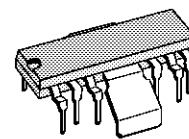


**TV VERTICAL DEFLECTION**

- SYNCHRONIZATION CIRCUIT
- OSCILLATOR AND RAMP GENERATOR
- HIGH POWER GAIN AMPLIFIER
- FLYBACK GENERATOR
- VOLTAGE REGULATOR



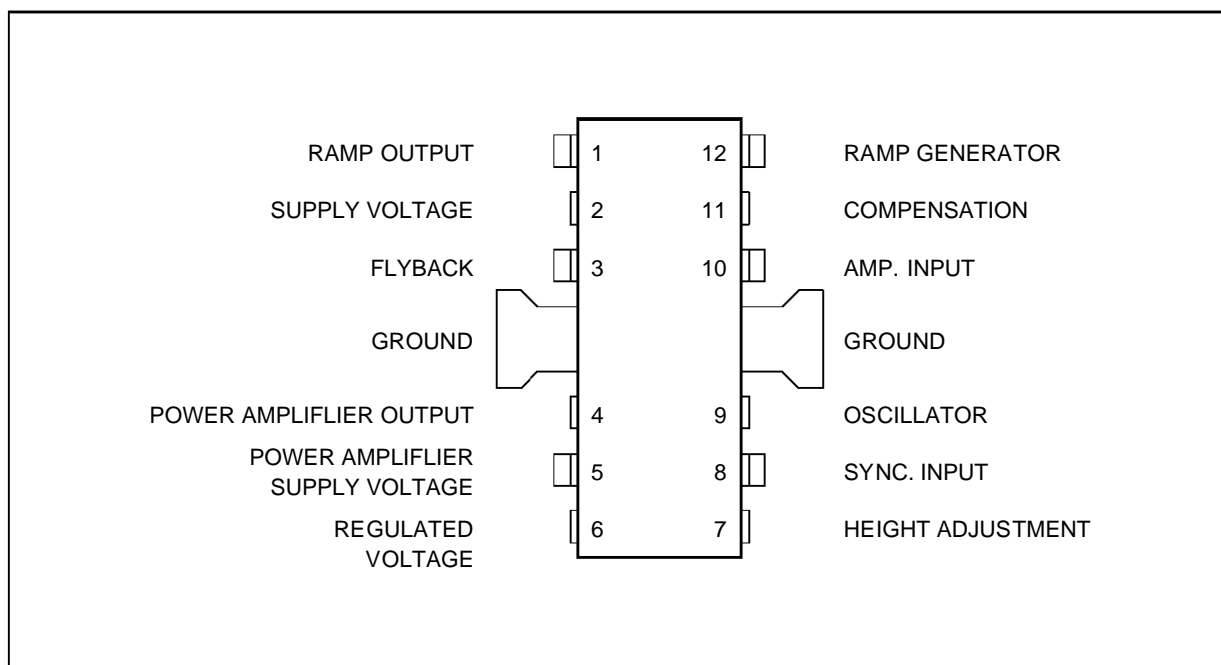
**FINDIP**  
(Plastic Package)

**ORDER CODE : TDA1170S**

**DESCRIPTION**

The TDA1170S 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.

