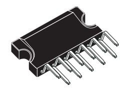
10W+10W STEREO AMPLIFIER WITH MUTE & ST-BY

1 FEATURES

- WIDE SUPPLY VOLTAGE RANGE UP TO +20V
- SPLIT SUPPLY
- 10+10W @THD = 10%, R_L= 8Ω, V_S = ±14V
- NO POP AT TURN-ON/OFF
- MUTE (POP FREE)
- STAND-BY FEATURE (LOW I_q)
- SHORT CIRCUIT PROTECTION TO GND
- THERMAL OVERLOAD PROTECTION
- CLIPWATT 11 PACKAGE

Figure 1. Package



Clipwatt11

Table 1. Order Codes

Part Number	Package
TDA7269SA	Clipwatt11

2 DESCRIPTION

The TDA7269SA is class AB power amplifier assembled in the @ Clipwatt 11 package, specially designed for high quality sound application as Hi-Fi music centers and stereo TV sets.

The TDA7269SA is pin to pin compatible with TDA7269, TDA7269A, TDA7269ASA, TDA7265, TDA7499, TDA7499SA.

Figure 2. Block Diagram

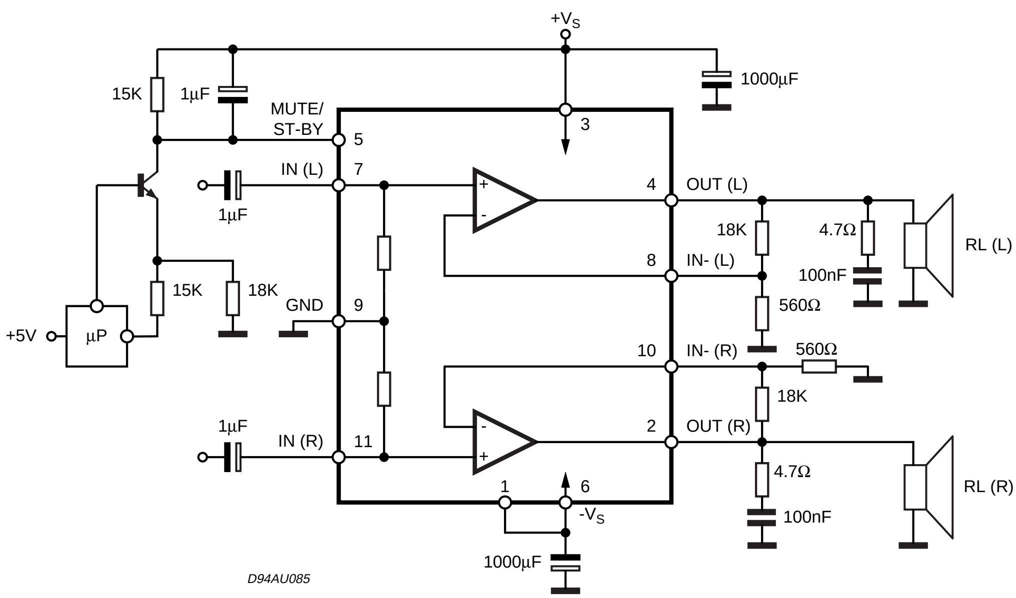


Table 2. Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_S	DC Supply Voltage	±22	V
I_O	Output Power Current (internally limited)	3	A
P_{tot}	Total Power Dissipation (Tamb = 70°C)	20	W
T_{amb}	Ambient Operating Temperature (1)	0 to 70	°C
T_{stg}, T_j	Storage and Junction Temperature	-40 to 150	°C

Figure 3. Pin Connection (Top view)

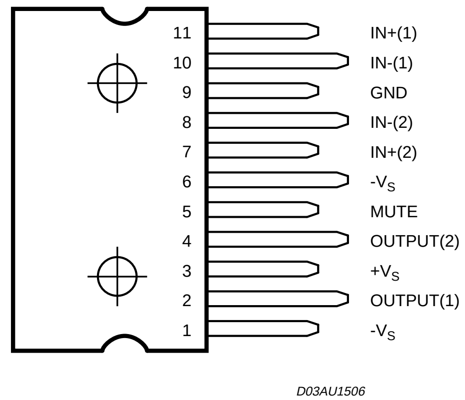


Table 3. Thermal Data

Symbol	Parameter	Value	Unit
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case Max.	3.9	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	48	°C/W

