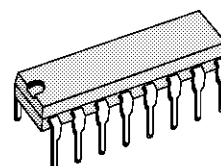


## LOW-NOISE TV VERTICAL DEFLECTION SYSTEM

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

### DESCRIPTION

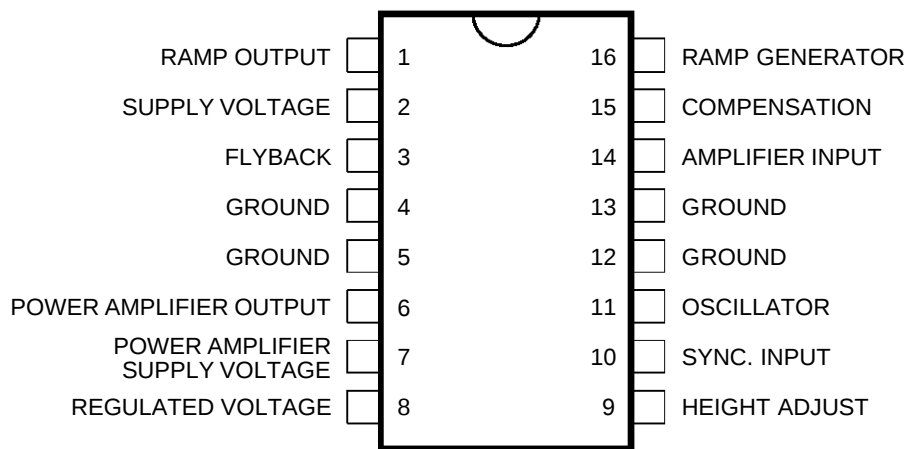
The TDA 1170D is a monolithic integrated circuit in a 16-lead dual in-line plastic package. It is intended for use in black and white and colour TV receivers. **Low-noise makes this device particularly suitable for use in monitors.** The functions incorporated are : synchronization circuit, oscillator and ramp generator, high power gain amplifier, flyback generator, voltage regulator.



