TDA1190Z

LINEAR INTEGRATED CIRCUIT

COMPLETE TV SOUND CHANNEL

The TDA 1190Z 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 1190Z 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.

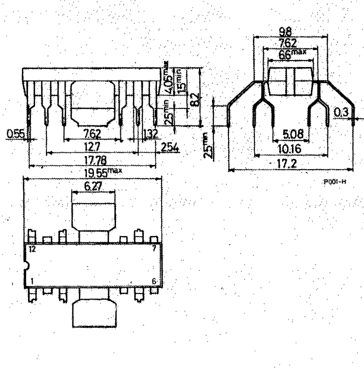
ABSOLUTE MAXIMUM RATINGS

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° (free air)	1	W
T_{stg}, T_j	Storage and junction temperature	-40 to 150	°C

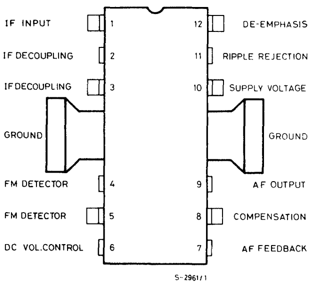
ORDERING NUMBER: TDA 1190Z

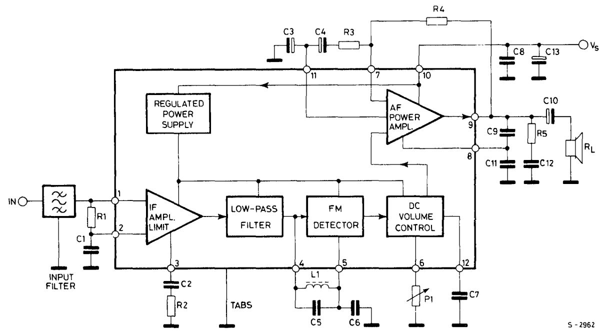
MECHANICAL DATA

Dimensions in mm

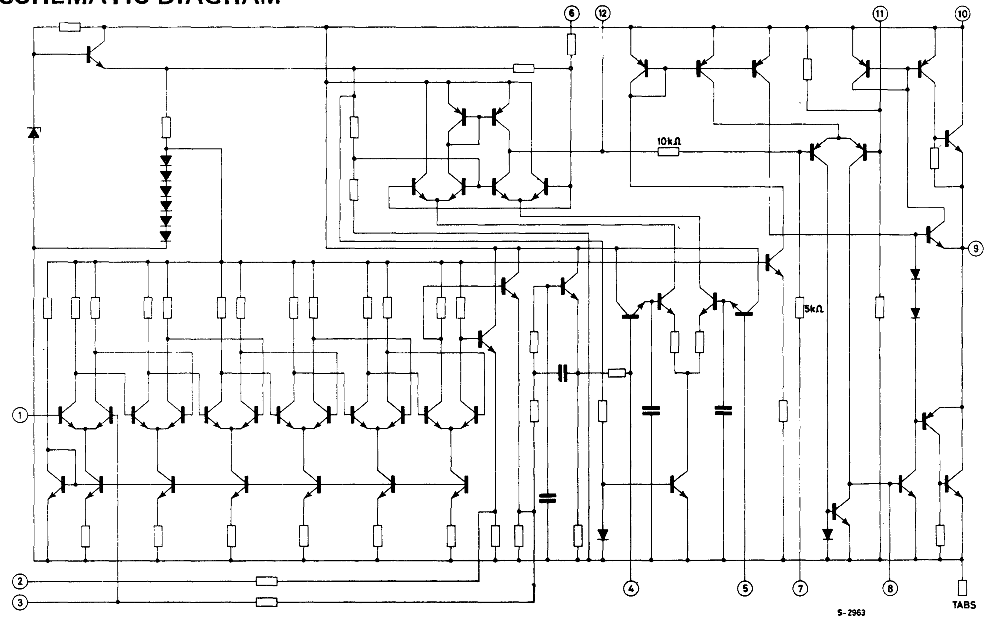


CONNECTION AND BLOCK DIAGRAM
(top view)

