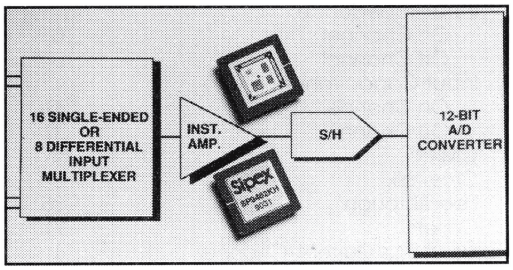
SP9462, SP9472, SP9463, SP9473

Sipex Data Converter Line

12-Bit Data Acquisition Systems

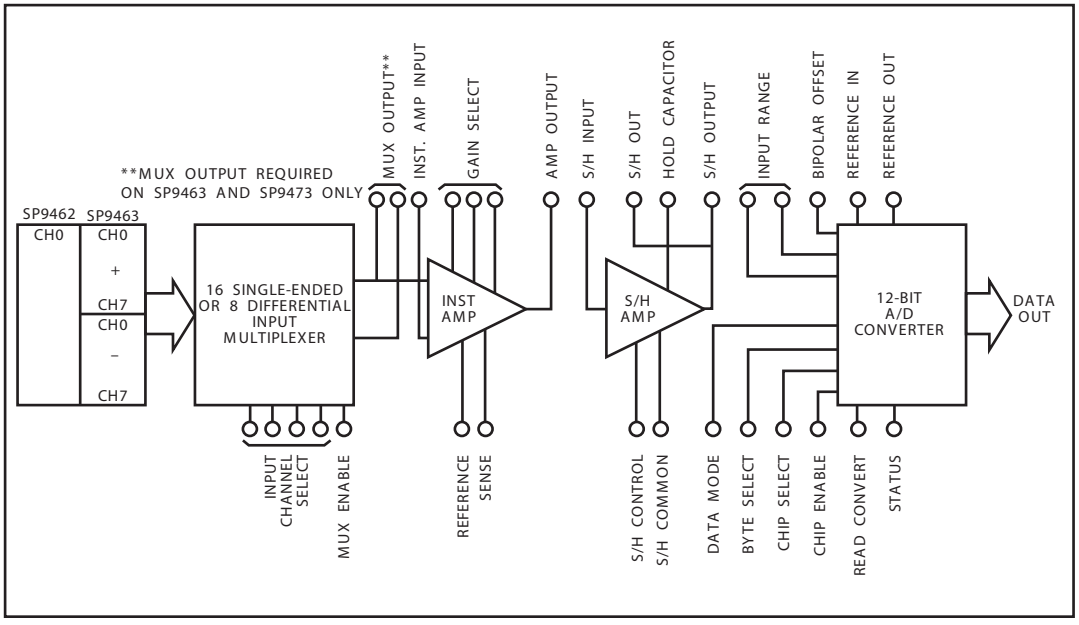
FEATURES

- Complete 12-Bit Data Acquisition System
- Guaranteed No Missing Codes over Temperature
- Three State Output
- 33 KHz or 50KHz Throughput Rate
- Selectable Gains of 1,10 and 100
- Small Pin Grid Array Package
- Input Ranges Selectable for Unipolar or Bipolar Operation



DESCRIPTION

The SP9462/9472 and SP9463/9473 are complete data acquisition systems in a 68-pin grid array package. The SP9462/ 9472 include a 16-channel input multiplexer, selectable gain instrumentation amplifier, sample-and-hold amplifier, a single chip 12-Bit Analog to Digital Converter with 3-state output buffers. The SP9463/9473 are the 8 differential input channel devices equivalent to the SP9462/9472. All models accept unipolar or bipolar voltage inputs of 0 to +10V, ±5V and ±10V. The instrumentation amplifier can be selected for gains of 1, 10 and 100 by pin-strapping pins. The SP9462/9472 and SP9463/9473 are available in two temperature ranges: 0 to +70 C, and -55 to +125 C, with MIL-STD-883C screening available.



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SPECIFICATIONS

At 25°C, V_{CC} = ±15V, V_{DD} = 5V, external sample/hold capacitor at 4700pF. All grades are burned-in at +125°C for 168 hour.