Figure 4. Single Supply Application

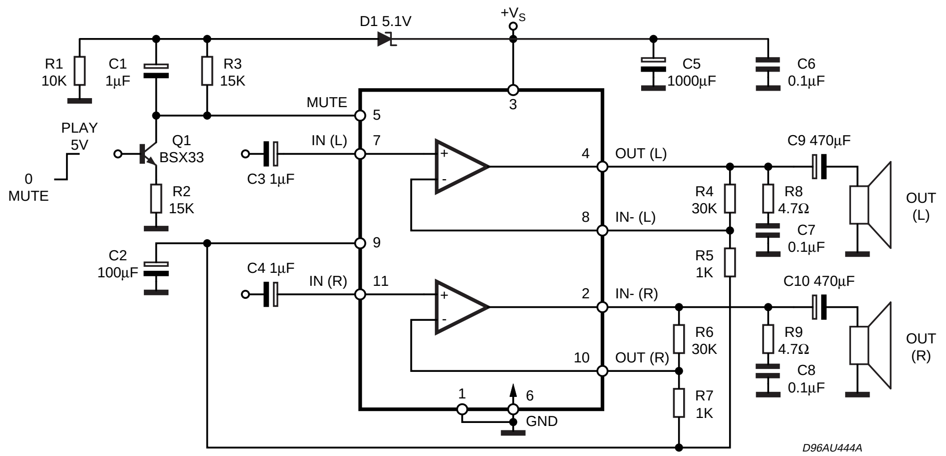


Table 4. ELECTRICAL CHARACTERISTCS

(Refer to the test circuit V_S = ±14V; R_L = 8Ω; R_S = 50Ω; G_V = 30dB, f = 1KHz; T_{amb} = 25°C, unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_S	Supply Voltage Range	R_L = 8Ω; R_L = 4Ω;	±5 ±5		±20 ±15	V V
I_q	Total Quiescent Current			60	100	mA
V_{OS}	Input Offset Voltage		-25		25	mV
I_b	Non Inverting Input Bias Current			500		nA
P_O	Output Power	THD = 10%; R_L = 8Ω; V_S = ±12.5V; R_L = 4Ω;	 8 7.5	 10 10		 W W
		THD = 1%; R_L = 8Ω; V_S = ±12.5V; R_L = 4Ω;		 7.5 7.5		 W W
THD	Total Harmonic Distortion	R_L = 8Ω; P_O = 1W; f = 1KHz;		0.03		%
		R_L = 8Ω; P_O = 0.1 to 5W; f = 100Hz to 15KHz;			0.7	%
		R_L = 4Ω; P_O = 1W; f = 1KHz;		0.02		%
		R_L = 4Ω; V_S = ±10V; P_O = 0.1 to 5W; f = 100Hz to 15KHz;			1	%
C_T	Cross Talk	f = 1KHz; f = 10KHz;	 50	70 60		dB dB
SR	Slew Rate		6.5	10		V/µs
G_{OL}	Open Loop Voltage Gain			80		dB
e_N	Total Output Noise	A Curve f = 20Hz to 22KHz		3 4	 8	µV µV
R_i	Input Resistance		15	20		KΩ
SVR	Supply Voltage Rejection (each channel)	f = 100Hz; V_R = 0.5V		60		dB
T_j	Thermal Shut-down Junction Temperature			145		°C
MUTE FUNCTION [ref +V_S] (*)						
V_{MUTE}	Mute /Play threshold		-7	-6	-5	V
A_{MUTE}	Mute Attenuation		60	70		dB
STAND-BY FUNCTIONS [ref: +V_S] (only for Split Supply)						
V_{ST-BY}	Stand-by Mute threshold		-3.5	-2.5	-1.5	V
A_{ST-BY}	Stand-by Attenuation			110		dB
I_{qST-BY}	Quiescent Current @ Stand-by			3	6	mA

(*) In mute condition the current drawn from Pin 5 must be ≤650µA

3 MUTE STAND-BY FUNCTION

The pin 5 (MUTE/STAND-BY) controls the amplifier status by two different thresholds, referred to $+V_S$.

– When V_{pin5} higher than = $+V_S$ -2.5V the amplifier is in Stand-by mode and the final stage generators are off.

– When V_{pin5} between = $+V_S$ -2.5V and V_S -6V the final stage current generators are switched on and the amplifier is in mute mode.

– When V_{pin5} lower than = $+V_S$ -6V the amplifier is play mode.

Figure 5.

