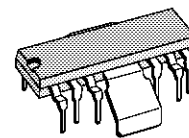


**LOW-NOISE TV VERTICAL DEFLECTION SYSTEM**

- COMPLETE VERTICAL DEFLECTION SYSTEM
- LOW NOISE
- SUITABLE FOR HIGH DEFINITION MONITORS

**DESCRIPTION**

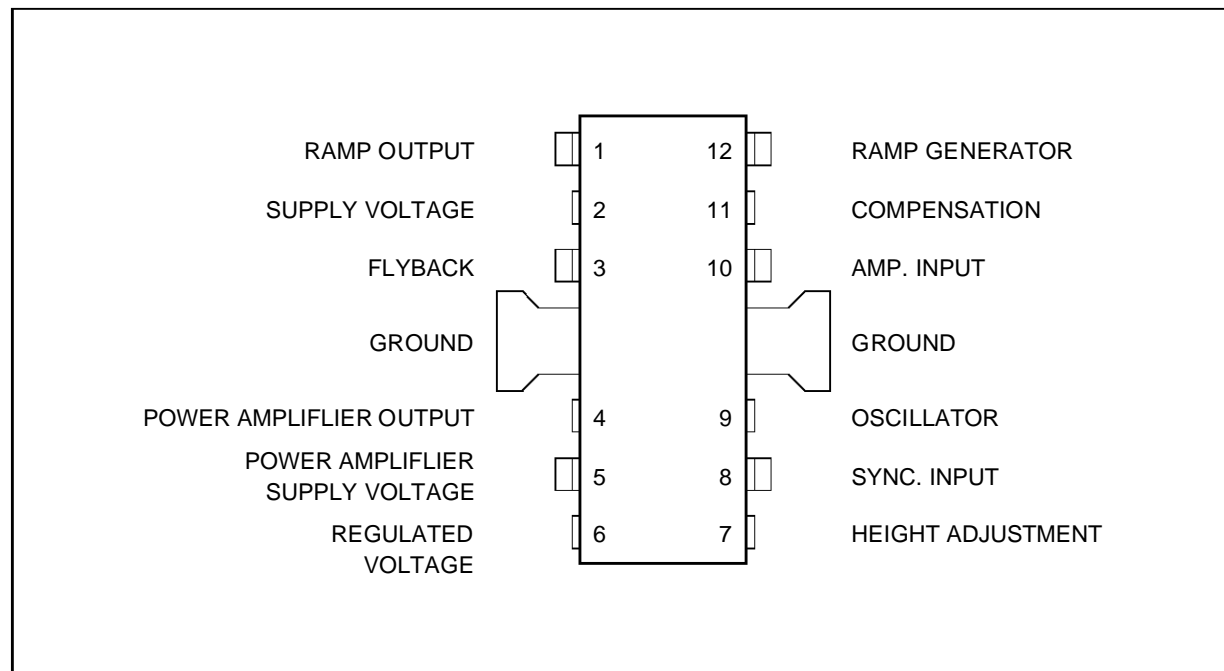
The TDA1170N is a monolithic integrated circuit in a 12-lead quad in-line plastic package. It is intended for use in black and white and colour TV receivers. Low-noise makes this device particularly suitable for use in monitors. The functions incorporated are : synchronization circuit, oscillator and ramp generator, high power gain amplifier, flyback generator, voltage regulator.