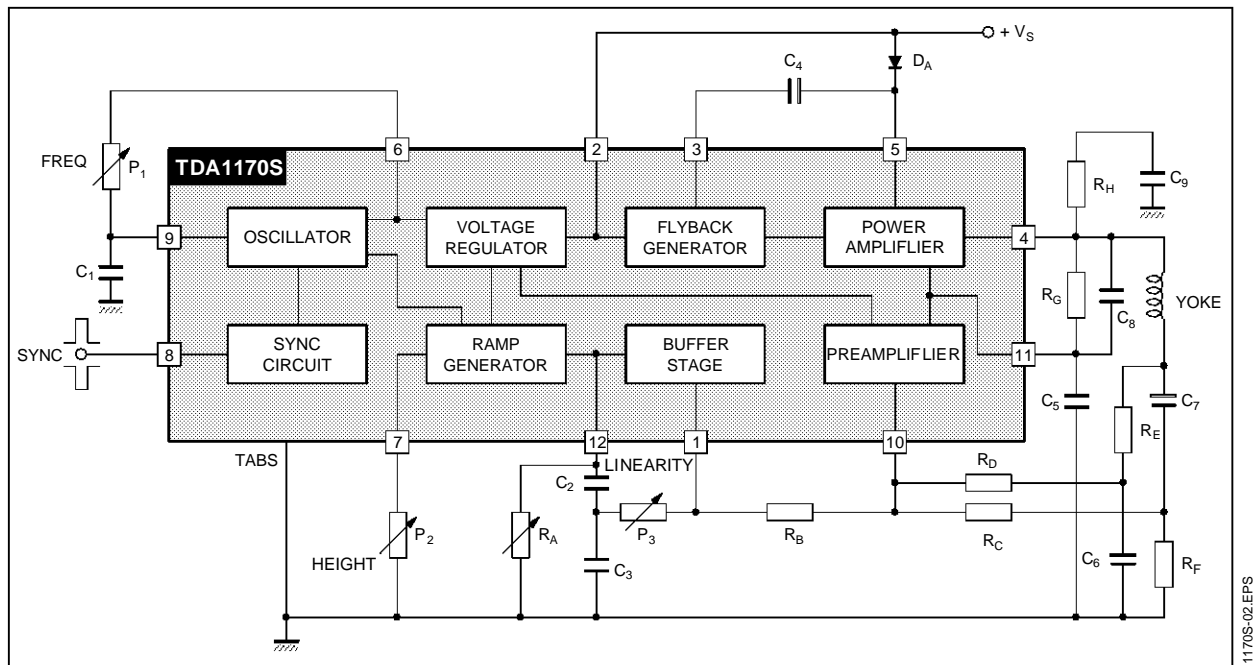
**PIN CONNECTIONS**



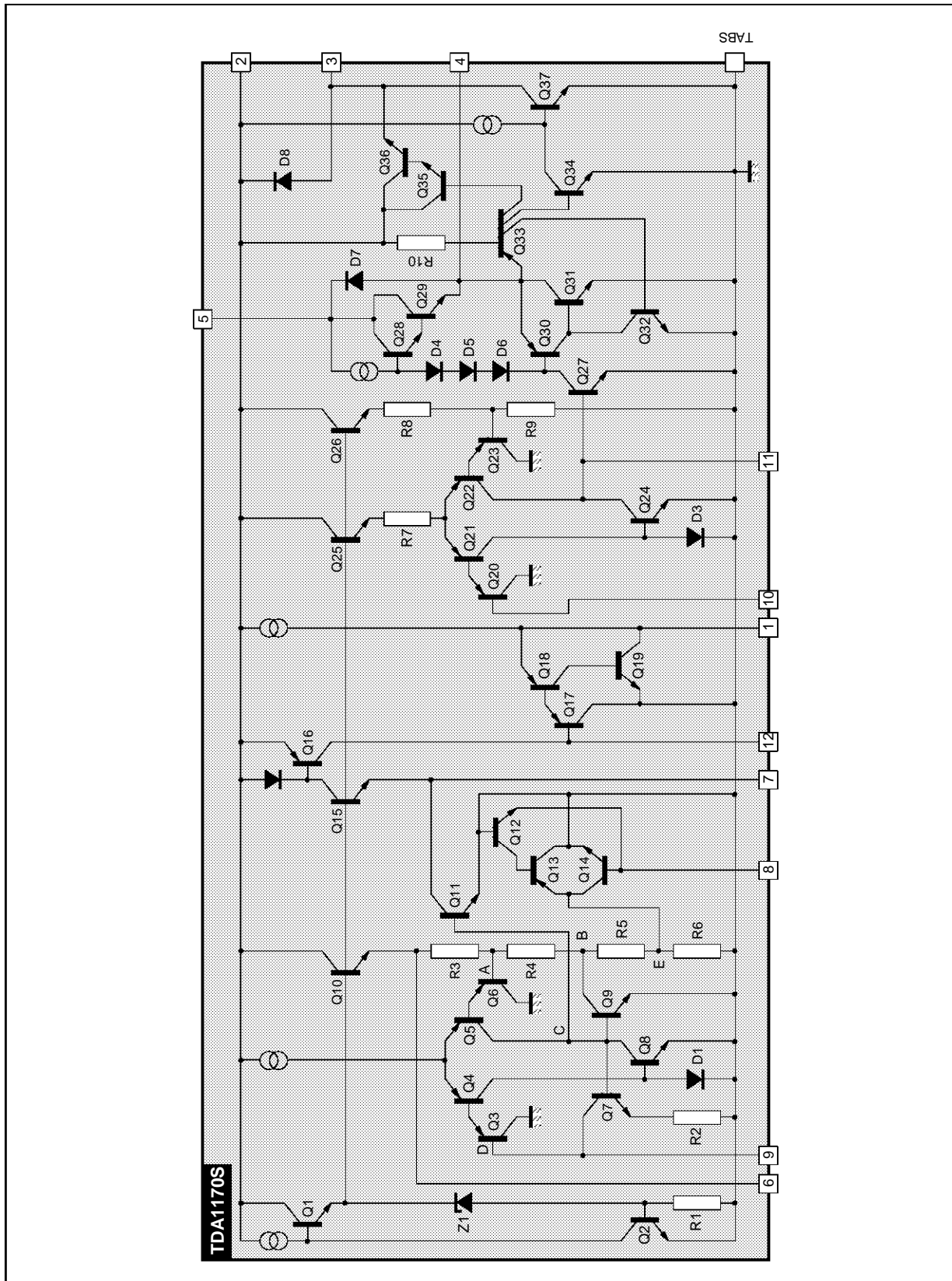
1170S-01.EPS

# TDA1170S

## BLOCK DIAGRAM



SCHEMATIC DIAGRAM



1170S-03.EPS

**ABSOLUTE MAXIMUM RATINGS**

| Symbol                            | Parameter  | Value         | Unit   |
|-----------------------------------|--|---------------|--------|
| V <sub>S</sub>                    | Supply Voltage at Pin 2  | 35            | V      |
| V <sub>4</sub> , V <sub>5</sub>   | Flyback Peak Voltage   | 60            | V      |
| V <sub>10</sub>                   | Power Amplifier Input Voltage  | + 10<br>- 0.5 | V<br>V |
| I <sub>o</sub>                    | Output Peak Current (non repetitive) at t = 2msec                              | 2             | A      |
| I <sub>o</sub>                    | Output Peak Current at f = 50Hz t ≤ 10μsec                                     | 2.5           | A      |
| I <sub>o</sub>                    | Output Peak Current at f = 50Hz t > 10μsec                                     | 1.5           | A      |
