

## 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 :

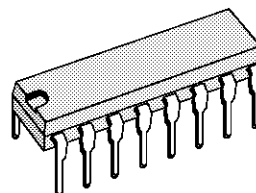
- IF LIMITER AMPLIFIER
- ACTIVE LOW-PASS FILTER
- FM DETECTOR
- DC VOLUME CONTROL
- AF PREAMPLIFIER
- AF OUTPUT STAGE

### DESCRIPTION

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

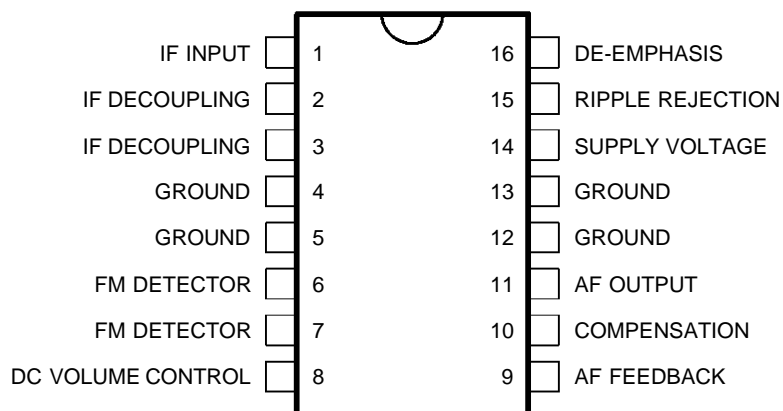
The TDA3190 is a pin to pin replacement of TDA1190Z.



**DIP16**  
(Plastic Package)

**ORDER CODE : TDA3190**

### PIN CONNECTIONS



The diagram shows a radio receiver circuit. It starts with an input (IN) connected to a capacitor C1 and a resistor R1. The signal then goes to an IF amplifier with pins 1 and 2. A regulated power supply is connected to pins 3 and 4. The IF amplifier's output goes to a low-pass filter, then to an FM detector, and finally to a DC volume control. The output of the DC volume control is connected to an AF power amplifier. The AF power amplifier has pins 9, 10, 11, 12, 13, 14, 15, and 16. It is connected to a speaker (R<sub>L</sub>) through a network of capacitors (C7, C8, C12) and a resistor (R4). The circuit also includes a feedback loop from the speaker back to the IF amplifier through a network of capacitors (C9, C4, RF) and a resistor (R3). A ground connection is shown at pin 5.

\* PINS 4-5-12-13 ARE CONNECTED TO GROUND

S - 3481

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 $T_{pins} = 90\text{ }^{\circ}\text{C}$	4.3	W
	at $T_{amb} = 70\text{ }^{\circ}\text{C}$ (free air)	1	W
$T_{stg}, T_j$	Storage and Junction Temperature	- 40 to 150	$^{\circ}\text{C}$

Symbol	Parameter	Value	Unit
R <sub>th j-pins</sub>	Thermal Resistance Junction-pins	Max 14	°C/W
R <sub>th j-amb</sub>	Thermal Resistance Junction-ambient	Max 80*	°C/W

