

**5.1V +12V REGULATOR WITH DISABLE AND RESET**

- OUTPUT CURRENTS UP TO 1A
- FIXED PRECISION OUTPUT 1 VOLTAGE 5.1V +/- 2%
- FIXED PRECISION OUTPUT 2 VOLTAGE 12V +/- 2%
- OUTPUT 1 WITH RESET FACILITY
- OUTPUT 2 WITH DISABLE BY TTL INPUT
- SHORT CIRCUIT PROTECTION AT BOTH OUTPUTS
- THERMAL PROTECTION
- LOW DROP OUTPUT VOLTAGE
- AVAILABLE ALSO IN HEPTAWATT PACKAGE IN TWO VERSIONS : TDA8138A (DISABLE ONLY), TDA8138B (RESET ONLY)

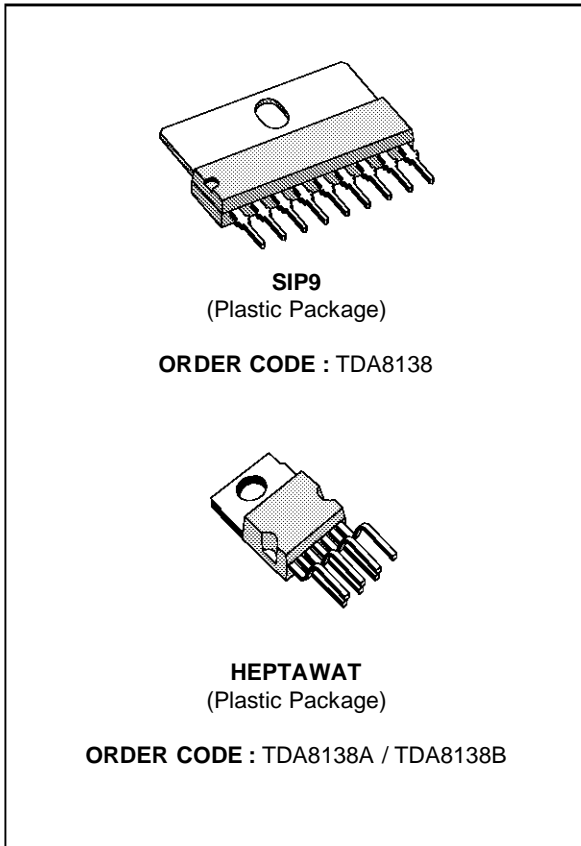
**DESCRIPTION**

The TDA8138 is a monolithic dual positive voltage regulator designed to provide fixed precision output voltages of 5.1V and 12V at currents up to 1A.

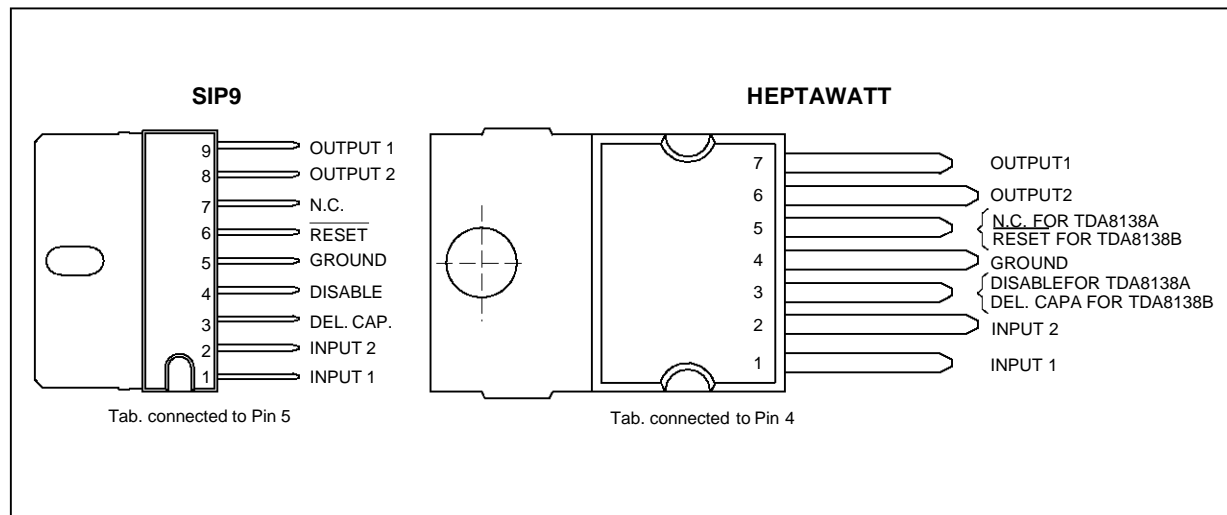
An internal reset circuit generates a reset pulse when the output 1 decrease below the regulated voltage value (for TDA8138 and TDA8138B).

