ST SGS-THOMSON MICROELECTRONICS
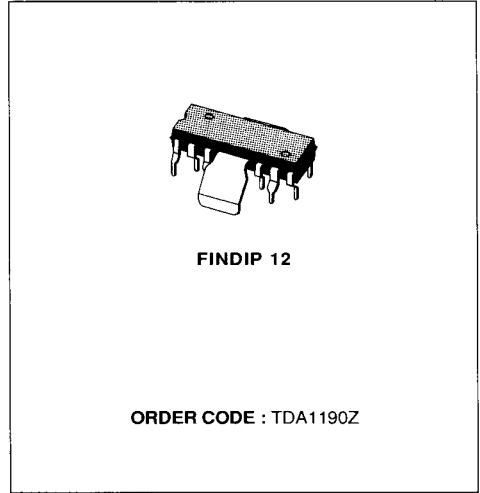
TDA1190Z

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
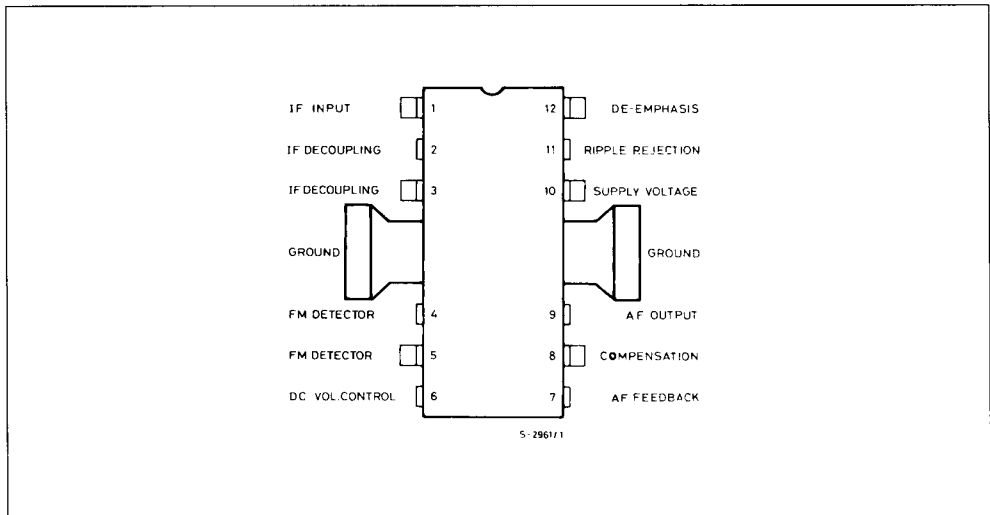- DC VOLUME CONTROL
- AF PREAMPLIFIER
- AF OUTPUT STAGE

DESCRIPTION

The TDA 1190Z 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.
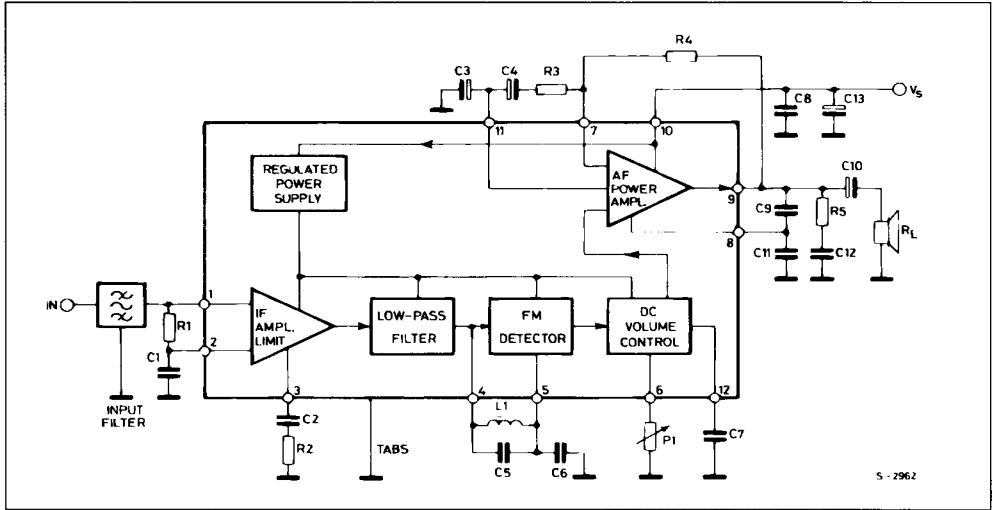
FINDIP 12

