TDA 1190

LINEAR INTEGRATED CIRCUIT

COMPLETE TV SOUND CHANNEL

The TDA 1190 is a monolithic integrated circuit in a 12-lead quad in-line plastic package. It performs all the functions needed for the TV sound channel:

- IF limiter-amplifier
- Active low-pass filter
- FM detector
- DC volume control
- AF preamplifier
- AF output stage

The TDA 1190 can give an output power of 4.2W (d = 10%) into a 16Ω load at V_s = 24V, or 1.5W (d = 10%) into an 8Ω load at V_s = 12V. This performance, together with the FM-IF section characteristics of high sensitivity, high AM rejection and low distortion, enables the device to be used in almost every type of television receivers. The device has no irradiation problems, hence no external screening is needed.

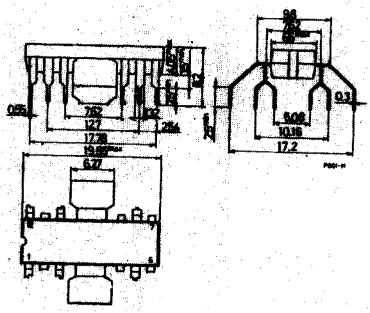
ABSOLUTE MAXIMUM RATINGS

V_s	Supply voltage (pin 10)	28	V
V_i	Input signal voltage (pin 1)	1	V
I_o	Output peak current (non-repetitive)	2	A
I_o	Output peak current (repetitive)	1.5	A
P_{tot}	Power dissipation: at T_{tab} = 90°C	5	W
	at T_{amb} = 80°C (free air)	1	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

