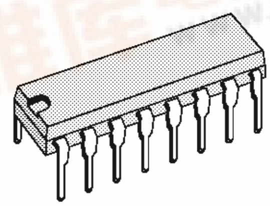
SGS-THOMSON MICROELECTRONICS

TDA3190

COMPLETE TV SOUND CHANNEL

The TDA3190 is a monolithic integrated circuit in a 16-lead dual 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



DIP16
(Plastic Package)

ORDER CODE : TDA3190

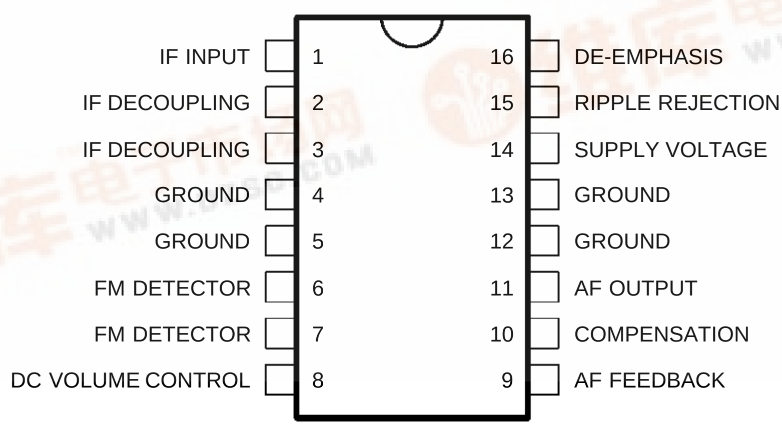
DESCRIPTION

The TDA3190 can give an output power of 4.2 W (d = 10 %) into a 16 Ω load at V_S = 24 V, or 1.5 W (d = 10 %) into an 8 Ω load at V_S = 12 V. 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.

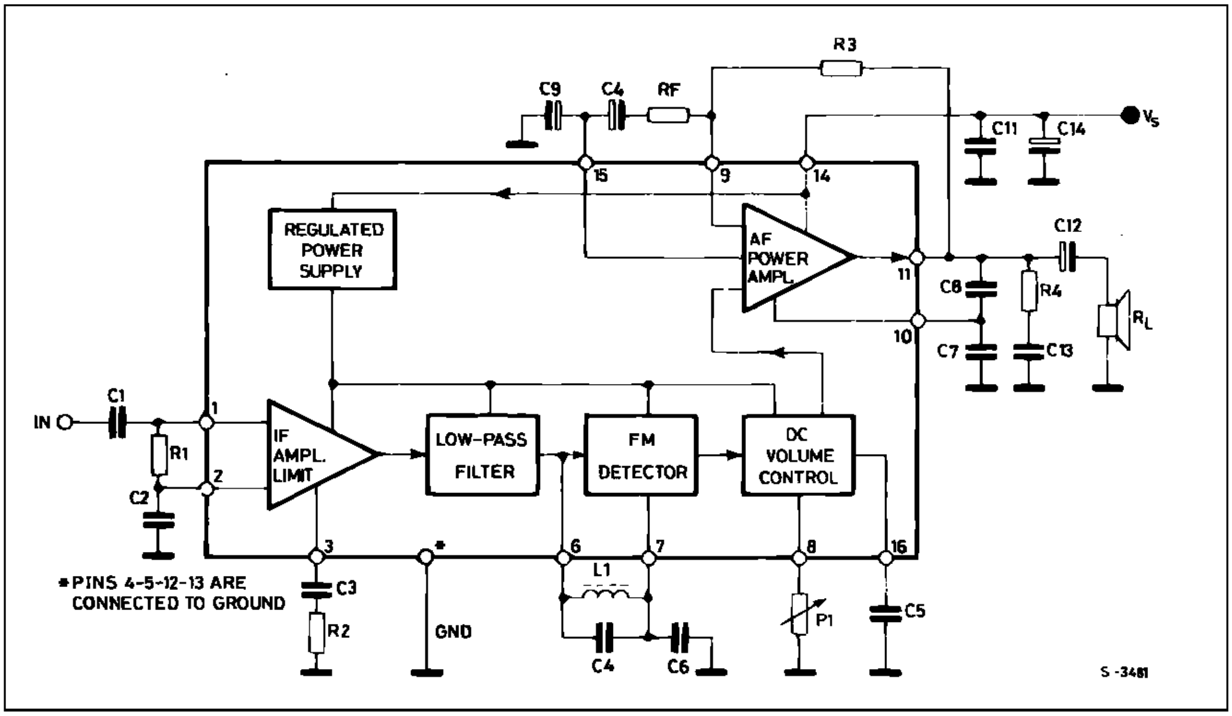
The TDA3190 is a pin to pin replacement of TDA1190Z.

