

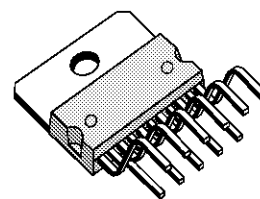
TV VERTICAL DEFLECTION OUTPUT CIRCUIT

The functions incorporated are :

- POWER AMPLIFIER
- FLYBACK GENERATOR
- REFERENCE VOLTAGE
- THERMAL PROTECTION

DESCRIPTION

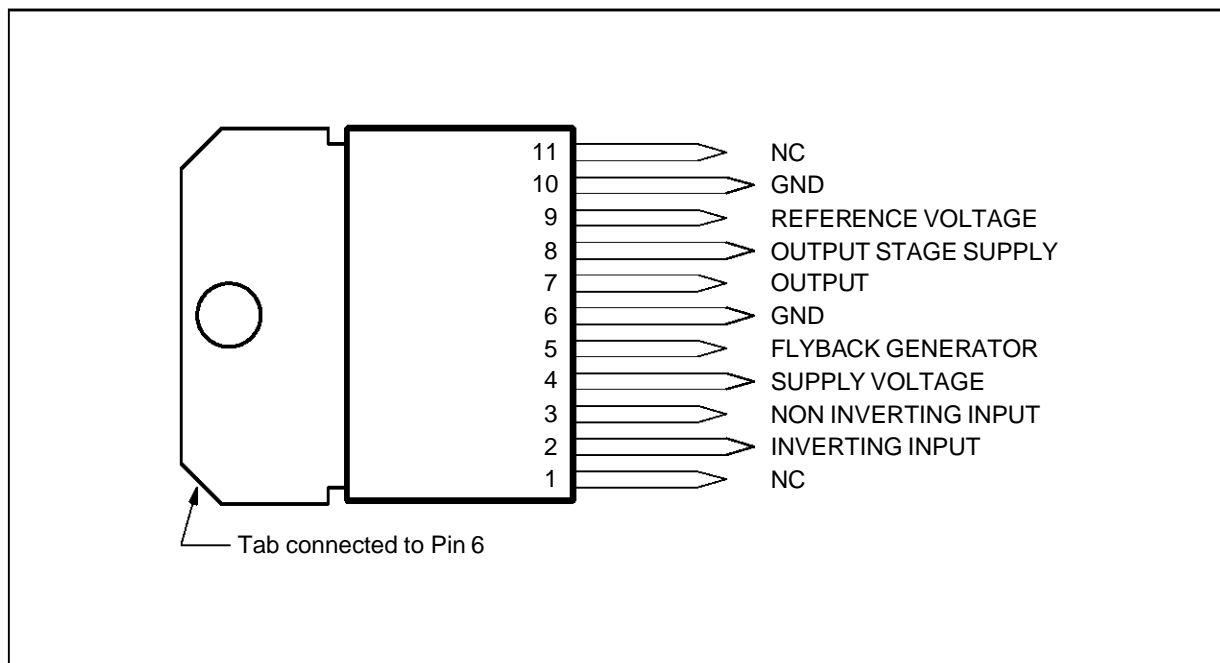
The TDA2170 is a monolithic integrated circuit in 11-lead Multiwatt® package. It is a high efficiency power booster for direct driving of vertical windings of TV yokes. It is intended for use in Colour and B & W television receivers as well as in monitors and displays.



MULTIWATT 11
(Plastic Package)