PARAMETERS	MIN.	TYP.	MAX.	UNIT	CONDITIONS
RESOLUTION		12		BITS	
INPUT CHARACTERISTICS					
ANALOG					
Voltage Ranges:					
Bipolar		±5, ±10		V	
Unipolar		0-10		V	
Input Impedence:					
On Channel		10^{10}			
Off Channel		10^{10}			
Input Capacitance:					
On Channel		20		pF	
Off Channel		20		pF	
CMRR[7]	80	85	–80	dB	(20VDCto1KHz)
Crosstalk[7]	–85	-85	–80	dB	(20VP-P, 1KHz)
Feedthrough[7]		–85	100	dB	(at 1KHz)
Offset[2]		30	5	µV	(channel to channel) G=1
Input Bios Current/Channel		1		µA	
Input Voltage Range[3]	+10	+11		V	
	–10	–15		V	
DIGITAL					
MUX Input Channel Select:					
Logic T (4V)		5	30	µA	
Logic '0' (0.8V)		5	30	µA	
S/H Command:					
Logic'1'(2.4V)		0.2		nA	
Logic '0' (0.8V)		5	30	µA	
ADC Section:					
Logic T (2.4V)			10	µA	
Logic '0' (0.8V)		10		µA	
TRANSFER CHARACTERISTICS					
ACCURACY					
Integral of Linearity[4]:					
JH, SH			±0.024	% FSR	
KH, TH			±0,012	% FSR	
Differential Linearity[4]:					
JH, SH			±0.024	% FSR	
KH, TH			±0.012	% FSR	
Gain Error[6]					
G=1		0.7		%	
G=100		0.9		%	
Unipolar Offset Error[6]		16		mV	
Bipolar Offset Error[6]		50		mV	
Noise Error[7]		0.5	1	mVP–P	(Measured at S/H Output) G=1
Droop Rate[7]		50	500	µV/mS	
Temperature Coefficients:					
Unipolar Offset					
JH, SH		20		ppm of FSR/°C	
KH,TH		15		ppm of FSR/°C	
Bipolar Offset					
JH, SH		30		ppm of FSR/°C	
KH, TH		25		ppm of FSR/°C	
Full Scale Calibration					
JH, SH		60		ppm of FSR/°C	
KH,TH		35		ppm of FSR/°C	
SYSTEM TIMINGS					
ADC Conversion Time:					
SP9462/SP9463	15	20	25	µS	
SP9472/SP9473	9	12	15	µS	
S/H Aperture Delay		50		nS	
S/H Aperture Uncertainty		2		nS	

SPECIFICATIONS (continued)

At 25°C, V_{CC} = ±15V, V_{DD} = 5V, external sample/hold capacitor at 4700pF. All grades are burned-in at +125°C for 168 hour.

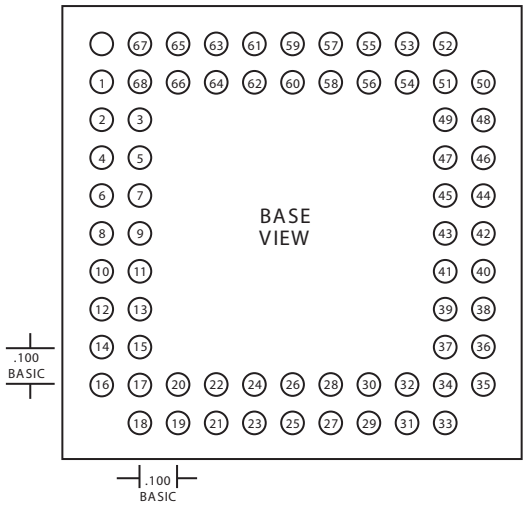
PARAMETERS	MIN.	TYP.	MAX.	UNIT	CONDITIONS
TIMING					
Acquisition Time:					
(to 0.01% of final value					
for full-scale step)		5		µS	
Throughput:					
(Serial Mode)					
SP9462/SP9463[7]			22	KHz	
SP9472/SP9473[7]			22.8	KHz	
(Overlap Mode)					
SP9462/SP9463[7]			31.7	KHz	
SP9472/SP9473[7]			46.5	KHz	
MULTIPLEXER[6]					
Switching Time		1.5		µS	(between channels)
Settling Time		2.5		µS	(10V step to 0.02%)
Enable Time:					
On[7]		1	2	µS	
Off[7]		0.25	0.5	µS	
INSTRUMENTATION AMPLIFIER[6]					
Settling Time:					(20V step to 0.01%)
G=1[7]		5	12.5	µS	
G=10[7]		3	7.5	µS	
G=100[7]		4	7.5	µS	
Slew Rate[7]	12	17		V/µS	
S/H AMPLIFIER[6]					
Acquisition Time		5		µS	
Aperture Delay		50		nS	
Hold mode settling time		1.5		µS	
Slew rate		10		V/µS	
DIGITAL OUTPUT DATA					
Output Codes:					
Unipolar		Unipolar Straight Binary (USB)			
Bipolar		Bipolar Offset Binary (BOS)			
Logic Levels:					
Logic 0			+0.4	V	sink = 1.6mA
Logic 1	+2.4			V	source = 500µA
Leakage (Data Bits Only)	–5	+0.1	+5	µA	High-Z State
POWER SUPPLY REQUIREMENTS					
Rated Voltage:					
Analog	14.25	15	15.75	VDC	$\pm V_{CC}$
Digital	4.75	5	5.25	VDC	V_{DD}
Supply Drain:					
+15V		20	27	mA	
–15V		10	18	mA	
+5V		10	14	mA	
Power Dissipation		500	750	mW	
TEMPERATURE RANGE					
Operating Temperature Range:					
JH, SH	0		70	°C	
SH, TH	–55		+125	°C	
Storage Temp Range	–65		+150	°C	

NOTES: (1) Measured at the sample-and-hold output. (2) Measured with all input channels grounded. (3) The range of voltage on any input with respect to common over which accuracy and leakage current is guaranteed. (4) Applicable over full temperature range. NO MISSING CODES GUARANTEED OVER TEMPERATURE RANGE. (5) Adjustable to zero using external potentiometer or setect-on-test resistor. (6) Specifications are at +25°C and measured at 50% level of transition. (7) Parameter guaranteed but not tested.