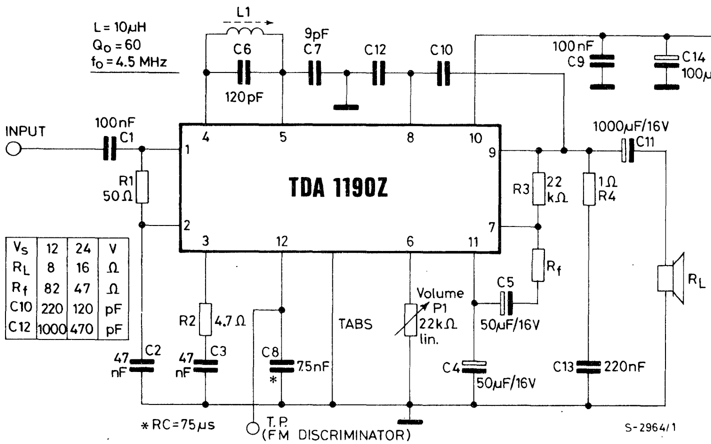




SCHEMATIC DIAGRAM



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 5.1	12 6	13 6.9	V V
I_d	Quiescent drain current	P_1 = 22 KΩ V_s = 24V V_s = 12V	11	22 19	45 40	mA mA
P_o	Output power	d = 10% f_m = 400 Hz f_o = 4.5 MHz Δf = ±25 kHz V_s = 24V R_L = 16Ω V_s = 12V R_L = 8Ω		4.2 1.5		W W

ELECTRICAL CHARACTERISTICS (continued)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
P_o	Output power	d = 2% f_m = 400 Hz f_o = 4.5 MHz Δf = ±25 kHz V_s = 24V R_L = 16Ω V_s = 12V R_L = 8Ω		3.5 1.4		W W
V_i	Input limiting voltage (-3 dB) at pin 1	f_o = 4.5 MHz Δf = ±7.5 kHz f_m = 400 Hz P_1 = 0		40	100	μV
d	Distortion	P_o = 50 mW f_m = 400 Hz f_o = 4.5 MHz Δf = ±7.5 kHz V_s = 24V R_L = 16Ω V_s = 12V R_L = 8Ω		0.75 1		% %
B	Frequency response of audio amplifier (-3 dB)	R_L = 16Ω C_{10} = 120 pF C_{12} = 470 pF P_1 = 22 kΩ R_f = 82Ω R_f = 47Ω		70 to 12 000 70 to 7 000		Hz Hz
V_o	Recovered audio voltage (PIN. 12)	V_i ≥ 1 mV f_o = 4.5 MHz f_m = 400 Hz Δf = ±7.5 kHz P_1 = 0		120		mV
AMR	Amplitude modulation rejection	V_i ≥ 1 mV f_o = 4.5 MHz f_m = 400 Hz Δf = ±25 kHz m = 0.3		55		dB
$\frac{S+N}{N}$	Signal to noise ratio	V_i ≥ 1 mV V_o = 4 V f_o = 4.5 MHz f_m = 400 Hz Δf = ±25 kHz	50	65		dB
R_f	External feedback resistance (between pins 7 and 9)				25	kΩ
R_i	Input resistance (pin 1)	V_i = 1 mV f_o = 4.5 MHz		30		kΩ
C_i	Input capacitance (pin 1)			5		pF
SVR	Supply voltage rejection	R_L = 16Ω f_{ripple} = 120 Hz P_1 = 22 kΩ		46		dB
A	DC volume control attenuation	P_1 = 12 kΩ		90		dB

