110MHz, High Slew Rate, High Output Current Buffer

The HA-5002 is a monolithic, wideband, high slew rate, high output current, buffer amplifier.

Utilizing the advantages of the Intersil D.I. technologies, the HA-5002 current buffer offers 1300V/μs slew rate with 110MHz of bandwidth. The ±200mA output current capability is enhanced by a 3Ω output impedance.

The monolithic HA-5002 will replace the hybrid LH0002 with corresponding performance increases. These characteristics range from the 3000kΩ input impedance to the increased output voltage swing. Monolithic design technologies have allowed a more precise buffer to be developed with more than an order of magnitude smaller gain error.

The HA-5002 will provide many present hybrid users with a higher degree of reliability and at the same time increase overall circuit performance.

For the military grade product, refer to the HA-5002/883 datasheet.

Features

- Voltage Gain. 0.995
- High Input Impedance 3000kΩ
- Low Output Impedance 3Ω
- Very High Slew Rate 1300V/μs
- Very Wide Bandwidth. 110MHz
- High Output Current. . . . . ±200mA
- Pulsed Output Current 400mA
- Monolithic Construction
- Pb-Free Plus Anneal Available (RoHS Compliant)

Applications

- Line Driver
- Data Acquistion
- 110MHz Buffer
- Radara Cable Driver
- High Power Current Booster
- High Power Current Source
- Sample and Holds
- Video Products

Ordering Information

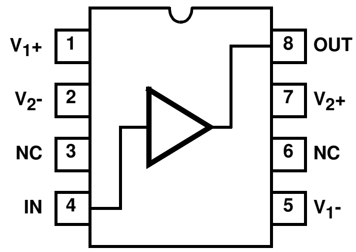
PART NUMBER	PART MARKING	TEMP. RANGE (°C)	PACKAGE	PKG. DWG. #
HA2-5002-2	HA2-5002-2	-55 to 125	8 Pin Metal Can	T8.C
HA2-5002-5	HA2-5002-5	0 to 75	8 Pin Metal Can	T8.C
HA3-5002-5	HA3-5002-5	0 to 75	8 Ld PDIP	E8.3
HA3-5002-5Z (Note)	HA3-5002-5Z	0 to 75	8 Ld PDIP* (Pb-free)	E8.3
HA4P5002-5	HA4P5002-5	0 to 75	20 Ld PLCC	N20.35
HA4P5002-5Z (Note)	HA4P5002-5Z	0 to 75	20 Ld PLCC (Pb-free)	N20.35
HA9P5002-5	50025	0 to 75	8 Ld SOIC	M8.15
HA9P5002-5Z (Note)	50025Z	0 to 75	8 Ld SOIC (Pb-free)	M8.15
HA9P5002-9	50029	-40 to 85	8 Ld SOIC	M8.15
HA9P5002-9Z (Note)	50029Z	-40 to 85	8 Ld SOIC (Pb-free)	M8.15

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

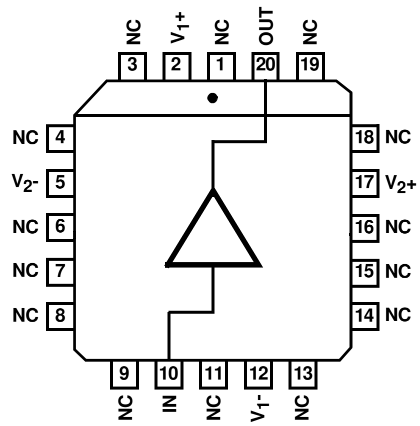
NOTE: Intersil Pb-free plus anneal products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations. Intersil Pb-free products are MSL classified at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

Pinouts

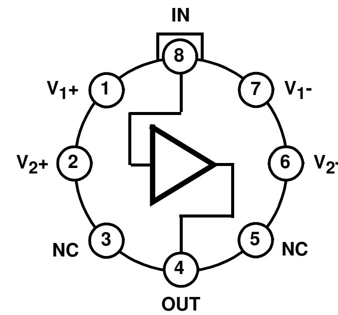
HA-5002 (PDIP, SOIC)
TOP VIEW



HA-5002 (PLCC)
TOP VIEW



HA-5002 (METAL CAN)
TOP VIEW



NOTE: Case Voltage = Floating

Absolute Maximum Ratings

Voltage Between V+ and V- Terminals 44V
Input Voltage . . . . V_1+ to V_1-
Output Current (Continuous) . . . . ±200mA
Output Current (50ms On, 1s Off) . . . . ±400mA

Operating Conditions

Temperature Range
HA-5002-2 . . . . -55°C to 125°C
HA-5002-5 . . . . 0°C to 75°C
HA-5002-9 . . . . -40°C to 85°C

Thermal Information

Thermal Resistance (Typical, Note 2)	θ_{JA} (°C/W)	θ_{JC} (°C/W)
PDIP Package*	92	N/A
Metal Can Package	155	67
PLCC Package	74	N/A
SOIC Package	157	N/A

Max Junction Temperature (Hermetic Packages, Note 1) . . . . . . 175°C
Max Junction Temperature (Plastic Packages, Note 1) . . . . 150°C
Max Storage Temperature Range . . . . -65°C to 150°C
Max Lead Temperature (Soldering 10s) . . . . 300°C
(PLCC and SOIC - Lead Tips Only)
*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: 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. Maximum power dissipation, including load conditions, must be designed to maintain the maximum junction temperature below 175°C for the can packages, and below 150°C for the plastic packages.
2. θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Electrical Specifications

V_{SUPPLY} = ±12V to ±15V, R_S = 50Ω, R_L = 1kΩ, C_L = 10pF, Unless Otherwise Specified

PARAMETER	TEST CONDITIONS	TEMP (°C)	HA-5002-2 MIN	HA-5002-2 TYP	HA-5002-2 MAX	HA-5002-5, -9 MIN	HA-5002-5, -9 TYP	HA-5002-5, -9 MAX	UNITS
INPUT CHARACTERISTICS									
Offset Voltage		25	-	5	20	-	5	20	mV
		Full	-	10	30	-	10	30	mV
Average Offset Voltage Drift		Full	-	30	-	-	30	-	μV/°C
Bias Current		25	-	2	7	-	2	7	μA
		Full	-	3.4	10	-	2.4	10	μA
Input Resistance		Full	1.5	3	-	1.5	3	-	MΩ
Input Noise Voltage	10Hz-1MHz	25	-	18	-	-	18	-	$μV_{P-P}$
TRANSFER CHARACTERISTICS									
Voltage Gain (V_{OUT} = ±10V)	R_L = 50Ω	25	-	0.900	-	-	0.900	-	V/V
	R_L = 100Ω	25	-	0.971	-	-	0.971	-	V/V
	R_L = 1kΩ	25	-	0.995	-	-	0.995	-	V/V
	R_L = 1kΩ	Full	0.980	-	-	0.980	-	-	V/V
-3dB Bandwidth	V_{IN} = $1V_{P-P}$	25	-	110	-	-	110	-	MHz
AC Current Gain		25	-	40	-	-	40	-	A/mA
OUTPUT CHARACTERISTICS									
Output Voltage Swing	R_L = 100Ω	25	±10	±10.7	-	±10	±11.2	-	V
	R_L = 1kΩ, V_S = ±15V	Full	±10	±13.5	-	±10	±13.9	-	V
	R_L = 1kΩ, V_S = ±12V	Full	±10	±10.5	-	±10	±10.5	-	V
Output Current	V_{IN} = ±10V, R_L = 40Ω	25	-	220	-	-	220	-	mA
Output Resistance		Full	-	3	10	-	3	10	Ω
Harmonic Distortion	V_{IN} = $1V_{RMS}$, f = 10kHz	25	-	<0.005	-	-	<0.005	-	%
TRANSIENT RESPONSE									
Full Power Bandwidth (Note 3)		25	-	20.7	-	-	20.7	-	MHz
Rise Time		25	-	3.6	-	-	3.6	-	ns
Propagation Delay		25	-	2	-	-	2	-	ns
Overshoot		25	-	30	-	-	30	-	%
Slew Rate		25	1.0	1.3	-	1.0	1.3	-	V/ns
Settling Time	To 0.1%	25	-	50	-	-	50	-	ns

