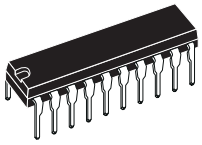
SGS-THOMSON MICROELECTRONICS

TDA7496L

2W+2W AMPLIFIER WITH DC VOLUME CONTROL

- 2W+2W OUTPUT POWER
  R_L = 8Ω @THD = 10% V_{CC} = 14V
- 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 15V
- SHORT CIRCUIT PROTECTION
- THERMAL OVERLOAD PROTECTION
- INTERNALLY FIXED GAIN
- SOFT CLIPPING
- VARIABLE OUTPUT AFTER VOLUME CONTROL CIRCUIT
- POWERDIP (14+3+3) PACKAGE



Powerdip (14+3+3)

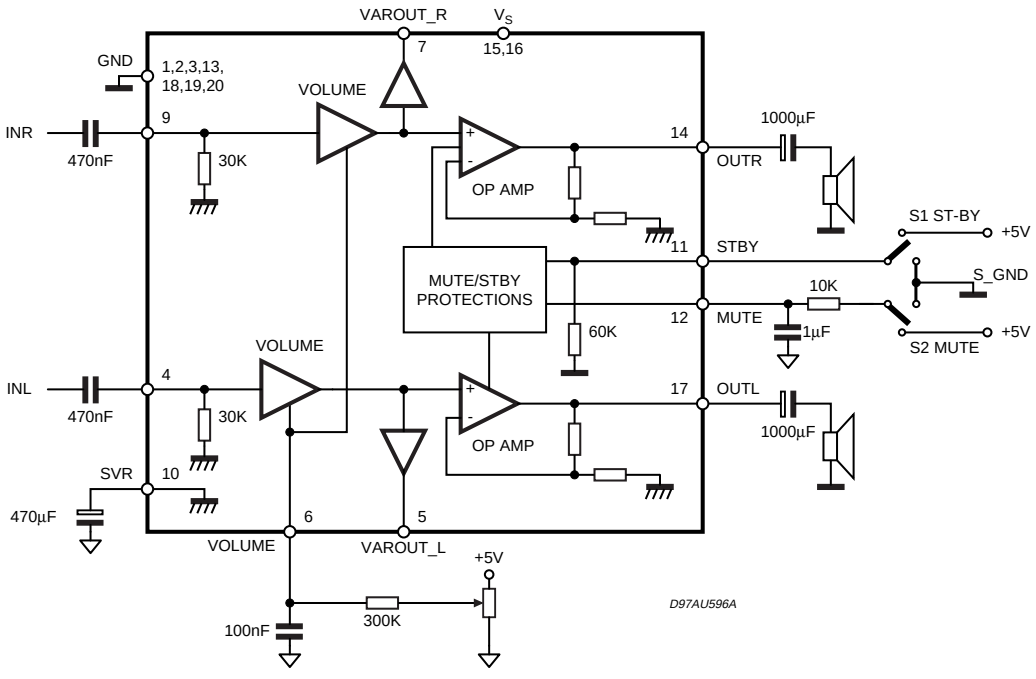
ORDERING NUMBER: TDA7496L

DESCRIPTION

The TDA7496L is a stereo 2W+2W class AB power amplifier assembled in the @ Powerdip 14+3+3 package, specially designed for high quality sound, TV and Monitor applications.

Features of the TDA7496L include linear volume control, Stand-by and mute functions.