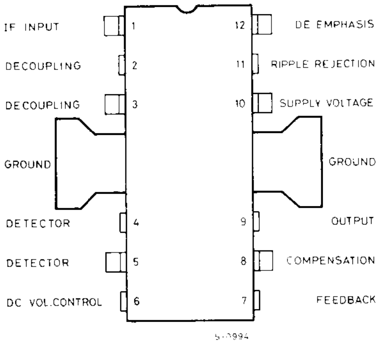
ORDERING NUMBER: TDA 1190

MECHANICAL DATA

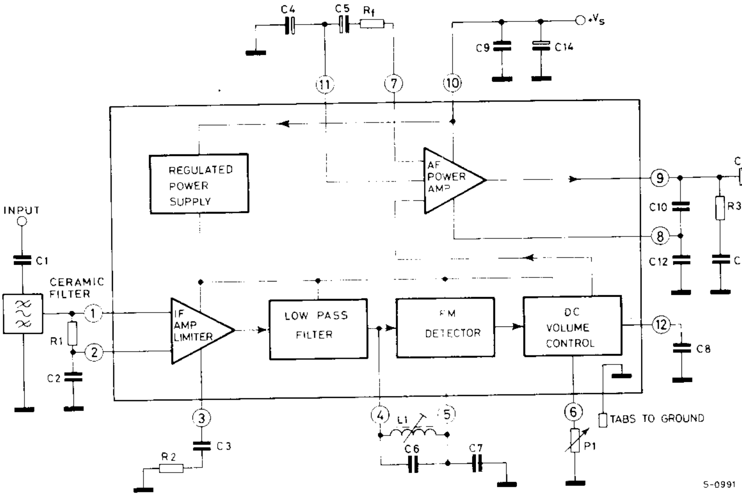
Dimensions in mm



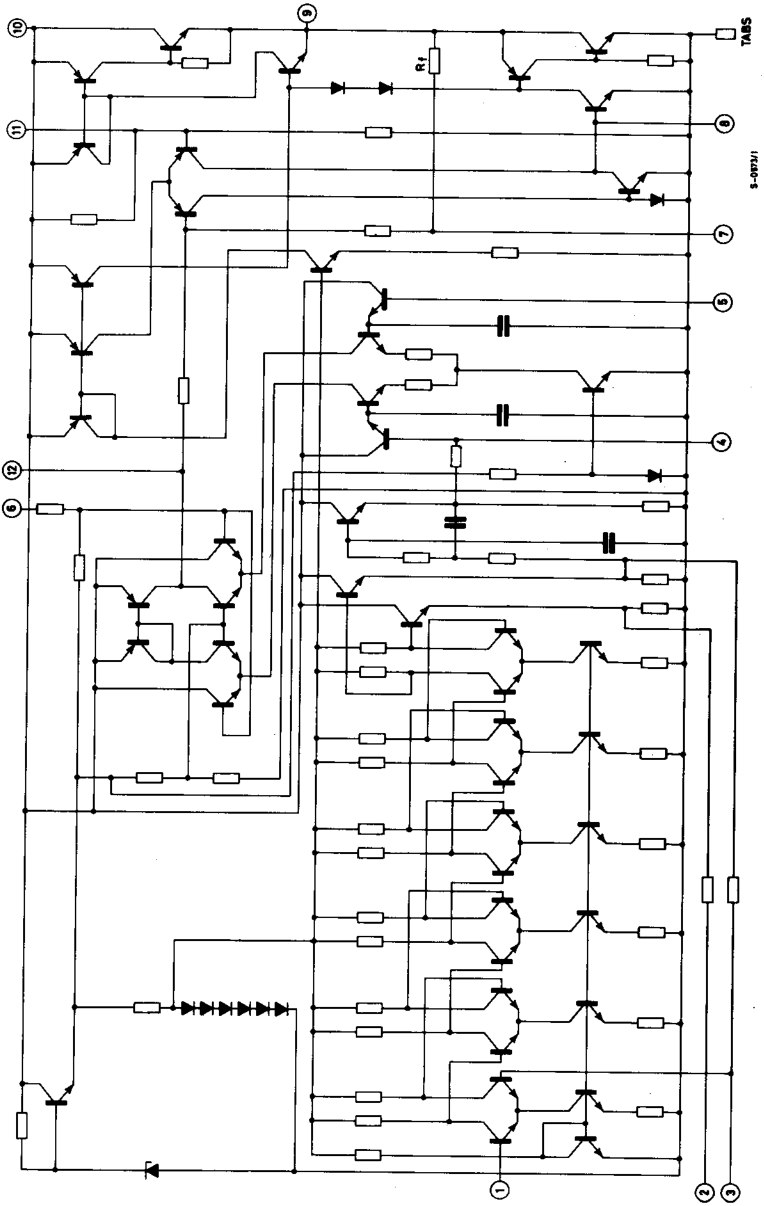
CONNECTION DIAGRAM (top view).



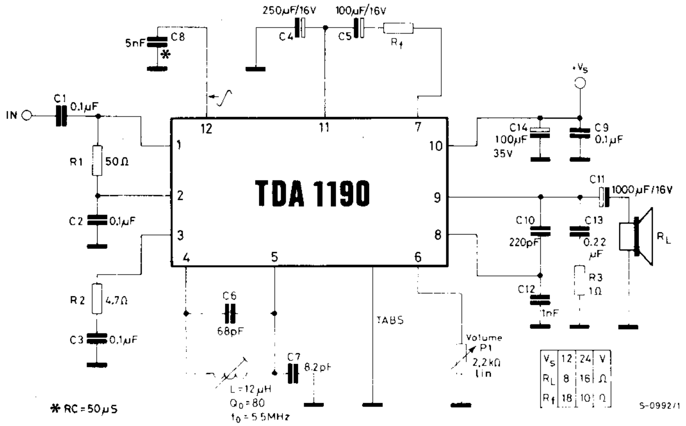
BLOCK DIAGRAM



SCHEMATIC DIAGRAM



TEST CIRCUIT



THERMAL DATA

$R_{th\ j\text{-}tab}$	Thermal resistance junction-tab	max	12	°C/W
$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	70*	°C/W