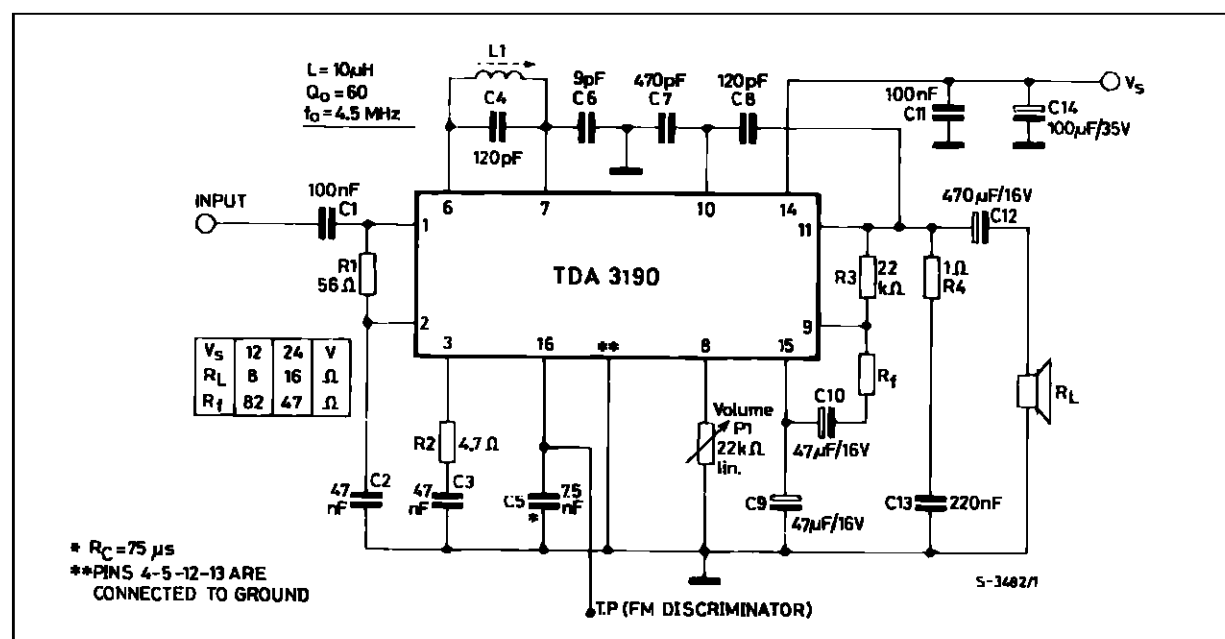
## ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V <sub>s</sub>	Supply Voltage (Pin 14)		9		28	V
V <sub>o</sub>	Quiescent Output Voltage (Pin11)	V <sub>s</sub> = 24V V <sub>s</sub> = 12V	11 5.1	12 6	13 6.9	V V
I <sub>d</sub>	Quiescent Drain Current	P <sub>1</sub> = 22kΩ V <sub>s</sub> = 24V V <sub>s</sub> = 12V	11	22 19	45 40	mA mA