Output 2 can be disabled by TTL input (for TDA8138 and TDA8138A).

Short circuit and thermal protections are included in all the versions.



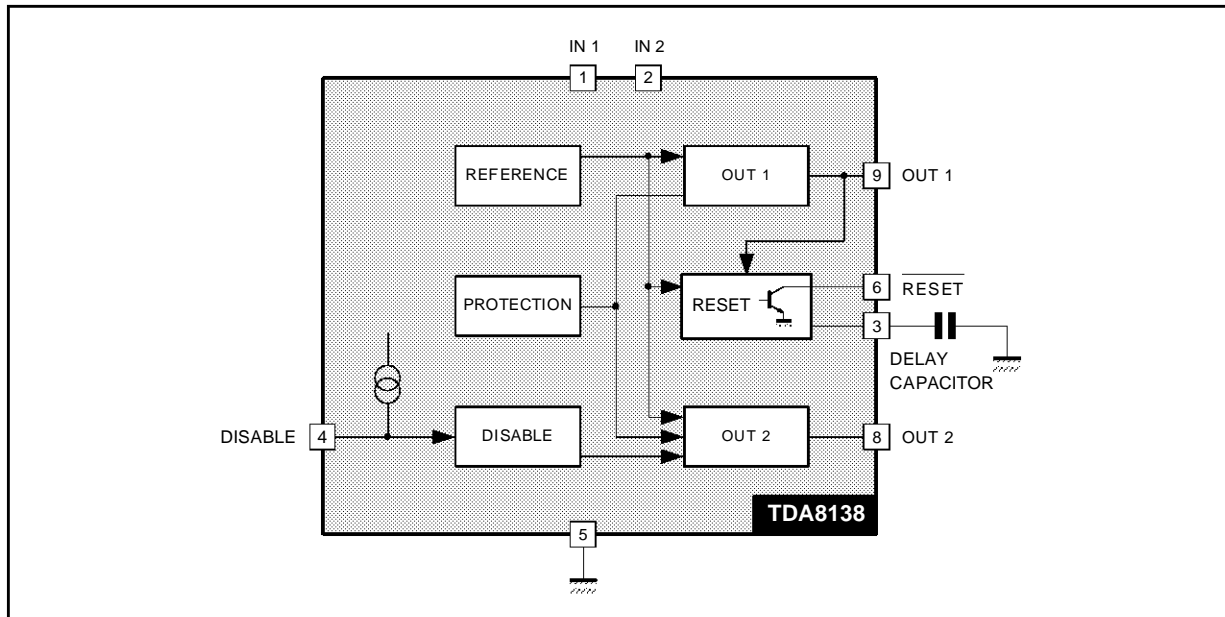
**PIN CONNECTIONS**



8138-01A.EPS-8138-01B.EPS

# TDA8138

## BLOCK DIAGRAM (SIP9 package)



8138-02.EPS

## ABSOLUTE MAXIMUM RATINGS

| Symbol     | Parameter   | Value              | Unit |
|------------|---|--------------------|------|
| $V_{IN}$   | DC Input Voltage Pin 1                                  | 20                 | V    |
| $V_{DIS}$  | Disable Input Voltage Pin 3 (Heptawatt) or Pin 4 (SIP9) | 20                 | V    |
| $V_{RST}$  | Output Voltage at Pin 6 (SIP9) or Pin 5 (Heptawatt)     | 20                 | V    |
| $I_{O1,2}$ | Output Currents   | Internally Limited |      |
| $P_t$      | Power Dissipation                                       | Internally Limited |      |
| $T_{stg}$  | Storage Temperature                                     | -65 to +150        | °C   |
| $T_j$      | Junction Temperature                                    | 0 to +150          | °C   |

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## THERMAL DATA

| Symbol        | Parameter   | Value  | Unit         |
|---------------|---|--------|--------------|
| $R_{th(j-c)}$ | Maximum Thermal Resistance Junction-case for SIP9<br>Maximum Thermal Resistance Junction-case for Heptawatt | 8<br>3 | °C/W<br>°C/W |
| $R_{th(j-a)}$ | Maximum Thermal Resistance Junction-ambient for SIP9  | 60     | °C/W         |
| $T_j$         | Maximum Recommended Junction Temperature  | 130    | °C           |

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**ELECTRICAL CHARACTERISTICS** ( $V_{IN1} = 7V$ ,  $V_{IN2} = 14V$ ,  $T_j = 25^\circ C$ , unless otherwise specified)

| Symbol       | Parameter   | Test Conditions  | Min.      | Typ.       | Max.       | Unit            |
|--------------|---|--|-----------|------------|------------|-----------------|
| $V_{O1}$     | Output Voltage  | $I_{O1} = 10mA$  | 5         | 5.1        | 5.2        | V               |
| $V_{O2}$     | Output Voltage  | $I_{O2} = 10mA$  | 11.76     | 12         | 12.24      | V               |
| $V_{O1}$     | Output Voltage  | $7V < V_{IN1} < 14V$   | 4.9       |            | 5.3        | V               |