* Obtained with tabs soldered to printed circuit with minimized copper area

ELECTRICAL CHARACTERISTICS

(Refer to the test circuit, $V_s = 24V$, $T_{amb} = 25°C$ unless otherwise specified)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
V_s	Supply voltage (pin 10)		9		28	V
V_o	Quiescent output voltage (pin 9)	V_s = 24V V_s = 12V	11 5.5	12 6	13 6.5	V V
I_d	Quiescent drain current	P1 = 2.2 kΩ V_s = 24V V_s = 12V		22 19	35 31	mA mA
P_o	Output power	d = 10% f_0 = 5.5 MHz f_m = 1 kHz Δf = ± 25 kHz V_s = 24V R_L = 16 Ω V_s = 12V R_L = 8 Ω		4.2 1.5		W W

ELECTRICAL CHARACTERISTICS (continued)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
P_o	Output power	$d = 2\%$ $f_0 = 5.5$ MHz $f_m = 1$ kHz $\Delta f = \pm 25$ kHz $V_s = 24V$ $R_L = 16\ \Omega$ $V_s = 12V$ $R_L = 8\ \Omega$		3.4 1.35		W W
V_i	Input limiting voltage (-3 dB) at pin 1	$f_0 = 5.5$ MHz $f_m = 1$ kHz $\Delta f = \pm 7.5$ kHz $P1 = 0$		30		μV
d	Distortion	$P_o = 50$ mW $f_0 = 5.5$ MHz $f_m = 1$ kHz $\Delta f = \pm 7.5$ kHz $V_s = 24V$ $R_L = 16\ \Omega$ $V_s = 12V$ $R_L = 8\ \Omega$		0.55 0.65		% %
B	Frequency response of audio amplifier (-3 dB)	$R_L = 16\ \Omega$ $C10 = 220$ pF $C12 = 1000$ pF $P1 = 2.2\ k\Omega$ $R_f = 18\ \Omega$ $R_f = 10\ \Omega$		50 to 12,000 50 to 9,100		Hz Hz
V_o	Recovered audio voltage (pin 12)	$V_i \geqslant 1$ mV $f_0 = 5.5$ MHz $f_m = 1$ kHz $\Delta f = \pm 7.5$ kHz $P1 = 0$		60		mV
AMR	Amplitude modulation rejection	$V_i \geqslant 1$ mV $f_0 = 5.5$ MHz $f_m = 1$ kHz $\Delta f = \pm 50$ kHz $m = 0.3$		55		dB
$\frac{S+N}{N}$	Signal to noise ratio	$V_i \geqslant 10$ mV $f_o = 5.5$ MHz $V_o = 4V$ $f_m = 1$ kHz $\Delta f = \pm 50$ MHz		70		dB
R_f	Internal feedback resistance (pins 7 and 9)		3.5	5	6.5	$k\Omega$
R_i	Input resistance (pin 1)	$V_i = 1$ mV $f_0 = 5.5$ MHz		30		$K\Omega$
C_i	Input capacitance (pin 1)			5		pF
SVR	Supply voltage rejection	$R_L = 16\Omega$ $f_{ripple} = 100$ Hz $P1 = 2.2\ k\ \Omega$		46		dB
A	DC volume control attenuation	$P1 = 2.2\ k\ \Omega$		90		dB

Fig. 1 - Relative audio output voltage and output noise vs. input signal.

