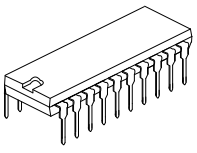
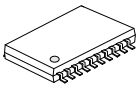
TDA7496L

LINEAR INTEGRATED CIRCUIT

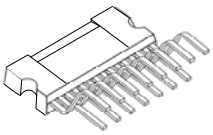
2W+2W AMPLIFIER WITH DC VOLUME CONTROL



DIP-20



SOP-20



HZIP-15D

■ DESCRIPTION

The **UTC TDA7496L** is a class AB power amplifier with linear volume control, Stand-by and mute functions, it's mainly using for high quality sound, TV and Monitor applications.

■ FEATURES

* Linear volume control, Stand-by and mute functions
* Silent Turn On/Off
* No boucherot cell
* 2 x 2W output power: R_L=8Ω@THD=10%, V_{CC}=14V
* No ST-BY RC input network
* Internally Fixed Gain (Typ.=30dB)
* Single supply (Max.=18V)
* Soft clipping
* Output DC Short Circuit protection when shorted to GND or V_{CC}.
* Thermal shutdown
* Variable output after volume control circuit

■ ORDERING INFORMATION

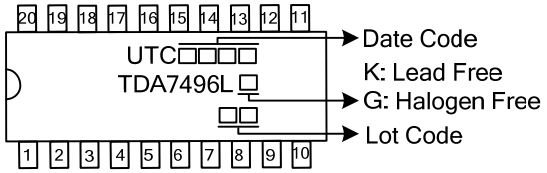
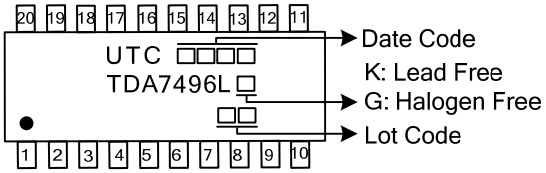
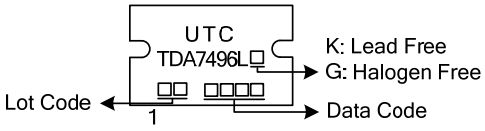
Ordering Number		Package	Packing
Lead Free	Halogen Free		
TDA7496LK-D20-T	TDA7496LG-D20-T	DIP-20	Tube
TDA7496LK-S20-R	TDA7496LG-S20-R	SOP-20	Tape Reel
TDA7496LK-J15-D-T	TDA7496LG-J15-D-T	HZIP-15D	Tube

TDA7496LG-D20-T

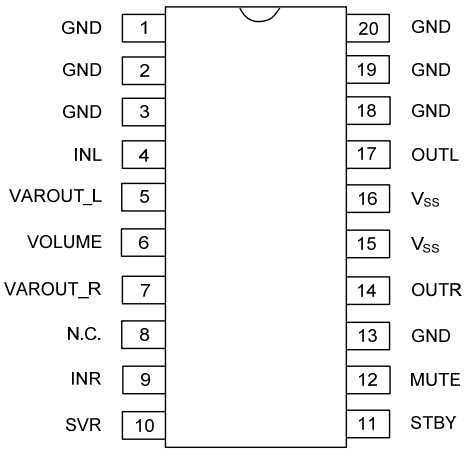
(1)Packing Type
(2)Package Type
(3)Green Package

(1) T: Tube, R: Tape Reel
(2) D20: DIP-20, S20: SOP-20, J15-D:HZIP-15D
(3) G: Halogen Free and Lead Free, K: Lead Free