Electrical Specifications V_{SUPPLY} = ±12V to ±15V, R_S = 50Ω, R_L = 1kΩ, C_L = 10pF, Unless Otherwise Specified **(Continued)**

PARAMETER	TEST CONDITIONS	TEMP (°C)	HA-5002-2			HA-5002-5, -9			UNITS
			MIN	TYP	MAX	MIN	TYP	MAX	
Differential Gain	R_L = 500Ω	25	-	0.06	-	-	0.06	-	%
Differential Phase	R_L = 500Ω	25	-	0.22	-	-	0.22	-	Degrees
POWER REQUIREMENTS									
Supply Current		25	-	8.3	-	-	8.3	-	mA
		Full	-	-	10	-	-	10	mA
Power Supply Rejection Ratio	A_V = 10V	Full	54	64	-	54	64	-	dB

NOTE:

3. $FPBW = \frac{\text{Slew Rate}}{2\pi V_{PEAK}}$; V_P = 10V.

Test Circuit and Waveforms

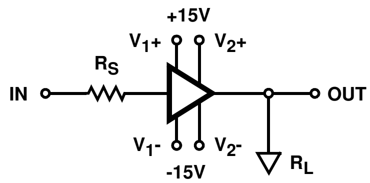
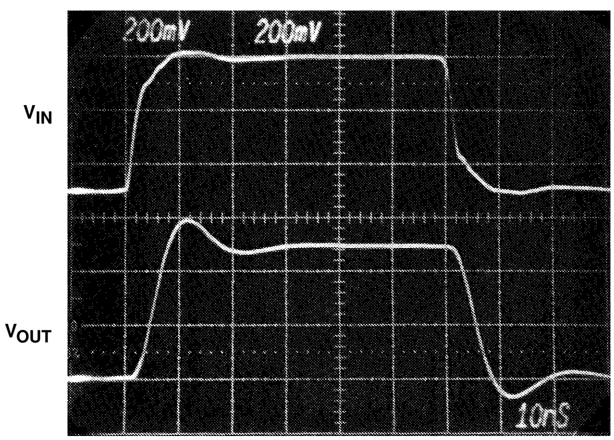
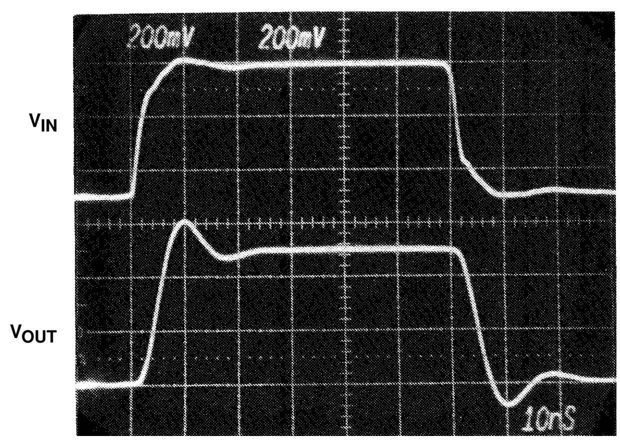


FIGURE 1. LARGE AND SMALL SIGNAL RESPONSE



R_S = 50Ω, R_L = 100Ω

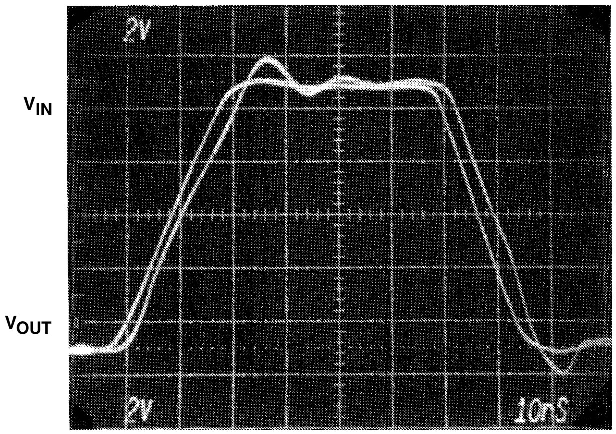
SMALL SIGNAL WAVEFORMS



R_S = 50Ω, R_L = 1kΩ

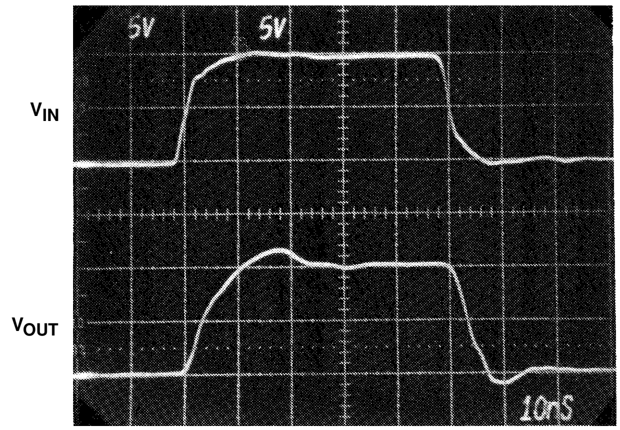
SMALL SIGNAL WAVEFORMS

Test Circuit and Waveforms (Continued)