| $V_{O2}$     | Output Voltage  | $14 < V_{IN2} < 18V$<br>$5mA < I_{O1,2} < 750mA$                                       | 11.5      |            | 12.5       | V               |
| $V_{IO1,2}$  | Dropout Voltage   | $I_{O1,2} = 750mA$<br>$I_{O1,2} = 1A$  |           |            | 1.4<br>2   | V<br>V          |
| $V_{O1,2LI}$ | Line Regulation   | $7V < V_{IN1} < 14V$<br>$14 < V_{IN2} < 18V$<br>$I_{O1,2} = 200mA$                     |           |            | 50<br>120  | mV<br>mV        |
| $V_{O1,2LO}$ | Load Regulation   | $5mA < I_{O1} < 0.6A$<br>$5mA < I_{O2} < 0.6A$   |           |            | 100<br>250 | mV<br>mV        |
| $I_Q$        | Quiescent Current   | $I_{O1} = 10mA$<br>Output 2 Disabled   |           |            | 2          | mA              |
| $V_{O1RST}$  | Reset Threshhold Voltage  | $K = V_{O1}$   | $K - 0.4$ | $K - 0.25$ | $K - 0.1$  | V               |
| $V_{RTH}$    | Reset Threshhold Hysteresis   | See circuit description  | 20        | 50         | 75         | mV              |
| $t_{RD}$     | Reset Pulse Delay   | $C_e = 100nF$<br>See circuit description   |           | 25         |            | ms              |
| $V_{RL}$     | Saturation Voltage in Reset Condition   | $I_5 = 5mA$  |           |            | 0.4        | V               |
| $I_{RH}$     | Leakage Current in Normal Condition<br>(at Pin 6 for SIP9 or Pin 5 for Heptawatt) | $V_5 = 10V$  |           |            | 10         | $\mu A$         |
| $K_{O1,2}$   | Output Voltage Thermal Drift  | $T_j = 0$ to $125^\circ C$<br>$K_O = \frac{\Delta V_O \cdot 10^6}{\Delta T \cdot V_O}$ |           | 100        |            | ppm/ $^\circ C$ |
| $I_{O1,2SC}$ | Short Circuit Output Current  | $V_{IN1} = 7V$ , $V_{IN2} = 14V$<br>$V_{IN1,2} = 16V$ (see Note)                       |           |            | 1.6<br>1   | A<br>A          |
| $V_{DISH}$   | Disable Voltage High (out 2 active)   |  | 2         |            |            | V               |
| $V_{DISL}$   | Disable Voltage Low (out 2 disabled)  |  |           |            | 0.8        | V               |
| $I_{DIS}$    | Disable Bias Current  | $0V < V_{DIS} < 7V$  | -100      |            | 2          | $\mu A$         |
| $T_{jsd}$    | Junction Temperature for Thermal Shut Down  |  |           | 145        |            | $^\circ C$      |