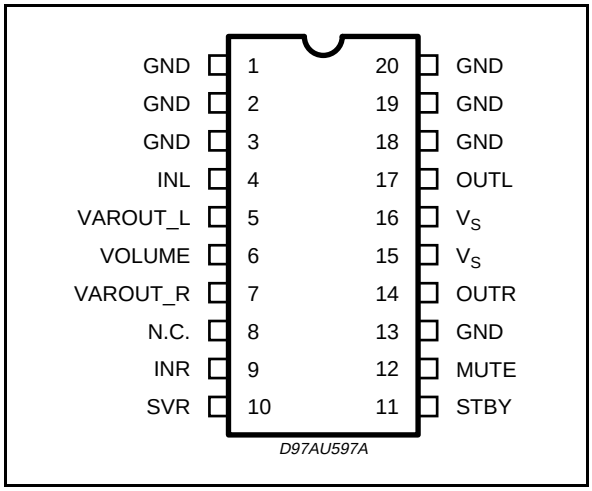
BLOCK DIAGRAM



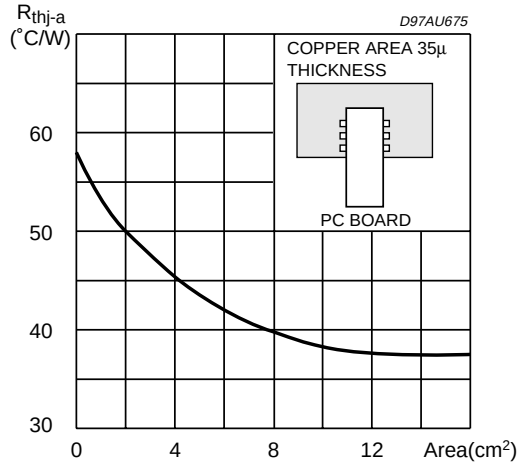
ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_S	DC Supply Voltage	26	V
V_{IN}	Maximum Input Voltage	8	Vpp
P_{tot}	Total Power Dissipation (T_{case} = 60°C)	6	W
T_{amb}	Ambient Operating Temperature	0 to 70	°C
T_{stg}, T_j	Storage and Junction Temperature	-40 to 150	°C
V_6	Volume CTRL DC voltage	7	V

PIN CONNECTION



Rth with "on board" Square Heatsink vs. copper area.



THERMAL DATA

Symbol	Parameter		Value	Unit
$R_{th\ j\text{-}pins}$	Thermal Resistance Junction-pins	max.	15	°C/W
$R_{th\ j\text{-}amb}$ (*)	Thermal Resistance Junction-ambient	max.	50	°C/W

(*) Mounted on PCB with no heatsink

ELECTRICAL CHARACTERISTICS (Refer to the test circuit V_S = 14V; R_L = 8Ω, R_g = 50Ω, T_{amb} = 25°C).

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_S	Supply Voltage Range		10		18	V
I_q	Total Quiescent Current			25	50	mA
DCV_{OS}	Output DC Offset Referred to SVR Potenial	No Input Signal		200		mV
V_O	Quiescent Output Voltage			7		V
P_O	Output Power	THD = 10%; R_L = 8Ω;	1.6	2		W
		THD = 1%; R_L = 8Ω;		1.3		W
THD	Total Harmonic Distortion	G_V = 30dB; P_O = 1W; f = 1KHz;			0.4	%
I_{peak}	Output Peak Current	(internally limited)	0.7	0.9		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

ELECTRICAL CHARACTERISTICS (continued)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
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						
$V_{ST\ ON}$	Stand-by ON Threshold		3.5			V
$V_{ST\ OFF}$	Stand-by OFF Threshold				1.5	V
$V_{M\ ON}$	Mute ON Threshold		3.5			V
$V_{M\ OFF}$	Mute OFF Threshold				1.5	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

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

Figure 1A. Application Circuit.