**FINDIP12**  
(Plastic Package)

**ORDER CODE : TDA1170N**

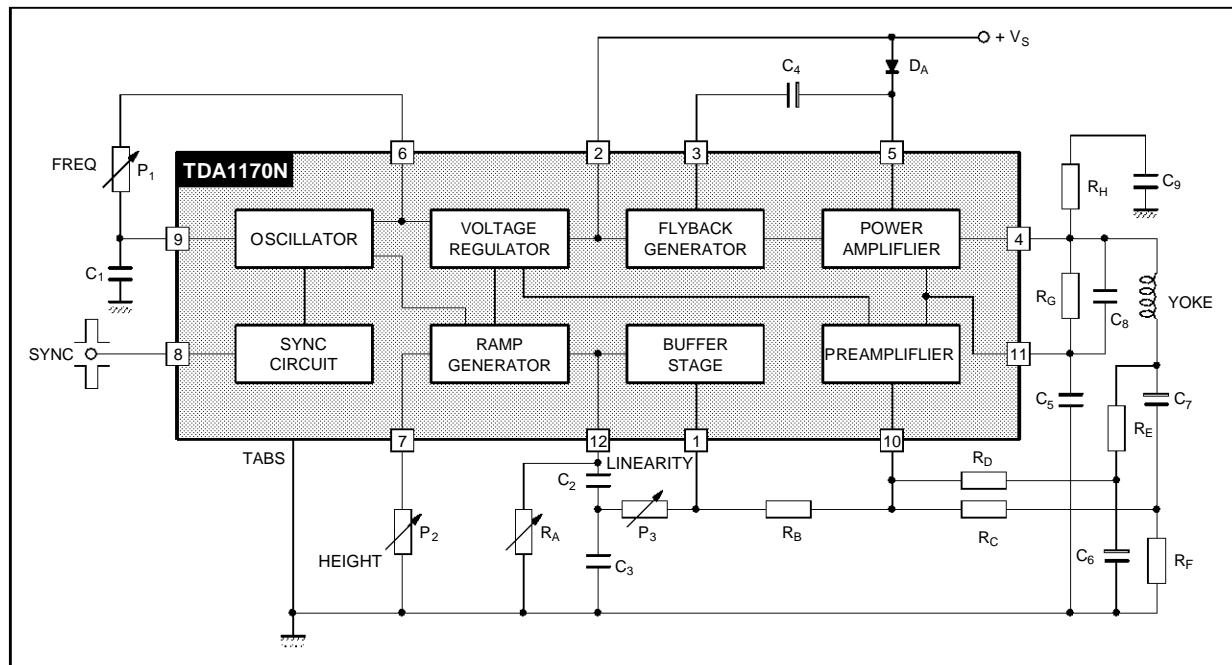
**PIN CONNECTIONS**



1170N-01.EPS

# TDA1170N

## BLOCK DIAGRAM



1170N-02.EPS

## ABSOLUTE MAXIMUM RATINGS

| Symbol         | Parameter  | Value         | Unit             |
|----------------|--|---------------|------------------|
| $V_S$          | Supply Voltage at Pin 2  | 35            | V                |
| $V_4, V_5$     | Flyback Peak Voltage   | 60            | V                |
| $V_{10}$       | Power Amplifier Input Voltage  | + 10<br>- 0.5 | V                |
| $I_o$          | Output Peak Current (non repetitive) at $t = 2\text{msec}$                                       | 2             | A                |
| $I_o$          | Output Peak Current at $f = 50\text{Hz}$ $t \leq 10\mu\text{sec}$                                | 2.5           | A                |
| $I_o$          | Output Peak Current at $f = 50\text{Hz}$ $t > 10\mu\text{sec}$                                   | 1.5           | A                |
| $I_3$          | Pin 3 DC Current at $V_4 < V_2$  | 100           | mA               |
| $I_3$          | Pin 3 Peak to Peak Flyback Current for $f = 50\text{Hz}$ , $t_{fly} \leq 1.5\text{msec}$         | 1.8           | A                |
| $I_8$          | Pin 8 Current  | $\pm 20$      | mA               |
| $P_{tot}$      | Power Dissipation : at $T_{ab} = 90^\circ\text{C}$<br>at $T_{amb} = 80^\circ\text{C}$ (free air) | 5<br>1        | W                |
| $T_{stg}, T_j$ | Storage and Junction Temperature   | - 40, +150    | $^\circ\text{C}$ |

1170N-01.TBL

## THERMAL DATA

| Symbol          | Parameter                           | Value | Unit                 |
|-----------------|-------------------------------------|-------|----------------------|
| $R_{th\ j-tab}$ | Thermal Resistance Junction-tab     | Max   | $^\circ\text{C/W}$   |
| $R_{th\ j-amb}$ | Thermal Resistance Junction-ambient | Max   | $^\circ\text{C/W}^*$ |

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

1170N-02.TBL

**ELECTRICAL CHARACTERISTICS**(Refer to the test circuits,  $V_S = 35\text{ V}$ ,  $T_{\text{amb}} = 25^\circ\text{C}$ , unless otherwise specified)**DC CHARACTERISTICS**

