

## 6W AMPLIFIER WITH MUTING

### 1 FEATURES

- WIDE SUPPLY VOLTAGE RANGE
- 6W @  $V_S = 20V$ ,  $R_L = 8\Omega$ , THD=10%
- MUTE FACILITY (POP FREE) WITH LOW CONSUMPTION
- AC SHORT CIRCUIT PROTECTION
- THERMAL OVERLOAD PROTECTION (150°C)

### 2 DESCRIPTION

The TDA7253L is class AB audio power amplifier assembled in the Single in Line 10 pins Package.

Figure 1. Package

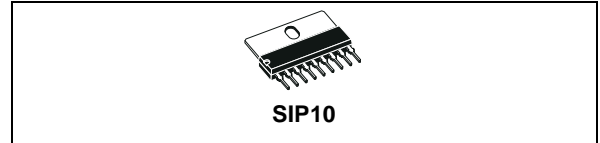
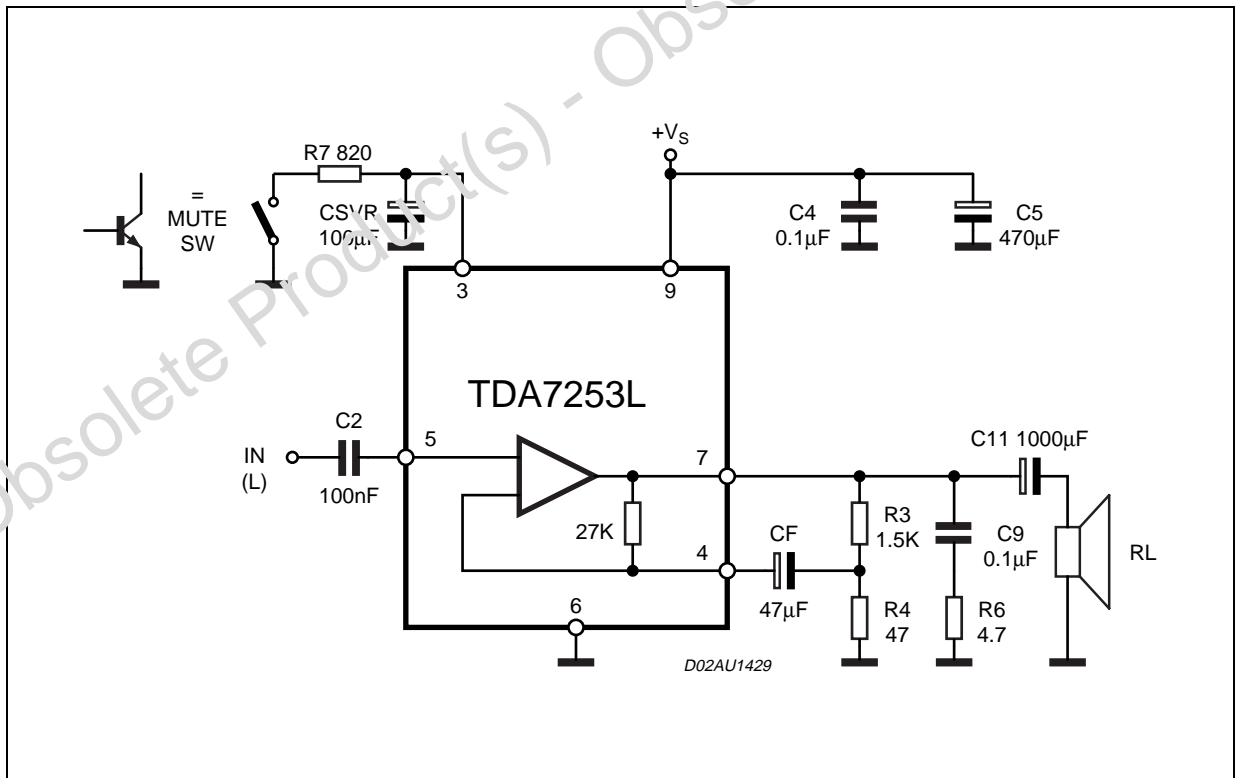


