BURR-BROWN®

HI-508A/883B
HI-509A/883B

REVISION NONE
JANUARY, 1989

Single-Ended 8-Channel/Differential 4-Channel CMOS ANALOG MULTIPLEXERS

FEATURES

- ANALOG OVERVOLTAGE PROTECTION: 70Vp-p
- NO CHANNEL INTERACTION DURING OVERVOLTAGE
- ESD RESISTANT
- BREAK-BEFORE-MAKE SWITCHING
- ANALOG SIGNAL RANGE: ±15V
- STANDBY POWER: 7.5mW typ

DESCRIPTION

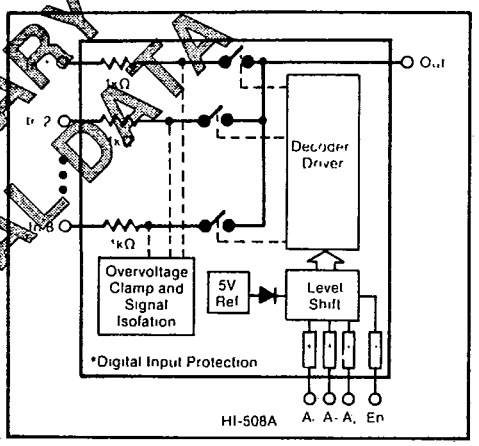
The HI-508A/883B is an 8-channel single-ended analog multiplexer, and the HI-509A/883B is a 4-channel differential multiplexer.

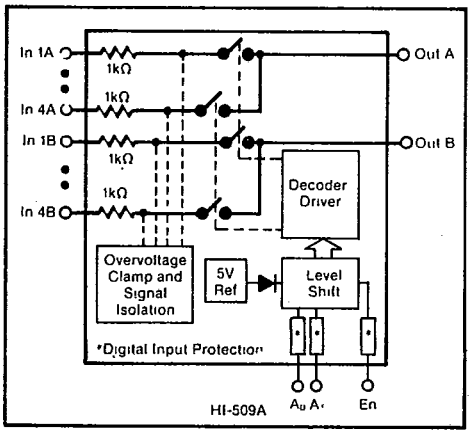
The HI-508A and HI-509A multiplexers have input overvoltage protection. Analog input voltages may exceed either power supply voltage without damaging the device or disrupting the signal path of other channels. The protection circuitry assures that signal fidelity is maintained even under faulty conditions that would destroy other channels. Analog inputs can withstand 70Vp-p signal levels and standard ESD tests. Signal sources are protected from short circuits should multiplexer power loss occur; each input presents a 1kΩ resistance under this condition. Digital inputs can also sustain continuous faults up to 4V greater than either supply voltage.

These features make the HI-508A and HI-509A ideal for use in systems where analog signals originate from external equipment or separately powered sources.

The HI-508A and HI-509A are fabricated with Burr-Brown's dielectrically isolated CMOS technology. The multiplexers are packaged in a hermetic ceramic DIP.

FUNCTIONAL DIAGRAMS





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SPECIFICATIONS

T-51-11

ELECTRICAL

Supplies = +15V, −15V; V_{AH} (Logic Level High) = +4.0V, V_{AL} (Logic Level Low) = +0.8V unless otherwise specified.

PARAMETER	TEMP	HI1-508A-2/883B HI1-509A-2/883B MIN	TYP	MAX	UNITS
ANALOG CHANNEL CHARACTERISTICS					
V_S, Analog Signal Range	Full	−15		+15	V
R_{ON}, On Resistance[1]	+25°C		1.2	1.5	kΩ
	Full		1.5	1.8	kΩ
I_S (OFF), Off Input Leakage Current	+25°C		0.03		nA
	Full			50	nA
I_D (OFF), Off Output Leakage Current	+25°C		0.1		nA
HI-508A	Full			200	nA
HI-509A	Full			100	nA
I_D (OFF) with Input Overvoltage Applied[2]	+25°C		4.0		nA
	Full			2.0	μA
I_D (ON), On Channel Leakage Current	+25°C		0.1		nA
HI-508A	Full			200	nA
HI-509A	Full			100	nA
I_{DIFF} Differential Off Output Leakage Current (HI-509A Only)	Full			50	nA
DIGITAL INPUT CHARACTERISTICS					
V_{AL}, Input Low Threshold	Full			0.8	V
V_{AH}, Input High Threshold[3]	Full	4.0			V
I_A, Input Leakage Current (High or Low)[4]	Full			1.0	μA
SWITCHING CHARACTERISTICS					
t_A, Access Time	+25°C		0.5		μs
	Full			1.0	μs
t_{OPEN}, Break-Before-Make Delay	+25°C	25	80		ns
t_{ON} (EN), Enable Delay (ON)	+25°C		300	500	ns.
	Full			1000	ns
t_{OFF} (EN), Enable Delay (OFF)	+25°C		300	500	ns
	Full			1000	ns
Settling Time: (0.1%)	+25°C		1.2		μs
(0.01%)	+25°C		3.5		μs
"OFF Isolation"[5]	+25°C	50	68		dB
C_S (OFF), Channel Input Capacitance	+25°C		5		pF
C_D (OFF), Channel Output Capacitance: HI-508A	+25°C		25		pF
HI-509A	+25°C		12		pF
C_A, Digital Input Capacitance	+25°C		5		pF
C_{DS} (OFF), Input to Output Capacitance	+25°C		0.1		pF
POWER REQUIREMENTS					
P_D, Power Dissipation	Full		7.5		mW
I+, Current[6]	Full		0.5	2.0	mA
I−, Current[6]	Full		0.02	1.0	mA

