



## LOW-NOISE VERTICAL DEFLECTION SYSTEM

### FEATURES SUMMARY

- 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.

Figure 1. Package

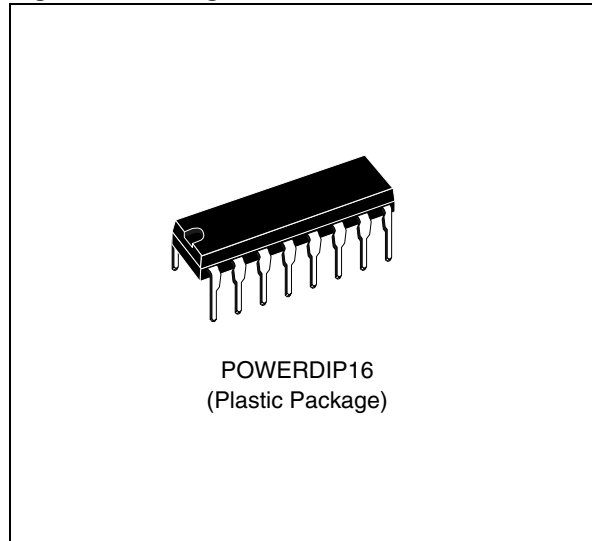
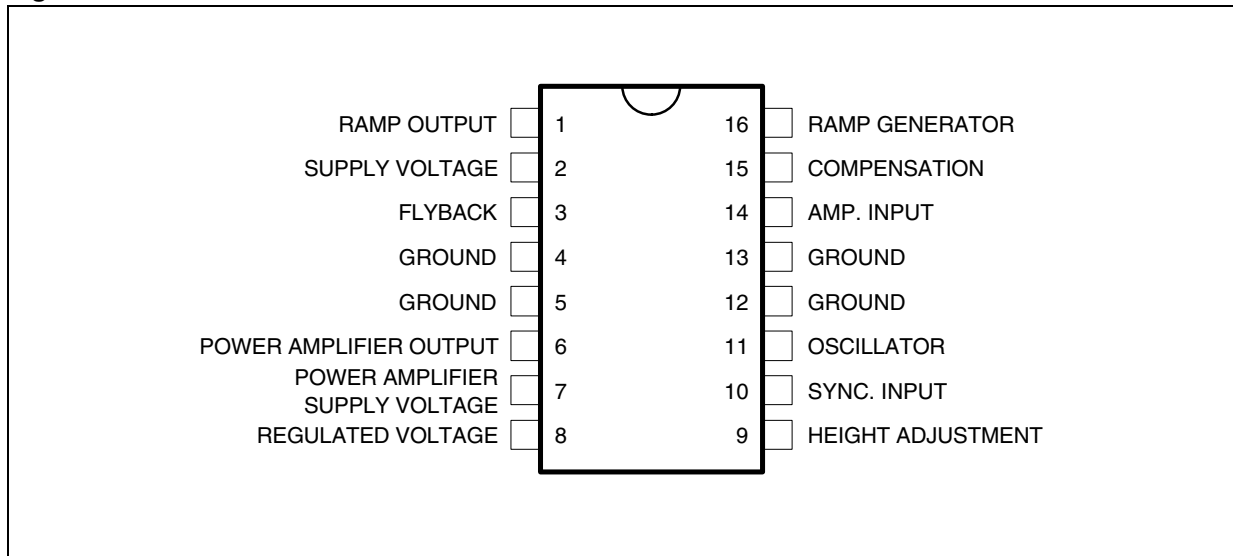
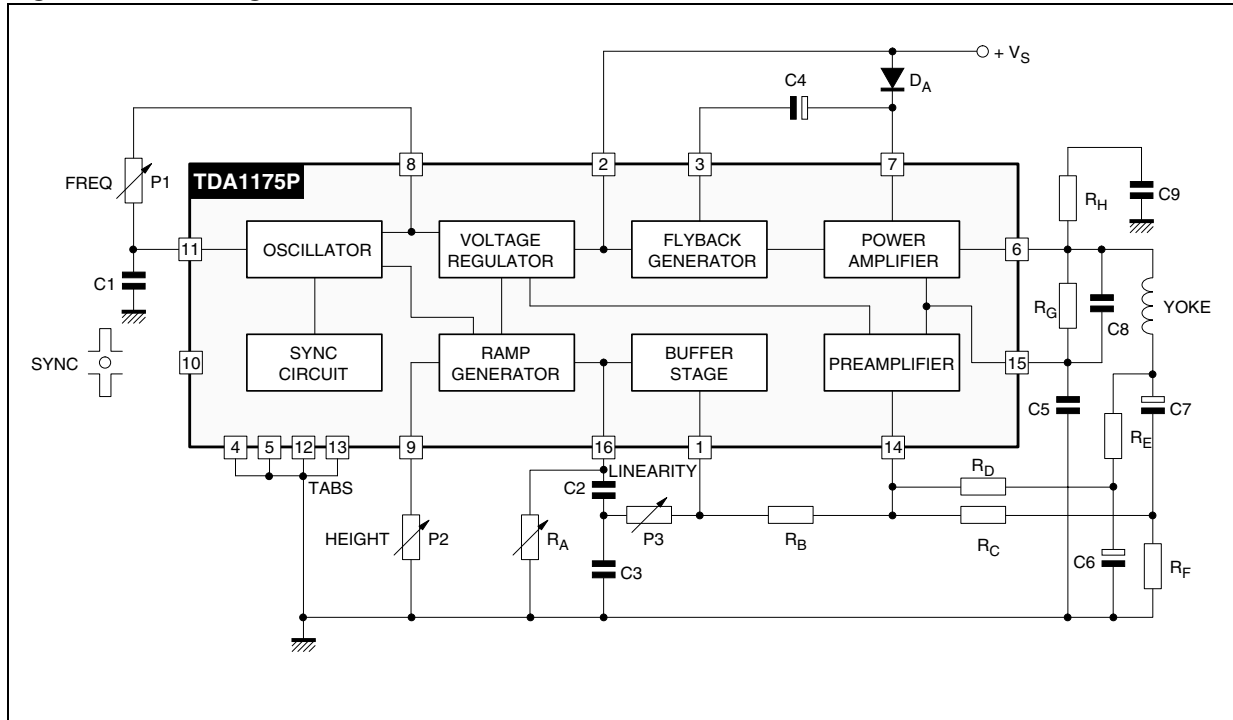