ORDER CODE : TDA1190Z
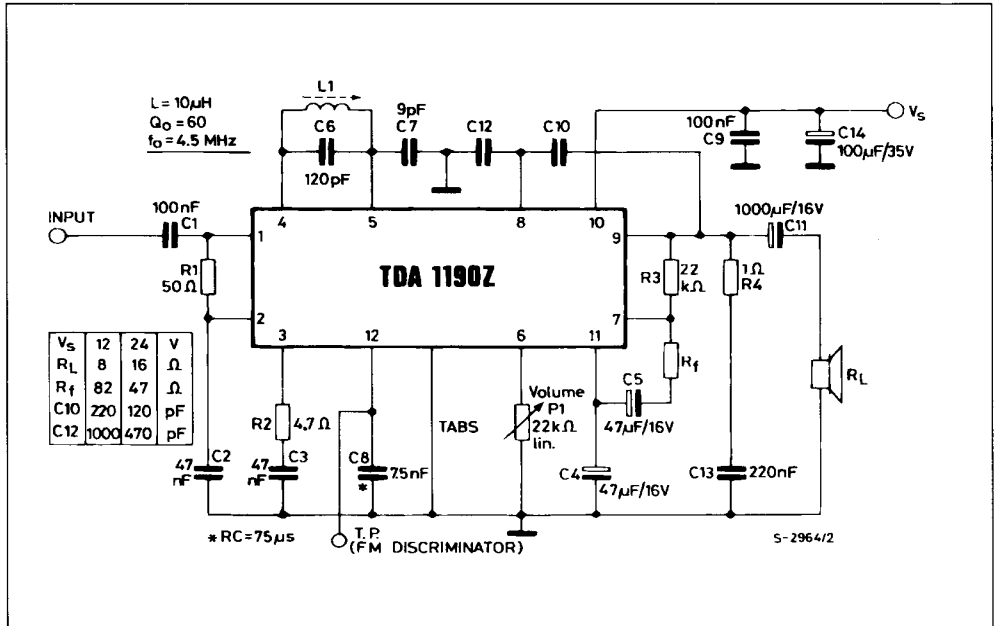
CONNECTION DIAGRAM (top view)

Pin	
IF INPUT	1
IF DECOUPLING	2
IF DECOUPLING	3
GROUND	
FM DETECTOR	4
FM DETECTOR	5
DC VOL.CONTROL	6
DE-EMPHASIS	12
RIPPLE REJECTION	11
SUPPLY VOLTAGE	10
GROUND	
AF OUTPUT	9
COMPENSATION	8
AF FEEDBACK	7

S-2961/1

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_{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

BLOCK DIAGRAM

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TEST CIRCUIT

THERMAL DATA

$R_{th\ j-tab}$	Thermal Resistance Junction-tab	Max	12	°C/W
$R_{th\ j-amb}$	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 ; $V_s = 24$ V, $T_{amb} = 25$ °C, unless otherwise specified

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
V_s	Supply Voltage (pin 10)			9		28	V
V_o	Quiescent Output Voltage (pin 9)	$V_s = 24$ V		11	12	13	V
		$V_s = 12$ V		5.1	6	6.9	V
I_d	Quiescent Drain Current	$P_I = 22$ kΩ					
		$V_s = 24$ V		11	22	45	mA
		$V_s = 12$ V			19	40	mA
P_o	Output Power	$d = 10$ %	$f_m = 400$ Hz				
		$f_o = 4.5$ MHz	$\Delta f = \pm 25$ kHz				
		$V_s = 24$ V	$R_L = 16$ Ω		4.2		W
		$V_s = 12$ V	$R_L = 8$ Ω		1.5		W