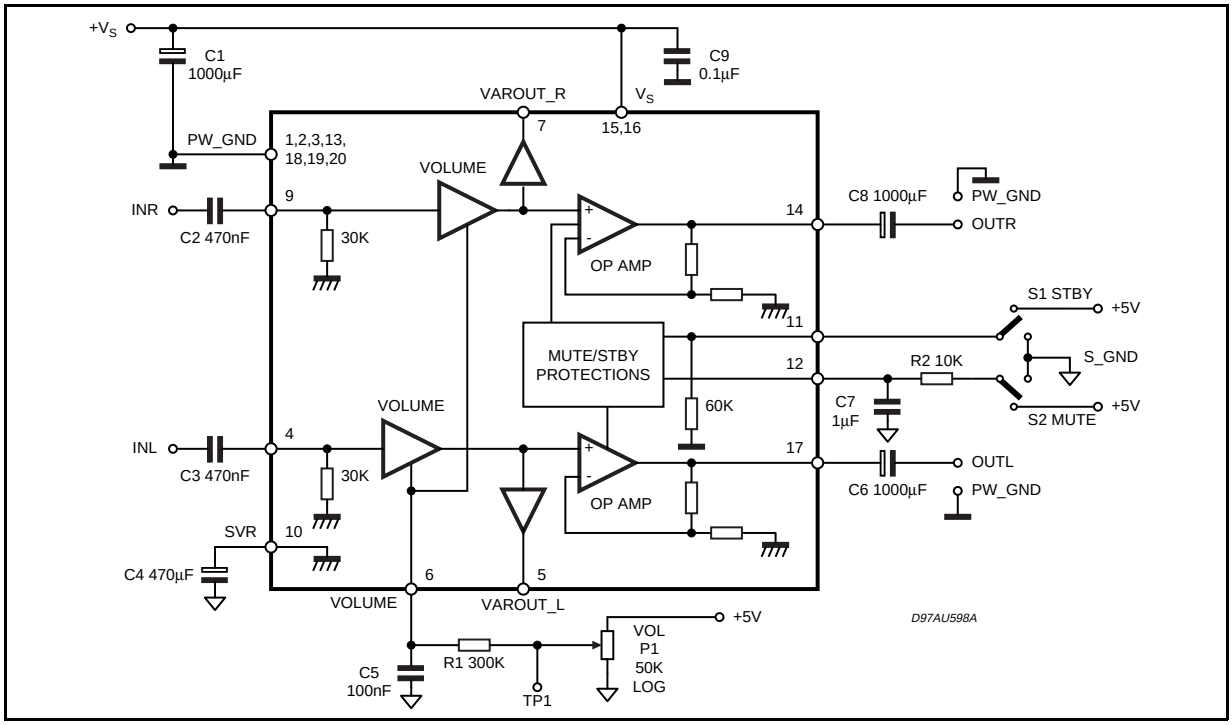
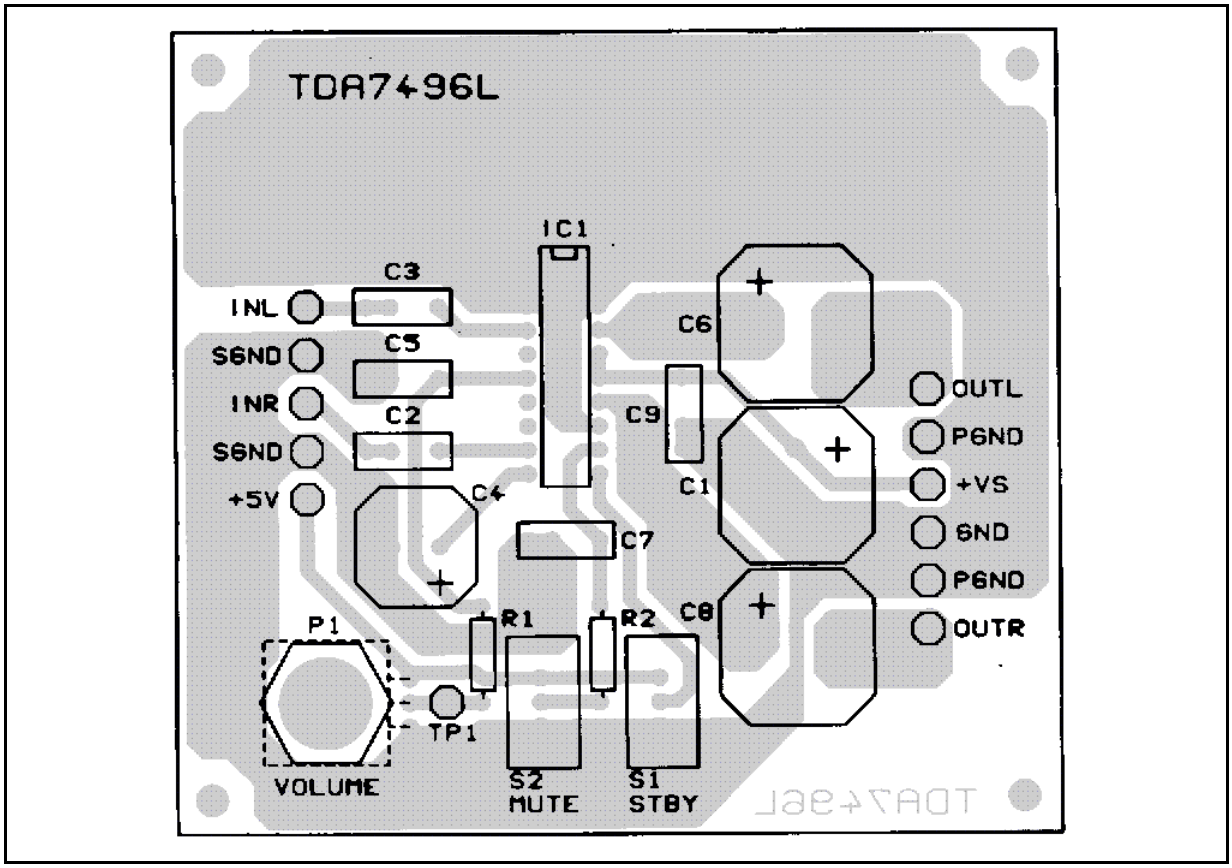


