

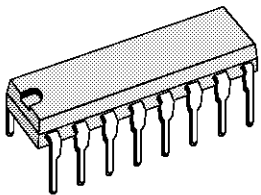
**LOW-NOISE VERTICAL DEFLECTION SYSTEM**

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

**DESCRIPTION**

The TDA1175P is a monolithic integrated circuit in POWERDIP16 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.

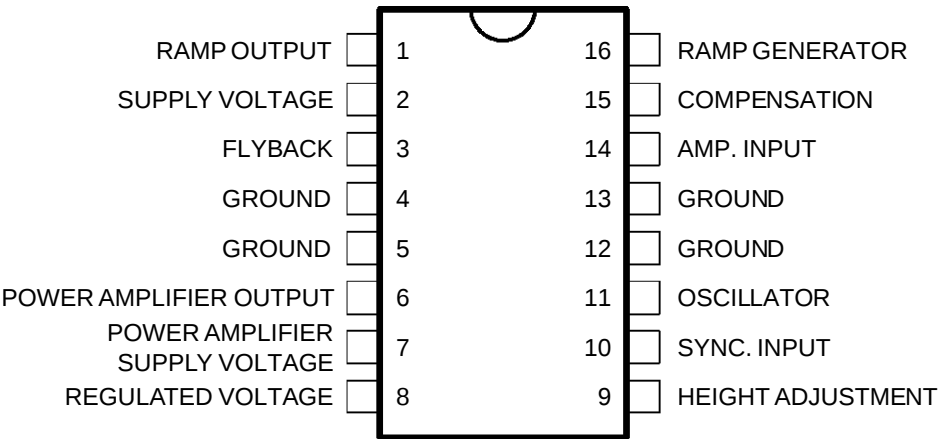
The functions incorporated are : synchronization circuit, oscillator and ramp generator, high power gain amplifier, flyback generator, voltage regulator.



