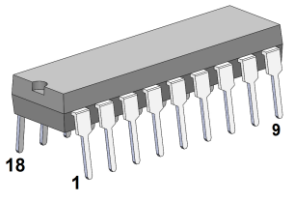
AS3330 - Dual Voltage Controlled Amplifier (VCA)

FEATURES

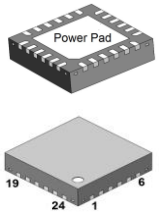
- two independent voltage controlled amplifiers
- simultaneous linear and exponential control Inputs
- wide control range: 120dB min.
- very accurate control scales for excellent gain tracking
- exceptionally low control voltage feedthrough < -90dB
- low distortion: < 0.1%
- exceptionally low noise: < -100dB
- operating point anywhere from Class B to Class A
- summing nodes for signal and linear control inputs
- current outputs for ease of use in voltage controlled 2-Pole Filters
- can be used in VCO and VCF control paths without causing shift
- ±15 volt supplies

APPLICATIONS
for electronic music

AS3330
PDIP-18 (300 mil)



AS3330F
QFN-24 4x4mm 0,5mm



General Description

The AS 3330 is a dual, high performance, voltage controlled amplifier intended for electronic musical instrument and professional audio applications. Each amplifier includes complete circuitry for simultaneous linear and exponential control of gain. In addition, the operating point of the amplifiers may be set anywhere from Class B to Class A, allowing the user to optimize those parameters critical to the particular application. Also featured are virtual ground summing nodes for both the signal and linear control inputs, so that signal and control mixing may be accomplished within the device itself. VCA outputs are signal currents, allowing the device to be conveniently used in two-pole voltage controlled filters, as well as dual voltage controlled amplifiers.

The devices include an on-chip 7.4 volt Zener, allowing them to operate off ±15 volt supplies as well as +15, -5 volt supplies.

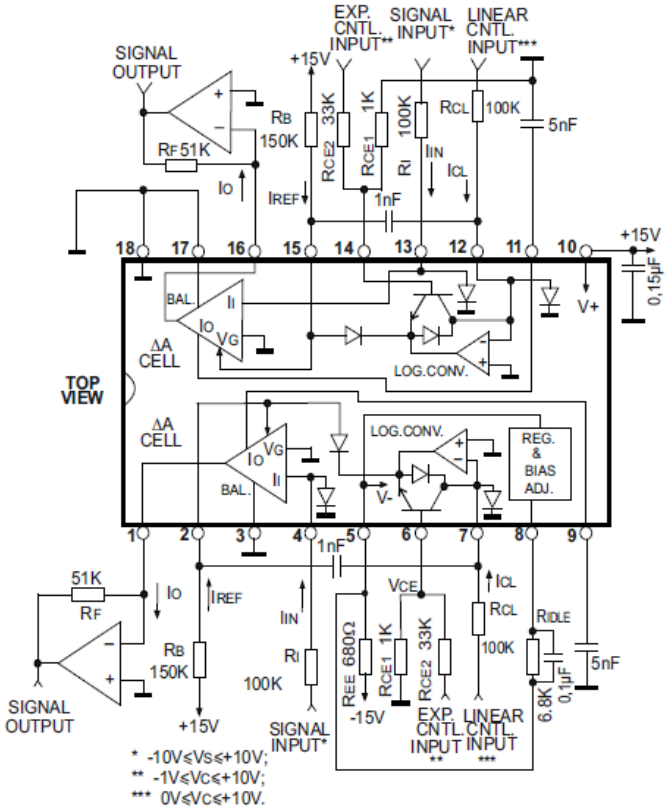
Improved protection and crosstalk level (better than -80 dB).

Power pad in QFN package highly improves thermal stability of parameters of AS3330F.