$R_S = 50\Omega$, $R_L = 100\Omega$

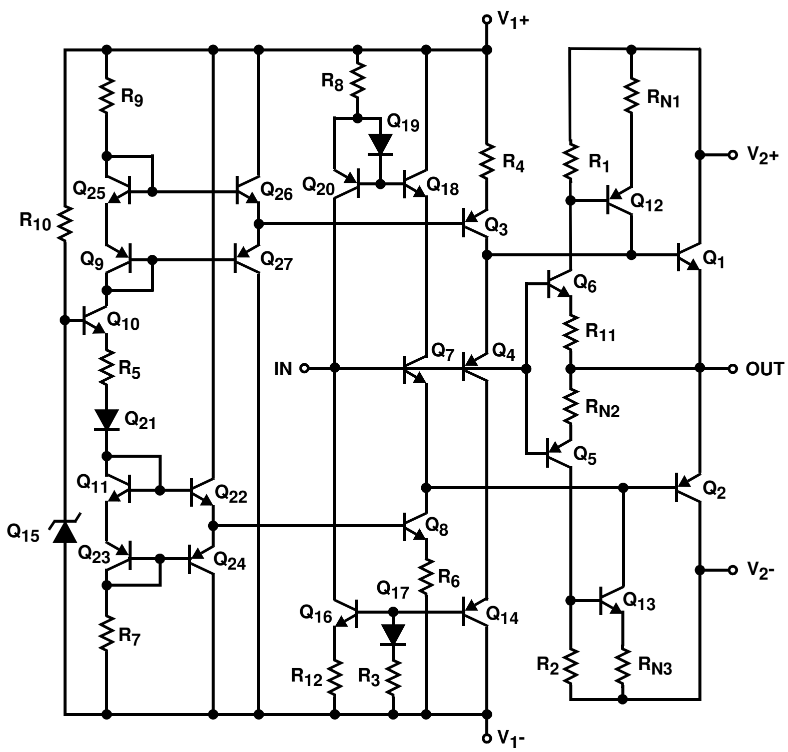
LARGE SIGNAL WAVEFORMS



$R_S = 50\Omega$, $R_L = 1k\Omega$

LARGE SIGNAL WAVEFORMS

Schematic Diagram



Application Information

Layout Considerations

The wide bandwidth of the HA-5002 necessitates that high frequency circuit layout procedures be followed. Failure to follow these guidelines can result in marginal performance.

Probably the most crucial of the RF/video layout rules is the use of a ground plane. A ground plane provides isolation and minimizes distributed circuit capacitance and inductance which will degrade high frequency performance.

Other considerations are proper power supply bypassing and keeping the input and output connections as short as possible which minimizes distributed capacitance and reduces board space.

Power Supply Decoupling

For optimal device performance, it is recommended that the positive and negative power supplies be bypassed with capacitors to ground. Ceramic capacitors ranging in value from 0.01 to 0.1μF will minimize high frequency variations in supply voltage, while low frequency bypassing requires larger valued capacitors since the impedance of the capacitor is dependent on frequency.

It is also recommended that the bypass capacitors be connected close to the HA-5002 (preferably directly to the supply pins).

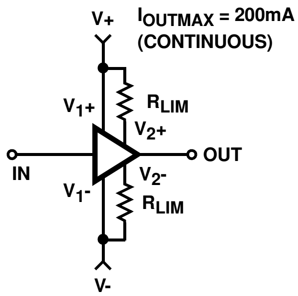
Operation at Reduced Supply Levels

The HA-5002 can operate at supply voltage levels as low as ±5V and lower. Output swing is directly affected as well as slight reductions in slew rate and bandwidth.

Short Circuit Protection

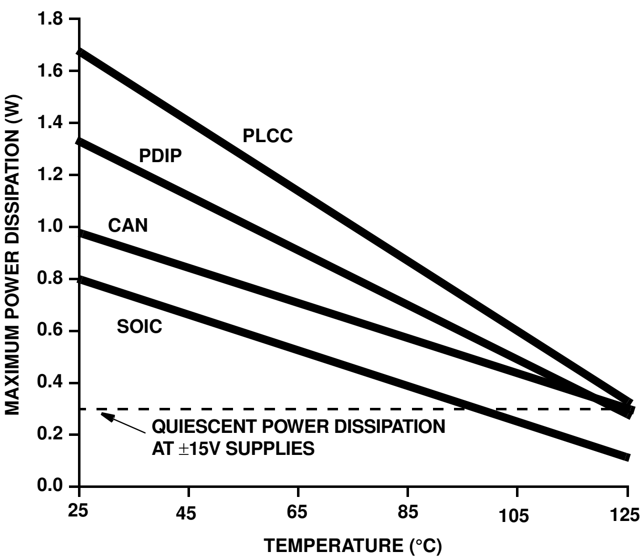
The output current can be limited by using the following circuit:

$$R_{LIM} = \frac{V+}{I_{OUTMAX}} = \frac{V-}{I_{OUTMAX}}$$



Capacitive Loading

The HA-5002 will drive large capacitive loads without oscillation but peak current limits should not be exceeded. Following the formula I = Cdv/dt implies that the slew rate or the capacitive load must be controlled to keep peak current below the maximum or use the current limiting approach as shown. The HA-5002 can become unstable with small capacitive loads (50pF) if certain precautions are not taken. Stability is enhanced by any one of the following: a source resistance in series with the input of 50Ω to 1kΩ; increasing capacitive load to 150pF or greater; decreasing C_{LOAD} to 20pF or less; adding an output resistor of 10Ω to 50Ω; or adding feedback capacitance of 50pF or greater. Adding source resistance generally yields the best results.