ORDER CODE : TDA2170

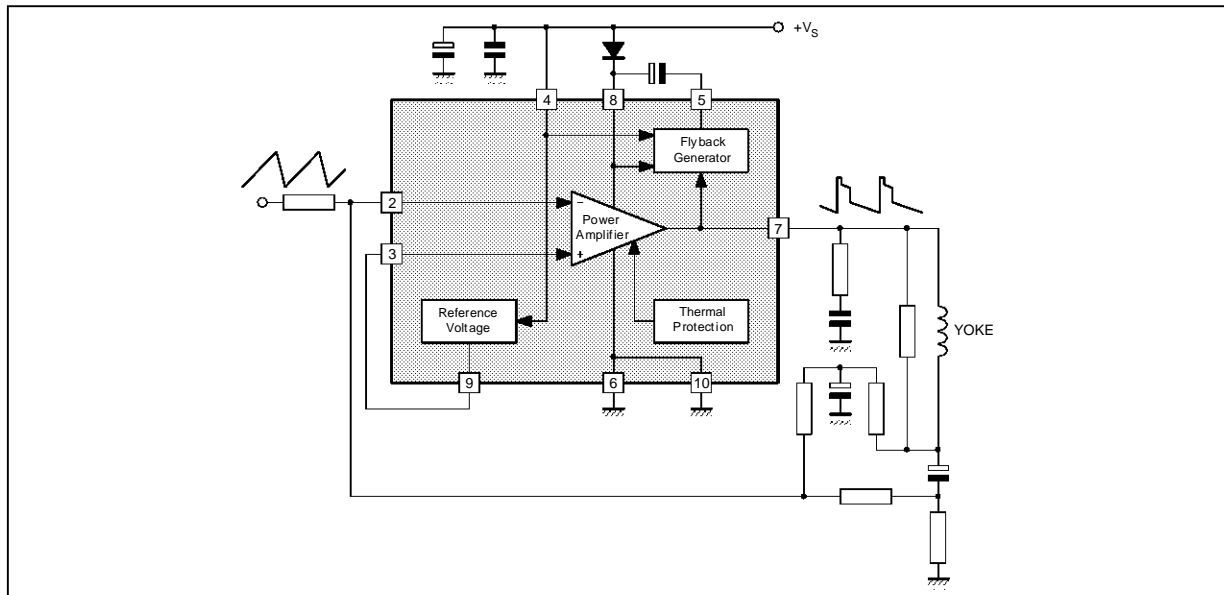
PIN CONNECTIONS



2170-01LEPS

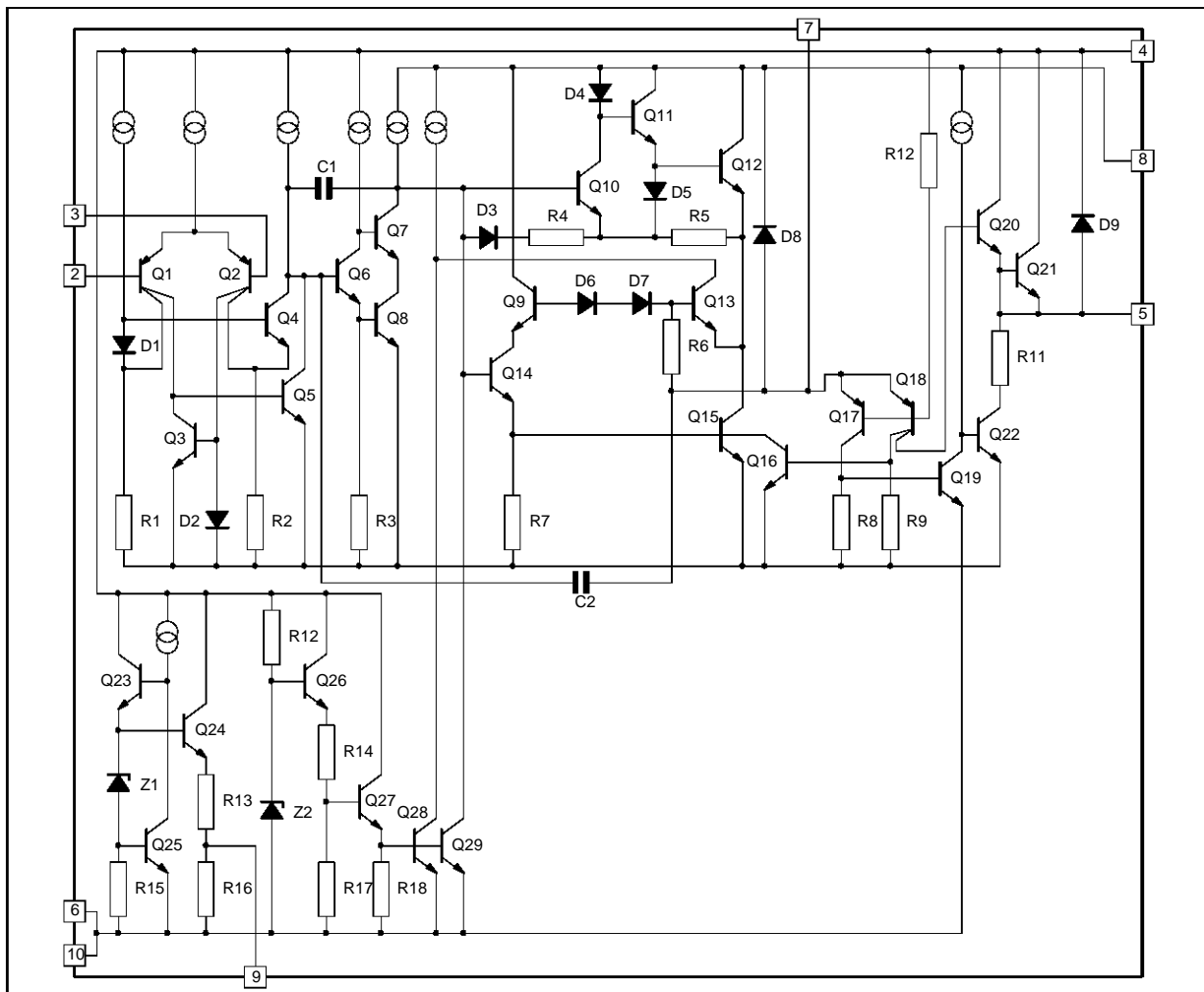
TDA2170

BLOCK DIAGRAM



2170-02.EPS

SCHEMATIC DIAGRAM



2170-03.EPS

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|----------------|--|--------------|------|
| V_s | Supply Voltage (pin 4) | 35 | V |
| V_7, V_8 | Flyback Peak Voltage | 60 | V |
| V_5 | Voltage at Pin 5 | $+V_s$ | |
| V_2, V_3 | Amplifier Input Voltage | $+V_s - 0.5$ | V |
| I_o | Output Peak Current (non repetitive, $t = 2$ msec) | 2.5 | A |
| I_o | Output Peak Current at $f = 50$ Hz, $t \leq 10$ μ sec | 3 | A |
| I_o | Output Peak Current at $f = 50$ Hz, $t > 10$ μ sec | 2 | A |
| I_5 | Pin 5 DC Current at $V_7 < V_4$ | 100 | mA |
