	f = 1 KHz		80		dB
SVR	Supply voltage rejection (°°)	f = 1 KHz R_g= 600Ω		120		dB
SVR (°°)	Of reference voltage (Pin 4)	f = 1 KHz R_g= 600Ω		100		dB
V_{ref}	Reference voltage (pin 4)			55		mV
R_{ref}	Ref. voltage output resistance (pin 4)			100		Ω
$\frac{\Delta V_{ref}}{\Delta T}$	Voltage temperature coefficient			10		μV/°C

(°) The weighting filter used for the noise measurement has a curve A frequency response.
(°°) Referred to the input.
(°°°) Between a disabled input and an input ON.

ELECTRICAL CHARACTERISTICS (Refer test circuit, V_s= 30V)

AMPLIFIER N° 1

Parameter		Test conditions	Min.	Typ.	Max.	Unit
G_v	Gain (pins 6 to 5)		29	30	30.5	dB
d	Distortion	V_o= 300 mV f = 1 KHz f = 10 KHz		0.05 0.05		%
e_n	Total input noise (°)	R_g= 600Ω		0.4		μV
Z_o	Output impedance (pin 5)	f = 1 KHz		100		Ω
I_o	Output current (pin 5)			1		mA
V_5	DC output voltage (pin 5)	V_s = 10V	1.3	2	2.7	V

AMPLIFIER N° 2

G_v	Open loop voltage gain (pins 2 to 1)			100		dB
I_B	Input bias current			0.2		μA
V_{os}	Input offset voltage			2		mV
I_{os}	Input offset current			0.05		μA
BW	Small signal bandwidth	G_v= 30 dB		150		KHz
e_n	Total input noise (°)	R_g= 600Ω		2		μV
R_i	Input impedance	f = 1 KHz (open loop)	150	500		KΩ

AUTOREVERSE

P_{in}	$V_{12} < 2V$	$V_{12} > 4.5V$
6 – 10	OFF	ON
7 – 9	ON	OFF

(°) The weighting filter used for the noise measurement has a curve A frequency response.

Fig. 1 - Total input noise vs. source resistance (curve A)

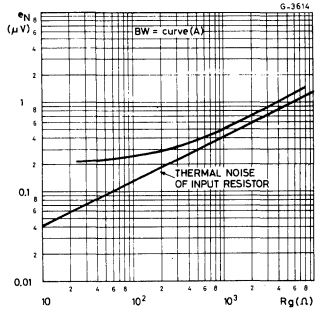


Fig. 2 - Total input noise vs. source resistance (BW= 22 Hz to 22 KHz)

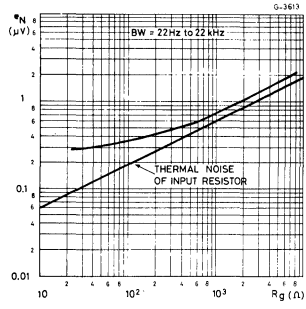


Fig. 3 - Total harmonic distortion vs. output voltage

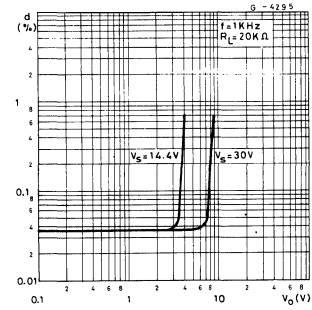


Fig. 6 - Very low noise stereo preamplifier for car cassette players (with Gap Loss Correction and autoreverse function)

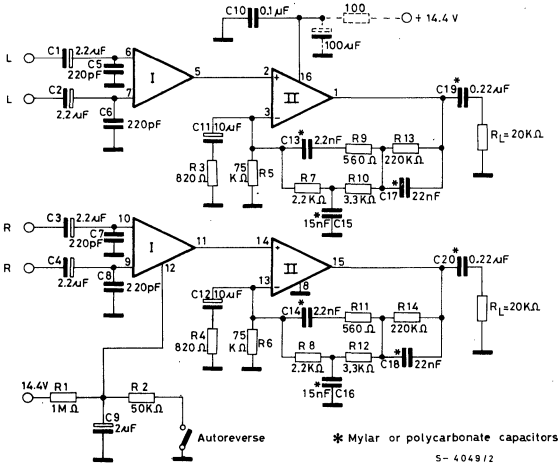


Fig. 5 - Frequency response

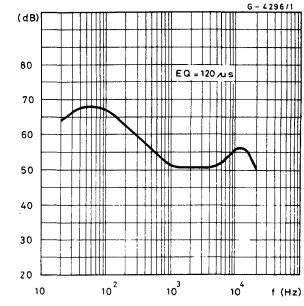


Fig. 6 - P.C. board and component lay-out (1:1 scale) for the circuit of fig. 4

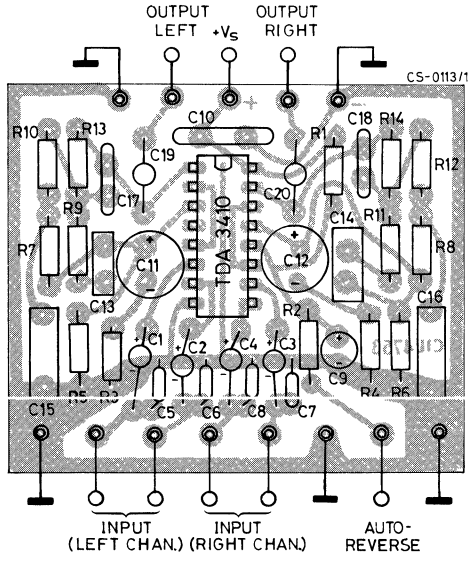


Fig. 7 - Stereo preamplifier for car cassette players, with low value capacitors (Autoreverse function)

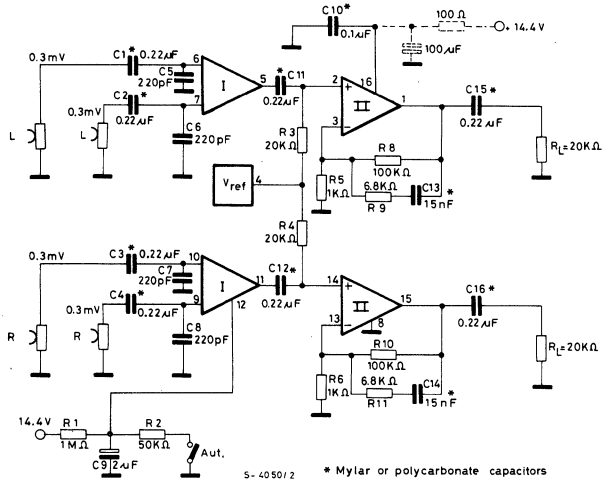


Fig. 8 - Frequency response