POSiFA
Microsystems, Inc.

PMFc3000 Series

Mass Air Flow Sensors

Description

Posifa's PMFc3000 series of Mass Air Flow Sensors offer pin compatible upgrade solutions to the popular AWM3000 series. Using the robust Posifa Thermal Flow Sensor Die, and incorporating the latest microcontroller technology, PMFc3000 offers drastically improved interchangeability (< 2% full scale), temperature stability (< 4% reading from 0°C to +50° C), and resistance to adverse environmental factors such as dust particles and water vapor that have plagued the AWM3000.

Tailored to meet the exacting packaging and calibration specifications of AWM3000, PMFc3000 also offers enhanced interchangeability by improving the output tolerance by 200% to < 2% full scale. Additionally, PMFc3000 is temperature compensated to < 4% reading drift over the temperature range of 0°C to +50°C.

Posifa designed the PMFc3000 series of Mass Air Flow Sensors from the ground up, incorporating the latest MEMS and microelectronics innovations. The sensor die uses a pair of thermopiles to detect changes in temperature gradient caused by mass flow, delivering ultra-low noise to signal, and unsurpassed repeatability. The "solid state" thermal isolation on the die eliminates the need for surface cavity or fragile membrane, making the sensor resistant to clogging (from water vapor or dust particles) and pressure shock. The sensor's signal conditioning circuitry leverages off-the-shelf microcontroller, providing proven reliability and low cost.

Applications in medical, industrial and transportation industries are benefiting by:

- Taking advantage of tighter tolerances
- Eliminating complicated and expensive temperature compensation schemes
- Inherent immunity to adverse environmental factors

Features

- Resistance to dust, water vapor and shock
- Sensitivity to low flows
- Amplified analog output 1 - 5V
- Digitally improved sensor interchangeability (2% F.S. Max.)
- Replaced AWM3000 series sensors

Applications

- HVAC damper control
- Industrial process control
- Medical respirators, ventilators, O2 concentrators and anesthesia equipment
- Gas leak detectors
- Gas analyzing, monitoring and metering equipment

Maximum Ratings

- Operating Temperature: -25 °C to 85 °C
- Storage Temperature: -40 °C to 90 °C
- Humidity: 0 to 100% RH [1]
- Shock: 100 g peak (5 drops, 3 axis)
- Common Mode Pressure: 1.72 Bar [2]