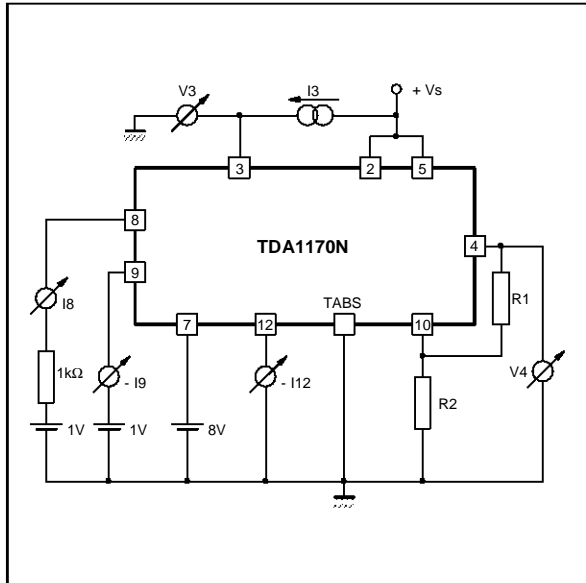
| Symbol   | Parameter                                   | Test Conditions   | Min. | Typ. | Max. | Unit             | Fig. |
|--|---|---|------|------|------|------------------|------|
| $I_2$  | Pin 2 Quiescent Current                     | $I_3 = 0$   |      | 7    | 14   | mA               | 1b   |
| $I_5$  | Pin 5 Quiescent Current                     | $I_4 = 0$   |      | 8    | 17   | mA               | 1b   |
| $-I_9$   | Oscillator Bias Current                     | $V_9 = 1\text{V}$   |      | 0.1  | 1    | $\mu\text{A}$    | 1a   |
| $-I_{10}$  | Amplifier Input Bias Current                | $V_{10} = 1\text{V}$  |      | 1    | 10   | $\mu\text{A}$    | 1b   |
| $-I_{12}$  | Ramp Generator Bias Current                 | $V_{12} = 0$  |      | 0.02 | 0.3  | $\mu\text{A}$    | 1a   |
| $-I_{12}$  | Ramp Generator Current                      | $I_7 = 20\mu\text{A}$ , $V_{12} = 0$                                    | 18.5 | 20   | 21.5 | $\mu\text{A}$    | 1b   |
| $\frac{\Delta I_{12}}{I_{12}}$                                   | Ramp Generator Non-linearity                | $\Delta V_{12} = 0$ to $12\text{V}$ , $I_7 = 20\mu\text{A}$             |      | 0.2  | 1    | %                | 1b   |
| $V_S$  | Supply Voltage Range                        |   | 10   |      | 35   | V                |      |
| $V_1$  | Pin 1 Saturation Voltage to Ground          | $I_1 = 1\text{mA}$  |      | 1    | 1.4  | V                |      |
| $V_3$  | Pin 3 Saturation Voltage to Ground          | $I_3 = 10\text{mA}$   |      | 300  | 450  | mV               | 1a   |
| $V_4$  | Quiescent output Voltage                    | $V_S = 10\text{V}$<br>$R_1 = 1\text{k}\Omega$ , $R_2 = 1\text{k}\Omega$ | 4.1  | 4.4  | 4.75 | V                | 1a   |
|  |   | $V_S = 35\text{V}$<br>$R_1 = 3\text{k}\Omega$ , $R_2 = 1\text{k}\Omega$ | 8.3  | 8.8  | 9.45 | V                | 1a   |
| $V_{4L}$   | Output Saturation Voltage to Ground         | $-I_4 = 0.1\text{A}$  |      | 0.9  | 1.2  | V                | 1c   |
|  |   | $-I_4 = 0.8\text{A}$  |      | 1.9  | 2.3  | V                | 1c   |
| $V_{4H}$   | Output Saturation Voltage to Supply         | $I_4 = 0.1\text{A}$   |      | 1.4  | 2.1  | V                | 1d   |
|  |   | $I_4 = 0.8\text{A}$   |      | 2.8  | 3.2  | V                | 1d   |
| $V_6$  | Regulated Voltage at Pin 6                  |   | 6.1  | 6.5  | 6.9  | V                | 1b   |
| $V_7$  | Regulated Voltage at Pin 7                  | $I_7 = 20\mu\text{A}$   | 6.2  | 6.6  | 7    | V                | 1b   |
| $\frac{ \Delta V_6 }{\Delta V_S}, \frac{\Delta V_7}{\Delta V_S}$ | Regulated Voltage Drift with Supply Voltage | $\Delta V_S = 10$ to $35\text{V}$                                       |      | 1    |      | mV/V             | 1b   |
| $V_{10}$   | Amplifier Input Reference Voltage           |   | 2.07 | 2.2  | 2.3  | V                |      |
| R8   | Pin 8 Input Resistance                      | $V_8 \leq 0.4\text{V}$  | 1    |      |      | $\text{M}\Omega$ | 1a   |