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ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
P_o	Output Power	d = 2 % $f_m = 400$ Hz $f_o = 4.5$ MHz $\Delta f = \pm 25$ kHz $V_s = 24$ V $R_L = 16\ \Omega$ $V_s = 12$ V $R_L = 8\ \Omega$			3.5 1.4		W W
V_i	Input Limiting Voltage (− 3 dB) at Pin 1	$f_o = 4.5$ MHz $f_m = 400$ Hz $P_1 = 0$ $\Delta f = \pm 7.5$ kHz			40	100	µV
d	Distortion	$P_o = 50$ mW $f_m = 400$ Hz $f_o = 4.5$ MHz $\Delta f = \pm 7.5$ kHz $V_s = 24$ V $R_L = 16\ \Omega$ $V_s = 12$ V $R_L = 8\ \Omega$			0.75 1		% %
B	Frequency Response of Audio Amplifier (− 3 dB)	$R_L = 16\ \Omega$ $C_{10} = 120$ pF $C_{12} = 470$ pF $P_1 = 22$ kΩ $R_f = 82\ \Omega$ $R_f = 47\ \Omega$			70 to 12000 70 to 7000		Hz Hz
V_o	Recovered Audio Voltage (pin. 12)	$V_i \geq 1$ mV $f_o = 4.5$ MHz $f_m = 400$ Hz $\Delta f = \pm 7.5$ kHz $P_1 = 0$			120		mV
AMR	Amplitude Modulation Rejection	$V_i \geq 1$ mV $f_o = 4.5$ MHz $f_m = 400$ Hz $\Delta f = \pm 25$ kHz m = 0.3			55		dB
$\dfrac{S + N}{N}$	Signal to Noise Ratio	$V_i \geq 1$ mV $V_o = 4$ V $f_o = 4.5$ MHz $f_m = 400$ Hz $\Delta f = \pm 25$ 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			30		kΩ
C_i	Input Capacitance (pin 1)	$f_o = 4.5$ MHz			5		pF
SVR	Supply Voltage Rejection	$R_L = 16\ \Omega$ $f_{ripple} = 120$ Hz $P_1 = 22$ kΩ			46		dB
A	DC Volume Control Attenuation	$P_1 = 12$ kΩ			90		dB

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Figure 1 : Relative Audio Output Voltage and Out-Noise vs. Input Signal.
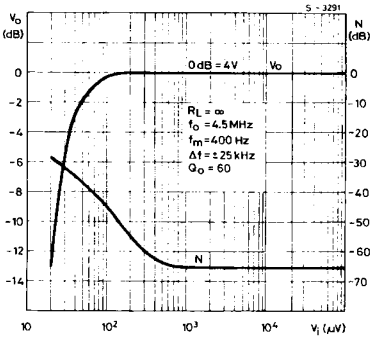

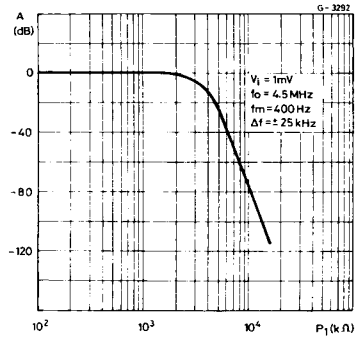**Figure 2** : Output Voltage Attenuation vs. DC Volume Control Resistance.

Figure 3 : Amplitude Modulation Rejection vs. Input Signal.
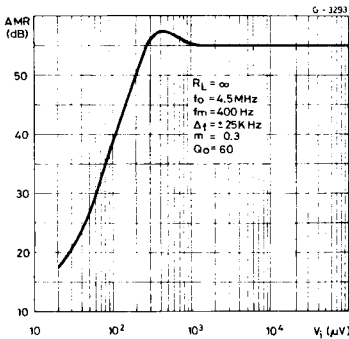

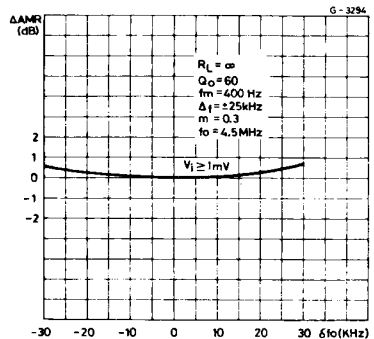**Figure 4** : Δ AMR vs. Tuning Frequency Change.