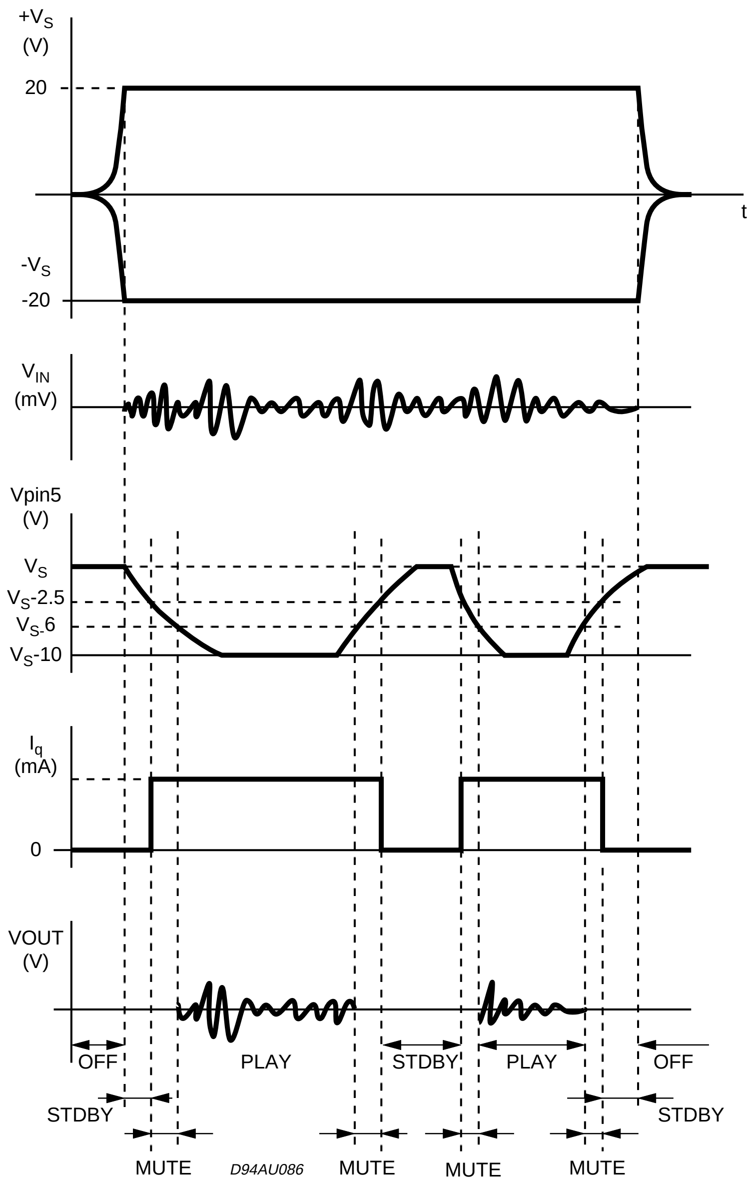
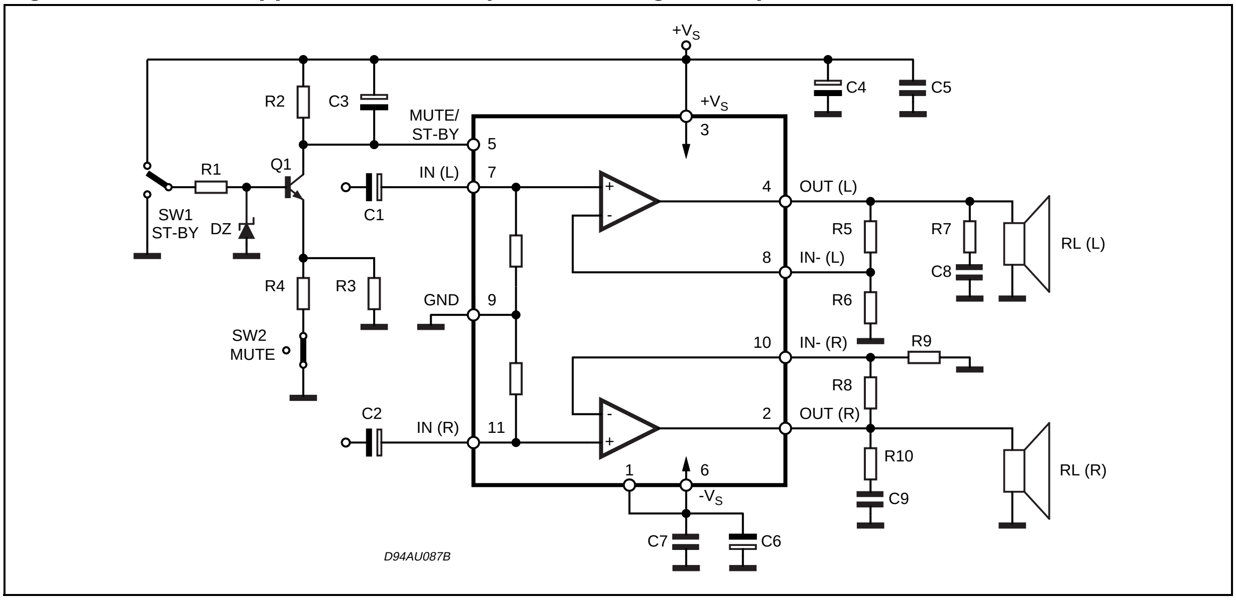