| I <sub>3</sub>                    | Pin 3 DC Current at V <sub>4</sub> 2   | 100           | mA     |
| I <sub>3</sub>                    | Pin 3 Peak to Peak Flyback Current for f = 50Hz, t <sub>fly</sub> ≤ 1.5msec    | 1.8           | A      |
| I <sub>8</sub>                    | Pin 8 Current  | ± 20          | mA     |
| P <sub>tot</sub>                  | Power Dissipation : at T <sub>tab</sub> = 90 °C<br>at T <sub>amb</sub> = 80 °C | 5<br>1        | W<br>W |
| T <sub>stg</sub> , T <sub>j</sub> | Storage and Junction Temperature   | - 40, + 150   | °C     |

1170S-01.TBL

**THERMAL DATA**

| Symbol                | Parameter                               | Value | Unit |
|-----------------------|---|-------|------|
| R <sub>th j-tab</sub> | Thermal Resistance Junction-tab Max     | 12    | °C/W |
| R <sub>th j-amb</sub> | Thermal Resistance Junction-ambient Max | 70    | °C/W |

(°) Obtained with tabs soldered to printed circuit with minimized copper area.

1170S-02.TBL

**ELECTRICAL CHARACTERISTICS**

(refer to the test circuits, V<sub>S</sub> = 35V, T<sub>amb</sub> = 25°C, unless otherwise specified)