PIN CONNECTIONS



3190-01.EPS

BLOCK DIAGRAM



3190-02.EPS

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
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_{pins} = 90 °C at T_{amb} = 70 °C (free air)	4.3 1	W W
T_{stg}, T_j	Storage and Junction Temperature	– 40 to 150	°C

3190-01.TBL

THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ j\text{-}pins}$	Thermal Resistance Junction-pins	Max	14	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	80*	°C/W

3190-02.TBL

* Obtained with the GND pins 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)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_s	Supply Voltage (Pin 14)		9		28	V
V_o	Quiescent Output Voltage (Pin11)	V_s = 24V V_s = 12V	11 5.1	12 6	13 6.9	V V
I_d	Quiescent Drain Current	P_1 = 22kΩ V_s = 24V V_s = 12V	11	22 19	45 40	mA mA

3190-03.TBL

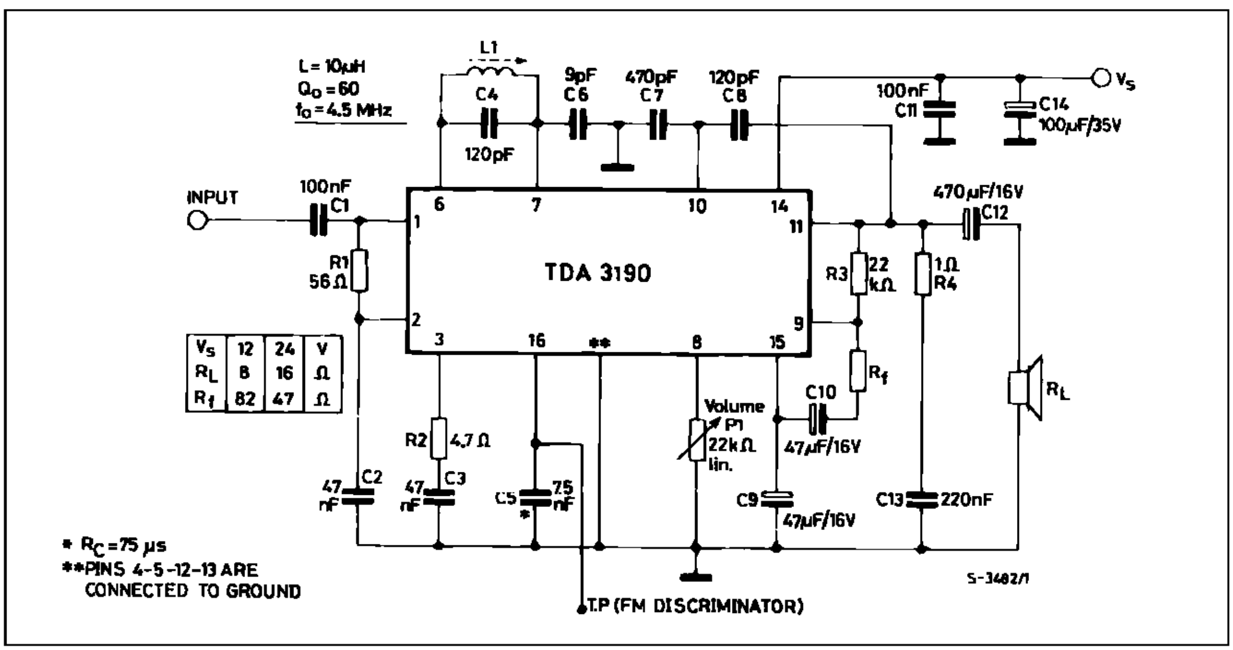
ELECTRICAL CHARACTERISTICS

(refer to the test circuit, V_S = 24V, T_{amb} = 25^{o}C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Po	Output Power	d = 10%, f_m = 400Hz, f_o = 4.5MHz, Δf = ± 25kHz V_s = 24V, R_L = 16Ω V_s = 12V, R_L = 8Ω		 4.2 1.5		 W W
		d = 2%, f_m = 400Hz, f_o = 4.5MHz, Δf = ± 25kHz V_s = 24V, R_L = 16Ω V_s = 12V, R_L = 8Ω		 3.5 1.4		 W W
V_i	Input Limiting Voltage (–3dB) atPin 1	f_o = 4.5MHz, Δf = ± 7.5kHz, f_m = 400Hz, P_1 = 0		40	100	µV
d	Distortion	P_o = 50mW, f_m = 400Hz, f_o = 4.5MHz, Δf = ± 7.5kHz V_s = 24V, R_L = 16Ω V_s = 12V, R_L = 8Ω		 0.75 1		 % %
B	Frequency Response of audio amplifier (–3dB)	R_L = 16Ω, C_8 = 120pF C_7 = 470pF, P_1 = 22kΩ R_f = 82Ω R_f = 47Ω		 70 to 1200 70 to 7000		 Hz Hz
V_o	Recovered Audio Voltage (Pin16)	V_i ≥ 1mV, f_o = 4.5MHz f_m = 400Hz, Δf = ± 7.5kHz, P_1 = 0		120		mV
AMR	Ampliture Modulation Rejection	V_i ≥ 1mV, f_o = 4.5MHz, f_m = 400Hz, Δf = ± 25kHz, m = 0.3		55		dB
$\frac{S+N}{N}$	Signal to Noise Ratio	V_I ≥ 1mV, V_o = 4V, f_o = 4.5MHz, f_m = 400Hz, Δf = ± 25kHz	50	65		dB
R_3	External Feedback Resistance (betweenPins9and11)				25	kΩ
R_i	Input Resistance (Pin1)	V_i = 1mV, fo = 4.5MHz		30		kΩ
C_i	Input Capacitance (Pin1)			5		pF
SVR	Supply Voltage Rejection	R_L = 16Ω, f_{ripple} = 120Hz, P_1 = 22kΩ		46		dB
A_v	DC Volume Control Attenuation	P_1 = 12kΩ		90		dB

