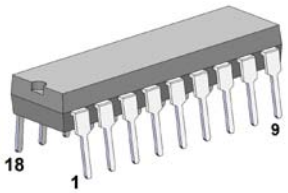
AS3330 - Dual Voltage Controlled Amplifier (VCA)

FEATURES

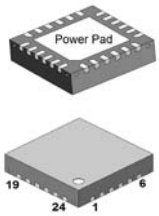
- Two Independent Voltage Controlled Amplifiers in a Single Package
- Simultaneous Linear and Exponential Control Inputs
- Wide Control Range: 120dB min.
- Very Accurate Control Scales for Excellent Gain Tracking
- Exceptionally Low Control Voltage Feedthrough - better than -80dB
- Low Distortion: Less than 0.1%
- Exceptionally Low Noise: Better than -100dB
- Class B to Class A Operation
- Summing 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
- Improved CEM 3330 replacement

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. Finally, the 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.

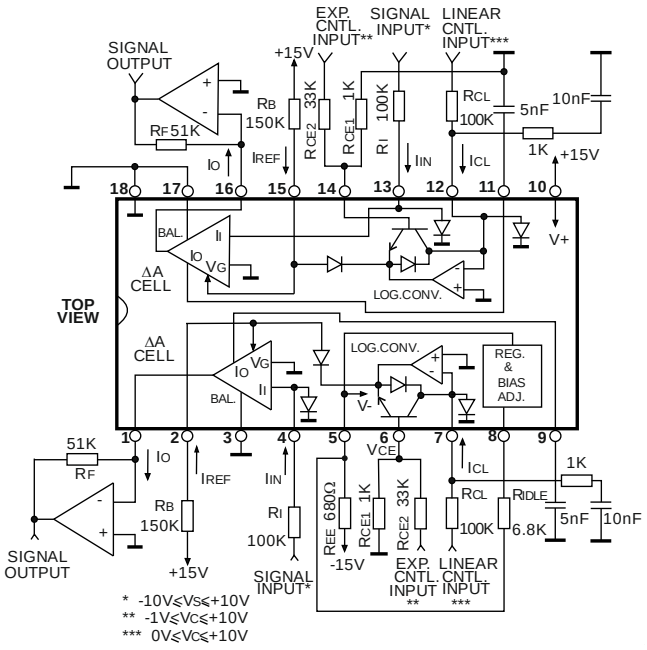
Improved protection and crosstalk level (better than -80 dB).

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}=+15B T_A= 25°C

Parameter	Conditions	Min.	Typ.	Max.	Units
Exponential Control Range		120	150	-	dB
Linear Control Range		100	130	-	dB
Peak Cell Current, I_{CP}	Class B	±400	±600	-	µA
(input plus output)	Class A	+800	±1400	-	µA
Exponential Control Scale Sensitivity		2.8	3.0	3.2	mV/dB
Tempco of Exponential Control Scale		+3000	+3300	+3600	ppm
Tempco of Linear Control Scale		-	±100	±300	ppm
Exponential Control Scale Error[1]			0.3	1	dB
Linear Control Scale Error[1]	0< I_{CL}<100µA	-	0.3	1.5	%
Cell Current Gain	V_G = 0	0.83	1	1.2	
Current Gain Tempco	V_G = 0	-	±100	±300	ppm
Log Converter Output	I_{CL} = I_{REF}	-5	0	+5	mV
Output Voltage Compliance		-0.3	-	+13.5	V
Untrimmed Distortion[2]	Class B	-	1.5	5	%
	Class A	-	0.3	1	%
Trimmed Distortion[2]	Class B		0.2	0.8	%
	Class A	-	0.05	0.2	%
Untrimmed Control Feedthrough[3]	Class B	-	0.2	0.8	µA
	Class A	-	7	25	µA
Trimmed Control Feedthrough[3]	Class B	-	0.01	0.08	µA
	Class A	-	1	5	µA
Output Noise Current in 20KHz	Class B	-	1.2	3.5	nARMS
Bandwidth (V_G = 0)	Class A	-	3.5	12	nARMS
Signal Current Bandwidth[4]	Class B	30	100	-	KHz
	Class A	100	350	-	KHz
Signal Current Slew Rate	Class B	60	150		µA/µS
	Class A	400	750	-	µA/µS
Crosstalk Between VCAs	F = 10KHz	-80	-90	-	dB
Internal Bias Current at Signal & Linear	Class B	80	175	350	nA
Control Inputs	Class A	130	300	600	nA
Exponential Control Input Current	I_{CL} = 100µA	0.4	0.8	1.3	µA
Linear Control Input Offset Voltage		-7	+3	+ 15	mV
Signal Input Offset Voltage		-15	-5	+5	mV
Positive Supply Current	Class B	0.8	1.3	2.1	mA
	Class A	2.1	2.7	3.7	mA
Positive Supply Range		+9	-	+18	V
Negative Supply Range[5]		-4.5	-	-18	V

Note 1: From current gains of +20dB to -80dB. Peak cell current is less than 100µA.