**POWERDIP16**  
(Plastic Package)

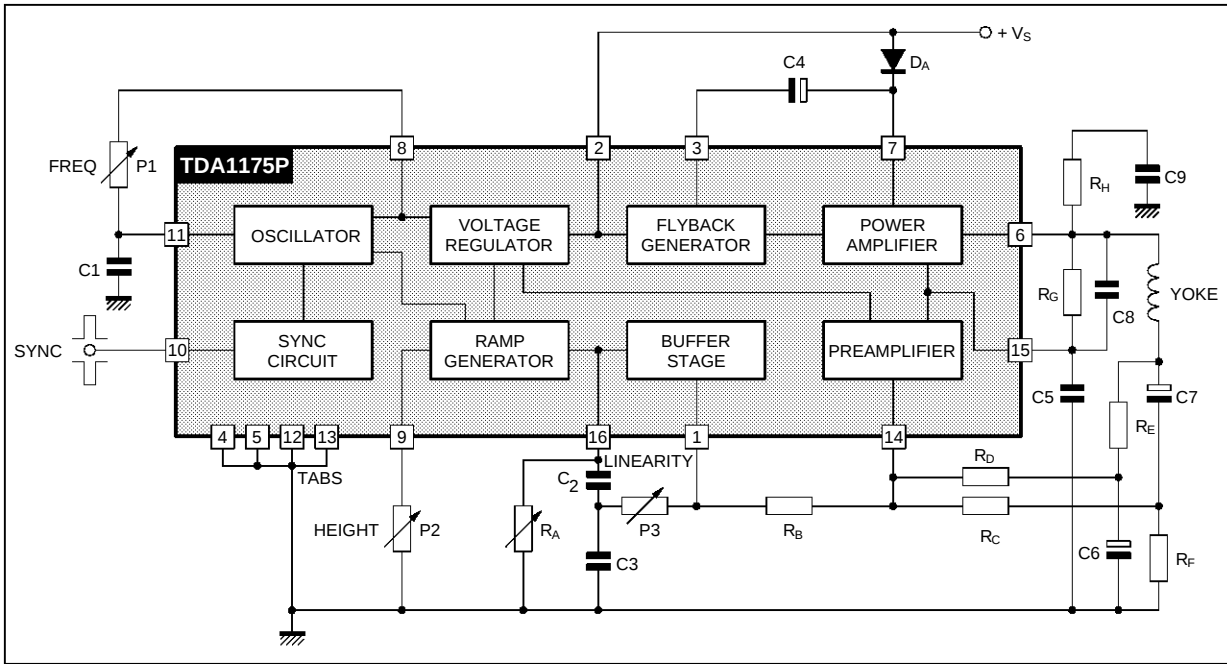
**ORDER CODE : TDA1175P**

**PIN CONNECTIONS**



1175P-01LEPS

# 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                |
| $I_o$          | Output Peak Current (non repetitive) at $t = 2\text{ms}$                                              | 2             | A                |
| $I_o$          | Output Peak Current at $f = 50\text{Hz}$ , $t \leq 10\mu\text{s}$                                     | 2.5           | A                |
| $I_o$          | Output Peak Current at $f = 50\text{Hz}$ , $t > 10\mu\text{s}$                                        | 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 $f = 50\text{Hz}$ , $t_{fly} \leq 1.5\text{ms}$                | 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) (1) | 4.3<br>1      | W<br>W           |
| $T_{stg}, T_j$ | Storage and Junction Temperature                                                                      | - 40, + 150   | $^\circ\text{C}$ |

# THERMAL DATA

| Symbol          | Parameter                                | Value | Unit                     |
|-----------------|------------------------------------------|-------|--------------------------|
| $R_{th(j-tab)}$ | Thermal Resistance Junction-pin Max.     | 12    | $^\circ\text{C/W}$       |
| $R_{th(j-amb)}$ | Thermal Resistance Junction-ambient Max. | 80    | $^\circ\text{C/W}^{(1)}$ |

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

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| Symbol                                                                | Parameter                                   | Test Conditions                                                                                                                                  | Min.       | Typ.       | Max.       | Unit          | Fig.     |
|-----------------------------------------------------------------------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|---------------|----------|
| DC CHARACTERISTICS (Refer to the test circuits, $V_S = 35\text{V}$ )  |                                             |                                                                                                                                                  |            |            |            |               |          |
| $I_2$                                                                 | 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                     | $V_{11} = 1\text{V}$                                                                                                                             |            | 0.1        | 1          | $\mu\text{A}$ | 1a       |
| $-I_{14}$                                                             | Amplifier Input Bias Current                | $V_{14} = 1\text{V}$                                                                                                                             |            | 1          | 10         | $\mu\text{A}$ | 1b       |
| $-I_{16}$                                                             | Ramp Generator Bias Current                 | $V_{16} = 0$                                                                                                                                     |            | 0.02       | 0.3        | $\mu\text{A}$ | 1a       |
| $-I_{16}$                                                             | Ramp Generator Current                      | $I_9 = 20\mu\text{A}$ , $V_{16} = 0$                                                                                                             | 18.5       | 20         | 21.5       | $\mu\text{A}$ | 1b       |
| $\frac{\Delta I_{16}}{I_{16}}$                                        | Ramp Generator Non-linearity                | $\Delta V_{16} = 0$ to $12\text{V}$ , $I_9 = 20\mu\text{A}$                                                                                      |            | 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          | $I_3 = 10\text{mA}$                                                                                                                              |            | 1.5        | 2.5        | V             | 1a       |
| $V_6$                                                                 | Quiescent output Voltage                    | $V_S = 10\text{V}$ , $R_1 = 1\text{k}\Omega$ , $R_2 = 1\text{k}\Omega$<br>$V_S = 35\text{V}$ , $R_1 = 3\text{k}\Omega$ , $R_2 = 1\text{k}\Omega$ | 4.1<br>8.2 | 4.4<br>8.8 | 4.7<br>9.4 | V<br>V        | 1a<br>1a |
| $V_{6L}$                                                              | Output Saturation Voltage to Ground         | $-I_6 = 0.1\text{A}$<br>$-I_6 = 0.8\text{A}$                                                                                                     |            | 0.9<br>1.8 | 1.2<br>2.2 | V<br>V        | 1c<br>1c |
| $V_{6H}$                                                              | Output Saturation Voltage to Supply         | $I_6 = 0.1\text{A}$<br>$I_6 = 0.8\text{A}$                                                                                                       |            | 1.4<br>2.8 | 2.1<br>3.1 | V<br>V        | 1d<br>1d |
| $V_8$                                                                 | Regulated Voltage at Pin 8                  |                                                                                                                                                  | 6.5        | 6.7        | 6.9        | V             | 1b       |
| $V_9$                                                                 | Regulated Voltage at Pin 9                  | $I_9 = 20\mu\text{A}$                                                                                                                            | 6.6        | 6.8        | 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 $35\text{V}$                                                                                                                |            | 1          | 2          | mV/V          | 1b       |
| $V_{14}$                                                              | Amplifier Input Reference Voltage           | $V_{10} \leq 0.4\text{V}$                                                                                                                        | 2.20       | 2.27       | 2.35       | V             |          |

