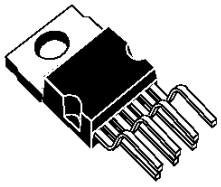
SGS-THOMSON MICROELECTRONICS

# TDA8170

## TV VERTICAL DEFLECTION OUTPUT CIRCUIT

The functions incorporated are :
- POWER AMPLIFIER
- FLYBACK GENERATOR
- REFERENCE VOLTAGE
- THERMAL PROTECTION



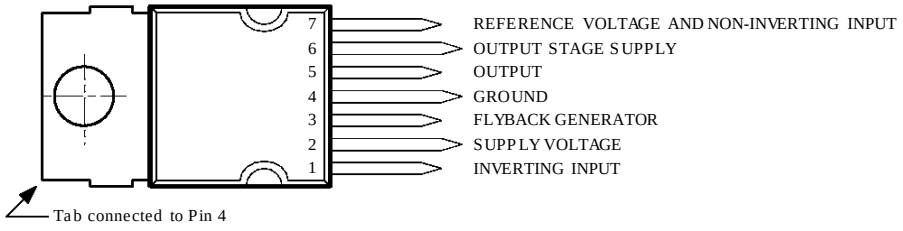
**HEPTAWATT**
(Plastic Package)

**ORDER CODE :** TDA8170

### DESCRIPTION

The TDA8170 is a monolithic integrated circuit in HEPTAWATT™ 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.

### PIN CONNECTIONS

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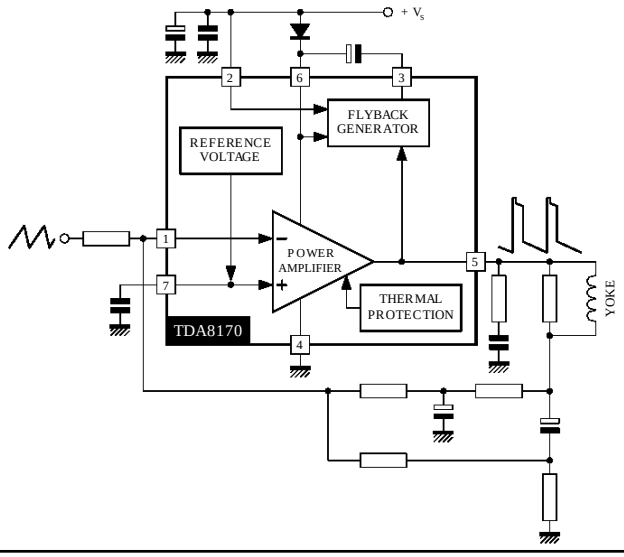
### BLOCK DIAGRAM