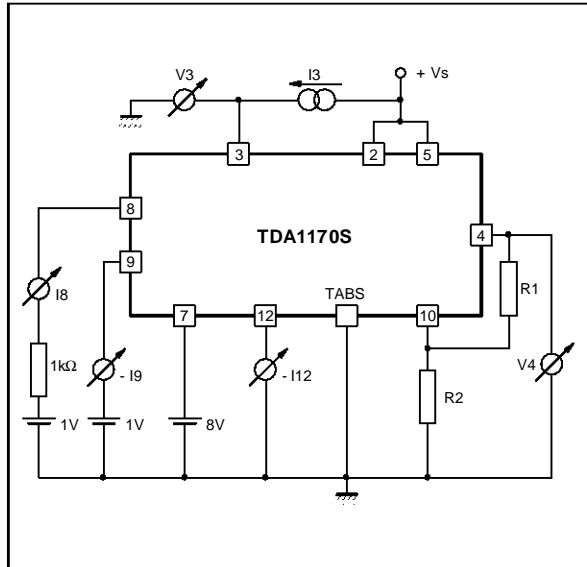
**DC CHARACTERISTICS**

| Symbol   | Parameter                                   | Test Conditions                                    | Min. | Typ.       | Max.       | Unit   | Fig.     |
|--|---|--|------|------------|------------|--------|----------|
| I <sub>2</sub>   | Pin 2 Quiescent Current                     | I <sub>3</sub> = 0                                 |      | 7          | 14         | mA     | 1b       |
| I <sub>5</sub>   | Pin 5 Quiescent Current                     | I <sub>4</sub> = 0                                 |      | 8          | 15         | mA     | 1b       |
| - I <sub>9</sub>   | Oscillator Bias Current                     | V <sub>9</sub> = 1V                                |      | 0.1        | 1          | μA     | 1a       |
| - I <sub>10</sub>  | Amplifier Input Bias Current                | V <sub>10</sub> = 1V                               |      | 0.1        | 1          | μA     | 1b       |
| - I <sub>12</sub>  | Ramp Generator Bias Current                 | V <sub>12</sub> = 0                                |      | 0.02       | 0.3        | μA     | 1a       |
| - I <sub>12</sub>  | Ramp Generator Current                      | I <sub>7</sub> = 20 μA, V <sub>12</sub> = 0        | 19   | 20         | 24         | μA     | 1b       |
| $\frac{\Delta I_{12}}{I_{12}}$                                 | Ramp Generator Non-linearity                | ΔV <sub>12</sub> = 0 to 12V, I <sub>7</sub> = 20μA |      | 0.2        | 1          | %      | 1b       |
| V <sub>S</sub>   | Supply Voltage Range                        |  | 10   |            | 35         | V      | -        |
| V <sub>1</sub>   | Pin 1 Saturation Voltage to Ground          | I <sub>1</sub> = 1 mA                              |      | 1          | 1.4        | V      | -        |
| V <sub>3</sub>   | Pin 3 Saturation Voltage to Ground          | I <sub>3</sub> = 10 mA                             |      | 1.7        | 2.6        | V      | 1a       |
| V <sub>4</sub>   | Quiescent Output Voltage                    | V <sub>S</sub> = 10V<br>R1 = 10kΩ, R2 = 10kΩ       | 4.1  | 4.4        | 4.75       | V      | 1a       |
|  |   | V <sub>S</sub> = 35V<br>R1 = 30kΩ, R2 = 10kΩ       | 8.3  | 8.8        | 9.45       | V      | 1a       |
| V <sub>4L</sub>  | Output Saturation Voltage to Ground         | - I <sub>4</sub> = 0.1A<br>- I <sub>4</sub> = 0.8A |      | 0.9<br>1.9 | 1.2<br>2.3 | V<br>V | 1c<br>1c |
| V <sub>4H</sub>  | Output Saturation Voltage to Supply         | I <sub>4</sub> = 0.1A<br>I <sub>4</sub> = 0.8A     |      | 1.4<br>2.8 | 2.1<br>3.2 | V<br>V | 1d<br>1d |
| V <sub>6</sub>   | Regulated Voltage at Pin 6                  |  | 6.1  | 6.5        | 6.9        | V      | 1b       |
| V <sub>7</sub>   | Regulated Voltage at Pin 7                  | I <sub>7</sub> = 20μA                              | 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 | ΔV <sub>S</sub> = 10 to 35V                        |      | 1          |            | mV/V   | 1b       |
| V <sub>10</sub>  | Amplifier Input Reference Voltage           |  | 2.07 | 2.2        | 2.3        | V      | -        |
| R <sub>8</sub>   | Pin 8 Input Resistance                      | V <sub>8</sub> ≤ 0.4V                              | 1    |            |            | MΩ     | 1a       |

