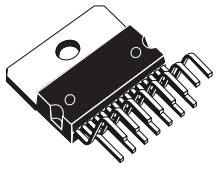
SGS-THOMSON MICROELECTRONICS

TDA7495

11W+11W AMPLIFIER WITH DC VOLUME CONTROL

- 11+11W OUTPUT POWER
  R_L = 8Ω @THD = 10% V_{CC} = 28V
- ST-BY AND MUTE FUNCTIONS
- LOW TURN-ON TURN-OFF POP NOISE
- LINEAR VOLUME CONTROL DC COUPLED WITH POWER OP. AMP.
- NO BOUCHEROT CELL
- NO ST-BY RC INPUT NETWORK
- SINGLE SUPPLY RANGING UP TO 35V
- SHORT CIRCUIT PROTECTION
- THERMAL OVERLOAD PROTECTION
- INTERNALLY FIXED GAIN
- SOFT CLIPPING
- VARIABLE OUTPUT AFTER VOLUME CONTROL CIRCUIT
- MULTIWATT 15 PACKAGE

MULTIPOWER BI50II TECHNOLOGY



Multiwatt15

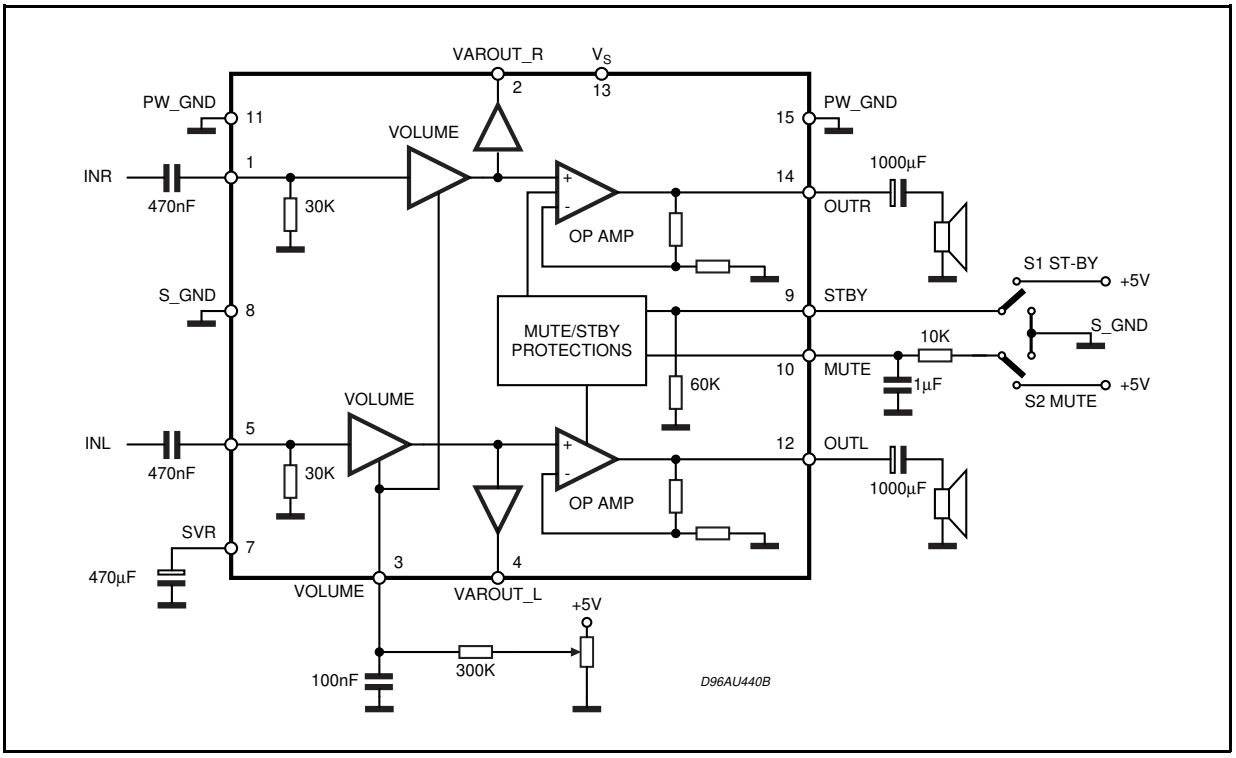
ORDERING NUMBER: TDA7495

DESCRIPTION

The TDA7495 is a stereo 11+11W class AB power amplifier assembled in the @ Multiwatt 15 package, specially designed for high quality sound, TV applications.

Features of the TDA7495 include linear volume control, Stand-by and mute functions.