Figure 6. Test and Application Circuit (Stereo Configuration)



4 APPLICATION SUGGESTIONS

4.1 (Demo Board Schematic)

The recommended values of the external components are those shown the demoboard schematic different values can be used, the following table can help the designer

Table 5. .

COMPONENT	SUGGESTION VALUE	PURPOSE	LARGER THAN RECOMMENDED VALUE	SMALLER THAN RECOMMENDED VALUE
R1	10KΩ	Mute Circuit	Increase of Dz Biasing Current	
R2	15KΩ	Mute Circuit	V_{pin} #5 Shifted Downward	V_{pin} #5 Shifted Upward
R3	18KΩ	Mute Circuit	V_{pin} #5 Shifted Upward	V_{pin} #5 Shifted Downward
R4	15KΩ	Mute Circuit	V_{pin} #5 Shifted Upward	V_{pin} #5 Shifted Downward
R5, R8	18KΩ	Closed Loop Gain Setting (*)	Increase of Gain	
R6, R9	560Ω		Decrease of Gain	
R7, R10	4.7Ω	Frequency Stability	Danger of Oscillations	Danger of Oscillations
C1, C2	1µF	Input DC Decoupling		Higher Low Frequency Cutoff
C3	1µF	St-By/Mute Time Constant	Larger On/Off Time	Smaller On/Off Time
C4, C6	1000µF	Supply Voltage Bypass		Danger of Oscillations
C5, C7	0.1µF	Supply Voltage Bypass		Danger of Oscillations
C8, C9	0.1µF	Frequency Stability		
Dz	5.1V	Mute Circuit		

(*) Closed loop gain has to be ≥25dB

4.2 PC Board

Figure 7. LC

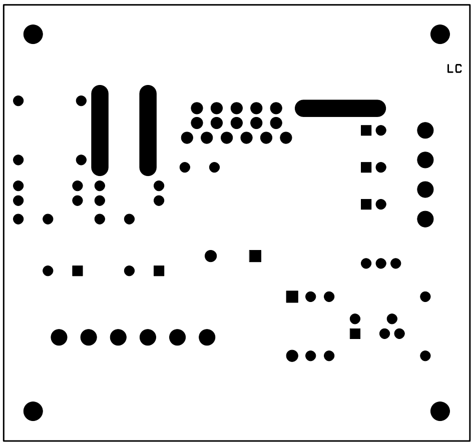


Figure 8. LS

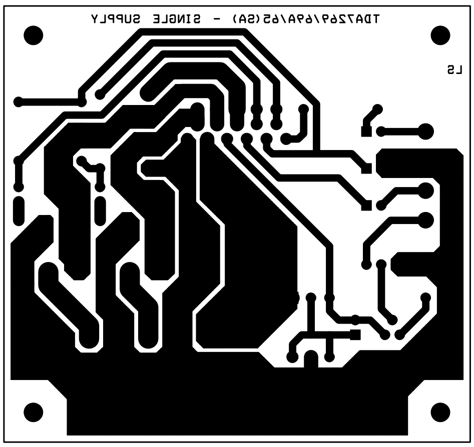
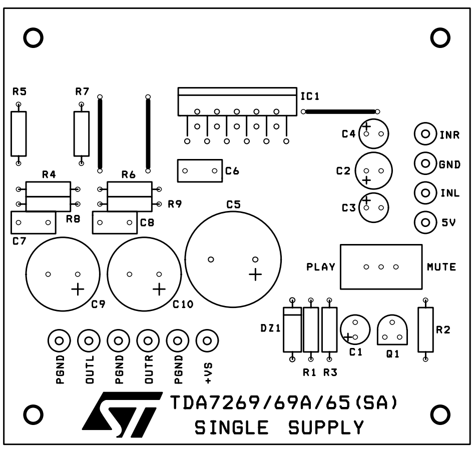


