

## 2MHz, Operational Transconductance Amplifier (OTA)

The CA3080 and CA3080A types are Gatable-Gain Blocks which utilize the unique operational-transconductance-amplifier (OTA) concept described in Application Note AN6668, "Applications of the CA3080 and CA3080A High-Performance Operational Transconductance Amplifiers".

The CA3080 and CA3080A types have differential input and a single-ended, push-pull, class A output. In addition, these types have an amplifier bias input which may be used either for gating or for linear gain control. These types also have a high output impedance and their transconductance ( $g_M$ ) is directly proportional to the amplifier bias current ( $I_{ABC}$ ).

The CA3080 and CA3080A types are notable for their excellent slew rate ( $50V/\mu s$ ), which makes them especially useful for multiplexer and fast unity-gain voltage followers. These types are especially applicable for multiplexer applications because power is consumed only when the devices are in the "ON" channel state.

The CA3080A's characteristics are specifically controlled for applications such as sample-hold, gain-control, multiplexing, etc.

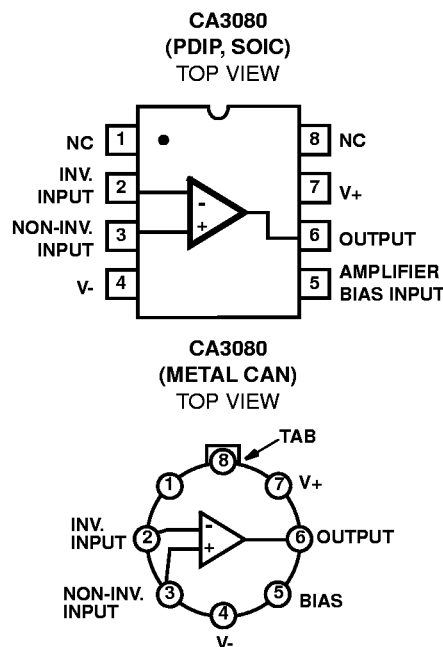
## Features

- Slew Rate (Unity Gain, Compensated). . . . .  $50V/\mu s$
- Adjustable Power Consumption. . . . .  $10\mu W$  to  $30\mu W$
- Flexible Supply Voltage Range. . . . .  $\pm 2V$  to  $\pm 15V$
- Fully Adjustable Gain . . . . . 0 to  $g_M R_L$  Limit
- Tight  $g_M$  Spread:
  - CA3080. . . . . 2:1
  - CA3080A . . . . . 1.6:1
- Extended  $g_M$  Linearity . . . . . 3 Decades

## Applications

- Sample and Hold
- Multiplexer
- Voltage Follower
- Multiplier
- Comparator

## Pinouts



**\* For complete Rochester ordering guide, please refer to page 2 \***

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# CA3080, CA3080A

## Rochester Ordering Guide

*\*Most products can also be offered as RoHS compliant, designated by a -G suffix. Please contact factory for more information.*

Rochester Part Number	Intersil Part Number	Package	Temperature
CA3080	CA3080	CAN-8, Metal	0° to +70°C
CA3080E	CA3080E	PDIP-8	0° to +70°C
CA3080EX	CA3080EX	PDIP-8	0° to +70°C
CA3080M	CA3080M	SOP-8, Plastic	0° to +70°C
CA3080S	CA3080S	TO5-8, Metal	0° to +70°C
CA3080SX	CA3080SX	TO5-8, Metal	0° to +70°C
CA3080X	CA3080X	CAN-8, Metal	0° to +70°C
CA3080A	CA3080A	CAN-8, Metal	-55° to +125°C
CA3080AE	CA3080AE	PDIP-8	-55° to +125°C
CA3080AM	CA3080AM	SOP-8, Plastic	-55° to +125°C
CA3080AS	CA3080AS	TO5-8, Metal	-55° to +125°C
CA3080ASX	CA3080ASX	TO5-8, Metal	-55° to +125°C
CA3080AX	CA3080AX	CAN-8, Metal	-55° to +125°C

# CA3080, CA3080A

## Absolute Maximum Ratings

Supply Voltage (Between V+ and V- Terminal)	36V
Differential Input Voltage	5V
Input Voltage	V+ to V-
Input Signal Current	1mA
Amplifier Bias Current (I <sub>ABC</sub> )	2mA
Output Short Circuit Duration (Note 1)	No Limitation