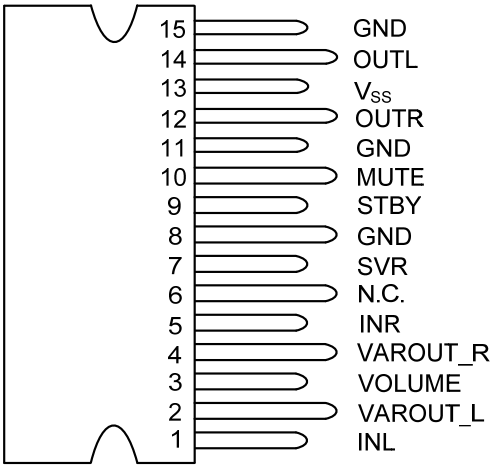
■ MARKING

Package	Marking
DIP-20	
SOP-20	
HZIP-15D	

■ PIN CONFIGURATION

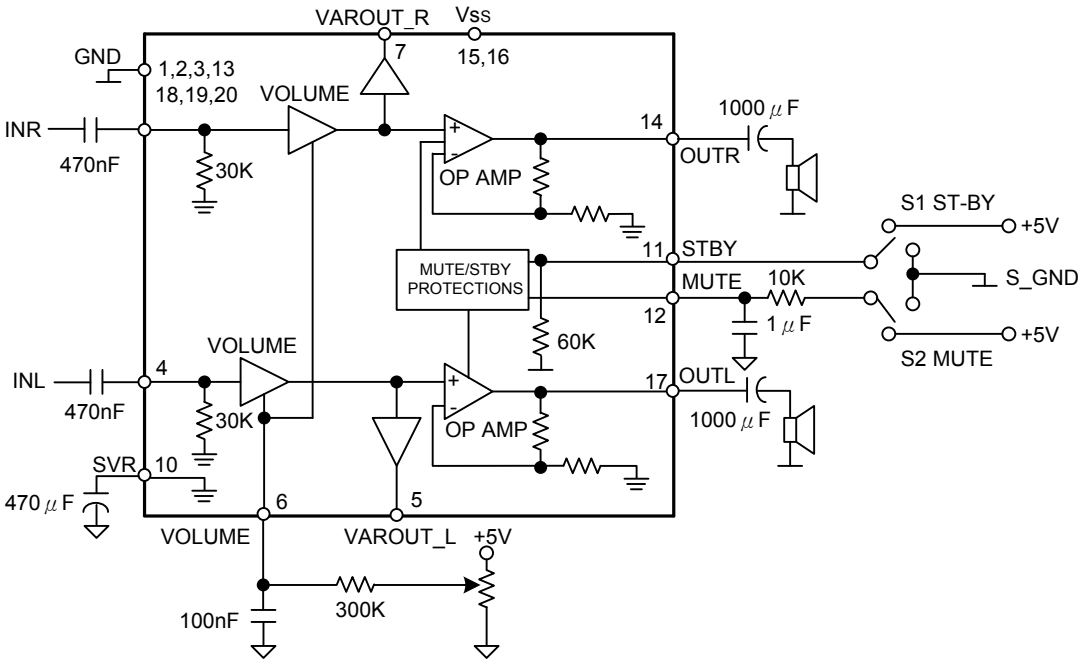


DIP-20/SOP-20



HZIP-15D

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T_A=25°C, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
DC Supply Voltage		V_{SS}	26	V
Maximum Input Voltage		V_{IN}	8	V
Volume CTRL DC Voltage		V_6	6	V
Power Dissipation	DIP-20(T_C=60°C)	P_D	6	W
	SOP-20		4	
	HZIP-15D		12.5	
Junction Temperature		T_J	+150	°C
Ambient Operating Temperature		T_{OPR}	0 ~ +70	°C
Storage Temperature		T_{STG}	-40 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ THERMAL DATA

PARAMETER		SYMBOL	RATINGS	UNIT
Junction to Ambient	DIP-20	θ_{JA}	50	°C/W
	SOP-20		80	
	HZIP-15D		46	

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, V_{SS}=14V, unless otherwise specified)