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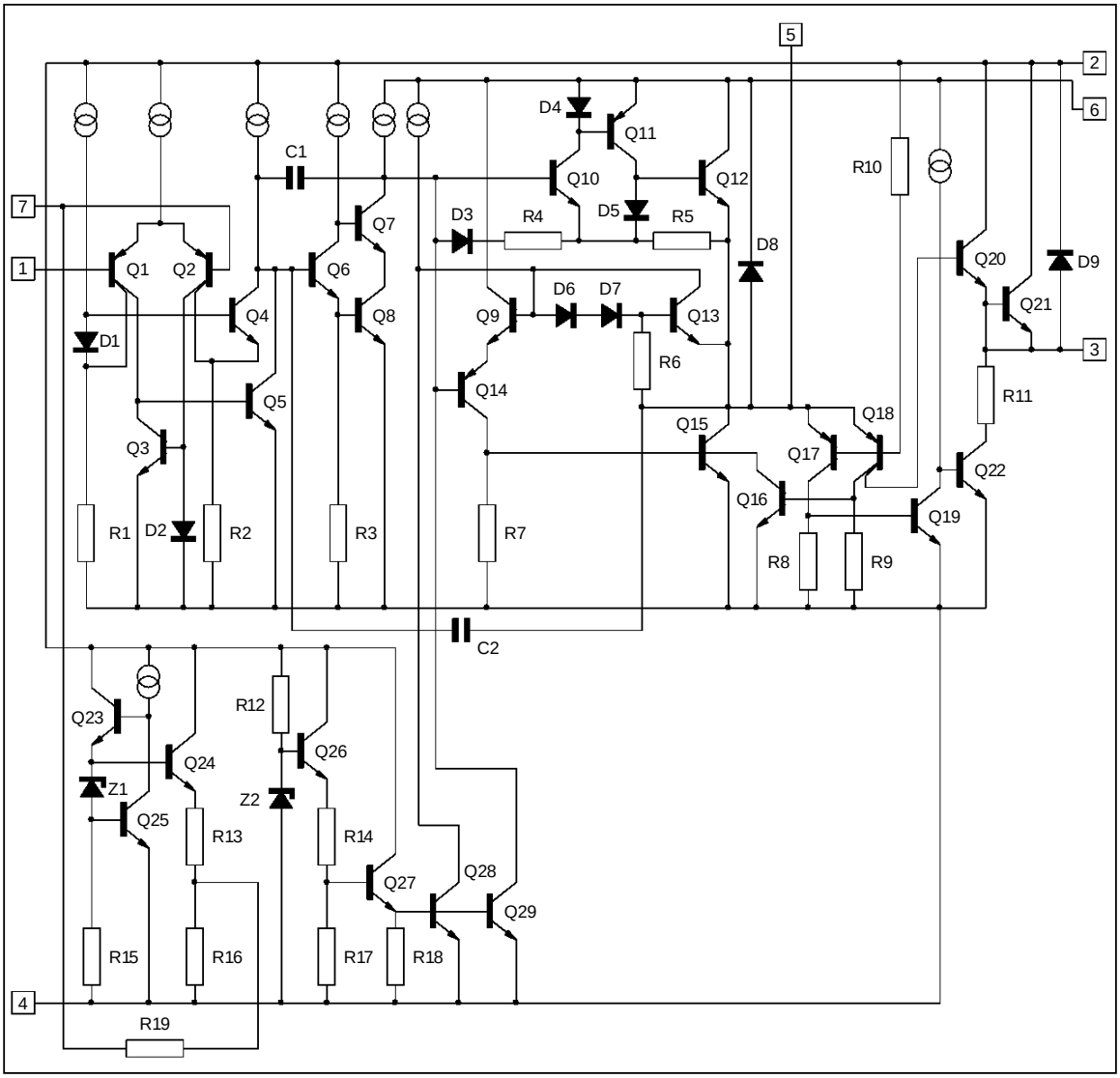
## SCHEMATIC DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_S$ | Supply Voltage (pin 2) | 35 | V |
| $V_5$, $V_6$ | Flyback Peak Voltage | 60 | V |
| $V_3$ | Voltage at Pin 3 | $+ V_s$ | |
| $V_1$, $V_7$ | 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 or 60 Hz, $t \leq 10$ µsec | 3 | A |
| $I_o$ | Output Peak Current at f = 50 or 60 Hz, $t > 10$ µsec | 2 | A |
| $I_3$ | Pin 3 DC Current at $V_5 < V_2$ | 100 | mA |
| $I_3$ | Pin 3 Peak to Peak Flyback Current at f= 50 or 60 Hz, $t_{fly} \leq 1.5$msec | 3 | A |
| $P_{tot}$ | Total Power Dissipation at $T_{case}$ = 90 °C | 20 | W |
| $T_{stg}$, $T_j$ | Storage and Junction Temperature | – 40 to 150 | °C |

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## THERMAL DATA

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{th\ j-case}$ | Thermal Resistance Junction-case Max. | 3 | °C/W |

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## ELECTRICAL CHARACTERISTICS