AC CHARACTERISTICS (Refer to the AC test circuit,  $V_S = 22\text{V}$ ,  $f = 50\text{Hz}$ )

|                                    |                                            |                                                                                  |     |       |     |                        |   |
|------------------------------------|--------------------------------------------|----------------------------------------------------------------------------------|-----|-------|-----|------------------------|---|
| $I_S$                              | Supply Current                             | $I_Y = 1\text{A}_{PP}$                                                           |     | 140   |     | mA                     | 2 |
| $I_{10}$                           | Sync. Input Current (positive or negative) |                                                                                  | 0.5 |       | 2   | mA                     | 2 |
| $V_6$                              | Flyback Voltage                            | $I_Y = 1\text{A}_{PP}$                                                           |     | 45    |     | V                      | 2 |
| $t_{fly}$                          | Flyback Time                               | $I_Y = 1\text{A}_{PP}$                                                           |     | 0.7   |     | ms                     | 2 |
| $V_{ON}$                           | Peak to Peak Output Noise                  | Pin 11 Connected to GND                                                          |     | 18    | 30  | mVpp                   | 2 |
| $f_0$                              | Free Running Frequency                     | $(P1 + R1) = 300\text{k}\Omega$<br>$C9 = 0.1\mu\text{F}$                         | 36  | 43.5  |     | Hz                     | 2 |
| $f_{OPER}$                         | Operating Frequency Range                  |                                                                                  | 10  |       | 120 | Hz                     | 2 |
| $\Delta f$                         | Synchronization Range                      | $I_{10} = 0.5\text{mA}$ , $C9 = 0.1\mu\text{F}$<br>$(P1+R1) = 300\text{k}\Omega$ | 14  |       |     | Hz                     | 2 |
| $\frac{\Delta f}{\Delta V_S}$      | Frequency Drift with Supply Voltage        | $V_S = 10$ to $35\text{V}$                                                       |     | 0.005 |     | Hz/V                   | 2 |
| $\frac{ \Delta f }{\Delta T_{ab}}$ | Frequency Drift with tab Temperature       | $T_{tab} = 40$ to $120^{\circ}\text{C}$                                          |     | 0.01  |     | Hz/ $^{\circ}\text{C}$ | 2 |

