Rochester Electronics

Datasheet

PART NUMBER

CLC505AJB-ROCV

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All re-creations are done with the approval of the Original Component Manufacturer. (OCM)

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceeds the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
    - Class Q Military
    - Class V Space Level

Qualified Suppliers List of Distributors (QSLD)

- Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

National Semiconductor is now part of

Texas Instruments.

Search http://www.ti.com/ for the latest technical

information and details on our current products and services.

National Semiconductor

MICROCIRCUIT DATA SHEET

MNCLC505A-X REV 0A0

Original Creation Date: 08/06/98
Last Update Date: 08/18/99
Last Major Revision Date: 08/06/98

HIGH-SPEED, PROGRAMMABLE-SUPPLY CURRENT, MONOLITHIC OP AMP

General Description

The CLC505 is a monolithic, high-speed op amp with a unique combination of high performance, low power consumption, and flexibility of operation. With a 10 to 1 range of supply current programmability (not preset currents, but rather a continuous range "programmed" with a single external resistor, (Rp), this amplifier can be used in a wide variety of high-performance applications. Performance (typical) at any supply current is exceptional.

Even at 10mW power consumption, the CLC505 provides performance far beyond other monolithic op amps, many of which consume nearly 100 times as much power.

The CLC505's combination of high performance, low power consumption, and large signal performance makes the CLC505 ideal for many demanding applications in which power consumption must be minimized. Examples include a variety of remote site equipment such as battery-powered test instrumentation and communications gear. Power is also critical in applications requiring many channels, such as video switching matrices, ATE, and phased-array radar systems.

Industry Part Number

CLC505A

NS Part Numbers

CLC505AJ-QML

Prime Die

VB1929B

Controlling Document

5962-9099301MPA

Processing

MIL-STD-883, Method 5004

Quality Conformance Inspection

MIL-STD-883, Method 5005

Subgrp	Description	Temp (°C)
1	Static tests at	+25
2	Static tests at	+125
3	Static tests at	-55
4	Dynamic tests at	+25
5	Dynamic tests at	+125
6	Dynamic tests at	-55
7	Functional tests at	+25
8A	Functional tests at	+125
8B	Functional tests at	-55
9	Switching tests at	+25
10	Switching tests at	+125
11	Switching tests at	-55

Features

- 10mW power consumption with 50MHz BW
- Single-resistor programming of supply current
- 3.4 mA Icc provides 100Mhz bandwidth and 14ns settling (0.05%)
- Fast disable capability
- 0.04% differential gain at Icc = 3.4mA
- 0.06% differential phase at Icc = 3.4mA

Applications

- Low-power/battery applications
- Remote site instrumentation
- Mobile communications gear
- Video switching matrix
- Phased-array radar

(Absolute Maximum Ratings)
(Note 1)

Supply Voltage (Vs)	±7V dc
Output Current (Iout)	70mA
Common Mode Input Voltage (Vcm)	±7V dc
Differential Input Voltage (Vid)	10V dc
Power Dissipation (Pd) (Note 2)	1.2W
Junction Temperature	+175 C
Storage Temperature Range	-65 C to +150 C
Lead Temperature (soldering, 10 seconds)	+300 C
Thermal Resistance	
Junction-to-ambient (ThetaJA)	
Ceramic DIP (Still Air)	TBD
(500 LFPM)	TBD
Junction-to-case (ThetaJC)	
Ceramic DIP	TBD
Package Weight (Typical)	
CERAMIC DIP	TBD
ESD Tolerance (Note 3)	2000V

Note 1: Absolute Maximum Ratings are limits beyond which damage to the device may occur. Operating Ratings are conditions for which the device is functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions see the Electrical Characteristics. The guaranteed specifications apply only for the test conditions listed. Some performance characteristics may degrade when the device is not operated under the listed test conditions.

Note 2: The maximum power dissipation must be derated at elevated temperatures and is dictated by Tjmax (maximum junction temperature), ThetaJA (package junction to ambient thermal resistance), and TA (ambient temperature). The maximum allowable power dissipation at any temperature is Pdmax = (Tjmax - TA) /ThetaJA or the number given in the Absolute Maximum Ratings, whichever is lower.