1170S-03.TBL

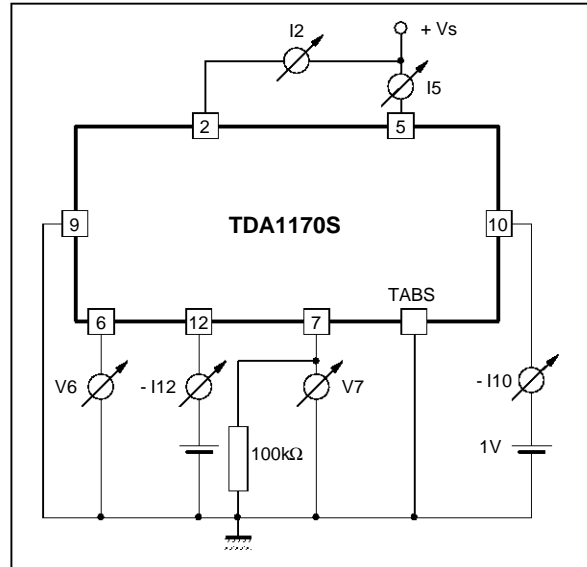
Figure 1 : DC Test Circuit

Figure 1a



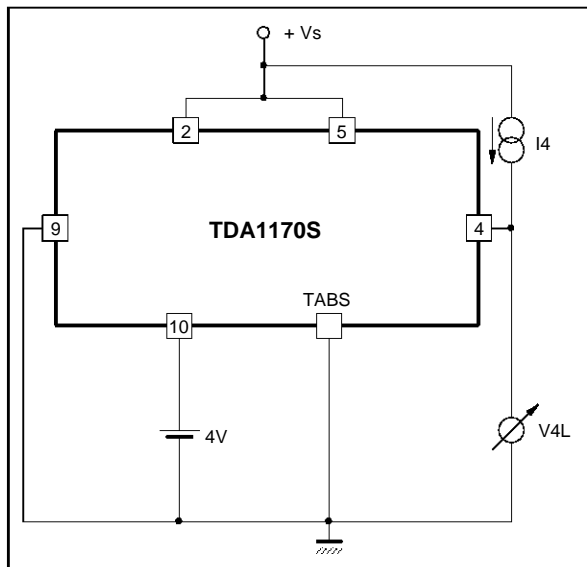
1170S-04.EPS

Figure 1b



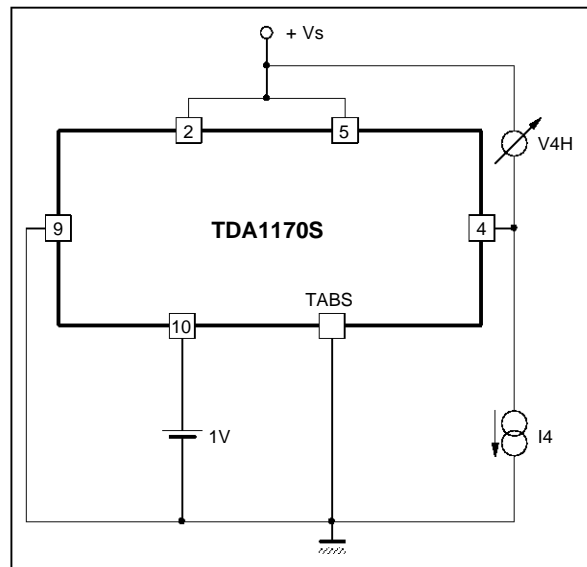
1170S-05.EPS

Figure 1c



1170S-06.EPS

Figure 1d



1170S-07.EPS

**ELECTRICAL CHARACTERISTICS**

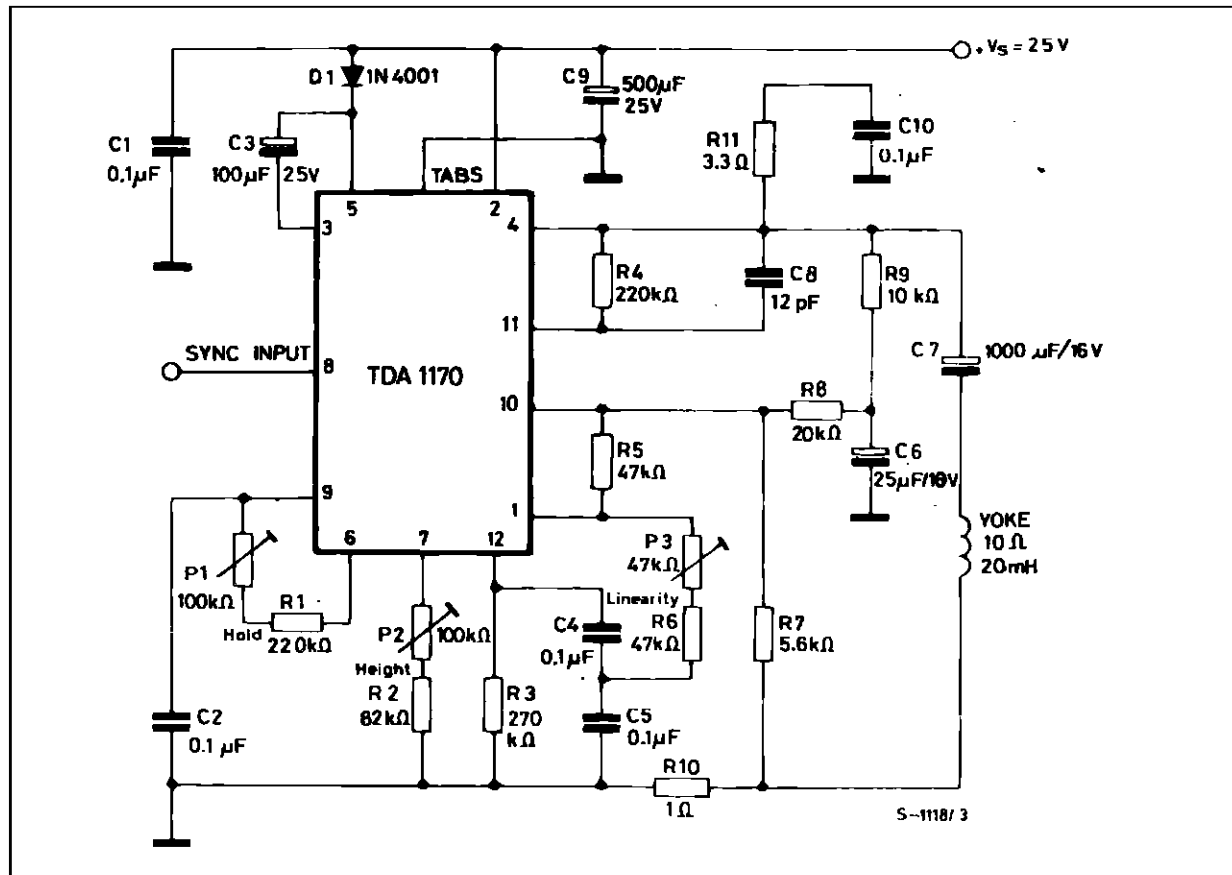
(refer to the test circuit,  $V_S = 25V$  ;  $f = 50Hz$  ;  $T_{amb} = 25^{\circ}C$ , unless otherwise specified)

