Data Sheet | December 10, 2009 | FN1266.7

4MHz, BiMOS Operational Amplifier with MOSFET Input/CMOS Output

CA3260A and CA3260 are integrated circuit operational amplifiers that combine the advantage of both CMOS and bipolar transistors on a monolithic chip. The CA3260 series circuits are dual versions of the popular CA3160 series.

Gate protected P-Channel MOSFET (PMOS) transistors are used in the input circuit to provide very high input impedance, very low input current, and exceptional speed performance. The use of PMOS field effect transistors in the input stage results in common mode input voltage capability down to 0.5V below the negative supply terminal, an important attribute in single supply applications.

A complementary symmetry MOS (CMOS) transistor pair, capable of swinging the output voltage to within 10mV of either supply voltage terminal (at very high values of load impedance), is employed as the output circuit.

The CA3260 Series circuits operate at supply voltages ranging from 4V to 16V, or ±2V to ±8V when using split supplies. The CA3260A offers superior input characteristics over those of the CA3260.

Ordering Information

PART NUMBER	PART MARKING	TEMP. RANGE (°C)	PACKAGE	PKG. DWG. #
CA3260E	CA3260E	-55 to +125	8 Ld PDIP	E8.3
CA3260EZ (Note)	CA3260EZ	-55 to +125	8 Ld PDIP* (Pb-free)	E8.3
CA3260AE	CA3260AE	-55 to +125	8 Ld PDIP	E8.3
CA3260AEZ (Note)	3260AEZ	-55 to +125	8 Ld PDIP* (Pb-free)	E8.3

*Pb-free PDIPs can be used for through hole wave solder processing only. They are not intended for use in Reflow solder processing applications.

NOTE: These Intersil Pb-free plastic packaged products employ special Pb-free material sets, molding compounds/die attach materials, and 100% matte tin plate plus anneal (e3 termination finish, which is RoHS compliant and compatible with both SnPb and Pb-free soldering operations). Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020.

Features

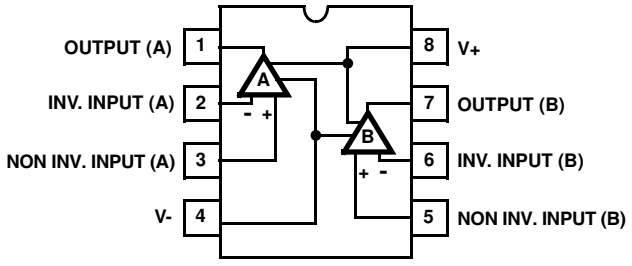
- MOSFET Input Stage provides
  - Very High Z_I = 1.5TΩ (1.5 x 10^{12}Ω) (Typ)
  - Very Low I_I . . . . . 5pA (Typ) at 15V Operation
    . . . . . 2pA (Typ) at 5V Operation
- Ideal for Single Supply Applications
- Common Mode Input Voltage Range Includes Negative Supply Rail; Input Terminals Can be Swung 0.5V Below Negative Supply Rail
- CMOS Output Stage Permits Signal Swing to Either (Or Both) Supply Rails
- Pb-Free Available (RoHS Compliant)

Applications

- Ground Referenced Single Supply Amplifiers
- Fast Sample-Hold Amplifiers
- Long Duration Timers/Monostables
- Ideal Interface with Digital CMOS
- High Input Impedance Wideband Amplifiers
- Voltage Followers (e.g. Follower for Single Supply D/A Converter)
- Voltage Regulators (Permits Control of Output Voltage Down to 0V)
- Wien Bridge Oscillators
- Voltage Controlled Oscillators
- Photo Diode Sensor Amplifiers

Pinout

CA3260, CA3260A
(8 LD PDIP)
TOP VIEW



CAUTION: These devices are sensitive to electrostatic discharge; follow proper IC Handling Procedures.
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Absolute Maximum Ratings