## Thermal Information

Thermal Resistance (Typical, Note 2)	$\theta_{JA}$ (°C/W)	$\theta_{JC}$ (°C/W)
PDIP Package	130	N/A
SOIC Package	170	N/A
Metal Can Package	200	120
Maximum Junction Temperature (Metal Can)	175°C	
Maximum Junction Temperature (Plastic Package)	150°C	
Maximum Storage Temperature Range	-65°C to 150°C	
Maximum Lead Temperature (Soldering 10s)	300°C (SOIC - Lead Tips Only)	

## Operating Conditions

Temperature Range	
CA3080	0°C to 70°C
CA3080A	-55°C to 125°C

**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.

### NOTES:

- Short circuit may be applied to ground or to either supply.
- $\theta_{JA}$  is measured with the component mounted on an evaluation PC board in free air.

## Electrical Specifications For Equipment Design, V<sub>SUPPLY</sub> = ±15V, Unless Otherwise Specified

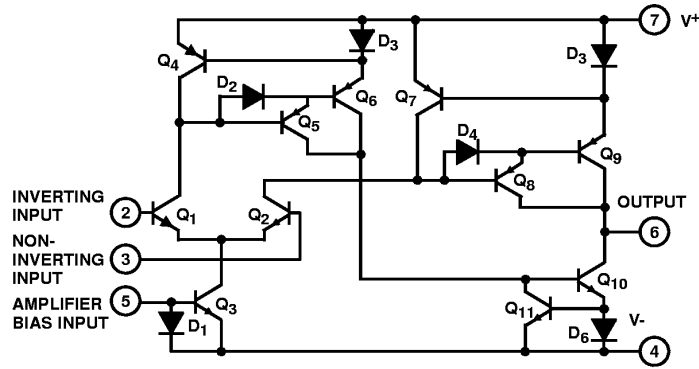
PARAMETER	TEST CONDITIONS	TEMP	CA3080			CA3080A			UNITS	
			MIN	TYP	MAX	MIN	TYP	MAX		
Input Offset Voltage	I <sub>ABC</sub> = 5μA	25	-	0.3	-	-	0.3	2	mV	
	I <sub>ABC</sub> = 500μA	25	-	0.4	5	-	0.4	2	mV	
	Full		-	-	6	-	-	5	mV	
Input Offset Voltage Change	I <sub>ABC</sub> = 500μA to 5μA	25	-	0.2	-	-	0.1	3	mV	
Input Offset Voltage Temp. Drift	I <sub>ABC</sub> = 100μA	Full	-	-	-	-	3.0	-	μV/°C	
Input Offset Voltage Sensitivity	Positive	I <sub>ABC</sub> = 500μA	25	-	-	150	-	-	150	μV/V
	Negative		25	-	-	150	-	-	150	μV/V
Input Offset Current	I <sub>ABC</sub> = 500μA	25	-	0.12	0.6	-	0.12	0.6	μA	
Input Bias Current	I <sub>ABC</sub> = 500μA	25	-	2	5	-	2	5	μA	
		Full	-	-	7	-	-	15	μA	
Differential Input Current	I <sub>ABC</sub> = 0, V <sub>DIFF</sub> = 4V	25	-	0.008	-	-	0.008	5	nA	
Amplifier Bias Voltage	I <sub>ABC</sub> = 500μA	25	-	0.71	-	-	0.71	-	V	
Input Resistance	I <sub>ABC</sub> = 500μA	25	10	26	-	10	26	-	kΩ	
Input Capacitance	I <sub>ABC</sub> = 500μA, f = 1MHz	25	-	3.6	-	-	3.6	-	pF	
Input-to-Output Capacitance	I <sub>ABC</sub> = 500μA, f = 1MHz	25	-	0.024	-	-	0.024	-	pF	
Common-Mode Input-Voltage Range	I <sub>ABC</sub> = 500μA	25	12 to -12	13.6 to -14.6	-	12 to -12	13.6 to -14.6	-	V	
Forward Transconductance (Large Signal)	I <sub>ABC</sub> = 500μA	25	6700	9600	13000	7700	9600	12000	μS	
		Full	5400	-	-	4000	-	-	μS	
Output Capacitance	I <sub>ABC</sub> = 500μA, f = 1MHz	25	-	5.6	-	-	5.6	-	pF	
Output Resistance	I <sub>ABC</sub> = 500μA	25	-	15	-	-	15	-	MΩ	
Peak Output Current	I <sub>ABC</sub> = 5μA, R <sub>L</sub> = 0Ω	25	-	5	-	3	5	7	μA	
	I <sub>ABC</sub> = 500μA, R <sub>L</sub> = 0Ω	25	350	500	650	350	500	650	μA	
		Full	300	-	-	300	-	-	μA	