1170N-03.TBL

# TDA1170N

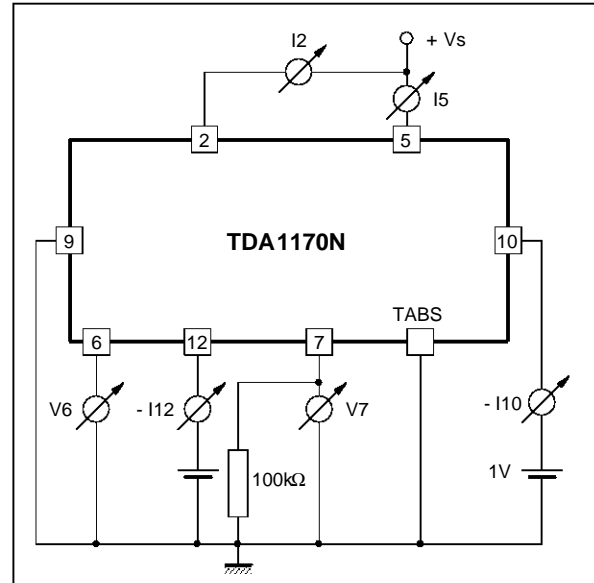
Figure 1 : DC Test Circuits

Figure 1a



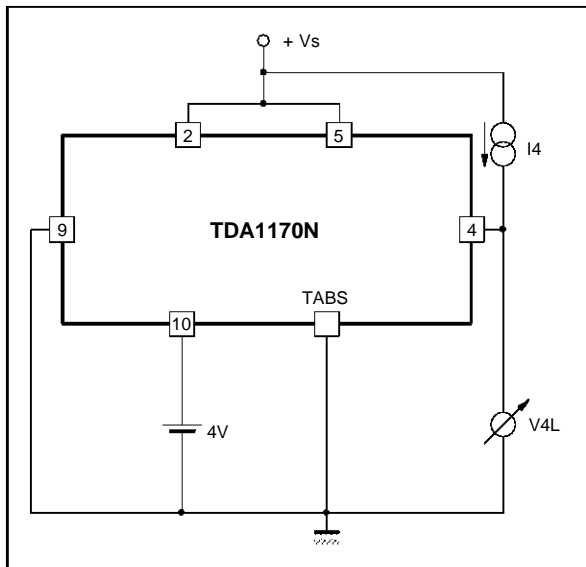
1170N-03.EPS

Figure 1b



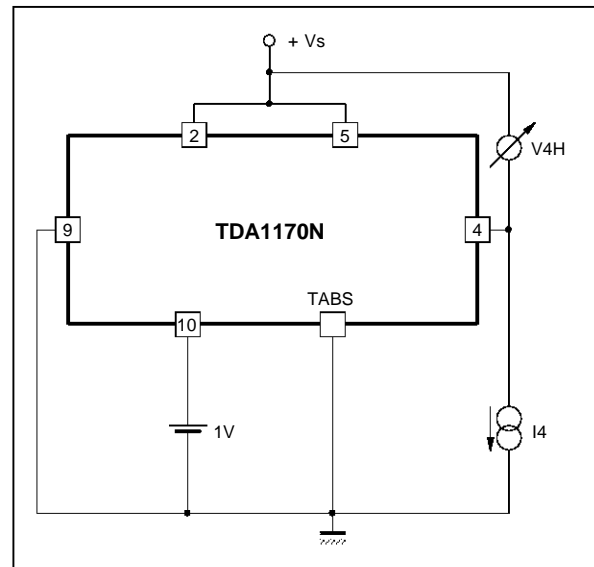
1170N-04.EPS

Figure 1c



1170N-05.EPS

Figure 1d



1170N-06.EPS

**ELECTRICAL CHARACTERISTICS**

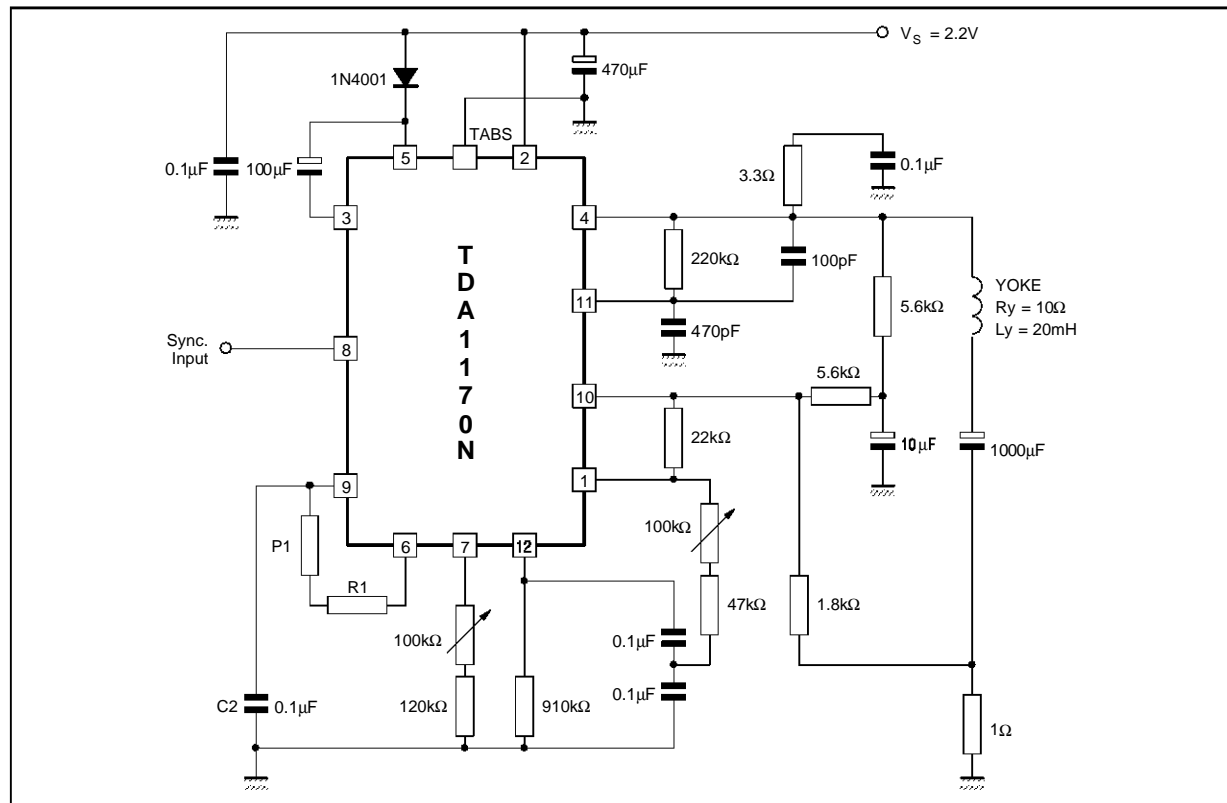
(Refer to the AC test circuit,  $V_S = 22V$  ;  $f = 50Hz$  ;  $T_{amb} = 25^\circ C$ , unless otherwise specified)

