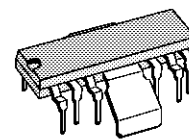


**TV VERTICAL DEFLECTION**

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



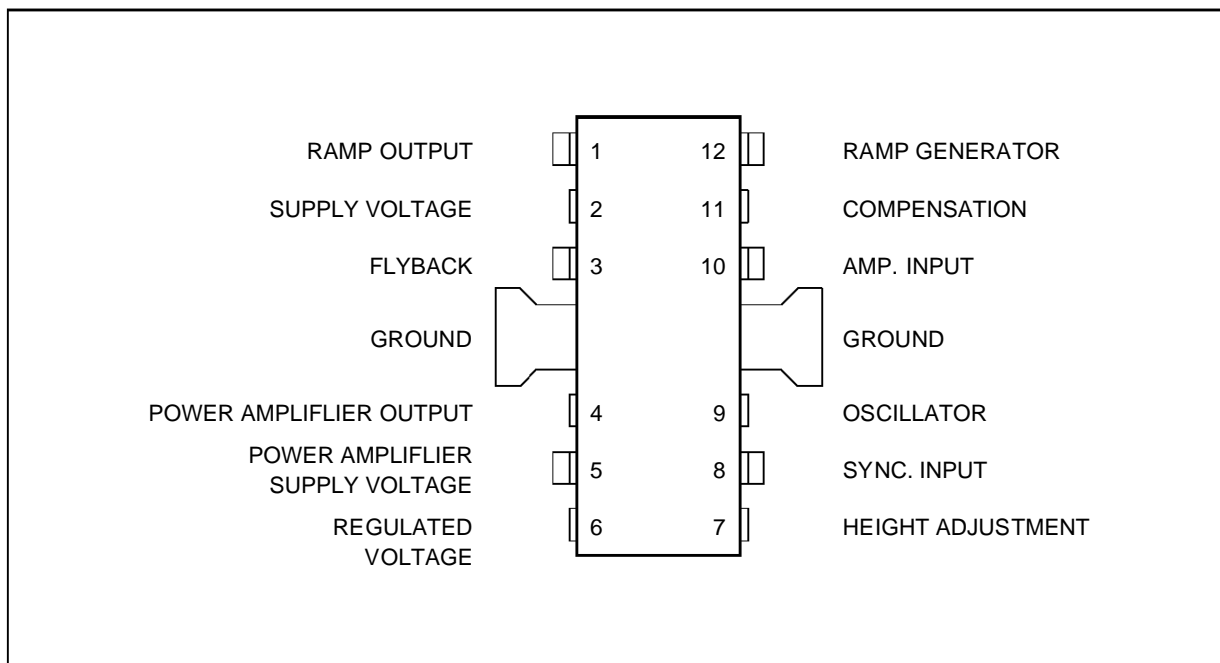
**FINDIP**  
(Plastic Package)