BLOCK AND APPLICATION DIAGRAM

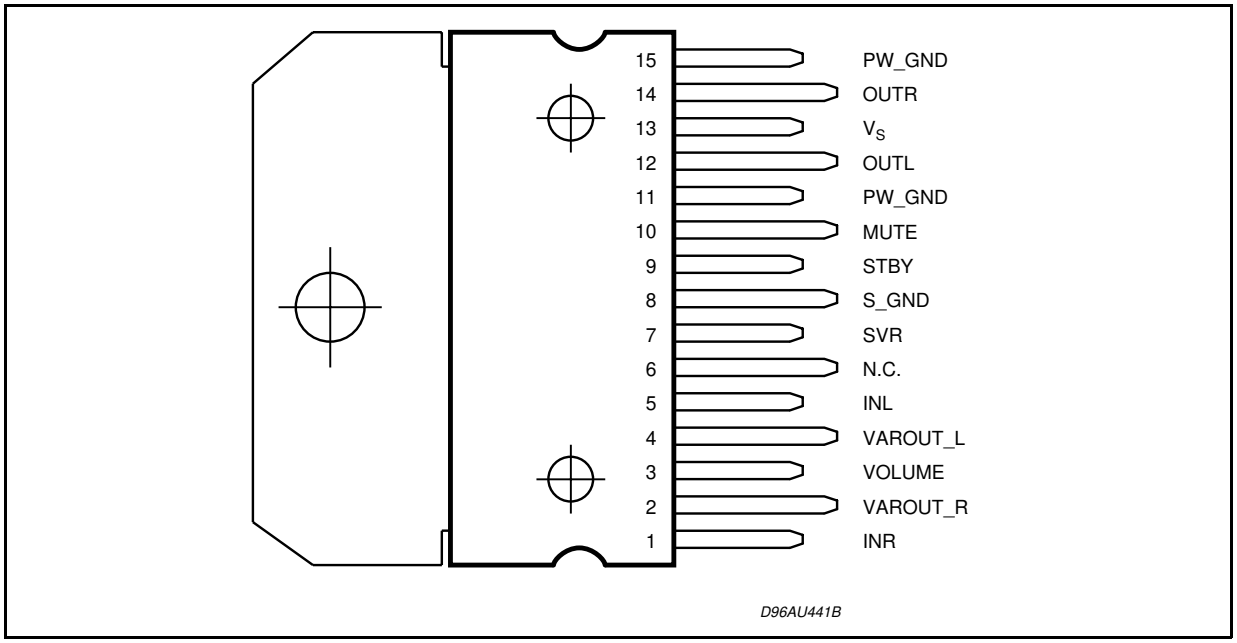


ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	DC Supply Voltage	35	V
V_{IN}	Maximum Input Voltage	8	Vpp
P_{tot}	Total Power Dissipation (Tamb = 70°C)	20	W
T_{amb}	Ambient Operating Temperature (1)	-20 to 85	°C
T_{stg}, T_j	Storage and Junction Temperature	-40 to 150	°C
V_3	Volume CTRL DC voltage	7	V

(1) Operation between -20 to 85 °C guaranteed by correlation with 0 to 70°C.

PIN CONNECTION (Top view)



THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case		Typ. = 2 Max. = 2.8	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	max	35	°C/W

ELECTRICAL CHARACTERISTICS (Refer to the test circuit V_S = 20V; R_L = 8Ω, R_g = 50Ω, T_{amb} = 25°C).

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_S	Supply Voltage Range		11		35	V
I_q	Total Quiescent Current			70	100	mA
DCV_{OS}	Output DC Offset Referred to SVR Potenial	No Input Signal	-650		650	mV
V_O	Quiescent Output Voltage			10		V
P_O	Output Power	THD = 10%; R_L = 8Ω; V_S = 28V	9.5	11		W
		THD = 1%; R_L = 8Ω; V_S = 28V	7.5	8		W
		THD = 10%; R_L = 4Ω; V_{CC} = 20V	7	8		W
		THD = 1%; R_L = 4Ω; V_{CC} = 20V	5	6		W
		THD = 10%; R_L = 8Ω; V_{CC} = 18V	3.5	3.8		W
		THD = 1%; R_L = 8Ω; V_{CC} = 18V	2.6	2.9		W

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
THD	Total Harmonic Distortion	G_V = 30dB; P_O = 1W; f = 1KHz;			0.4	%
I_{peak}	Output Peak Current	(internally limited)	1.7	2.4		A
V_{in}	Input Signal				2.8	Vrms
G_V	Closed Loop Gain	Vol Ctrl > 4.5V	28.5	30	31.5	dB
G_{vLine}	Monitor Out Gain	Vol Ctrl > 4.5V; Zload > 30KΩ	-1.5	0	1.5	dB
$A_{Min\ VOL}$	Attenuation at Minimum Volume	Vol Ctrl < 0.5V	80			dB
BW				0.6		MHz
e_N	Total Output Noise	f = 20Hz to 22KHz Play, max volume		500	800	μV
		f = 20Hz to 22KHz Play, max attenuation		100	250	μV
		f = 20Hz to 22KHz Mute		60	150	μV
SR	Slew Rate		5	8		V/μs
R_i	Input Resistance		22.5	30		KΩ
$R_{Var\ Out}$	Variable Output Resistance			30	100	Ω
$R_{load\ Var\ Out}$	Variable Output Load		2			KΩ
SVR	Supply Voltage Rejection	f = 1kHz; max volume C_{SVR} = 470μF; V_{RIP} = $1V_{rms}$	35	39		dB
		f = 1kHz; max attenuation C_{SVR} = 470μF; V_{RIP} = $1V_{rms}$	55	65		dB
T_M	Thermal Muting			150		°C
T_s	Thermal Shut-down			160		°C
MUTE STAND-BY & INPUT SELECTION FUNCTIONS						
V_{ST-BY}	Stand-by threshold		2.3	2.5	2.7	V
V_{MUTE}	Mute Threshold		2.3	2.5	2.7	V
I_{qST-BY}	Quiescent Current @ Stand-by			0.6	1	mA
A_{MUTE}	Mute Attenuation		50	65		dB
$I_{stbyBIAS}$	Stand-by bias current	Stand by on V_{ST-BY} = 5V V_{MUTE} = 5V		80		μA μA
		Play or Mute	-20	-5		μA
$I_{muteBIAS}$	Mute bias current	Mute		1	5	μA
		Play		0.2	2	μA

