

# Analog Output (Non-Digitally Corrected) & Single Point Pressure Threshold Detection Semiconductor Pressure Sensor

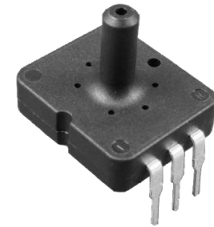
## AP3 Series

### Description

The AP3 pressure sensor series is composed of a silicon piezoresistive pressure sensing chip and a signal conditioning integrated circuit. The signal conditioning IC does not have A/D and D/A converter in a gain amplifier. Therefore the AP3 series can provide full analog amplified and temperature compensated output. Moreover the amplification circuit is designed with low noise output. As a unique function, the AP3 series has Single Point Pressure Threshold Detection. Analog output and threshold voltage are supplied to an internal comparator that compares two voltages and outputs a comparison result as digital output.



AP3\*N



AP3\*R

### Features

- Non-digitally amplified and temperature compensated analog output
- Single point pressure threshold detection
- High accuracy  $\pm 1.5\%FS$  / 0 to  $+60^\circ C$
- Supply voltage 3.0, 3.3 & 5.0 Vdc
- Package compatible with Fujikura's XFPM integrated pressure sensor
- Customization or modification available

### Applications

- Medical devices
- Industrial pneumatic devices
- Consumer devices

✓ RoHS Compliant

### Device Lineup

Model	Pin Direction	Pressure Type	Supply Voltage	Accuracy	Pressure Range										
					-100	-50	0	25	50	100	200	500	700	1000 kPa	
					(-15)	(-7)		(3)	(7)	(15)	(30)	(70)	(100)	(150) psi	
AP3	Normal or Opposite	Gauge	5.0 Vdc	$\pm 1.5\%FS$											
			3.3 Vdc		3.0 Vdc	$\pm 2.0\%FS$	Same as the above								

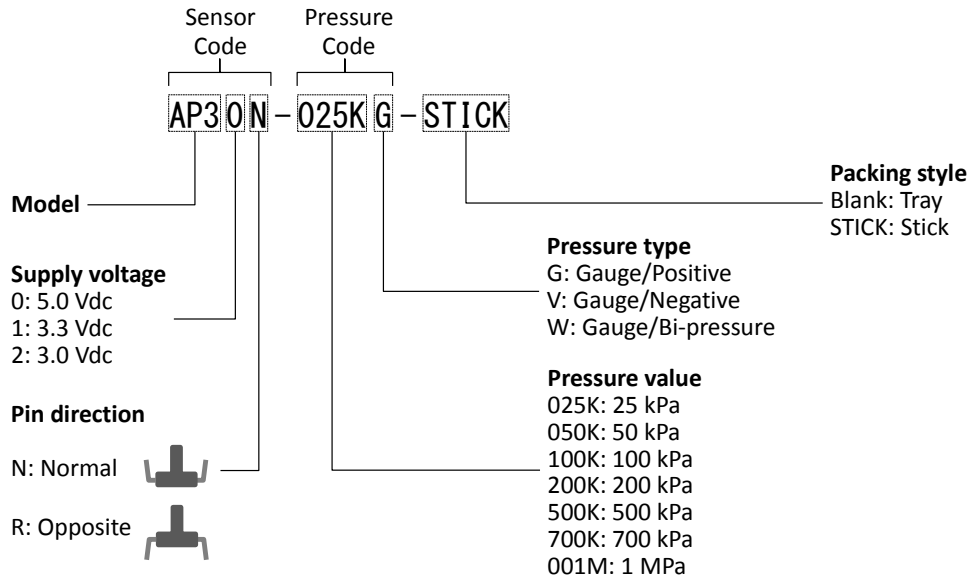
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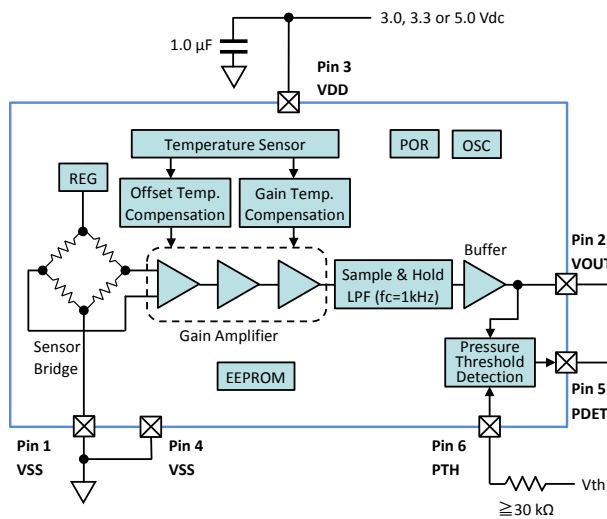
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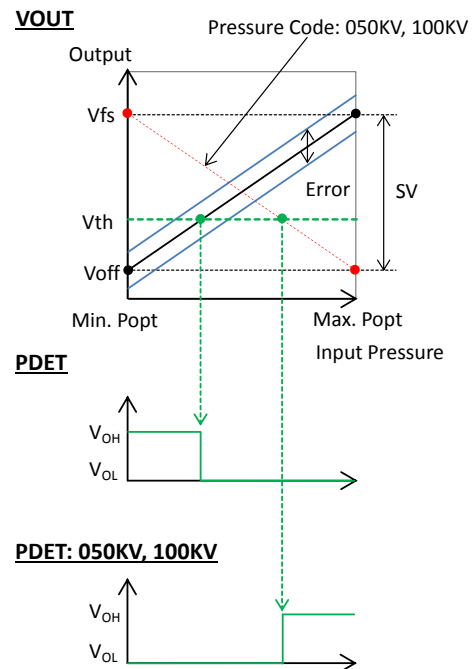
### Device Name Code