**AC CHARACTERISTICS**

| Symbol                             | Parameter                                  | Test Conditions  | Min. | Typ.         | Max. | Unit             |
|------------------------------------|--|--|------|--------------|------|------------------|
| $I_S$                              | Supply Current                             | $I_y = 1App$   |      | 140          |      | mA               |
| $I_B$                              | Sync. Input Current (positive or negative) |  | 500  |              |      | $\mu A$          |
| V4                                 | Flyback Voltage                            | $I_y = 1App$   |      | 45           |      | V                |
| $t_{fly}$                          | Flyback Time                               | $I_y = 1App$   |      | 0.7          |      | ms               |
| $V_{ON}$                           | Peak to Peak Output Noise                  | Pin 9 Connected to GND   |      |              | 40   | mV <sub>PP</sub> |
| $f_o$                              | Free Running Frequency                     | (P1 + R1) = 300k $\Omega$ , C2 = 0.1 $\mu F$<br>(P1 + R1) = 260k $\Omega$ , C2 = 0.1 $\mu F$ |      | 42.2<br>48.5 |      | Hz<br>Hz         |
| $\Delta f$                         | Synchronization Range                      | $I_B = 0.5mA$  | 14   |              |      | Hz               |
| $\frac{\Delta f}{\Delta V_S}$      | Frequency Drift with Supply Voltage        | $V_S = 10$ to 35V  |      | 0.005        |      | Hz/V             |
| $\frac{ \Delta f }{\Delta T_{ab}}$ | Frequency Drift with tab Temperature       | $T_{tab} = 40$ to 120 $^\circ C$   |      | 0.01         |      | Hz/ $^\circ C$   |

1170N-04.TBL

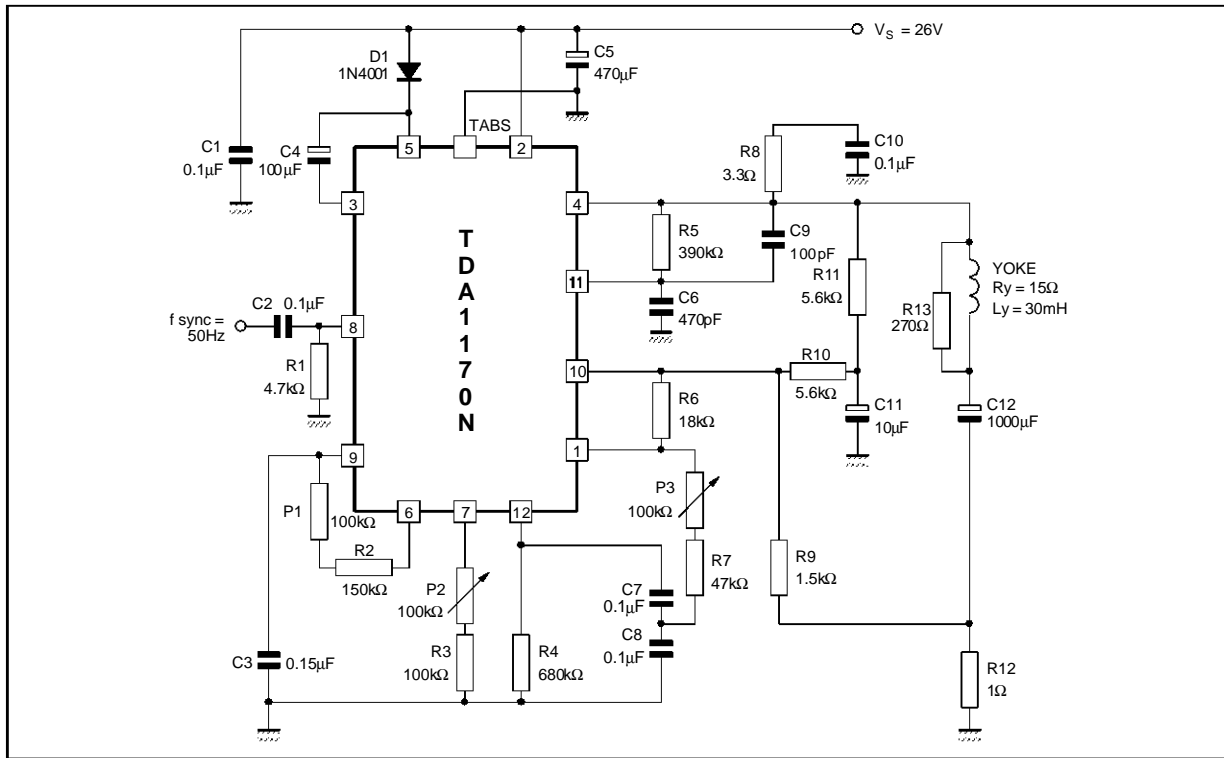
**Figure 2 : AC Test and Application Circuit for Large Screen B/W TV Set 10 $\Omega$ /20mH/1App**