1. Sensor is resistant to water condensation
2. 10 bar common mode pressure model is also available

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ELECTRICAL CHARACTERISTICS

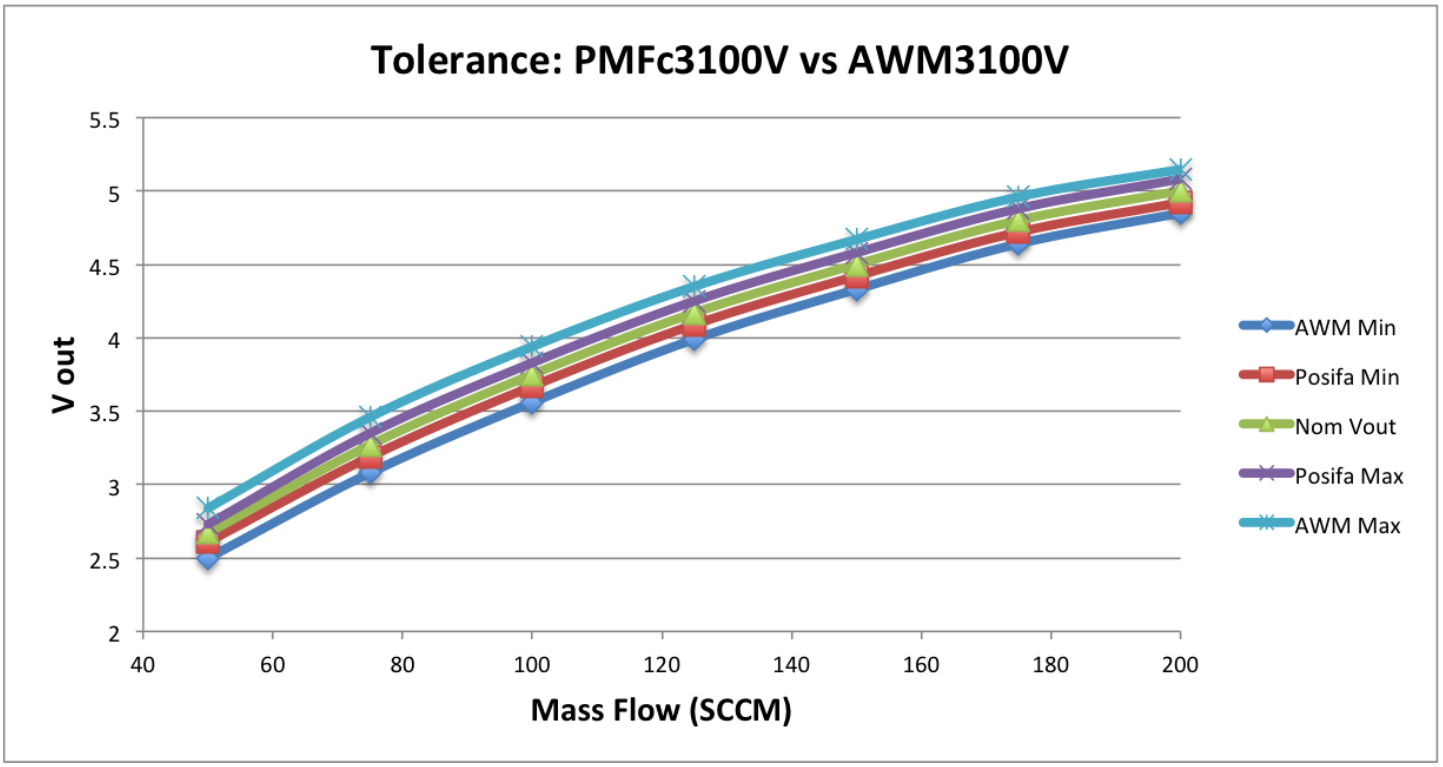
Test Conditions: Vin=10±0.01VDC, Ta=25°C. Relative Humidity: 40%<RH<60%

PARAMETERS	PMFc3100				CONDITIONS
	MIN	TYP	MAX	UNIT	
Flow Range (Full Scale)	0		200	SCCM[1]	
PARAMETERS	PMFc3150V				CONDITIONS
	MIN	TYP	MAX	UNIT	
Flow Range (Full Scale)	0		30	SCCM	
PARAMETERS	PMFc3300V				CONDITIONS
	MIN	TYP	MAX	UNIT	
Flow Range (Full Scale)	0		1000	SCCM	
Pressure Drop			800	Pa	@ 1000 SCCM
PARAMETERS	PMFc3000 Series				CONDITIONS
	MIN	TYP	MAX	UNIT	
Analog Voltage Output [2]	1		5	VDC	Linear
Null Voltage[3]	.95	1	1.05	VDC	
Null Drift		0.2		% / Year	Full Scale
Output Temperature Drift			4	% reading	0°C to +50°C
Null Temperature Drift			±40	mV	0°C to +25°C
			±60	mV	25°C to +50°C
Pressure Shift			±0.4	%F.S./100KPa	
Repeatability		0.1		%	Full Scale
Load		100		KΩ	
Accuracy[4] (Full Scale)		1.5	2	%	
Response Time		10	15	mSec	
Warm-up Tijme		1		Min	
Supply Voltage	8	10	14	VDC	(≤ 1 ms ramp-up time)
Supply Current	22		23	mA	
Inrush Current [5]			550	mA	Duration: 3 ms
Operating Pressure			1.72	Bar	
Caqlibratio Gas	Nitrogen				
Wetted Materials	Silicon carbide, Epoxy, PPS, FR4, Silicone as static seal				