$$P_{DMAX} = \frac{T_{JMAX} - T_A}{\theta_{JC} + \theta_{CS} + \theta_{SA}}$$

Where: T_{JMAX} = Maximum Junction Temperature of the Device

T_A = Ambient

θ_{JC} = Junction to Case Thermal Resistance

θ_{CS} = Case to Heat Sink Thermal Resistance

θ_{SA} = Heat Sink to Ambient Thermal Resistance

Graph is based on: $P_{DMAX} = \frac{T_{JMAX} - T_A}{\theta_{JA}}$

FIGURE 2. MAXIMUM POWER DISSIPATION vs TEMPERATURE

Typical Application

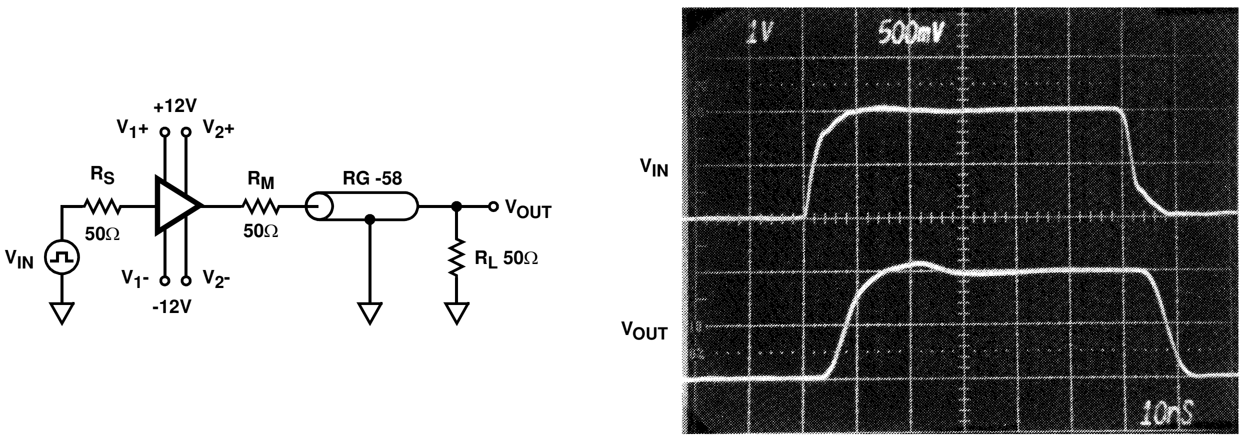


FIGURE 3. COAXIAL CABLE DRIVER - 50Ω SYSTEM

Typical Performance Curves

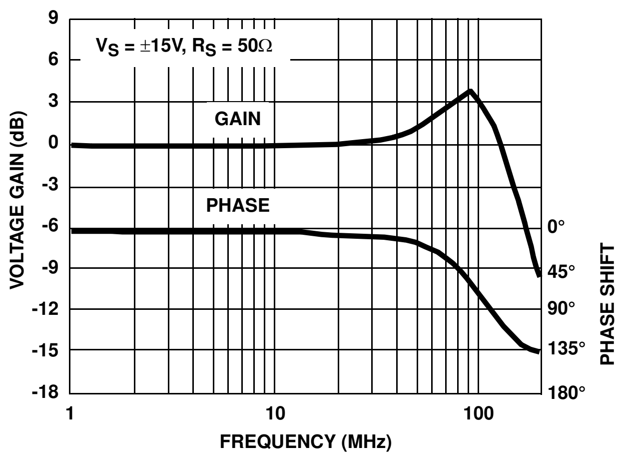


FIGURE 4. GAIN/PHASE vs FREQUENCY (R_L = 1kΩ)

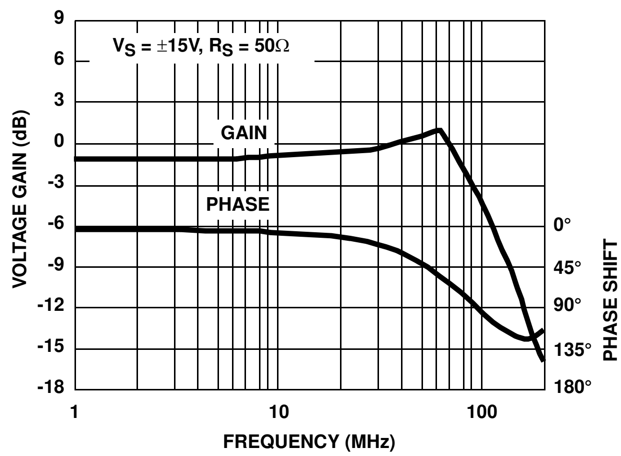


FIGURE 5. GAIN/PHASE vs FREQUENCY (R_L = 50Ω)

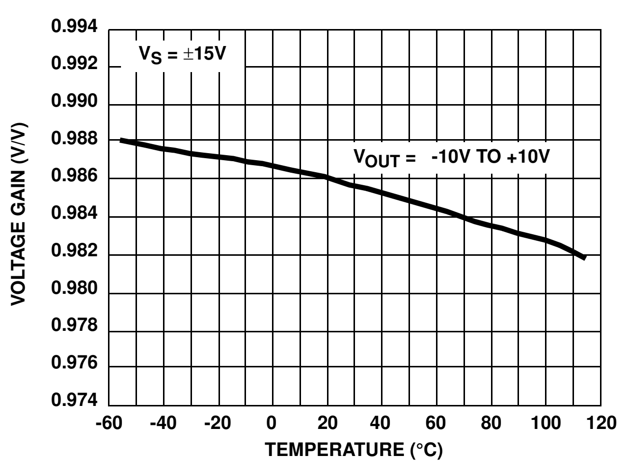


FIGURE 6. VOLTAGE GAIN vs TEMPERATURE (R_L = 100Ω)

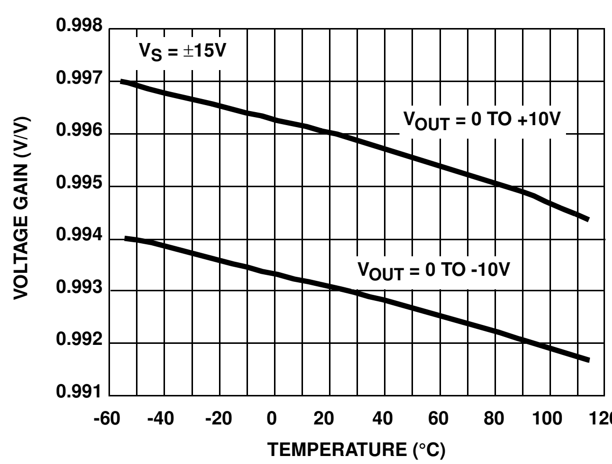


FIGURE 7. VOLTAGE GAIN vs TEMPERATURE (R_L = 1kΩ)

Typical Performance Curves (Continued)