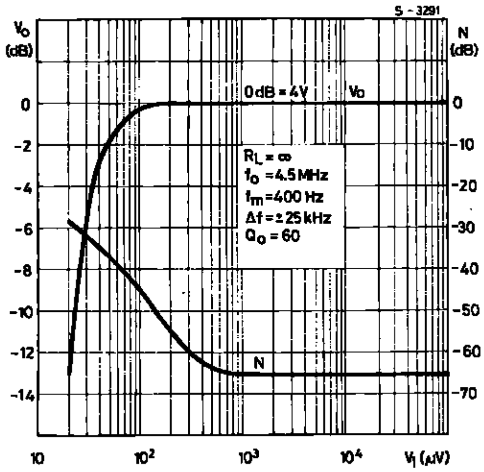
3190-04.TBL

TYPICAL CIRCUIT



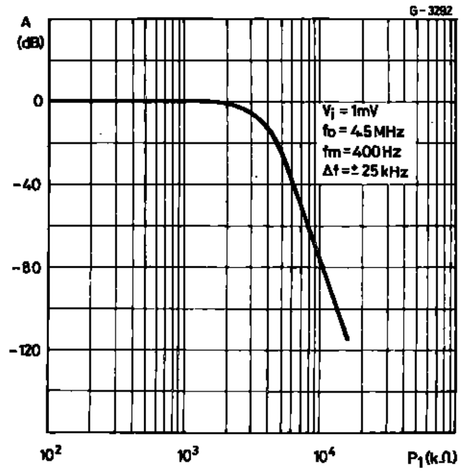
3190-03.EPS

Figure 1 : Relative Audio Output Voltage and Output Noise versus Input Signal



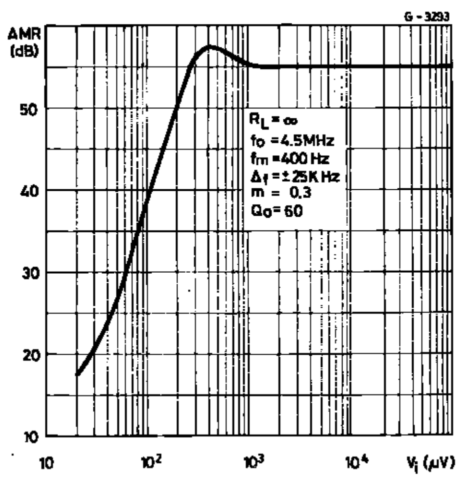
3190-04.EPS

Figure 2 : Output Voltage Attenuation versus DC Volume Control Resistance



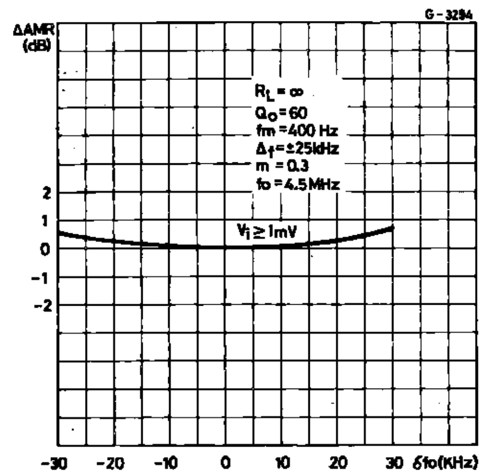
3190-05.EPS

Figure 3 : Amplitude Modulation Rejection versus Input Signal



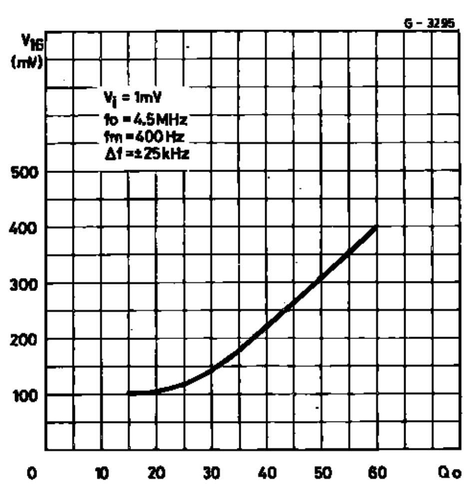
3190-06.EPS

Figure 4 : ΔAMR versus Tuning Frequency Change



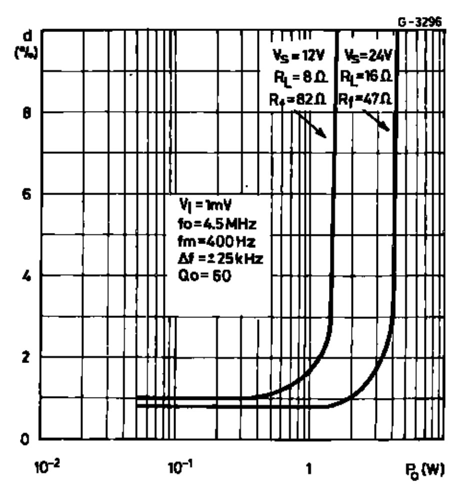
3190-07.EPS