Table 1. Order Codes

| Part Number | Package |
|-------------|---------|
| TDA7253L    | SIP10   |

Figure 2. Test and Application Circuit



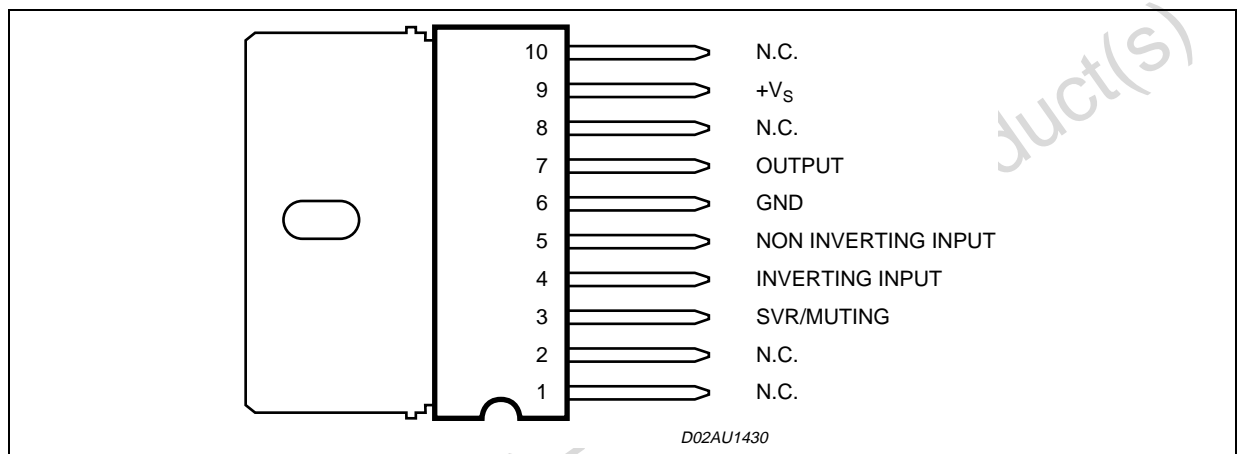
**Table 2. Absolute Maximum Ratings**

| Symbol         | Parameter   | Value      | Unit             |
|----------------|---|------------|------------------|
| $V_S$          | Supply Voltage  | 30         | V                |
| $I_O$          | Output Peak Current (repetitive $f > 20\text{Hz}$ )         | 1.7        | A                |
| $I_O$          | Output Peak Current (non repetitive, $t = 100\mu\text{s}$ ) | 2          | A                |
| $P_{tot}$      | Total Power Dissipation ( $T_{case} = 70^\circ\text{C}$ )   | 8          | W                |
| $T_{op}$       | Operating Temperature Range                                 | 0 to 70    | $^\circ\text{C}$ |
| $T_{stg}, T_j$ | Storage & Junction Temperature                              | -40 to 150 | $^\circ\text{C}$ |