**DIP16**  
(Plastic Package)

**ORDER CODE : TDA1170D**

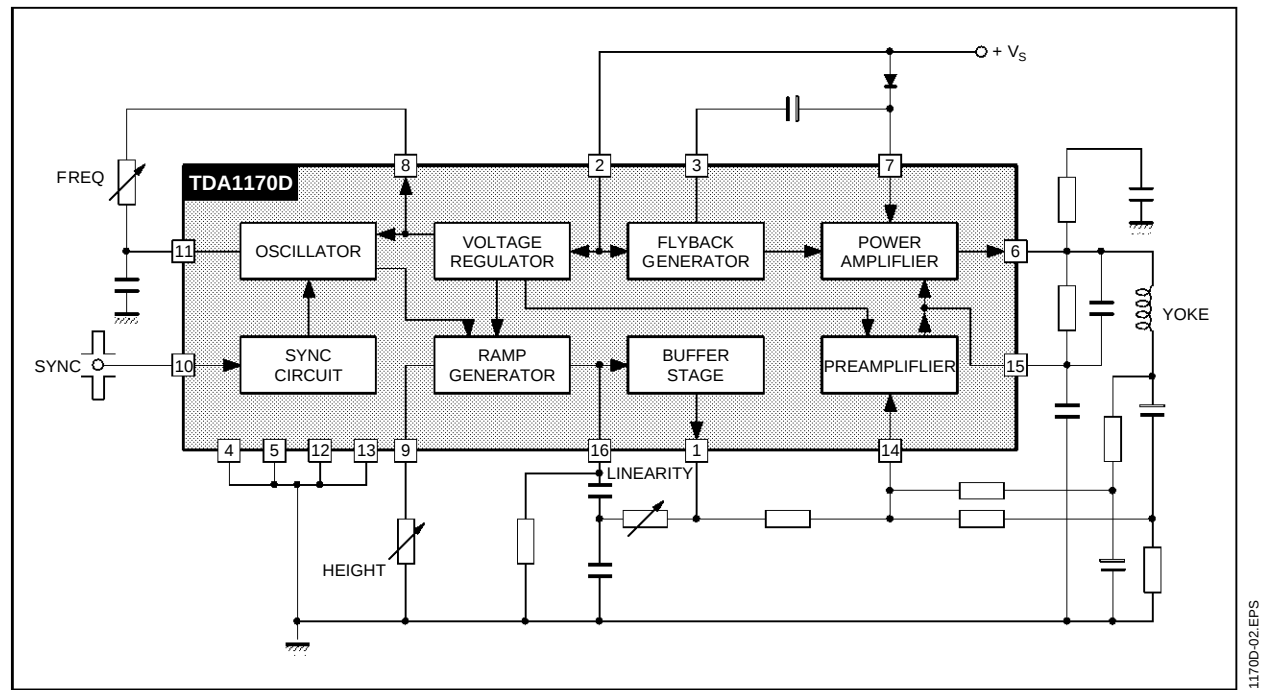
### PIN CONNECTIONS



1170D-01.EPS

# TDA1170D

## BLOCK DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Symbol         | Parameter                                                                                         | Value         | Unit             |
|----------------|---------------------------------------------------------------------------------------------------|---------------|------------------|
| $V_S$          | Supply Voltage at Pin 2                                                                           | 35            | V                |
| $V_6, V_7$     | Flyback Peak Voltage                                                                              | 60            | V                |
| $V_{14}$       | Power Amplifier Input Voltage                                                                     | + 10<br>- 0.5 | V<br>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 $V_6 < V_2$                                                                   | 100           | mA               |
| $I_3$          | Pin 3 Peak to Peak Flyback Current for $f = 50\text{Hz}$ , $t_{ry} \leq 1.5\text{msec}$           | 1.8           | A                |
| $I_{10}$       | Pin 10 Current                                                                                    | $\pm 20$      | mA               |
| $P_{tot}$      | Power Dissipation : at $T_{tab} = 90^\circ\text{C}$<br>at $T_{amb} = 70^\circ\text{C}$ (free air) | 4.3<br>1      | W<br>W           |
| $T_{stg}, T_j$ | Storage and Junction Temperature                                                                  | - 40 to 150   | $^\circ\text{C}$ |

## THERMAL DATA

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

\* Obtained with pins 4, 5, 12, 13 soldered to printed circuit with minimized copper area.

**ELECTRICAL CHARACTERISTICS**(refer to the test circuits,  $V_S = 35V$ ,  $T_{amb} = 25^{\circ}C$ , 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   |
| $I_7$                                                          | Pin 7 Quiescent Current                     | $I_6 = 0$                                        |      | 8    | 17   | mA        | 1b   |
| $-I_{11}$                                                      | Oscillator Bias Current                     | $V_{11} = 1V$                                    |      | 0.1  | 1    | $\mu A$   | 1a   |
| $-I_{14}$                                                      | Amplifier Input Bias Current                | $V_{14} = 1V$                                    |      | 1    | 10   | $\mu A$   | 1b   |
| $-I_{16}$                                                      | Ramp Generator Bias Current                 | $V_{16} = 0$                                     |      | 0.02 | 0.3  | $\mu A$   | 1a   |
| $-I_{16}$                                                      | Ramp Generator Current                      | $I_9 = 20\mu A$ , $V_{16} = 0$                   | 18.5 | 20   | 21.5 | $\mu A$   | 1b   |