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

| Symbol | Parameter | Test Conditions | Min. | Typ. | Max. | Unit | Fig. |
|---|---|---|---|---|---|---|---|
| $I_2$ | Pin 2 Quiescent Current | $I_3 = 0$, $I_5 = 0$ | | 8 | 16 | mA | 1a |
| $I_6$ | Pin 6 Quiescent Current | $I_3 = 0$, $I_5 = 0$ | | 16 | 36 | mA | 1a |
| $I_1$ | Amplifier Input Bias Current | $V_1$ = 1 V | | – 0.1 | – 1 | µA | 1a |
| $V_7$ | Reference Voltage | | | 2.2 | | V | 1a |
| $\frac{\Delta V_7}{\Delta V_S}$ | Reference Voltage Drift versus Supply Voltage | $V_s$ = 15 to 30 V | | 1 | 2 | mV/V | 1a |
| $V_{3L}$ | Pin 3 Saturation Voltage to GND | $I_3$ = 20 mA | | 1 | | V | 1c |
| $V_5$ | Quiescent Output Voltage | $V_s$ = 35 V , $R_a$ = 39 kΩ | | 18 | | V | 1d |
| | | $V_s$ = 15 V , $R_a$ = 13 kΩ | | 7.5 | | V | 1d |
| $V_{5L}$ | Output Saturation Voltage to GND | $I_5$ = 1.2 A | | 1 | 1.4 | V | 1c |
| | | $I_5$ = 0.7 A | | 0.7 | 1 | V | 1c |
| $V_{5H}$ | Output Saturation Voltage to Supply | $- I_5$ = 1.2 A | | 1.6 | 2.2 | V | 1b |
| | | $- I_5$ = 0.7 A | | 1.3 | 1.8 | V | 1b |
| $T_j$ | Junction Temperature for Thermal Shut Down | | | 140 | | °C | |

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**Figure 1a :** Measurement of $I_1$, $I_2$, $I_6$, $V_7$, $\Delta V_7/\Delta V_S$

