Low Pressure & Digital Output Semiconductor Pressure Sensor

Differential Pressure Type

AL4 Series

Description

The AL4 pressure sensor series is a low pressure and digital output pressure sensor. It composed of a silicon piezoresistive pressure sensing chip and a signal conditioning integrated circuit. The low-level signal from the sensing chip is amplified, temperature compensated, calibrated and finally converted to digital data that is proportional with the applied pressure.

AL4*DB

Features

- Low pressure range (Differential)
- High proof pressure +100 kPa
- I^2C or SPI digital output
- High accuracy ±1.0 %FS
- Supply voltage 3.0, 3.3 & 5.0 Vdc
- Low supply current Max 3.5 mA at 3.3 Vdc
- Moisture sensitivity level (MSL) 1
- Miniature 11.36mm x 10.32 mm SMT package
- Operating temperature -40 to 85°C
- Compensated temperature -5 to 65°C
- Pressure range modification available

Applications

- Battery-operated Devices
- Medical Devices
- Industrial Pneumatic Devices
- Consumer Devices

✓ **RoHS Compliant**

Device Lineup

Model	Pressure Type	Supply Voltage	Accuracy	Pressure Range
AL4	Gauge	5.0 Vdc 3.3 Vdc 3.0 Vdc	±1.0%FS	-10 (-100) -7 (-70) -4 (-40) -2 (-20) -1 (-10) 0 1 (10) 2 (20) 4 (40) 7 (70) 10 kPa (100) cmH_2O 001KD 002KD 004KD 007KD 010KD

Fujikura

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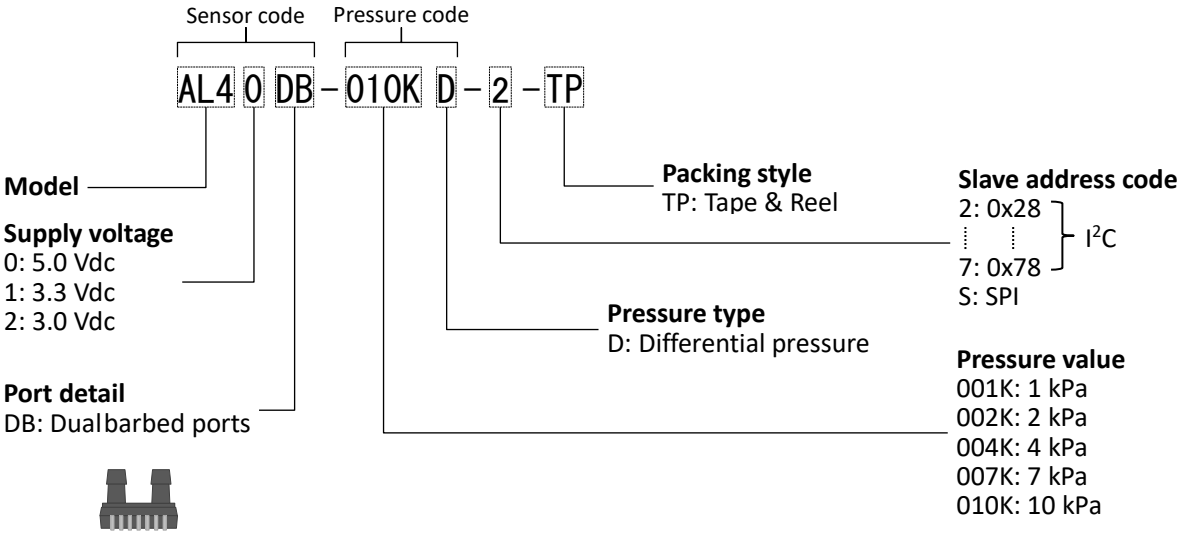
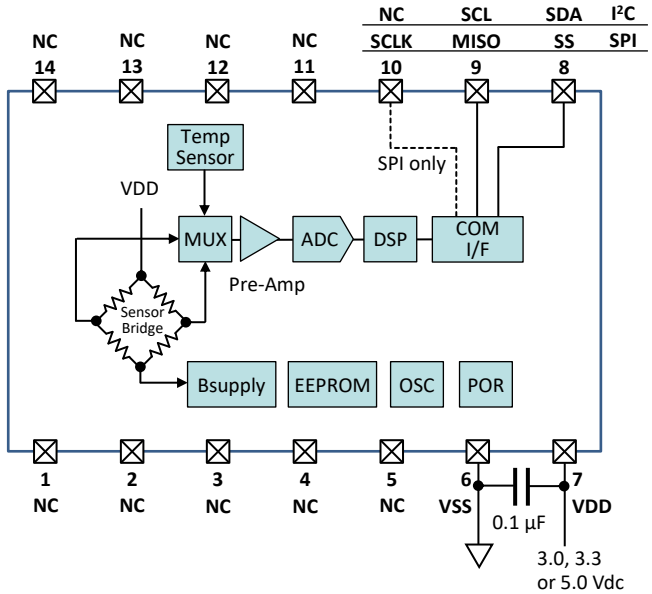
Device Name Code

