AS2164 - Quad voltage exponentially controlled amplifier (VCA)

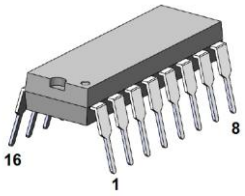
Features

- protection from negaive supply turned OFF
- four high performance VCAs in a single package
- no external trimming
- 120 dB gain range
- 0,07 dB gain matching (unity gain)
- class A or AB operation

Applications

- Remote, Automatic, or Computer Volume Controls
- Automotive Volume/Balance/Faders
- Compressor/Limiters/Compandors
- Noise Reduction Systems
- Automatic Gain Controls
- Voltage Controlled Filters
- Special Sound Processors

AS2164
PDIP-16, 300mil, 2.54 mm



AS2164D
SOIC-16, 150 Mil, 1.27 mm

General Description

AS2164 contains four independent voltage controlled amplifiers (VCAs) in a single package. High performance (dynamic range 100 dB) provides excellent use of VCA's in gain control applications. Each VCA offers current inputs and outputs for maximum design flexibility, as well as a –33 mV/ dB ground control port. All channels are closely matched to within 0,07 dB at unity gain, and 0,24 dB at 40 dB of attenuation. A 120 dB gain range is possible.

A single resistor tailors operation between full Class A and AB modes.

AS2164 is internally protected in situations where negative supply is turned OFF.

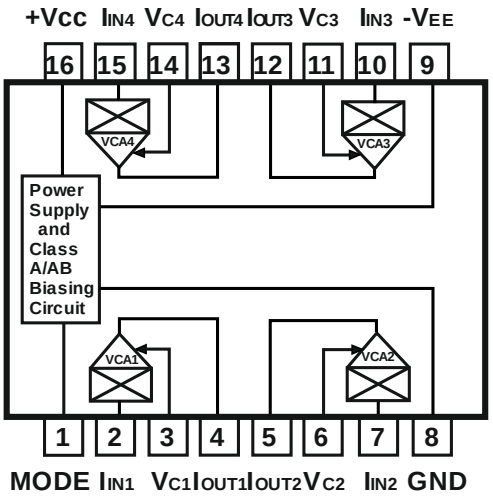
The AS2164 will operate over a wide supply voltage range of ±4 V to ±18 V.

PART NUMBER	PACKAGE	BODY SIZE (NOM)
AS2164	PDIP-16	300mil, 2.54 mm pitch
AS2164D	SOIC-16	150 Mil, 1.27 mm pitch

Pin Information

Pin No	Pin Name	Description
1	MODE	Mode select
2	I_{IN1}	Input current 1
3	V_{C1}	Control voltage 1
4	I_{OUT1}	Output current 1
5	I_{OUT2}	Output current 2
6	V_{C2}	Control voltage 2
7	I_{IN2}	Input current 2
8	GND	Ground
9	V_{EE}	Negative supply
10	I_{IN3}	Input current 3
11	V_{C3}	Control voltage 3
12	I_{OUT3}	Output current 3
13	I_{OUT4}	Output current 4
14	V_{C4}	Control voltage 4
15	I_{IN4}	Input current 4
16	V_{CC}	Positive supply

Figure 1 Block and Connection Diagram



Absolute Maximum Ratings

Unless otherwise specified, T_A= 25°C

Parameter	Symbol	Value	Unit
Supply voltage	V_{CC}, V_{EE}	+18, -18	V
Input, Output, Control Voltages	V_{IN}, V_O, V_C	V- ~ V+	V
Output Short Circuit Duration to GND		Indefinite	sec
Storage Temperature Range	Tstg	-65~+150	°C
Operating Temperature Range	Topr	-40~+85	°C
Junction Temperature Range	Tj	-65~+150	°C
Lead Temperature Range (Soldering 60 sec)		+300	°C

Electrical Characteristics

V_{CC} = +15 V, V_{EE} =-15V, A_V = 0 dB, 0 dBµ = 0,775 V rms, V_{IN} = 0 dBµ, R_{IN} = R_{OUT} = 30 kΩ, f = 1 kHz, -40°C < T_A < +85°C using Typical Application Circuit (Class AB), unless otherwise noted.
Typical specifications apply at T_A = +25°C.