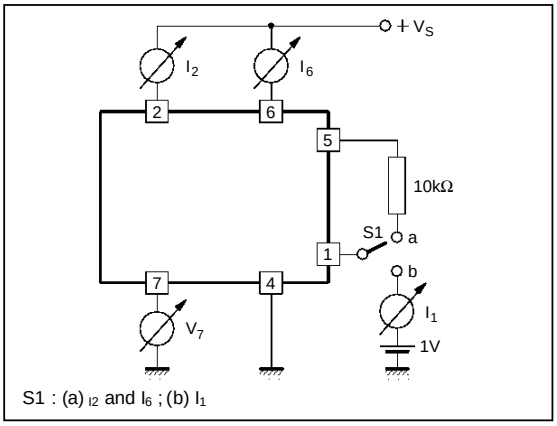



**Figure 1b :** Measurement of $V_{5H}$

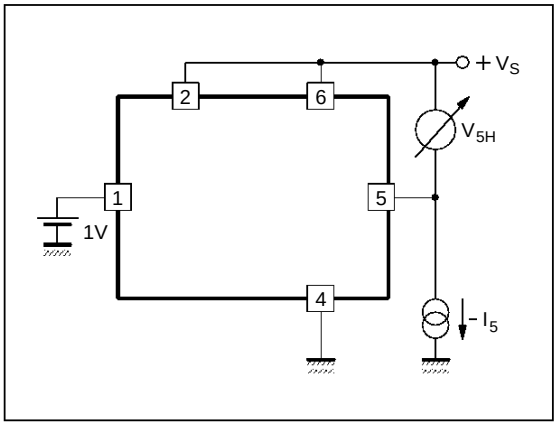



**Figure 1c :** Measurement of $V_{3L}$, $V_{5L}$

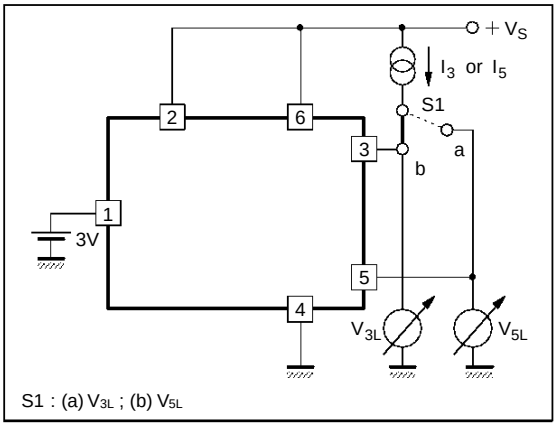



**Figure 1d :** Measurement of $V_5$

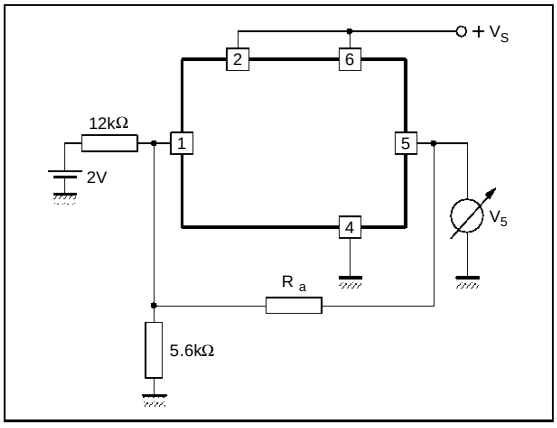



**Figure 2 :** AC Test Circuit

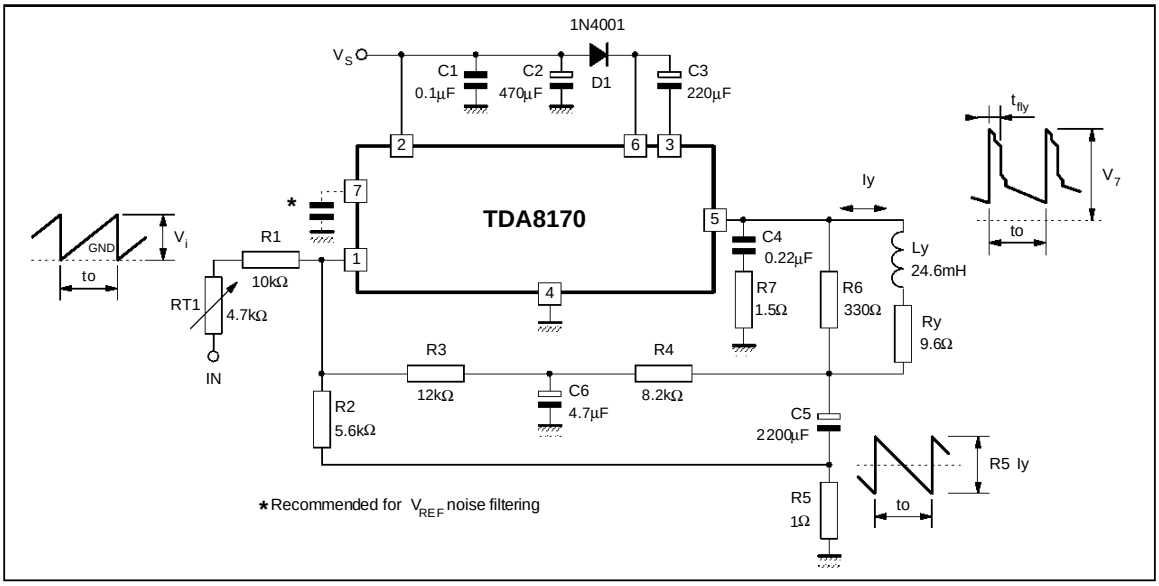
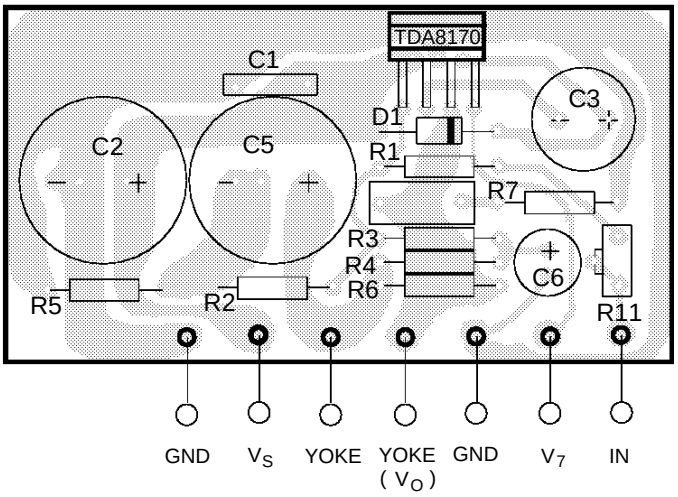