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**Note** : Safe permanent short-circuit is only guaranteed for input voltages up to 16V.

**CIRCUIT DESCRIPTION**

The TDA8138 is a dual voltage regulator with Reset and Disable (TDA8138A: Disable only, TDA8138B: Reset only).

The two regulation parts are supplied from one voltage reference circuit trimmed by zener zap during EWS test.

Since the supply voltage of this last is connected at Pin 1 ( $V_{IN1}$ ), the regulator 2 will not work if Pin 1 is not supplied.

The outputs stage have been realized in darlington configuration with a drop typical 1.2V.

The disable circuit, switch-off the output 2 if a voltage lower than 0.8V is applied at Pin 3

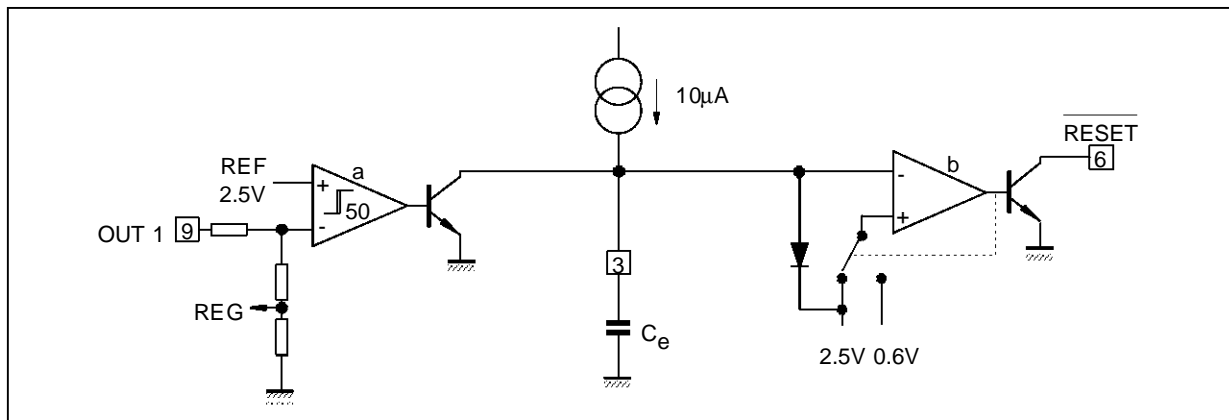
(Heptawatt) or Pin 4 (SIP9)

The Reset circuit checks the voltage at the output 1. If this one goes below  $V_{OUT} - 0.25V$  (4.85V typ.), the comparator "a" (see Figure 1) discharges rapidly the capacitor  $C_e$  and the reset output goes at once Low. When the voltage at the out1 rises above  $V_{OUT} - 0.2V$  (4.9V typ.), the voltage  $V_{C_e}$  increases linearly to 2.5V corresponding to a delay