1170N-07.EPS

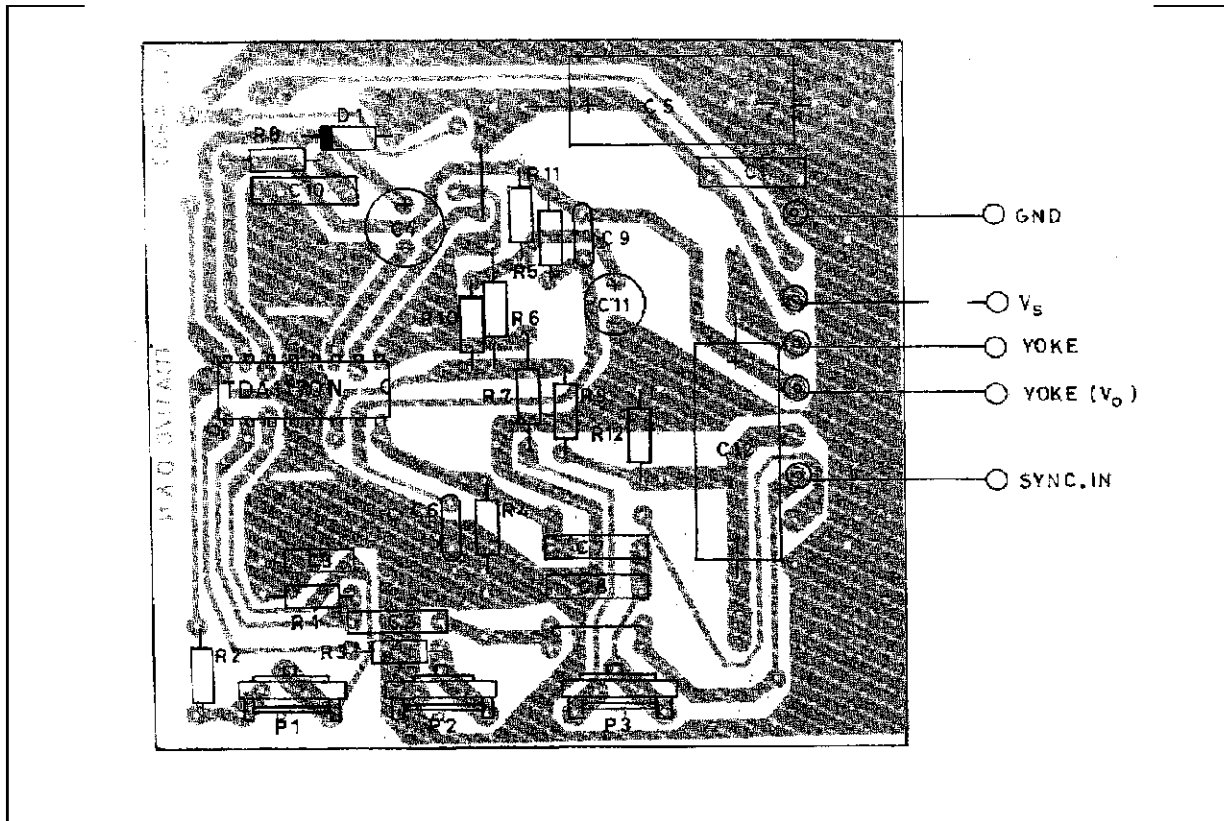
# TDA1170N

**Figure 3 :** Typical Application Circuit for Small Screen 90° TVC Set ( $R_Y = 15\Omega$ ,  $L_Y = 30\text{mH}$ ,  $I_Y = 0.82\text{ App}$ )