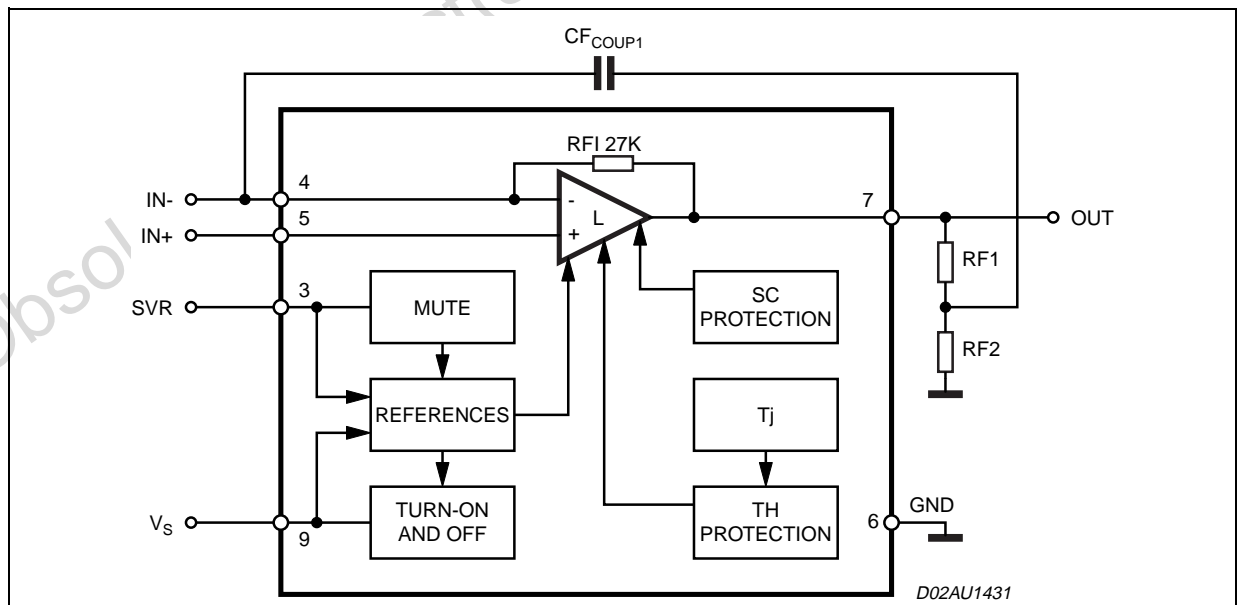
**Table 3. Thermal Data**

| Symbol           | Parameter                           | Value | Unit               |
|------------------|-------------------------------------|-------|--------------------|
| $R_{th\ j-case}$ | Thermal resistance junction to case | Max 9 | $^\circ\text{C/W}$ |

**Figure 3. Pin Connection (Top view)**



**Figure 4. Block Diagram**



**Table 4. ELECTRICAL CHARACTERISTICS**

(Refer to the test and application circuit,  $V_S = 20V$ ;  $R_L = 8\Omega$ ;  $G_v = 30dB$ ;  $f = 1KHz$ ;  $T_{amb} = 25^\circ C$  unless otherwise specified).

| Symbol        | Parameter                      | Test Condition                                 | Min. | Typ. | Max. | Unit      |
|---------------|--------------------------------|--|------|------|------|-----------|
| $V_S$         | Supply Voltage                 |  | 10   |      | 24   | V         |
| $V_O$         | Quiescent Output Voltage       |  |      | 9.5  |      | V         |
| $I_q$         | Total Quiescent Current        |  |      | 30   | 60   | mA        |
| $P_O$         | Output Power                   | $d = 10\%$                                     | 5    | 6    |      | W         |
|               |                                | $d = 1\%$                                      | 4    | 5    |      | W         |
| $d$           | Total Harmonic Distortion      | $P_O = 1W$                                     |      | 0.03 | 0.3  | %         |
| $R_I$         | Input Resistance               |  | 100  | 200  |      | $K\Omega$ |
| $f_L$         | Low Frequency Roll-off (-3dB)  |  |      | 40   |      | Hz        |
| $f_H$         | High Frequency Roll-off (-3dB) |  |      | 80   |      | KHz       |
| $e_N$         | Total Input Noise Voltage      | A Curve; $R_S = 10K\Omega$                     |      | 2    |      | mV        |
|               |                                | $f = 22Hz$ to $22KHz$ ; $R_S = 10K\Omega$      |      | 2.5  | 10   | $\mu V$   |
| SVR           | Supply Voltage Rejection       | $R_S = 10K\Omega$ ; $f = 100Hz$ ; $V_r = 0.5V$ | 46   | 60   |      | dB        |
| $V_{T\_MUTE}$ | Mute Threshold                 |  | 1    | 1.6  |      | V         |
| $V_{T\_PLAY}$ | Play Threshold                 |  |      | 4.5  |      | V         |
| $A_M$         | Mute Attenuation               |  | 80   | 100  |      | dB        |
| $I_{q\_MUTE}$ | Quiescent Current Mute         |  |      | 6    | 10   | mA        |