**AC CHARACTERISTICS**

| Symbol                            | Parameter                                  | Test Conditions  | Min. | Typ.         | Max. | Unit            |
|-----------------------------------|--|--|------|--------------|------|-----------------|
| $I_s$                             | Supply Current                             | $I_y = 1App$   |      | 140          |      | mA              |
| $I_8$                             | Sync. Input Current (positive or negative) |  | 500  |              |      | $\mu A$         |
| $V_4$                             | Flyback Voltage                            | $I_y = 1App$   |      | 51           |      | V               |
| $V_9$                             | Peak to Peak Oscillator Sawtooth Voltage   |  |      | 2.4          |      | V               |
| $t_{fly}$                         | Flyback Time                               | $I_y = 1App$   |      | 0.7          |      | ms              |
| $f_o$                             | Free Running Frequency                     | $(P_1 + R_1) = 300k\Omega$ , $C_2 = 0.1 \mu F$<br>$(P_1 + R_1) = 260k\Omega$ , $C_2 = 0.1 \mu F$ |      | 42.2<br>48.5 |      | Hz<br>Hz        |
| $\Delta f$                        | Synchronization Range                      | $I_8 = 0.5mA$  | 14   |              |      | Hz              |
| $\frac{\Delta f}{\Delta V_S}$     | Frequency Drift with Supply Voltage        | $V_S = 10$ to $35V$  |      | 0.005        |      | Hz/V            |
| $\frac{\Delta f}{\Delta T_{tab}}$ | Frequency Drift with Tab Temperature       | $T_{tab} = 40$ to $120^{\circ}C$   |      | 0.01         |      | Hz/ $^{\circ}C$ |

