



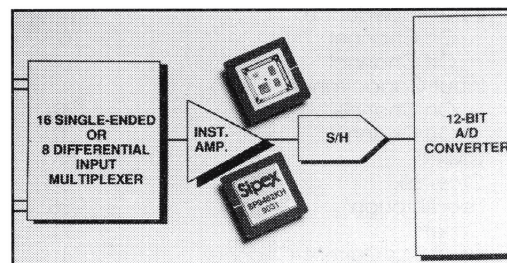
SP9462, SP9472, SP9463, SP9473

Sipex Data Converter Line

12-Bit Data Acquisition Systems

FEATURES

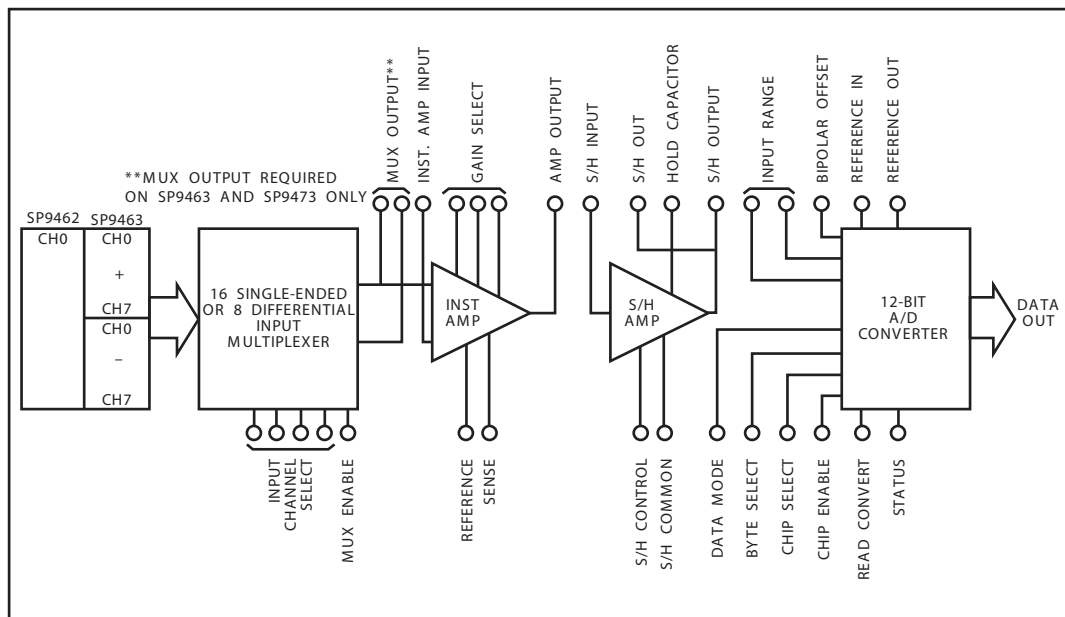
- Complete 12-Bit Data Acquisition System
- Guaranteed No Missing Codes over Temperature
- Three State Output
- 33 KHz or 50KHz Throughput Rate
- Selectable Gains of 1, 10 and 100
- Small Pin Grid Array Package
- Input Ranges Selectable for Unipolar or Bipolar Operation



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, $\pm 5V$ and $\pm 10V$. 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.



SPECIFICATIONS

At 25°C, $V_{CC} = \pm 15V$, $V_{DD} = 5V$, 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		$\pm 5, \pm 10$		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	(20VDC to 1KHz)
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 Bias Current/Channel		1		μA	
Input Voltage Range ³	+10 -10	+11 -15		V 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	
Droop Rate ⁷		50	500	$\mu V/mS$	(Measured at S/H Output) G=1
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)