| I_5 | Pin 5 Peak to Peak Flyback Current at $f = 50$ Hz, $t_{fly} \leq 1.5$ msec | 3 | A |
| P_{tot} | Total Power Dissipation at $T_{case} = 60$ °C | 30 | W |
| T_{stg}, T_j | Storage and Junction Temperature | - 40 to 150 | °C |

2170-01.TBL

THERMAL DATA

| Symbol | Parameter | Value | Unit |
|---------------|-------------------------------------|--------|------|
| $R_{th(j-c)}$ | Thermal Resistance Junction-case | Max 3 | °C/W |
| $R_{th(j-a)}$ | Thermal Resistance Junction-ambient | Max 40 | °C/W |

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ELECTRICAL CHARACTERISTICS

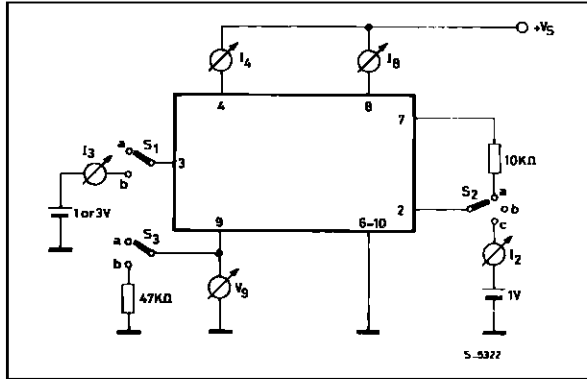
(refer to the test circuits, $V_s = 35$ V, $T_{amb} = 25$ °C unless otherwise specified)