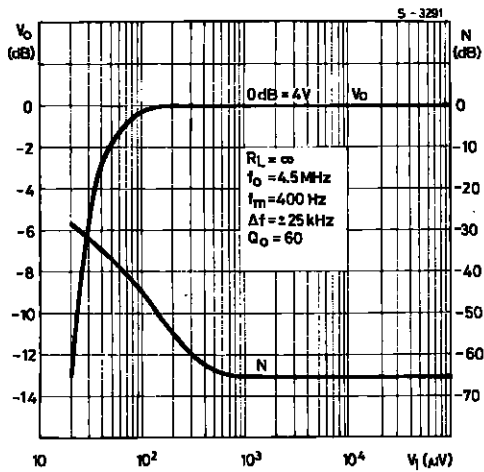
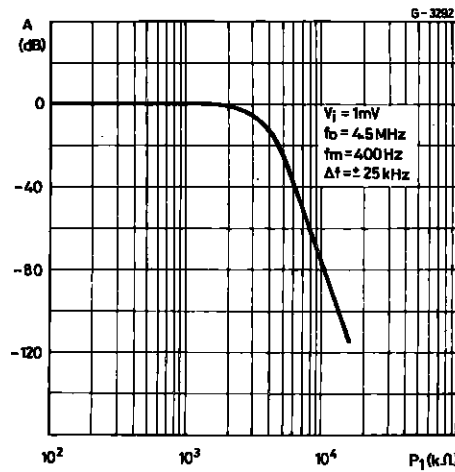
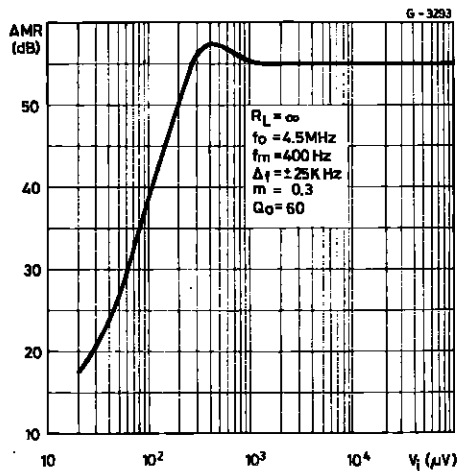
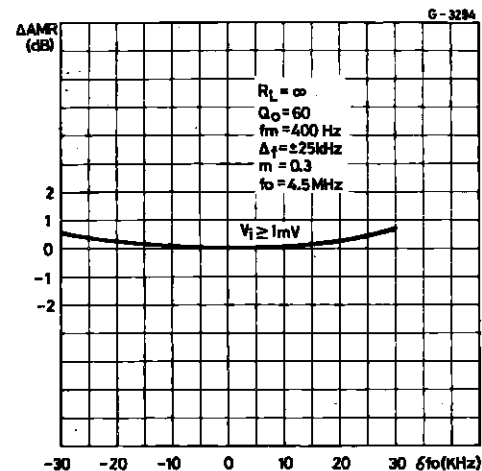
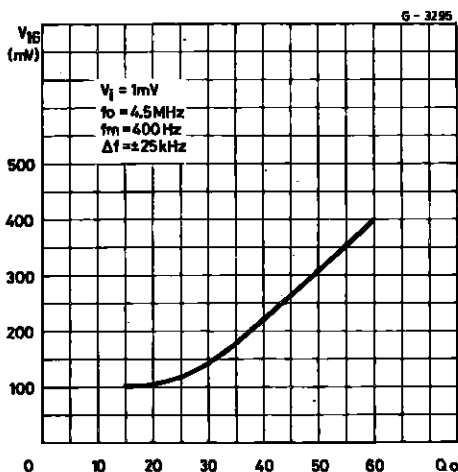
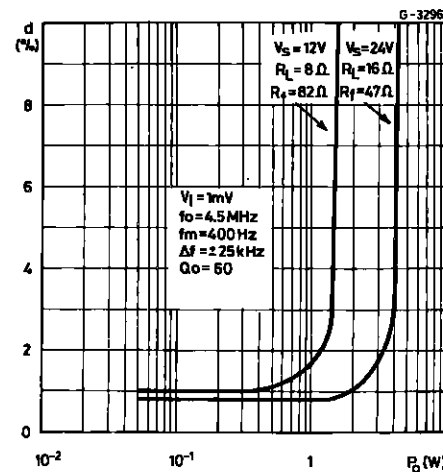
**ELECTRICAL CHARACTERISTICS**(refer to the test circuit,  $V_S = 24V$ ,  $T_{amb} = 25^\circ C$  unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Po	Output Power	$d = 10\%$ , $f_m = 400Hz$ , $f_o = 4.5MHz$ , $\Delta f = \pm 25kHz$ $V_s = 24V$ , $R_L = 16\Omega$ $V_s = 12V$ , $R_L = 8\Omega$		4.2 1.5		W W
		$d = 2\%$ , $f_m = 400Hz$ , $f_o = 4.5MHz$ , $\Delta f = \pm 25kHz$ $V_s = 24V$ , $R_L = 16\Omega$ $V_s = 12V$ , $R_L = 8\Omega$		3.5 1.4		W W
V <sub>i</sub>	Input Limiting Voltage (-3dB) at Pin 1	$f_o = 4.5MHz$ , $\Delta f = \pm 7.5kHz$ , $f_m = 400Hz$ , $P_1 = 0$		40	100	$\mu V$
d	Distortion	$P_o = 50mW$ , $f_m = 400Hz$ , $f_o = 4.5MHz$ , $\Delta f = \pm 7.5kHz$ $V_s = 24V$ , $R_L = 16\Omega$ $V_s = 12V$ , $R_L = 8\Omega$		0.75 1		% %
B	Frequency Response of audio amplifier (-3dB)	$R_L = 16\Omega$ , $C_8 = 120pF$ $C_7 = 470pF$ , $P_1 = 22k\Omega$ $R_f = 82\Omega$ $R_f = 47\Omega$		70 to 1200 70 to 7000		Hz Hz
V <sub>o</sub>	Recovered Audio Voltage (Pin16)	$V_i \geq 1mV$ , $f_o = 4.5MHz$ $f_m = 400Hz$ , $\Delta f = \pm 7.5kHz$ , $P_1 = 0$		120		mV
AMR	Amplitude Modulation Rejection	$V_i \geq 1mV$ , $f_o = 4.5MHz$ , $f_m = 400Hz$ , $\Delta f = \pm 25kHz$ , $m = 0.3$		55		dB
$\frac{S+N}{N}$	Signal to Noise Ratio	$V_i \geq 1mV$ , $V_o = 4V$ , $f_o = 4.5MHz$ , $f_m = 400Hz$ , $\Delta f = \pm 25kHz$	50	65		dB
R <sub>3</sub>	External Feedback Resistance (between Pins 9 and 11)				25	k $\Omega$
R <sub>i</sub>	Input Resistance (Pin1)	$V_i = 1mV$ , $f_o = 4.5MHz$		30		k $\Omega$
C <sub>i</sub>	Input Capacitance (Pin1)			5		pF
SVR	Supply Voltage Rejection	$R_L = 16\Omega$ , $f_{ripple} = 120Hz$ , $P_1 = 22k\Omega$		46		dB
A <sub>v</sub>	DC Volume Control Attenuation	$P_1 = 12k\Omega$		90		dB