Note 3: Human body model, 100pF discharged through 1.5k Ohms.

Recommended Operating Conditions

Supply Voltage (Vs)	±5V dc
Gain Range (Av)	+2 to +21 and -1 to -20
Ambient Operating Temperature Range (Ta)	-55 C to +125 C

Electrical Characteristics

DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vs = ±5V dc, Rl is load resistance, Rp is programming resistance, feedback resistance (Rf) = 1000 Ohms, peak capacitance (Cp) = 100 pF, and Av = +6. -55 C ≤ Ta ≤ +125 C (Note 3)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
+Iin	Input Bias Current (noninverting)	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		-18	+18	uA	1, 2
			1		-36	+36	uA	3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms			-6	+6	uA	1, 2
					-12	+12	uA	3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		-2.5	+2.5	uA	1
			1		-3.0	+3.0	uA	2
			1		-5	+5	uA	3
-Iin	Input Bias Current (inverting)	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		-38	+38	uA	1
			1		-40	+40	uA	2
			1		-60	+60	uA	3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms			-14	+14	uA	1
					-15	+15	uA	2
					-22	+22	uA	3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		-7	+7	uA	1
			1		-11	+11	uA	2
			1		-10	+10	uA	3
Vio	Input Offset Voltage	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms, Rs = 50Ohms	1		-8.0	+8.0	mV	1
			1		-14.0	+14.0	mV	2
			1		-12.8	+12.8	mV	3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms, Rs = 50Ohms			-7.0	+7.0	mV	1
					-13.0	+13.0	mV	2
					-11.8	+11.8	mV	3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms, Rs = 50Ohms	1		-7.0	+7.0	mV	1
			1		-14.5	+14.5	mV	2
			1		-13.0	+13.0	mV	3

Electrical Characteristics

DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vs = ±5V dc, Rl is load resistance, Rp is programming resistance, feedback resistance (Rf) = 1000 Ohms, peak capacitance (Cp) = 100 pF, and Av = +6. -55 C ≤ Ta ≤ +125 C (Note 3)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Tc (+Iin)	Average +Input Bias Current Drift	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		-100	+100	nA/C	2
			1		-225	+225	nA/C	3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1		-50	+50	nA/C	2
			1		-75	+75	nA/C	3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		-30	+30	nA/C	2
			1		-32	+32	nA/C	3
Tc (-Iin)	Average -Input Bias Current Drift	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		-125	+125	nA/C	2
			1		-275	+275	nA/C	3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1		-60	+60	nA/C	2
			1		-100	+100	nA/C	3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		-35	+35	nA/C	2
			1		-38	+38	nA/C	3
Tc (Vio)	Average Offset Voltage Drift	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		-50	+50	uV/C	2, 3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1		-60	+60	uV/C	2, 3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		-75	+75	uV/C	2, 3
Icc	Supply Current	Rp = 33kOhms, no load	1			11	mA	1, 3
			1			12	mA	2
		Rp = 100kOhms, no load				3.8	mA	1, 3
						4.2	mA	2
		Rp = 300kOhms, no load	1			1.3	mA	1
			1			1.4	mA	2, 3
PSRR	Power Supply Rejection Ratio	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms, -V=-4.5V to -5.0V, +V=+4.5V to +5.0V	1		48		dB	1
			1		45		dB	2, 3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms, -V=-4.5V to -5.0V, +V=+4.5V to +5.0V	2		48		dB	1
			2		45		dB	2, 3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms, -V=-4.5V to -5.0V, +V=+4.5V to +5.0V	1		48		dB	1
			1		45		dB	2, 3