DC Supply Voltage (V+ to V-) 16V
DC Input Voltage . . . . . (V+ +8V) to (V- -0.5V)
Differential Input Voltage 8V
Input Terminal Current 1mA
Output Short Circuit Duration (Note 1). . . . . Indefinite

Operating Conditions

Temperature Range . . . . . -55°C to +125°C

Thermal Information

Thermal Resistance (Typical, Note 2)	θ_{JA} (°C/W)	θ_{JC} (°C/W)
PDIP Package*	100	N/A

Maximum Junction Temperature (Plastic Package) . . . . . +150°C
Maximum Storage Temperature Range . . . . . -65°C to +150°C
Pb-Free Reflow Profile. . . . . .see link below
http://www.intersil.com/pbfree/Pb-FreeReflow.asp
*Pb-free PDIPs can be used for through hole wave solder processing only. They are not intended for use in Reflow solder processing applications.

CAUTION: Do not operate at or near the maximum ratings listed for extended periods of time. Exposure to such conditions may adversely impact product reliability and result in failures not covered by warranty.

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.

Electrical Specifications

T_A = +25°C, Typical Values Intended Only for Design Guidance.

PARAMETER		SYMBOL	TEST CONDITIONS	TYPICAL VALUES CA3260A	TYPICAL VALUES CA3260	UNITS
Input Resistance		R_I	V_S = ±7.5V	1.5	1.5	TΩ
Input Capacitance		C_I	f = 1MHz, V_S = ±7.5V	4.3	4.3	pF
Unity Gain Crossover Frequency		f_T	V_S = ±7.5V	4	4	MHz
Slew Rate		SR	V_S = ±7.5V	10	10	V/µs
Transient Response	Rise Time	t_r	C_L = 25pF, R_L = 2kΩ, A_V = +1, V_S = ±7.5V	0.09	0.09	µs
	Overshoot	OS		10	10	%
Settling Time (to <0.1%, V_{IN} = $4V_{P-P}$)		t_S	C_L = 25pF, R_L = 2kΩ, A_V = +1, V_S = ±7.5V	1.8	1.8	µs
Input Offset Voltage		V_{IO}	V+ = 5V, V- = 0V	2	6	mV
Input Offset Current		I_{IO}	V+ = 5V, V- = 0V	0.1	0.1	pA
Input Current		I_I	V+ = 5V, V- = 0V	2	2	pA
Common Mode Rejection Ratio		CMRR	V+ = 5V, V- = 0V	70	60	dB
Large Signal Voltage Gain		A_{OL}	V_O = $4V_{P-P}$, R_L = 20kΩ, V+ = 5V, V- = 0V	100	100	kV/V
				100	100	dB
Common Mode Input Voltage Range		V_{ICR}	V+ = 5V, V- = 0V	0 to 2.5	0 to 2.5	V
Supply Current		I+	V_O = 5V, R_L = ∞, V+ = 5V, V- = 0V	1	1	mA
			V_O = 2.5V, R_L = ∞, V+ = 5V, V- = 0V	1.2	1.2	mA
Power Supply Rejection Ratio		PSRR	$\Delta V_{IO}/\Delta V+$, V+ = 5V, V- = 0V	200	200	µV/V