### Block Diagram



### Output Characteristics



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### Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply Voltage	VDDmax	6	Vdc
Input Voltage	VIN	VSS - 0.3 to VDD + 0.3	V
Load Pressure	Pmax+	See Pressure Range Table	
Operating Temperature	Topt	-40 to +105	°C
Storage Temperature	Tstg	-40 to +105	°C

### General Specifications

Item	Symbol	Sensor Code			Unit
		AP30*	AP31*	AP32*	
Supply Voltage	VDD	5.0±0.25	3.3±0.165	3.0±0.15	Vdc
Type of Pressure	-	Gauge pressure			
Pressure Media	-	Non-corrosive gases			
Compensated Temperature	-	0 to +60			°C
Operating Humidity	Hopt	30 to 85 (non-condensing)			%RH
Storage Humidity	Hstg	30 to 85 (non-condensing)			%RH

### Pressure Range

Item	Symbol	Pressure Code										Unit
		025KG	050KG	100KG	200KG	500KG	700KG	001MG	050KV	100KV	100KW	
Absolute Maximum Load Pressure	Pmax+	+50	+100	+200	+400	+1000	+1400	+1500	+100	+200	+200	kPa
Measurement Pressure	Popt	Min.	0	0	0	0	0	0	-50	-100	-100	
		Max.	+25	+50	+100	+200	+500	+700	+1000	0	0	+100

### Electrical Characteristics

Load resistor  $R_L = \infty$ , Ambient temperature  $T_a = 25^\circ\text{C}$ 

Sensor Code	Item	Condition	Symbol	Rating			Unit
				Min.	Typ.	Max.	
AP30* VDD = 5.0 Vdc	Offset Voltage	Min. Popt, 050KV & 100KV: Max. Popt	Voff	0.1325	0.2	0.2675	V
	Full Scale Voltage	Max. Popt, 050KV & 100KV: Min. Popt	Vfs	4.6325	4.7	4.7675	V
	Span Voltage	Min. to max. Popt	SV	-	4.5	-	V
	Accuracy	0 to 60°C	Error	-1.5	-	+1.5	%FS
				-0.0675	-	+0.0675	V
	Supply Current		Ic	-	-	6	mAdc
AP31* VDD = 3.3 Vdc	Offset Voltage	Min. Popt, 050KV & 100KV: Max. Popt	Voff	0.2595	0.3	0.3405	V
	Full Scale Voltage	Max. Popt, 050KV & 100KV: Min. Popt	Vfs	2.9595	3.0	3.0405	V
	Span Voltage	Min. to max. Popt	SV	-	2.7	-	V
	Accuracy	0 to 60°C	Error	-1.5	-	+1.5	%FS
				-0.0405	-	+0.0405	V
	Supply Current		Ic	-	-	5	mAdc
AP32* VDD = 3.0 Vdc	Offset Voltage	Min. Popt, 050KV & 100KV: Max. Popt	Voff	0.096	0.15	0.204	V
	Full Scale Voltage	Max. Popt, 050KV & 100KV: Min. Popt	Vfs	2.796	2.85	2.904	V
	Span Voltage	Min. to max. Popt	SV	-	2.7	-	V
	Accuracy	0 to 60°C	Error	-2.0	-	+2.0	%FS
				-0.054	-	+0.054	V
	Supply Current		Ic	-	-	5	mAdc
Pressure Threshold Detection	Type of Output		PDET	CMOS			
	Threshold Input to PTH		Vth	0.1 x VDD	-	0.9 x VDD	V
	Input Impedance of PTH		Zin	1	-	-	MΩ
	Output from PDET	VOU < Vth	VOH	0.9 x VDD	-	-	V
				VOU ≥ Vth	VOH	-	0.1 x VDD
	Pressure Hysteresis		Phys	-	0.05 x VDD	-	V
Common	Response Time	for reference	tr	-	2	-	msec.
	Load Resistor	VOU - VSS or VDD - VOUT	RL	9.5	-	-	kΩ
	Load Capacitance	VOU - VSS	CL	-	-	50	nF