PARAMETER		SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Supply Voltage Range		V_{SS}		10		18	V
Quiescent Current		I_Q			25	50	mA
Output DC Offset Referred to SVR Potenial		DCVos	No Input Signal		200		mV
Quiescent Output Voltage		V_{OUT}			7		V
Output Power	THD=10%	P_{OUT}	R_L=8Ω	1.6	2		W
	THD=1%				1.3		
Total Harmonic Distortion		THD	G_V=30dB, P_{OUT}=1W, f=1KHz			0.4	%
Output Peak Current		$I_{OUT(PEAK)}$	(internally limited)	0.7	0.9		A
Input Signal		V_{IN}				2.8	V
Closed Loop Gain		G_V	V_{OL} Ctrl>4.5V	28.5	30	31.5	dB
Monitor Out Gain		$G_{V(LINE)}$	V_{OL} Ctrl>4.5V, Z_{LOAD}>30kΩ	-1.5	0	1.5	dB
Attenuation at Minimum Volume		Amin VoL	V_{OL} Ctrl<0.5V	80			dB
Bandwidth		BW			0.6		MHz
Total Output Noise	Volume	eN	f=20Hz to 22KHz		500	800	μV
	Attenuation		f=20Hz to 22KHz		100	250	
	Mute		f=20Hz to 22KHz		60	150	
Slew Rate		SR		5	8		V/μs
Input Resistance		R_{IN}		22.5	30		kΩ
Variable Output Resistance		$R_{VAR(OUT)}$			30	100	Ω
Variable Output Load		$R_{LOAD(OUT)}$		2			kΩ
Supply Voltage Rejection f=1kHz	Volume	SVR	CSVR=470μF, VRIP=1V	35	39		dB
	Attenuation			55	65		
Thermal Muting		TM			150		°C
Thermal Shut-down		T_S			160		°C
MUTE STAND-BY&INPUT SELECTION FUNCTIONS							
Stand-by ON Threshold		$V_{ST(ON)}$		3.5			V
Stand-by OFF Threshold		$V_{ST(OFF)}$				1.5	V
Mute ON Threshold		$V_{M(ON)}$		3.5			V
Mute OFF Threshold		$V_{M(OFF)}$				1.5	V
Quiescent Current@ Stand-by		I_{QST-BY}			0.6	1	mA
Mute Attenuation		AMUTE		50	65		dB
Stand-by bias current		$I_{BIAS(ST-BY)}$	Stand by on V_{ST-BY}=5V, V_{MUTE}=5V		80		μA
			Play or Mute	-20	-5		μA
Mute bias current		$I_{BIAS(MUTE)}$	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 1. 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 Constant	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	0.1μF	Supply voltage bypass		Danger of oscillation

