

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.

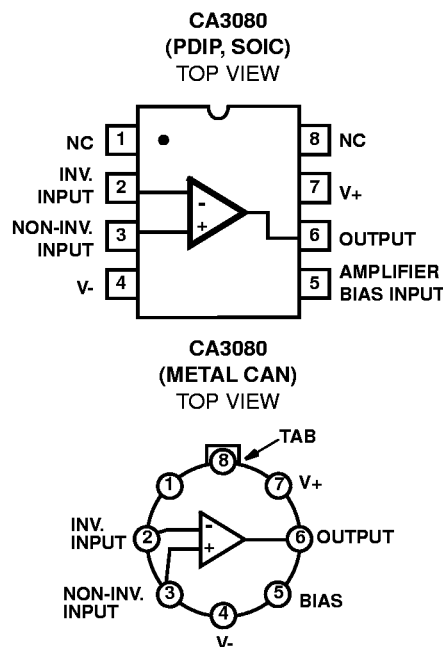
Features

- 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_MR_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_{ABC}) 2mA
Output Short Circuit Duration (Note 1) No Limitation

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:

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

Thermal Information

Thermal Resistance (Typical, Note 2) θ_{JA} (°C/W) θ_{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)

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

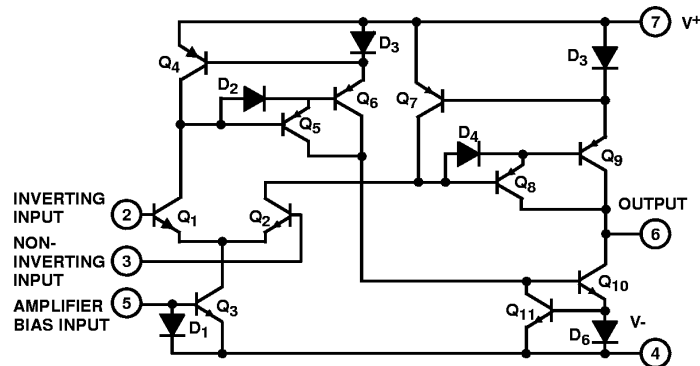
PARAMETER		TEST CONDITIONS	TEMP	CA3080			CA3080A			UNITS
				MIN	TYP	MAX	MIN	TYP	MAX	
Input Offset Voltage		$I_{ABC} = 5\mu A$	25	-	0.3	-	-	0.3	2	mV
		$I_{ABC} = 500\mu A$	25	-	0.4	5	-	0.4	2	mV
		Full		-	-	6	-	-	5	mV
Input Offset Voltage Change		$I_{ABC} = 500\mu A$ to $5\mu A$	25	-	0.2	-	-	0.1	3	mV
Input Offset Voltage Temp. Drift		$I_{ABC} = 100\mu A$	Full	-	-	-	-	3.0	-	$\mu V/^{\circ}C$
Input Offset Voltage Sensitivity	Positive	$I_{ABC} = 500\mu A$	25	-	-	150	-	-	150	$\mu V/V$
	Negative		25	-	-	150	-	-	150	$\mu V/V$
Input Offset Current		$I_{ABC} = 500\mu A$	25	-	0.12	0.6	-	0.12	0.6	μA
Input Bias Current		$I_{ABC} = 500\mu A$	25	-	2	5	-	2	5	μA
			Full	-	-	7	-	-	15	μA
Differential Input Current		$I_{ABC} = 0$, $V_{DIFF} = 4V$	25	-	0.008	-	-	0.008	5	nA
Amplifier Bias Voltage		$I_{ABC} = 500\mu A$	25	-	0.71	-	-	0.71	-	V
Input Resistance		$I_{ABC} = 500\mu A$	25	10	26	-	10	26	-	k Ω
Input Capacitance		$I_{ABC} = 500\mu A$, $f = 1MHz$	25	-	3.6	-	-	3.6	-	pF
Input-to-Output Capacitance		$I_{ABC} = 500\mu A$, $f = 1MHz$	25	-	0.024	-	-	0.024	-	pF
Common-Mode Input-Voltage Range		$I_{ABC} = 500\mu A$	25	12 to -12	13.6 to -14.6	-	12 to -12	13.6 to -14.6	-	V
Forward Transconductance (Large Signal)		$I_{ABC} = 500\mu A$	25	6700	9600	13000	7700	9600	12000	μS
			Full	5400	-	-	4000	-	-	μS
Output Capacitance		$I_{ABC} = 500\mu A$, $f = 1MHz$	25	-	5.6	-	-	5.6	-	pF
Output Resistance		$I_{ABC} = 500\mu A$	25	-	15	-	-	15	-	M Ω
Peak Output Current		$I_{ABC} = 5\mu A$, $R_L = 0\Omega$	25	-	5	-	3	5	7	μA
		$I_{ABC} = 500\mu A$, $R_L = 0\Omega$	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/ μs
		Compensated	25	-	50	-	-	50	-	V/ μs

Schematic Diagram



Typical Applications

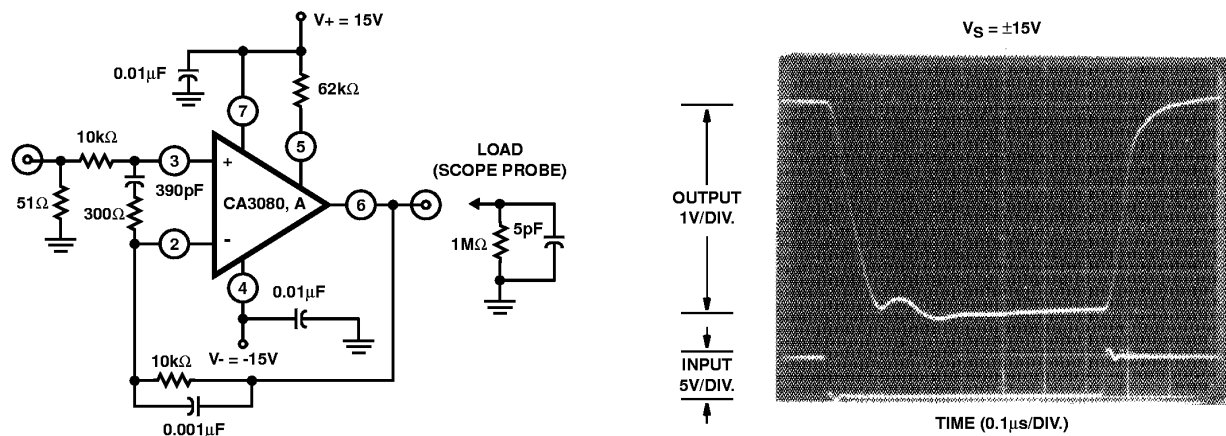


FIGURE 1. SCHEMATIC DIAGRAM OF THE CA3080 AND CA3080A IN A UNITY-GAIN VOLTAGE FOLLOWER CONFIGURATION AND ASSOCIATED WAVEFORM

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