**Figure 3 :** PC Board and Component layout of the Circuit of fig. 2(1 : 1 scale)

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**COMPONENTS LIST FOR TYPICAL APPLICATIONS**

| Component | 110 ° TVC<br>5.9 Ω/10 mH<br>1.95 App | 110 ° TVC<br>9.6 Ω/24.6 mH<br>1.2 App | 90 ° TVC<br>15 Ω/30 mH<br>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. | 200/25 V | 2200/25 V | 1000/16 V | µF |
| C6 el. | 4.7/16 V | 4.7/16 V | 10/16 V | µF |

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## 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 Dissip. | 4.2 | 2.5 | 2.05 | W |
| $R_{th\ o\text{-}a}$ - 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 | $V_{pp}$ |
| $V_7$ | 2.5 | 2.5 | 2.5 | $V_p$ |

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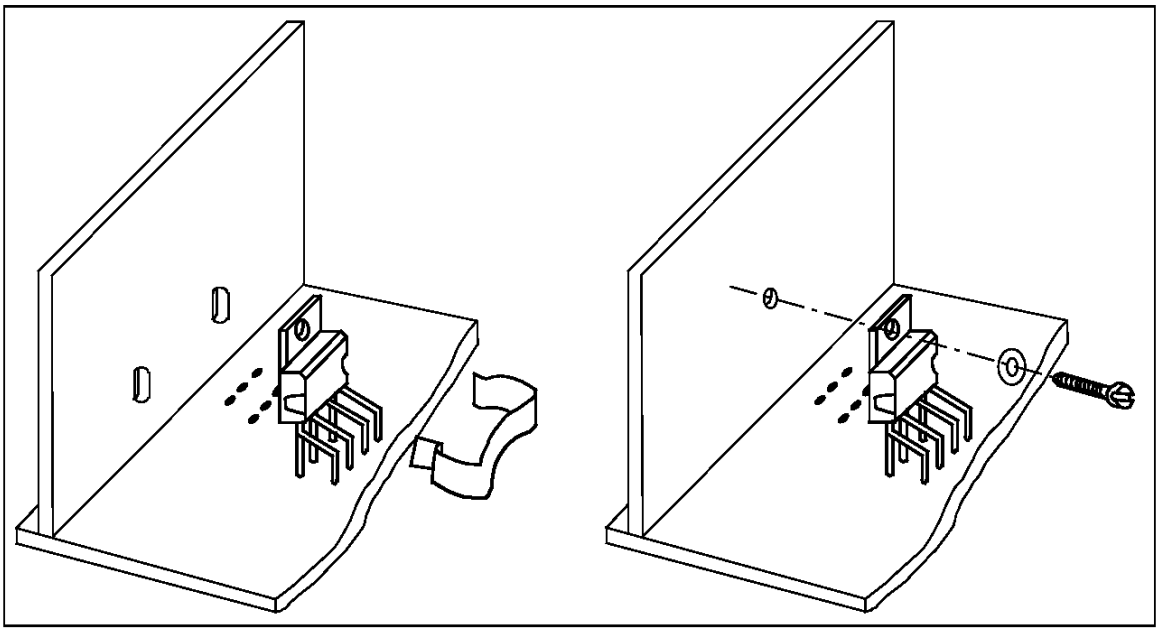
## MOUNTING INSTRUCTIONS