Figure 9. Component Layout



5 HEAT SINK DIMENSIONING:

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

The parameters that influence the dimensioning are:

– Maximum dissipated power for the device (P_{dmax})

– Max thermal resistance Junction to case ($R_{Th\ j\text{-}c}$)

– Max. ambient temperature $T_{amb\ max}$

– Quiescent current I_q (mA)

5.1 Example:

V_{CC} = ±14V, R_{load} = 8ohm, $R_{Th\ j\text{-}c}$ = 3.9 °C/W , $T_{amb\ max}$ = 50°C

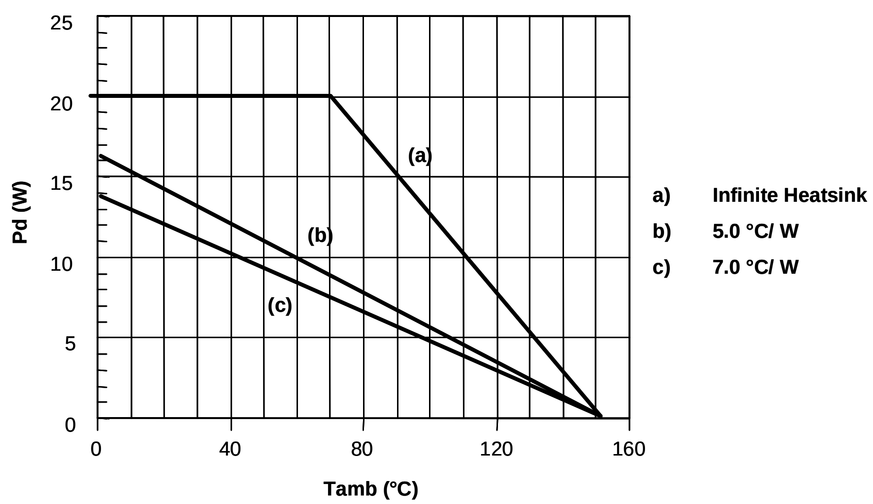
$$P_{dmax} = (N°\ channels) \cdot \frac{2V_{cc}^2}{\Pi^2 \cdot R_{load}} + I_q \cdot V_{cc}$$

$$P_{dmax} = 2 \cdot (4.96) + 0.84 = 10.7\ W$$

$$\text{(Heat Sinker)}\ R_{Th\ c\text{-}a} = \frac{150 - T_{amb\ max}}{P_{d\ max}} - R_{Th\ j\text{-}c} = \frac{150 - 50}{10.7} - 3.9 = 5.4°C/W$$

In figure 7 is shown the Power derating curve for the device.

Figure 10. Power derating curve



6 CLIPWATT ASSEMBLING SUGGESTIONS

The suggested mounting method of Clipwatt on external heat sink, requires the use of a clip placed as much as possible in the plastic body center, as indicated in the example of figure 11.

A thermal grease can be used in order to reduce the additional thermal resistance of the contact between package and heatsink.

A pressing force of 7 - 10 Kg gives a good contact and the clip must be designed in order to avoid a maximum contact pressure of 15 Kg/mm2 between it and the plastic body case.

As example , if a 15Kg force is applied by the clip on the package , the clip must have a contact area of 1mm2 at least.