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit | Fig. |
|---------------------------------|--|-------------------------------------|------|-------|------|------------|------|
| I_4 | Pin 4 Quiescent Current | $I_5 = 0$; $I_7 = 0$; $V_3 = 3$ V | | 8 | 16 | mA | 1a |
| I_8 | Pin 8 Quiescent Current | $I_5 = 0$; $I_7 = 0$; $V_3 = 3$ V | | 16 | 36 | mA | 1a |
| I_3 | Amplifier Input Bias Current | $V_3 = 1$ V | | - 0.1 | - 1 | μ A | 1a |
| I_2 | Amplifier Input Bias Current | $V_2 = 1$ V | | - 0.1 | - 1 | μ A | 1a |
| V_9 | Reference Voltage | $I_9 = 0$ | | 2.2 | | V | 1a |
| $\frac{\Delta V_9}{\Delta V_s}$ | Reference Voltage Drift vs. Supply Voltage | $V_s = 15$ to 30 V | | 1 | 2 | mV/V | 1a |
| V_{5L} | Pin 5 Saturation Voltage to GND | $I_5 = 20$ mA | | 1 | | V | 1c |
| V_7 | Quiescent Output Voltage | $V_s = 35$ V; $R_a = 13$ k Ω | | 18 | | V | 1d |
| | | $V_s = 15$ V; $R_a = 13$ k Ω | | 7.5 | | V | 1d |
| V_{7L} | Output Saturation Voltage to GND | $I_7 = 1.2$ A | | 1 | 1.4 | V | 1c |
| | | $I_7 = 0.7$ A | | 0.7 | 1 | V | 1c |
| V_{7H} | Output Saturation Voltage to Supply | - $I_7 = 1.2$ A | | 1.6 | 2.2 | V | 1b |
| | | - $I_7 = 0.7$ A | | 1.3 | 1.8 | V | 1b |
| R_9 | Reference Voltage Output Resistance | | | 2.1 | | k Ω | |
| T_j | Junction Temperature for Thermal Shut Down | | | 140 | | °C | |

2170-03.TBL

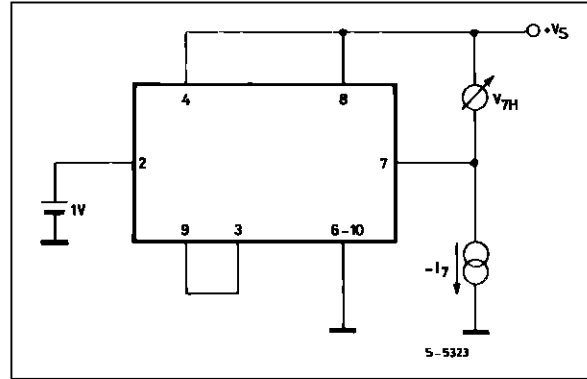
Figure 1 : DC Test Circuits

Figure 1a : Measurement of I_2 ; I_3 ; I_4 ; I_8 ; I_9 ; $\Delta V_9/\Delta V_S$; R_9