Parameter	Symbol	Conditions	Min	Typ	Max	Units
POWER SUPPLY						
Supply Voltage Range	V_{CC}, V_{EE}		±4		±18	V
Supply Current	I_S	Class AB		7,5	8,9	mA
Power Supply Rejection Ratio	PSRR	60Hz		90		dB
AUDIO SIGNAL PATHS						
Noise	V_{NO}	V_{IN} = GND, 20 kHz Bandwidth		-94		dBµ
Headroom	HR	Clip point=1%THD+N		22		dBµ
Total Harmonic Distortion	THD	2nd and 3nd Harmonics Only				
		Av = 0dB, Class A		0,03	0,1	%
		Av = ±20dB, Class A[1]		0,15		%
		Av = 0dB, Class AB		0,16	1	%
		Av = ±20dB, Class AB[1]		0,3		%
Channel Separation	Sep			-110		dB
Unity Gain Bandwidth	GB	C_F = 10 pF		500		kHz
Slew Rate	SR	C_F = 10 pF		0,7		mA/µs
Input Bias Current	I_{IB}			±10		nA
Output Offset Current	I_{OO}	V_{IN} = 0		±60		nA
Output Compliance	V_{OC}			±100		mV
CONTROL PORTS						
Input Impedance	R_{IN}			10,5		kΩ
Gain Constant	G_C	After 60 seconds operation		-33		mV/dB
Gain Constant Temperature Coefficient	TCG_C			-3300		ppm/°C
Control Feedthrough	V_{CF}	Av = 0dB to -40dB Gain Range [2]	-8,5	1,5	8,5	mV
Gain Matching, Channel-to-Channel	G_M	Av = 0dB		0,07		dB
		Av = -40dB		0,24		dB
Maximum Attenuation	G_A		-90	-110		dB
Maximum Gain	G_{MAX}		17	+22	23	dB

NOTES
[1] -10 dBµ input @ 20 dB gain; +10 dBµ input @ -20 dB gain.
[2] +25°C to +85°C.
Specifications subject to change without notice.