Figure 5 : Recovered Audio Voltage versus Unloaded Q Factor of the Detector Coil



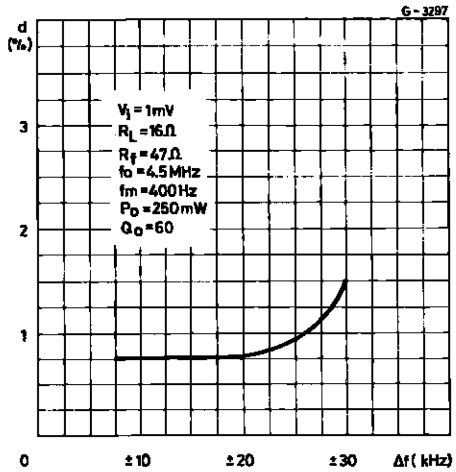
3190-08.EPS

Figure 6 : Distortion versus Output Power



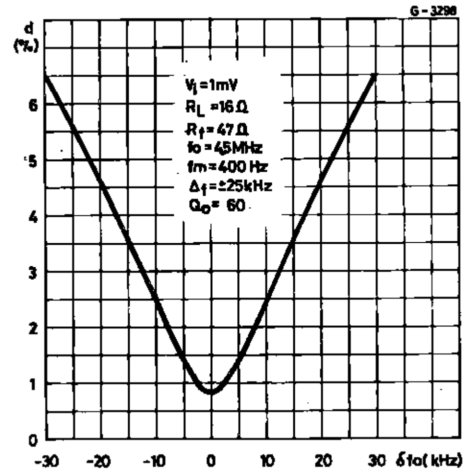
3190-09.EPS

Figure 7 : Distortion versus Frequency Deviation



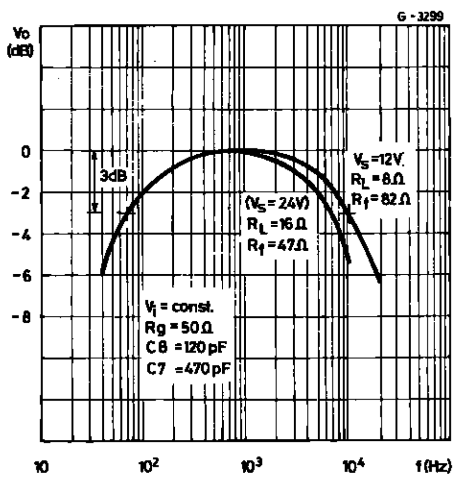
3190-10.EPS

Figure 8 : Distortion versus Tuning Frequency Change



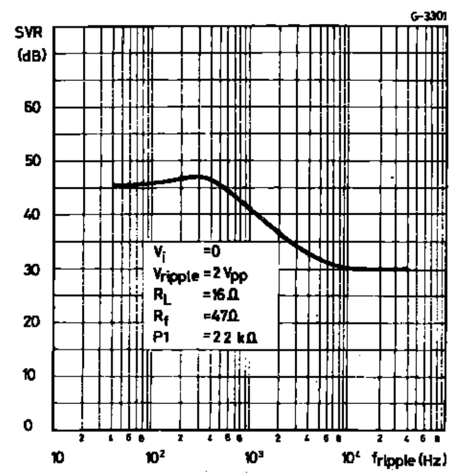
3190-11.EPS

Figure 9 : Audio Amplifier Frequency Response



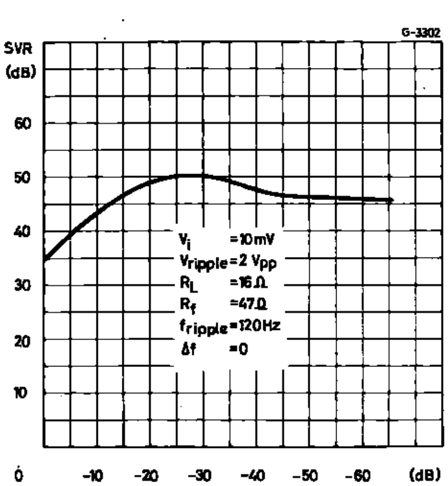
3190-12.EPS

Figure 10 : Supply Voltage Ripple Rejection versus Ripple Frequency



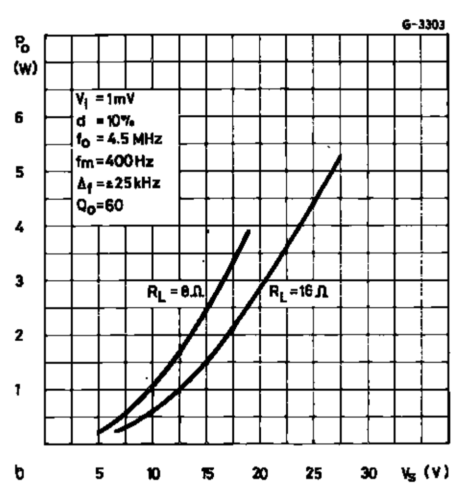