1170N-08.EPS

**Figure 4 :** P.C. Board and Components Layout of the Circuit of fig. 3 (1:1 scale)



1170N-09.TIF

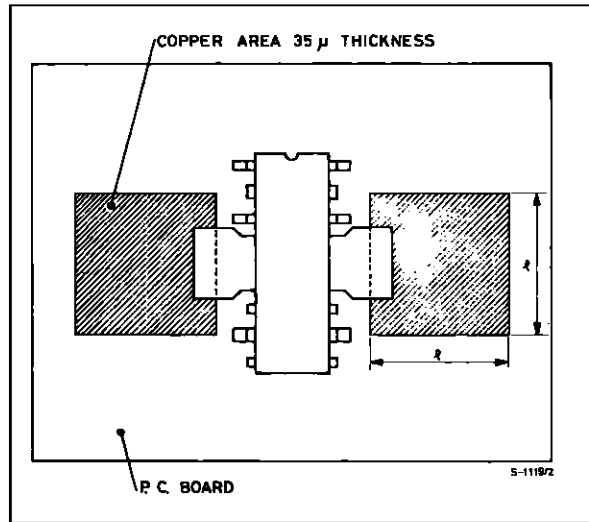
**MOUNTING INSTRUCTION**

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.

The junction to ambient thermal resistance can be

**Figure 5 :** Example of P.C. Board Copper Area Used as Heatsink

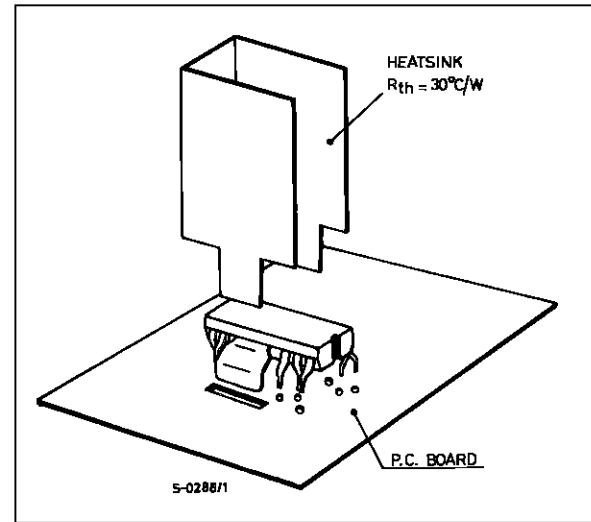


1170N-10.EPS

reduced by soldering the tabs to a suitable copper area of the printed circuit board (fig. 5) or to an external heatsink (fig. 6).

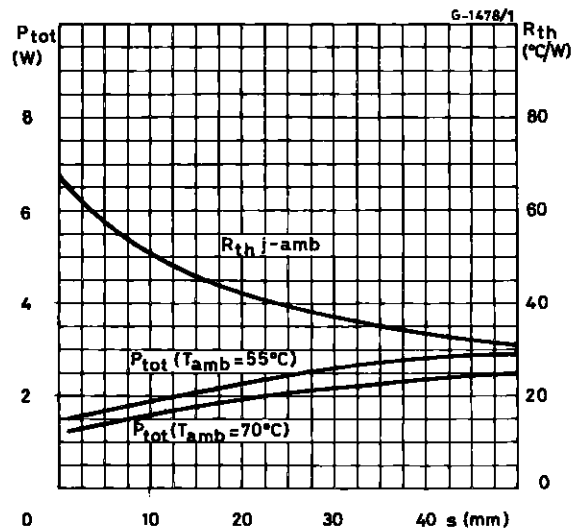
The diagram of fig. 7 shows the maximum dissippable power  $P_{tot}$  and the  $R_{th\ j-amb}$  as a function of the side "e" of two equal square copper areas having a thickness of 35  $\mu$  (1.4 mil).