# CA3080, CA3080A

## Electrical Specifications For Equipment Design, $V_{SUPPLY} = \pm 15V$ , Unless Otherwise Specified (Continued)

PARAMETER	TEST CONDITIONS	TEMP	CA3080			CA3080A			UNITS	
			MIN	TYP	MAX	MIN	TYP	MAX		
Peak Output Voltage	Positive	$I_{ABC} = 5\mu A, R_L = \infty$	25	-	13.8	-	12	13.8	-	V
	Negative		25	-	-14.5	-	-12	-14.5	-	V
	Positive	$I_{ABC} = 500\mu A, R_L = \infty$	25	12	13.5	-	12	13.5	-	V
	Negative		25	-12	-14.4	-	-12	-14.4	-	V
Amplifier Supply Current	$I_{ABC} = 500\mu A$	25	0.8	1	1.2	0.8	1	1.2	mA	
Device Dissipation	$I_{ABC} = 500\mu A$	25	24	30	36	24	30	36	mW	
Magnitude of Leakage Current	$I_{ABC} = 0, V_{TP} = 0$	25	-	0.08	-	-	0.08	5	nA	
	$I_{ABC} = 0, V_{TP} = 36V$	25	-	0.3	-	-	0.3	5	nA	
Propagation Delay	$I_{ABC} = 500\mu A$	25	-	45	-	-	45	-	ns	
Common-Mode Rejection Ratio	$I_{ABC} = 500\mu A$	25	80	110	-	80	110	-	dB	
Open-Loop Bandwidth	$I_{ABC} = 500\mu A$	25	-	2	-	-	2	-	MHz	
Slew Rate	Uncompensated	25	-	75	-	-	75	-	V/ $\mu s$	
	Compensated	25	-	50	-	-	50	-	V/ $\mu s$	

## Schematic Diagram



## Typical Applications

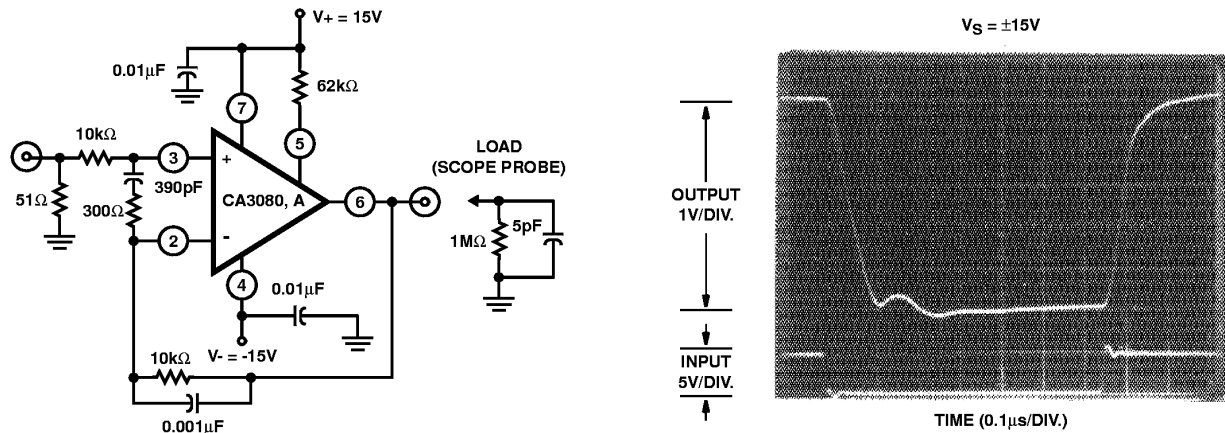


FIGURE 1. SCHEMATIC DIAGRAM OF THE CA3080 AND CA3080A IN A UNITY-GAIN VOLTAGE FOLLOWER CONFIGURATION AND ASSOCIATED WAVEFORM

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