3190-13.EPS

Figure 11 : Supply Voltage Ripple Rejection versus Volume Control Attenuation



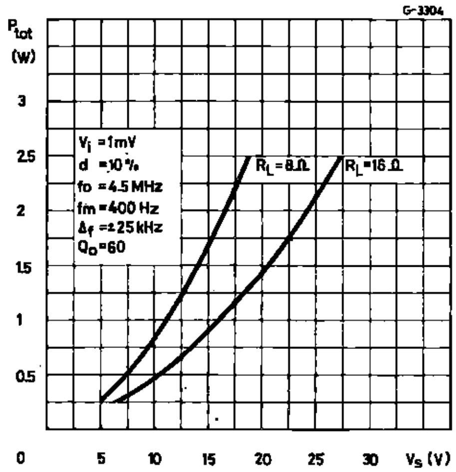
3190-14.EPS

Figure 12 : Output Power versus Supply Voltage



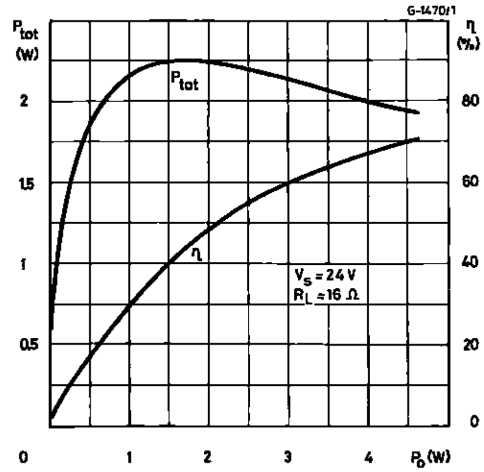
3190-15.EPS

Figure 13 : Maximum Power Dissipation versus Supply Voltage (sinewave operation)



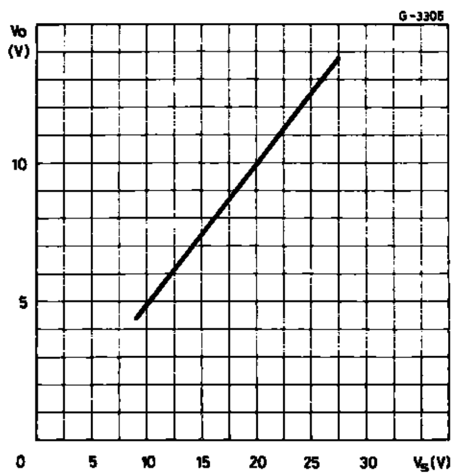
3190-16.EPS

Figure 14 : Power Dissipation and Efficiency versus Output Power



3190-17.EPS

Figure 15 : Quiescent Output Voltage (Pin 11) versus Supply Voltage



3190-18.EPS

APPLICATION INFORMATION

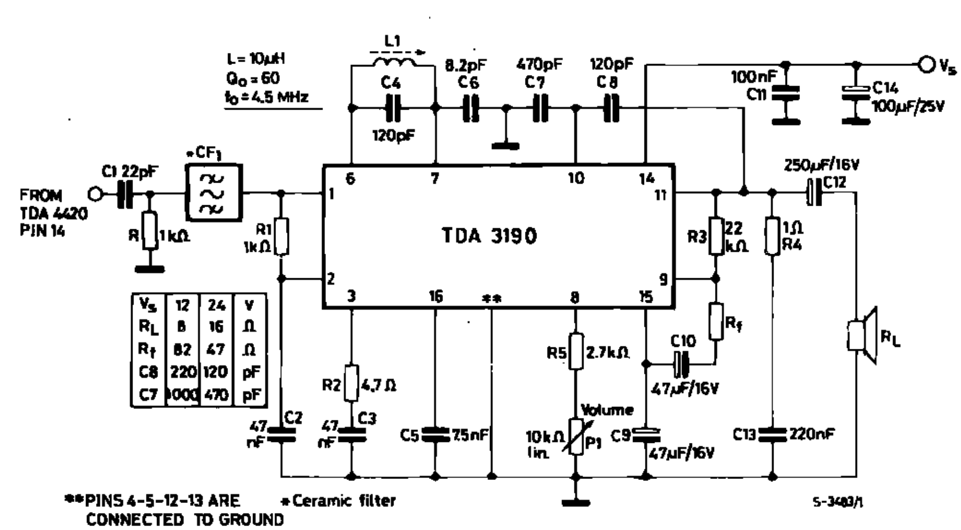
The electrical characteristics of the TDA3190 remain almost constant over the frequency range 4.5 to 6 MHz, therefore it can be used in all television standards (FM mod.). The TDA3190 has a high input impedance, so it can work with a ceramic filter or with a tuned circuit that provide the necessary input selectivity.

The value of the resistors connected to pin 9, 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.

Capacitor C8, connected between pins 10 and 11, determines the upper cutoff frequency of the audio bandwidth. To increase the bandwidth the values of C8 and C7 must be reduced, keeping the ratio C7/C8 as shown in the table of fig. 16.