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

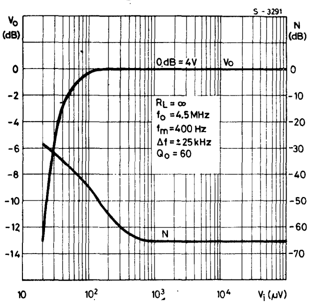


Fig. 2 - Output voltage attenuation vs. DC volume control resistance

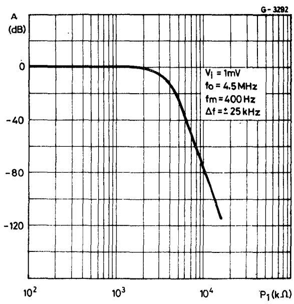


Fig. 3 - Amplitude modulation rejection vs. input signal

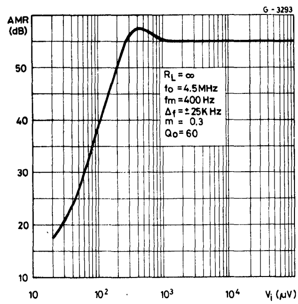


Fig. 4 - ΔAMR vs. tuning frequency change

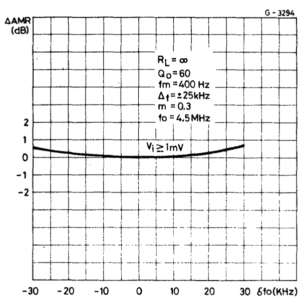


Fig. 5 - Recovered audio voltage vs. unloaded Q factor of the detector coil

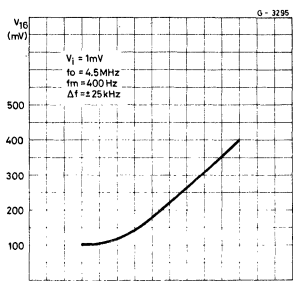


Fig. 6 - Distortion vs. output power

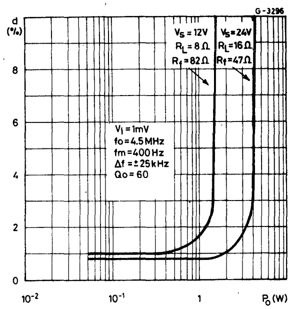


Fig. 7 - Distortion vs. frequency deviation

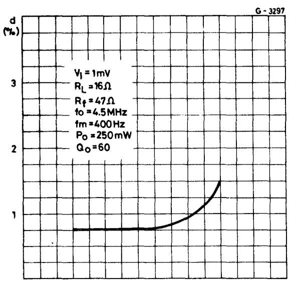


Fig. 8 - Distortion vs. tuning frequency change

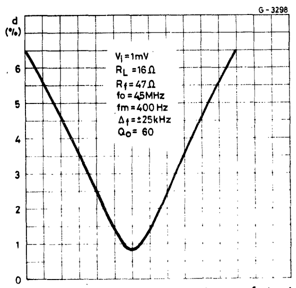


Fig. 9 - Audio amplifier frequency response

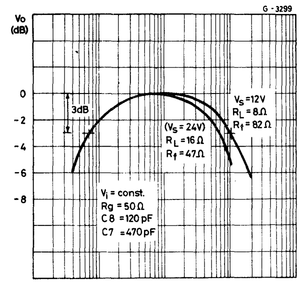


Fig. 10 - Supply voltage ripple rejection vs. ripple frequency

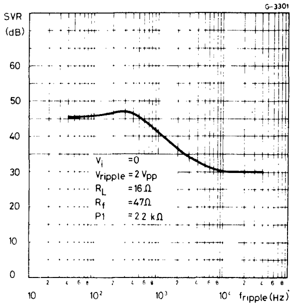


Fig. 11 - Supply voltage ripple rejection vs. volume control attenuation

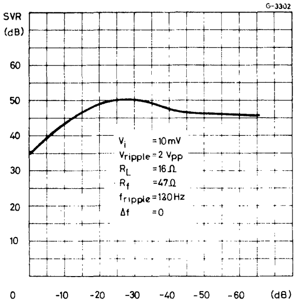


Fig. 12 - Output power vs. supply voltage

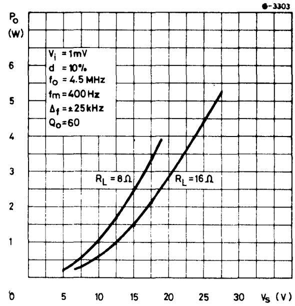


Fig. 13 - Maximum power dissipation vs. supply voltage (sine wave operation)

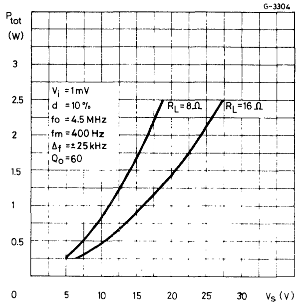


Fig. 14 - Power dissipation and efficiency vs. output power

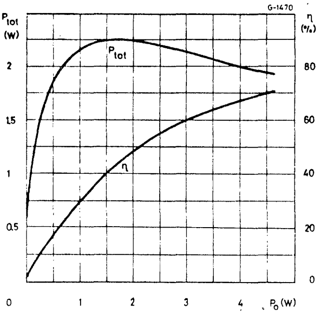
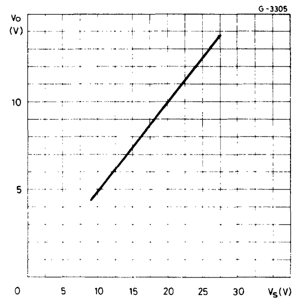


Fig. 15 - Quiescent output voltage (pin 9) vs. supply voltage



APPLICATION INFORMATION

The electrical characteristics of the TDA 1190Z remain almost constant over the frequency range of 4.5 to 6 MHz, therefore it can be used in all television standard (FM mod.). The TDA 1190Z 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 resistors connected to pin 7, determine 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. If larger bandwidth is required C_{10}, C_{12} must be reduced keeping C_{12}/C_{10} as in Fig. 16.