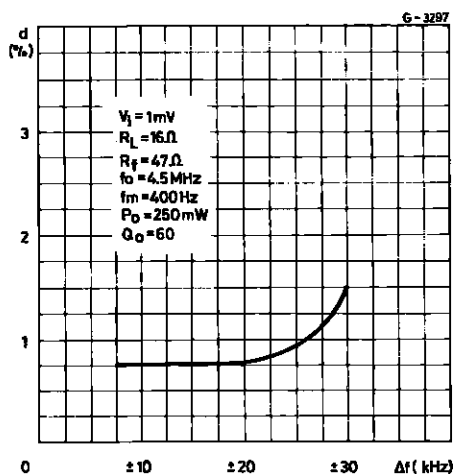
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**TYPICAL CIRCUIT**

3190-03.EPS

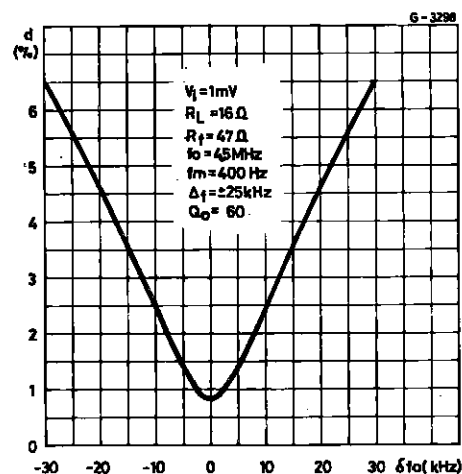
**Figure 1 :** Relative Audio Output Voltage and Output Noise versus Input Signal**Figure 2 :** Output Voltage Attenuation versus DC Volume Control Resistance**Figure 3 :** Amplitude Modulation Rejection versus Input Signal**Figure 4 :**  $\Delta AMR$  versus Tuning Frequency Change**Figure 5 :** Recovered Audio Voltage versus Unloaded Q Factor of the Detector Coil**Figure 6 :** Distortion versus Output Power

**Figure 7 :** Distortion versus Frequency Deviation



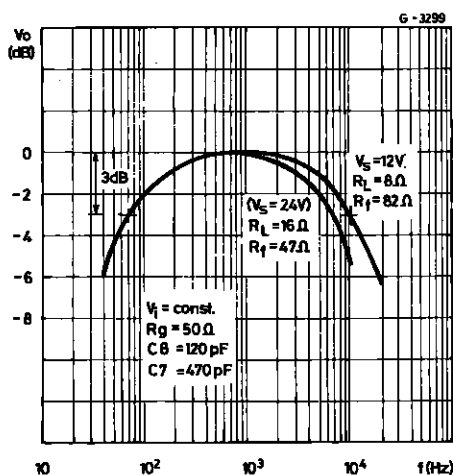
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**Figure 8 :** Distortion versus Tuning Frequency Change



