APS300

- 0-150°C Operating Temperature
- 316L Stainless Steel Case and Cover
- 3.3V Power Supply
- 1ms Response Time
- Pressure/ PT100 RTD temperature read-out
- 0.25% Total Error Band
- 15 Bit Digital Output – SPI
- 2Mhz Internal Clock Frequency
- 10,000 PSI Pressure Range
- Media – Harsh Liquid, Air, & Gas
- 2 Week Stabilization Burn-In

DESCRIPTION

The APS300 is a pressure transducer manufactured for a high operating temperature range for the most challenging of applications. This silicon pressure transducer was designed for demanding industrial and commercial applications. The stainless-steel media isolated port design allows for pressure measurement of liquid or gas media.

The APS300 series utilizes MEMS piezo-resistive sensors pressurized on the passive backside of the SS diaphragm which has superior long-term stability and accuracy (.15% Linearity).

The design is simple and proves value for OEM customers. Please contact us for Custom design availability.

APPLICATIONS

- Mil/Aero
- Industrial Automation
- HVAC
- Automotive Engine
- Compressor
- Pneumatic

Maximum Environmental Ratings

Operating Temperature ……. 0°C to 150°C
Storage Temperature Range ……..-55°C to 175°C

Proof pressure ……..……... 3x full scale pressure
Burst pressure ……..……... 5x full scale pressure

Package

The one-piece body design is made of 316L stainless steel, which allows for service in high pressure applications and long-term stability.

Stability

The silicon MEMS pressure sensor is welded into a 316L stainless steel media isolated housing. That in turn is mounted in the 316L stainless steel housing with the NPT port.

Additional stability is gained from a 2-week factory burn-in at 150 °C.

Pressure port

NPT fittings: ¼”-18.

Optional Ports:

Autoclave: F250X

FNPT: 1/8” -27

O-Ring Seal: 7/16”-20

Media

The 316L media isolated pressure port is tolerant to most media including oil, air, gas, some corrosive media, and saltwater.

Wetted parts

The wetted surfaces are composed of 316L stainless steel.

Pressure Range

The standard full-scale pressure range is 10,000 PSIA.

Temperature

Calibrated diode temperature: °C readout

Soldering

The PTFE electrical connection wires for the APS300 sensor can be easily attached to a connector or soldered directly to a board.

APS300 Digital Output Operational Characteristics

V_+ = 3.3V, V_- = 0V, Temperature = 25°C

PARAMETER	SYMBOL	Min	Typ	Max	UNITS
Supply Voltage	V_{DD}	2.7	3.3	5.5	V
Operating Temperature	T_S	0		165	C
Supply Current (Note 1)	I_{DD}	70	120	2500	µA
Sleep Mode Supply Current	I_{stdby}		.5	32	µA
Accuracy					
Total Error Band		-0.25		0.25	%Full Scan
Non-Linearity (Note 2)		-.01		.01	%Full Scan
Temperature Error (Null and Span) (Note 3)		-1	.5	1	C
Response Time	t_R	1	2	20	ms
Analog-to-Digital					
Resolution	ADC		15		Bits
Temperature Resolution			0.1		C
SPI Interface					
Input Low Level	V_{in_low}	0		.2	Vdd
Input High Level	V_{in_high}	.8		1	Vdd
Output Low Level	V_{o_low}			.1	Vdd
Load Capacitance @SDA	Csda @400khz			200	pF
Pull-Up Resistor	R_{I2C_PU}	500			Ω
Input Capacitance (each pin)	C_{I2C_In}			10	pF

Notes: 1) Measured at zero pressure. 2) Defined as best straight line 3) Measured from 0°C to 150°C.

Electrical Pin Configuration (Digital [SPI])

Yellow - SCLK

Green - MISO

White- INT/SS

Red - V+

Black - GND

Orange – MOSI

Fig. 1

Digital Interface – SPI

On power-up, there is a 20ms delay before the data out transfer will start. There are three 16 bit output words. The first is the sensor output, the second is the internal temperature diode, the third is the PT1000 RTD output. The high byte and MSB come out first. The output is 15 bits and the MSB is always 0.

The serial clock (SCK) is active low.