Figure 2. Pin Connections



# TDA1175P

**Figure 3. Block Diagram**



**Table 1. 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 - 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 $T_{tab} = 90^\circ\text{C}$	4.3	W
	Power Dissipation at $T_{amb} = 70^\circ\text{C}$ (free air) (1)	1	W
$T_{STG}, T_j$	Storage and Junction Temperature	- 40 to 150	$^\circ\text{C}$

**Table 2. 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	$^\circ\text{C/W}^{(1)}$

Note: 1. Obtained with tabs soldered to printed circuit with minimized copper area.

**ELECTRICAL CHARACTERISTICS**(T<sub>amb</sub> = 25°C, unless otherwise specified)**Table 3. DC CHARACTERISTICS**(Refer to the test circuits, V<sub>S</sub> = 35V)

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	5
I <sub>7</sub>	Pin 7 Quiescent Current	I <sub>6</sub> = 0		8	17	mA	5
-I <sub>11</sub>	Oscillator Bias Current	V <sub>11</sub> = 1V		0.1	1	μA	4
-I <sub>14</sub>	Amplifier Input Bias Current	V <sub>14</sub> = 1V		1	10	μA	5
-I <sub>16</sub>	Ramp Generator Bias Current	V <sub>16</sub> = 0		0.02	0.3	μA	4
-I <sub>16</sub>	Ramp Generator Current	I <sub>9</sub> = 20μA, V <sub>16</sub> = 0	18.5	20	21.5	μA	5
$\frac{\Delta I_{16}}{I_{16}}$	Ramp Generator Non-linearity	ΔV <sub>16</sub> = 0 to 12V, I <sub>9</sub> = 20μA		0.2	1	%	5
V <sub>S</sub>	Supply Voltage Range		10		35	V	
V <sub>1</sub>	Pin 1 Saturation Voltage to Ground	I <sub>1</sub> = 1mA		1	14	V	
V <sub>3</sub>	Pin 3 Saturation Voltage to Ground	I <sub>3</sub> = 10mA		1.5	2.5	V	4
V <sub>6</sub>	Quiescent output Voltage	V <sub>s</sub> = 10V, R1 = 1kΩ, R2 = 1kΩ V <sub>s</sub> = 35V, R1 = 3kΩ, R2 = 1kΩ	4.1 8.2	4.4 8.8	4.7 9.4	V V	4 4
V <sub>6L</sub>	Output Saturation Voltage to Ground	- I <sub>6</sub> = 0.1A - I <sub>6</sub> = 0.8A		0.9 1.8	1.2 2.2	V V	6 6
V <sub>6H</sub>	Output Saturation Voltage to Supply	I <sub>6</sub> = 0.1A I <sub>6</sub> = 0.8A		1.4 2.8	2.1 3.1	V V	7 7
V <sub>8</sub>	Regulated Voltage at Pin 8		6.5	6.7	6.9	V	5
V <sub>9</sub>	Regulated Voltage at Pin 9	I <sub>9</sub> = 20μA	6.6	6.8	7	V	5
$\frac{ \Delta V_8 }{\Delta V_S} \quad \frac{ \Delta V_9 }{\Delta V_S}$	Regulated Voltage Drift with Supply Voltage	ΔV <sub>s</sub> = 10 to 35V		1	2	mV/V	5
V <sub>14</sub>	Amplifier Input Reference Voltage	V <sub>10</sub> ≤ 0.4V	2.20	2.27	2.35	V	