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

APPLICATION INFORMATION (continued)

Fig. 16 – Typical application circuit

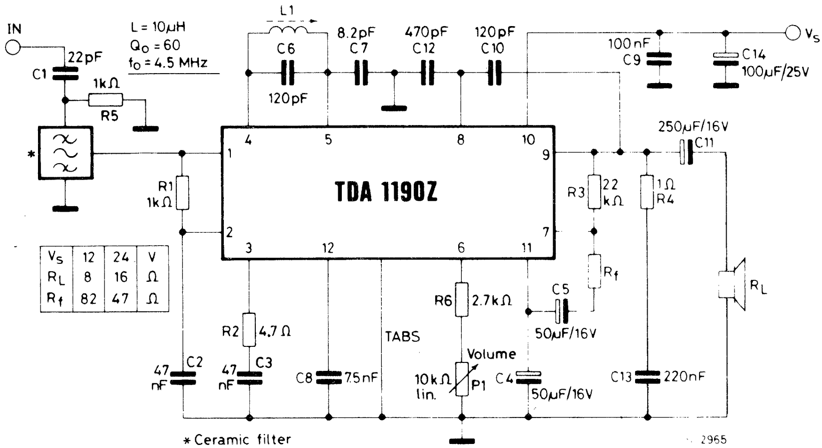
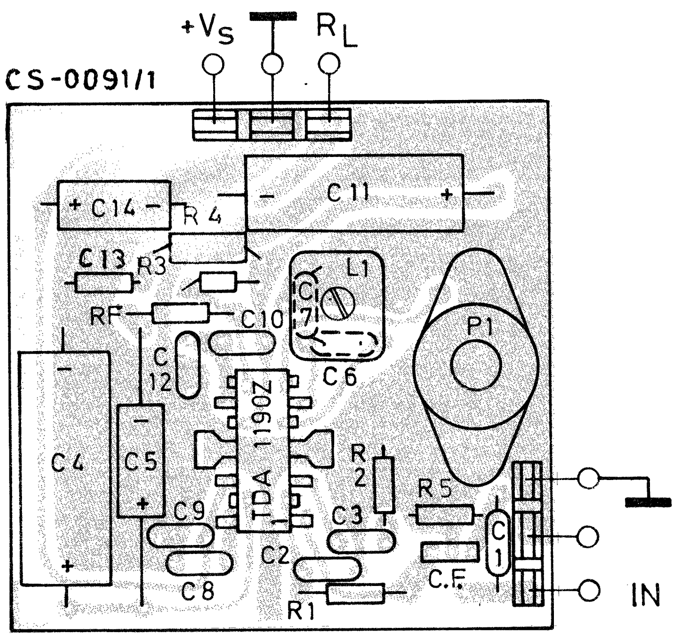


Fig. 17 – P.C. board and component layout of the circuit shown in Fig. 16



MOUNTING INSTRUCTION

The $R_{th\ j\text{-}amb}$ of the TDA 1190Z can be reduced by soldering the tabs to a suitable copper area of the 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 of the side "ℓ" of two equal square copper areas having a thickness of 35μ (1.4 mils).
During soldering the tab temperature must not exceed 260°C and the soldering time must not be longer than 12 seconds.
The external heatsink or printed circuit copper area must be connected to electrical ground.

Fig. 18 - Example of P.C. board copper area which is used as heatinsk

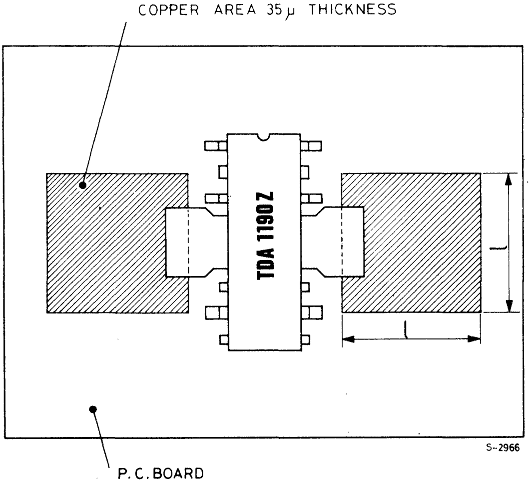


Fig. 19 - External heatsink mounting example

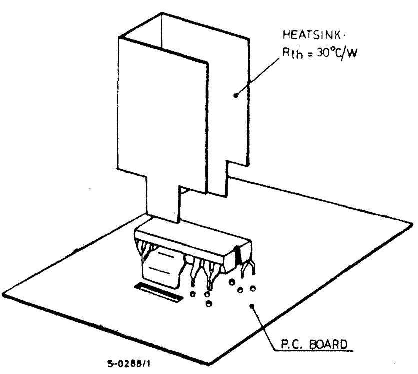


Fig. 20 - Maximum dissipable power and junction to ambient thermal resistance vs. side "ℓ"

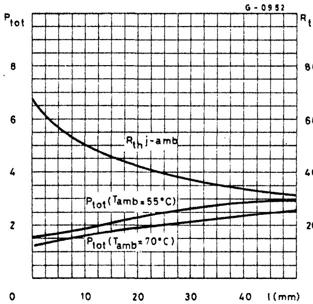


Fig. 21 - Maximum allowable power dissipation vs. ambient temperature