1. SCCM standard conditions: 0°C, 1013.23 mbar
2. Output voltage resolution is 4 mV (10-bit)
3. Null tolerance for PMFc3150V is ± 0.1V
4. Accuracy for PMFc3150V is 2.5% F.S. Max
5. A series resistance of 5 ohms on the source supply will reduce inrush current to under 250 mA (duration: 8 ms)

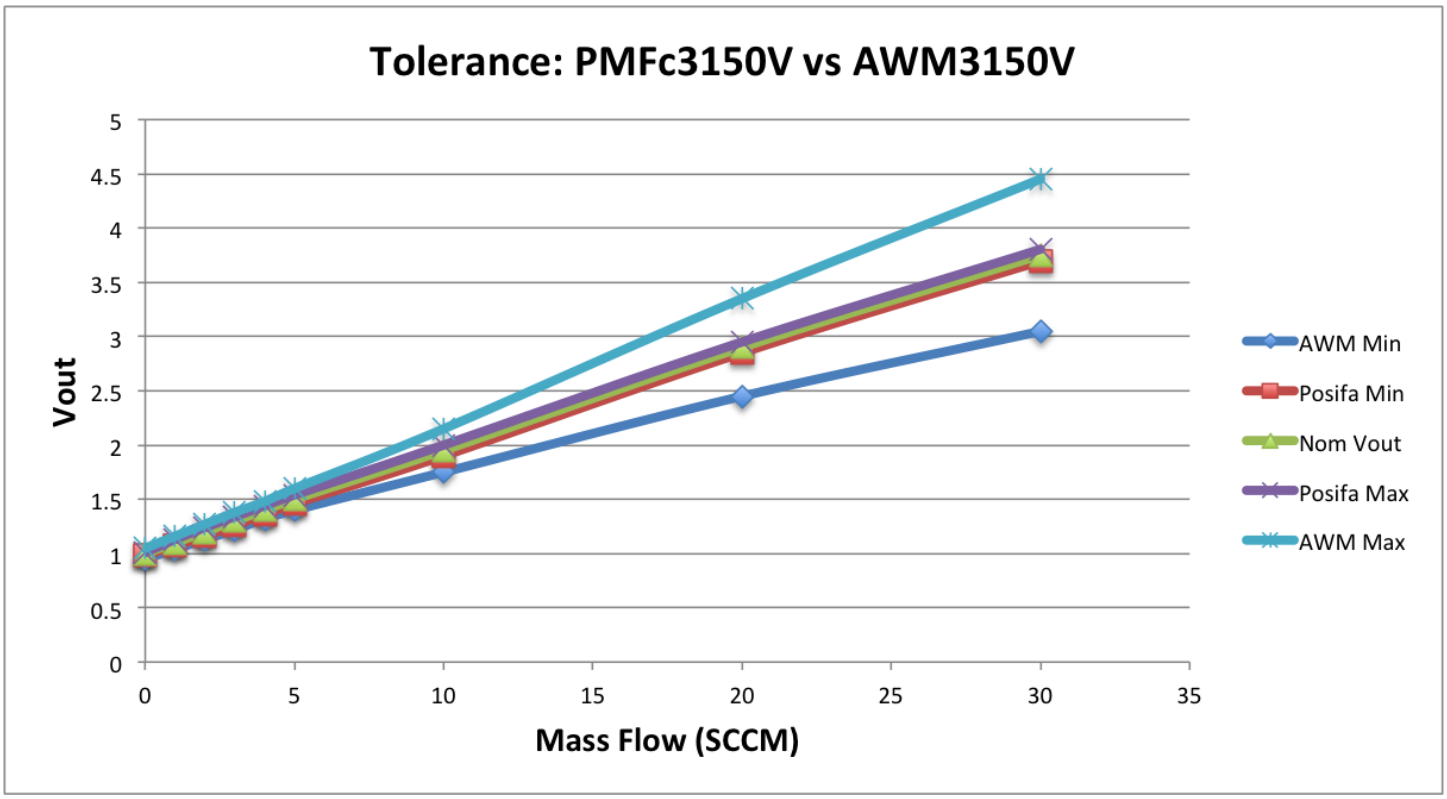
Output Flow vs. Interchangeability; Supply =10VDC, Ta=25°C