$t_d$  following the law :  $t_1 = \frac{C_e \cdot 2.5V}{10\mu A}$  (see Figure 2),

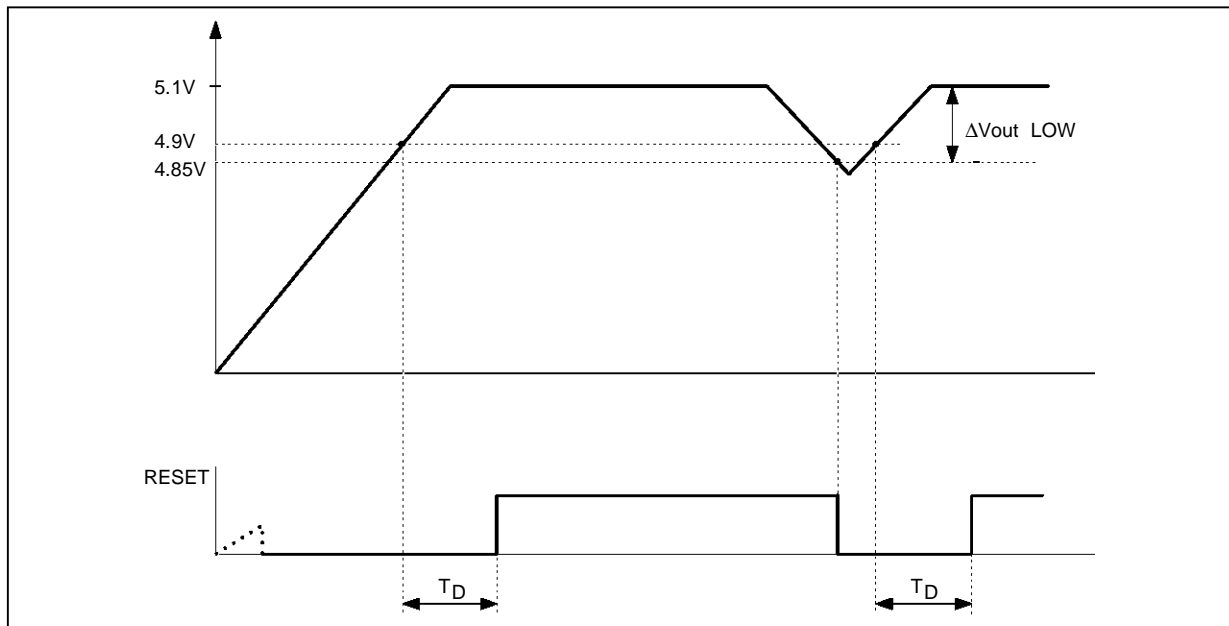
then the reset output goes high again. To avoid glitches in the reset output, the second comparator "b" has a large hysteresis (1.9V).