Figure 1B. PCB and Component Layout of the Fig. 1A (1.25:1 scale)

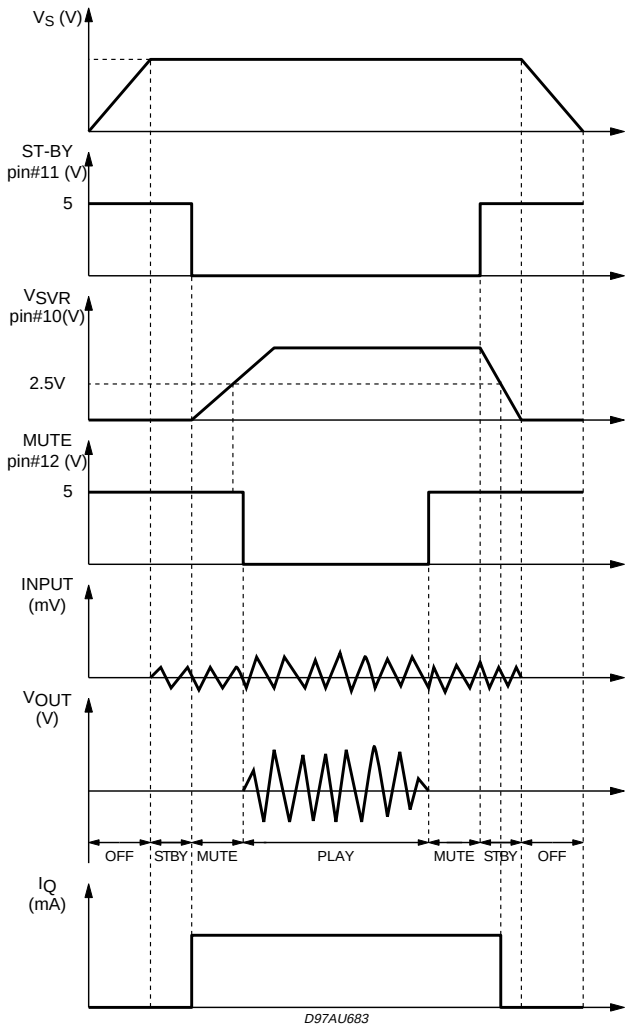


MUTE STAND-BY TRUTH TABLE

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



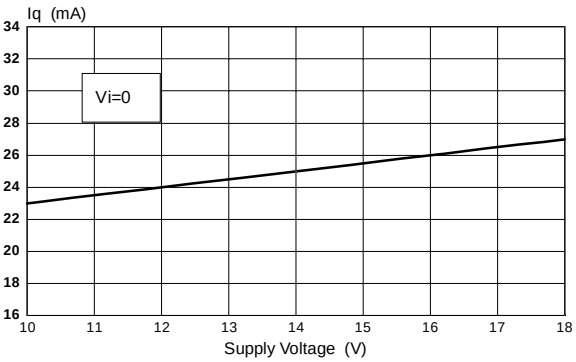
B) USING ONLY THE MUTE FUNCTION

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

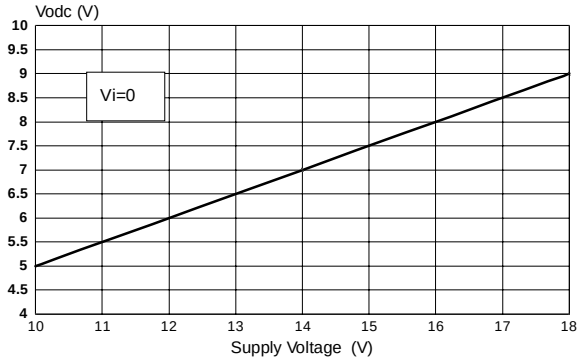
During the ON/OFF transitions is recommend to respect the following conditions.