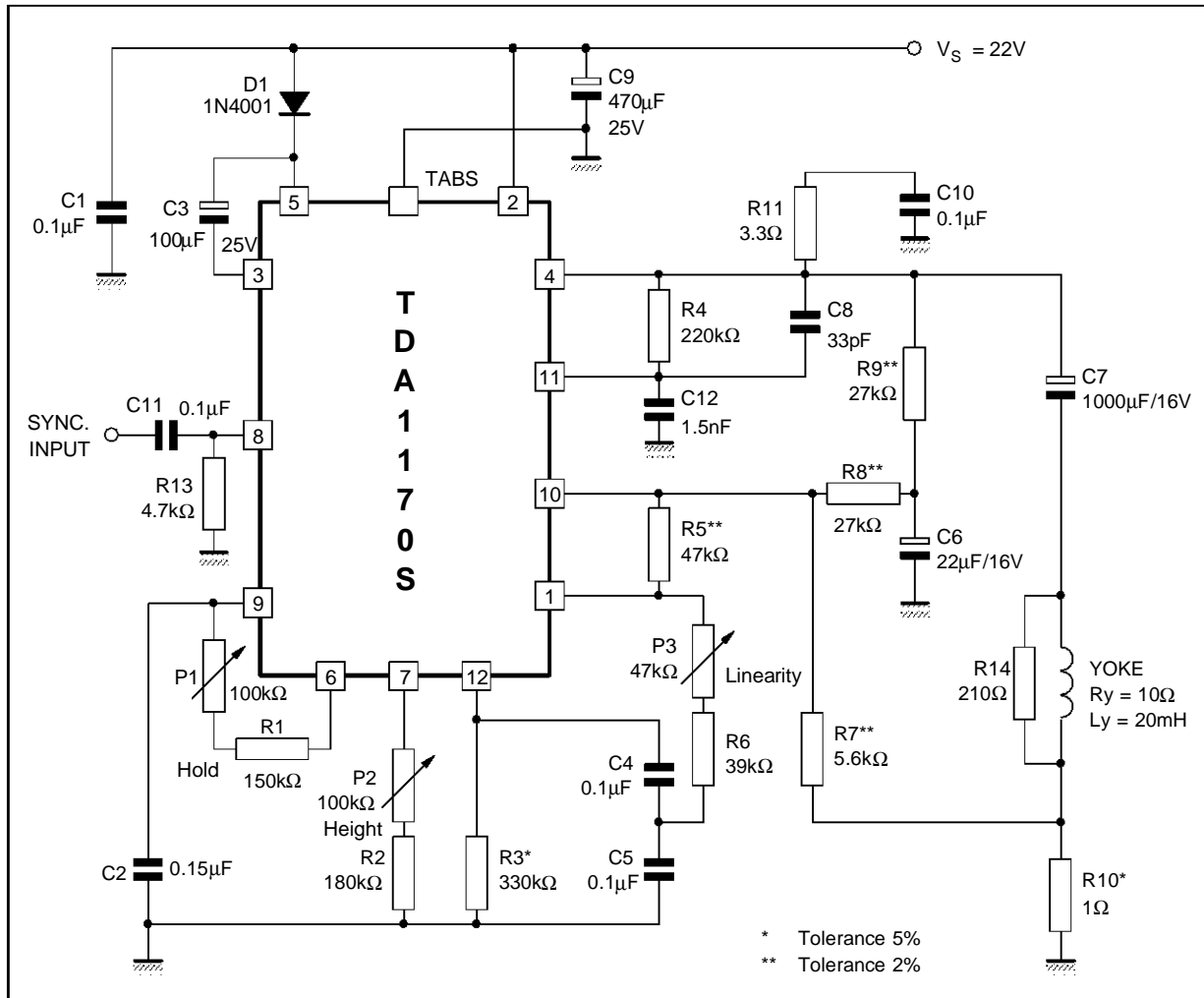
1170S-04.TBL

**Figure 2 : AC Test Circuit**



1170S-08.EPS

Figure 3 : Typical Application Circuit for Large Screen B/W TV SET ( $R_Y = 10\Omega$ ,  $L_Y = 20mH$ ,  $I_Y = 1APP$ )



TYPICAL PERFORMANCE

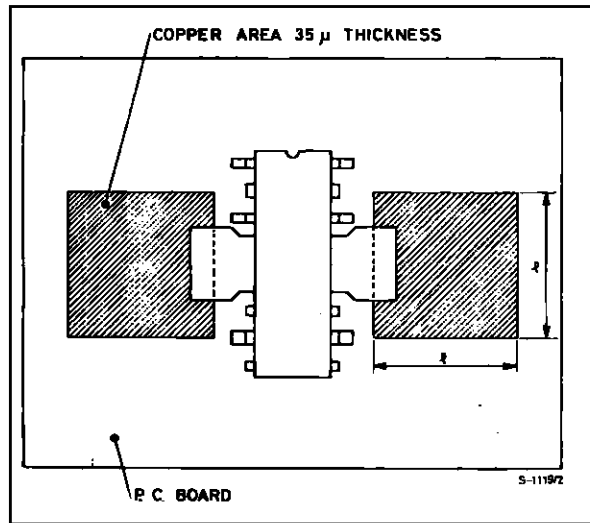
| Symbol    | Parameter                               | Value | Unit |
|-----------|---|-------|------|
| $V_S$     | Operating Supply Voltage                | 22    | V    |
| $I_S$     | Supply Current                          | 145   | mA   |
| $t_{fly}$ | Flyback Time                            | 0.7   | ms   |
| $P_{tot}$ | Power Dissipation                       | 2.3   | W    |
| $I_Y$     | Maximum Scanning Current (peak to peak) | 1.2   | A    |

For safe working up to  $T_{amb} = 60^\circ C$  a heatsink of  $R_{th} = 14^\circ C/W$  is required.

**MOUNTING INSTRUCTION**

The junction to ambient thermal resistance of the TDA 1170S can be reduced by soldering the tabs to a suitable copper area of the printed circuit board (fig. 4) or to an external heatsink (fig. 5).

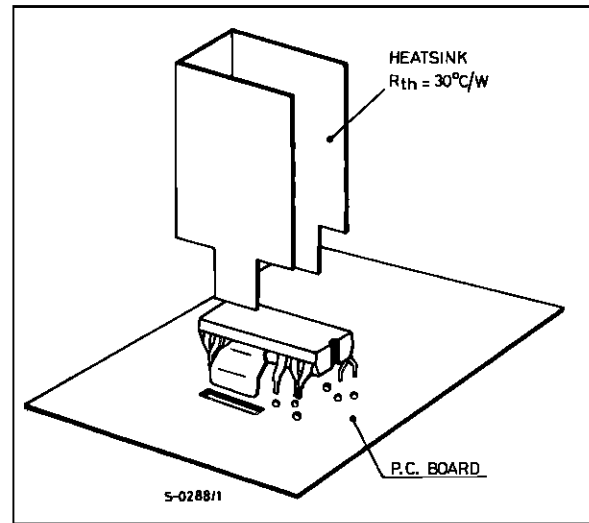
**Figure 4 :** Example of P.C Board Copper Area is Used as Heatsink