Electrical Characteristics

DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vs = ±5V dc, Rl is load resistance, Rp is programming resistance, feedback resistance (Rf) = 1000 Ohms, peak capacitance (Cp) = 100 pF, and Av = +6. -55 C ≤ Ta ≤ +125 C (Note 3)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
CMRR	Common Mode Rejection Ratio	Icc = 9mA, Vcm = ±1V, Rp = 33kOhms, Rl = 250Ohms	1		48		dB	4
			1		45		dB	5, 6
		Icc = 3.4mA, Vcm = ±1V, Rp = 100kOhms, Rl = 500Ohms	1		48		dB	4
			1		45		dB	5, 6
		Icc = 1mA, Vcm = ±1V, Rp = 300kOhms, Rl = 1kOhms	1		48		dB	4
			1		45		dB	5, 6
+Rin	Input Resistance	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		800		kOhms	1
			1		1600		kOhms	2
			1		400		kOhms	3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1		2		MOhms	1
			1		4		MOhms	2
			1		1		MOhms	3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		5		MOhms	1
			1		10		MOhms	2
			1		2.5		MOhms	3
Rout	Output Impedance at dc	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1			0.3	Ohms	1
			1			0.2	Ohms	2
			1			1.2	Ohms	3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1			0.5	Ohms	1
			1			0.2	Ohms	2
			1			1.6	Ohms	3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1			1.0	Ohms	1
			1			0.5	Ohms	2
			1			3.0	Ohms	3
Cin	Input Capacitance	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms, Ta = +25 C	1			2	pF	4
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms, Ta = +25 C	1			2	pF	4
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms, Ta = +25 C	1			2	pF	4

Electrical Characteristics

DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vs = ±5V dc, Rl is load resistance, Rp is programming resistance, feedback resistance (Rf) = 1000 Ohms, peak capacitance (Cp) = 100 pF, and Av = +6. -55 C ≤ Ta ≤ +125 C (Note 3)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Vout	Output Voltage Swing	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		2.7		V	4, 5
			1		2.5		V	6
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	2		2.7		V	4, 5
			2		2.5		V	6
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		2.5		V	4, 5
			1		1.2		V	6
Iout	Output Current	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		36		mA	1
			1		36		mA	2
			1		18		mA	3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1		18		mA	1
			1		18		mA	2
			1		9		mA	3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		5		mA	1
			1		5		mA	2
			1		2.5		mA	3
CMIR	Common Mode Input Voltage Range	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		-1.8	+1.8	V	1
			1		-2.0	+2.0	V	2
			1		-1.5	+1.5	V	3
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1		-1.8	+1.8	V	1
			1		-2.0	+2.0	V	2
			1		-1.5	+1.5	V	3
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		-1.8	+1.8	V	1
			1		-2.0	+2.0	V	2
			1		-1.5	+1.5	V	3

Electrical Characteristics

DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vs = ±5V dc, Rl is load resistance, Rp is programming resistance, feedback resistance (Rf) = 1000 Ohms, peak capacitance (Cp) = 100 pF, and Av = +6. -55 C ≤ Ta ≤ +125 C (Note 3)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
SSBW	Small Signal Bandwidth	-3dB bandwidth, Vout < 2Vpp, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		115		MHz	4
			1		100		MHz	5
			1		115		MHz	6
		-3dB bandwidth, Vout < 2Vpp, Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms			80		MHz	4
			2		65		MHz	5
			2		80		MHz	6
		-3dB bandwidth, Vout < 2Vpp, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		35		MHz	4
			1		30		MHz	5, 6
LSBW	Large Signal Bandwidth	-3dB bandwidth, Vout < 5Vpp, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		95		MHz	4, 6
			1		80		MHz	5
		-3dB bandwidth, Vout < 5Vpp, Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1		50		MHz	4, 6
			1		40		MHz	5
		-3dB bandwidth, Vout < 5Vpp, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		20		MHz	4
			1		18		MHz	5
GFPL	Gain Flatness Peaking Low	0.1Mhz to 25MHz, Vout < 2Vpp, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1			0.3	dB	4
			1			0.4	dB	5, 6
		0.1Mhz to 20MHz, Vout < 2Vpp, Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms				0.2	dB	4
			2			0.3	dB	5, 6
		0.1Mhz to 10MHz, Vout < 2Vpp, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1			0.1	dB	4
			1			0.2	dB	5, 6
GFPH	Gain Flatness Peaking High	>25MHz, Vout < 2Vpp, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1			0.5	dB	4
			1			0.6	dB	5, 6
		>20MHz, Vout < 2Vpp, Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms				0.4	dB	4
			2			0.5	dB	5, 6
		>10MHz, Vout < 2Vpp, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1			0.2	dB	4
			1			0.3	dB	5, 6