Note 2: Output signal is 10dB below clipping and is at a frequency of 1 KHz. V_G = 0.

Note 3: Current gain varies from unity to maximum attenuation (>110dB).

Note 4: Peak Output Current is ±200µA.

Note 5: Current limiting resistor required for negative voltages greater than -6 volts.

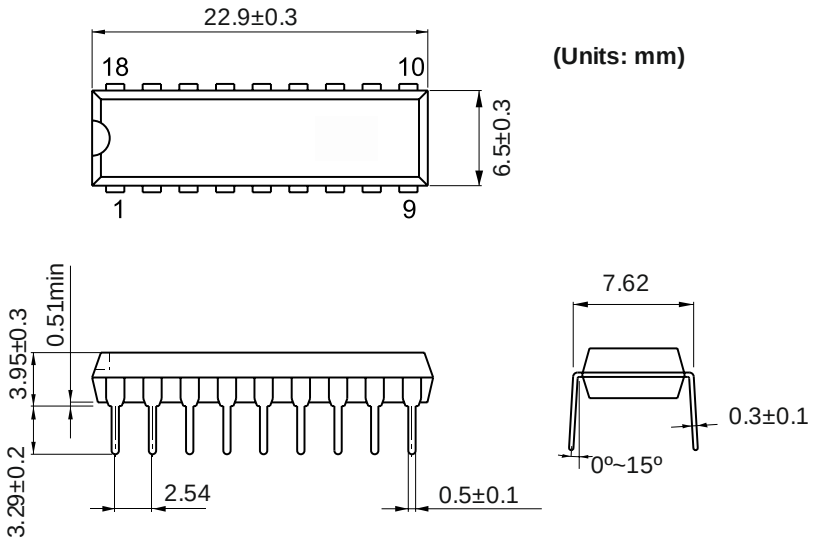
Note 6: Class B is defined at an idle current of 1 µA; Class A is at an idle current of 100µA.

Specifications subject to change without notice.

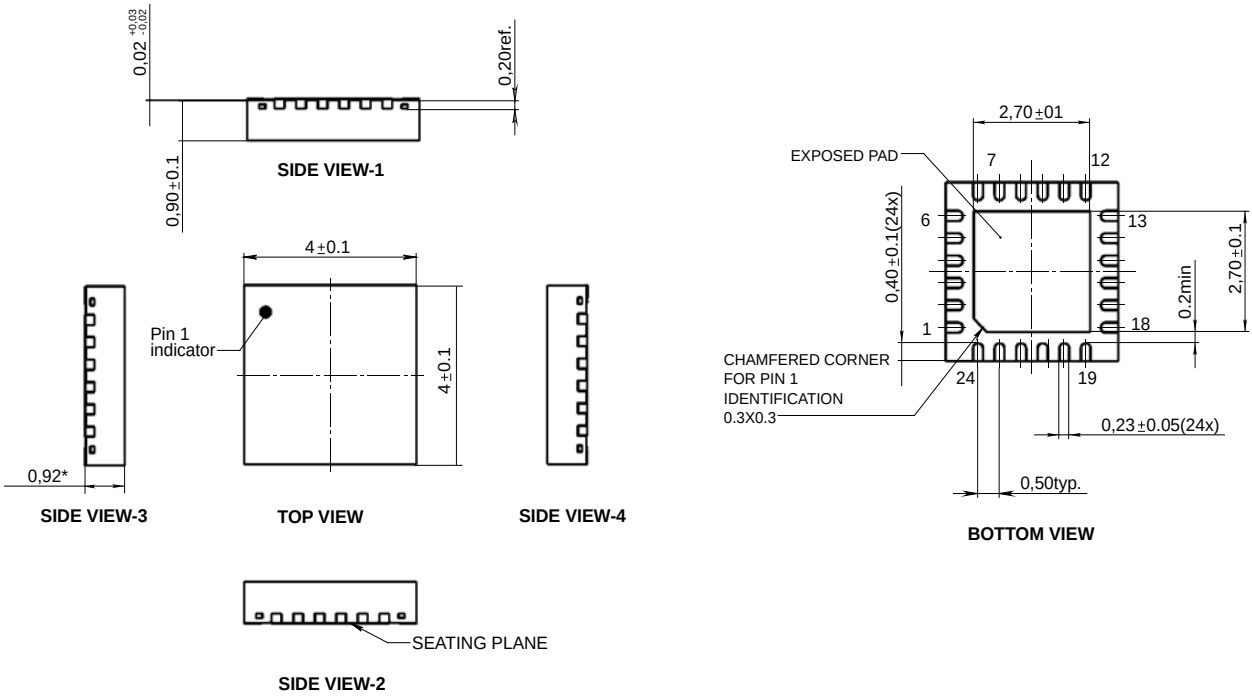
Device type	Package
AS3330	PDIP-18 (300Mil)
AS3330F	QFN-24L (4x4 mm)

Package Information

PDIP-18 (300Mil)



QFN-24 4x4 mm, 0.5 mm



Revision history

Date	Revision	Changes
18-Dec-2017	**1**	Initial version 1