2170-04.EPS

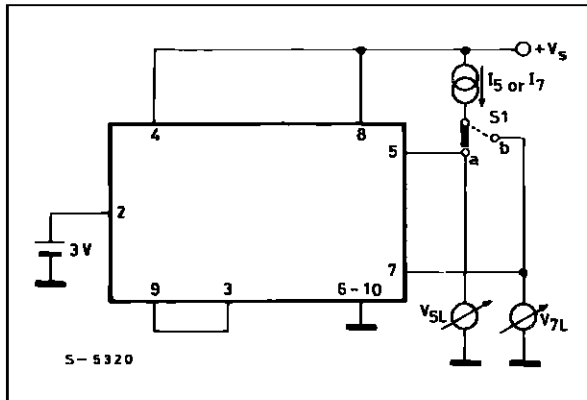
Figure 1b : Measurement of V_{7H}



2170-05.EPS

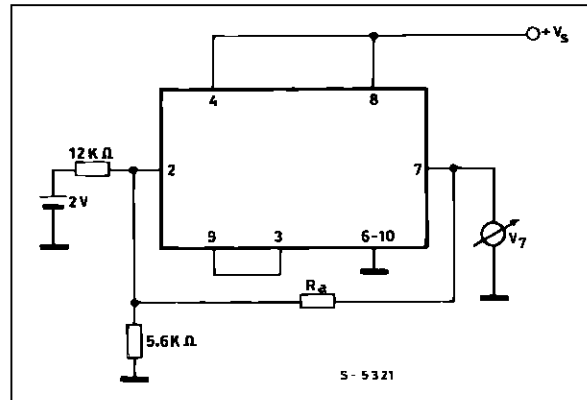
S1 : (a) I_2 ; (b) I_3 , I_4 and I_8 .
 S2 : (a) I_4 and I_8 ; (b) I_3 ; (c) I_2 .
 S3 : (a) I_2 , I_3 , I_4 , I_8 , I_9 and V_9 ; (b) R_9 .

Figure 1c : Measurement of V_{5L} , V_{7L} .



2170-06.EPS

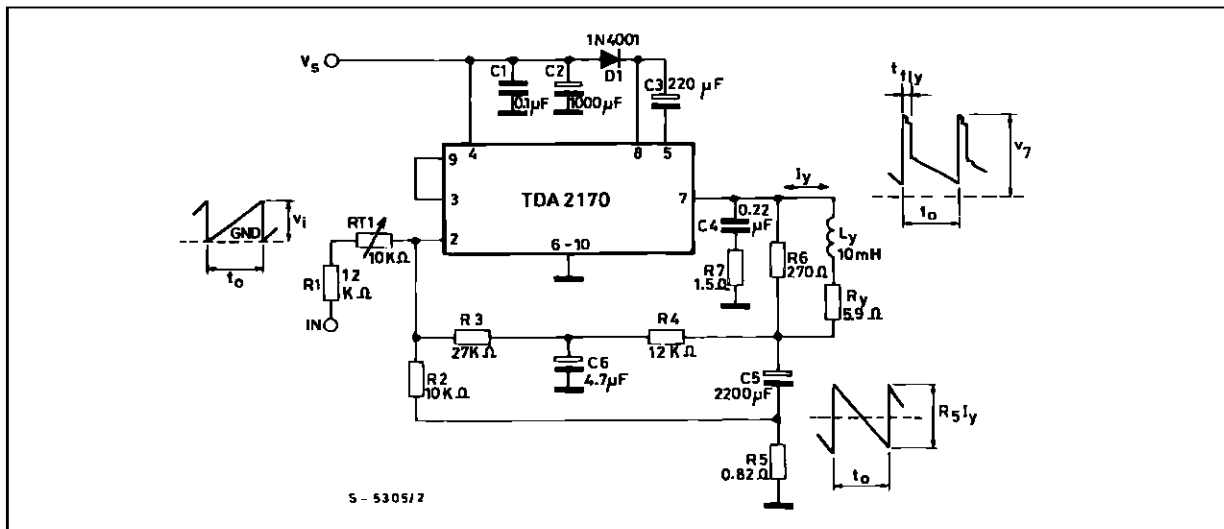
Figure 1d : Measurement of V_7 .



2170-07.EPS

S1 : (a) V_{5L} ; (b) V_{7L} .