Note: to avoid pop-on noise  $\frac{C_F}{C_{SVR}} \leq 1$

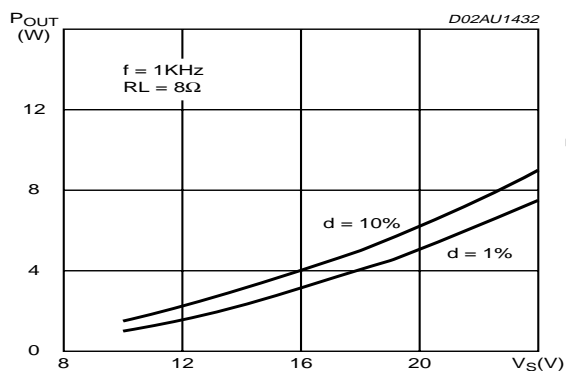
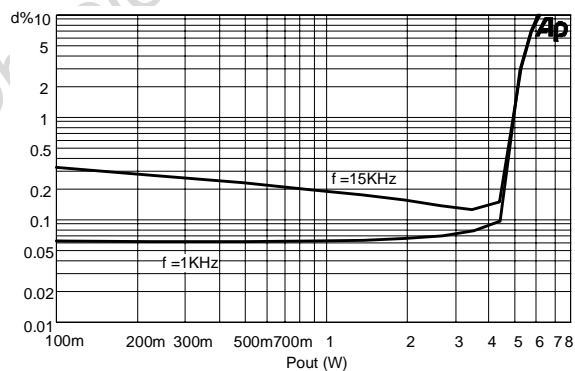
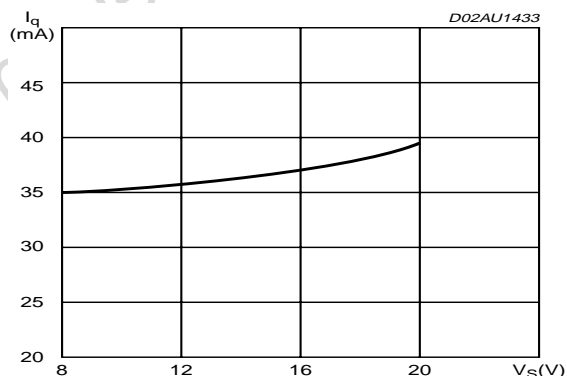
**Figure 5. Output Power vs. Supply Voltage****Figure 7. Distortion vs. Output Power****Figure 6. Quiescent Current vs. Supply Voltage**