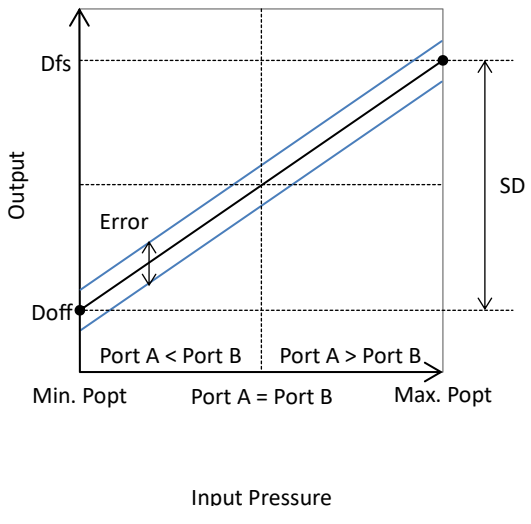


Block Diagram

Communication mode is factory setting.
User can NOT change communication mode like I²C to SPI or SPI to I²C.



Output Characteristics



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Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply Voltage	VDDmax	-0.3 to +6	Vdc
Voltage at Digital I/O Pins	Vdiomax	-0.3 to VDD + 0.3	Vdc
Proof Pressure, Burst Pressure		See Pressure Range Table	
Common Mode Pressure	Pcom	+100	kPa
Operating Temperature	Topt	-40 to +85	°C
Storage Temperature	Tstg	-40 to +85	°C

General Specifications

Item	Symbol	Sensor Code			Unit
		AL40DB	AL41DB	AL42DB	
Supply Voltage	VDD	5.0±0.25	3.3±0.165	3.0±0.15	Vdc
Type of Pressure	-	Differential pressure			
Pressure Media	-	Non-corrosive gases			
Compensated Temperature	-	-5 to +65			°C
Operating Humidity	Hopt	to 95 (non-condensing, +65°C)			%RH
Storage Humidity	Hstg	to 95 (non-condensing, +65°C)			%RH

Pressure Range

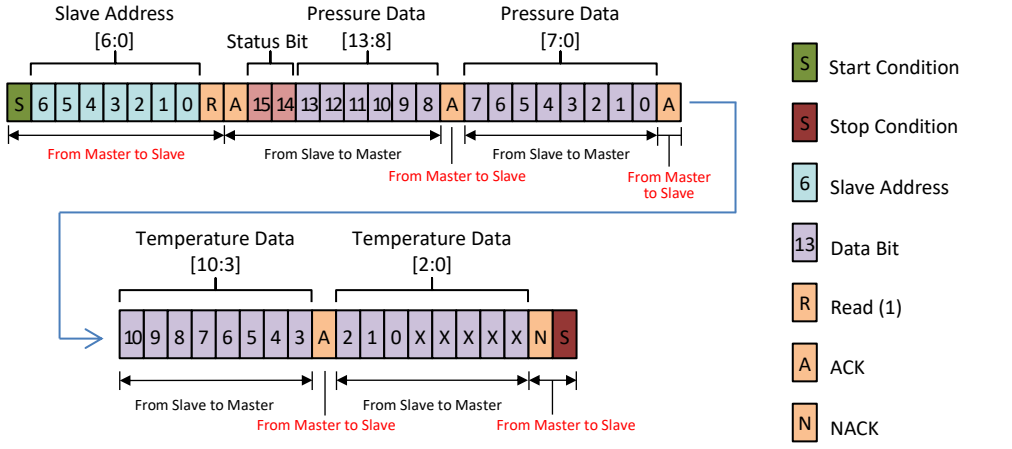
Item	Symbol		Pressure Code					Unit
			001KD	002KD	004KD	007KD	010KD	
Absolute Maximum Proof Pressure	Pmax+		+100	+100	+100	+100	+100	kPa
Absolute Minimum Burst Pressure	Pburst		+100	+100	+100	+100	+100	
Measurement Pressure	Popt	Min.	-1	-2	-4	-7	-10	
		Max.	+1	+2	+4	+7	+10	