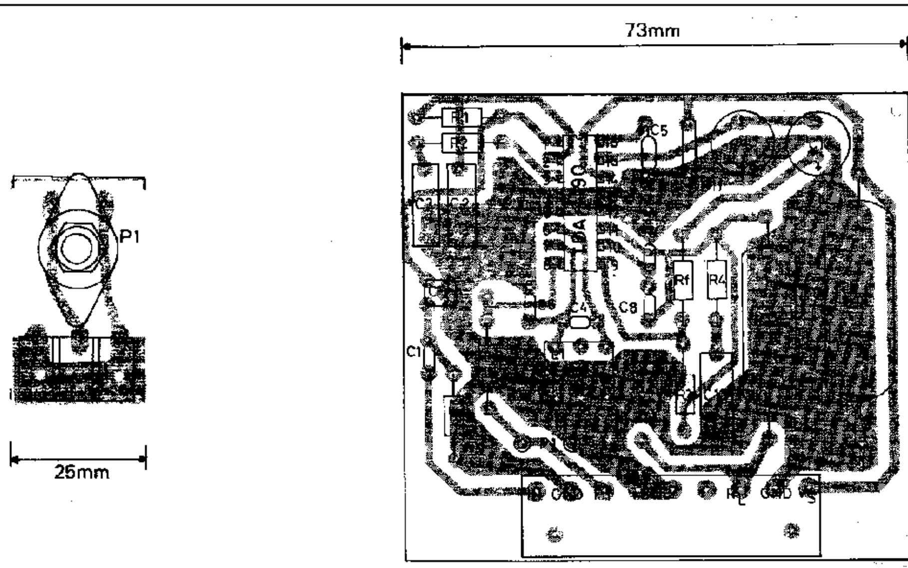
The capacitor connected between pin 16 and ground, together with the internal resistor of 10 KΩ forms the de-emphasis network. The Boucherot cell eliminates the high frequency oscillations caused by the inductive load and the wires connecting the loudspeaker.

Figure 16 : Typical Application Circuit



3190-19.EPS

Figure 17 : P.C. Board and Component Layout of the Circuit shown in Figure 16 (1 : 1 scale)



3190-20.TIF

MOUNTING INSTRUCTION

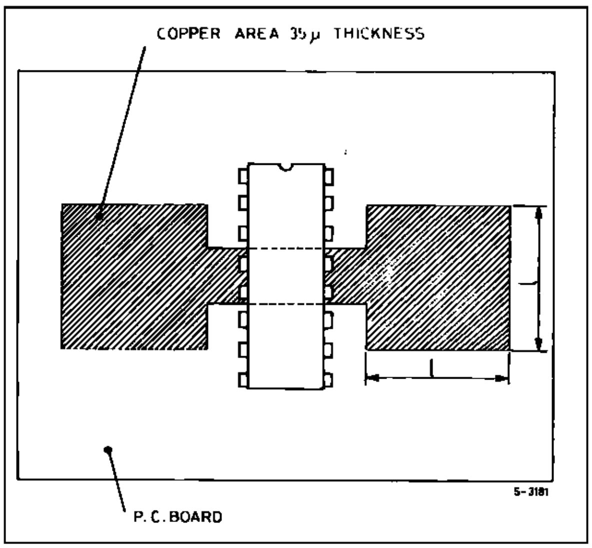
The Rth j-amb of the TDA3190 can be reduced by soldering the GND pins to a suitable copper area of the printed circuit board (fig. 18) or to an external heatsink (fig. 19).

The diagram of figure 20 shows the maximum dissipable power Ptot and the Rth j-amb as a function of the side "l" of two equal square copper areas having a thickness of 35 µ (1.4 mils).

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

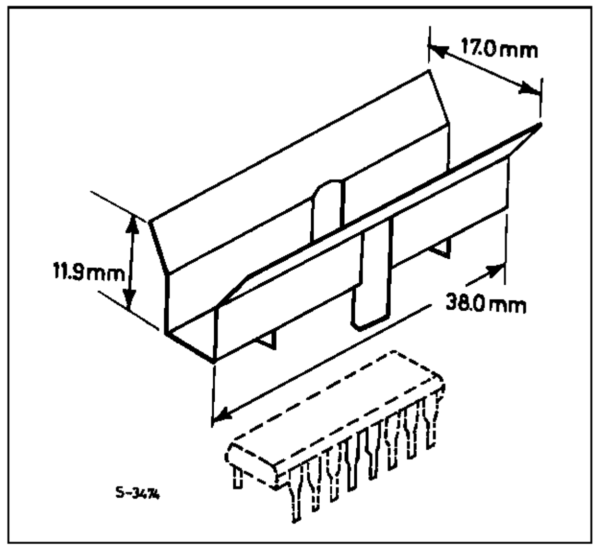
The external heatsink or printed circuit copper area must be connected to electrical ground.