PMFc3100V				AWM3100V
Press. mBar	Flow sccm	Nom. Vout	Tol. ±V	Tol. ±V
0.49	200	5.00	0.08	0.15
0.42	175	4.80	0.08	0.16
0.35	150	4.50	0.08	0.17
0.28	125	4.17	0.08	0.18
0.21	100	3.75	0.08	0.19
0.14	75	3.27	0.08	0.19
0.09	50	2.67	0.08	0.17
0.04	20	1.90	0.08	0.13
0.00	0	1.00	0.05	0.05



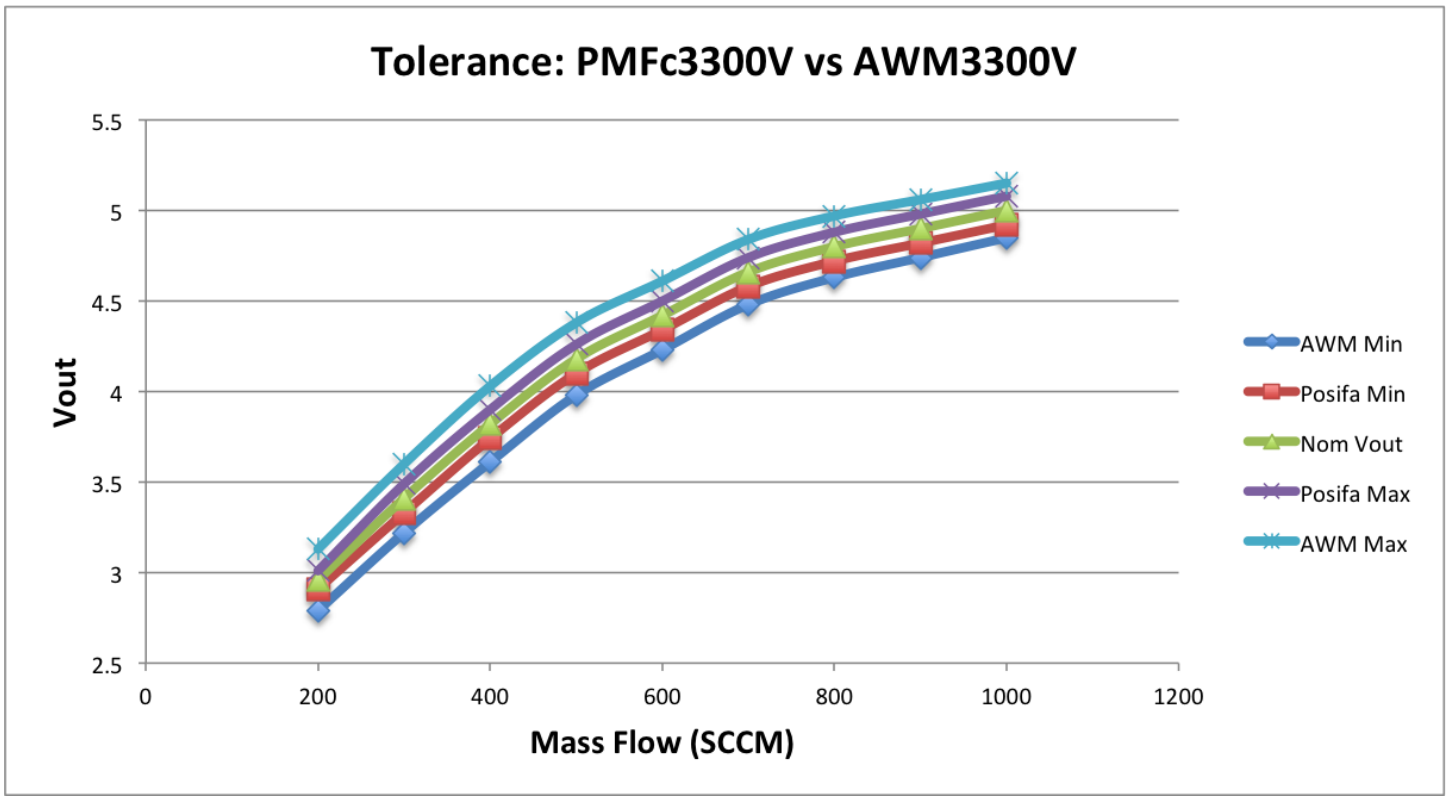
Output Flow vs. Interchangeability; Supply =10VDC, Ta=25°C