**Table 4. AC CHARACTERISTICS**(Refer to the AC test circuit,  $V_S = 22V$ ,  $f = 50Hz$ )

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit	Fig.
$I_S$	Supply Current	$I_Y = 1_{APP}$		140		mA	8
$I_{10}$	Sync. Input Current (positive or negative)		0.5		2	mA	8
$V_6$	Flyback Voltage	$I_Y = 1_{APP}$		45		V	8
$t_{fly}$	Flyback Time	$I_Y = 1_{APP}$		0.7		ms	8
$V_{ON}$	Peak to Peak Output Noise	Pin 11 Connected to GND		18	30	mV <sub>pp</sub>	8
$f_0$	Free Running Frequency	$(P1 + R1) = 300k\Omega$ $C9 = 0.1 \mu F$	36	43.5		Hz	8
$f_{OPER}$	Operating Frequency Range		10		120	Hz	8
$\Delta f$	Synchronization Range	$I_{10} = 0.5mA$ , $C9 = 0.1\mu F$ $(P1+R1) = 300k\Omega$	14			Hz	8
$\frac{\Delta f}{\Delta V_S}$	Frequency Drift with Supply Voltage	$V_S = 10$ to $35V$		0.00 5		Hz/V	8
$\frac{ \Delta f }{\Delta T_{ab}}$	Frequency Drift with tab Temperature	$T_{tab} = 40$ to $120^\circ C$		0.01		Hz/ $^\circ C$	8

DC TEST CIRCUITS

Figure 4.

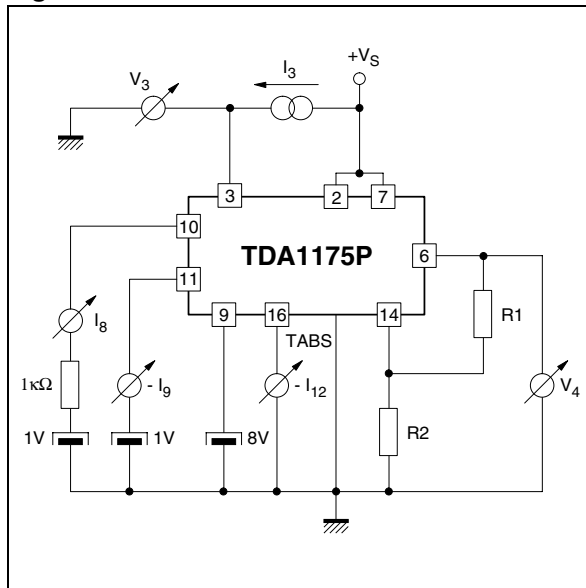


Figure 6.

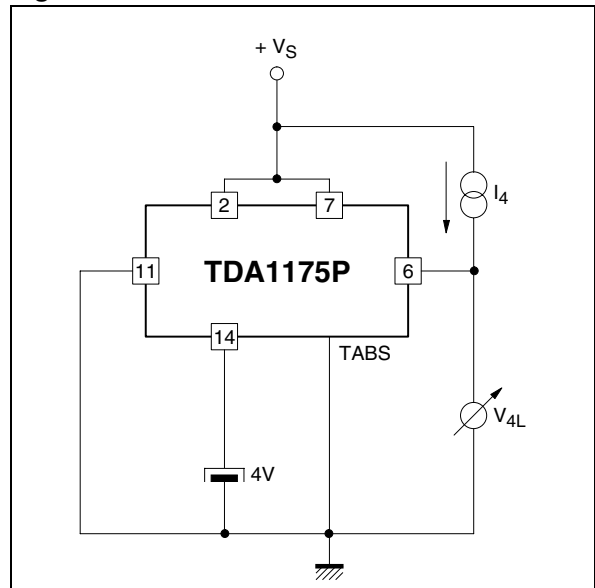


Figure 5.