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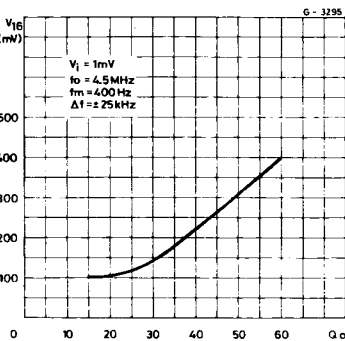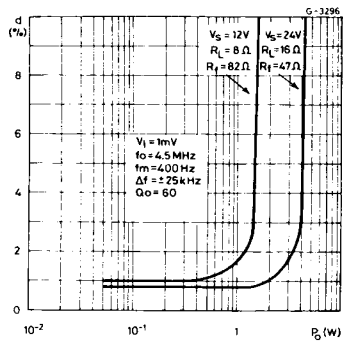

Figure 6 : Distortion vs. Output Power.

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Figure 7 : Distortion vs. Frequency Deviation.

Figure 8 : Distortion vs. Tuning Frequency Change.

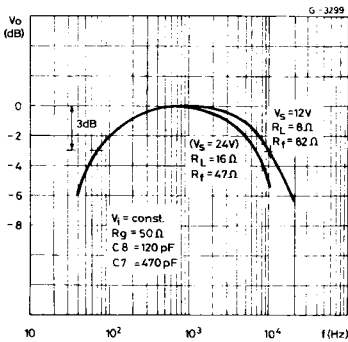**Figure 9** : Audio Amplifier Frequency Response.

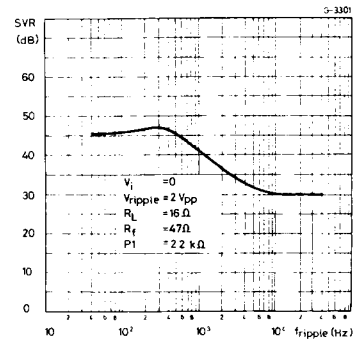**Figure 10** : Supply Voltage Ripple Rejection vs. Ripple Frequency.

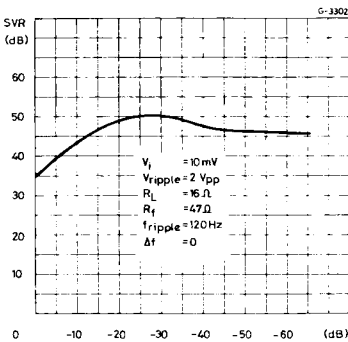**Figure 11** : Supply Voltage Ripple Rejection vs. Volume Control Attenuation.

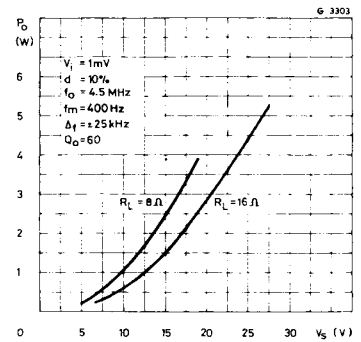
Figure 12 : Output Power vs. Supply Voltage.

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Figure 13 : Maximum Power Dissipation vs. Sup-
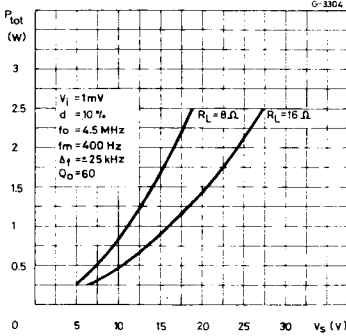ply Voltage (sine wave operation).

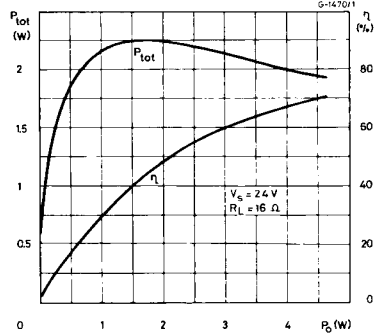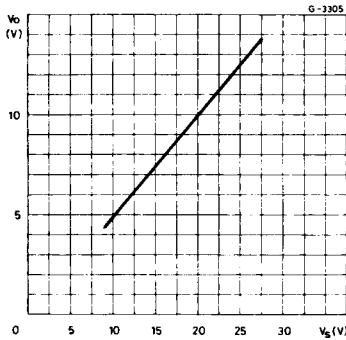**Figure 14** : Power Dissipation and Efficiency vs.
Output Power.

