calogic CORPORATION

100MHz High-Power Buffer Amplifier

Preliminary Data Sheet

CA2003/CA2033

FEATURES

- **Wide Bandwidth** **100MHz**
- **Voltage Gain** **0.99**
- **High Continuous Output Current** ..... **±100mA**
- **High Input Impedance** **2MOhm**
- **Short Circuit Protection**
- **Compatible with LH0002, HA-5002 and EL2003**

APPLICATIONS

- **Video Amplifiers**
- **High-Speed Current (Buffer) Amplifiers**
- **Signal Separators**
- **High-Power Drivers for**
  - **Coaxial cables**
  - **Transmission lines**
  - **Data Acquisition Circuits**
  - **A/D Converters**

ORDERING INFORMATION

PACKAGE			
HERMETIC TO-99 8-PIN	HERMETIC CERDIP 8-PIN	PLASTIC DIP 8-PIN	OPERATING TEMPERATURE RANGE
CA2003J	CA2003Z		MIL
	CA2033Z		MIL
CA2003CJ	CA2003CZ	CA2003CP	IND
	CA2033CZ	CA2033CP	IND

DESCRIPTION

The CA2003/CA2033 are high speed monolithic buffer amplifiers designed for high-performance video circuits and for driving Coaxial and twisted pair cables. The CA2003/CA2033's fast slew rate of 1200 V/μs make them extremely useful in applications where the output current of fast op-amps have to be boosted, or where the op-amp has to be isolated from a capacitive load. These buffers are capable of sustaining a 100mA current continuously. An internal output short circuit current limiting feature has been designed in the device such that when the junction temperature reaches 175°C the current is limited to 100mA. Therefore heatsinking will improve the power performance of these devices. If more than 100mA output current is required or if the heatsinking is insufficient for the application, then several buffers can be paralleled together.

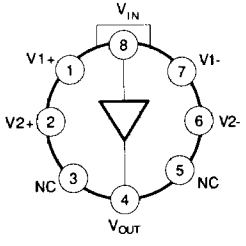
The CA2003/CA2033 are manufactured with the di-electric isolation process method in such a way that the NPN and PNP transistors have identical characteristics.

The CA2003 and CA2033 are designed for military temperature ranges, −55°C to 125°C, and are available in TO-99 and 8-pin HERMETIC-DIP. The CA2003C and CA2033C are for operation in the industrial temperature ranges, −25°C to 85°C, and are available in TO-99, 8-pin HERMETIC-DIP and 8-pin PLASTIC MINI-DIP.

01 Devices

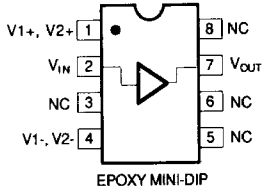
Pin Connections (Top View)

CA2003
CA2003C



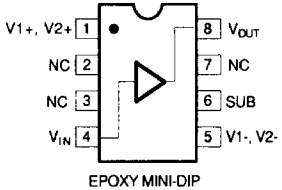
TO-99
(J-SUFFIX)

CA2003
CA2003C



EPOXY MINI-DIP
(P-SUFFIX)
8-PIN HERMETIC DIP
(Z-SUFFIX)

CA2033
CA2033C



EPOXY MINI-DIP
(P-SUFFIX)
8-PIN HERMETIC DIP
(Z-SUFFIX)

ABSOLUTE MAXIMUM RATINGS

Supply Voltage (V_S) ..... ±18V
Input Voltage ..... ±15V
Input Current ..... ±50mA
Output Short Circuit Duration with Heatsink is continuous
Storage Temperature Range
J and Z Packages ..... 65°C to +150°C
P Package ..... −65°C to +125°C

Operating Temperature Range
CA2003/2033 ..... −55°C to +125°C
CA2003C/2033C ..... −25°C to 85°C
Lead Temperature (soldering, 60 sec.) ..... 300°C
DICE Junction Temperature (T_j)
J and Z Packages ..... 175°C
P Package ..... 150°C