Figure 2 Typical Application and Test Circuit

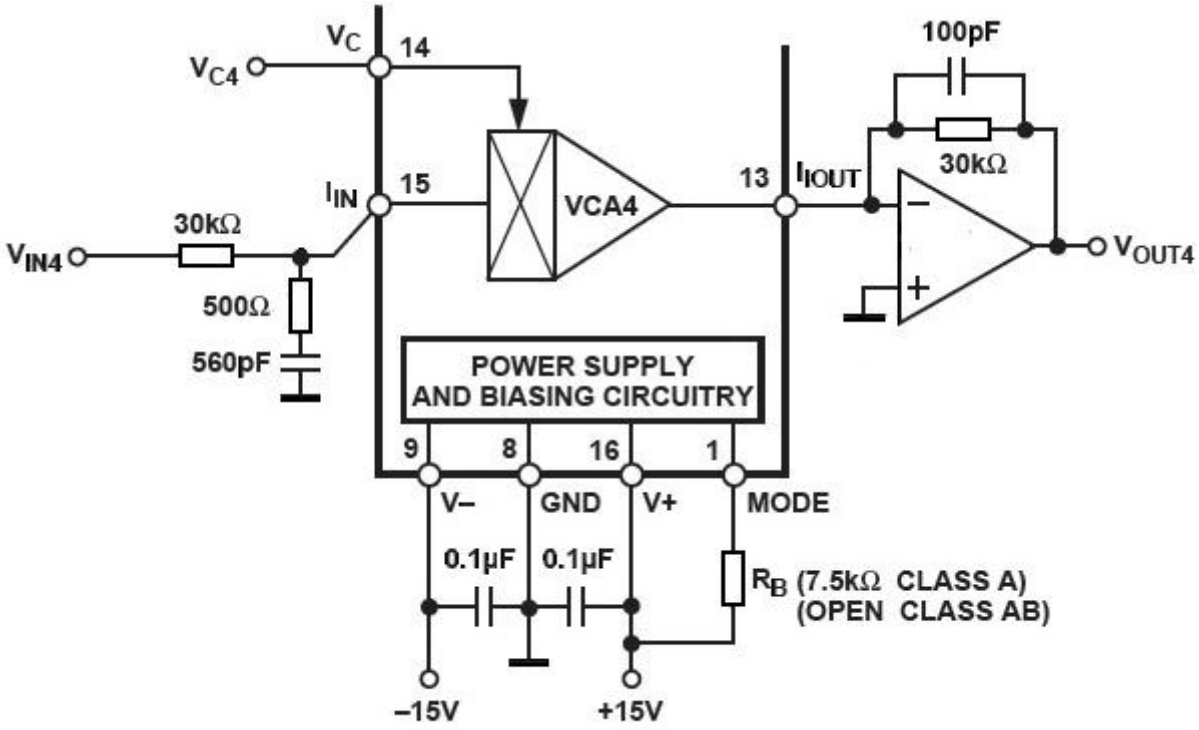
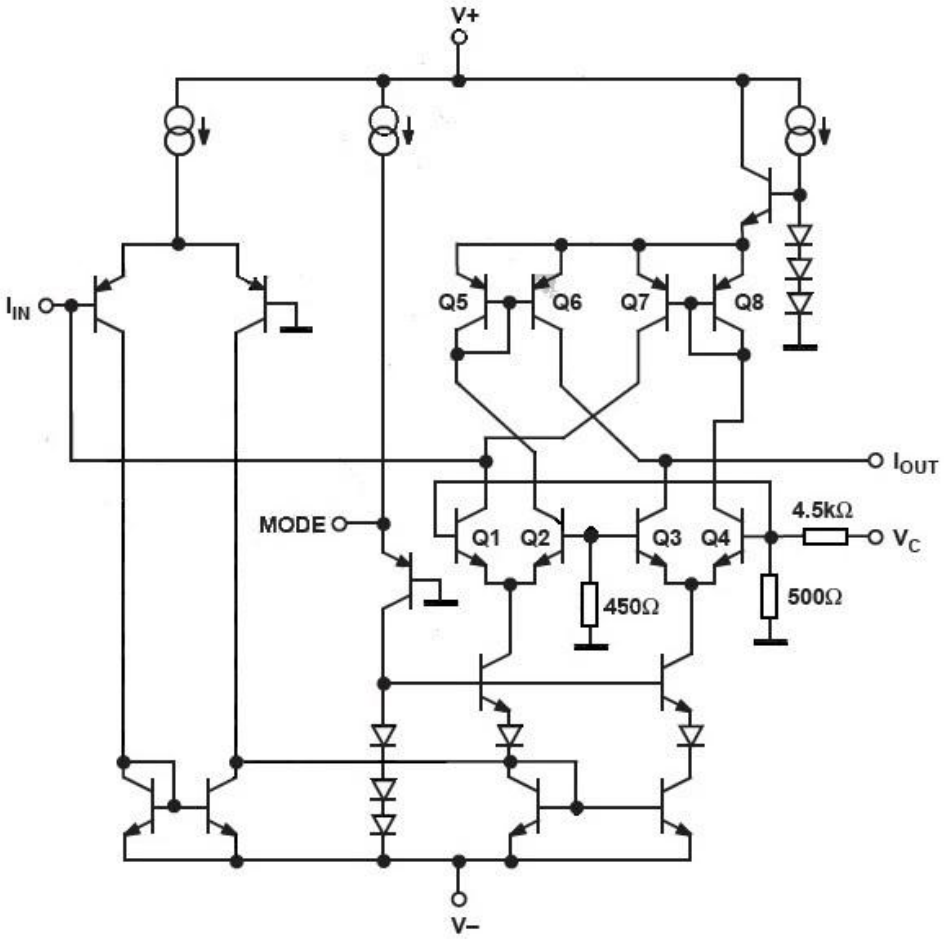