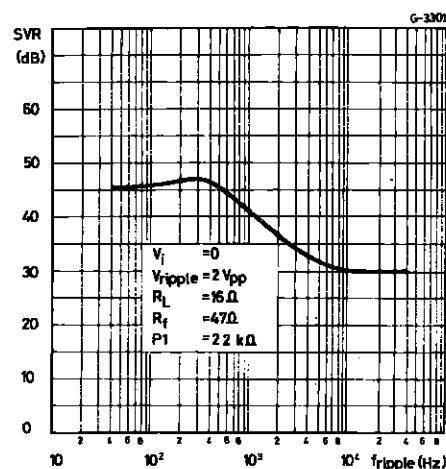
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**Figure 9 :** Audio Amplifier Frequency Response



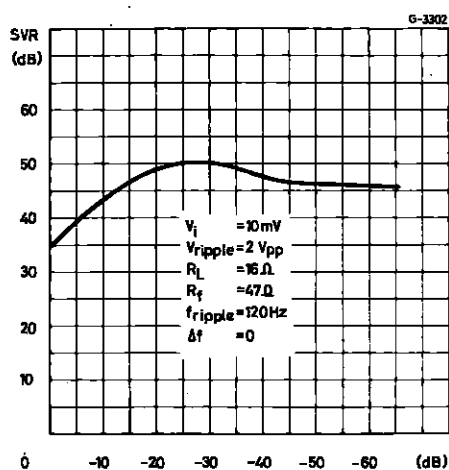
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**Figure 10 :** Supply Voltage Ripple Rejection versus Ripple Frequency



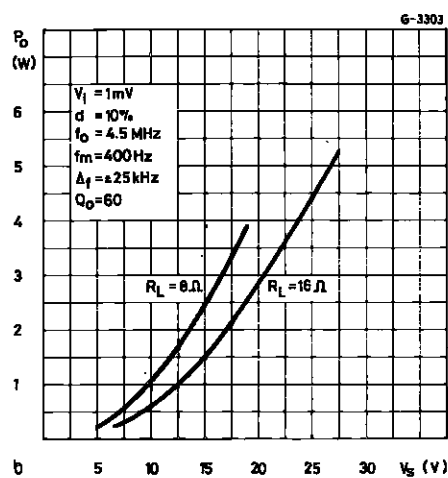
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**Figure 11 :** Supply Voltage Ripple Rejection versus Volume Control Attenuation



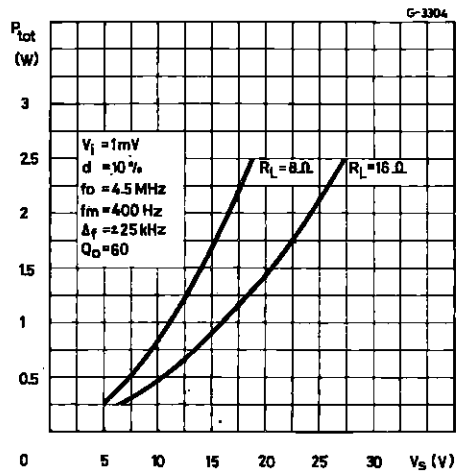
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**Figure 12 :** Output Power versus Supply Voltage



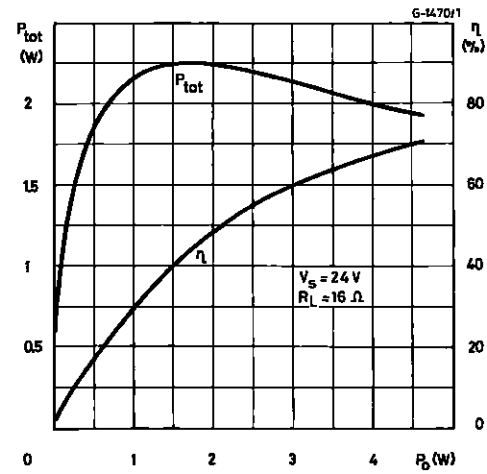
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**Figure 13 :** Maximum Power Dissipation versus Supply Voltage (sinewave operation)



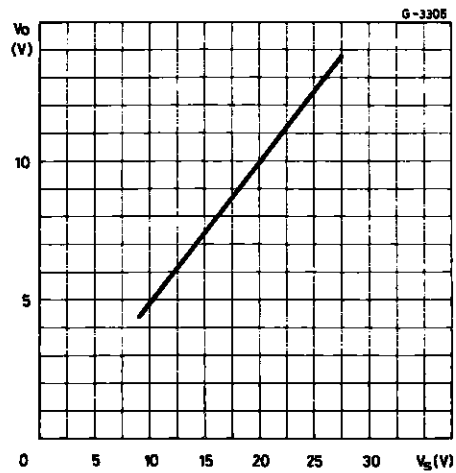
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**Figure 14 :** Power Dissipation and Efficiency versus Output Power