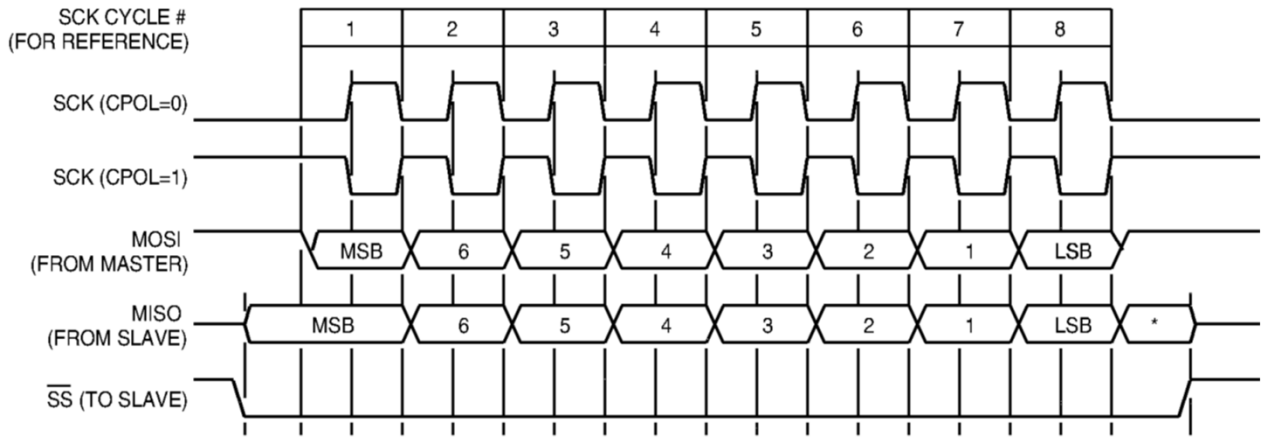


Figure 2

Nr.	Parameter	Symbol	min	typ	max	Unit	Conditions
1	SCK to internal clock frequency ratio	f_{SCK_CLK}			$f_{CLK}/5$		f_{SCK} must be 5 times smaller than f_{CLK}
2	MISO hold time after SCK sample slope	$t_{SPI\_HD\_MISO}$	200			ns	
3	MOSI setup time before SCK sample slope	$t_{SPI\_SU\_MISO}$	$2/f_{CLK}$				
4	/SS setup time before SCK sample slope	$t_{SPI\_SU\_SS}$	10			ns	
5	/SS hold time after SCK sample clk	$t_{SPI\_HD\_SS}$	$1/ f_{SCK\_CLK}$ *				

Figure 3

Digital Interface – SPI

Power On
0C02 Sent from Slave to Master

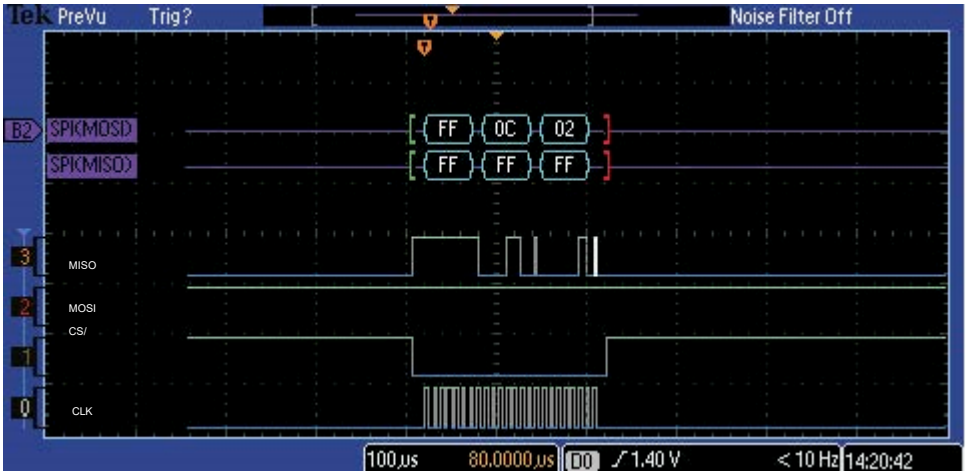


Figure 4

Read Command
F002 (address and Read command) Sent from Master to Slave.