Electrical Specifications

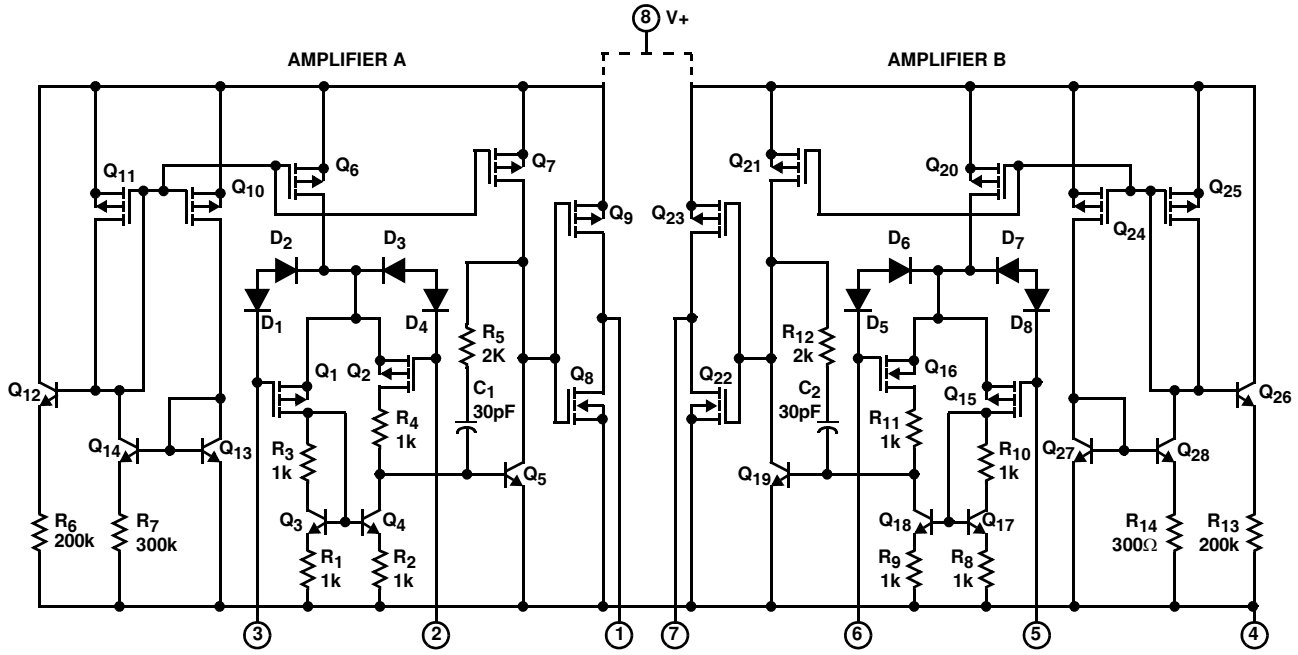
For Each Amplifier at T_A = +25°C, V+ = 15V, V- = 0V, Unless Otherwise Specified.

PARAMETER	SYMBOL	TEST CONDITIONS	CA3260A MIN	CA3260A TYP	CA3260A MAX	CA3260 MIN	CA3260 TYP	CA3260 MAX	UNITS
Input Offset Voltage	$\|V_{IO}\|$	V_S = ±7.5V	-	2	5	-	6	15	mV
Input Offset Current	$\|I_{IO}\|$	V_S = ±7.5V	-	0.5	20	-	0.5	30	pA
Input Current	I_I	V_S = ±7.5V	-	5	30	-	5	50	pA
Large Signal Voltage Gain	A_{OL}	V_O = $10V_{P-P}$, R_L = 10kΩ	50	320	-	50	320	-	kV/V
			94	110	-	94	110	-	dB
Common Mode Rejection Ratio	CMRR		80	95	-	70	90	-	dB

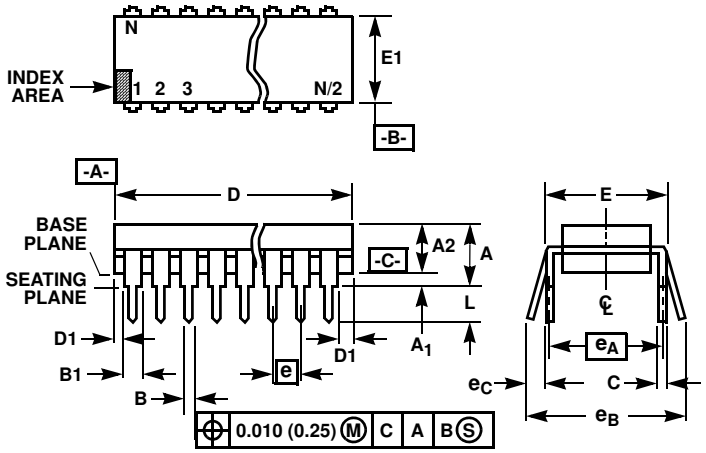
Electrical Specifications For Each Amplifier at T_A = +25°C, V+ = 15V, V- = 0V, Unless Otherwise Specified. **(Continued)**