■ TYPICAL APPLICATION CIRCUIT

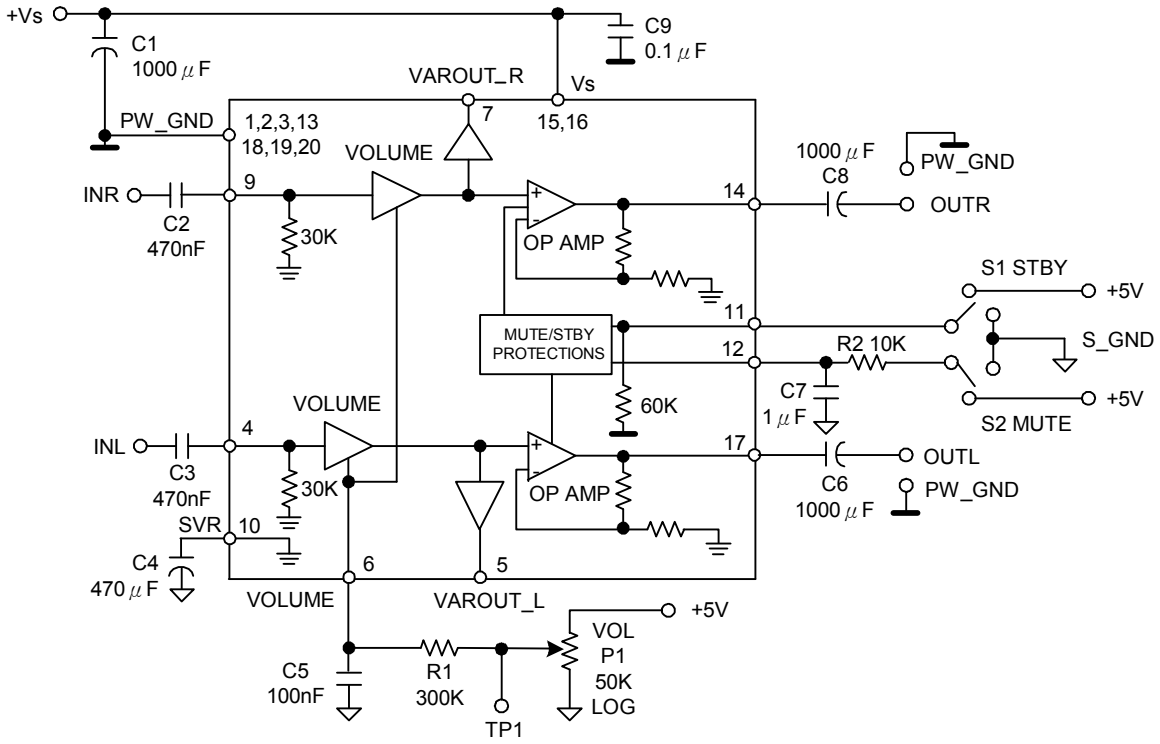


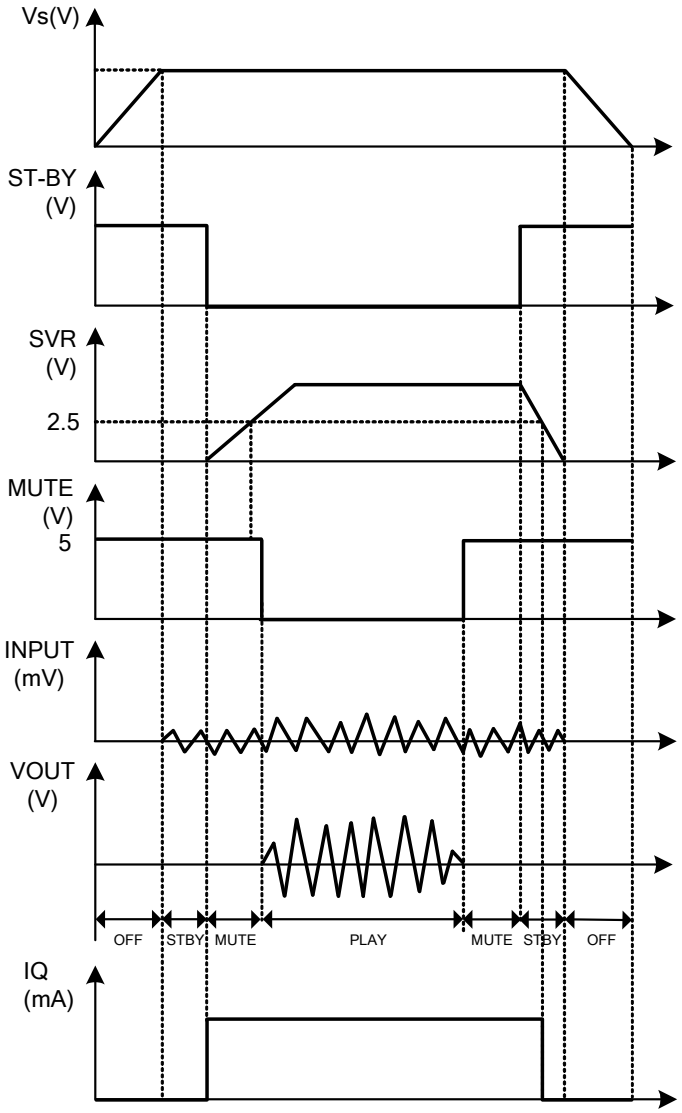
FIGURE 1. APPLICATION CIRCUIT

■ 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



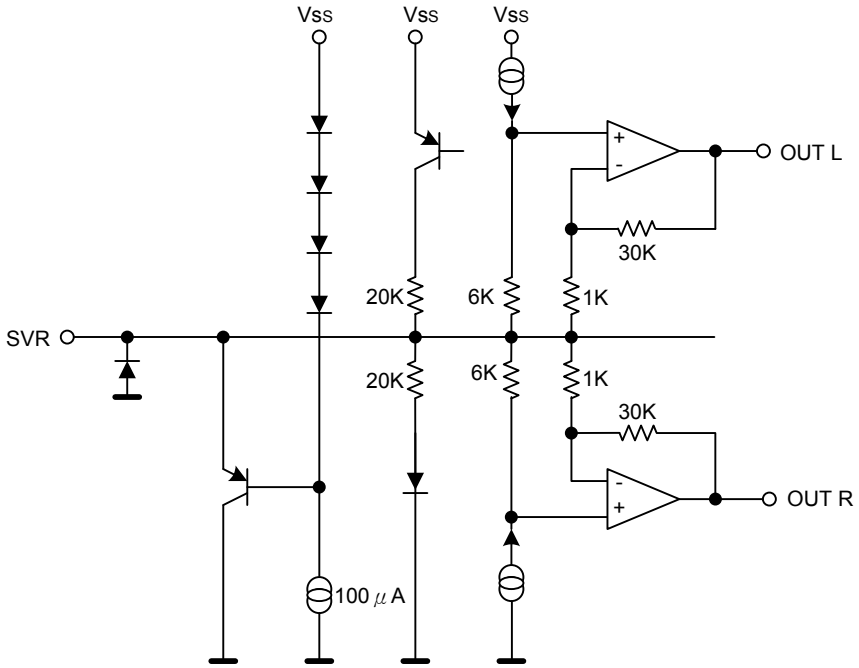
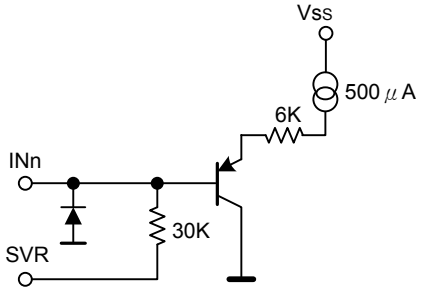
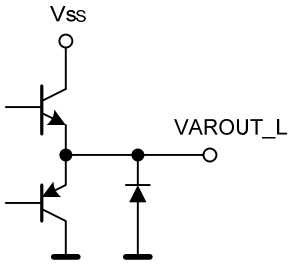
(B) The stand-by pin can be connected directly to Ground in the simply application.