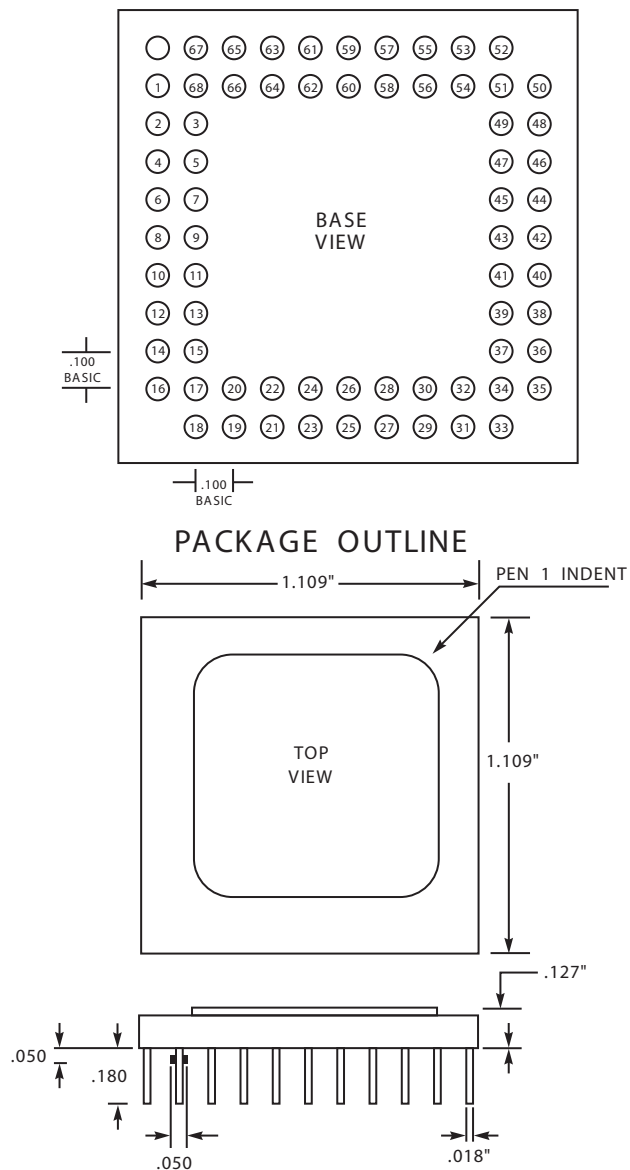
At 25°C, $V_{CC} = \pm 15V$, $V_{DD} = 5V$, external sample/hold capacitor at 4700pF. All grades are burned-in at +125°C for 168 hour.

PARAMETERS	MIN.	TYP.	MAX.	UNIT	CONDITIONS
TIMING Acquisition Time: (to 0.01% of final value for full-scale step) Throughput: (Serial Mode) SP9462/SP9463 ⁷ SP9472/SP9473 ⁷ (Overlap Mode) SP9462/SP9463 ⁷ SP9472/SP9473 ⁷		5		μS KHz KHz KHz KHz	
MULTIPLEXER⁶ Switching Time Settling Time Enable Time: On ⁷ Off ⁷		1.5 2.5 1 0.25		μS μS μS μS	(between channels) (10V step to 0.02%)
INSTRUMENTATION AMPLIFIER⁶ Settling Time: G=1 ⁷ G=10 ⁷ G=100 ⁷ Slew Rate ⁷		5 3 4 17	12.5 7.5 7.5	μS μS μS V/ μS	(20V step to 0.01%)
S/H AMPLIFIER⁶ Acquisition Time Aperture Delay Hold mode settling time Slew rate		5 50 1.5 10		μS nS μS V/ μS	
DIGITAL OUTPUT DATA Output Codes: Unipolar Bipolar Logic Levels: Logic 0 Logic 1 Leakage (Data Bits Only)		Unipolar Straight Binary (USB) Bipolar Offset Binary (BOS)			
	+2.4 -5	+0.1	+0.4 +5	V V μA	sink = 1.6mA source = 500 μA High-Z State
POWER SUPPLY REQUIREMENTS Rated Voltage: Analog Digital Supply Drain: +15V -15V +5V Power Dissipation	14.25 4.75	15 5	15.75 5.25	VDC VDC mA mA mA mW	$\pm V_{CC}$ V_{DD}
TEMPERATURE RANGE Operating Temperature Range: JH, SH SH, TH Storage Temp Range	0 -55 -65		70 +125 +150	°C °C °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 select-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	$\pm 1V$

PIN ASSIGNMENT



TOLERANCES ARE ± 0.010 "

PIN	FUNCTION	PIN	FUNCTION
1	Amp Out	35	S/H Out
2	Amp Ref	36	Hold Cap
3	+15V(1)	37	S/H Out
4	-15V(1)	38	NC
5	+5V	39	S/H in
6	Status	40	CH7 (CH7+)*
7	D11	41	CH6 (CH6+)*
8	D10	42	CH5 (CH5+)*
9	D9	43	CH4 (CH4+)*
10	D8	44	CH3 (CH3+)*
11	D7	45	CH2 (CH2+)*
12	D6	46	CH1 (CH1+)*
13	D5	47	CHO (CH0+)*
14	D4	48	MUX Enable
15	D3	49	MUX Address 0
16	D2	50	MUX Address 1
17	D1	51	MUX Address 2
18	DO	52	MUX Address 3 (NC)*
19	ADC DCOM	53	ACOM (1)
20	-15V(2)	54	CH8 (CH0-)*
21	AOC in (20V)	55	CH9 (CH1-)*
22	ADC in (10V)	56	CH10 (CH2-)*
23	Bipolar Offset	57	CH11 (CH3-)*
24	Ref In	58	CH12 (CH4-)*
25	ACOM (2)	59	CH13 (CH5-)*
26	Ref Out	60	CH14 (CH6-)*
27	+15V(2)	61	CH15 (CH7-)*
28	CE	62	RG (Gain Range)
29	R/C	63	G10
30	Data Mode	64	G100
31	CS	65	MUX Out+/Amp In+
32	Byte Select	66	Amp In-
33	S/H Control	67	NC (MUX Out-)*
34	S/H Common	68	Amp Sense

*Applicable to the SP9463/9473

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