1175P-03.TBL

Figure 1 : DC Test Circuits

Figure 1a

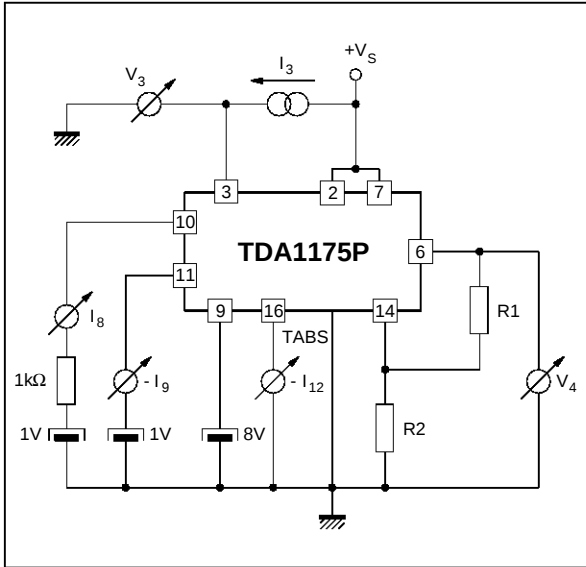


Figure 1b

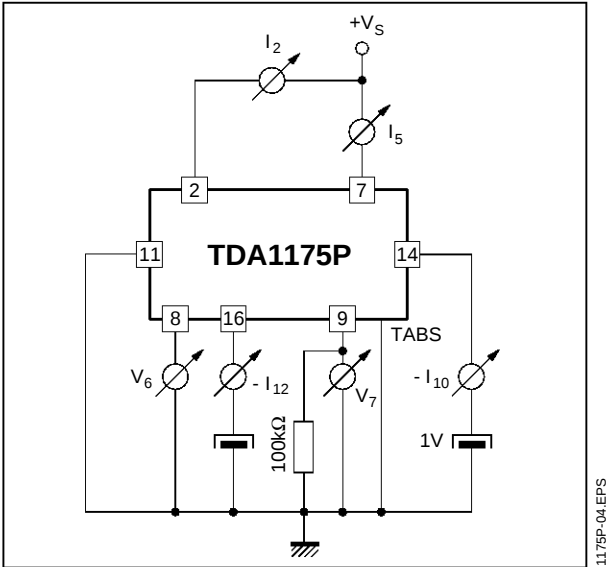


Figure 1c

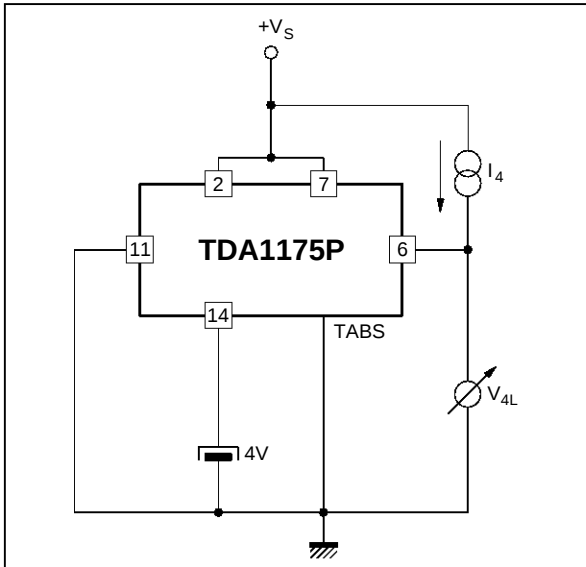


Figure 1d

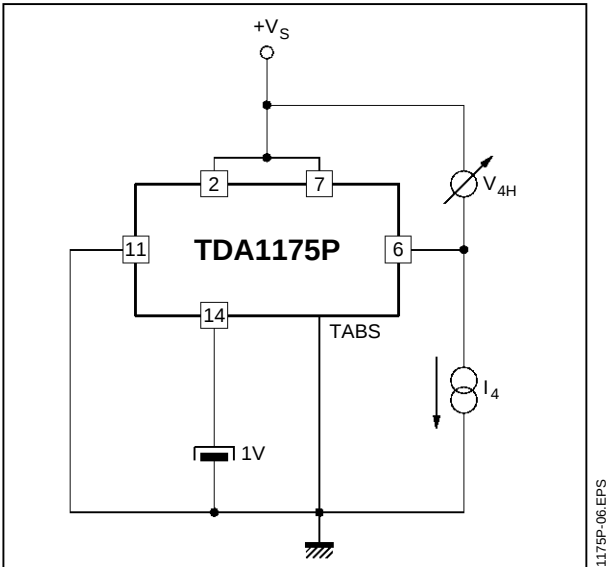
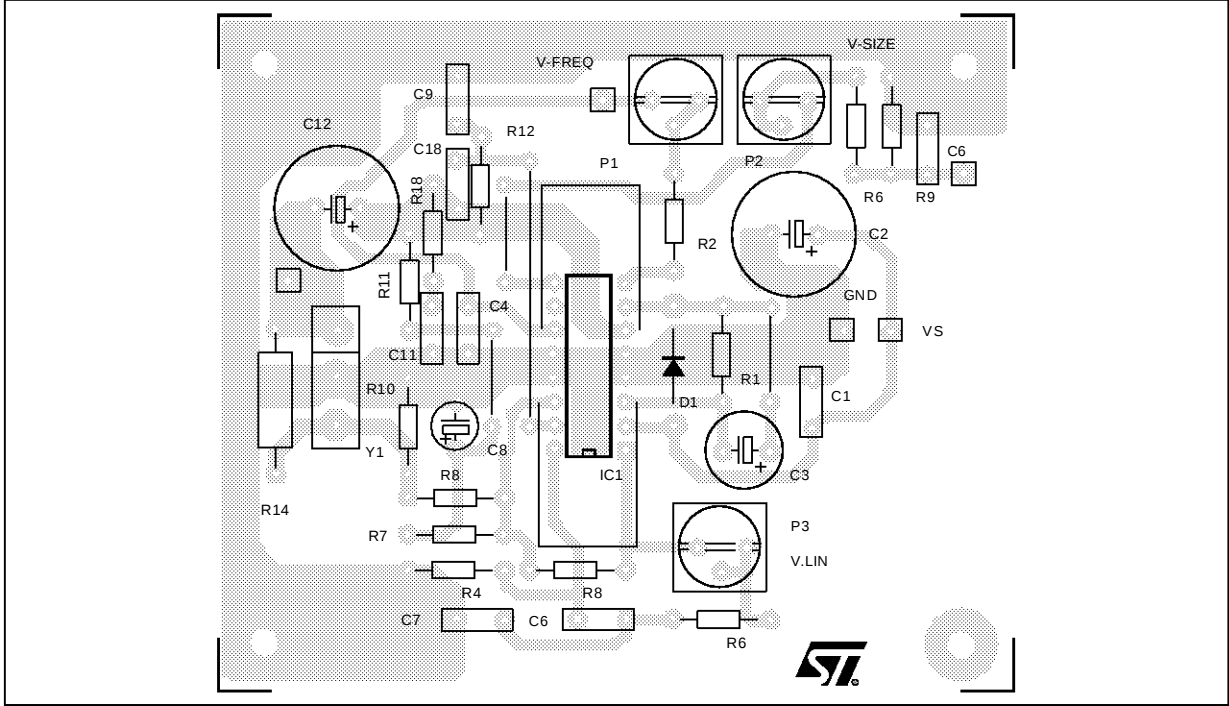




Figure 4 : P.C. Board and Components Layout of the Circuit of Figure 3 (1:1 scale)



BILL OF MATERIAL

| Item | Qty | Reference       | Part       |
|------|-----|-----------------|------------|
| 1    | 4   | C1, C6, C7, C11 | 0.1μF      |
| 2    | 1   | C2              | 1000μF 35V |
| 3    | 1   | C3              | 100μF 35V  |
| 4    | 1   | C4              | 0.15μF     |
| 5    | 1   | C5              | 1.8nF      |
| 6    | 1   | C8              | 22μF 35V   |
| 7    | 1   | C9              | 3.3nF      |
| 8    | 1   | C10             | 560pF      |
| 9    | 1   | C12             | 470μF 50V  |
| 10   | 1   | D1              | 1N4007     |
| 11   | 1   | IC1             | TDA1175P   |
| 12   | 1   | P1              | 100kΩ POT  |
| 13   | 1   | P2              | 220kΩ POT  |
| 14   | 1   | P3              | 50kΩPOT    |
| 15   | 1   | R1              | 3.3kΩ      |