- At the turn-on, the transition mute - play must be made when the SVR pin is higher than 2.5V
- At the turn-off, the TDA7496L must be brought to mute from the play condition when the SVR pin is higher than 2.5V.

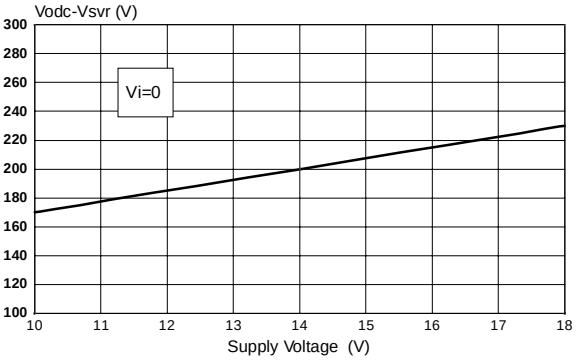
Quiescent current vs. Supply Voltage



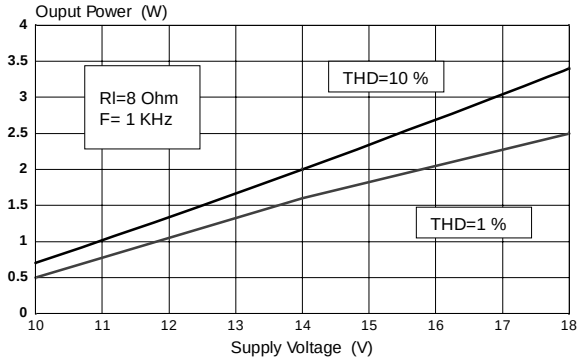
Output DC Voltage vs. Supply Voltage



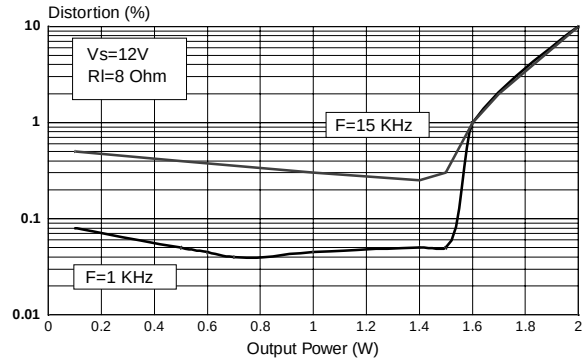