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

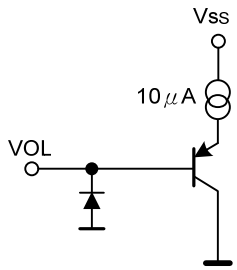
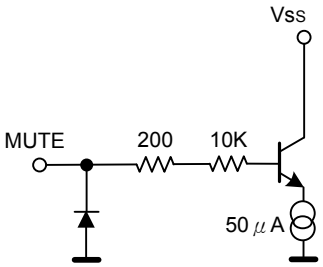
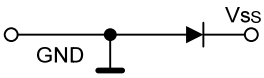
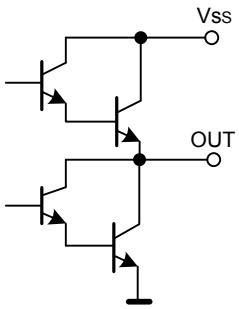
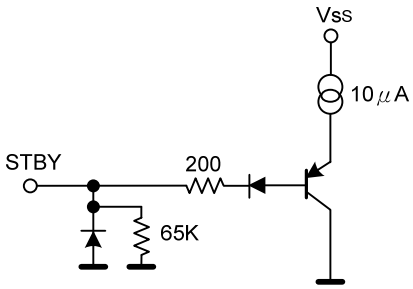
At the turn-on, when the SVR pin is higher than 2.5V, the transition mute - play can just be made.

At the turn-off, when the SVR pin is higher than 2.5V, the UTC TDA7496L can just be brought to mute from the play condition

■ FUNCTIONAL DESCRIPTION

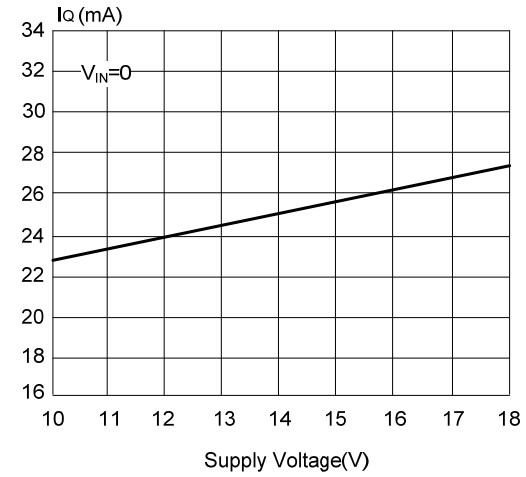
PIN	FIGURE
SVR	
INL,INR	
VAROUT_L, VAROUT_R	

■ FUNCTIONAL DESCRIPTION(Cont.)