| $\frac{\Delta I_{16}}{I_{16}}$                                 | Ramp Generator Non-linearity                | $\Delta V_{16} = 0$ to $12V$ , $I_9 = 20\mu A$   |      | 0.2  | 1    | %         | 1b   |
| $V_S$                                                          | Supply Voltage Range                        |                                                  | 10   |      | 35   | V         | —    |
| $V_1$                                                          | Pin 1 Saturation Voltage to Ground          | $I_1 = 1mA$                                      |      | 1    | 1.4  | V         | —    |
| $V_3$                                                          | Pin 3 Saturation Voltage to Ground          | $I_3 = 10mA$                                     |      | 300  | 450  | mV        | 1a   |
| $V_6$                                                          | Quiescent Output Voltage                    | $V_S = 10V$<br>$R1 = 1k\Omega$ , $R2 = 1k\Omega$ | 4.1  | 4.4  | 4.75 | V         | 1a   |
|                                                                |                                             | $V_S = 35V$<br>$R1 = 3k\Omega$ , $R2 = 1k\Omega$ | 8.3  | 8.8  | 9.45 | V         | 1a   |
| $V_{6L}$                                                       | Output Saturation Voltage to Ground         | $-I_6 = 0.1A$                                    |      | 0.9  | 1.2  | V         | 1c   |
|                                                                |                                             | $-I_6 = 0.8A$                                    |      | 1.9  | 2.3  | V         | 1c   |
| $V_{6H}$                                                       | Output Saturation Voltage to Supply         | $I_6 = 0.1A$                                     |      | 1.4  | 2.1  | V         | 1d   |
|                                                                |                                             | $I_6 = 0.8A$                                     |      | 2.8  | 3.2  | V         | 1d   |
| $V_8$                                                          | Regulated Voltage at Pin 8                  |                                                  | 6.1  | 6.5  | 6.9  | V         | 1b   |
| $V_9$                                                          | Regulated Voltage at Pin 9                  | $I_9 = 20\mu A$                                  | 6.2  | 6.6  | 7    | V         | 1b   |
| $\frac{\Delta V_8}{\Delta V_S}, \frac{\Delta V_9}{\Delta V_S}$ | Regulated Voltage Drift with Supply Voltage | $\Delta V_S = 10$ to $35V$                       |      | 1    |      | mV/V      | 1b   |
| $V_{14}$                                                       | Amplifier Input Reference Voltage           |                                                  | 2.07 | 2.2  | 2.3  | V         | —    |
| $R_{10}$                                                       | Pin 10 Input Resistance                     | $V_{10} \leq 0.4V$                               | 1    |      |      | $M\Omega$ | 1a   |