Output DC Offset vs. Supply Voltage



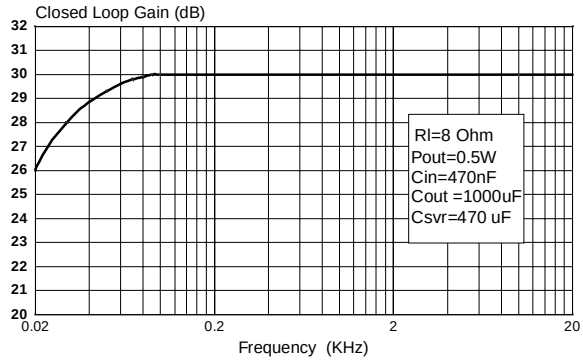
Output Power vs. Supply Voltage



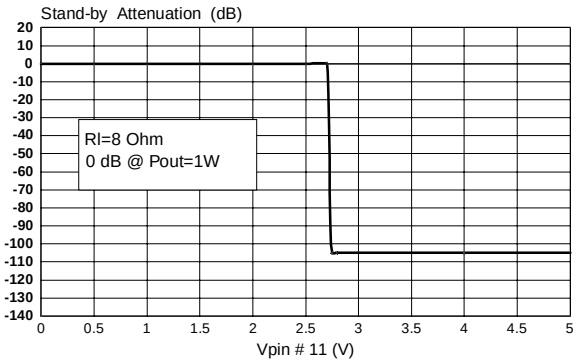
Distortion vs. Output Power



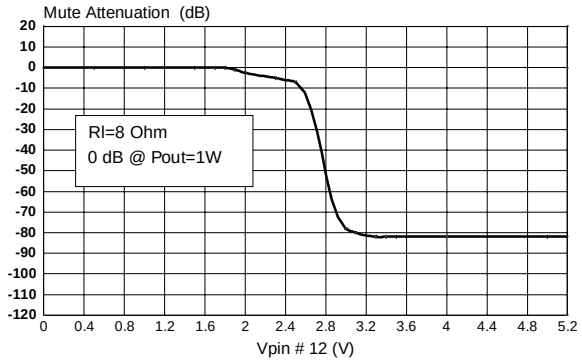
Closed Loop gain vs. Frequency



St-By Attenuation vs. Vpin 11

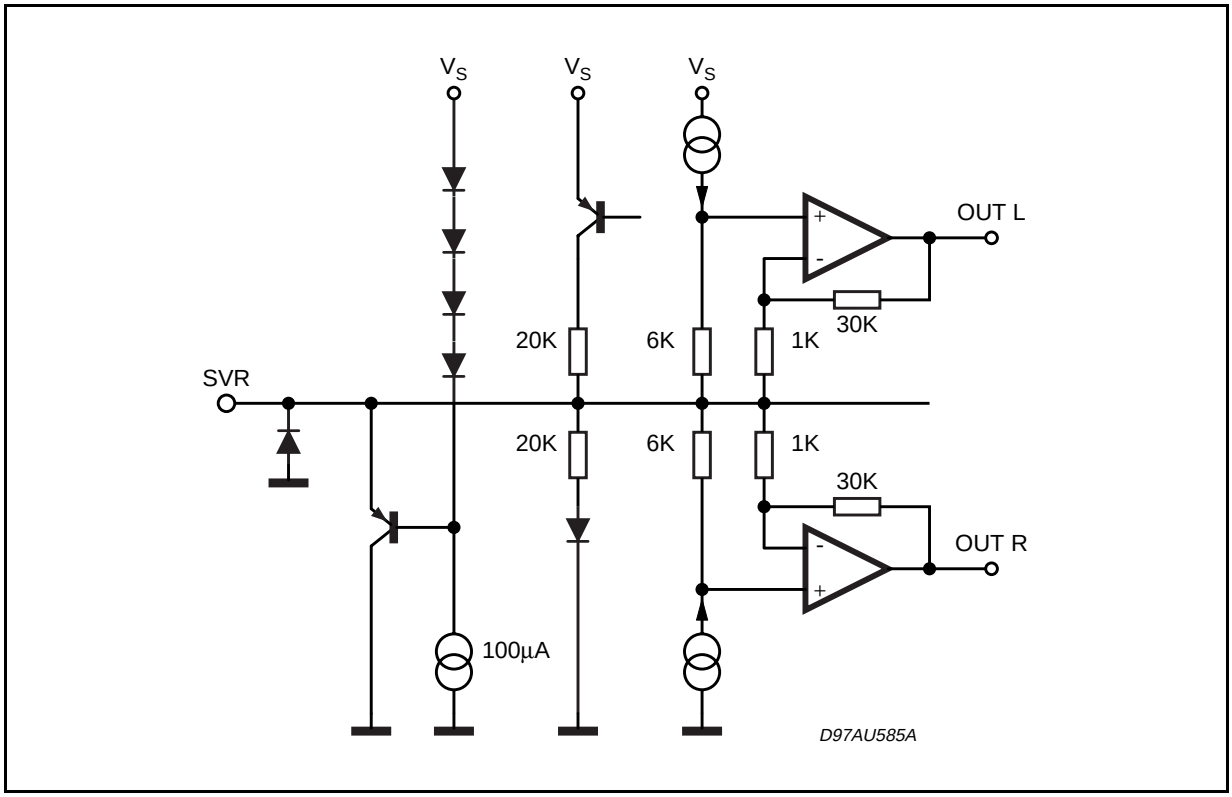


Mute Attenuation vs. Vpin 12

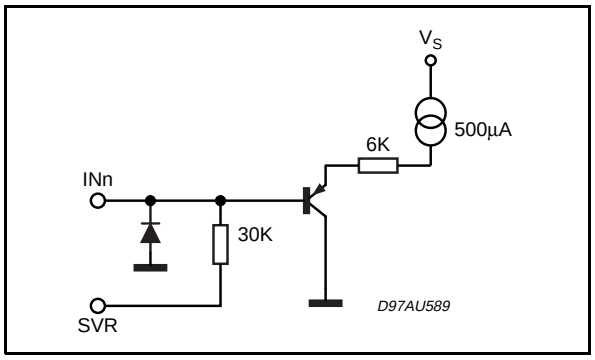