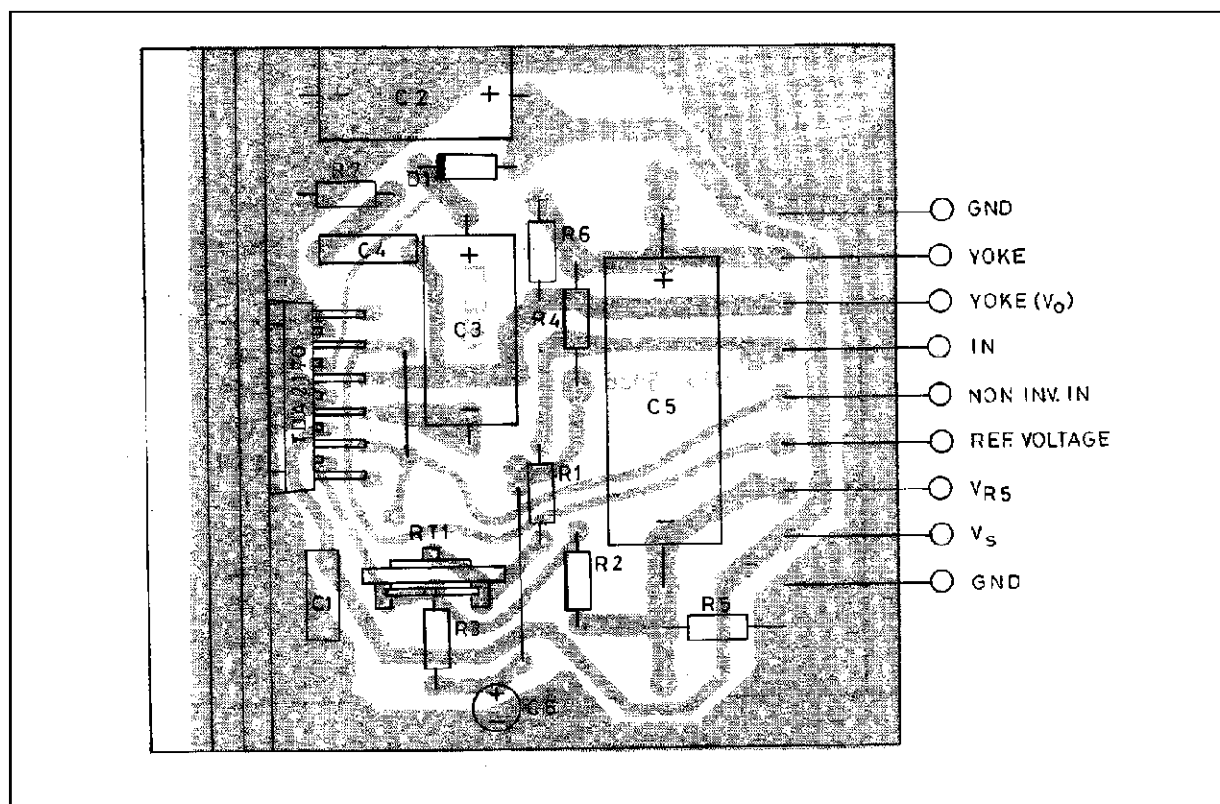
Figure 2 : Application Circuit



S - 5305/2

2170-08.EPS

Figure 3 : PC Board and Component Layout (1:1 scale)



2170-09.TIF

COMPONENTS LIST FOR TYPICAL APPLICATIONS

| Component | 110° TVC 5.9 Ω / 10 mH 1.95 App | 110° TVC 9.6 Ω / 24.6 mH 1.2 App | 90° TVC 15 Ω / 30 mH 0.82 App | Unit |
|-----------|---------------------------------------|--|-------------------------------------|------|
| RT1 | 10 | 4.7 | 10 | kΩ |
| R1 | 12 | 10 | 12 | kΩ |
| R2 | 10 | 5.6 | 5.6 | kΩ |
| R3 | 27 | 12 | 18 | kΩ |
| R4 | 12 | 8.2 | 5.6 | kΩ |
| R5 | 0.82 | 1 | 1 | Ω |
| R6 | 270 | 330 | 330 | Ω |
| R7 | 1.5 | 1.5 | 1.5 | Ω |
| D1 | 1N 4001 | 1N 4001 | 1N 4001 | – |
| C1 | 0.1 | 0.1 | 0.1 | μF |
| C2 el. | 1000/25 V | 470/25 V | 470/25 V | μF |
| C3 el. | 220/25 V | 220/25 V | 220/25 V | μF |
| C4 | 0.22 | 0.22 | 0.22 | μF |
| C5 el. | 2200/25 V | 2200/25 V | 1000/16 V | μF |
| C6 el. | 4.7/16 V | 4.7/16 V | 10/16 V | μF |