Figure 1a: Application Circuit.

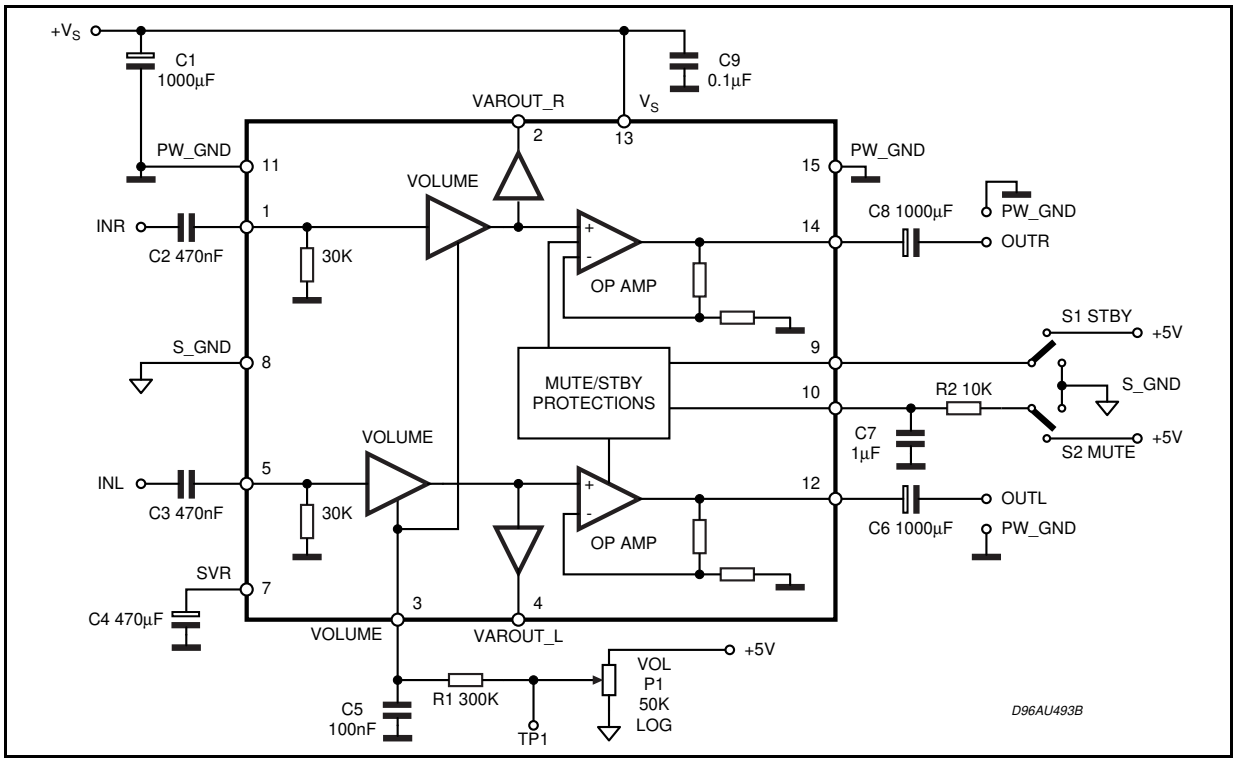
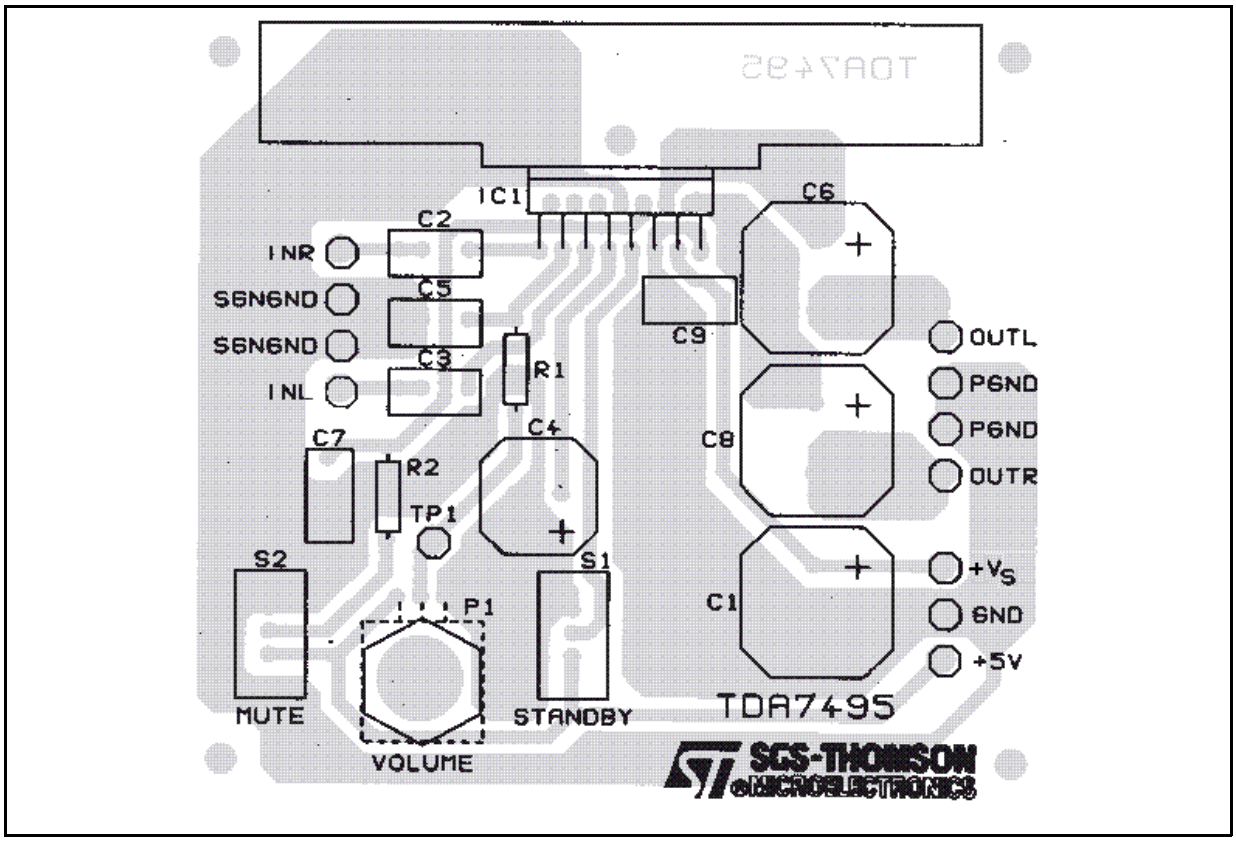