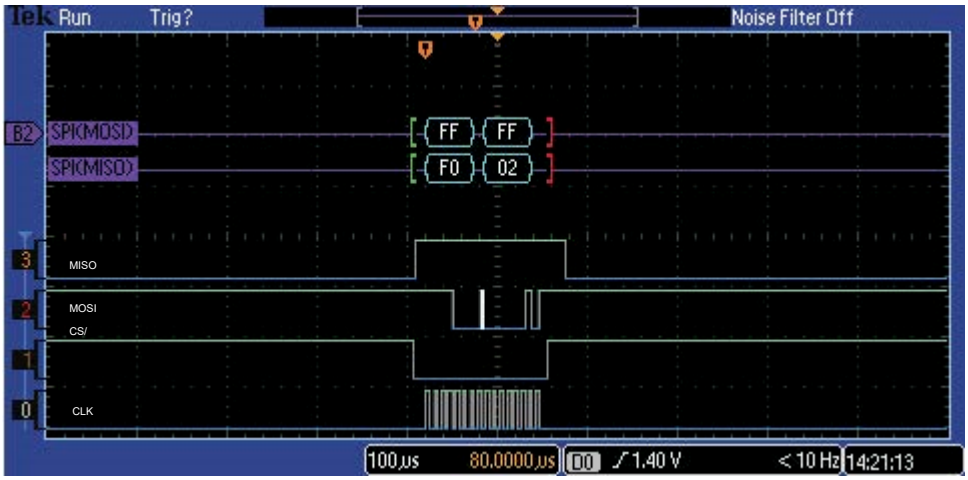


Figure 5

Data Output
CS/ (1) Pulled Low. Starts data output.

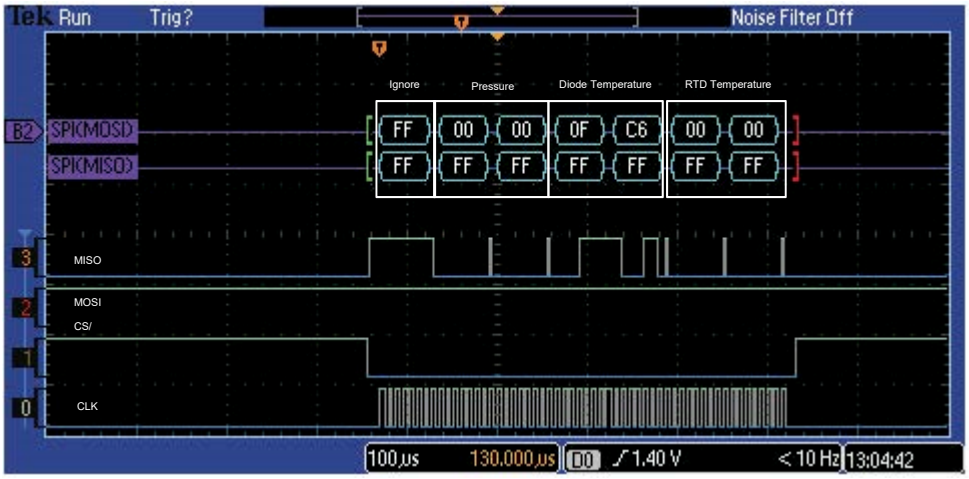
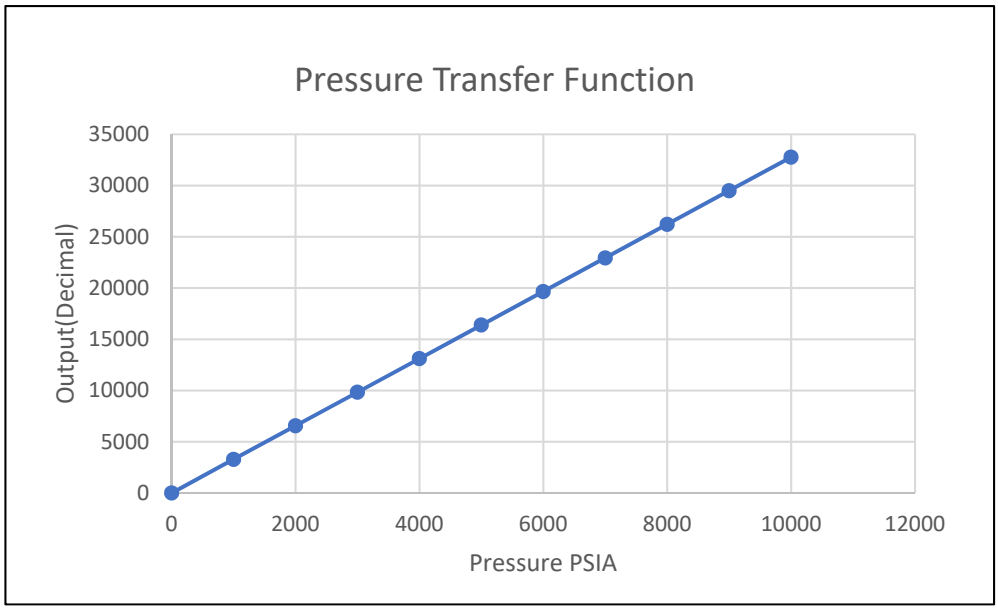