PIN DESCRIPTION

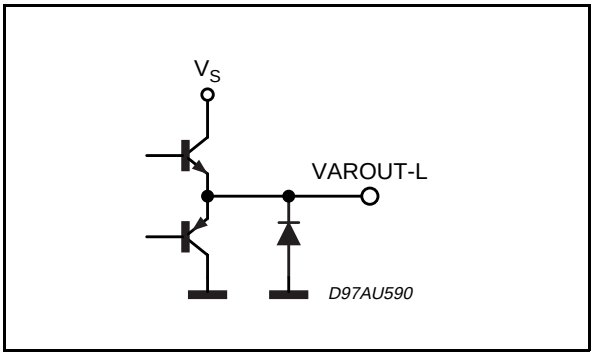
PIN: SVR



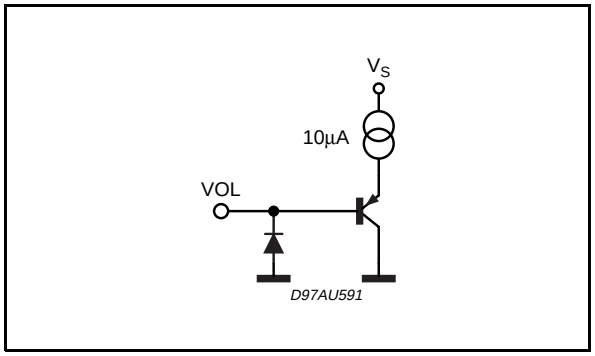
PINS: INL, INR



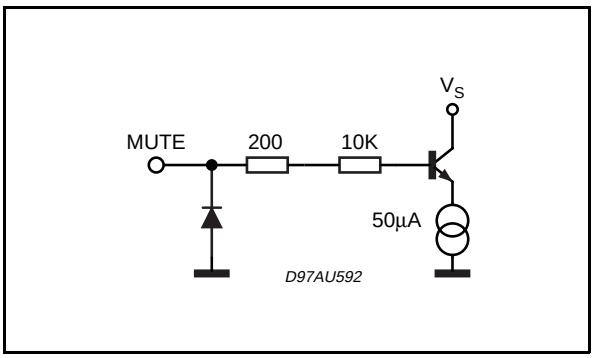
PINS: VAROUT-L, VAROUT-R



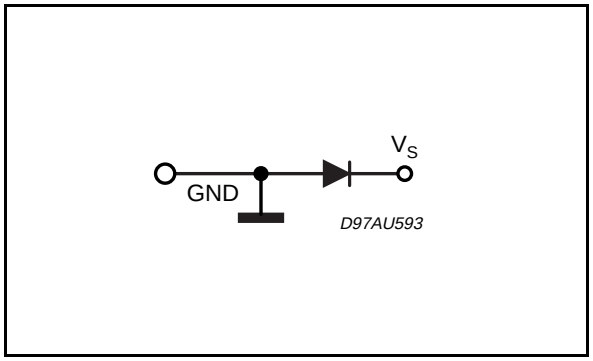
PIN: VOLUME



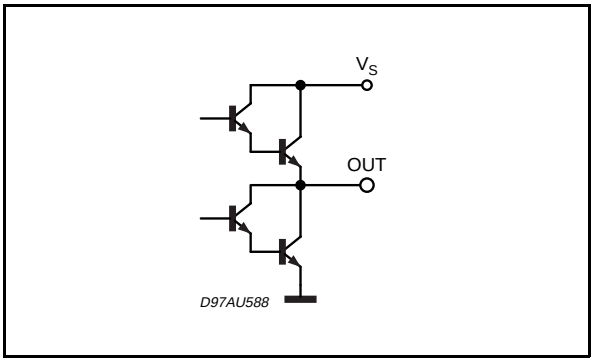
PIN: MUTE



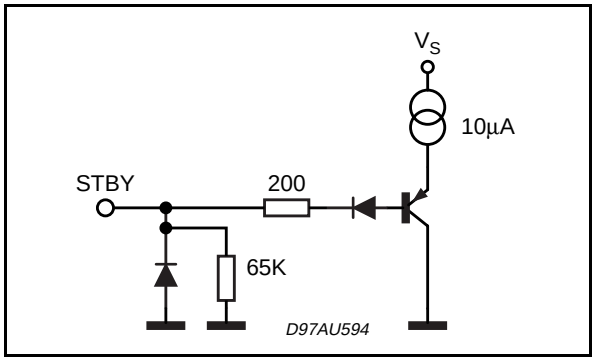
PINS: PW-GND, S-GND



PINS: OUT R, OUT L