Electrical Characteristics

DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vs = ±5V dc, Rl is load resistance, Rp is programming resistance, feedback resistance (Rf) = 1000 Ohms, peak capacitance (Cp) = 100 pF, and Av = +6. -55 C ≤ Ta ≤ +125 C (Note 3)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
GFR	Gain Flatness Rolloff	0.1Mhz to 50MHz, Vout < 2Vpp, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1			1.0	dB	4, 6
			1			1.3	dB	5
		0.1Mhz to 40MHz, Vout < 2Vpp, Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms				1.0	dB	4
			2			1.3	dB	5
			2			1.0	dB	6
		0.1Mhz to 20MHz, Vout < 2Vpp, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1			1.0	dB	4, 6
			1			1.3	dB	5
LPD	Linear Phase Deviation	< 50MHz, Vout = 2Vpp, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1		1.0		Deg	4, 6
			1		1.2		Deg	5
		< 40MHz, Vout = 2Vpp, Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1		1.0		Deg	4, 6
			1		1.2		Deg	5
		< 20MHz, Vout = 2Vpp, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1		0.8		Deg	4, 6
			1		1.0		Deg	5
HD2	2nd Harmonic Distortion	2Vpp at 20MHz, Vout = 2Vpp, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1			-45	dBc	4, 5
			1			-40	dBc	6
		2Vpp at 10MHz, Vout = 2Vpp, Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms				-45	dBc	4
			2			-45	dBc	5
			2			-40	dBc	6
		2Vpp at 5MHz, Vout = 2Vpp, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1			-45	dBc	4, 5
			1			-40	dBc	6
HD3	3rd Harmonic Distortion	2Vpp at 20MHz, Vout = 2Vpp, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1			-55	dBc	4, 5, 6
		2Vpp at 10MHz, Vout = 2Vpp, Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms				-55	dBc	4
			2			-55	dBc	5, 6
		2Vpp at 5MHz, Vout = 2Vpp, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1			-55	dBc	4, 5, 6

Electrical Characteristics

DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vs = ±5V dc, Rl is load resistance, Rp is programming resistance, feedback resistance (Rf) = 1000 Ohms, peak capacitance (Cp) = 100 pF, and Av = +6. -55 C ≤ Ta ≤ +125 C (Note 3)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
NF	Noise Floor	> 1 MHz, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1, 4			-154	dBm 1Hz	4, 6
			1, 4			-153	dBm 1Hz	5
		> 1 MHz, Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms	1, 4			-153	dBm 1Hz	4, 6
			1, 4			-152	dBm 1Hz	5
		> 1 MHz, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1, 4			-150	dBm 1Hz	4, 6
			1, 4			-149	dBm 1Hz	5
INV	Noise Floor	1MHz to 200MHz, Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms	1, 4			65	uV	4, 6
			1, 4			70	uV	5
		1MHz to 200MHz, Icc = 3.4mA, Rp = 100kOhms, Rl =500Ohms	1, 4			70	uV	4, 6
			1, 4			80	uV	5
		1MHz to 200MHz, Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms	1, 4			70	uV	4, 6
			1, 4			80	uV	5
SR	Slew Rate	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms, Av = +2, Vout = 3V, measured at ±1V	1		1200		V/us	9, 10
			1		1000		V/us	11
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms, Av = +2, Vout = 3V, measured at ±1V	1		800		V/us	9, 10
			1		700		V/us	11
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms, Av = +2, Vout = 3V, measured at ±1V	1		600		V/us	9, 10
			1		500		V/us	11
Ts	Settling Time	Icc = 9mA, Rp = 33kOhms, Rl = 250Ohms, 2V step at ±0.1% of the fixed value	1			16	ns	9, 10, 11
		Icc = 3.4mA, Rp = 100kOhms, Rl = 500Ohms, 2V step at ±0.05% of the fixed value	1			22	ns	9, 10, 11
		Icc = 1mA, Rp = 300kOhms, Rl = 1kOhms, 2V step at ±0.05% of the fixed value	1			60	ns	9, 10
			1			70	ns	11