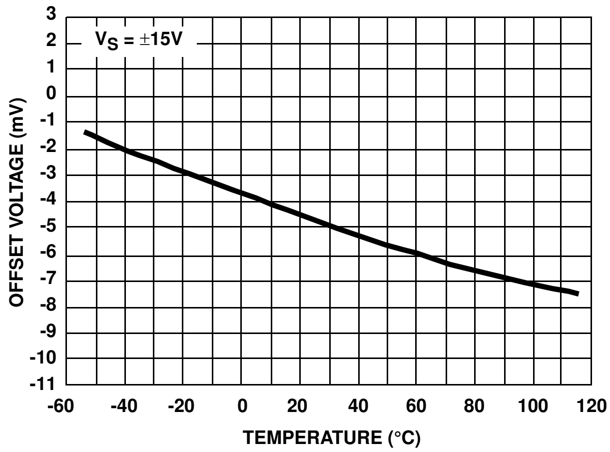


FIGURE 8. OFFSET VOLTAGE vs TEMPERATURE

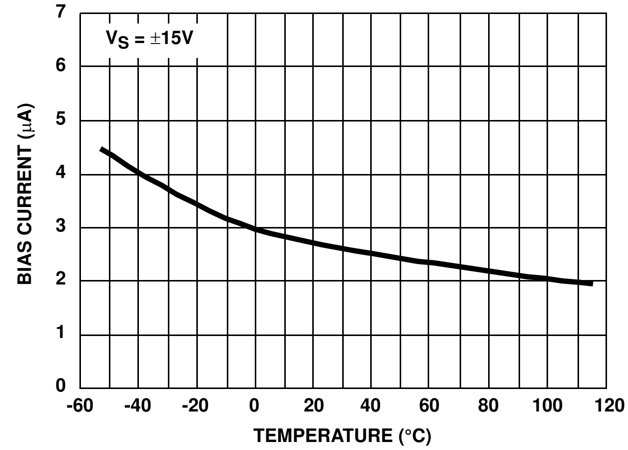


FIGURE 9. BIAS CURRENT vs TEMPERATURE

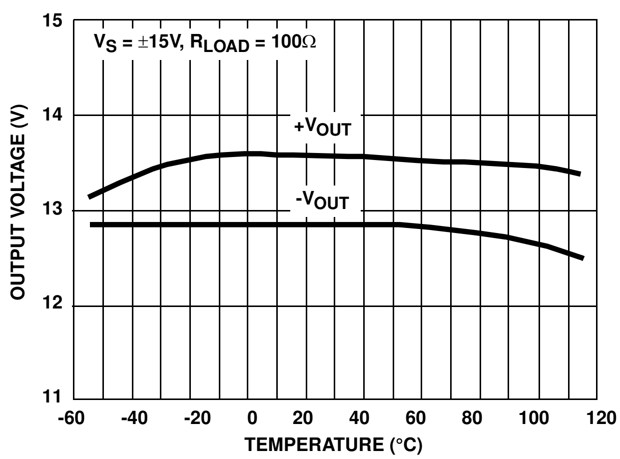


FIGURE 10. MAXIMUM OUTPUT VOLTAGE vs TEMPERATURE

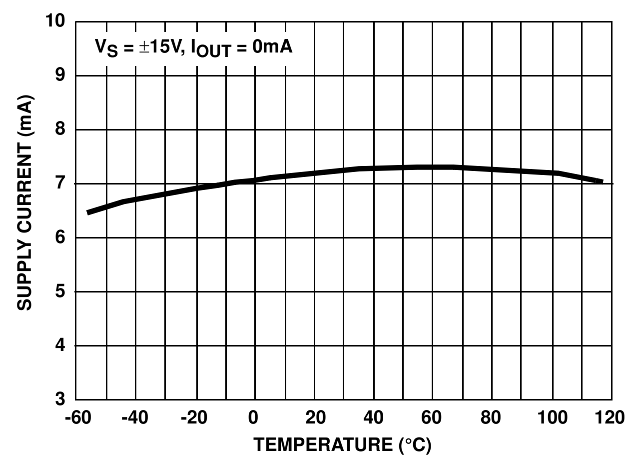


FIGURE 11. SUPPLY CURRENT vs TEMPERATURE

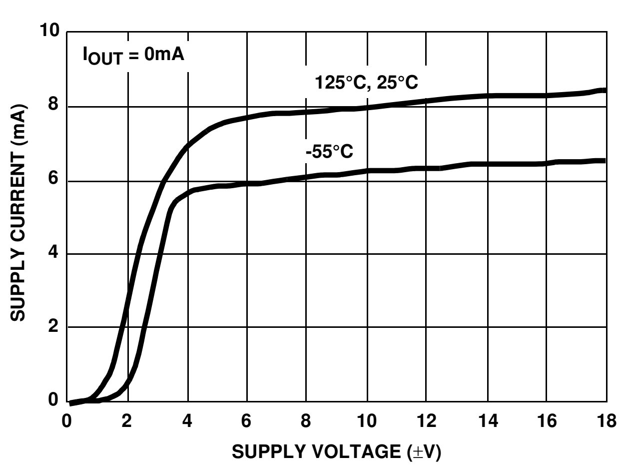


FIGURE 12. SUPPLY CURRENT vs SUPPLY VOLTAGE

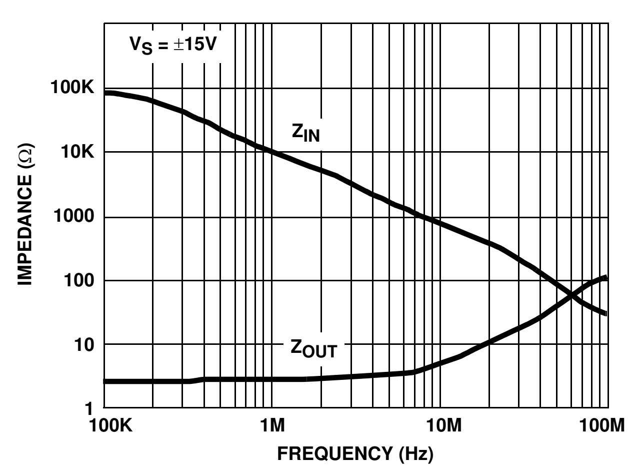


FIGURE 13. INPUT/OUTPUT IMPEDANCE vs FREQUENCY

Typical Performance Curves (Continued)

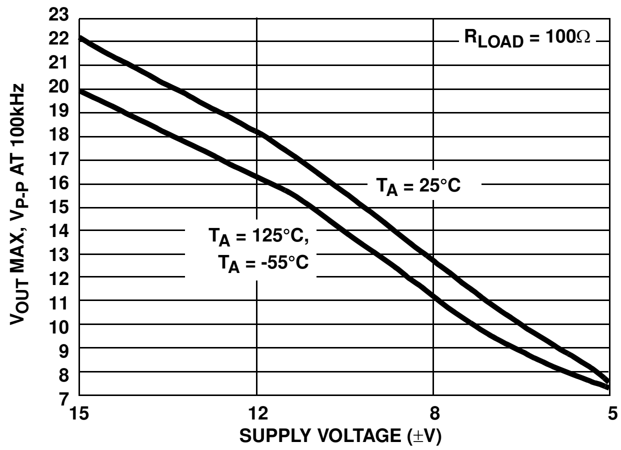


FIGURE 14. V_{OUT} MAXIMUM vs V_{SUPPLY}

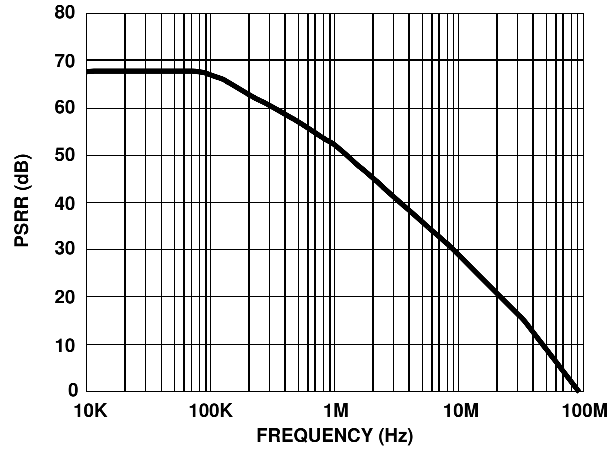


FIGURE 15. PSRR vs FREQUENCY

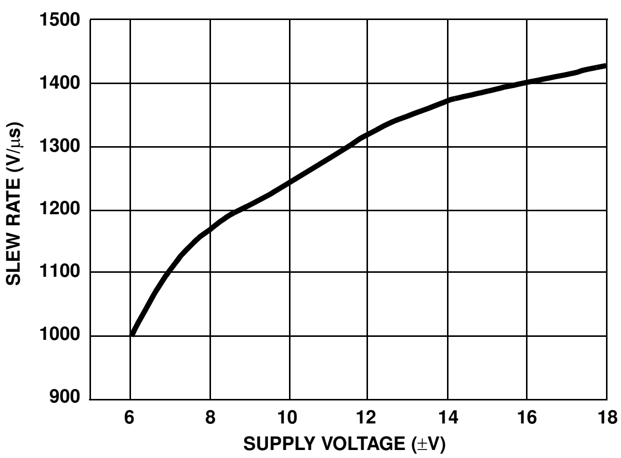


FIGURE 16. SLEW RATE vs SUPPLY VOLTAGE

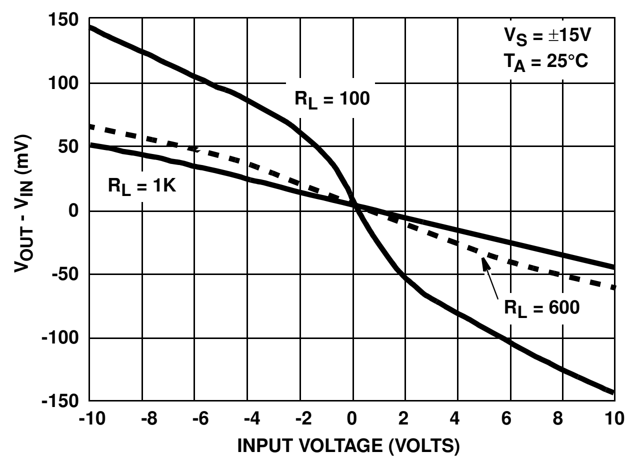


FIGURE 17. GAIN ERROR vs INPUT VOLTAGE

Die Characteristics

SUBSTRATE POTENTIAL (POWERED UP):