Pin Information

PDIP-18 Pin No	QFN-24L Pin No	Pin Name	Description
1	4	Out1	Current Output 1
2	5	V_{G1}	Gain 1
3	7	DTrim1	Distortion Trim 1
4	8	IN1	Signal Input 1
5	9	V_{EE}	Negative supply
6	11	V_{CE1}	Exponential Control Input 1
7	12	V_{CL1}	Linear Control Input 1
8	14	IDLE	IDLE Adjust
9	15	C_{COMP1}	Compensation 1
10	16	V_{CC}	Positive supply
11	17	C_{COMP2}	Compensation 2
12	19	V_{CL2}	Linear Control Input 2
13	20	IN2	Signal Input 2
14	22	V_{CE2}	Exponential Control Input 2
15	23	V_{G2}	Gain 2
16	24	Out2	Current Output 2
17	2	DTrim2	Distortion Trim 2
18	3	GND	Ground
-	Power pad	Power pad	Don't connect

Circuit Block and Connection Diagram (PDIP-18)



Absolute Maximum Ratings

Voltage between V_{CC} and V_{EE} pins	+22V, -0,5V
Voltage between V_{CC} and GND pins	+18V, -0,5V
Voltage between V_{EE} and GND pins	-6V, -0,5V
Voltage between Output and Distortion Trim and GND pins	+18V, -0,5V
Voltage between all other pins and GND pin	±6V
Current through any pin	±40mA
Storage temperature range	- 55°C to +150°C
Operating temperature range	- 25°C to +75°C

Electrical Characteristics

V_{CC}=+15V, Vee= -15V, T_A= 25°C

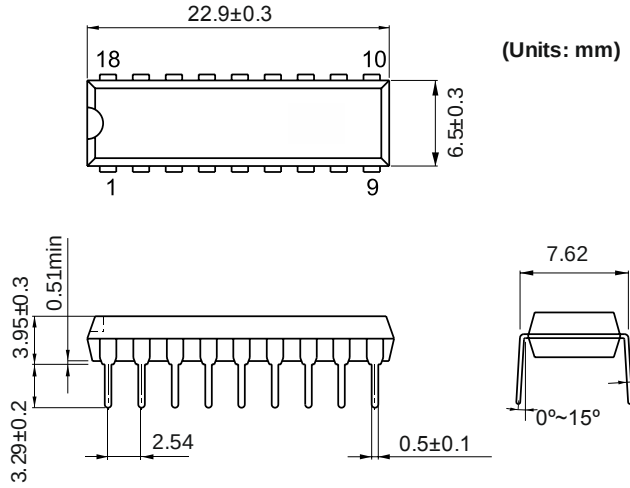
№	Parameter, symbol	Conditions	Class (8*)	Min	Typ	Max	Units
1.	Linear Control Scale Error (1*)	0 < Icl < 100 uA (7*)		0		1.5	%/V
2.	Linear Control Range			-125		-	dB
3.	Exponential Control Scale Error (1*)			0		1.0	dB
4.	Exponential Control Scale Sensitivity			2.80		3.2	mV/dB
5.	Exponential Control Range(6*)			-125		-	dB
6.	Peak Cell Current	input plus output	Class A Class B	0.8 0.7		1.8 1.2	mA mA
7.	Cell Current Gain	Vg=0, Icl = 100uA		0.83 0.7		1.2 1.2	
8.	Output Voltage Compliance	Icl=Iref Gain Deviation < 5%		-0.3		13	V
9.	Untrimmed Control Feedthrough Lin (2*)		Class A Class B	-5 -0.8		5 0.8	µA µA
10.	Untrimmed Control Feedthrough Exp (2*)		Class A Class B	-5 -0.8		5 0.8	µA µA
11.	Idle Current	B Ridle = 767K A Ridle = 68K	Class B Class A	0.8 80		1.2 120	µA µA
12.	Signal Control Input Offset Voltage			-15		5	mV
13.	Linear Control Input Offset Voltage			-7		15	mV
14.	Exponential Control Input Current (7*)	Icl = 100µA		-1.3		1.3	µA
15.	Internal Bias Current at Linear Control Input (5*)		Class A Class B	50 25		280 280	nA nA
16.	Internal Bias Current at Signal Control Input (5*)		Class A Class B	0 0		280 280	nA nA
17.	Positive Supply Current	Vcc=+15V, Vee=-15V	Class A Class B	1.5 0.8		2.5 2.1	mA mA
18.	Supply Current in Negative Supply Voltage Range (3*) Icc Iee	Vcc= +9V, Vee= -18V Ree = 680Ω		 1.3 13		 3 20	 mA mA
19.	Supply Current in Positive Supply Voltage Range Icc Iee	Vcc=+18V, Vee= -4.5V Ree = 680Ω		 0.5 1.2		 2 5	 mA mA