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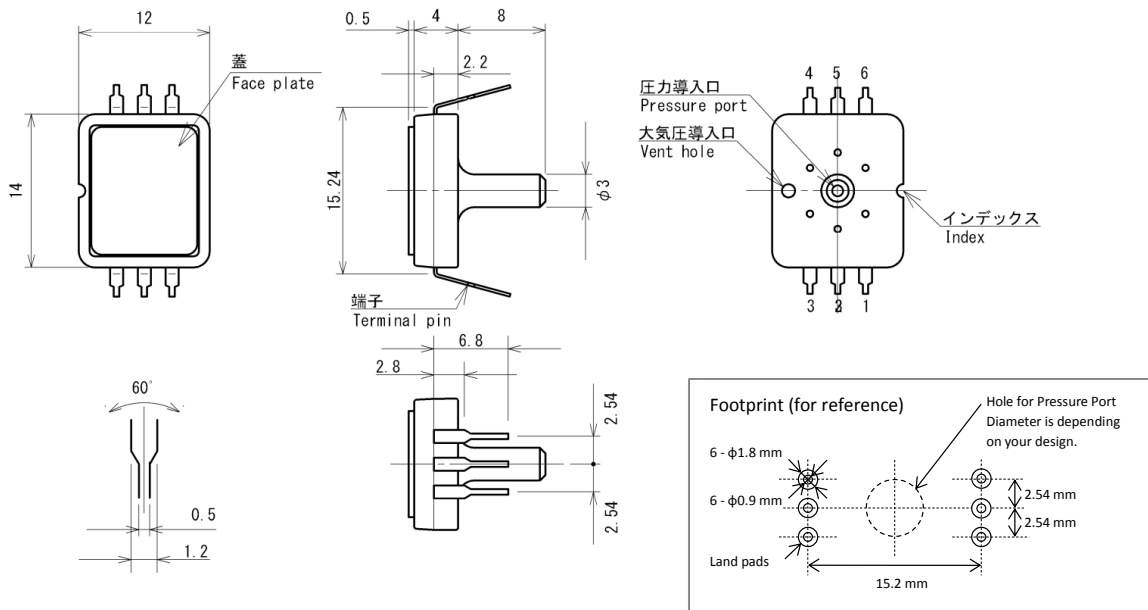
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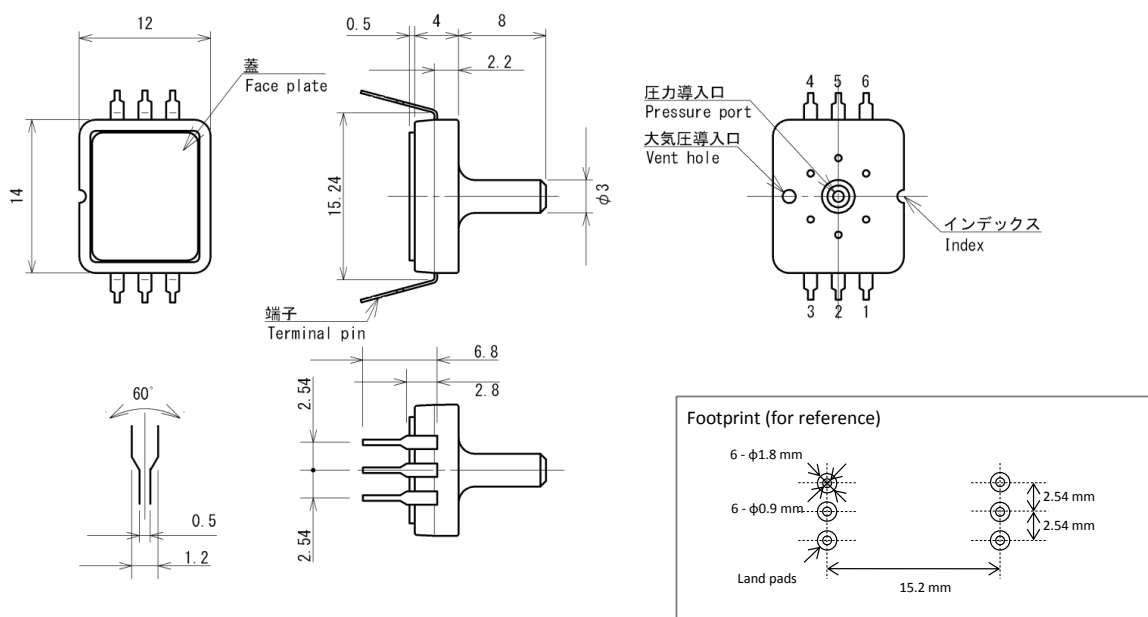
### Package Dimensions

unit: mm

#### Sensor Code: AP3\*N



#### Sensor Code: AP3\*R



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