1170D-03.TBL

**Figure 1a**



1170D-04.EPS

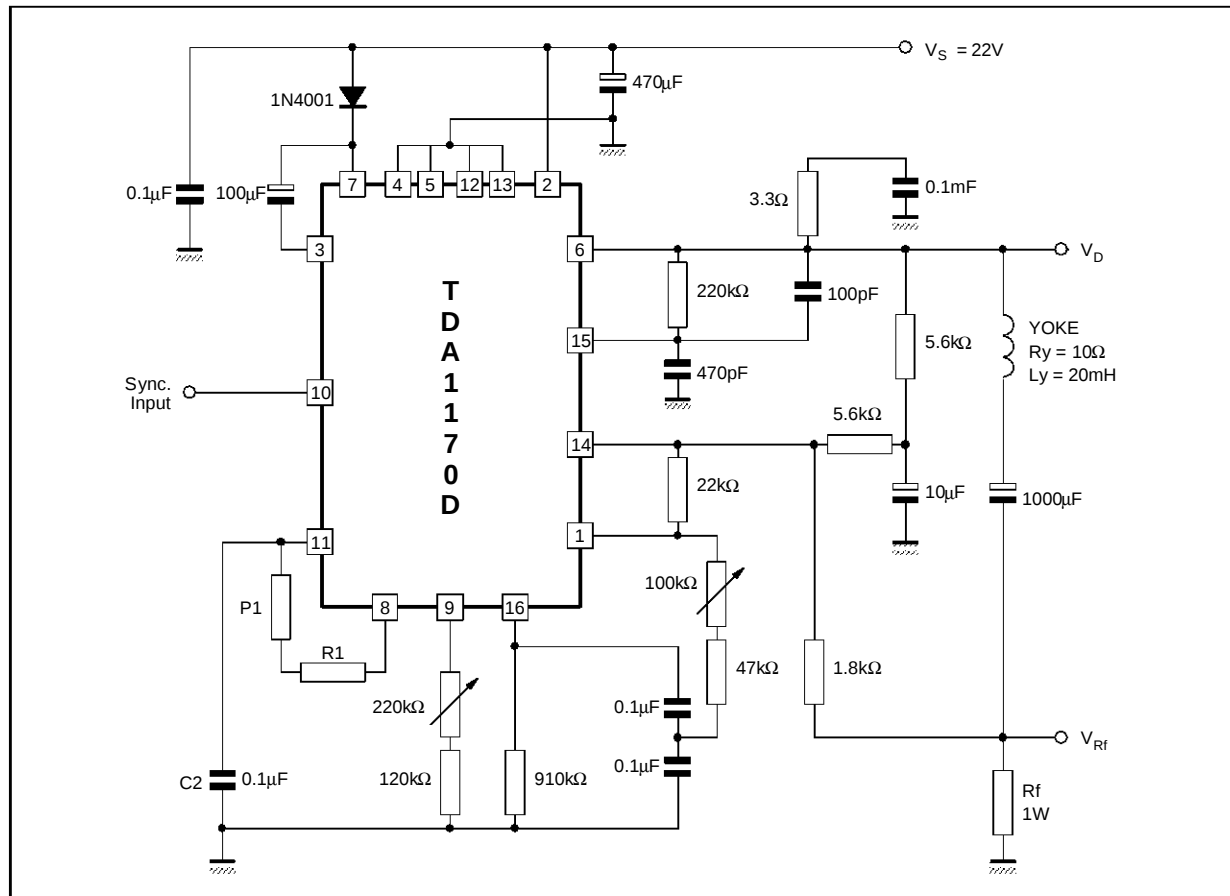
1170D-05.EPS

1170D-06.EPS

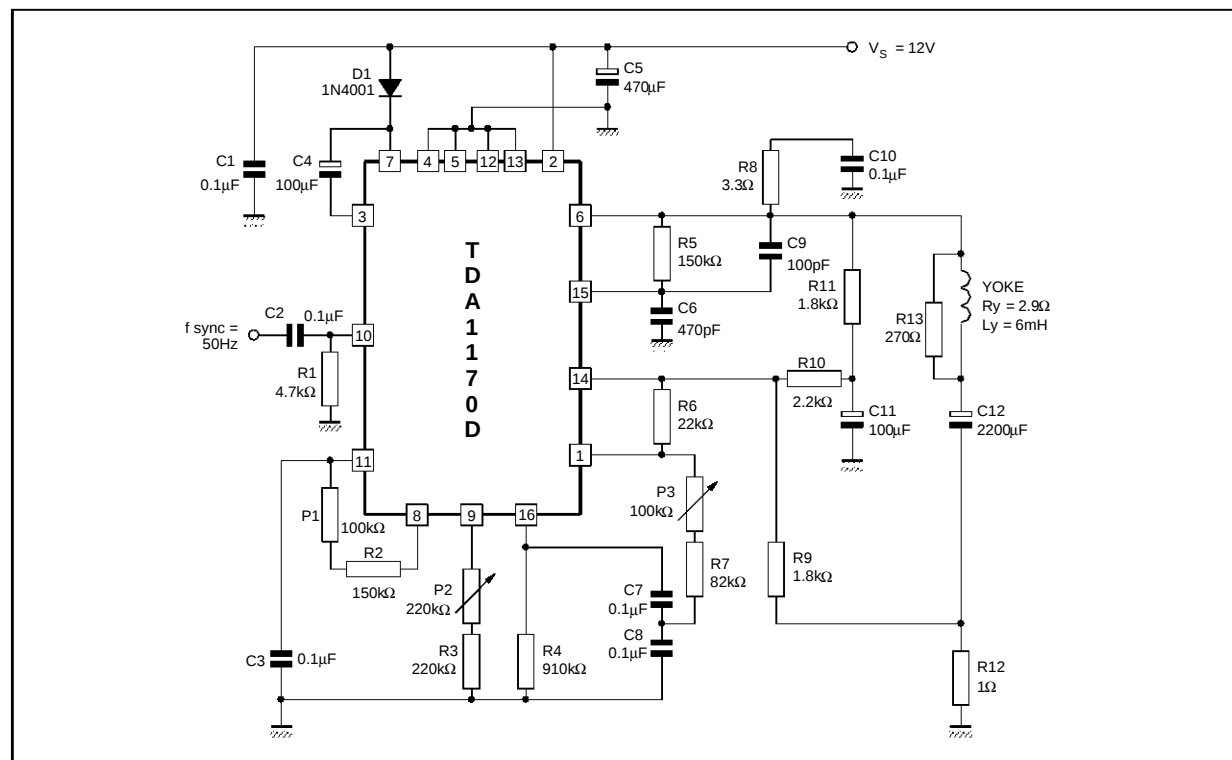
**ELECTRICAL CHARACTERISTICS**(refer to the AC test circuit,  $V_S = 22V$  ;  $f = 50Hz$  ;  $T_{amb} = 25^{\circ}C$ , unless otherwise specified)**AC CHARACTERISTICS**