**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.

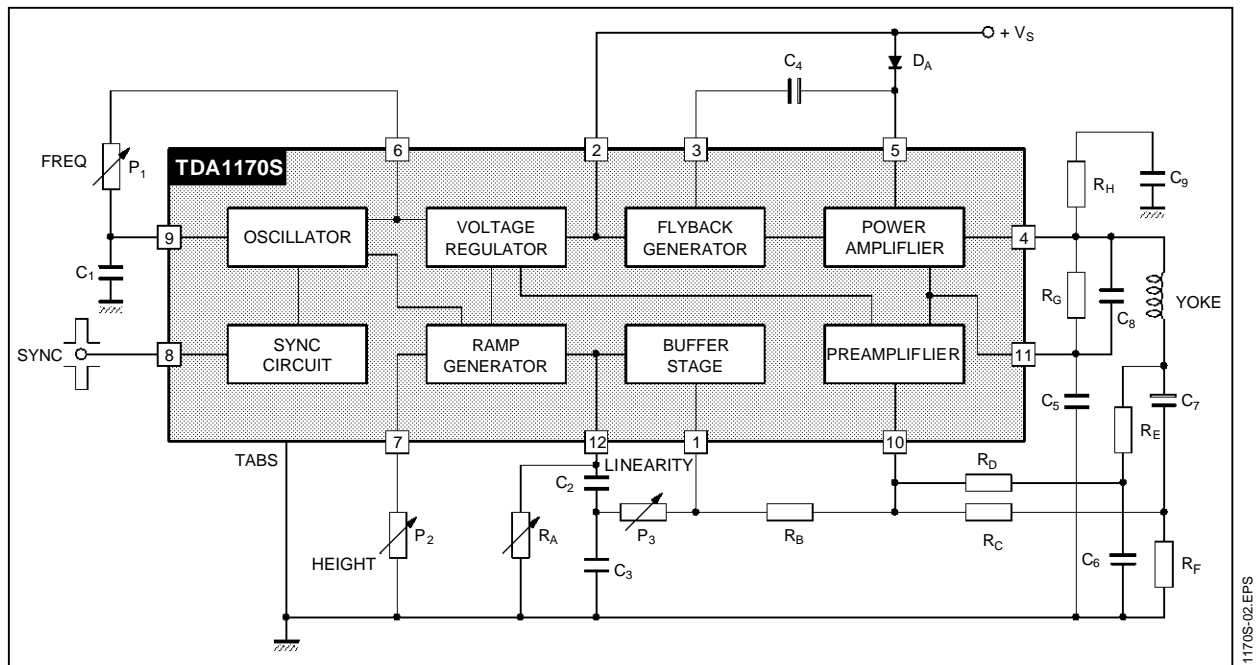
**PIN CONNECTIONS**



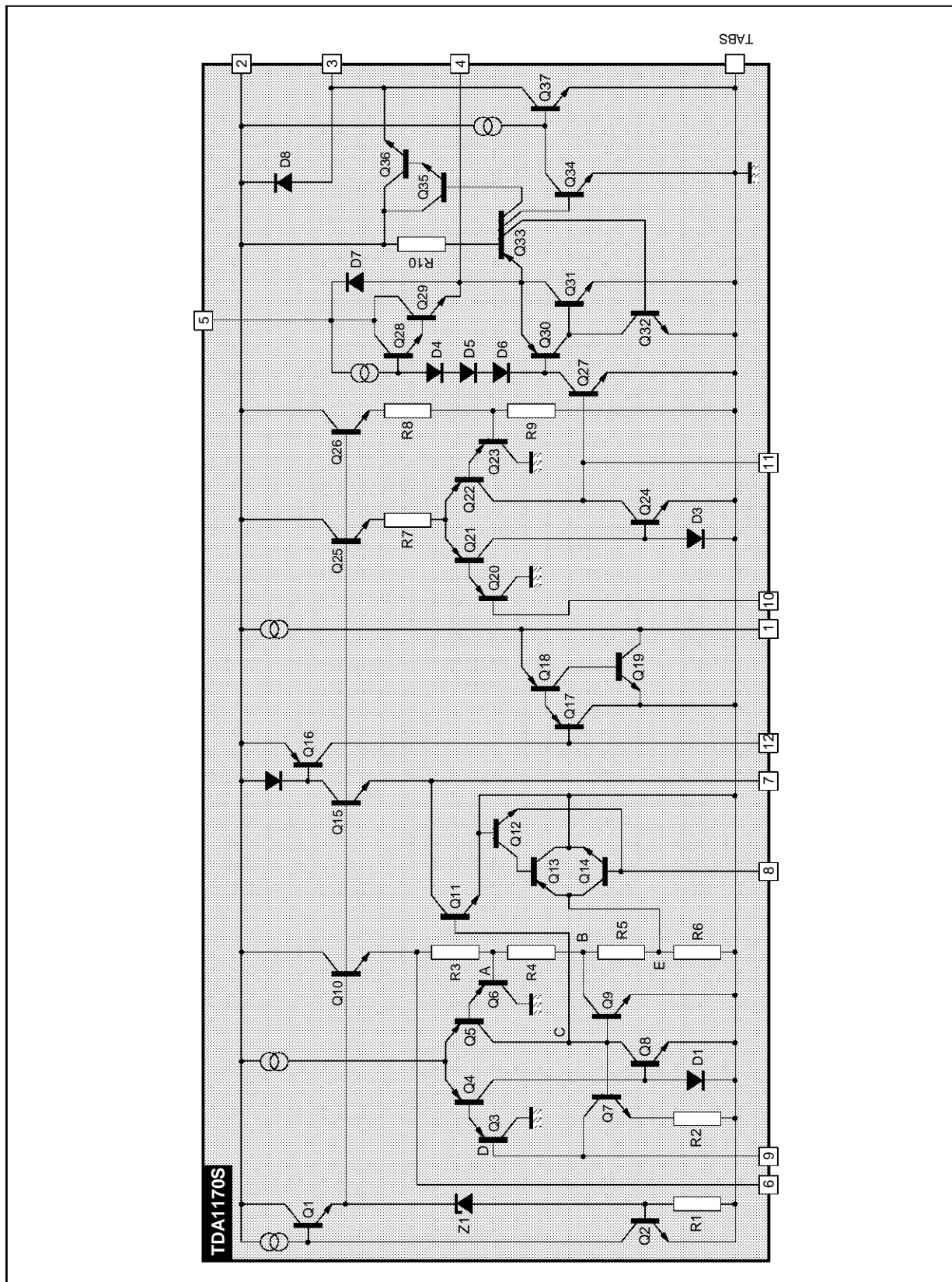
1170S-01.EPS

# 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 - 0.5	V 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 at T <sub>amb</sub> = 80 °C	5 1	W 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)

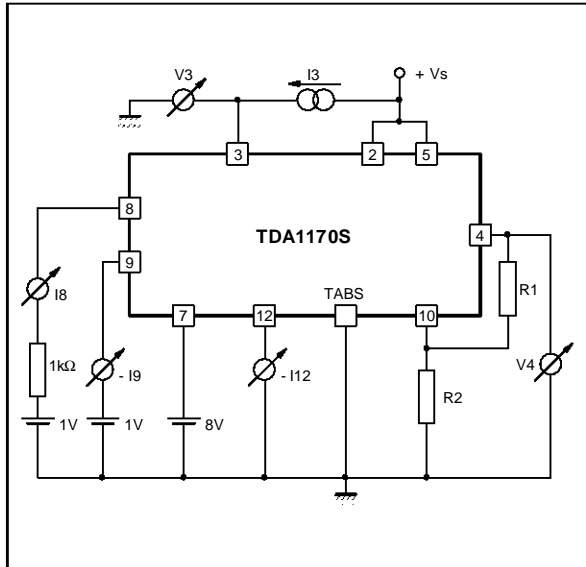
**DC CHARACTERISTICS**

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 R1 = 10kΩ, R2 = 10kΩ	4.1	4.4	4.75	V	1a
		V <sub>S</sub> = 35V 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 - I <sub>4</sub> = 0.8A		0.9 1.9	1.2 2.3	V V	1c 1c
V <sub>4H</sub>	Output Saturation Voltage to Supply	I <sub>4</sub> = 0.1A I <sub>4</sub> = 0.8A		1.4 2.8	2.1 3.2	V V	1d 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