Figure 1b: P.C.B. and Component Layout.



APPLICATION SUGGESTIONS

The recommended values of the external components are those shown on the application circuit of figure 1a. Different values can be used, the following table can help the designer.

COMPONENT	SUGGESTION VALUE	PURPOSE	LARGER THAN SUGGESTION	SMALLER THAN SUGGESTION
R1	300K	Volume control circuit	Larger volume regulation time	Smaller volume regulation time
R2	10K	Mute time constant	Larger mute on/off time	Smaller mute on/off time
P1	50K	Volume control circuit		
C1	1000µF	Supply voltage bypass		Danger of oscillation
C2	470nF	Input DC decoupling	Lower low frequency cutoff	Higher low frequency cutoff
C3	470nF	Input DC decoupling	Lower low frequency cutoff	Higher low frequency cutoff
C4	470µF	Ripple rejection	Better SVR	Worse SVR
C5	100nF	Volume control time costant	Larger volume regulation time	Smaller volume regulation time
C6	1000µF	Output DC decoupling	Lower low frequency cutoff	Higher low frequency cutoff
C7	1µF	Mute time costant	Larger mute on/off time	Smaller mute on/off time
C8	1000µF	Output DC decoupling	Lower low frequency cutoff	Higher low frequency cutoff
C9	100nF	Supply voltage bypass		Danger of oscillation

TYPICAL CHARACTERISTICS:

Refer to the application circuit of fig.1A T_{amb} = 25°C; V_S = 20V; R_L = 8Ω; F = 1KHz; R_S = 50Ω; unless otherwise specified.