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 K $\Omega$  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

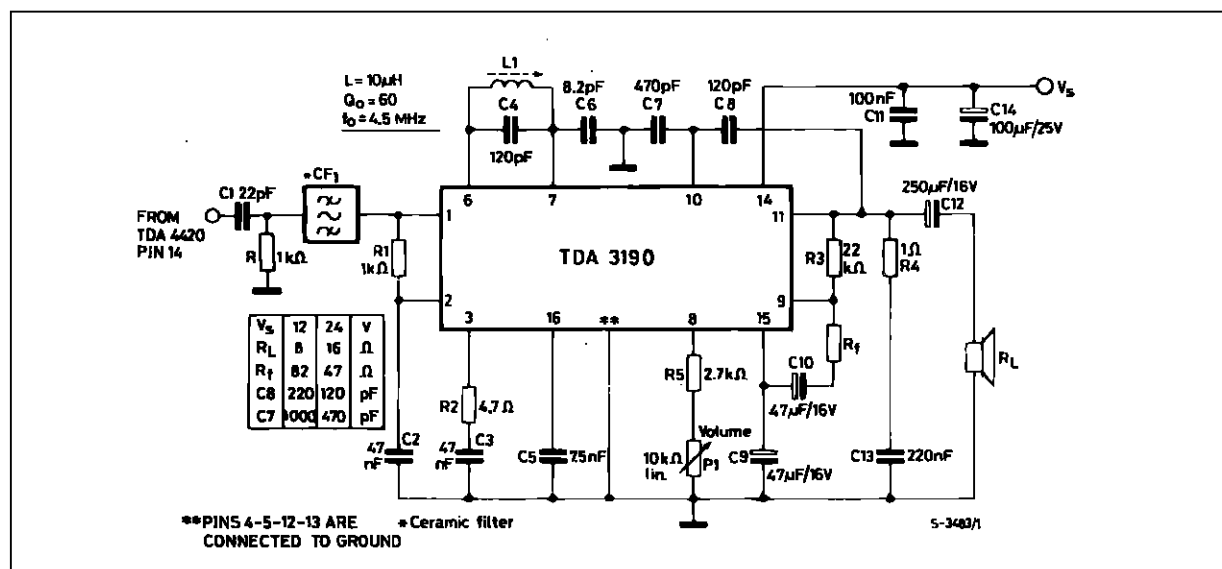
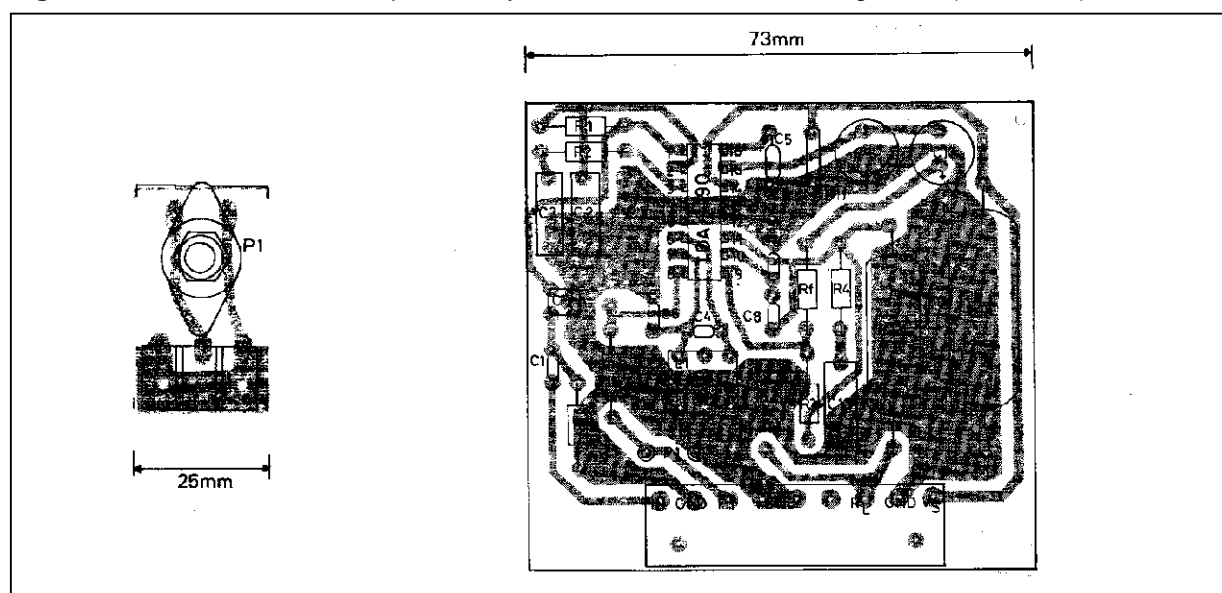