ELECTRICAL CHARACTERISTICS $V_S = \pm 15V$, VS = 50Ω, $T_A = 25°C$ for CA2003/CA2033 and CA2003C/CA2033C

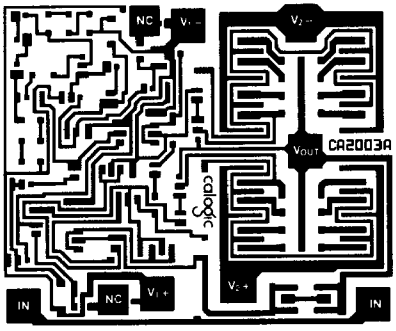
PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Offset Voltage	V_{OS}	$V_{IN} = 0V$, R_L = inf.	−30	5	30	mV
Input Current	I_{IN}	$V_{IN} = 0V$, R_L = inf.	−25	5	25	µA
Input Resistance	R_{IN}	$V_{IN} = \pm 12V$, $R_L = 100Ω$	1	2		MΩ
Voltage Gain	A_{V1}	$V_{IN} = \pm 12V$, $R_L = 1kΩ$	0.98	0.99		V/V
Voltage Gain	A_{V2}	$V_{IN} = \pm 12V$, $R_L = 100Ω$	0.83	0.90		V/V
Voltage Gain	A_{V3}	$V_{IN} = \pm 6V$, $R_L = 50Ω$	0.82	0.89		V/V
Output Voltage Swing	V_O	$V_{IN} = \pm 14V$, $R_L = 1kΩ$	±13	±13.5		V
Output Voltage Swing	V_O	$V_{IN} = \pm 12V$, $R_L = 100Ω$	±10.5	±11.3		V
Slew Rate	SR	$V_{IN} = \pm 10V$, $R_L = 1kΩ$ (Note 1)	600	1200		V/µs
Slew Rate	SR	$V_{IN} = \pm 5V$, $R_L = 50Ω$ (Note 2)	200	400		V/µs
Output Current	I_O	$V_{IN} = \pm 12V$ (Note 3)	±105	±230		mA
Output Resistance	R_O	$V_{IN} = \pm 2V$, $R_L = 50Ω$		5	10	Ω
Distortion @ 1kHz	THD	$V_{IN} = 4V_{rms}$, R_L = inf.		0.2	1	%
Supply Current	I_S	$V_{IN} = 0V$, R_L = inf.		10	15	mA
Power Supply Rejection Ratio	PSSR	$V_{IN} = 0V$, R_L = inf. (Note 4)	60	80		dB

ELECTRICAL CHARACTERISTICS $V_S = \pm 15V$, VS = 50Ω, $T_A = -55°C$ to $+125°C$ for CA2003/CA2033, $T_A = -25°C$ to $85°C$ for CA2003C/CA2033C

PARAMETER	SYMBOL	CONDITIONS	CA2003 MIN.	CA2003 TYP.	CA2003 MAX.	UNITS
Offset Voltage	V_{OS}	$V_{IN} = 0V$, R_L = inf.	−40		40	mV
Input Current	I_{IN}	$V_{IN} = 0V$, R_L = inf.	−50		50	µA
Input Resistance	R_{IN}	$V_{IN} = \pm 12V$, $R_L = 100Ω$	0.1			MΩ
Voltage Gain	A_{V1}	$V_{IN} = \pm 12V$, $R_L = 1kΩ$		0.97		V/V
Voltage Gain	A_{V2}	$V_{IN} = \pm 12V$, $R_L = 100Ω$		0.80		V/V
Voltage Gain	A_{V3}	$V_{IN} = \pm 6V$, $R_L = 50Ω$		0.79		V/V
Output Voltage Swing	V_O	$V_{IN} = \pm 14V$, $R_L = 1kΩ$	±12.5			V
Output Voltage Swing	V_O	$V_{IN} = \pm 12V$, $R_L = 100Ω$	±10			V
Slew Rate	SR	$V_{IN} = \pm 5V$, $R_L = 50Ω$ (Note 2)	200	400		V/µs
Output Current	I_O	$V_{IN} = \pm 12V$ (Note 3)	±100			mA
Output Resistance	R_O				12	Ω
Supply Current	I_S	$V_{IN} = 0V$, R_L = inf.			20	mA
Power Supply Rejection Ratio	PSSR	$V_{IN} = 0V$, R_L = inf. (Note 4)	50			dB

NOTES:
1. Slew rate is measured between $V_{OUT} = +5V$ and $-5V$.
2. Slew rate is measured between $V_{OUT} = +2.5V$ and $-2.5V$
3. Force input to +12V output +10V for $+I_{OUT}$ and $V_{IN} = -12V$, $V_{OUT} = -10V$ for $-I_{OUT}$
4. $V_S = \pm 4.5V$ to $\pm 10V$.

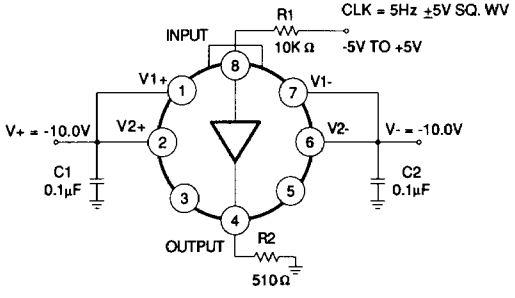
Die Layout



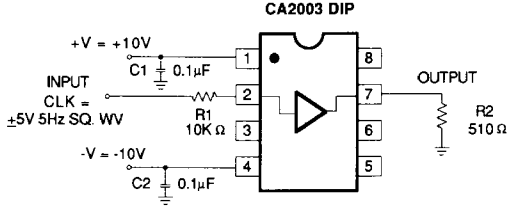
DIE SIZE:
0.057×0.048 inch, 2736 sq. mils
(1.448×1.219mm, 1.765 sq. mm)

Burn-In Circuits

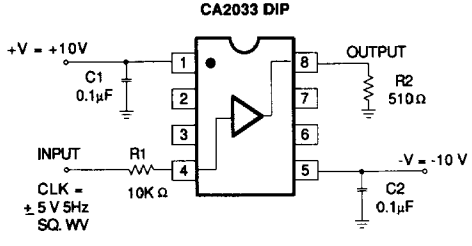
CA2003 TO99



CA2003 DIP



CA2033 DIP



DI Devices

Simplified Schematic