Figure 8. PC Board Component Layout

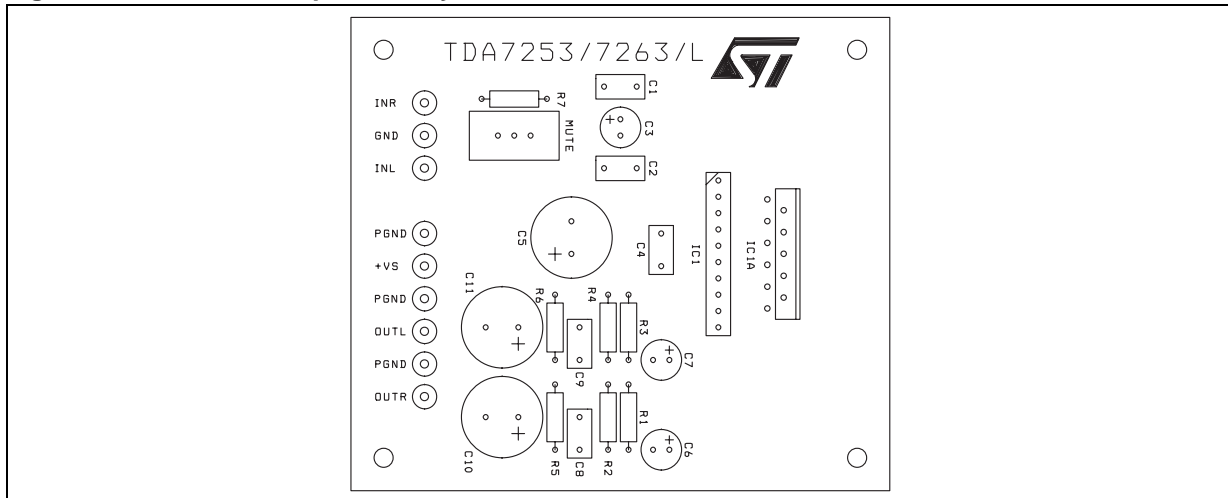


Figure 9. Evaluation Board Top Layer Layout

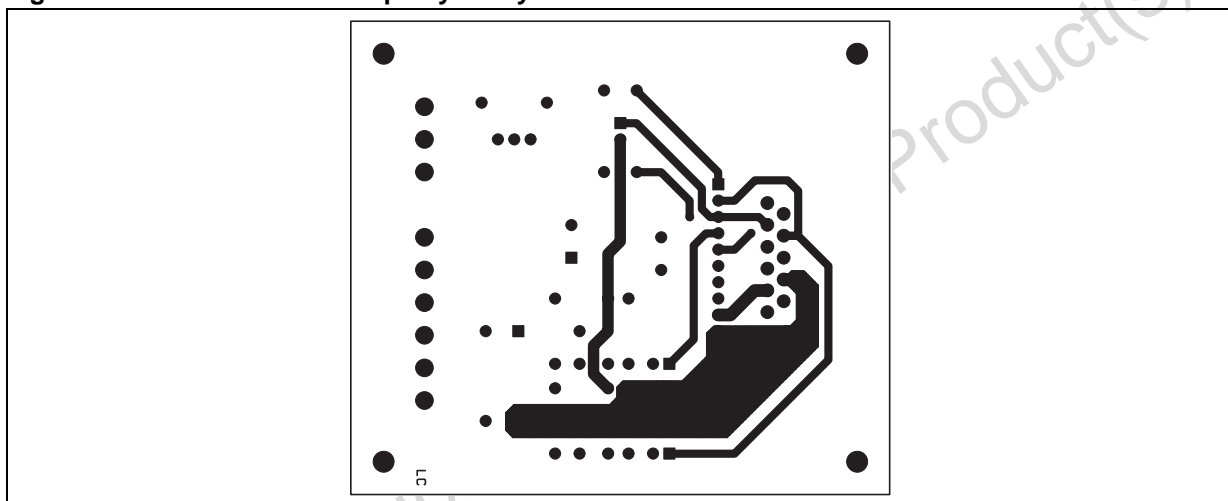
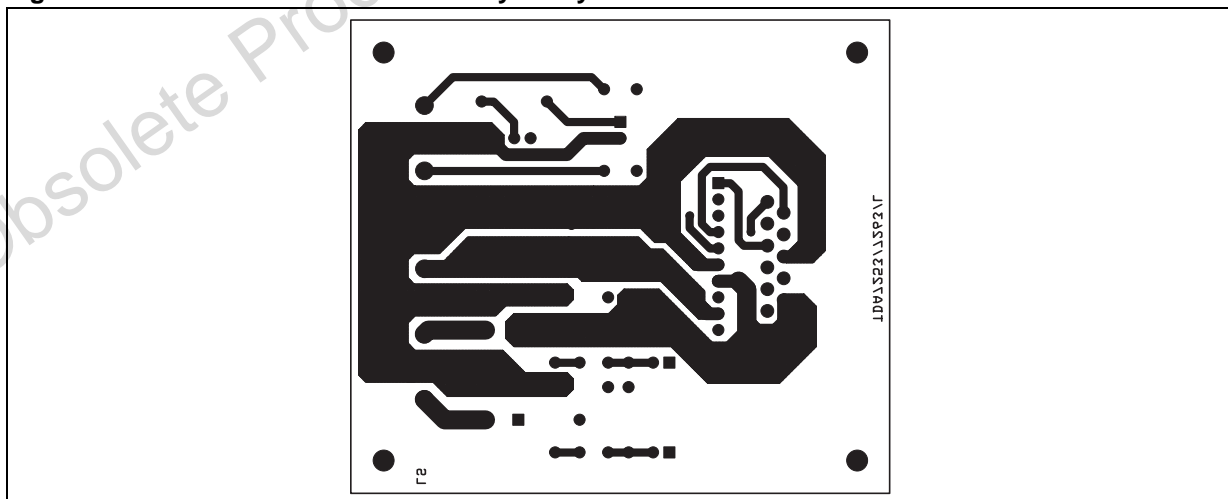


Figure 10. Evaluation Board Bottom Layer Layout



### 3 HEAT SINK DIMENSIONING:

In order to avoid the thermal protection intervention, that is placed approximatively at  $T_j = 150^\circ\text{C}$ , it is important the dimensioning of the Heat Sinker  $R_{Th}$  ( $^\circ\text{C}/\text{W}$ ).