Electrical Characteristics

DC PARAMETERS (Continued)

(The following conditions apply to all the following parameters, unless otherwise specified.)
DC: Vs = ±5V dc, Rl is load resistance, Rp is programming resistance, feedback resistance (Rf) = 1000 Ohms, peak capacitance (Cp) = 100 pF, and Av = +6. -55 C ≤ Ta ≤ +125 C (Note 3)

SYMBOL	PARAMETER	CONDITIONS	NOTES	PIN-NAME	MIN	MAX	UNIT	SUB-GROUPS
Tf	Rise and Fall Time	Icc = 9mA, 2V step, Rp = 33kOhms, Rl = 250Ohms	1			3.0	ns	9, 11
			1			3.5	ns	10
		Icc = 3.4mA, 2V step, Rp = 100kOhms, Rl = 500Ohms	1			4.4	ns	9, 11
			1			5.4	ns	10
		Icc = 1mA, 2V step, Rp = 300kOhms, Rl = 1kOhms	1			10	ns	9
			1			12	ns	10, 11
Tr	Rise and Fall Time	Icc = 9mA, 5V step, Rp = 33kOhms, Rl = 250Ohms	1			3.7	ns	9, 11
			1			4.4	ns	10
		Icc = 3.4mA, 5V step, Rp = 100kOhms, Rl = 500Ohms	1			7.0	ns	9, 11
			1			8.8	ns	10
		Icc = 1mA, 5V step, Rp = 300kOhms, Rl = 1kOhms	1			18	ns	9
			1			20	ns	10, 11
OS	Overshoot	Icc = 9mA, 2V step, Rp = 33kOhms, Rl = 250Ohms	1			12	%	9
			1			15	%	10, 11
		Icc = 3.4mA, 2V step, Rp = 100kOhms, Rl = 500Ohms	1			10	%	9
			1			12	%	10, 11
		Icc = 1mA, 2V step, Rp = 300kOhms, Rl = 1kOhms	1			5	%	9
			1			8	%	10, 11

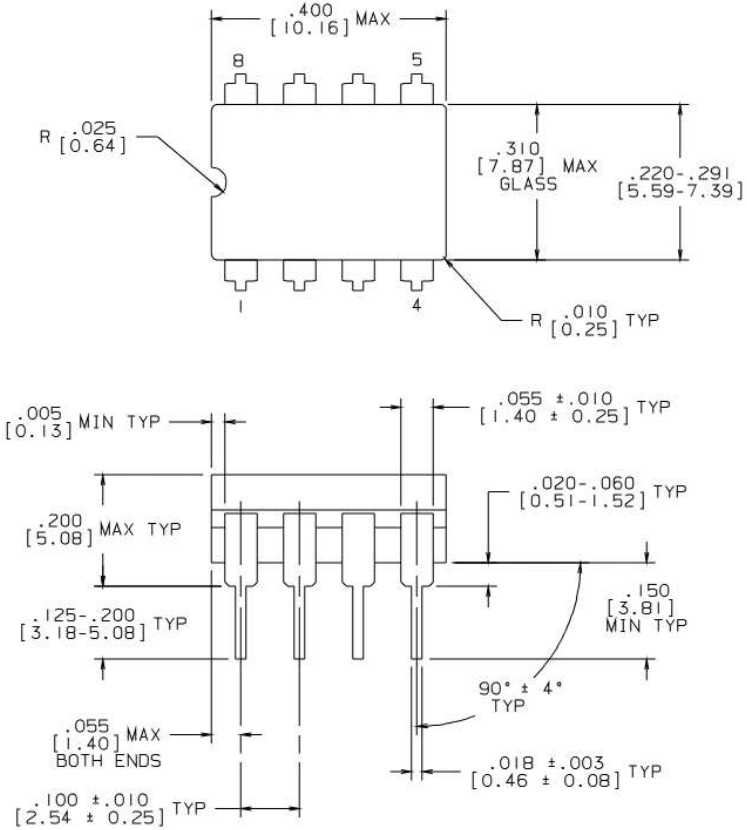
Note 1: If not tested, shall be guaranteed to the limits specified in table I herein.
Note 2: Group A testing only.
Note 3: The algebraic convention, whereby the most negative value is a minimum and the most positive is a maximum, is used in this table. Negative current shall be defined as conventional current flow out of a device terminal.
Note 4: Noise tests are performed from 1MHz to 200MHz for Icc = 9mA, 1MHz to 200MHz for Icc = 3.4mA, and 1MHz to 100MHz for Icc = 1mA.