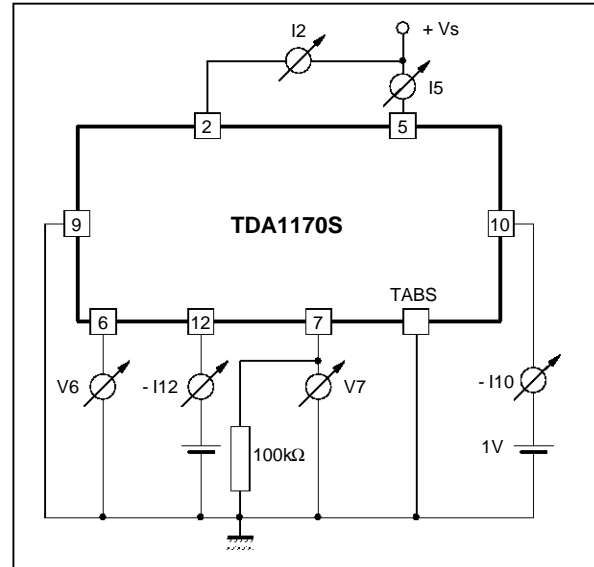
Figure 1 : DC Test Circuit

Figure 1a



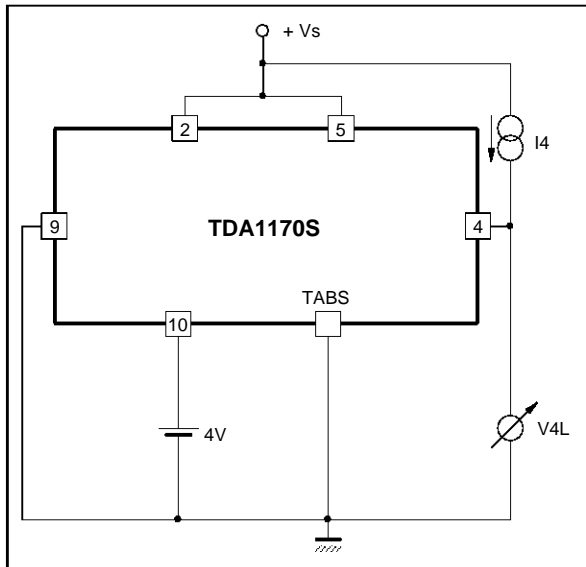
1170S-04.EPS

Figure 1b



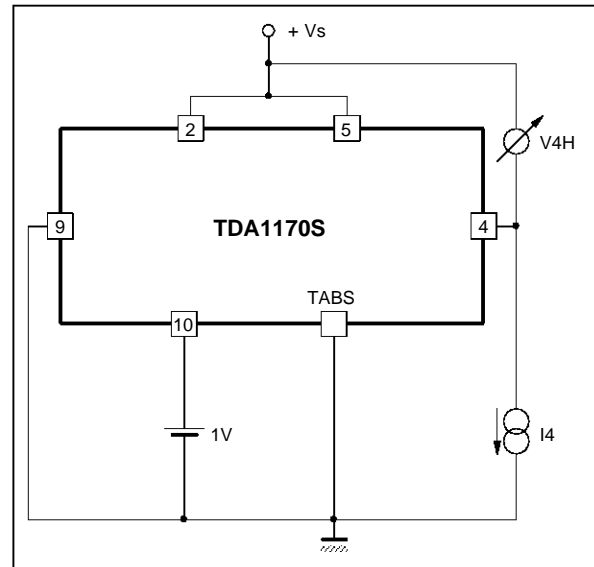
1170S-05.EPS

Figure 1c