ABSOLUTE MAXIMUM RATINGS

$+V_{CC}$ to A COM ..... –0.5V to +16V	Analog Input Signal Range .....$(+V_{CC}+20V)$ to $(-V_{CC}-20V)$
$+V_{CC}$ to A COM ..... +0.5V to –16V	Digital Input Signal .....–0.5V to $+V_{DD}$
$+V_{CC}$ to D COM .....–0.5V to +5.5V	A COM to D COM .....±1V

PIN ASSIGNMENT

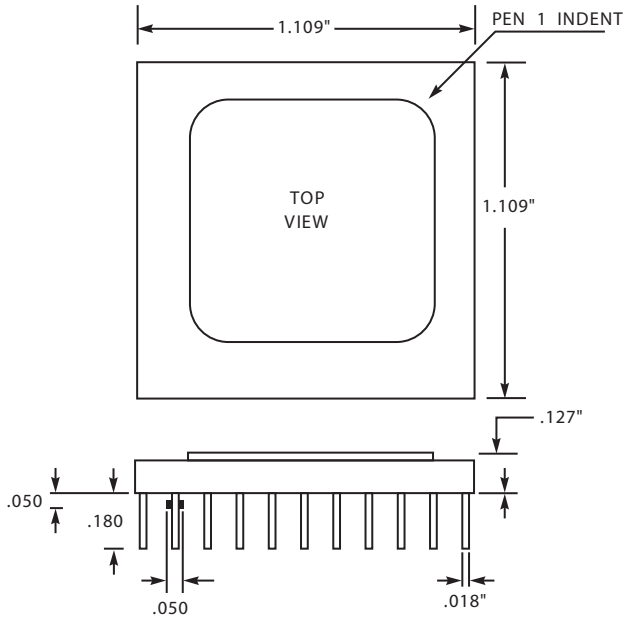


PIN	FUNCTION
1	Amp Out
2	Amp Ref
3	+15V(1)
4	-15V(1)
5	+5V
6	Status
7	D11
8	D10
9	D9
10	D8
11	D7
12	D6
13	D5
14	D4
15	D3
16	D2
17	D1
18	DO
19	ADC DCOM
20	-15V(2)
21	AOC in (20V)
22	ADC in (10V)
23	Bipolar Offset
24	Ref In
25	ACOM (2)
26	Ref Out
27	+15V(2)
28	CE
29	R/C
30	Data Mode
31	CS
32	Byte Select
33	S/H Control
34	S/H Common

PIN	FUNCTION
35	S/H Out
36	Hold Cap
37	S/H Out
38	NC
39	S/H in
40	CH7 (CH7+)*
41	CH6 (CH6+)*
42	CH5 (CH5+)*
43	CH4 (CH4+)*
44	CH3 (CH3+)*
45	CH2 (CH2+)*
46	CH1 (CH1+)*
47	CHO (CH0+)*
48	MUX Enable
49	MUX Address 0
50	MUX Address 1
51	MUX Address 2
52	MUX Address 3 (NC)*
53	ACOM (1)
54	CH8 (CHO-)*
55	CH9 (CHI-)*
56	CH10 (CH2-)*
57	CH11 (CH3-)*
58	CH12 (CH4-)*
59	CH13 (CH5-)*
60	CH14 (CH6-)*
61	CH15 (CH7-)*
62	RG (Gain Range)
63	G10
64	G100
65	MUX Out+/Amp In+
66	Amp In-
67	NC (MUX Out-)*
68	Amp Sense

*Applicable to the SP9463/9473

PACKAGE OUTLINE



TOLERANCES ARE ±0.010"

Consult factory for application information.

ORDERING INFORMATION

Model	Input	Accuracy (% FSR)	Throughput	Temp. Range (°C)	Model	Input	Accuracy (% FSR)	Throughput	Temp. Range (°C)
SP9462JH	16SE	±0.024	33KHz	0 to +70	SP9463JH	8DIF	±0.024	33KHz	0 to +70
SP9462KH	16SE	±0.012	33KHz	0 to +70	SP9463KH	8DIF	±0.012	33KHz	0 to +70
SP9462SH	16SE	±0.024	33KHz	–55 to +125	SP9463SH	8DIF	±0.024	33KHz	–55 to +125
SP9462TH	16SE	±0.012	33KHz	–55 to +125	SP9463TH	8DIF	±0.012	33KHz	–55 to +125
SP9472JH	16SE	±0.024	50KHz	0 to +70	SP9473JH	8DIF	±0.024	50KHz	0 to +70
SP9472KH	16SE	±0.012	50KHz	0 to +70	SP9473KH	8DIF	±0.012	50KHz	0 to +70
SP9472SH	16SE	±0.024	50KHz	–55 to +125	SP9473SH	8DIF	±0.024	50KHz	–55 to +125
SP9472TH	16SE	±0.012	50KHz	–55 to +125	SP9473TH	8DIF	±0.012	50KHz	–55 to +125

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