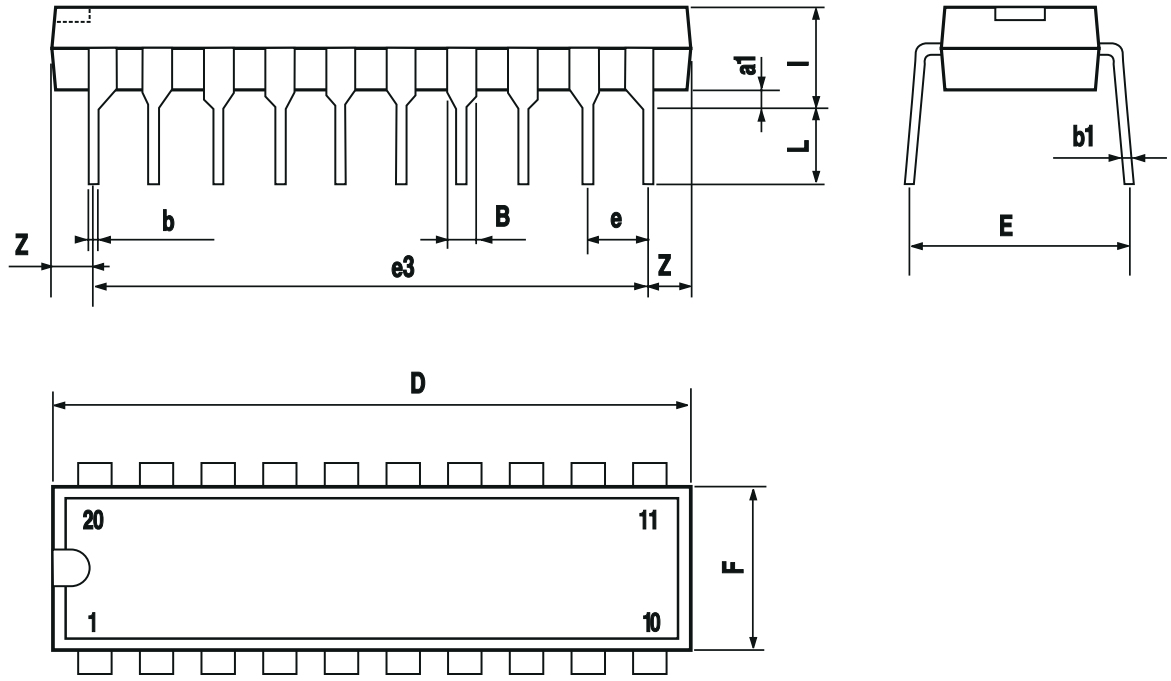


PIN: STBY



POWERDIP20 PACKAGE MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	0.85		1.40	0.033		0.055
b		0.50			0.020	
b1	0.38		0.50	0.015		0.020
D			24.80			0.976
E		8.80			0.346	
e		2.54			0.100	
e3		22.86			0.900	
F			7.10			0.280
I			5.10			0.201
L		3.30			0.130	
Z			1.27			0.050



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