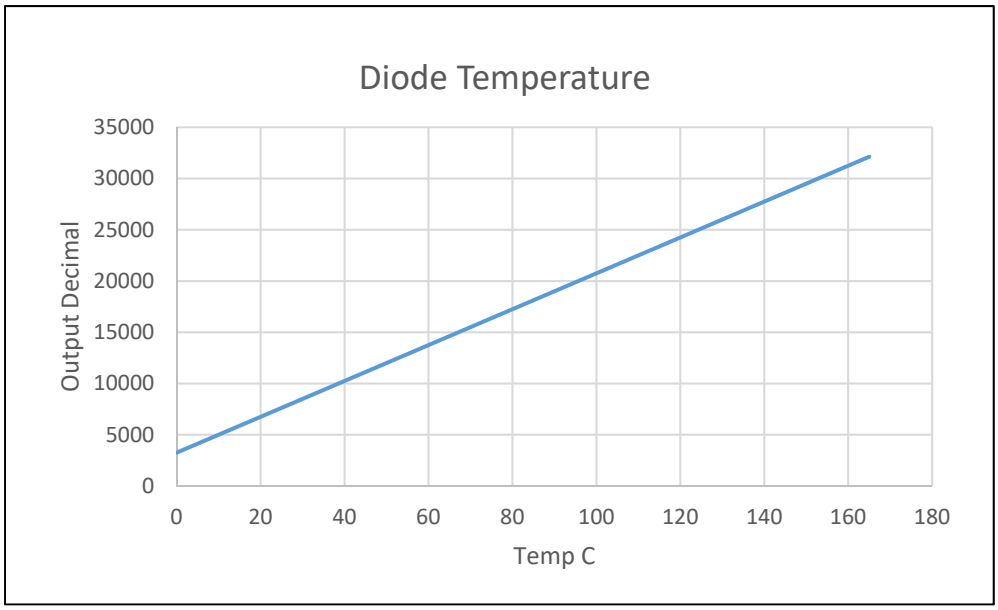
Figure 6

Sensor Outputs



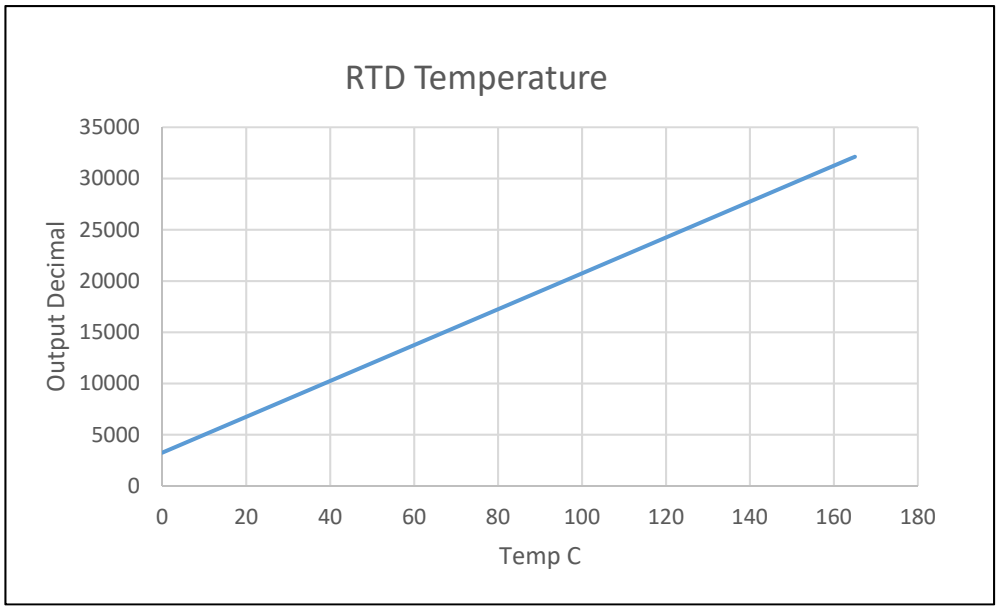
PSI	% Output	Decimal	Hex
0	0	0	0
1000	10	3277	CCC
2000	20	6554	1999
3000	30	9830	2666
4000	40	13107	3333
5000	50	16384	4000
6000	60	19661	4CCC
7000	70	22938	5999
8000	80	26214	6666
9000	90	29491	7333
10000	100	32768	8000