Figure 15 : Quiescent Output Voltage (pin 9) vs.
Supply Voltage.

APPLICATION INFORMATION

The electrical characteristics of the TDA 1190Z re-
main almost constant over the frequency range of
4.5 to 6 MHz, therefore it can be used in all televi-
sion standard (FM mod.). The TDA 1190Z has a
high input impedance, so it can work with a ceramic
filter or with a tuned circuit that provide the necess-
ary input selectivity.

The value of the resistors connected to pin 7, deter-
mine the AC gain of the audio frequency amplifier.
This enables the desired gain to be selected in re-
lation 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 loud-
speaker.

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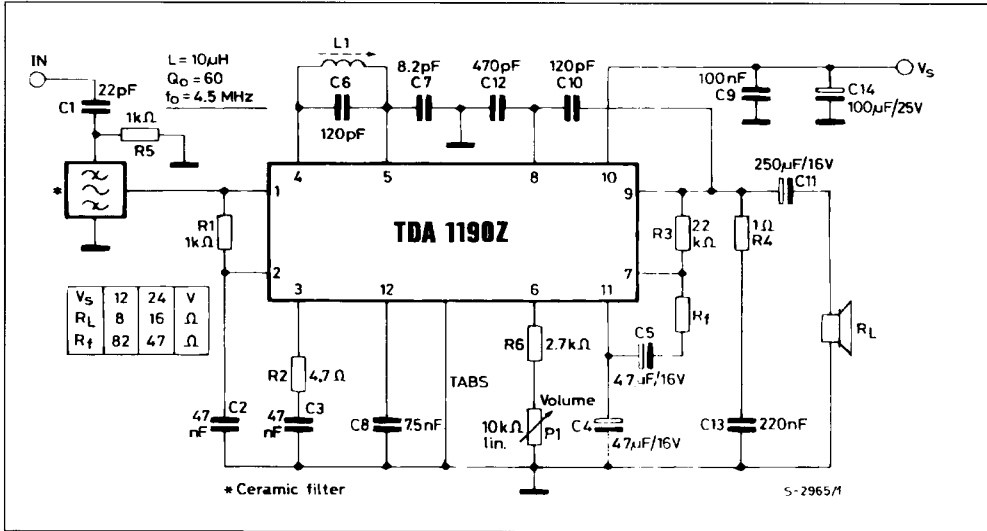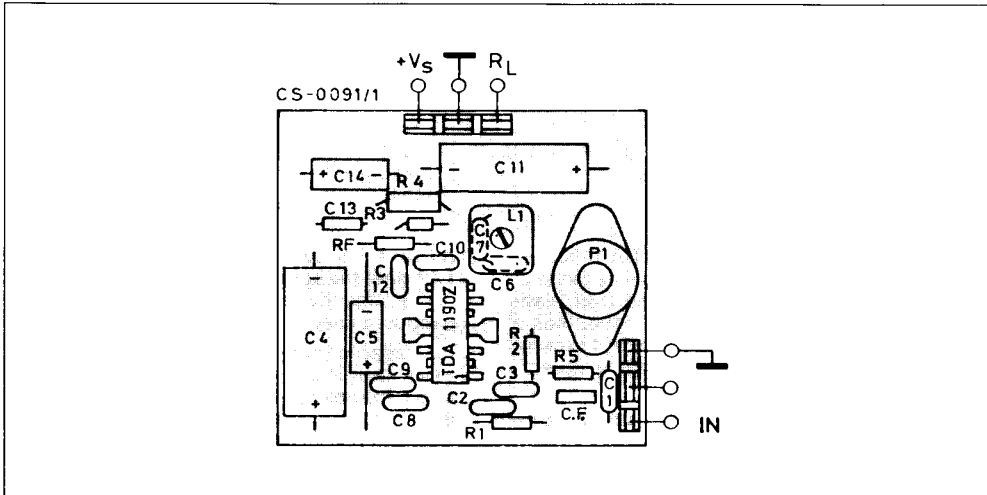
Figure 16 : Typical Application Circuit.

Figure 17 : P.C. Board and Component Layout of the Circuit Shown in Fig. 16.