PARAMETER	SYMBOL	TEST CONDITIONS	CA3260A			CA3260			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Common Mode Input Voltage Range	V_{ICR}		0	-0.5 to 12	10	0	-0.5 to 12	10	V
Power Supply Rejection Ratio	PSRR	$\Delta V_{IO}/\Delta V+$ V+ = 17.5V	-	32	150	-	32	320	µV/V
Maximum Output Voltage	$V_{OM}+$	R_L = 10kΩ	11	13.3	-	11	13.3	-	V
	$V_{OM}-$		-	0.002	0.01	-	0.002	0.01	V
	$V_{OM}+$	R_L = ∞	14.99	15	-	14.99	15	-	V
	$V_{OM}-$		-	0	0.01	-	0	0.01	V
Maximum Output Current	$I_{OM}+$ Source	V_O = 0V	12	22	45	12	22	45	mA
	$I_{OM}-$ Sink	V_O = 15V	12	20	45	12	20	45	mA
Total Supply Current V_O (Amplifier A) = 7.5V V_O (Amplifier B) = 7.5V	I+	R_L = ∞	-	9	15.5	-	9	15.5	mA
V_O (Amplifier A) = 0V V_O (Amplifier B) = 0V			-	1.2	3	-	1.2	3	mA
V_O (Amplifier A) = 0V V_O (Amplifier B) = 7.5V			-	5	8.5	-	5	8.5	mA
Input Offset Voltage Temperature Drift	$\Delta V_{IO}/\Delta T$		-	6	-	-	8	-	µV/°C
Crosstalk		f = 1kHz	-	120	-	-	120	-	dB

Schematic Diagram



Dual-In-Line Plastic Packages (PDIP)



NOTES:

1. Controlling Dimensions: INCH. In case of conflict between English and Metric dimensions, the inch dimensions control.
2. Dimensioning and tolerancing per ANSI Y14.5M-1982.
3. Symbols are defined in the "MO Series Symbol List" in Section 2.2 of Publication No. 95.
4. Dimensions A, A1 and L are measured with the package seated in JEDEC seating plane gauge GS-3.
5. D, D1, and E1 dimensions do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.010 inch (0.25mm).
6. E and e_A are measured with the leads constrained to be perpendicular to datum -C-.
7. e_B and e_C are measured at the lead tips with the leads unconstrained. e_C must be zero or greater.
8. B1 maximum dimensions do not include dambar protrusions. Dambar protrusions shall not exceed 0.010 inch (0.25mm).
9. N is the maximum number of terminal positions.
10. Corner leads (1, N, N/2 and N/2 + 1) for E8.3, E16.3, E18.3, E28.3, E42.6 will have a B1 dimension of 0.030 - 0.045 inch (0.76 - 1.14mm).

E8.3 (JEDEC MS-001-BA ISSUE D)
8 LEAD DUAL-IN-LINE PLASTIC PACKAGE

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	-	0.210	-	5.33	4
A1	0.015	-	0.39	-	4
A2	0.115	0.195	2.93	4.95	-
B	0.014	0.022	0.356	0.558	-
B1	0.045	0.070	1.15	1.77	8, 10
C	0.008	0.014	0.204	0.355	-
D	0.355	0.400	9.01	10.16	5
D1	0.005	-	0.13	-	5
E	0.300	0.325	7.62	8.25	6
E1	0.240	0.280	6.10	7.11	5
e	0.100 BSC		2.54 BSC		-
e_A	0.300 BSC		7.62 BSC		6
e_B	-	0.430	-	10.92	7
L	0.115	0.150	2.93	3.81	4
N	8		8		9

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