Figure 1



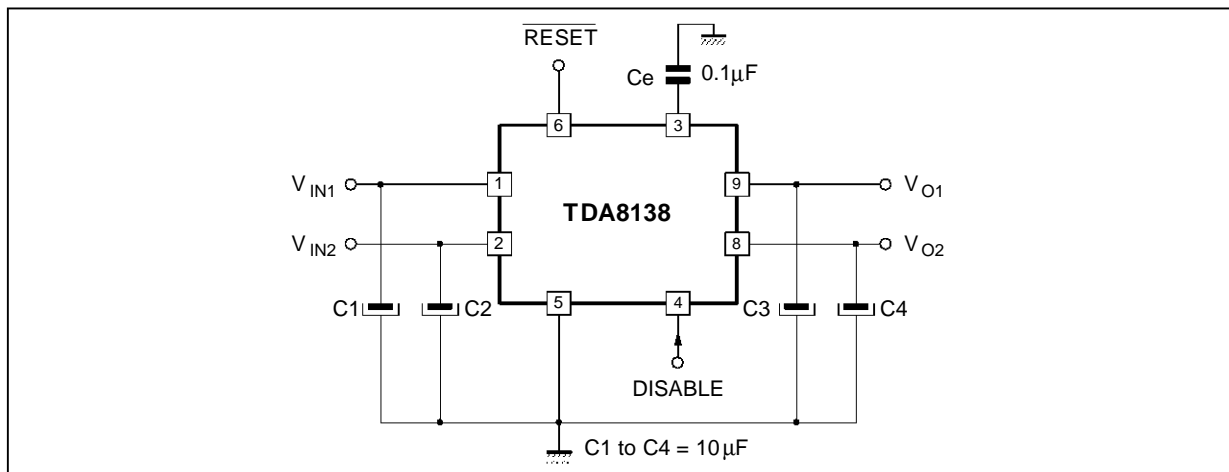
8138-03.EPS

Figure 2



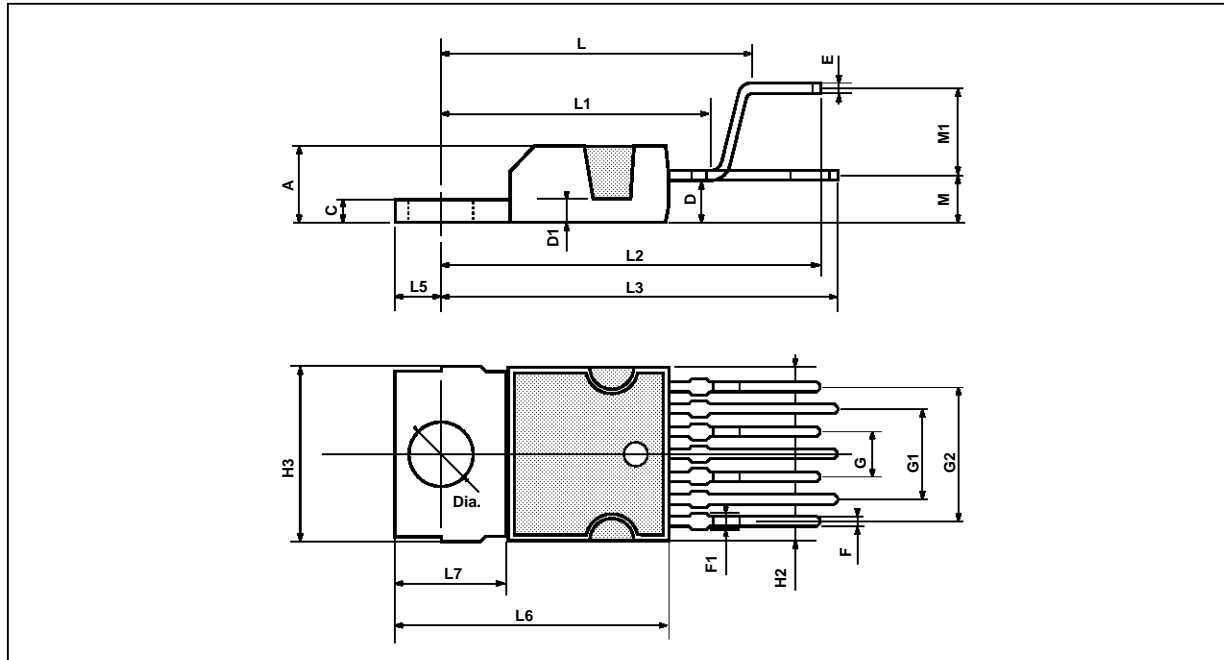
8138-04.EPS

TYPICAL APPLICATION (SIP9 package)