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MOUNTING INSTRUCTION

The $R_{th\ j\text{-}amb}$ of the TDA1190Z can be reduced by soldering the tabs to a suitable copper area of the printed circuit board (fig. 18) or to an external heat-sink (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 35 μ (1.4 mils).

During soldering the tab temperature must not exceed 260 ˚C and the soldering time mumst not be longer than 12 seconds.

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

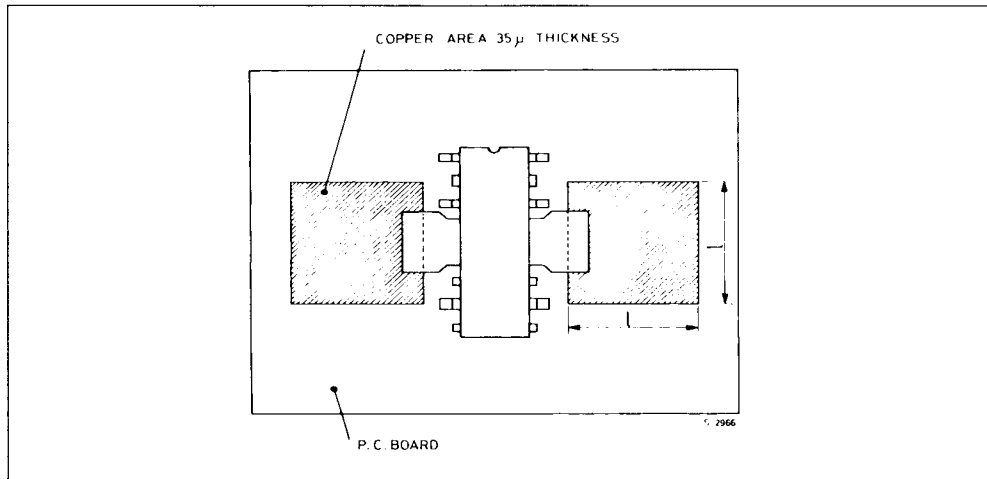**Figure 18** : Example of P.C. Board Copper Area Which is Used as Heatsink.

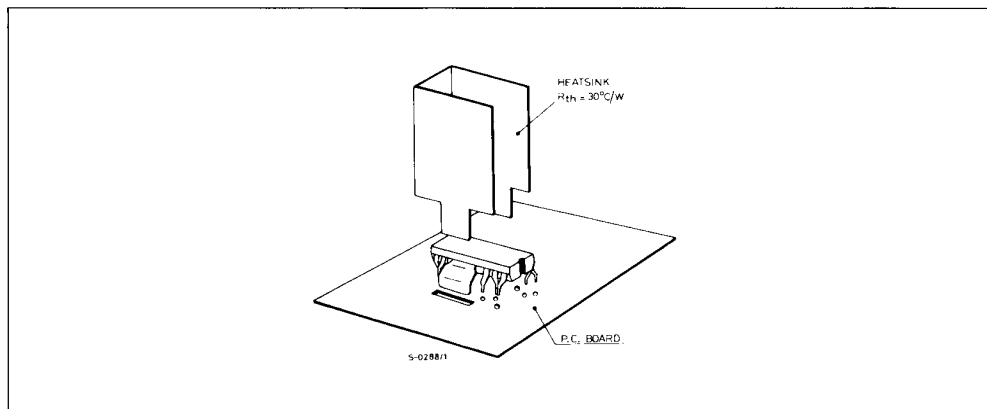**Figure 19** : External Heatsink Mounting Example.

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Figure 20 : Maximum Dissipable Power and Junc-
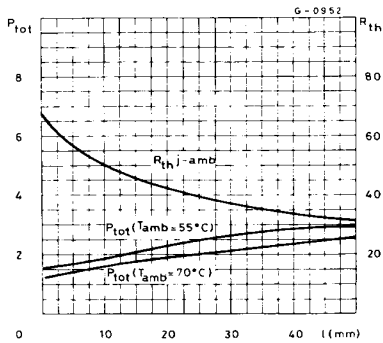tion to Ambient Thermal Resistance
vs. Side "l" .

Figure 21 : Maximum Allowable Power Dissipa-
tion vs. Ambient Temperature.

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