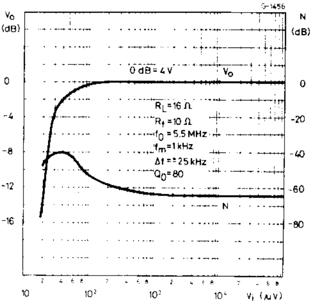


Fig. 2 - Output voltage attenuation vs. DC volume control resistance

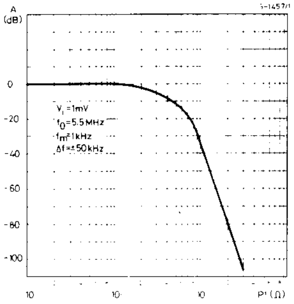


Fig. 3 - Amplitude modulation rejection vs. input signal

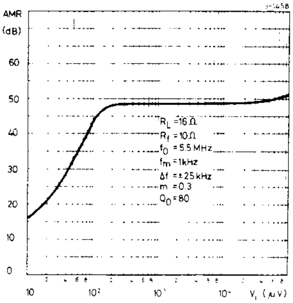


Fig. 4 - ΔAMR vs. tuning frequency change

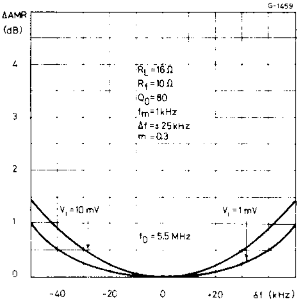


Fig. 5 - Recovered audio voltage vs. unloaded Q factor of the detector coil

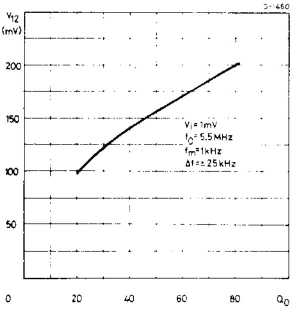


Fig. 6 - Distortion vs. output power

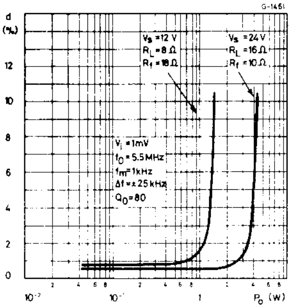


Fig. 7 - Distortion vs. frequency deviation

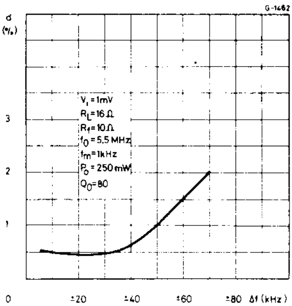


Fig. 8 - Distortion vs. tuning frequency change

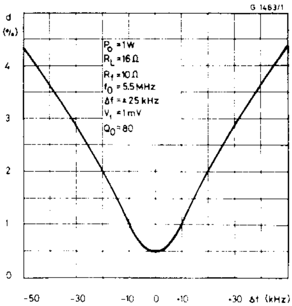


Fig. 9 - Audio amplifier frequency response

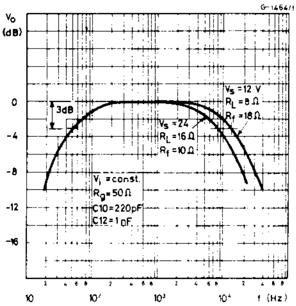


Fig. 10 - Supply voltage ripple rejection vs. ripple frequency

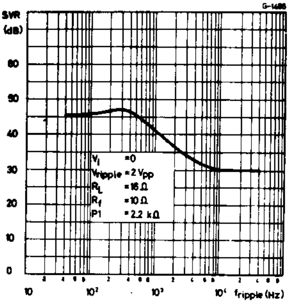


Fig. 11 - Supply voltage ripple rejection vs. volume control attenuation

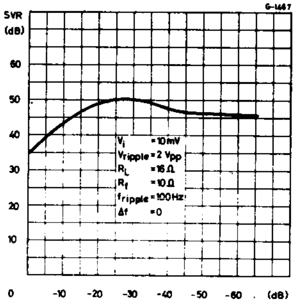


Fig. 12 - Output power vs. supply voltage

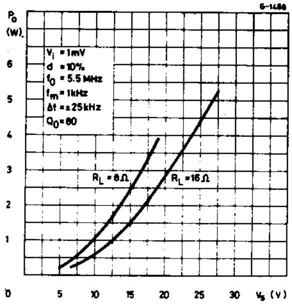


Fig. 13 - Maximum power dissipation vs. supply voltage (sine wave operation)