V_1-

TRANSISTOR COUNT:

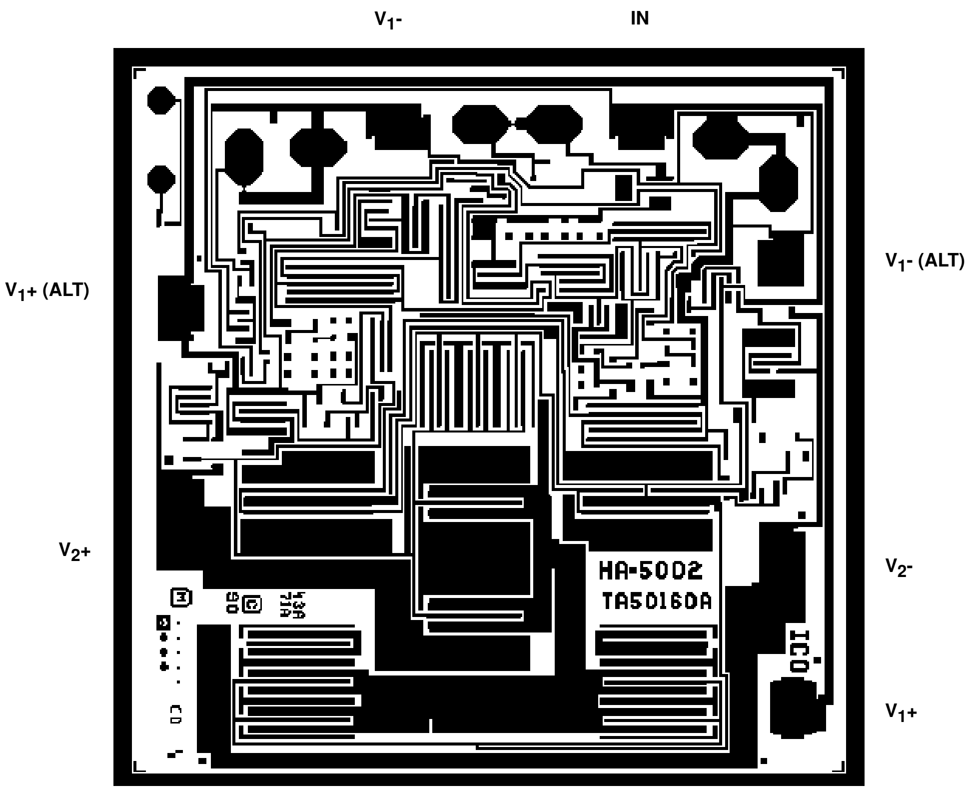
27

PROCESS:

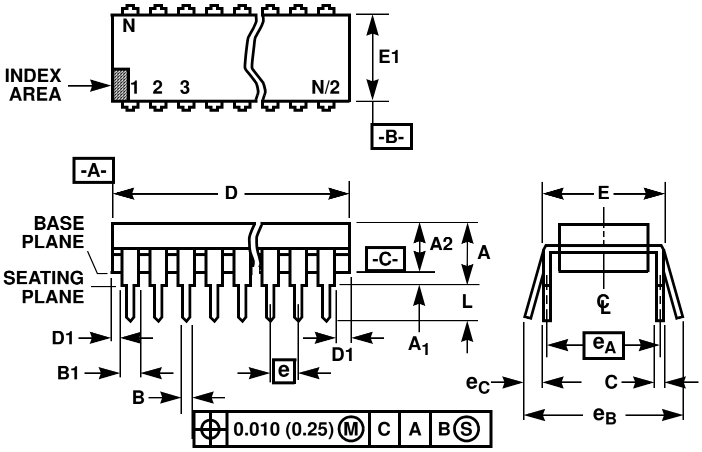
Bipolar Dielectric Isolation

Metallization Mask Layout

HA-5002



Dual-In-Line Plastic Packages (PDIP)



NOTES:

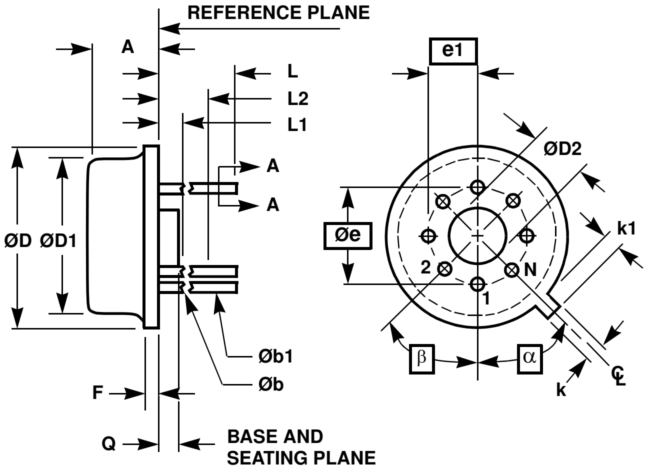
1. Controlling Dimensions: INCH. In case of conflict between English and Metric dimensions, the inch dimensions control.
2. Dimensioning and tolerancing per ANSI Y14.5M-1982.
3. Symbols are defined in the “MO Series Symbol List” in Section 2.2 of Publication No. 95.
4. Dimensions A, A1 and L are measured 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).

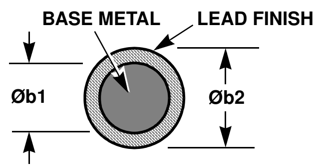
E8.3 (JEDEC MS-001-BA ISSUE D)
8 LEAD DUAL-IN-LINE PLASTIC PACKAGE

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

Rev. 0 12/93

Metal Can Packages (Can)





SECTION A-A

NOTES:

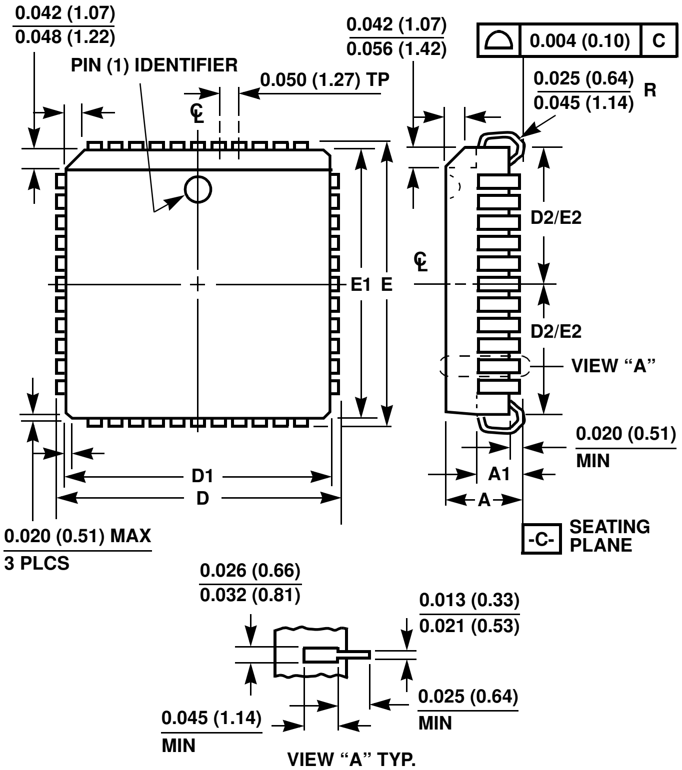
1. (All leads) Øb applies between L1 and L2. Øb1 applies between L2 and 0.500 from the reference plane. Diameter is uncontrolled in L1 and beyond 0.500 from the reference plane.
2. Measured from maximum diameter of the product.
3. α is the basic spacing from the centerline of the tab to terminal 1 and β is the basic spacing of each lead or lead position (N -1 places) from α, looking at the bottom of the package.
4. N is the maximum number of terminal positions.
5. Dimensioning and tolerancing per ANSI Y14.5M - 1982.
6. Controlling dimension: INCH.

T8.C MIL-STD-1835 MACY1-X8 (A1)
8 LEAD METAL CAN PACKAGE

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.165	0.185	4.19	4.70	-
Øb	0.016	0.019	0.41	0.48	1
Øb1	0.016	0.021	0.41	0.53	1
Øb2	0.016	0.024	0.41	0.61	-
ØD	0.335	0.375	8.51	9.40	-
ØD1	0.305	0.335	7.75	8.51	-
ØD2	0.110	0.160	2.79	4.06	-
e	0.200 BSC		5.08 BSC		-
e1	0.100 BSC		2.54 BSC		-
F	-	0.040	-	1.02	-
k	0.027	0.034	0.69	0.86	-
k1	0.027	0.045	0.69	1.14	2
L	0.500	0.750	12.70	19.05	1
L1	-	0.050	-	1.27	1
L2	0.250	-	6.35	-	1
Q	0.010	0.045	0.25	1.14	-
α	45^o BSC		45^o BSC		3
β	45^o BSC		45^o BSC		3
N	8		8		4

Rev. 0 5/18/94

Plastic Leaded Chip Carrier Packages (PLCC)



N20.35 (JEDEC MS-018AA ISSUE A)
20 LEAD PLASTIC LEADED CHIP CARRIER PACKAGE

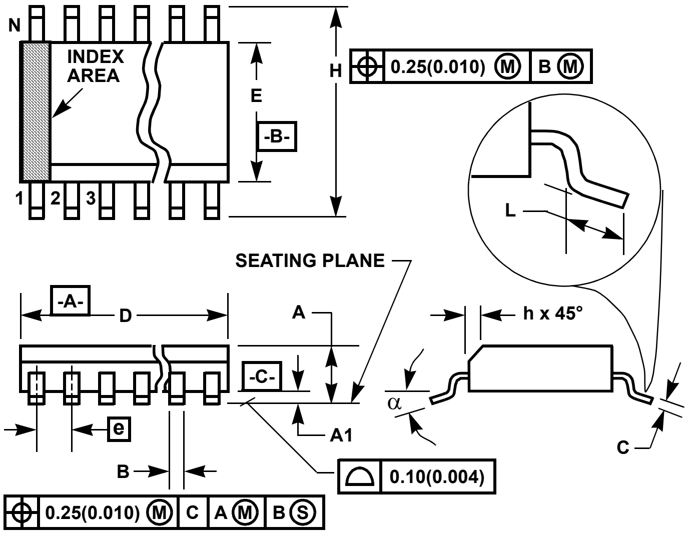
SYMBOL	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX	NOTES
A	0.165	0.180	4.20	4.57	-
A1	0.090	0.120	2.29	3.04	-
D	0.385	0.395	9.78	10.03	-
D1	0.350	0.356	8.89	9.04	3
D2	0.141	0.169	3.59	4.29	4, 5
E	0.385	0.395	9.78	10.03	-
E1	0.350	0.356	8.89	9.04	3
E2	0.141	0.169	3.59	4.29	4, 5
N	20		20		6

Rev. 2 11/97

NOTES:

1. Controlling dimension: INCH. Converted millimeter dimensions are not necessarily exact.
2. Dimensions and tolerancing per ANSI Y14.5M-1982.
3. Dimensions D1 and E1 do not include mold protrusions. Allowable mold protrusion is 0.010 inch (0.25mm) per side. Dimensions D1 and E1 include mold mismatch and are measured at the extreme material condition at the body parting line.
4. To be measured at seating plane -C- contact point.
5. Centerline to be determined where center leads exit plastic body.
6. "N" is the number of terminal positions.

Small Outline Plastic Packages (SOIC)



NOTES:

1. Symbols are defined in the “MO Series Symbol List” in Section 2.2 of Publication Number 95.
2. Dimensioning and tolerancing per ANSI Y14.5M-1982.
3. Dimension “D” does not include mold flash, protrusions or gate burrs. Mold flash, protrusion and gate burrs shall not exceed 0.15mm (0.006 inch) per side.
4. Dimension “E” does not include interlead flash or protrusions. Interlead flash and protrusions shall not exceed 0.25mm (0.010 inch) per side.
5. The chamfer on the body is optional. If it is not present, a visual index feature must be located within the crosshatched area.
6. “L” is the length of terminal for soldering to a substrate.
7. “N” is the number of terminal positions.
8. Terminal numbers are shown for reference only.
9. The lead width “B”, as measured 0.36mm (0.014 inch) or greater above the seating plane, shall not exceed a maximum value of 0.61mm (0.024 inch).
10. Controlling dimension: MILLIMETER. Converted inch dimensions are not necessarily exact.

M8.15 (JEDEC MS-012-AA ISSUE C)

8 LEAD NARROW BODY SMALL OUTLINE PLASTIC PACKAGE

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.0532	0.0688	1.35	1.75	-
A1	0.0040	0.0098	0.10	0.25	-
B	0.013	0.020	0.33	0.51	9
C	0.0075	0.0098	0.19	0.25	-
D	0.1890	0.1968	4.80	5.00	3
E	0.1497	0.1574	3.80	4.00	4
e	0.050 BSC		1.27 BSC		-
H	0.2284	0.2440	5.80	6.20	-
h	0.0099	0.0196	0.25	0.50	5
L	0.016	0.050	0.40	1.27	6
N	8		8		7
α	0°	8°	0°	8°	-

Rev. 1 6/05

Device Information

HA-5002

Printer Friendly Version

110MHz, High Slew Rate, High Output Current Buffer

DS Datasheets, Related Docs & Simulations | Description | Key Features | PT Parametric Data | Application Diagrams | Related Devices