1170S-06.EPS

Figure 1d



1170S-07.EPS

ELECTRICAL CHARACTERISTICS

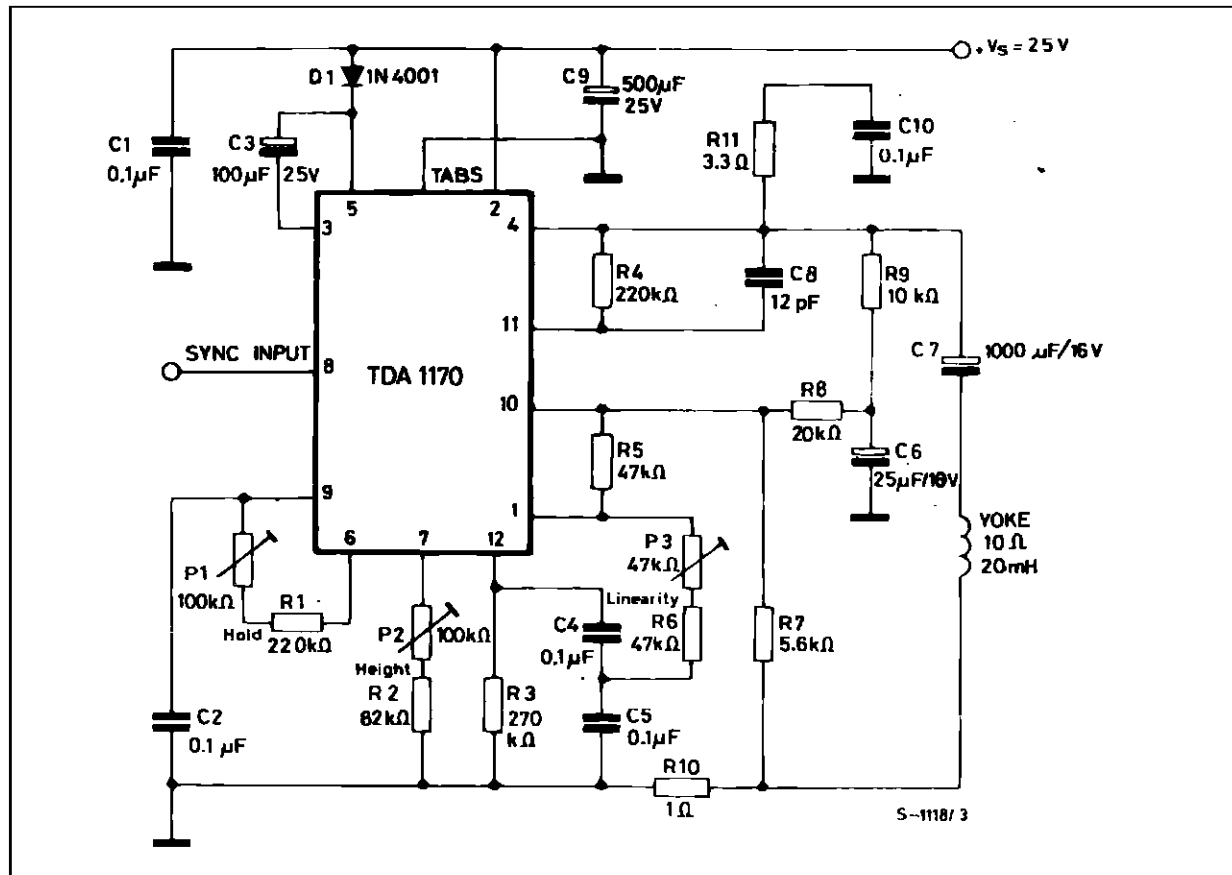
(refer to the test circuit,  $V_S = 25V$  ;  $f = 50Hz$  ;  $T_{amb} = 25^{\circ}C$ , unless otherwise specified)