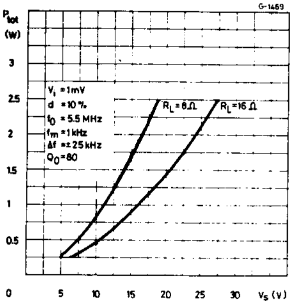


Fig. 14 - Power dissipation and efficiency vs. output power

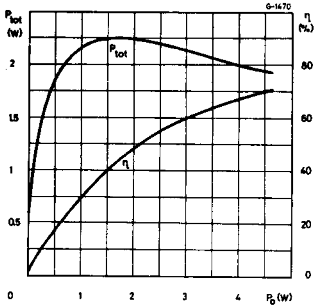
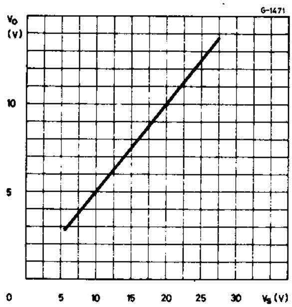


Fig. 15 - Quiescent output voltage (pin 9) vs. supply voltage



APPLICATION INFORMATION

The electrical characteristics of the TDA 1190 remain almost constant over the frequency range of 4.5 to 6 MHz, therefore it can be used in all television standards (FM mod.). The TDA 1190 has a high input impedance, so it can function with a ceramic filter or with a tuned circuit that provide the necessary input selectivity.

The value of the resistor connected to pin 7, determines the AC gain of the audio frequency amplifier. This enables the desired gain to be selected in relation to the frequency deviation at which the output stage of the AF amplifier must enter into clipping.

The capacitor connected between pins 9 and 8 determines the upper cut-off frequency of the audio band.

The capacitor connected between pin 12 and ground, together with the internal resistor of 10 kΩ, forms the de-emphasis network. The Boucherot cell eliminates the high frequency oscillations caused by the inductive load and the wires connecting the loudspeaker.

APPLICATION INFORMATION (continued)

Fig. 16 - Typical application circuit

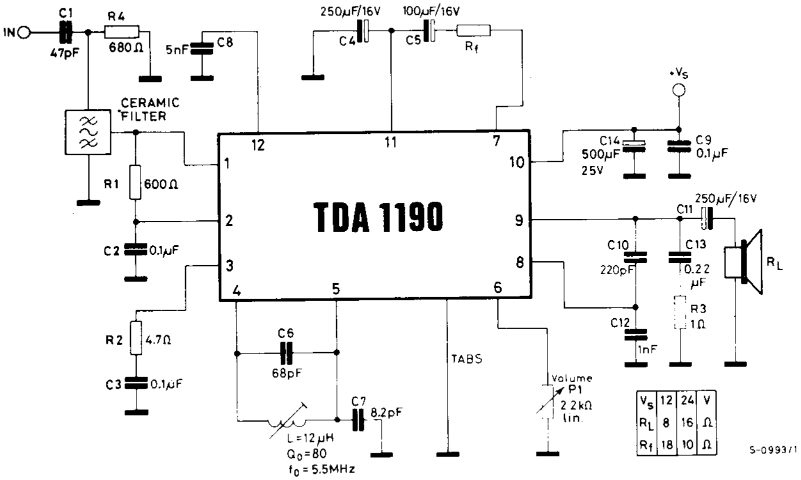
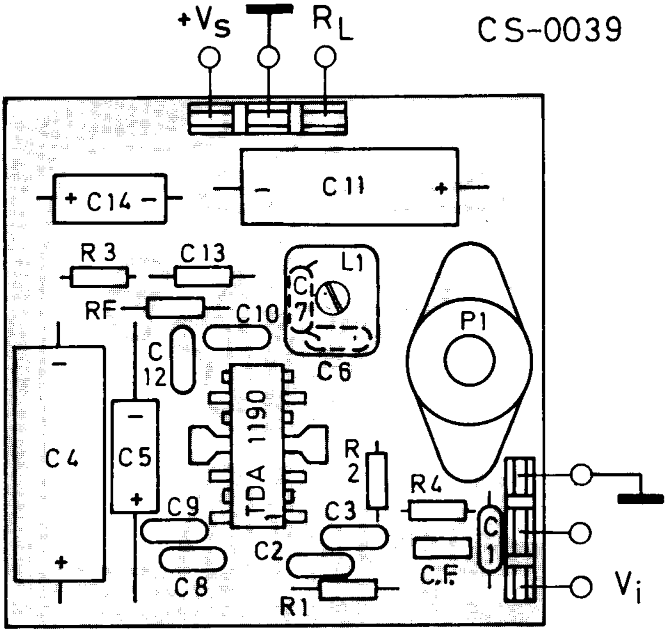