Ordering Information — RoHS/Pb-Free/Green Device

Part No.	Design-In Status	Temp.	Package	MSL	Price US $	
HA2-5002-2	Active	Mil	8 Ld Can	N/A	25.33	Buy
HA2-5002-2ZR5254 Pb	Active	Mil	8 Ld Can	N/A	25.33	Buy
HA2-5002-5	Active	Comm	8 Ld Can	N/A	19.65	Buy
HA3-5002-5	Active	Comm	8 Ld PDIP	N/A	2.59	Buy
HA3-5002-5Z Pb	Active	Comm	8 Ld PDIP	N/A	2.59	Buy Sample
HA4P5002-5	Active	Comm	20 Ld PLCC	3	6.19	Buy
HA4P5002-5Z Pb	Active	Comm	20 Ld PLCC	3	6.19	Buy Sample
HA9P5002-5	Active	Comm	8 Ld SOIC	1	1.95	Buy
HA9P5002-5Z Pb	Active	Comm	8 Ld SOIC	1	1.95	Buy Sample
HA9P5002-9	Active	Ind	8 Ld SOIC	1	2.91	Buy
HA9P5002-9Z Pb	Active	Ind	8 Ld SOIC	1	2.91	Buy Sample
HA7-5002-5	InActive	Comm	8 Ld CerDIP	N/A		

The price listed is the manufacturer's suggested retail price for quantities between 100 and 999 units. However, prices in today's market are fluid and may change without notice.

MSL = Moisture Sensitivity Level - per IPC/JEDEC J-STD-020

SMD = Standard Microcircuit Drawing

Description

The HA-5002 is a monolithic, wideband, high slew rate, high output current, buffer amplifier.

Utilizing the advantages of the Intersil D.I. technologies, the HA-5002 current buffer offers 1300V/µs slew rate with 110MHz of bandwidth. The ±200mA output current capability is enhanced by a 3Ω output impedance.

The monolithic HA-5002 will replace the hybrid LH0002 with corresponding performance increases. These characteristics range from the 3000kΩ input impedance to the increased output voltage swing. Monolithic design technologies have allowed a more precise buffer to be developed with more than an order of magnitude smaller gain error.

The HA-5002 will provide many present hybrid users with a higher degree of reliability and at the same time increase overall circuit performance.

For the military grade product, refer to the HA-5002/883 datasheet.

Key Features

- Voltage Gain 0.995
- High Input Impedance 3000kΩ
- Low Output Impedance 3Ω
- Very High Slew Rate 1300V/is
- Very Wide Bandwidth 110MHz
- High Output Current ±200mA
- Pulsed Output Current 400mA
- Monolithic Construction

- Pb-Free Plus Anneal Available (RoHS Compliant)

Related Documentation

Application Note(s):

- Basic Analog for Digital Designers
- Evaluation Programs for SPICE Op Amp Models
- Feedback, Op Amps and Compensation
- Operational Amplifier Noise Prediction
- Recommended Test Procedures for Operational Amplifiers

Datasheet(s):

- 110MHz, High Slew Rate, High Output Current Buffer

Military SMD(s):

- Monolithic, Wideband, High Slew Rate, High Output Current Buffer

Technical Homepage:

- Amplifiers/Buffers
- Military/Space ICs

i-Sim:

- Getting Started with iSim and iSim:PE
- HA-5002 iSim
- Java™ Plug-in Setup Instructions for Windows® 2000 Systems

Design Model(s):

- HA-5002 SPICE Buffer Amplifier Macro-Model
- HA-5002 SPICE Operational Amplifier Macro Model

Other:

- 20 Lead Plastic Leaded Chip Carrier Package (JEDEC MS-018AA Issue A)
- 8 Lead Dual-In-Line Plastic Package (JEDEC MS-001-BA Issue D)
- 8 Lead Narrow Body Small Outline Plastic Package (JEDEC MS-012-AA Issue C)
- Mil-Std-1835 GDIP1-T8 (D-4, Configuration A) 8 Lead Ceramic Dual-In-Line Frit Seal Package
- Mil-Std-1835 MACY1-X8 (A1) 8 Lead Metal Can Package

Parametric Data

# of Amps	1
BW @ -3dB (MHz)	110
Slew Rate (V/µs)	1300
Gain A_V (min)	1
V_{IN} (min) (V)	±5
V_{IN} (max) (V)	±20
I_{BIAS} (µA)	2
I_S (mA)	8.3
PSRR (dB)	64
V_{OS} (max) (mV)	5
Rail-to-Rail	N

Application Block Diagrams

- Smart Sensor

Applications

- Line Driver
- Data Acquistion
- 110MHz Buffer
- Radara Cable Driver
- High Power Current Booster
- High Power Current Source
- Sample and Holds
- Video Products

Related Devices Parametric Table

5962-0623501QPC	500MHz Rail-to-Rail Amplifier
5962-0623502QPC	500MHz Rail-to-Rail Amplifier
5962-0623601QPC	670MHz Low Noise Amplifiers
5962-0623602QPC	670MHz Low Noise Amplifiers
5962-0625501QXC	350MHz Fixed Gain Amplifiers with Enable
5962-0625601QHC	1.4GHz Current Feedback Amplifiers with Enable
5962-0625601QXC	1.4GHz Current Feedback Amplifiers with Enable
5962-0625602QHC	1.4GHz Current Feedback Amplifiers with Enable
5962-0625602QXC	1.4GHz Current Feedback Amplifiers with Enable
5962-0721201QXC	Video Distribution Amplifier
5962-0721301QHC	Dual 500MHz Rail-to-Rail Amplifier with Enable
5962-0721301QXC	500MHz Rail-to-Rail Amplifiers
5962-0721302QHC	Dual 500MHz Rail-to-Rail Amplifier
5962-0721302QXC	500MHz Rail-to-Rail Amplifiers
5962-0721303QDC	Quad 500MHz Rail-to-Rail Amplifier
5962-0721303QYC	500MHz Rail-to-Rail Amplifiers
HA-2400/883	40MHz, PRAM Four Channel Programmable Amplifiers
HA-2520	20MHz, High Slew Rate, Uncompensated, High Input Impedance, Operational Amplifiers
HA-2520/883	Microcircuit, Linear, High Speed, Operational Amplifier, Monolithic Silicon
HA-2539	600MHz, Very High Slew Rate Operational Amplifier
HA-2539/883	600MHz, Very High Slew Rate Operational Amplifier
HA-2544	50MHz, Video Operational Amplifier
HA-5002/883	Monolithic, Wideband, High Slew Rate, High Output Current Buffer
HA-5020	100MHz Current Feedback Video Amplifier With Disable
HA-5033	250MHz Video Buffer
HA-5101/883	Low Noise, High Performance Operational Amplifier
HA-5102	Dual and Quad, 8MHz and 60MHz, Low Noise Operational Amplifiers
HA-5104	Dual and Quad, 8MHz and 60MHz, Low Noise Operational Amplifiers
HA-5104/883	Low Noise, High Performance, Quad Operational Amplifier
HA-5190	150MHz, Fast Settling Operational Amplifiers
HA4600	480MHz, Video Buffer with Output Disable
HFA1130	850MHz, Output Limiting, Low Distortion Current Feedback Operational Amplifier

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