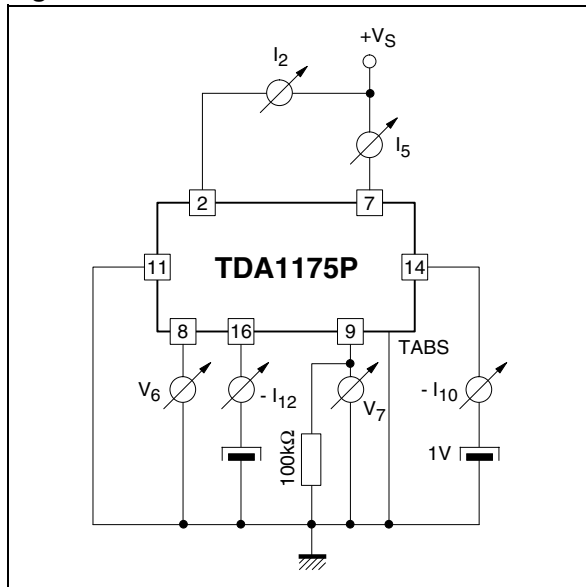
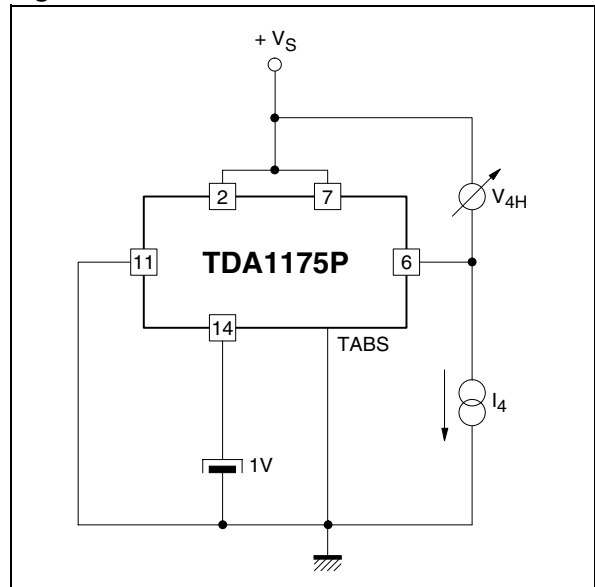


Figure 7.



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Figure 8. AC Test and Application Circuit for Large Screen B/W TV Set 10Ω/20mH/1A<sub>pp</sub>