The power dissipated in the circuit must be removed by adding an external heatsink.
Thanks to the HEPTAWATT™ package attaching the heatsink is very simple, a screw 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 4 :** Mounting Examples



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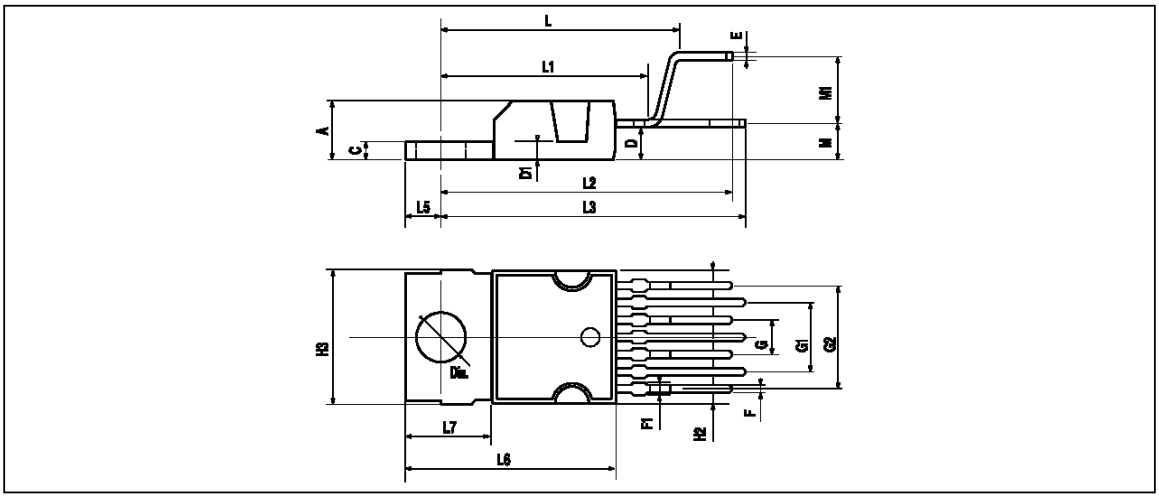
**PACKAGE MECHANICAL DATA :** 7 PINS - PLASTIC HEPTAWATT

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| Dimensions | Millimeters | | | Inches | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 4.8 | | | 0.189 |
| C | | | 1.37 | | | 0.054 |
| D | 2.4 | | 2.8 | 0.094 | | 0.110 |
| D1 | 1.2 | | 1.35 | 0.047 | | 0.053 |
| E | 0.35 | | 0.55 | 0.014 | | 0.022 |
| F | 0.6 | | 08 | 0.024 | | 0.031 |
| F1 | | | 0.9 | | | 0.035 |
| G | 2.41 | 2.54 | 2.67 | 0.095 | 0.100 | 0.105 |
| G1 | 4.91 | 5.08 | 5.21 | 0.193 | 0.200 | 0.205 |
| G2 | 7.49 | 7.62 | 7.8 | 0.295 | 0.300 | 0.307 |
| H2 | | | 10.4 | | | 0.409 |
| H3 | 10.05 | | 10.4 | 0.396 | | 0.409 |
| L | | 16.97 | | | 0.668 | |
| L1 | | 14.92 | | | 0.587 | |
| L2 | | 21.54 | | | 0.848 | |
| L3 | | 22.62 | | | 0.891 | |
| L5 | 2.6 | | 3 | 0.102 | | 0.118 |
| L6 | 15.1 | | 15.8 | 0.594 | | 0.622 |
| L7 | 6 | | 6.6 | 0.236 | | 0.260 |
| M | | 2.8 | | | 0.110 | |
| M1 | | 5.08 | | | 0.200 | |
| Dia. | 3.65 | | 3.85 | 0.144 | | 0.152 |

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