2170-04.TBL

TYPICAL PERFORMANCES

| Parameter | 110° TVC 5.9 Ω / 10 mH | 110° TVC 9.6 Ω / 27 mH | 90° TVC 15 Ω / 30 mH | Unit |
|--|---------------------------|---------------------------|-------------------------|-----------------|
| V _s – Supply Voltage | 24 | 22.5 | 25 | V |
| I _s – Current | 280 | 175 | 125 | mA |
| t _{fly} – Flyback Time | 0.6 | 1 | 0.7 | ms |
| * P _{tot} – Power Dissipation | 4.2 | 2.5 | 2.05 | W |
| * R _{th c-a} – Heatsink | 7 | 13 | 16 | °C/W |
| T _{amb} | 60 | 60 | 60 | °C |
| T _{j max} | 110 | 110 | 110 | °C |
| t _o | 20 | 20 | 20 | ms |
| V _i | 2.5 | 2.5 | 2.5 | V _{PP} |
| V ₇ | 50 | 47 | 52 | V _P |

* Worst case condition.

MOUNTING INSTRUCTIONS

The power dissipated in the circuit must be removed by adding an external heatsink.

Thanks to the MULTIWATT® package attaching the heatsink is very simple, a screw or a compression spring (clip) being sufficient.

Between the heatsink and the package it is better to insert a layer of silicon grease, to optimize the thermal contact ; no electrical isolation is needed between the two surfaces.

Figure 2 : Application Circuit

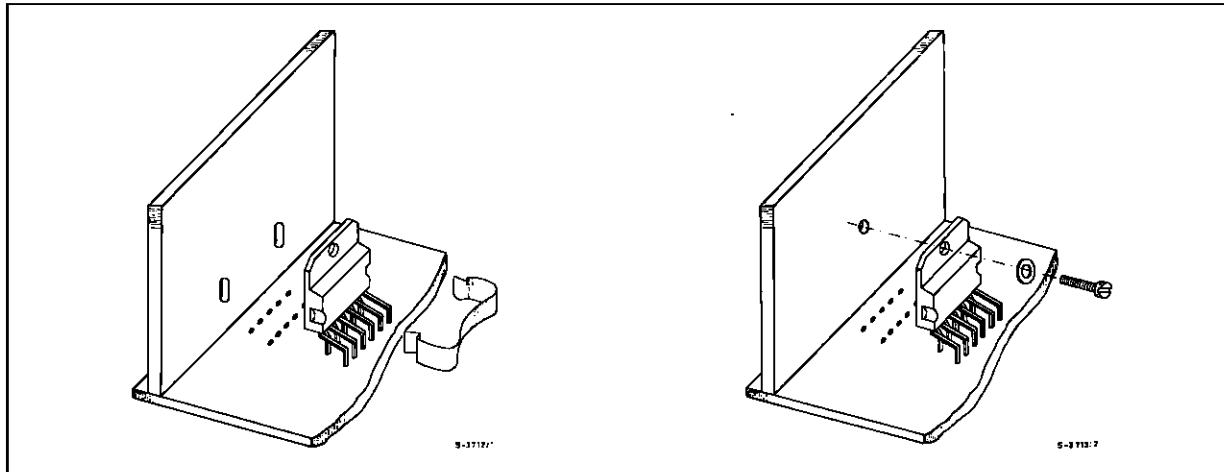
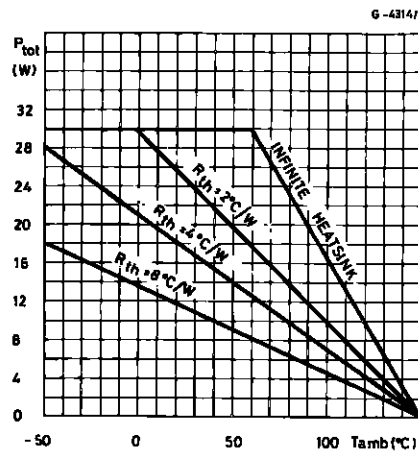
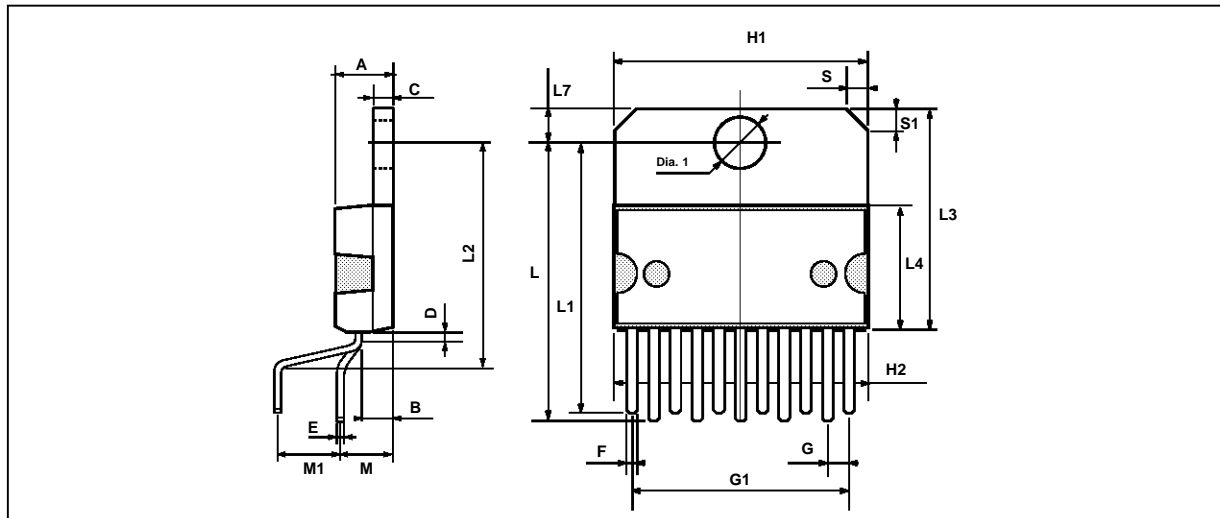