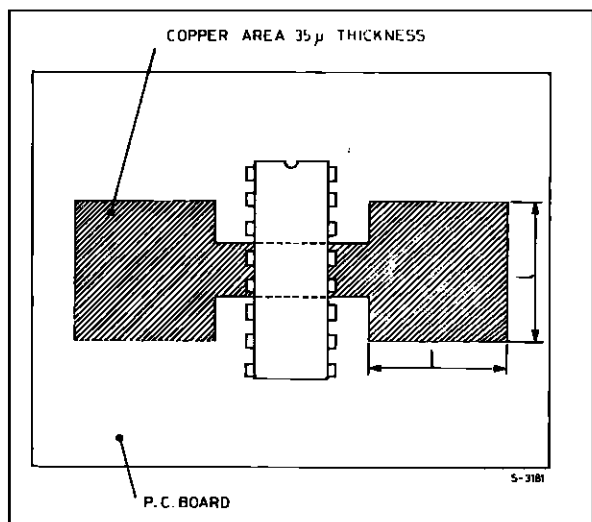
| Item | Qty | Reference | Part      |
|------|-----|-----------|-----------|
| 16   | 1   | R2        | 82kΩ      |
| 17   | 1   | R3        | 240kΩ     |
| 18   | 1   | R4        | 1MΩ       |
| 19   | 1   | R5        | 200kΩ     |
| 20   | 1   | R6        | 56kΩ      |
| 21   | 1   | R7        | 27kΩ      |
| 22   | 1   | R8        | 47kΩ      |
| 23   | 1   | R9        | 5.1kΩ     |
| 24   | 1   | R10       | 0.82Ω     |
| 25   | 1   | R11       | 2.7kΩ     |
| 26   | 1   | R12       | 220kΩ     |
| 27   | 1   | R13       | 3.3Ω      |
| 28   | 1   | R14       | 220Ω 1/2W |
| 29   | 1   | Y1        | YOKE      |

## MOUNTING INSTRUCTION

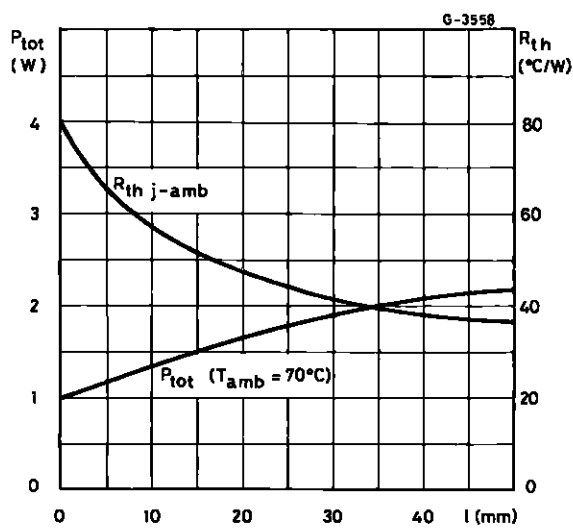
The  $R_{th(j-a)}$  can be reduced by soldering the GND pins to a suitable copper area of the printed circuit board (Figure 5) or to an external heatsink (Figure 6).

The diagram of Figure 7 shows the maximum dissippable power  $P_{tot}$  and the  $R_{th(j-a)}$  as a function of the side "l" of two equal square copper areas

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



**Figure 7 :** Maximum Power Dissipation and Junction-ambient Thermal Resistance versus "l"

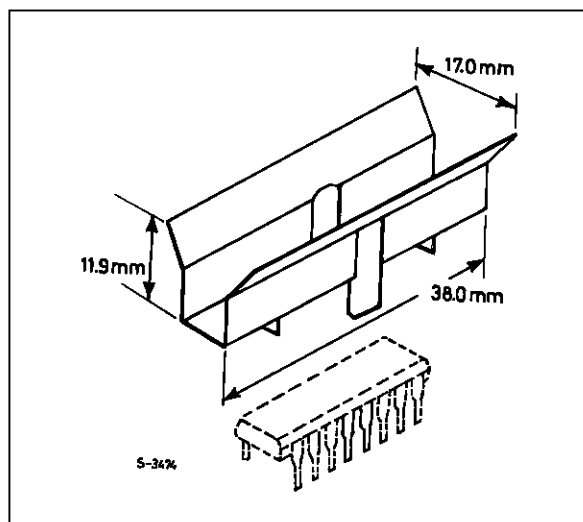


having a thickness of  $35\mu$  (1.4 mils).