Electrical Characteristics

Ambient temperature Ta = 25°C

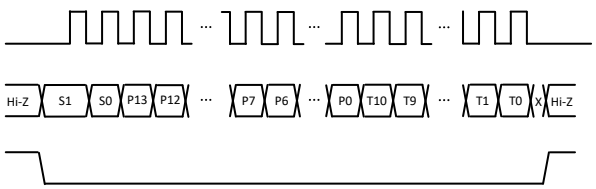
Item	Condition	Symbol	Rating			Unit
			Min.	Typ.	Max.	
Offset Pressure Data	Min. Popt	Doff	672	819	966	Count
Full Scale Pressure Data	Max. Popt	Dfs	15418	15565	15712	Count
Span Pressure Data	Min. to max. Popt	SD	-	14746	-	Count
Accuracy	-5 to +65°C	Error	-1.0	-	+1.0	%FS
Supply Current	VDD = 5 Vdc	Ic	-	-	4.5	mAdc
	VDD = 3.3, 3.0 Vdc		-	-	3.5	
Response Time	for reference	tr	-	1	-	msec.

I²C Communication Protocol

Item	Content
Data Fetch	

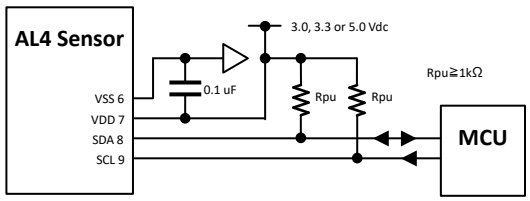
I²C™ is a trademark of NXP Semiconductors.

SPI Communication Protocol

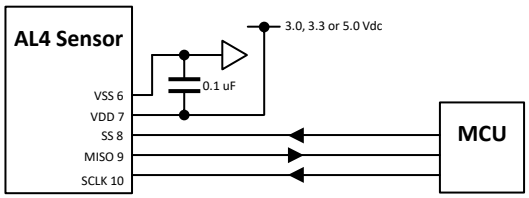
Item	Content
Data Fetch	 Packet = [{S(1:0),P(13:8)},{P(7:0)},{T(10:3)},{T(2:0),xxxxx}] S(1:0) = Status bits of packet (Normal, Command, Busy, EEPROM Error) P(13:8) = Upper 6 bits of 14-bit pressure data P(7:0) = Lower 8 bits of 14-bit pressure data T(10:3) = Corrected temperature data (if application does not require corrected temperature data, terminate read only.) T(2:0),xxxxx = Remaining bits of corrected temperature data for full 11-bit resolution Hi-Z = High impedance

Circuit Diagram

I²C

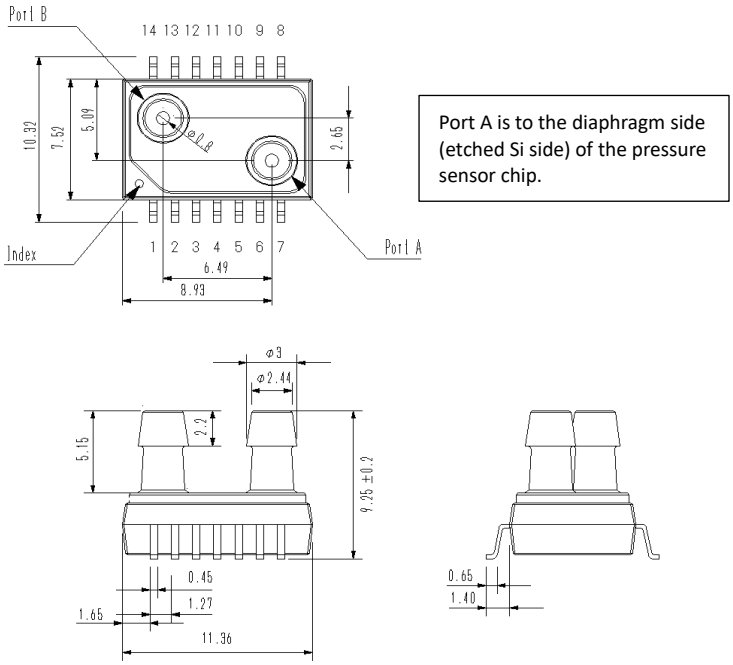


SPI



Package Dimensions

unit: mm



Port A is to the diaphragm side (etched Si side) of the pressure sensor chip.

Foot Print for PCB (Reference)