| Symbol                             | Parameter                                      | Test Conditions                                                                                    | Min. | Typ.         | Max. | Unit             |
|------------------------------------|------------------------------------------------|----------------------------------------------------------------------------------------------------|------|--------------|------|------------------|
| $I_S$                              | Supply Current                                 | $I_y = 1App$                                                                                       |      | 140          |      | mA               |
| $I_{10}$                           | Sync. Input Current (positive or negative)     |                                                                                                    | 500  |              |      | $\mu A$          |
| $V_6$                              | Flyback Voltage                                | $I_y = 1App$                                                                                       |      | 45           |      | V                |
| $t_{fly}$                          | Flyback Time                                   | $I_y = App$                                                                                        |      | 0.7          |      | ms               |
| $V_{ON}$                           | Peak to Peak Output Noise                      | Pin 11 Connected to GND                                                                            |      |              | 40   | mV <sub>PP</sub> |
| $f_o$                              | Free Running Frequency                         | ( $P1 = R1$ ) = 260k $\Omega$ , $C2 = 0.1\mu F$<br>( $P1 = R1$ ) = 300k $\Omega$ , $C2 = 0.1\mu F$ |      | 48.5<br>42.2 |      | Hz<br>Hz         |
| $\Delta f$                         | Synchronization Range                          | $I_g = 0.5mA$                                                                                      | 14   |              |      | Hz               |
| $\frac{\Delta f}{\Delta V_S}$      | Frequency Drift with Supply Voltage            | $V_S = 10$ to $35V$                                                                                |      | 0.005        |      | Hz/V             |
| $\frac{\Delta f}{\Delta T_{pins}}$ | Frequency Drift vs. Pins 4, 5, 12 and 13 Temp. | $T_{pins} = 40$ to $120^{\circ}C$                                                                  |      | 0.01         |      | Hz/ $^{\circ}C$  |