Figure 2: Output Power vs Supply Voltage

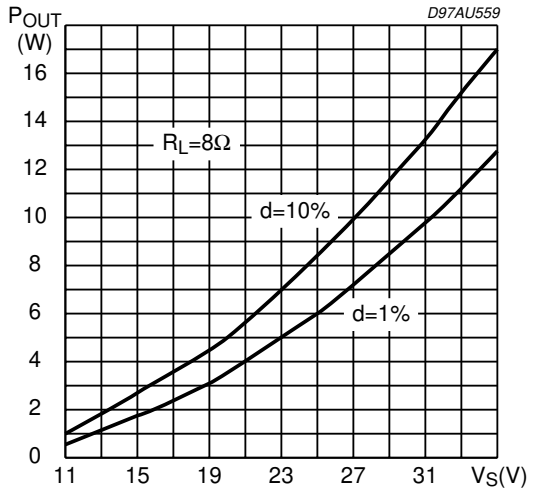


Figure 3: Distortion vs Output Power

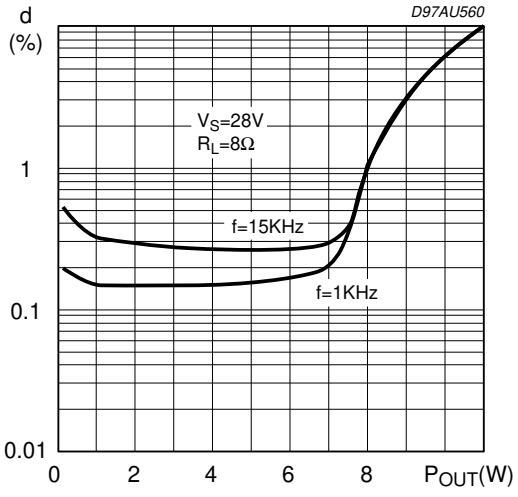


Figure 4: Output Power vs Supply Voltage

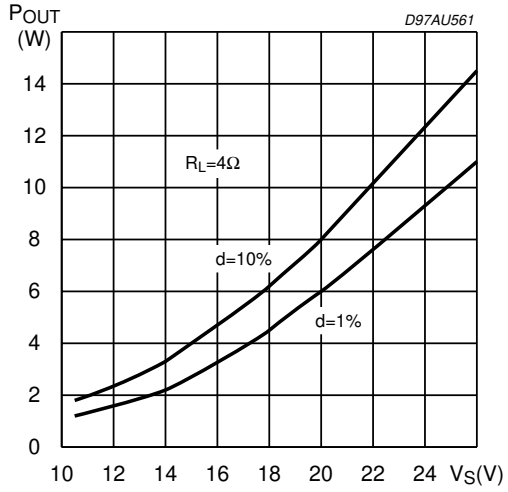


Figure 5: Distortion vs Output Power

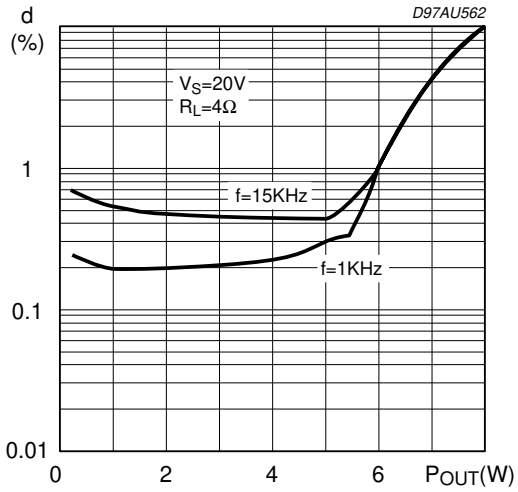


Figure 6: gain vs Volume Control (pin #3)