Figure 5 : Maximum Allowable Power Dissipation versus Ambient Temperature



PACKAGE MECHANICAL DATA
11 PINS - PLASTIC MULTIWATT



PMMUL11V.EPS

| Dimensions | Millimeters | | | Inches | | |
|------------|-------------|------|-------|--------|-------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 5 | | | 0.197 |
| B | | | 2.65 | | | 0.104 |
| C | | | 1.6 | | | 0.063 |
| E | 0.49 | | 0.55 | 0.019 | | 0.022 |
| F | 0.88 | | 0.95 | 0.035 | | 0.037 |
| G | 1.57 | 1.7 | 1.83 | 0.062 | 0.067 | 0.072 |
| G1 | 16.87 | 17 | 17.13 | 0.664 | 0.669 | 0.674 |
| H1 | 19.6 | | | 0.772 | | |
| H2 | | | 20.2 | | | 0.795 |
| L | 21.5 | | 22.3 | 0.846 | | 0.878 |
| L1 | 21.4 | | 22.2 | 0.843 | | 0.874 |
| L2 | 17.4 | | 18.1 | 0.685 | | 0.713 |
| L3 | 17.25 | 17.5 | 17.75 | 0.679 | 0.689 | 0.699 |
| L4 | 10.3 | 10.7 | 10.9 | 0.406 | 0.421 | 0.429 |
| L7 | 2.65 | | 2.9 | 0.104 | | 0.114 |
| M | 4.1 | 4.3 | 4.5 | 0.161 | 0.169 | 0.177 |
| M1 | 4.88 | 5.08 | 5.3 | 0.192 | 0.200 | 0.209 |
| S | 1.9 | | 2.6 | 0.075 | | 0.102 |
| S1 | 1.9 | | 2.6 | 0.075 | | 0.102 |
| Dia. 1 | 3.65 | | 3.85 | 0.144 | | 0.152 |

MUL11V.TBL

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