Sensor Outputs



Temp C	Decimal	Hex
0	3250	CB2
25	7625	1DC9
50	12000	2EE0
75	16375	3FF7
90	19000	4A38
100	20750	510E
125	25125	6225
150	29500	733C
165	32125	7D7D

Sensor Outputs



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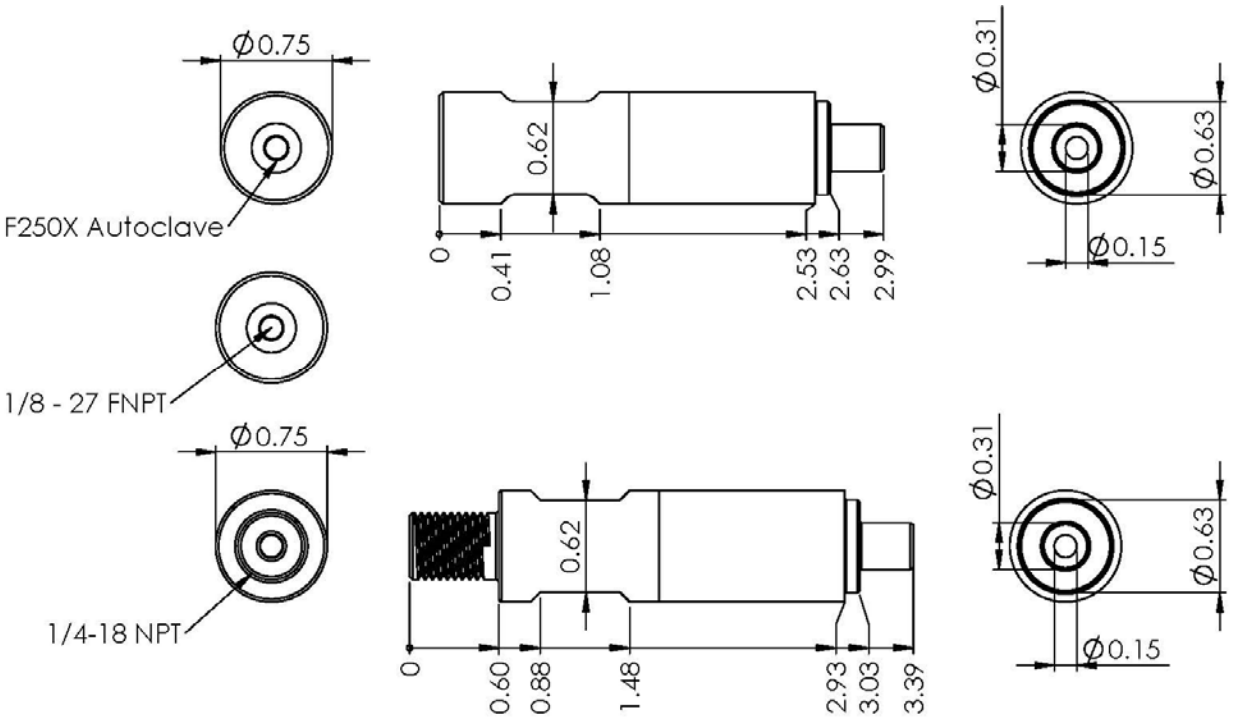
Mechanical Dimensions (inches)



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