NOTES: (1) V_{OUT} = ±10V, I_{OUT} = −100μA. (2) Analog overvoltage = ±33V. (3) To drive from DTL/TTL circuits, 1kΩ pull-up resistors to +5.0V supply are recommended. (4) Digital input leakage is primarily due to the clamp diodes. Typical leakage is less than 1nA at 25°C. (5) V_{EN} = 0.8V, R_L = 1kΩ, C_L = 15pF, V_S = 7Vrms, f = 100kHz. Worst-case isolation occurs on channel 4 due to proximity of the output pins. (6) V_{EN}, V_A = 0V or 4.0V.

TRUTH TABLES

HI-508A

A_2	A_1	A_0	EN	"ON" CHANNEL
X	X	X	L	None
L	L	L	H	1
L	L	H	H	2
L	H	L	H	3
L	H	H	H	4
H	L	L	H	5
H	L	H	H	6
H	H	L	H	7
H	H	H	H	8

HI-509A

A_1	A_0	EN	"ON" CHANNEL PAIR
X	X	L	None
L	L	H	1
L	H	H	2
H	L	H	3
H	H	H	4

ABSOLUTE MAXIMUM RATINGS[1]

Voltage between supply pins	44V
V+ to ground	22V
V− to ground	25V
Digital input overvoltage V_{EN}, V_A: V_{SUPPLY} (+)	+4V
V_{SUPPLY} (−)	−4V
or 20mA, whichever occurs first.	
Analog input overvoltage V_S: V_{SUPPLY} (+)	+20V
V_{SUPPLY} (−)	−20V
Continuous current, S or D	20mA
Peak current, S or D (pulsed at 1ms, 10% duty cycle max)	40mA
Power dissipation*	1.28W
Operating temperature range: HI1-508A/509A-2	−55°C to +125°C
Storage temperature range	−65°C to +150°C

*Derate 12.8mW/°C above T_A = +75°C.

NOTE: (1). Absolute maximum ratings are limiting values, applied individually, beyond which the serviceability of the circuit may be impaired. Functional operation under any of these conditions is not necessarily implied.

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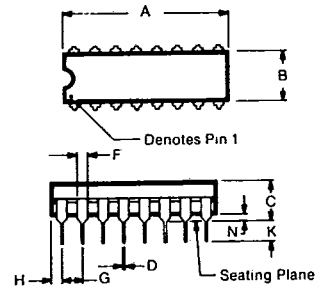
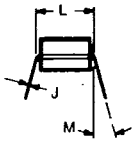
MECHANICAL



Ceramic DIP Package

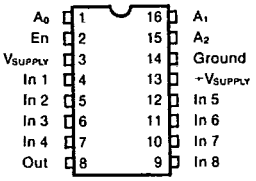


NOTE Leads in true position within 0.010" (0.25mm) R at MMC at seating plane.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.760	.885	19.30	22.48
B	.220	.280	5.59	7.11
C		.200		5.08
D	.015	.023	0.38	0.58
F	.030	.070	0.76	1.78
G	.100 BASIC		2.54 BASIC	
H	.030	.095	0.76	2.41
J	.008	.015	0.20	0.38
K	.100		2.54	
L	.300 BASIC		7.62 BASIC	
M		.15		.15
N	.020	.050	0.51	1.27

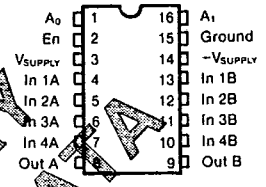
PIN CONFIGURATIONS

Top View



HI-508A (ceramic)

Top View



HI-509A (ceramic)

ORDERING INFORMATION

Model	Package	Temperature Range	Description
HI1-0508A-2/883B	16-Pin Ceramic DIP	−55°C to +125°C	8-Channel Single-Ended
HI1-0509A-2/883B	28-Pin Ceramic DIP	−55°C to +125°C	4-Channel Differential