1170S-10.EPS

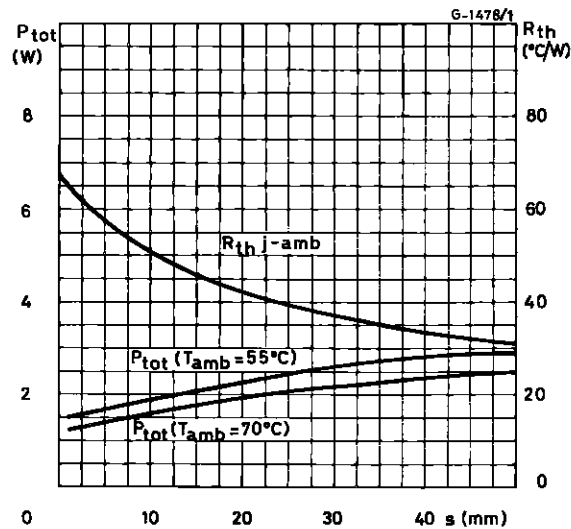
The diagram of fig. 6 shows the maximum dissippable power  $P_{tot}$  and the  $R_{th j-amb}$  as a function of the side "s" of two equal square copper areas having a thickness of 35 μ (1.4 mil).

**Figure 5 :** Example with External Heatsink



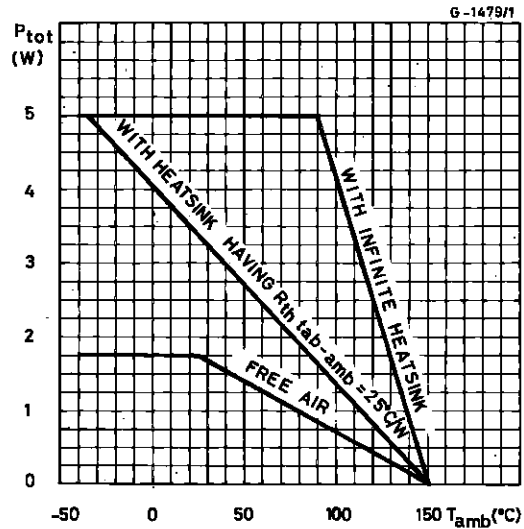
1170S-11.EPS

**Figure 6 :** Maximum Power Dissipation and Junction-Ambient Thermal Resistance versus "S"



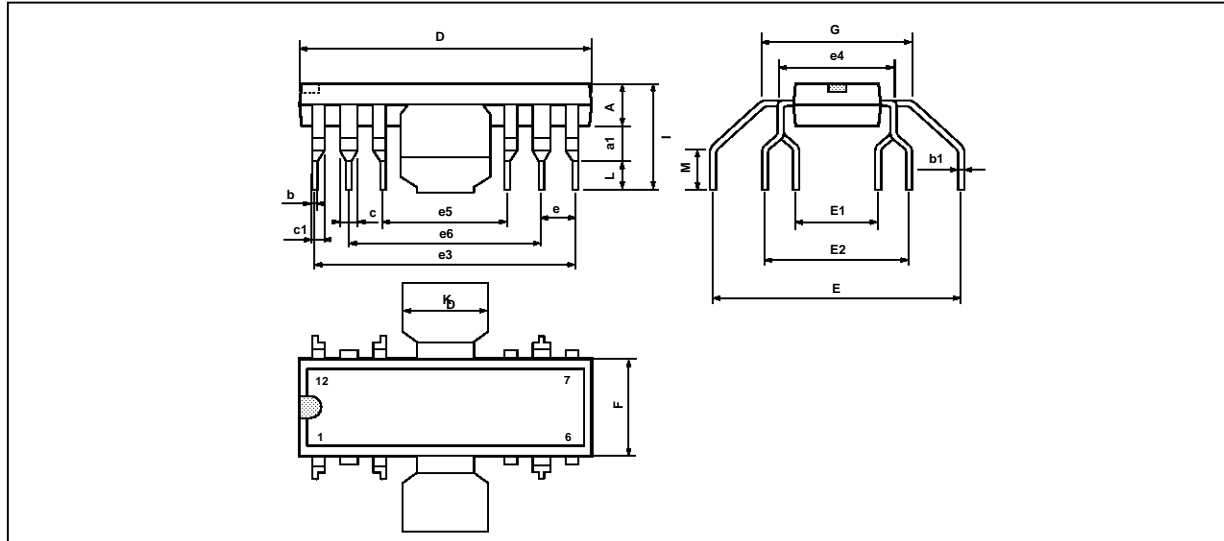
1170S-12.EPS

**Figure 7 :** Maximum Allowable Power Dissipation versus Ambient Temperature



1170S-13.EPS

PACKAGE MECHANICAL DATA : 12 PINS - PLASTIC FINDIP



PM-FDIP.EPS

| 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  |       |       |

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