Figure 17 : P.C. Board and Component Layout of the Circuit shown in Figure 16 (1 : 1 scale)

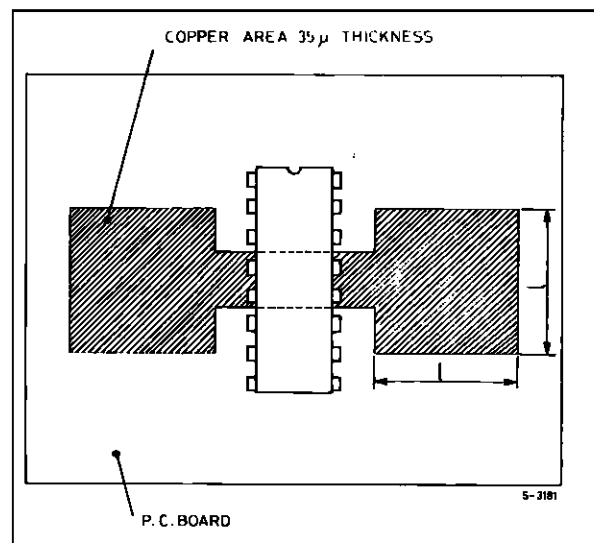


## MOUNTING INSTRUCTION

The  $R_{th j-amb}$  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).

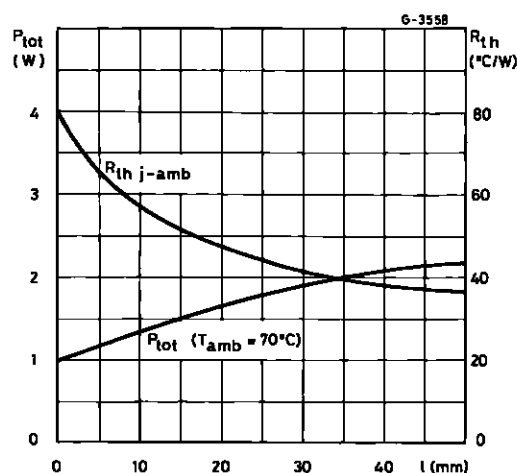
The diagram of figure 20 shows the maximum dissippable power  $P_{tot}$  and the  $R_{th j-amb}$  as a function of the side "l" of two equal square copper areas

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



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**Figure 20 :** Maximum Dissippable Power and Junction to Ambient Thermal Resistance versus Side "l"



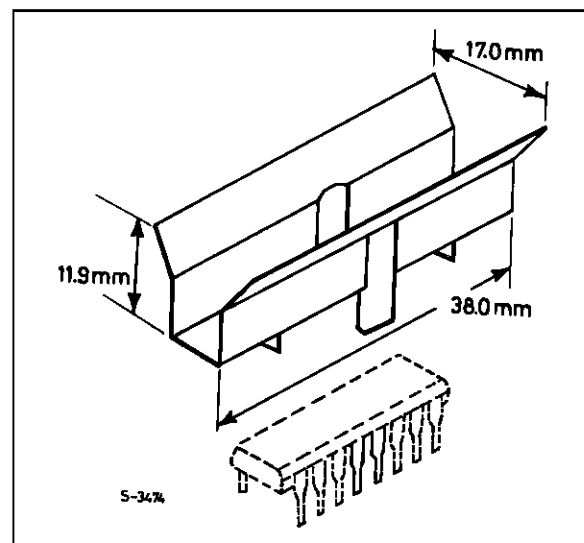
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having a thickness of  $35 \mu$  (1.4 mils).