The parameters that influence the dimensioning are:

- Maximum dissipated power for the device ( $P_{dmax}$ )
- Max thermal resistance Junction to case ( $R_{Th\ j-c}$ )
- Max. ambient temperature  $T_{amb\ max}$
- Quiescent current  $I_q$  (mA)

#### 3.1 Example:

$V_{CC} = 20\text{V}$ ,  $R_{load} = 80\text{ohm}$ ,  $R_{Th\ j-c} = 9\ ^\circ\text{C}/\text{W}$ ,  $T_{amb\ max} = 50^\circ\text{C}$

$$P_{dmax} = (N^\circ \text{ channels}) \cdot \frac{2V_{CC}^2}{\Pi^2 \cdot R_{load}} + I_q \cdot V_{CC}$$

$$P_{dmax} = 1 \cdot (2.5) + 0.5 = 3\text{W}$$

$$(\text{Heat Sinker}) R_{Th\ c-a} = \frac{150 - T_{amb\ max}}{P_{d\ max}} - R_{Th\ j-c} = \frac{150 - 50}{6} - 9 = 24.3^\circ\text{C}/\text{W}$$

In figure 8 is shown the Power derating curve for the device.

**Figure 11. Power Derating Curve**

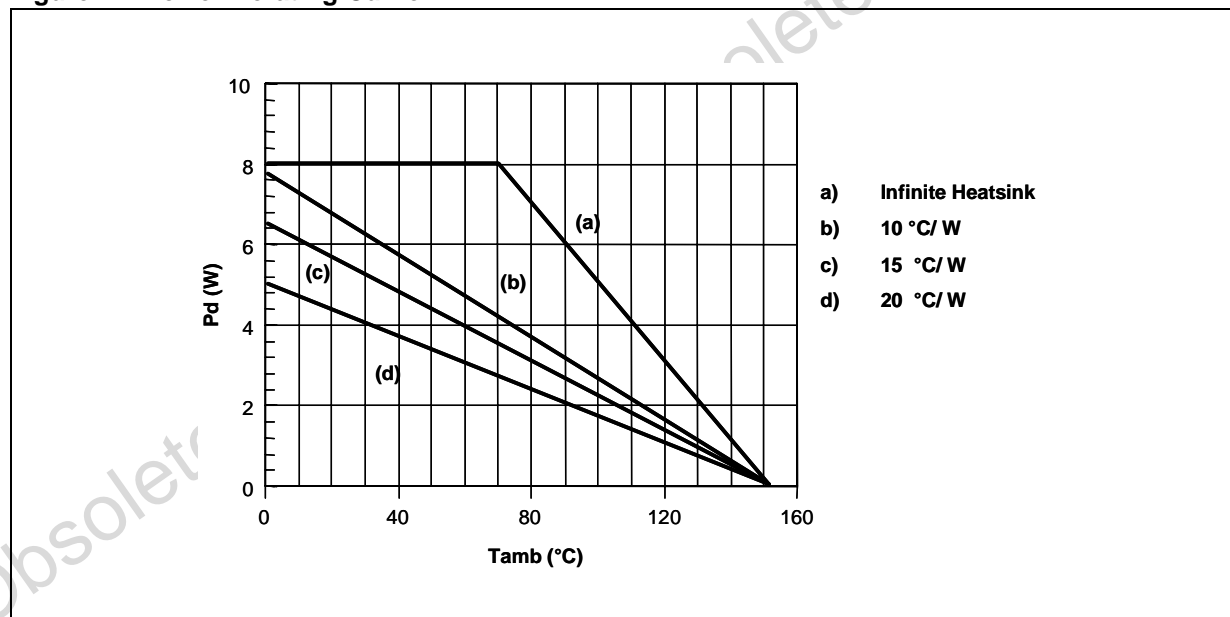
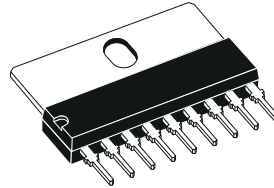