Figure 11. Example of right placement of the clip

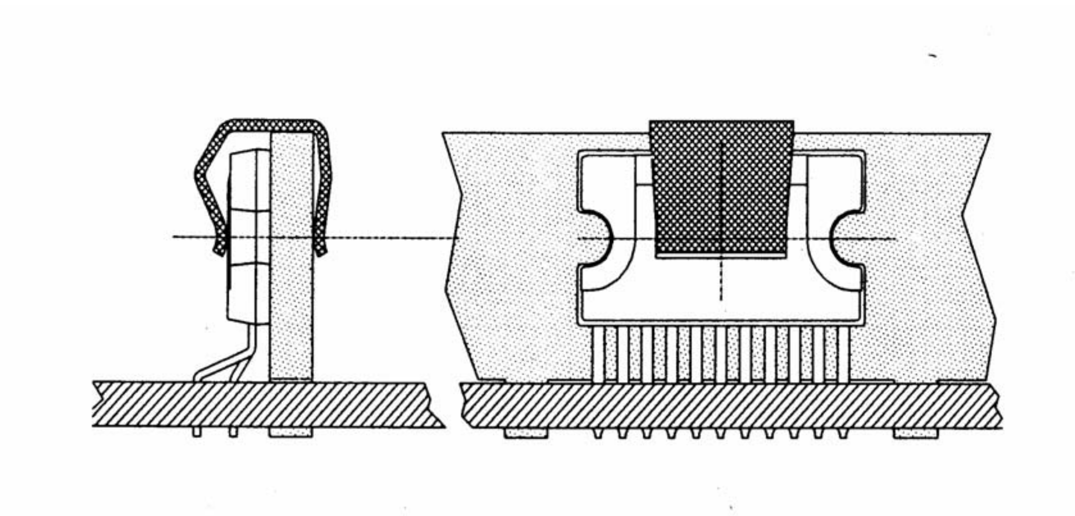
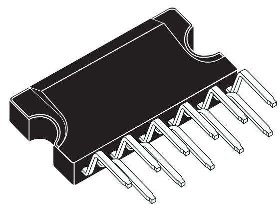


Figure 12. Clipwat11 Mechanical Data & Package Dimensions

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			3.2			0.126
B			1.05			0.041
C		0.15			0.006	
D		1.5			0.059	
E	0.49		0.55	0.019		0.002
F	0.77	0.8	0.88	0.030	0.031	0.035
F1			0.15			0.006
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		12			0.480	
H2		18.6			0.732	
H3	19.85			0.781		
L		17.9			0.700	
L1		14.55			0.580	
L2	10.7	11	11.2	0.421	0.433	0.441
L3		5.5			0.217	
M		2.54			0.100	
M1		2.54			0.100	

OUTLINE AND MECHANICAL DATA

Weight: 1.80gr



Clipwatt11

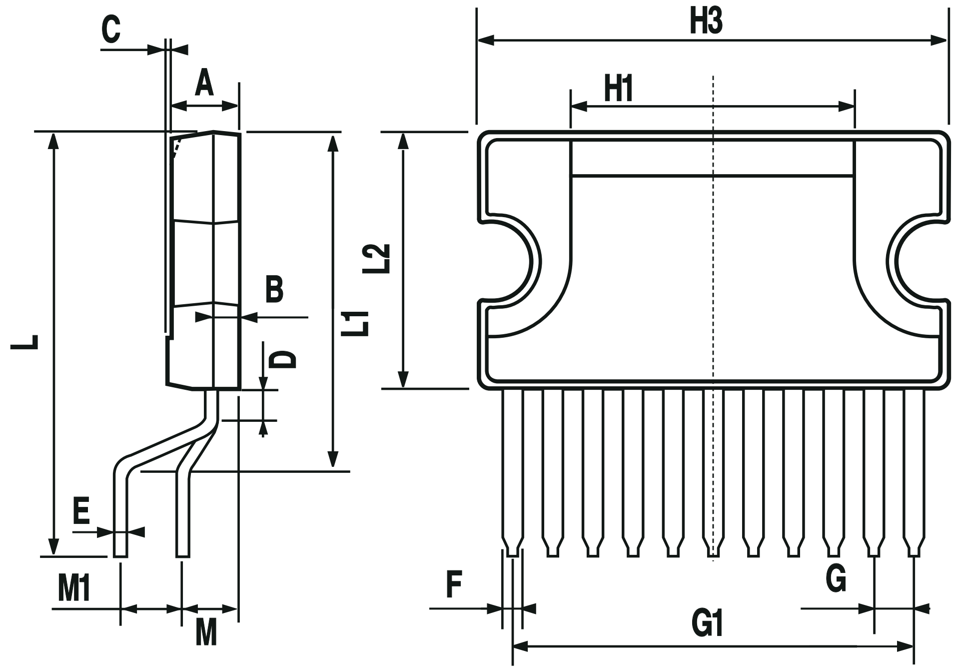


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Table 6. Revision History

Date	Revision	Description of Changes
May 2003	1	First Issue
Septembe 2004	2	Changed Status and the graphic aspect in compliant to the new rules “Corporate Technical Pubblications Design Guide”