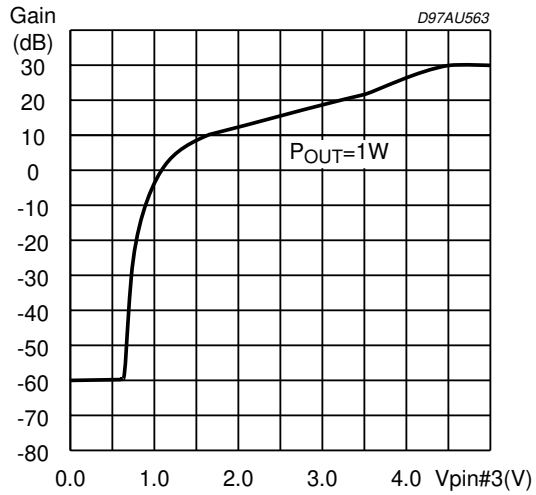


Figure 7: Supply Voltage vs Frequency

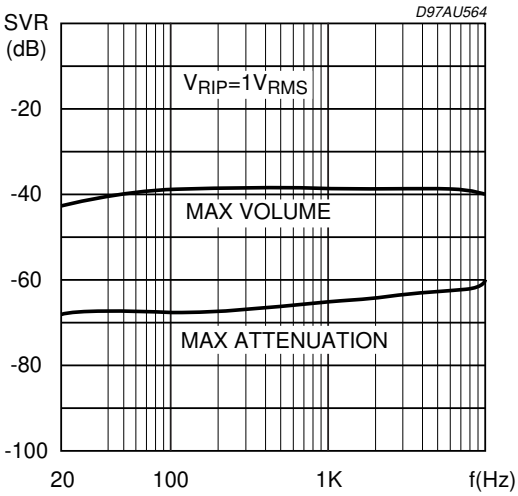


Figure 8: Stand-by Attenuation vs Vpin #9

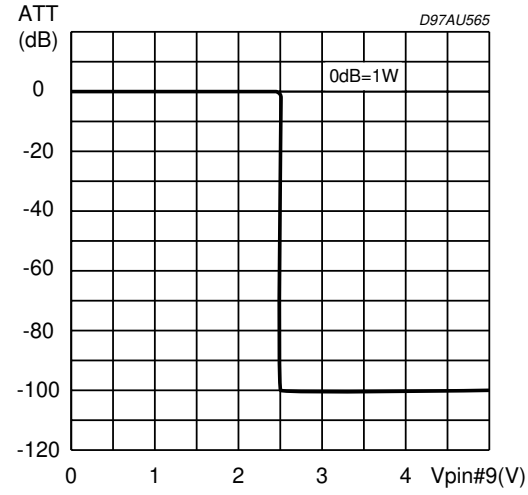


Figure 9: Mute Attenuation vs V pin #10

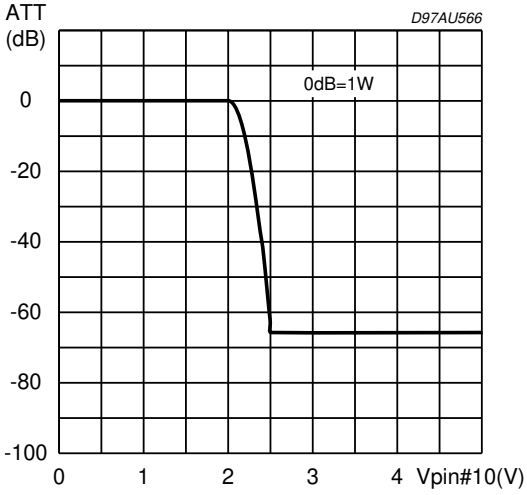


Figure 10: Power dissipation vs Output Power

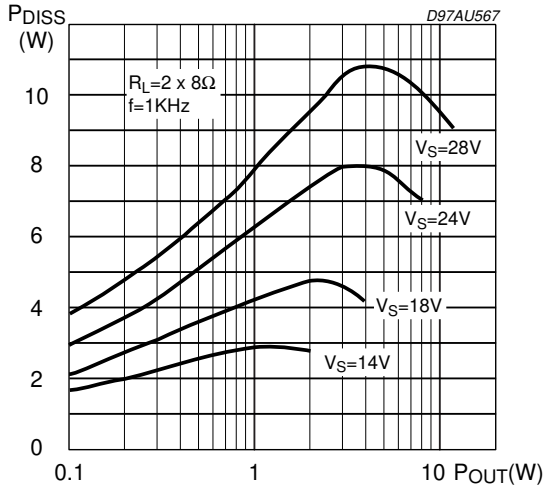
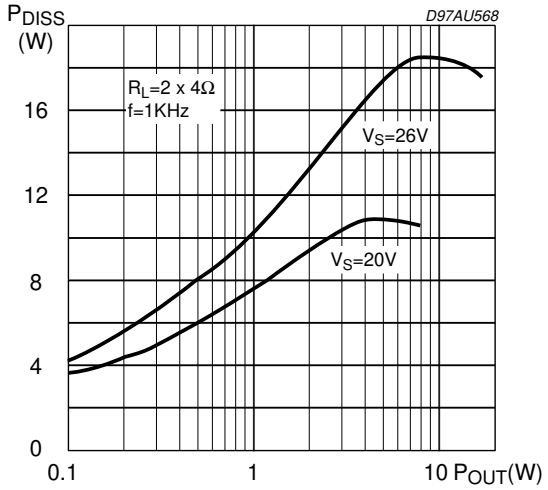


Figure 11: Power Dissipation vs Output Power

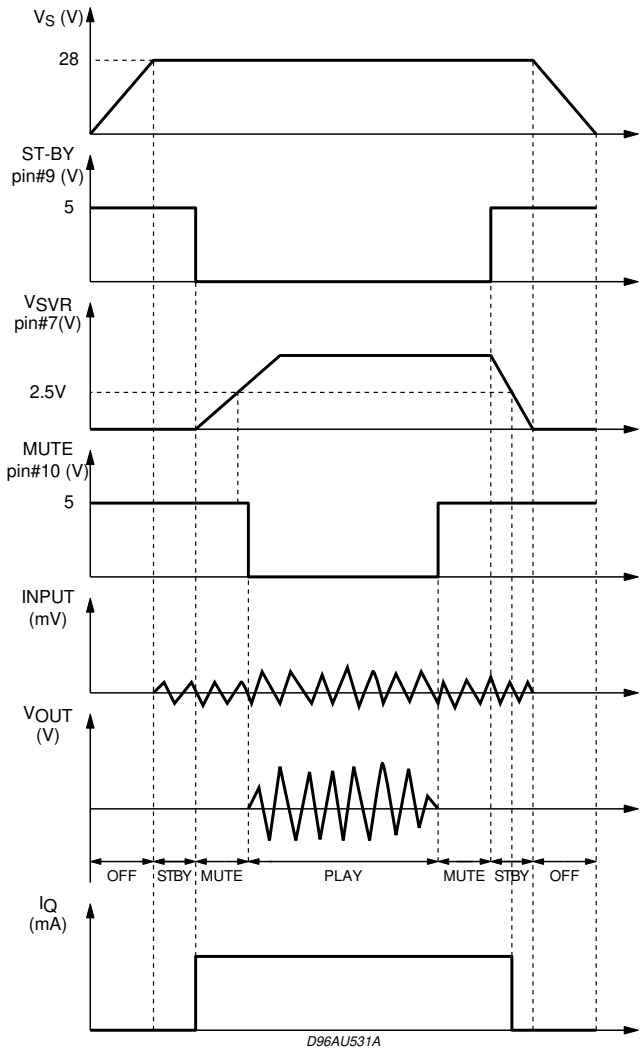


MUTE STAND-BY TRUTH TABLE

MUTE	ST-BY	OPERATING CONDITION
H	H	STANDBY
L	H	STANDBY
H	L	MUTE
L	L	PLAY

Turn ON/OFF Sequences (for optimizing the POP performances)