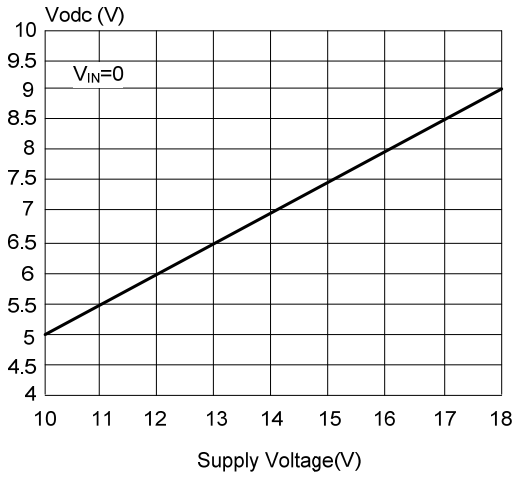
PIN	FIGURE
VOLUME	
MUTE	
PW_GND, S_GND	
VAROUT-L,VAROUT-R	
STBY	

■ TYPICAL CHARACTERISTICS

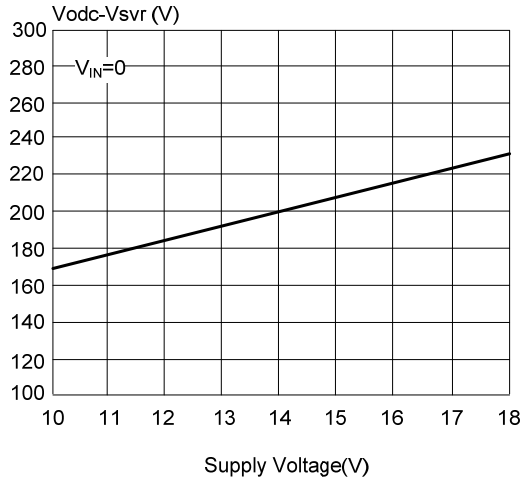
Quiescent current vs.Supply Voltage



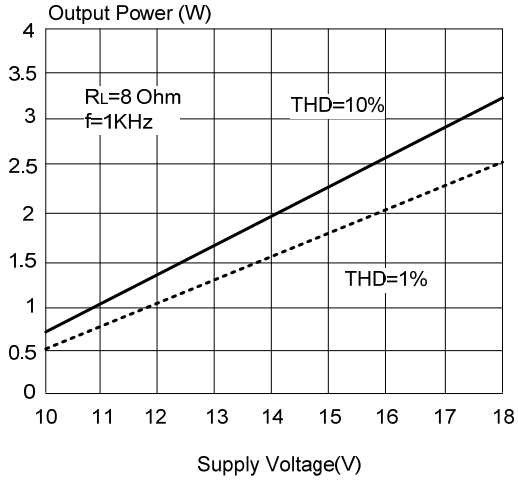
Output DC Voltage vs.Supply Voltage



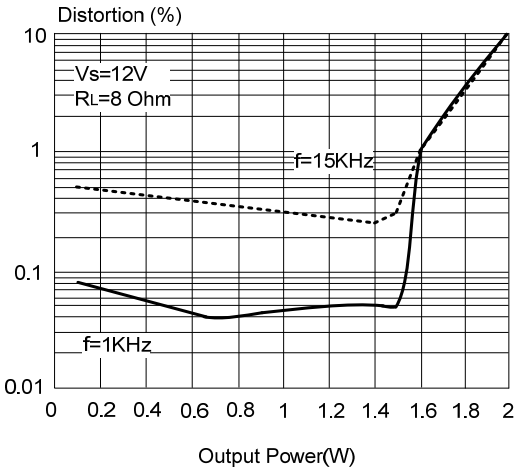
Output DC Offset vs.Supply Voltage



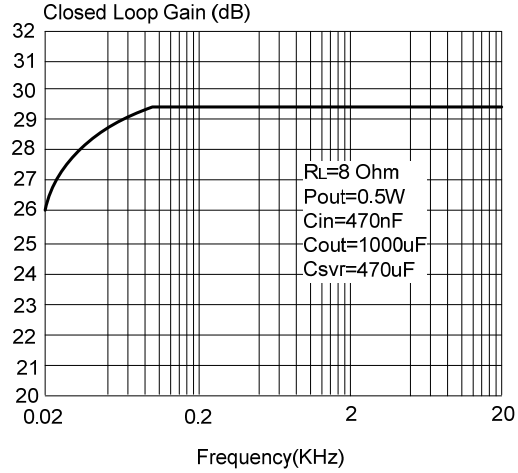
Output Power vs.Supply Voltage



Distortion vs.Output Power

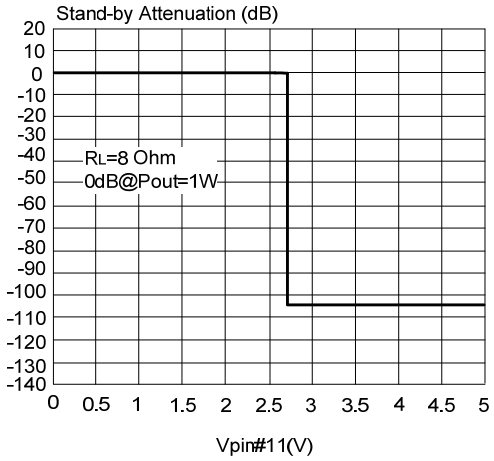


Closed Loop gain vs.Frequency



■ TYPICAL CHARACTERISTICS (Cont.)

St-By Attenuatio vs.Vpin



Mute Attenuation vs.Vpin 12