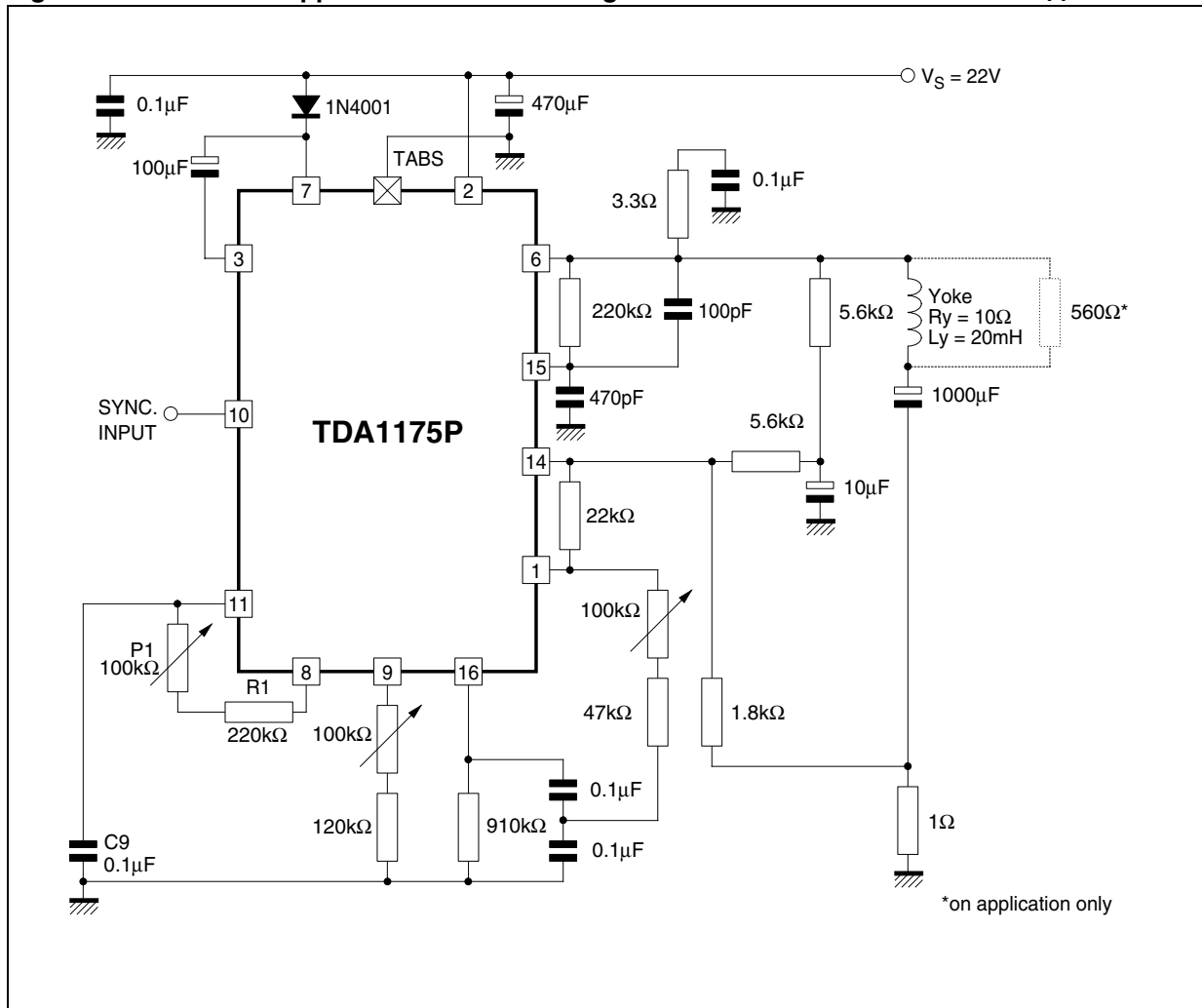


Figure 9. Typical Application Circuit for VGA Monitor ( $R_y = 10\Omega$ ,  $L_y = 20mH$ ,  $I_y = 0.8A_{pp}$ )

