



AS3280 – Dual Operational Transconductance Amplifier (OTA)

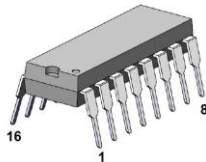
Features

- Low Initial Input Offset Voltage: 500 μ V (Max) (AS3280A)
- Low Offset Voltage Change vs I_{ABC}: <500 μ V (Typ)
- Low Offset Voltage Drift: 5 μ V/ $^{\circ}$ C (Max) (AS3280A)
- Excellent Matching of the Two Amplifiers for All Characteristics
- Internal Current-Driven Linearizing Diodes Reduce the External Input Current to an Offset Component
- Flexible Supply Voltage Range \pm 2V to \pm 15V

Applications

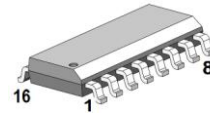
- Voltage Controlled Amplifiers Oscillators
- Multipliers
- Demodulators
- Sample and Hold
- Instrumentation Amplifiers
- Function Generators
- Triangle Wave-to-Sine Wave Converters
- Comparators
- Audio Preamplifier

AS3280, AS3280A



PDIP-16 300mil, 2.54 mm

AS3280D, AS3280AD



SOIC-16 150mil, 1.27 mm

General Description

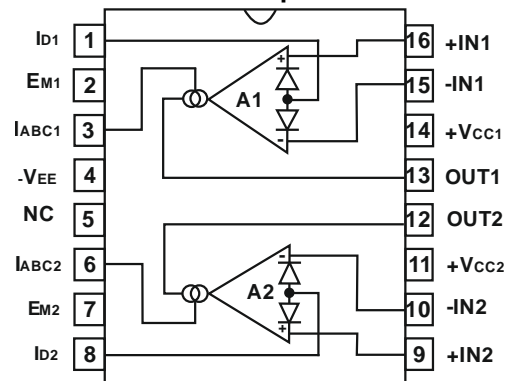
The AS3280 and AS3280A types consist of two variable operational amplifiers that are designed to substantially reduce the initial input offset voltage and the offset voltage variation with respect to changes in programming current. This design results in reduced "AGC thump," an objectionable characteristic of many AGC systems. Careful design of critical places of the circuit reduces the amplifier dependence upon thermal and processing variables.

The AS3280 has all the generic characteristics of an operational voltage amplifier except that the forward transfer characteristics is best described by transconductance rather than voltage gain, and the output is current, not voltage. The magnitude of the output current is equal to the product of transconductance and the input voltage. This type of operational transconductance amplifier has since gained wide acceptance as a gateable, gain controlled building block for instrumentation and audio applications, such as linearization of transducer outputs, standardization of widely changing signals for data processing, multiplexing, instrumentation amplifiers operating from the nanowatt range to high current and high speed comparators.

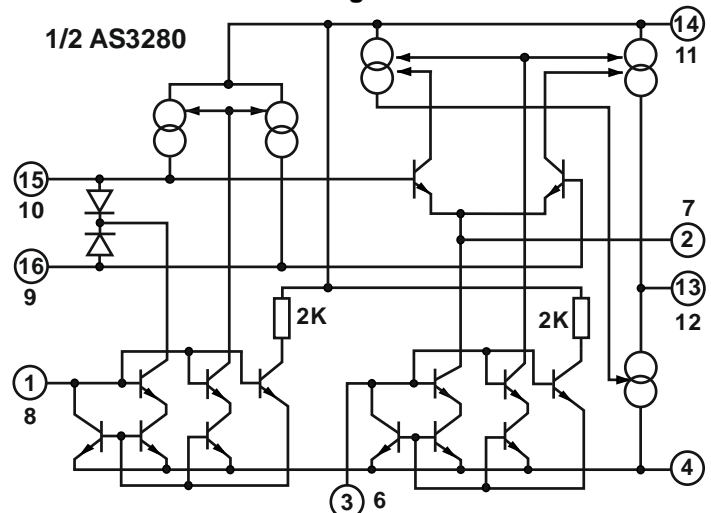
Pin Information

PDIP-16 SOIC-16 Pin No	Pin Name	Description
1	ID1	Input current with linearizing diode 1
2	EM1	Emitter 1
3	IABC1	Amplifier bias current 1
4	-VEE	Negative supply
5	NC	Not connect
6	IABC2	Amplifier bias current 2
7	EM2	Emitter 2
8	ID2	Input current with linearizing diode 2
9	+IN2	Noninverting input1
10	-IN2	Inverting input 2
11	+VCC2	Positive supply 2
12	OUT2	Output 2
13	OUT1	Output 1
14	+VCC1	Positive supply 1
15	-IN1	Inverting input 1
16	+IN1	Noninverting input1