Note 1. From current gain of +20dB to -80dB.Max cell current is less than 100uA.
Note 2. Current gain varies from unity to attenuation 110dB.
Note 3. Current limiting resistor required for negative voltages greater than -6 volts.
Note 4. Class B is defined at an idle current of 1uA±0.2 uA; Class A is at an idle current of 100uA±20uA.
Note 5. In absolute value (ABS).
Note 6. Specified with Control Voltage 13V or 10V with Rce = 25K
Note 7. Icl - linear control input current
Note 8. Not specified class – Class A

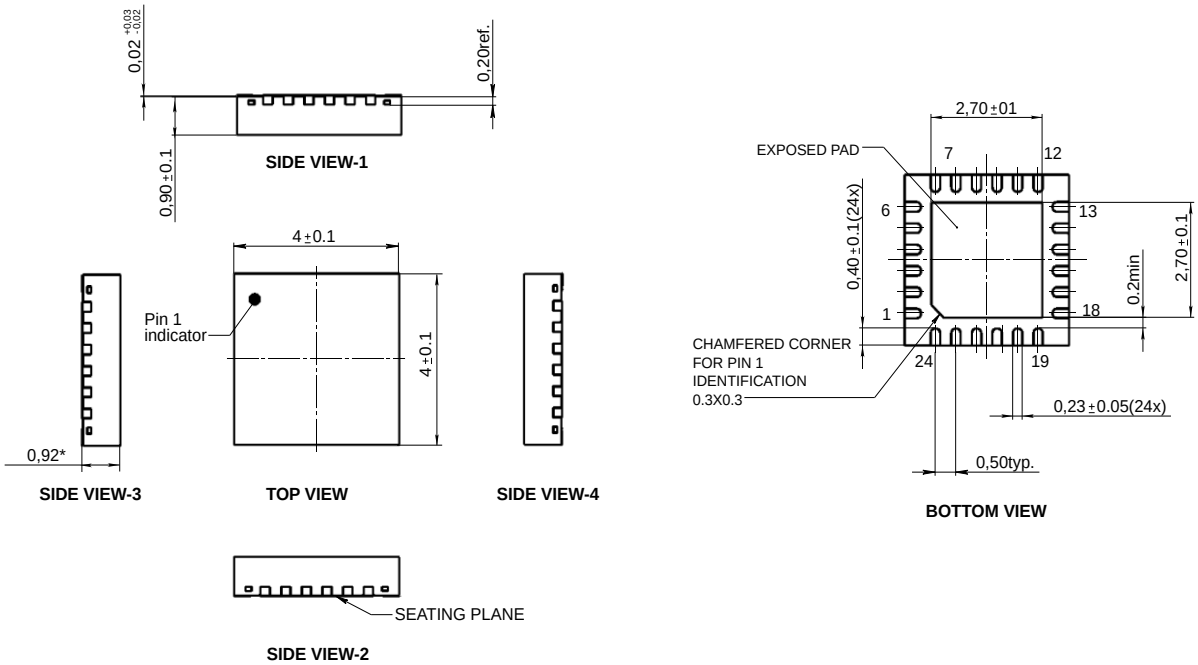
Device type	Package
AS3330	PDIP-18 (300mil)
AS3330F	QFN-24L (4x4 mm, 0.5 mm)

Package Information

PDIP-18 (300mil)



QFN-24 4x4 mm, 0.5 mm



Revision history

Date	Revision	Changes
18-Dec-2017	**1**	Initial version
30-May-2018	**2**	Minor changes
12-Jun-2018	**3**	Minor changes
16-Jul-2018	**4**	Electrical parameters precised
02-Aug-2018	**5**	Minor changes Connection Diagram
30-Aug-2019	**6**	Minor changes Connection Diagram