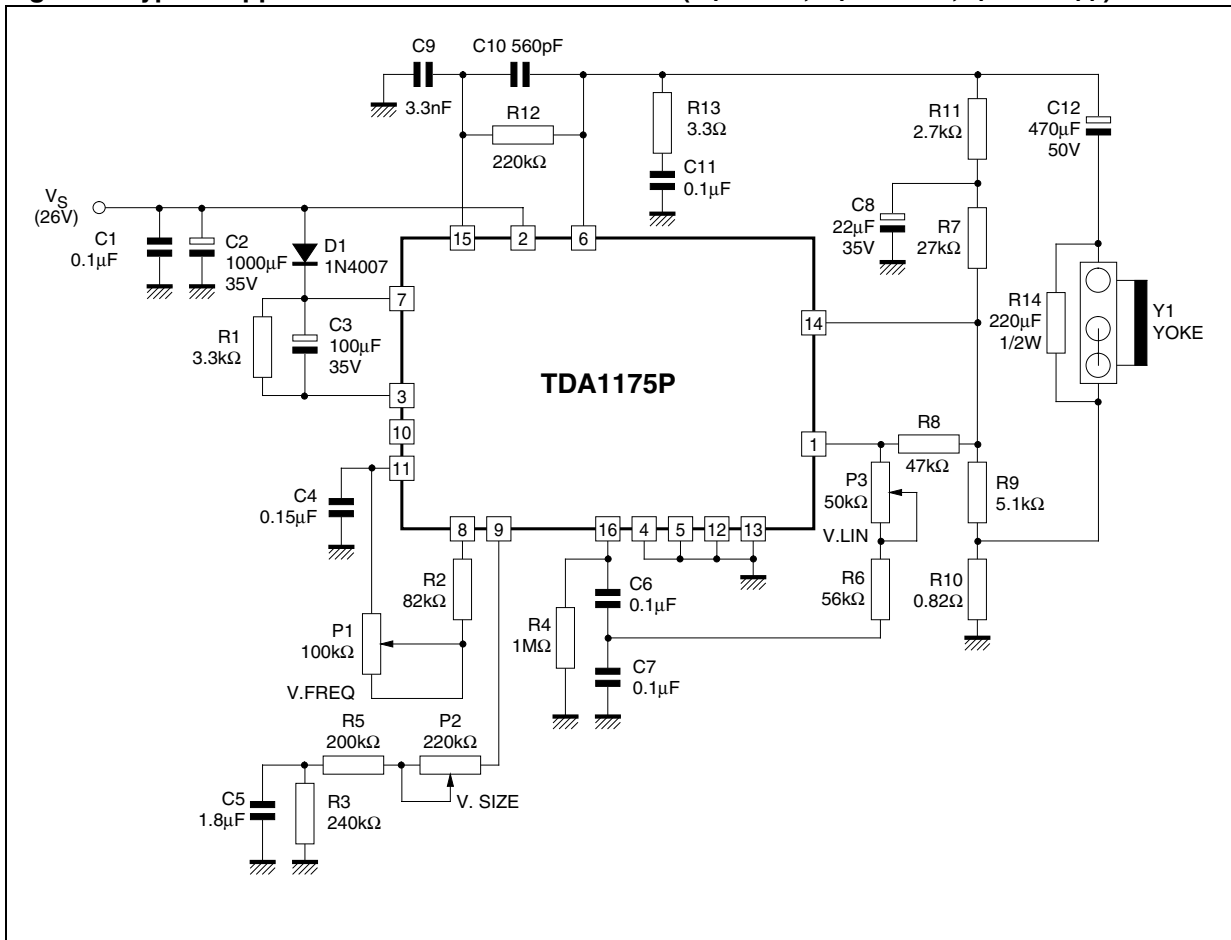


Figure 10. P.C. Board and Components Layout of the Circuit of Figure 9 (1:1 scale)

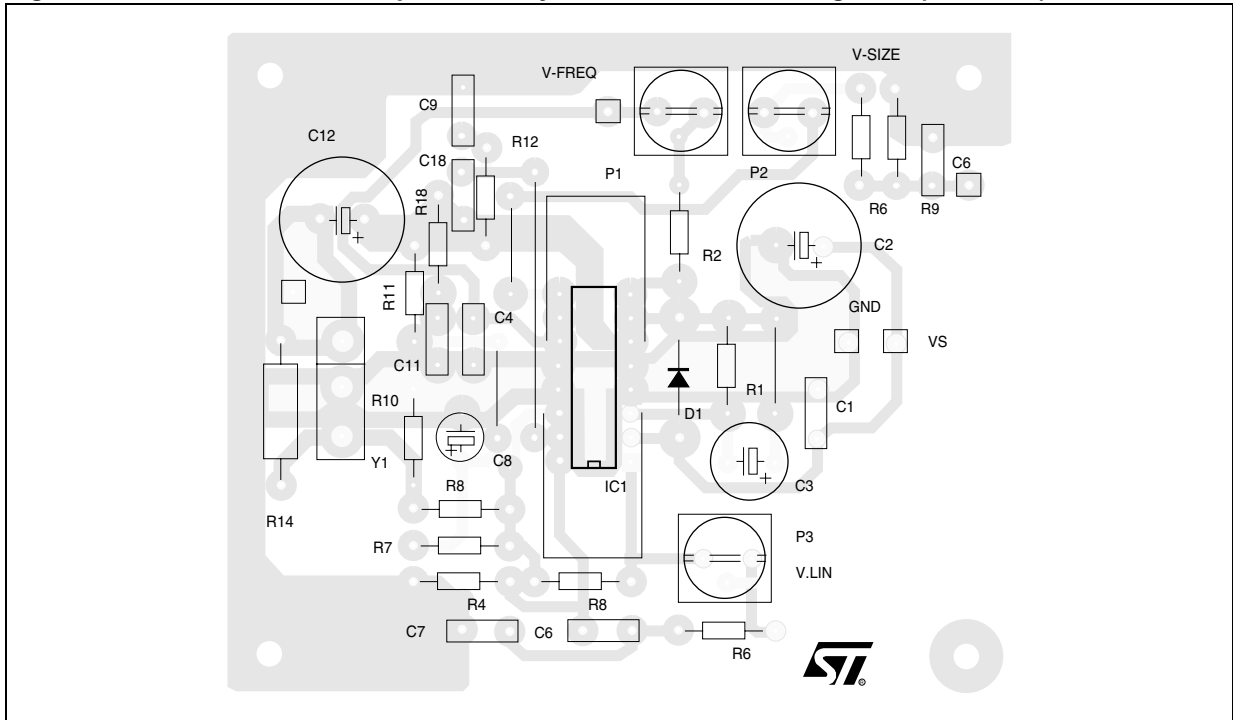


Table 5. Bill of Material

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

Item	Qty	Reference	Part
15	1	R1	3.3kΩ
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**