Pinout Top view



Functional diagram of AS3280





Absolute Maximum Ratings

Supply Voltage (Between V+ and V-).....	+36V
Differential Input Voltage.....	5V
Input Voltage Range.....	V+ to V-
Input Current at $I_D = 0$	100 μ A
Amplifier Bias Current (I_{ABC}).....	10mA
Output Short Circuit Duration (Note 1).....	Indefinite
Linearizing Diode Bias Current, I_D	5mA
Peak Input Current with Linearizing Diode.....	$\pm I_D$

Operating Conditions

Temperature Range	AS3280, AS3280A	0°C to 70°C
Supply Voltage Range (Typ).....		$\pm 2V$ to $\pm 15V$

Thermal Information

Thermal Resistance (Typical, Note 2) θ_{JA} (°C/W) θ_{JC} (°C/W)		
PDIP-16 Package.....	90	N/A
SOIC-16 Package.....	100	N/A

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

- Short circuit may be applied to ground or to either supply.
- θ_{JA} is measured with the component mounted on a low effective thermal conductivity test board in free air.

Electrical Specifications $T_A=25^\circ\text{C}$, $V_{\text{SUPPLY}}=\pm 15V$, unless otherwise specified

PARAMETER	SYMBOL	TEST CONDITIONS	AS3280			AS3280A			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage	V_{IO}	$I_{ABC} = 1\text{mA}$	-	-	1,8	-	-	0,5	mV
		$I_{ABC} = 100\mu\text{A}$	-	0,7	1,8	-	0,25	0,5	mV
		$I_{ABC} = 10\mu\text{A}$	-	-	1,8	-	-	0,5	mV
		$I_{ABC} = 1\text{mA}$ to $10\mu\text{A}$, $T_A = \text{Full Temp. Range}$	-	0,8	4	-	0,8	1,5	mV
Input Offset Voltage Drift	$ \Delta V_{IO} $	$I_{ABC} = 1\mu\text{A}$ to 1mA	-	0,5	1	-	0,5	1	mV
		$I_{ABC} = 100\mu\text{A}$, $T_A = \text{Full Temperature Range}$	-	5	-	-	3	5	$\mu\text{V}/^\circ\text{C}$
Amplifier Bias Voltage	V_{ABC}	$I_{ABC} = 100\mu\text{A}$	-	1,2	-	-	1,2	-	V
Peak Output Voltage	V_{OM+}	$I_{ABC} = 500\mu\text{A}$	12,5	12,6	-	12,5	12,6	-	V
	V_{OM-}		-	-13,5	-12,5	-	-13,5	-12,5	V
	V_{OM+}	$I_{ABC} = 5\mu\text{A}$	12,5	12,8	-	12,5	12,8	-	V
	V_{OM-}		-	-13,5	-12,5	-	-13,5	-12,5	V
Common Mode Input Voltage Range	V_{ICR}	$I_{ABC} = 100\mu\text{A}$	-13	-	13	-13	-	13	V
Noise Voltage	e_N	$I_{ABC} = 500\mu\text{A}$	-	20	-	-	20	-	$\text{nV}/\sqrt{\text{Hz}}$
			-	8	-	-	8	-	$\text{nV}/\sqrt{\text{Hz}}$
			-	7	-	-	7	-	$\text{nV}/\sqrt{\text{Hz}}$
Input Offset Current	I_{IO}	$I_{ABC} = 500\mu\text{A}$	-	0,3	0,5	-	0,3	0,5	μA
Input Bias Current	I_{IB}	$I_{ABC} = 500\mu\text{A}$	-	0,1	5	-	0,1	5	μA
		$I_{ABC} = 500\mu\text{A}$, $T_A = \text{Full Temperature Range}$	-	3	8	-	3	8	μA



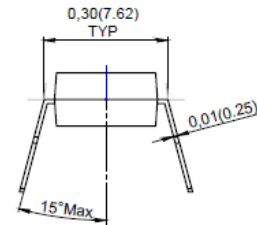
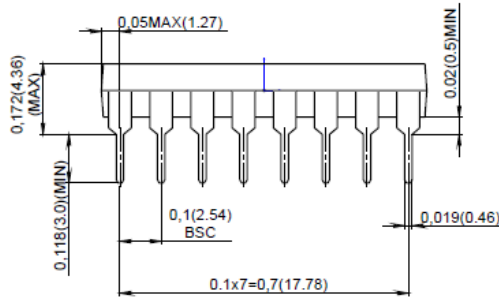
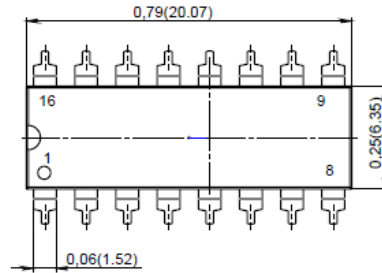
Electrical Specifications $T_A=25^{\circ}\text{C}$, $V_{\text{SUPPLY}}=\pm 15\text{V}$, unless otherwise specified (Continued)