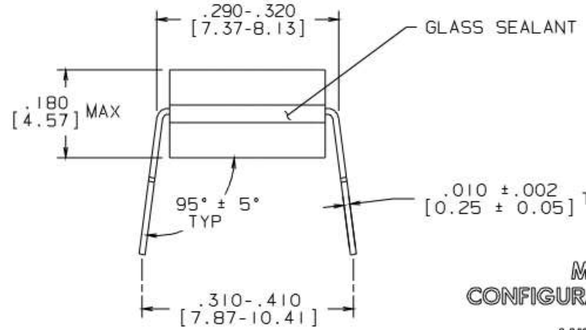
Graphics and Diagrams

GRAPHICS#	DESCRIPTION
07076HRA2	CERDIP (J), 8 LEAD (B/I CKT)
J08ARL	CERDIP (J), 8 LEAD (P/P DWG)
P000408A	CERDIP (J), 8 LEAD (PINOUT)

See attached graphics following this page.

REVISIONS				
LTR	DESCRIPTION	E.C.N.	DATE	BY/APP'D
L	REVISE PER CURRENT STD; REDRAW	10002	09/21/93	TL/





MIL/AERO CONFIGURATION CONTROL

MIL-M-38510 CONFIGURATION CONTROL

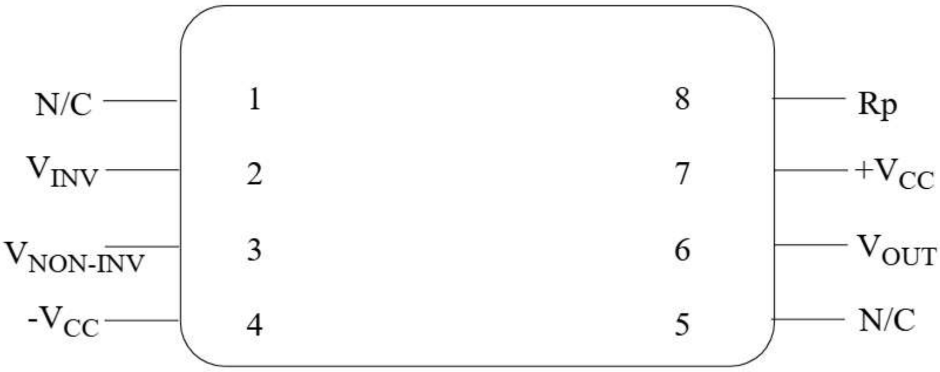
NOTES: UNLESS OTHERWISE SPECIFIED

1. LEAD FINISH TO BE 200 MICROINCHES / 5.08 MICROMETERS MINIMUM SOLDER MEASURED AT THE CREST OF THE MAJOR FLATS.
2. JEDEC REGISTRATION MO-036, VARIATION AA, DATED 04/1981.

CONTROLLING DIMENSION: INCH

APPROVALS	DATE	NATIONAL SEMICONDUCTOR CORPORATION 2900 Semiconductor Drive, Santa Clara, CA 95052-8090
DRAWN T. LEQUANG	09/21/93	CERDIP (J), 8 LEAD
DFTG. CHK.		
ENGR. CHK.		
APPROVAL		

PROJECTION	SCALE	SIZE	DRAWING NUMBER	REV
INCH [MM]	N/A	B	MKT-J08A	L
	DO NOT SCALE DRAWING		SHEET 1 OF 1	



CLC505J

8 - LEAD DIP

CONNECTION DIAGRAM

TOP VIEW

P000408A

National Semiconductor
MIL/AEROSPACE OPERATIONS
2900 SEMICONDUCTOR DRIVE
SANTA CLARA, CA 95050

Revision History

Rev	ECN #	Rel Date	Originator	Changes
0A0	M0003517	08/18/99	Shaw Mead	Initial MDS Release