A) USING MUTE AND STAND-BY FUNCTIONS



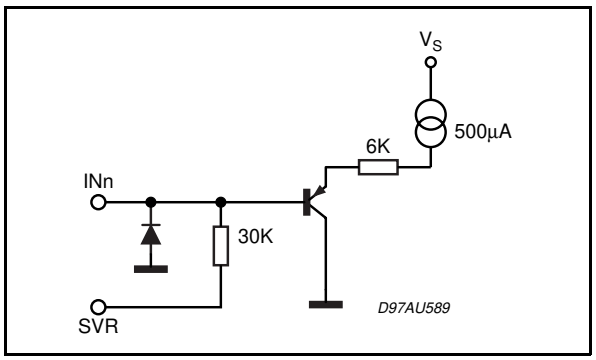
B) USING ONLY THE MUTE FUNCTION

To semplify the application, the stand-by pin can be connected directly to Ground.

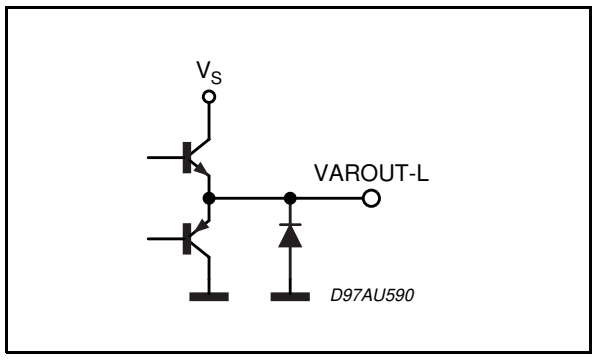
During the ON/OFF transitions we recommend to respect the following conditions:

- At the turn-on the transition mute to play must be made when the SVR pin is higher than 2.5V
- At the turn-off the TDA7495 must be brought to mute from the play condition when the SVR pin is higher than 2.5V.