AC CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_s$	Supply Current	$I_y = 1App$		140		mA
$I_b$	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	$(P_1 + R_1) = 300k\Omega, C_2 = 0.1 \mu F$ $(P_1 + R_1) = 260k\Omega, C_2 = 0.1 \mu F$		42.2 48.5		Hz
$\Delta f$	Synchronization Range	$I_b = 0.5mA$	14			Hz
$\frac{\Delta f}{\Delta V_s}$	Frequency Drift with Supply Voltage	$V_S = 10 \text{ to } 35V$		0.005		Hz/V
$\frac{\Delta f}{\Delta T_{tab}}$	Frequency Drift with Tab Temperature	$T_{tab} = 40 \text{ to } 120^{\circ}C$		0.01		Hz/ $^{\circ}C$

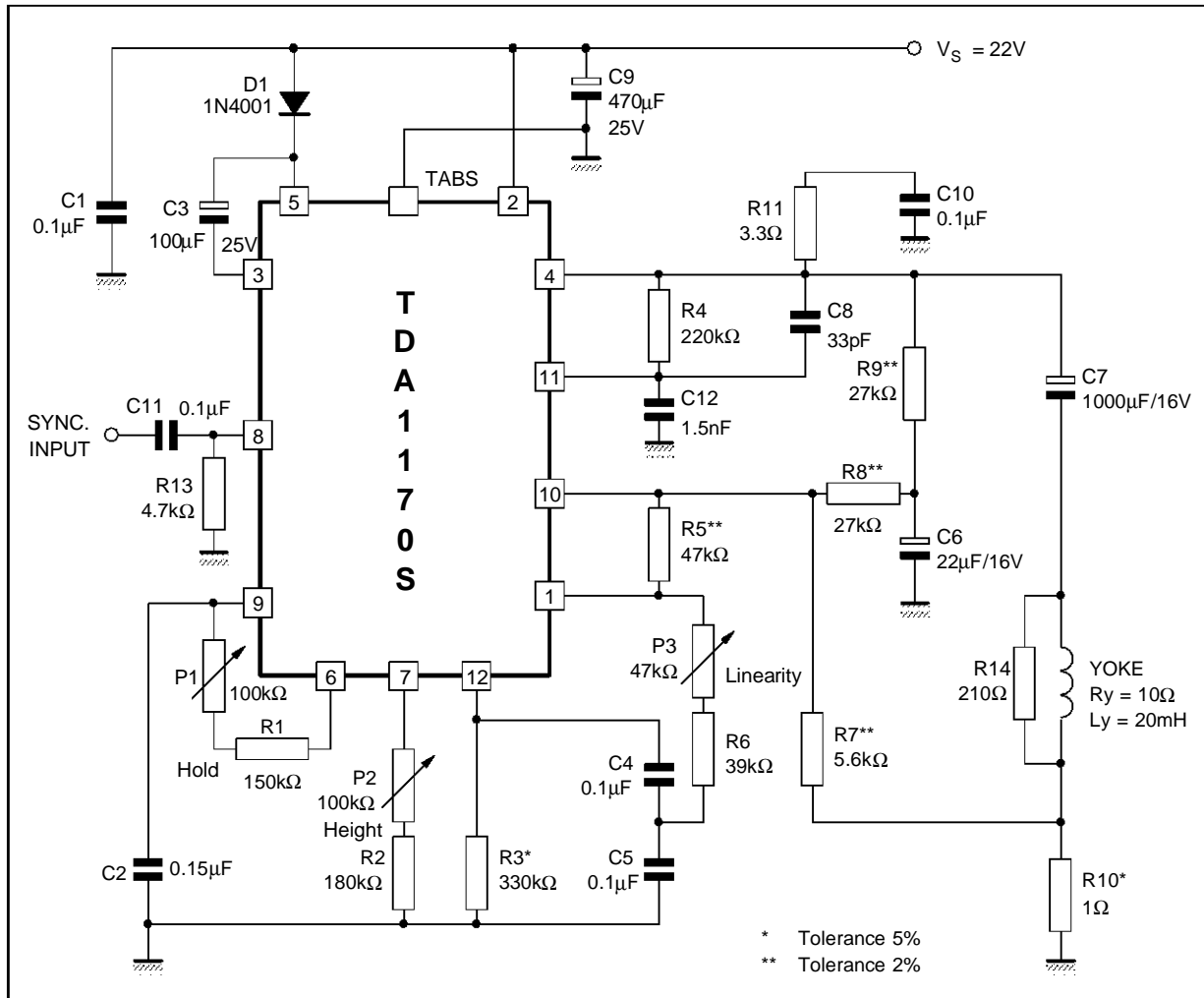
1170S-04.TBL

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

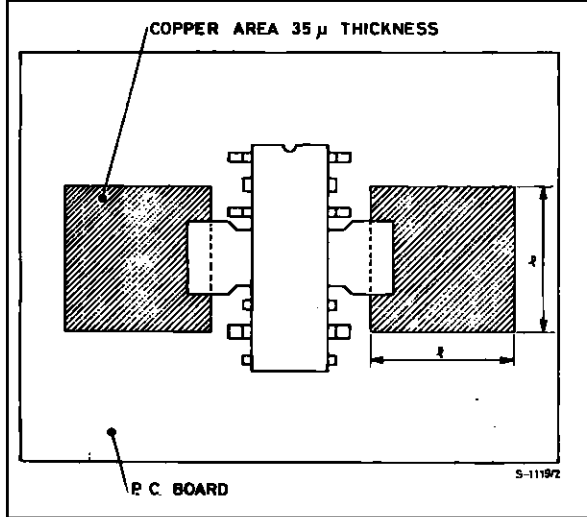
Symbol	Parameter	Value	Unit
$V_S$	Operating Supply Voltage	22	V
$I_S$	Supply Current	145	mA
$t_{fly}$	Flyback Time	0.7	ms
$P_{tot}$	Power Dissipation	2.3	W
$I_Y$	Maximum Scanning Current (peak to peak)	1.2	A

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

**MOUNTING INSTRUCTION**

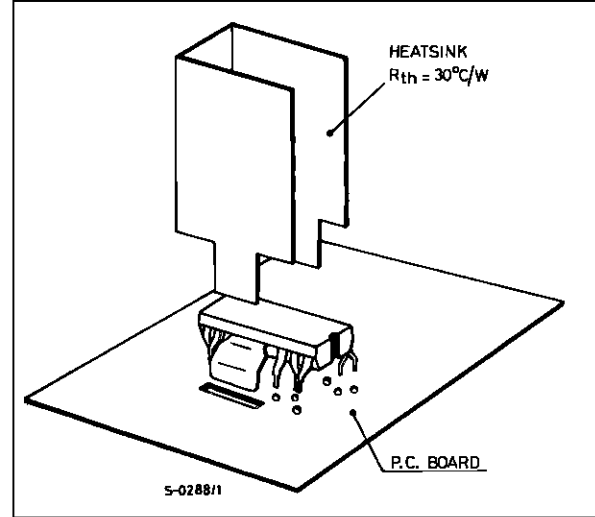
The junction to ambient thermal resistance of the TDA 1170S can be reduced by soldering the tabs to a suitable copper area of the printed circuit board (fig. 4) or to an external heatsink (fig. 5).