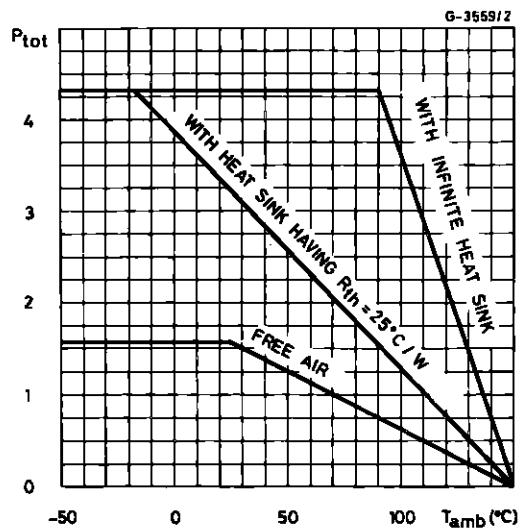
During soldering the pins temperature must not exceed  $260^{\circ}\text{C}$  and the soldering time must not be longer than 12 seconds.

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

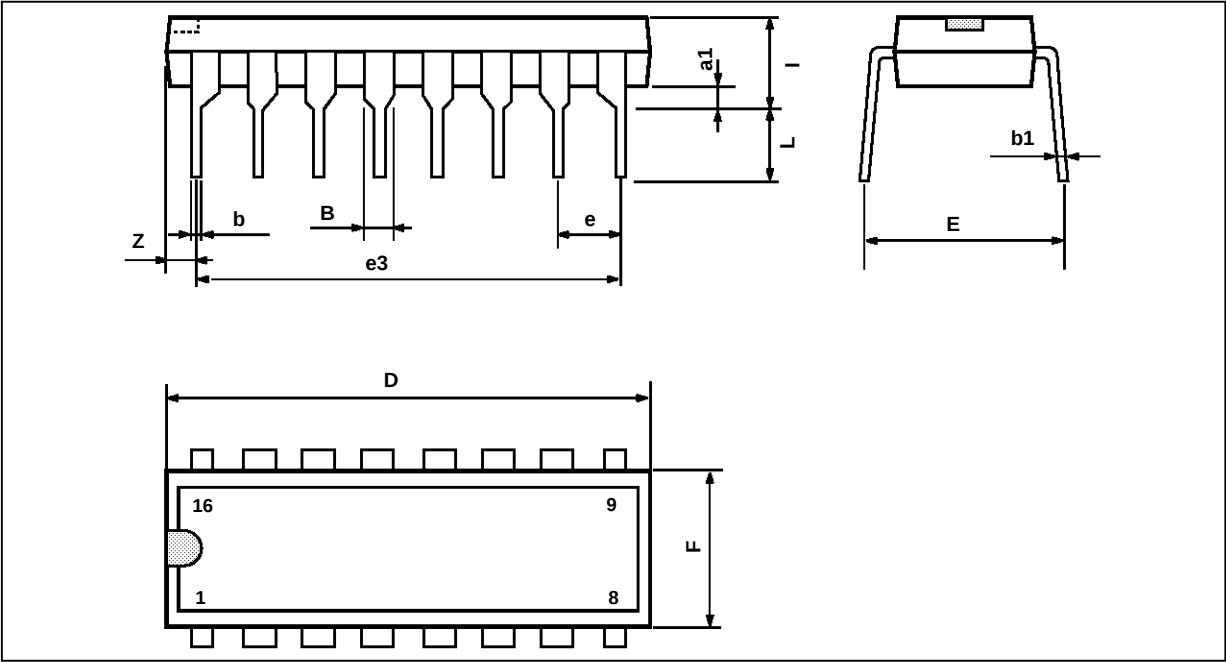
**Figure 6 :** External Heatsink Mounting Example



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



PACKAGE MECHANICAL DATA  
16 PINS - PLASTIC POWERDIP



| Dimensions | Millimeters |       |      | Inches |       |       |
|------------|-------------|-------|------|--------|-------|-------|
|            | Min.        | Typ.  | Max. | Min.   | Typ.  | Max.  |
| a1         | 0.51        |       |      | 0.020  |       |       |
| B          | 0.85        |       | 1.4  | 0.033  |       | 0.055 |
| b          |             | 0.5   |      |        | 0.020 |       |
| b1         | 0.38        |       | 0.5  | 0.015  |       | 0.020 |
| D          |             |       | 20   |        |       | 0.787 |
| E          |             | 8.8   |      |        | 0.346 |       |
| 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 |

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