Fig. 17 - P.C. board and component layout of the circuit shown in fig. 16 (1:1 scale)



MOUNTING INSTRUCTION

The $R_{th\ j\text{-}amb}$ of the TDA 1190 can be reduced by soldering the tabs to a suitable copper area of th printed circuit board (Fig. 18) or to an external heatsink (Fig. 19).

The diagram of figure 20 shows the maximum dissipable power P_{tot} and the $R_{th\ j\text{-}amb}$ as a function o the side "ℓ" of two equal square copper areas having a thickness of 35 µ (1.4 mils).

During soldering the tab temperature must not exceed 260 °C and the soldering time must not be longe than 12 seconds.

The external heatsink or printed circuit copper area must be connected to electrical ground.

Fig. 18 - Exampler of P.C. board copper area which is used as heatsink

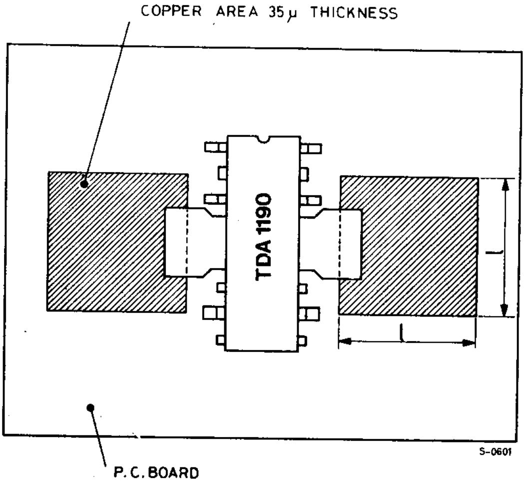


Fig. 19 - External heatsink mountin example

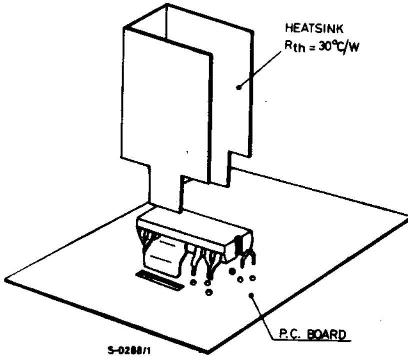


Fig. 20 - Maximum dissipable power and junction to ambient thermal resistance vs. side "ℓ"

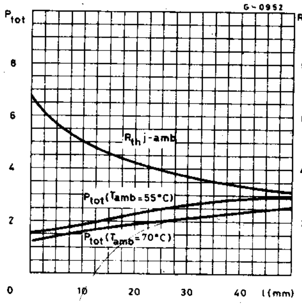


Fig. 21 - Maximum allowable power dissipation vs. ambient temperature