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

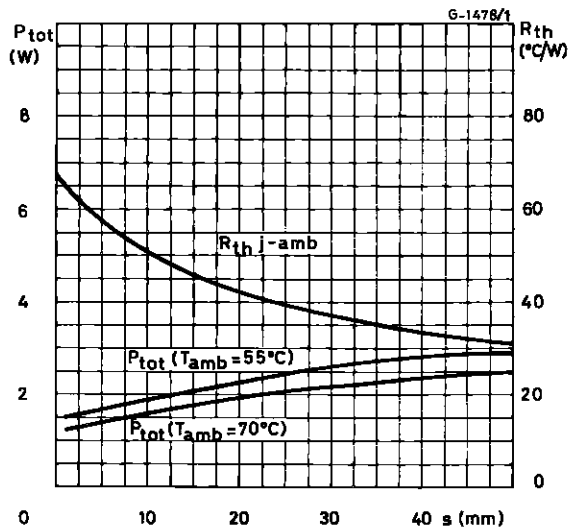


The diagram of fig. 6 shows the maximum dissippable power  $P_{tot}$  and the  $R_{th\ j-amb}$  as a function of the side "s" of two equal square copper areas having a thickness of 35 μ (1.4 mil).

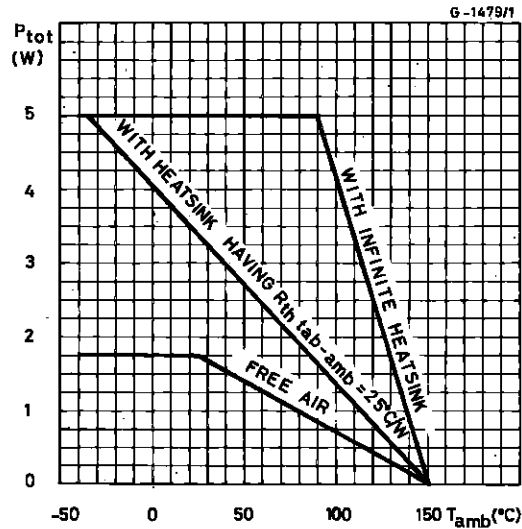
**Figure 5 :** Example with External Heatsink



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

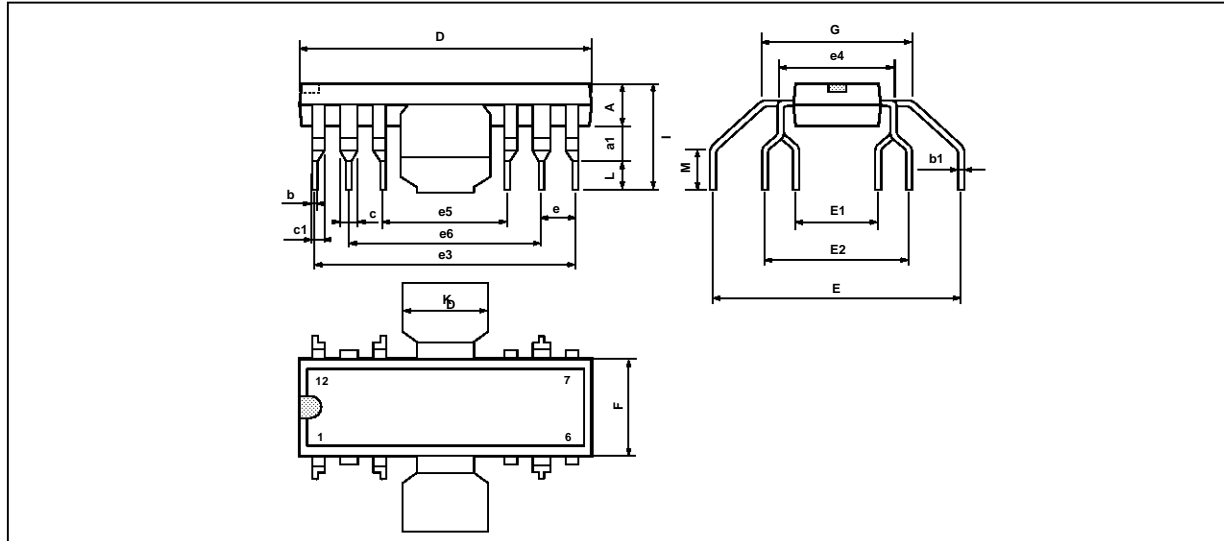


**Figure 7 :** Maximum Allowable Power Dissipation versus Ambient Temperature





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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