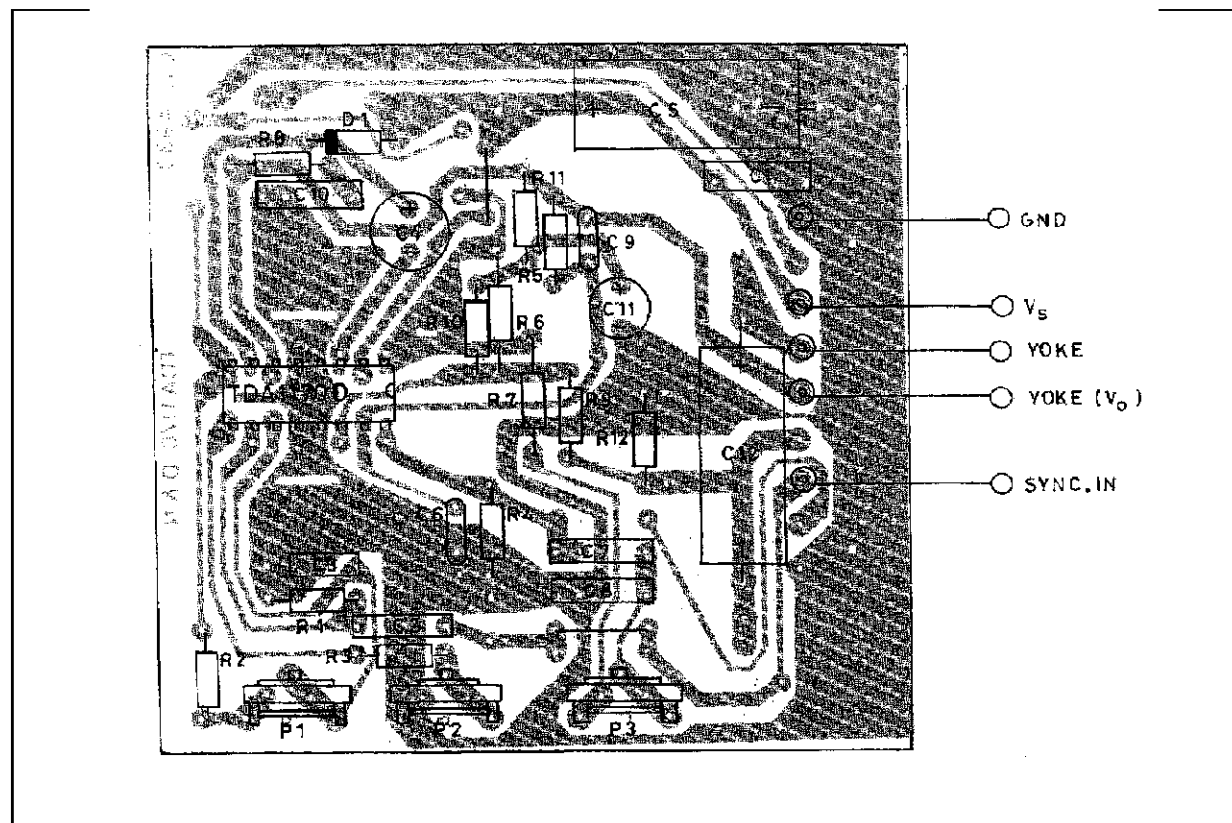
1170D-04.TBL

**Figure 2 : AC Test Circuit**

1170D-07.EPS

**Figure 3 :** Typical Application Circuit for Small Screen B/W TV SET ( $R_y = 2.9\Omega$ ,  $L_y = 6mH$ ,  $I_y = 1.1App$ )

1170D-08.EPS

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

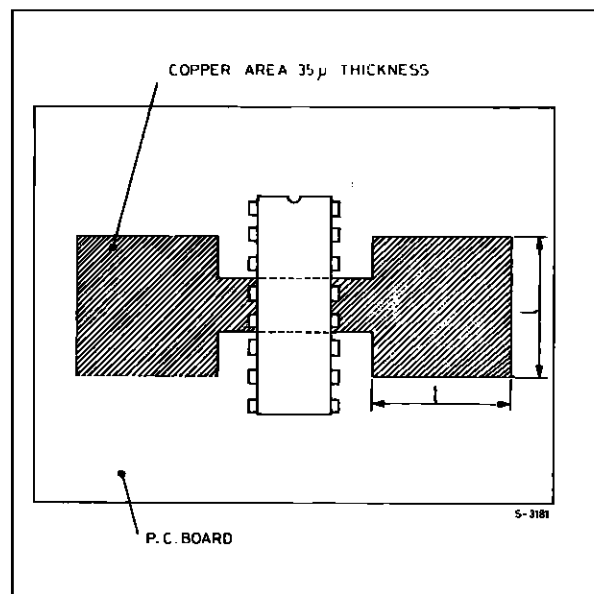
1170D-09.TIF

## MOUNTING INSTRUCTION

The  $R_{th\ j-amb}$  of the TDA 1170D can be reduced by soldering the GND pins to a suitable copper area of the printed circuit board (fig. 5) or to an external heatsink (fig. 6).

The diagram of figure 7 shows the maximum dissippable power  $P_{tot}$  and the  $R_{th\ j-amb}$  as a function of

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



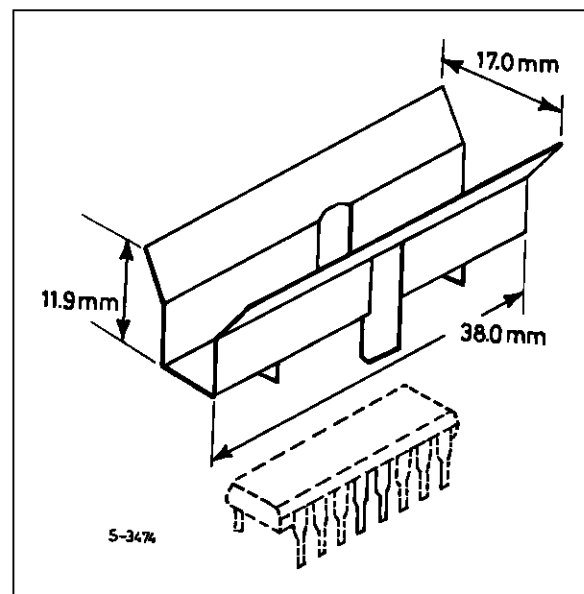
1170D-10.EPS

the side "l" of two equal square copper areas 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.

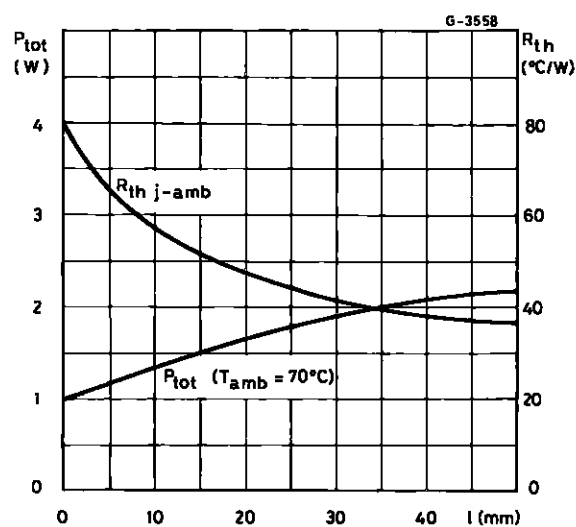
The external heatsink or printed circuit copper area must be connected to electrical ground.