PARAMETER	SYMBOL	TEST CONDITIONS	AS3280			AS3280A			UNITS	
			MIN	TYP	MAX	MIN	TYP	MAX		
Peak Output Current	I _{OM+}	I _{ABC} = 500μA Source	350	410	500	350	410	500	μA	
	I _{OM-}	Sink	-350	-410	-500	-350	-410	-500	μA	
	I _{OM+}	I _{ABC} = 5μA Source	3	5	7	3	5	7	μA	
	I _{OM-}	Sink	-7	-5	-3	-7	-5	-3	μA	
Peak Output Current Sink and Source	I _{OM-} , I _{OM+}	I _{ABC} = 500μA, T _A =Full Temperature Range	350	450	550	350	450	550	μA	
Linearization Diodes		I _D =100μA	-	10	-	-	10	-	μA	
Offset Current	I _{IOD}	I _D =10μA	-	0,5	1	-	0,5	1	μA	
Dynamic Impedance	R _{dyn}	I _D =100μA	-	700	-	-	700	-	Ω	
Diode Network Supply Current	I _{SD}	I _{ABC} = 100μA	250	600	800	250	600	800	μA	
Amplifier Supply Current (Per Amplifier)	I ₊	I _{ABC} = 500μA	-	2	2,5	-	2	2,5	mA	
Amplifier Output Leakage Current	I _{OL}	I _{ABC} = 0, V _o = 0V	-	0,015	0,1	-	0,015	0,1	nA	
		I _{ABC} = 0, V _o = 30V	-	0,15	1	-	0,15	1	nA	
Common Mode Rejection Ratio		I _{ABC} = 100μA	80	100	-	80	100	-	dB	
Power Supply Rejection Ratio	PSRR	I _{ABC} = 100μA	86	105	-	86	105	-	dB	
Open Loop Voltage Gain	A _{OL}	I _{ABC} = 100μA, R _L = ∞, V _o = 20V _{P-P}	50	100	-	50	100	-	kV/V	
			94	100	-	94	100	-	dB	
Forward Transconductance	G _M	I _{ABC} = 50μA, Large Signal	-	0,8	1,2	-	0,8	1,2	mS	
	g _M	I _{ABC} = 1mA, Small Signal	-	16	22	-	16	22	mS	
Input Resistance	R _I	I _{ABC} = 10μA	0,5	-	-	0,5	-	-	MΩ	
Channel Separation		f = 1kHz	-	94	-	-	94	-	dB	
Open Loop Total Harmonic Distortion	THD	f = 1kHz, I _{ABC} =1,5mA, R _L = 15kΩ, V _o = 20V _{P-P}	-	0,4	-	-	0,4	-	%	
Bandwidth	f _T	I _{ABC} = 1mA, R = 100Ω	-	9	-	-	9	-	MHz	
Slew Rate, Open Loop	SR	I _{ABC} = 10mA	-	125	-	-	125	-	V/μs	
Capacitance	C _I	I _{ABC} = 100μA	Input	-	4,5	-	-	4,5	-	pF
	C _O		Output	-	7,5	-	-	7,5	-	pF
Output Resistance	R _O	I _{ABC} = 100μA	-	63	-	-	63	-	MΩ	

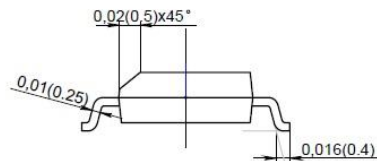
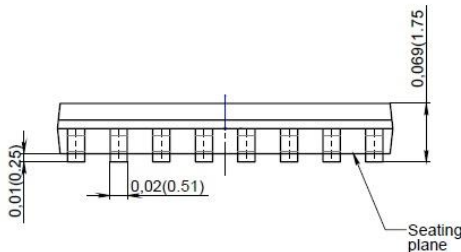
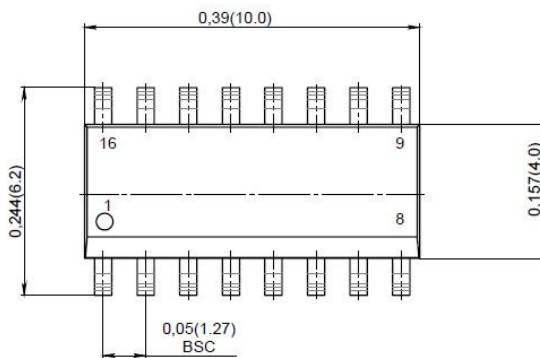


Device type	Package	Additional marking
AS3280	PDIP-16 (300mil)	----
AS3280 A	PDIP-16 (300mil)	white dot
AS3280 D	SOIC-16 (150mil)	----
AS3280 AD	SOIC-16 (150mil)	white dot

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



SOIC-16 (150Mil)



Revision history

Date	Revision	Changes
04-Dec-2018	1	Initial version
09-Jul-2019	2	PDIP-16 – New package