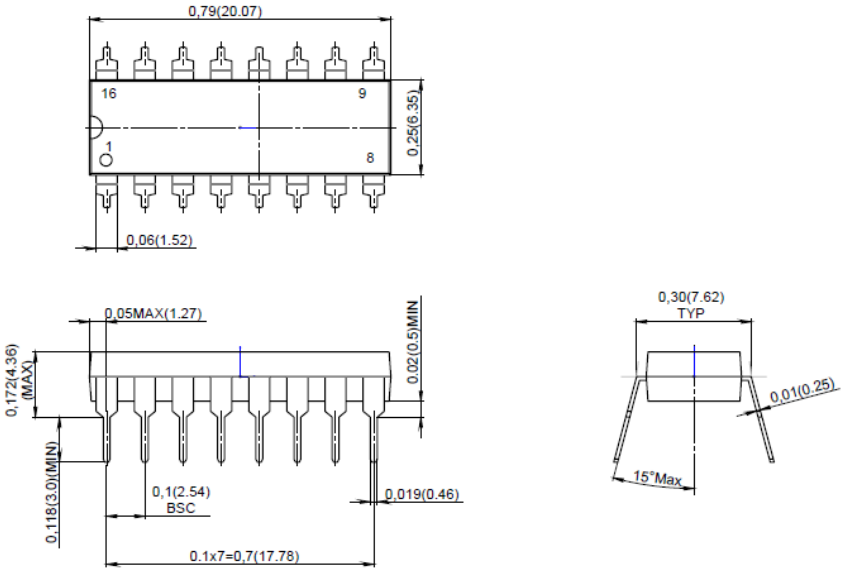
Figure 3 Simplified Schematic (One Channel)



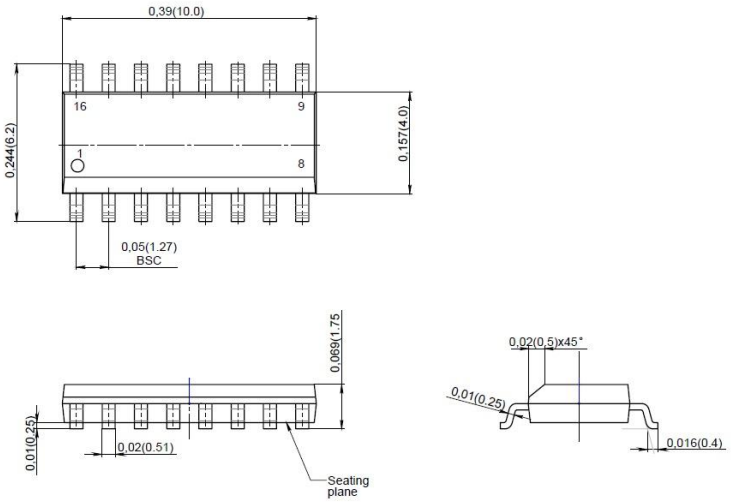
Device type	Package
AS2164	PDIP-16 (300 Mil, 2.54)
AS2164D	SOIC-16 (150 Mil, 1.27)

Package Information

Units: inch (mm)
PDIP-16 (300 Mil)



SOIC-16 (150 mil)



Revision history

Date	Revision	Changes
26-Mar-2019	**1**	Preliminary version 1
12-Aug-2019	**2**	Changes in Specifications
28-Oct-2019	**3**	SOIC-16 – new package
10-Dec-2020	**4**	Minor changes in Electrical Characteristics