**Figure 6 :** External Heatsink Mounting Example



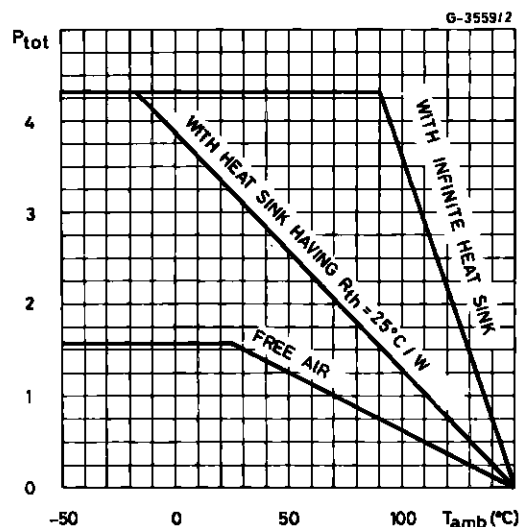
1170D-11.EPS

**Figure 7 :** Maximum Dissippable Power and Junction-Ambient Thermal Resistance versus Side "l"



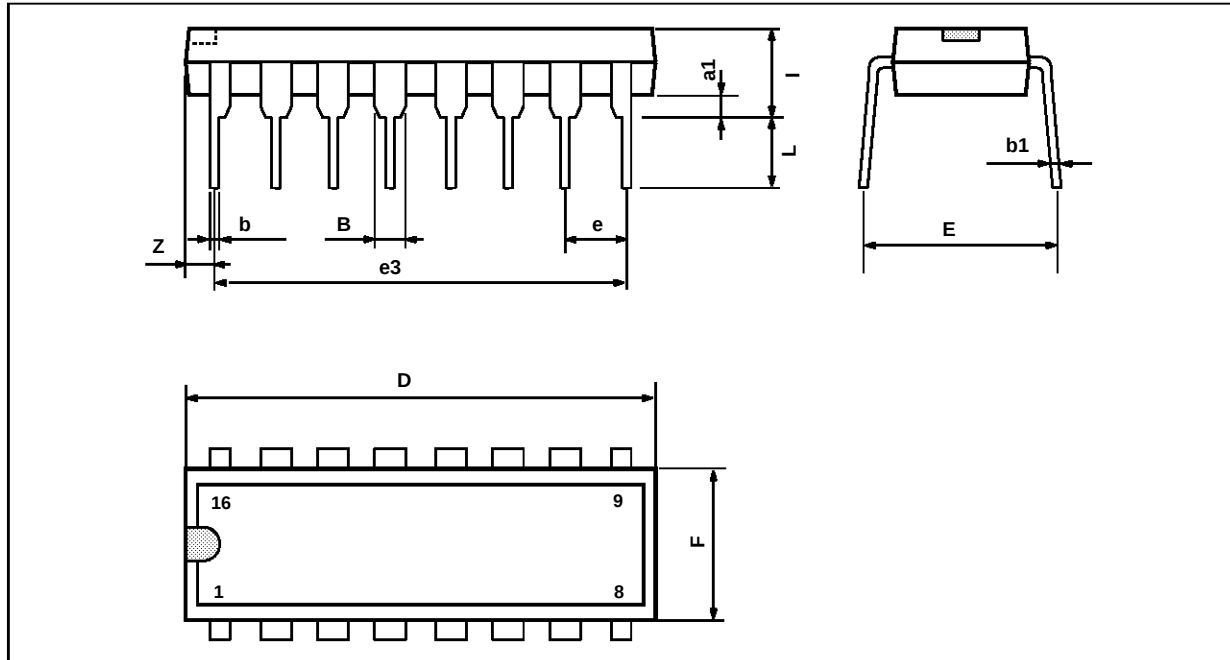
1170D-12.EPS

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



1170D-13.EPS

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



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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