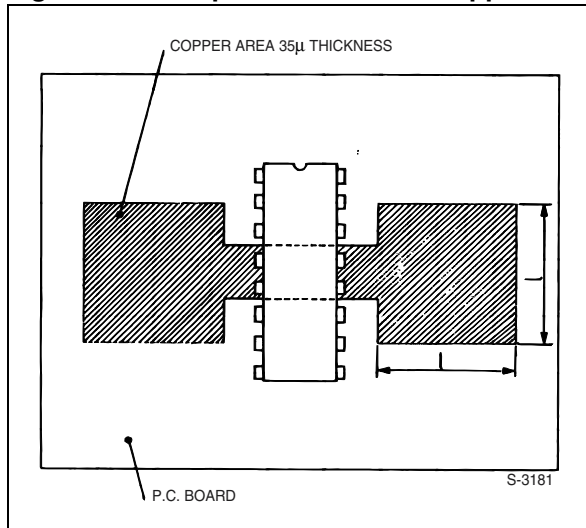
The  $R_{th(j-a)}$  can be reduced by soldering the GND pins to a suitable copper area of the printed circuit board (Figure 11) or to an external heatsink (Figure 12).

The diagram of Figure 13 shows the maximum dissipable power  $P_{tot}$  and the  $R_{th(j-a)}$  as a function of the side "l" of two equal square copper areas having a thickness of  $35\mu$  (1.4 mils).

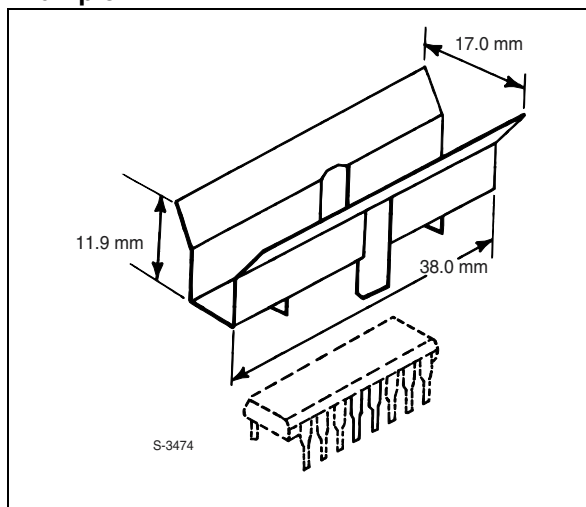
During soldering the pins temperature must not exceed  $260^{\circ}\text{C}$  and the soldering time must not be longer than 12 seconds.

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

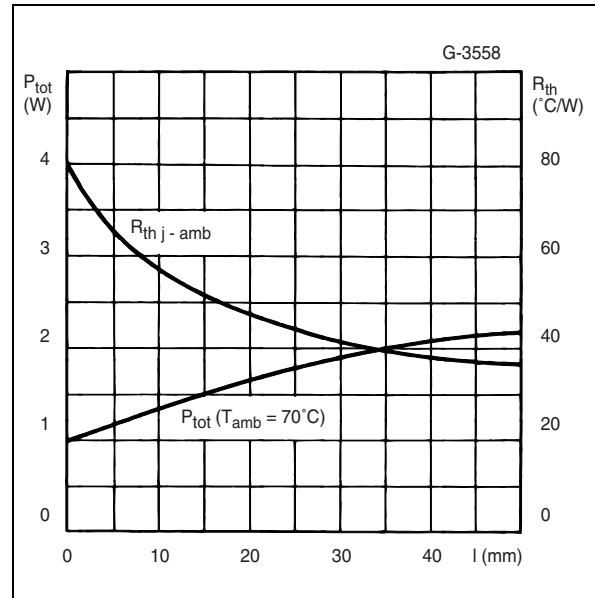
**Figure 11. Example of P.C. Board Copper Area**