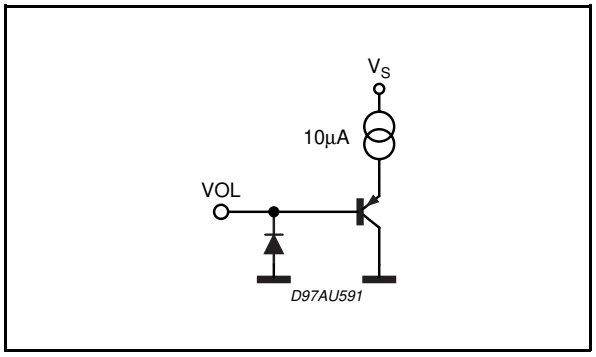
PINS: INL, INR



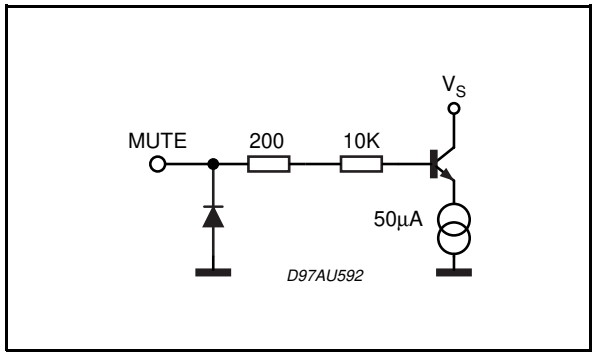
PINS: VAROUT-L, VAROUT-R



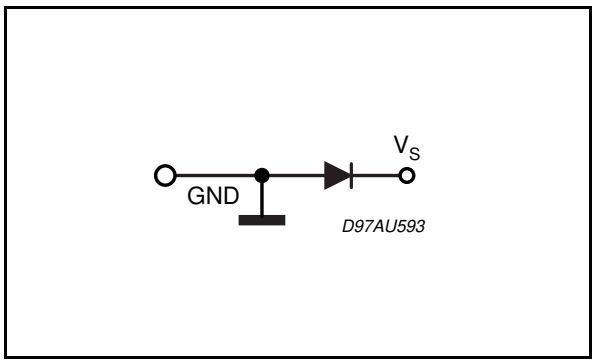
PIN: VOLUME



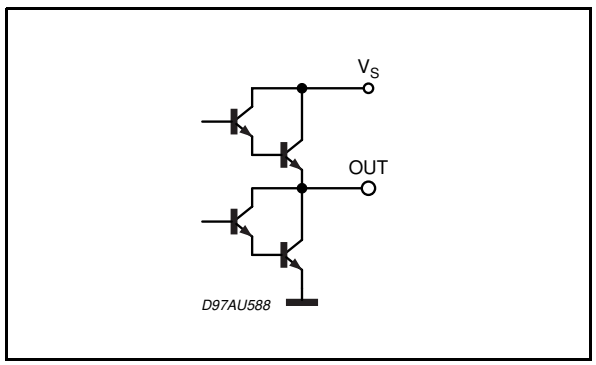
PIN: MUTE



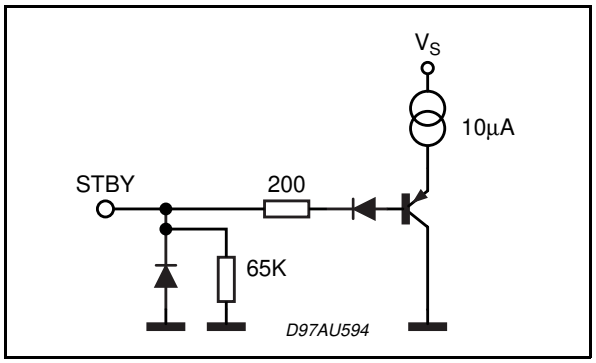
PINS: PW-GND, S-GND



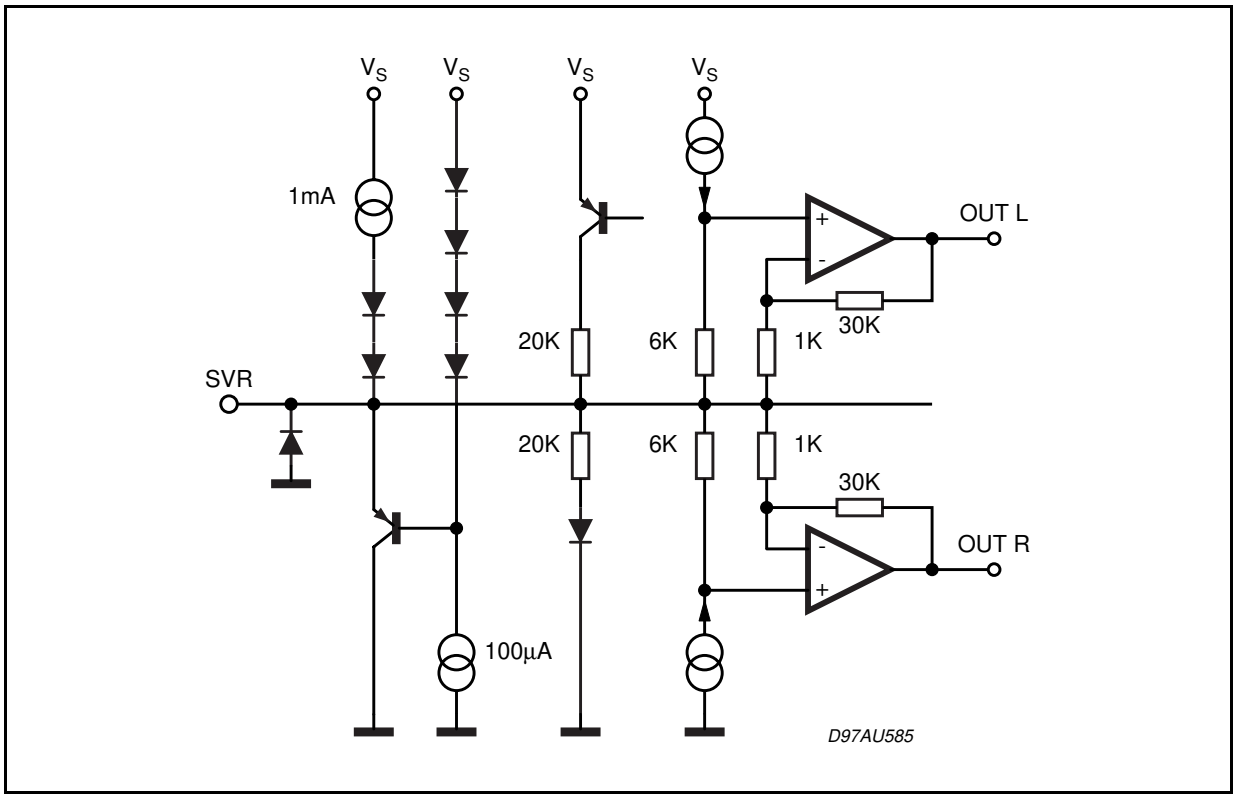
PINS: OUT R, OUT L



PIN: STBY



PIN: SVR


VS
VS
VS
VS
1mA
OUT L
20K
6K
1K
30K
SVR
20K
6K
1K
30K
OUT R
100µA
D97AU585

MULTIWATT15 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			5			0.197
B			2.65			0.104
C			1.6			0.063
D		1			0.039	
E	0.49		0.55	0.019		0.022
F	0.66		0.75	0.026		0.030
G	1.02	1.27	1.52	0.040	0.050	0.060
G1	17.53	17.78	18.03	0.690	0.700	0.710
H1	19.6			0.772		
H2			20.2			0.795
L	21.9	22.2	22.5	0.862	0.874	0.886
L1	21.7	22.1	22.5	0.854	0.870	0.886
L2	17.65		18.1	0.695		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	4.25	4.55	4.85	0.167	0.179	0.191
M1	4.63	5.08	5.53	0.182	0.200	0.218
S	1.9		2.6	0.075		0.102
S1	1.9		2.6	0.075		0.102
Dia1	3.65		3.85	0.144		0.152