Figure 18 : Example of P.C. Board Copper Area which is used as Heatsink



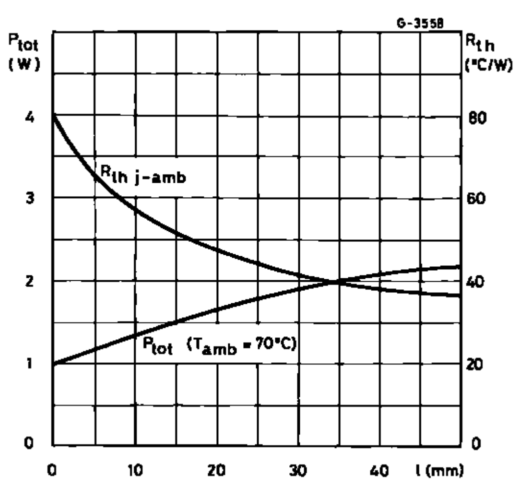
3190-21.EPS

Figure 19 : External Heatsink Mounting Example



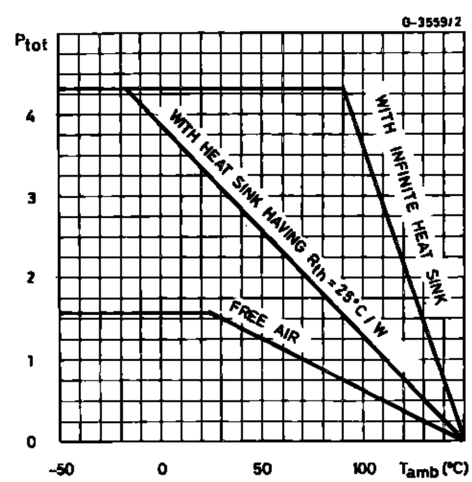
3190-22.EPS

Figure 20 : Maximum Dissipable Power and Junction to Ambient Thermal Resistance versus Side "T"



3190-23.EPS

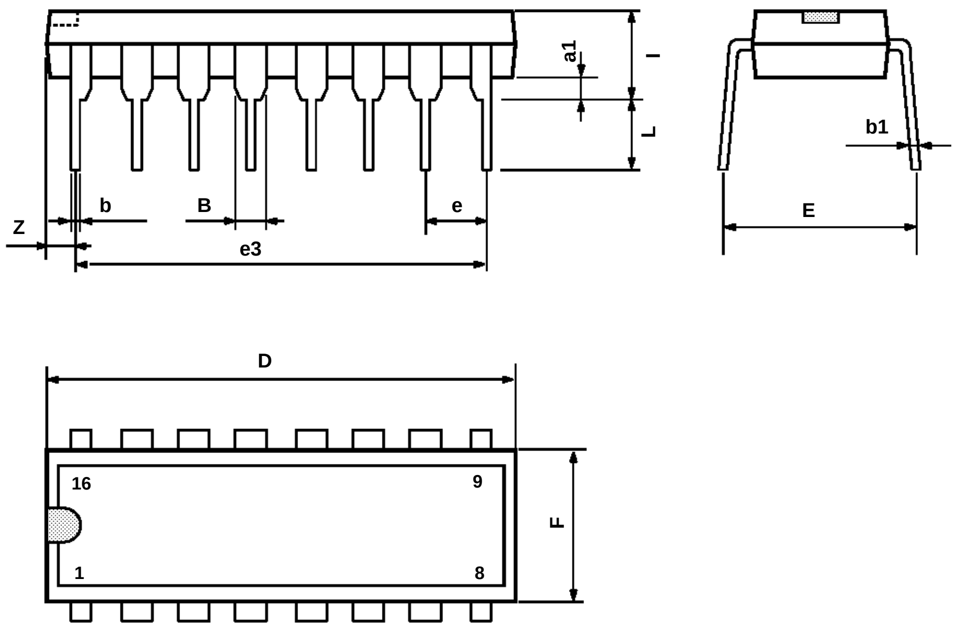
Figure 21 : Maximum Allowable Power Dissipation versus Ambient Temperature



3190-24.EPS

PACKAGE MECHANICAL DATA

16 PINS - PLASTIC DIP



Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
a1	0.51			0.020		
B	0.77		1.65	0.030		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		17.78			0.700	
F			7.1			0.280
i			5.1			0.201
L		3.3			0.130	
Z			1.27			0.050

DIP16.TBL