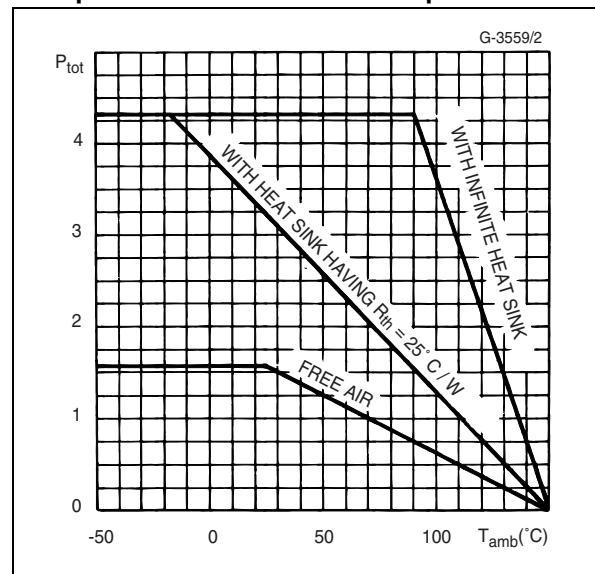
**Figure 12. External Heatsink Mounting Example**



**Figure 13. Maximum Power Dissipation and Junction-ambient Thermal Resistance versus "l"**



**Figure 14. Maximum Allowable Power Dissipation versus Ambient Temperature**



## TDA1175P

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### PART NUMBERING

**Table 6. Order Codes**

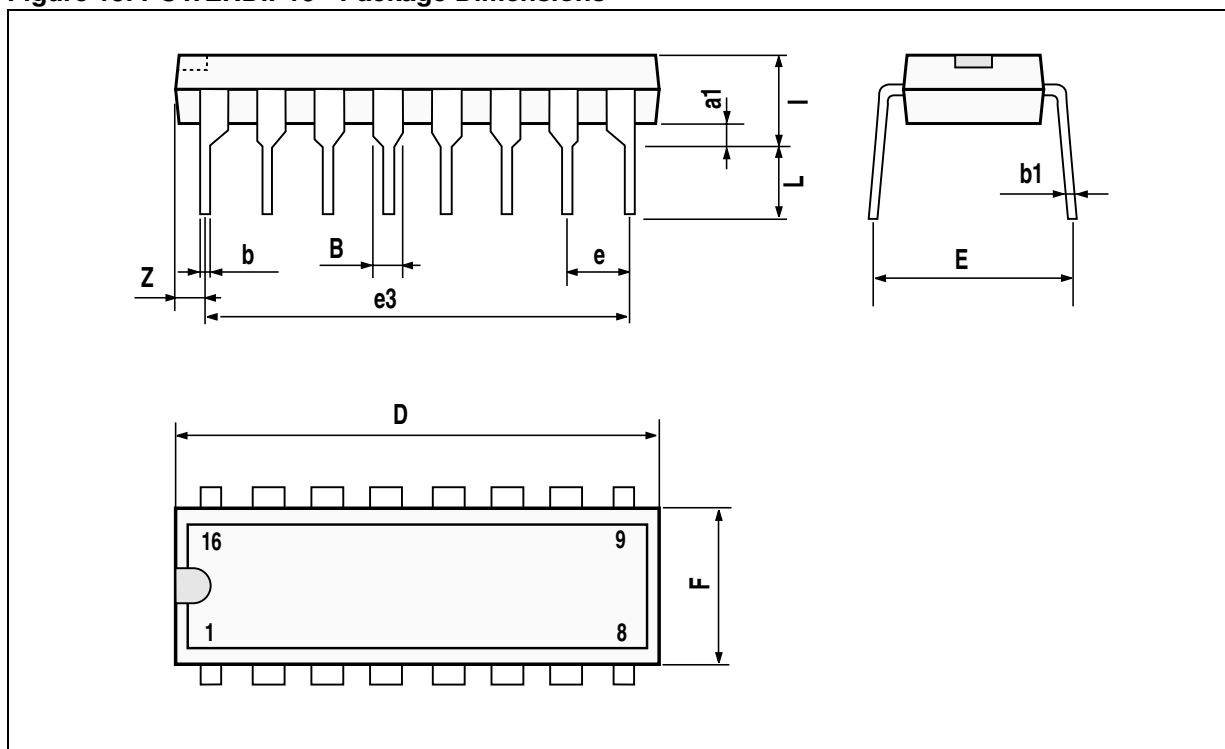
Part Number	Package	Temperature Range
TDA1175P	POWERDIP16	-25 to 85 °C

## PACKAGE MECHANICAL

Table 7. POWERDIP16 - Mechanical Data

Symbol	millimeters			inches		
	Typ	Min	Max	Typ	Min	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

Figure 15. POWERDIP16 - Package Dimensions



Note: Drawing is not to scale

**REVISION HISTORY**

**Table 8. Revision History**

Date	Revision	Description of Changes
August-1995	1	First Issue
14-Apr-2004	2	Stylesheet update. No content change.

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