Figure 12. SIP10 Mechanical Data & Package Dimensions

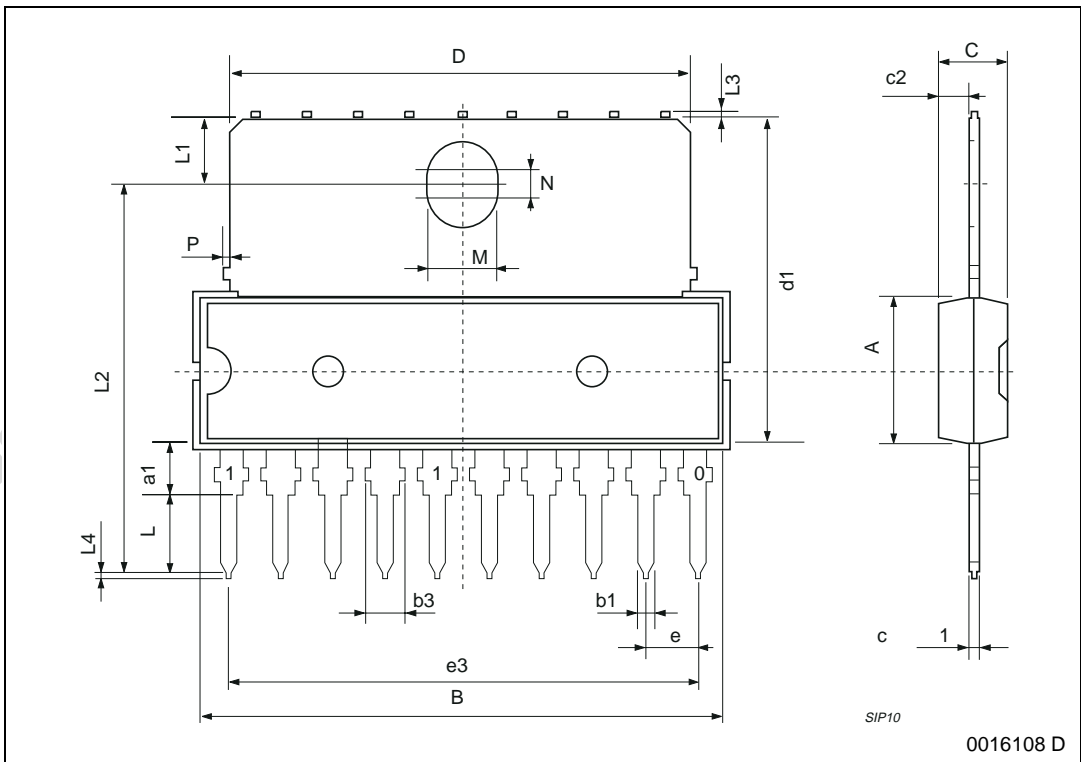
| DIM. | mm   |       |       | inch  |       |       |
|------|------|-------|-------|-------|-------|-------|
|      | MIN. | TYP.  | MAX.  | MIN.  | TYP.  | MAX.  |
| A    |      |       | 7.1   |       |       | 0.280 |
| a1   | 2.7  |       | 3     | 0.106 |       | 0.118 |
| B    |      |       | 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    |      |       | 23.7  |       |       | 0.933 |
| d1   |      | 14.5  |       |       | 0.571 |       |
| e    |      | 2.54  |       |       | 0.100 |       |
| e3   |      | 22.86 |       |       | 0.900 |       |
| L    | 3.1  |       |       | 0.122 |       |       |
| L1   |      | 3     |       |       | 0.118 |       |
| L2   |      | 17.6  |       |       | 0.693 |       |
| L3   |      |       | 0.25  |       |       | 0.010 |
| L4   |      |       | 0.254 |       |       | 0.010 |
| M    |      | 3.2   |       |       | 0.126 |       |
| N    |      | 1     |       |       | 0.039 |       |
| P    |      |       | 0.15  |       |       | 0.006 |

**OUTLINE AND MECHANICAL DATA**

Weight: 2.02gr



**SIP10**



SIP10

0016108 D

**Table 5. Revision History**

| Date           | Revision | Description of Changes  |
|----------------|----------|---|
| June 2003      | 1        | First Issue   |
| September 2004 | 2        | Changed Status and the graphic aspect in compliant to the new rules "Corporate Technical Publications Design Guide" |

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