**Figure 6 :** Example of External heatsink



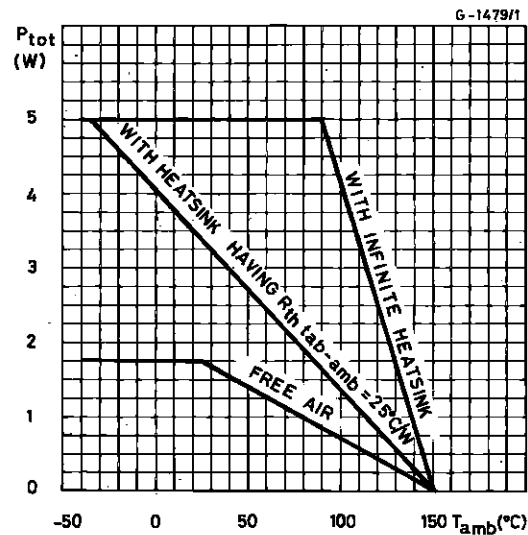
1170N-11.EPS

**Figure 7 :** Maximum Power Dissipation and Junction-Ambient Thermal Resistance versus "e"



1170N-12.EPS

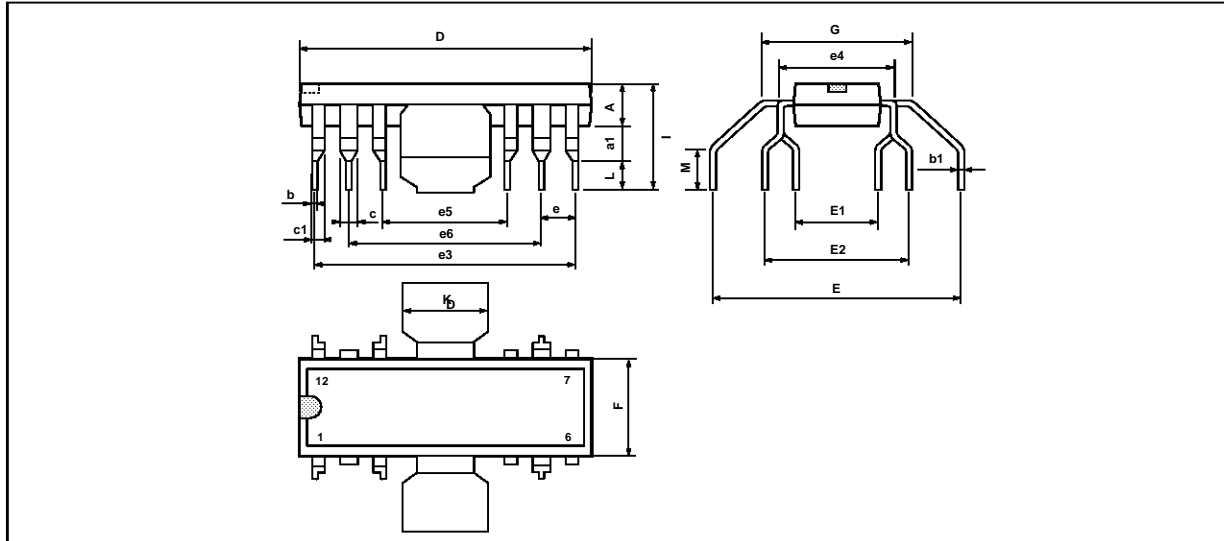
**Figure 8 :** Maximum Allowable Power Dissipation versus Ambient Temperature



1170N-13.EPS

# TDA1170N

## PACKAGE MECHANICAL DATA : 12 PINS - PLASTIC FINDIP



PM-FDIP/EP5

| Dimensions | Millimeters |       |       | Inches |       |       |
|------------|-------------|-------|-------|--------|-------|-------|
|            | Min.        | Typ.  | Max.  | Min.   | Typ.  | Max.  |
| A          | 3.8         |       | 4.05  | 0.150  |       | 0.159 |
| a1         | 1.5         |       | 1.75  | 0.059  |       | 0.069 |
| b          | 0.55        |       | 0.6   | 0.022  |       | 0.024 |
| b1         | 0.3         |       | 0.35  | 0.012  |       | 0.014 |
| c          |             | 1.32  |       |        | 0.052 |       |
| c1         |             | 0.94  |       |        | 0.037 |       |
| D          | 19.2        |       | 19.9  | 0.756  |       | 0.783 |
| E          | 16.8        | 17.2  | 17.6  | 0.661  | 0.677 | 0.693 |
| E1         | 4.86        |       | 5.56  | 0.191  |       | 0.219 |
| E2         | 10.11       |       | 10.81 | 0.398  |       | 0.426 |
| e          | 2.29        | 2.54  | 2.79  | 0.090  | 0.100 | 0.110 |
| e3         | 17.43       | 17.78 | 18.13 | 0.686  | 0.700 | 0.714 |
| e4         |             | 7.62  |       |        | 0.300 |       |
| e5         | 7.27        | 7.62  | 7.97  | 0.286  | 0.300 | 0.314 |
| e6         | 12.35       | 12.7  | 13.05 | 0.486  | 0.500 | 0.514 |
| F          | 6.3         |       | 7.1   | 0.248  |       | 0.280 |
| G          |             | 9.8   |       |        | 0.386 |       |
| I          | 7.8         |       | 8.6   | 0.307  |       | 0.339 |
| K          | 6.1         |       | 6.5   | 0.240  |       | 0.256 |
| L          | 2.5         |       | 2.9   | 0.098  |       | 0.114 |
| M          | 2.5         |       | 3.1   | 0.098  |       |       |

FINDIP, TBL

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