8138-05.EPS

**PACKAGE MECHANICAL DATA**  
**9 PINS - PLASTIC HEPTAWATT**



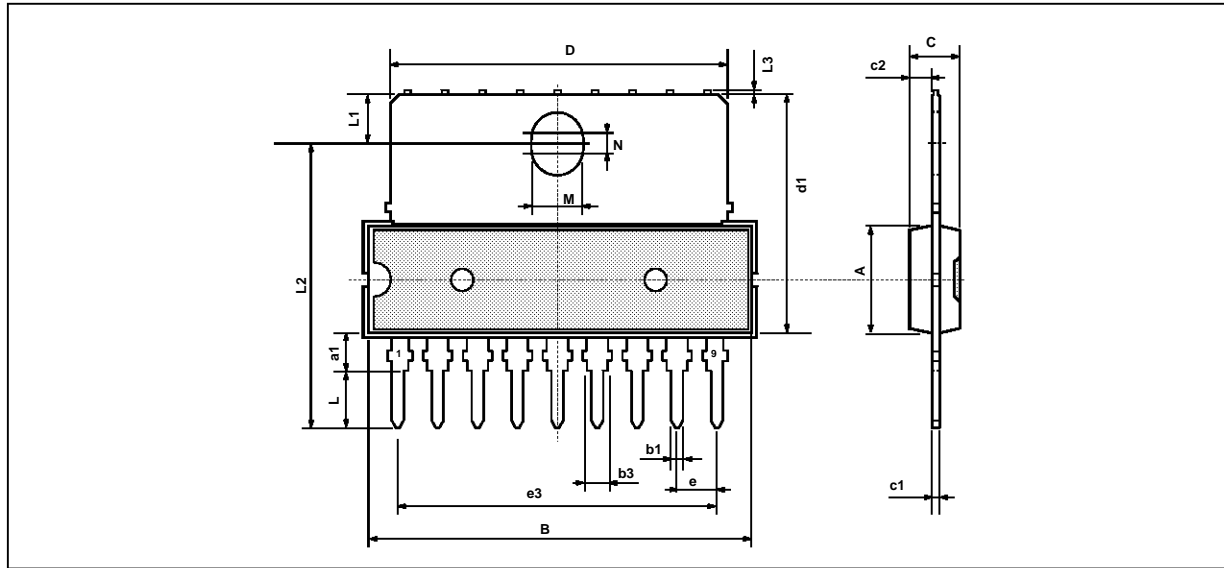
PM-HEPTV.EPS

| 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         |       | 0.8  | 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 |

HEPTV.TBL

**PACKAGE MECHANICAL DATA**

9 PINS - PLASTIC SIP



PM-SIP9.EPS

| Dimensions | Millimeters |       |      | Inches |       |       |
|------------|-------------|-------|------|--------|-------|-------|
|            | Min.        | Typ.  | Max. | Min.   | Typ.  | Max.  |
| A          |             |       | 7.1  |        |       | 0.280 |
| a1         | 2.7         |       | 3    | 0.106  |       | 0.118 |
| B          |             |       | 24.8 |        |       | 0.976 |
| b1         |             | 0.5   |      |        | 0.020 |       |
| b3         | 0.85        |       | 1.6  | 0.033  |       | 0.063 |
| C          |             | 3.3   |      |        | 0.130 |       |
| c1         |             | 0.43  |      |        | 0.017 |       |
| c2         |             | 1.32  |      |        | 0.052 |       |
| D          |             |       | 21.2 |        |       | 0.835 |
| d1         |             | 14.5  |      |        | 0.571 |       |
| e          |             | 2.54  |      |        | 0.100 |       |
| e3         |             | 20.32 |      |        | 0.800 |       |
| L          | 3.1         |       |      | 0.122  |       |       |
| L1         |             | 3     |      |        | 0.118 |       |
| L2         |             | 17.6  |      |        | 0.693 |       |
| L3         |             |       | 0.25 |        |       | 0.010 |
| M          |             | 3.2   |      |        | 0.126 |       |

SIP9.TBL

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