During soldering the pins temperature must not exceed  $260^\circ\text{C}$  and the soldering time must not be longer than 12 seconds.

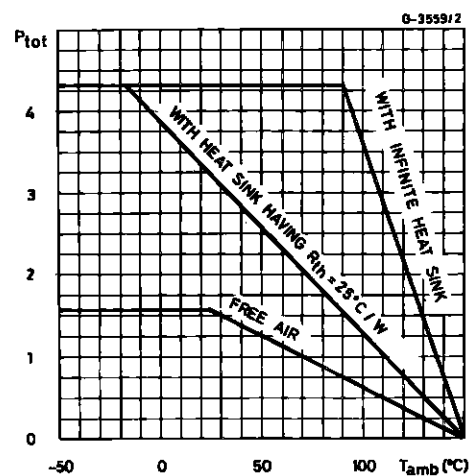
The external heatsink or printed circuit copper area must be connected to electrical ground.

**Figure 19 :** External Heatsink Mounting Example



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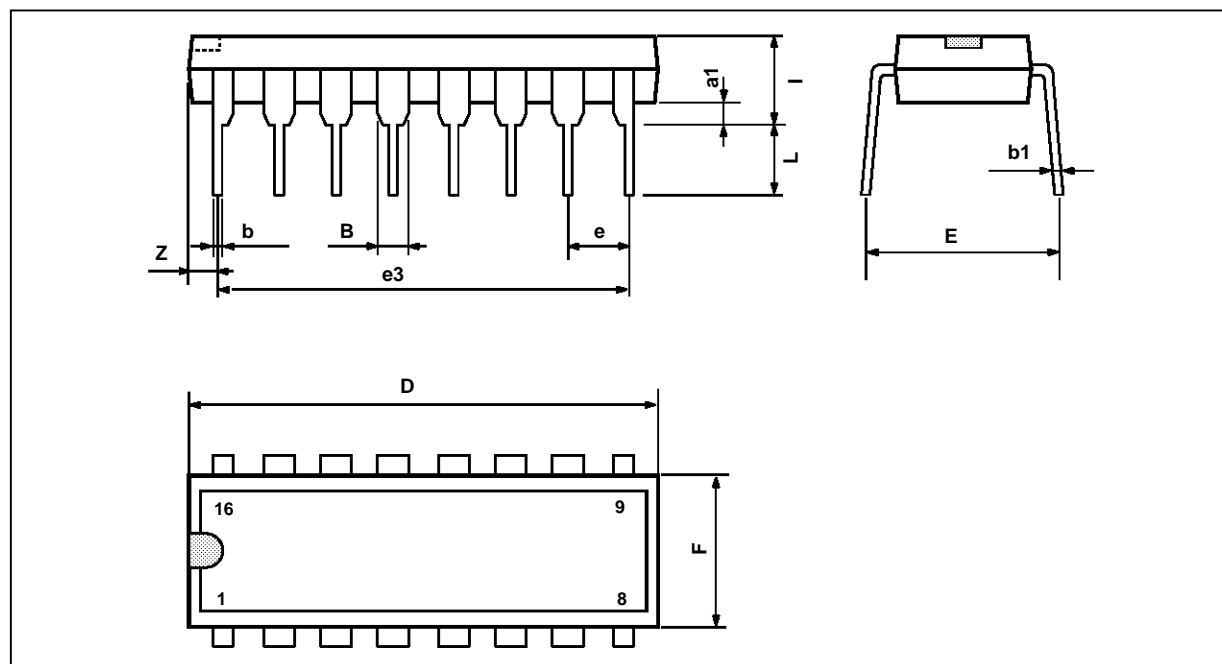
**Figure 21 :** Maximum Allowable Power Dissipation versus Ambient Temperature



3190-24.EPS



# **PACKAGE MECHANICAL DATA** **16 PINS - PLASTIC DIP**



PM-DIP16.EPS

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

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