PMFc3150V				AWM3150V
Press. mBar	Flow sccm	Nom. Vout	Tol. ±V	Tol. ±V
2.50	30	3.75	0.10	0.70
1.70	20	2.90	0.10	0.45
0.84	10	1.95	0.10	0.20
0.42	5	1.50	0.05	0.10
0.34	4	1.40	0.05	0.08
0.26	3	1.30	0.05	0.08
0.17	2	1.20	0.05	0.07
0.08	1	1.10	0.05	0.06
0.00	0	1.00	0.05	0.05

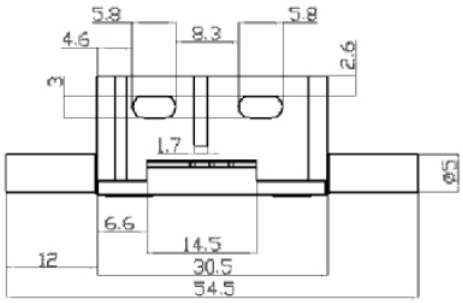


Output Flow vs. Interchangeability; Supply =10VDC, Ta=25°C

PMFc3300V				AWM3300V
Press. mBar	Flow sccm	Nom. Vout	Tol. ±V	Tol. ±V
3.40	1000	5.00	0.08	0.15
2.90	900	4.90	0.08	0.16
2.40	800	4.80	0.08	0.17
2.00	700	4.66	0.08	0.18
1.60	600	4.42	0.08	0.19
1.20	500	4.18	0.08	0.20
0.80	400	3.82	0.08	0.21
0.54	300	3.41	0.08	0.19
0.31	200	2.96	0.08	0.17
0.12	100	2.3	0.08	0.14
0.00	0	1	0.05	0.10

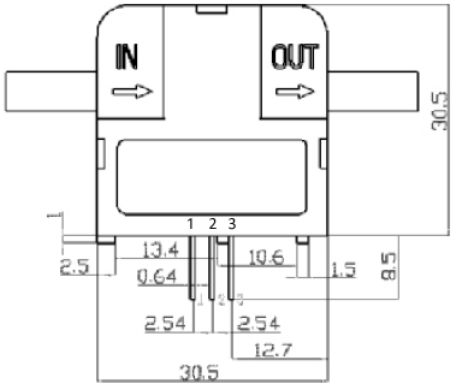


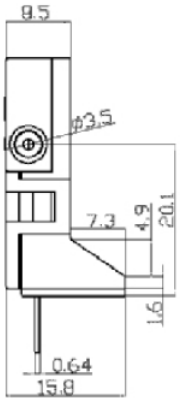
Package Dimensions



Pin-out

1 Vout
2 Vcc
3 GND





Ordering Information

Part Number	Specifications
PMFc3100V	Compatible with AWM3100V; 1 to 5 V; 0 to 200 SCCM
PMFc3150V	Compatible with AWM3150V; 1 to 5 V; 0 to 30 SCCM
PMFc3300V	Compatible with AWM3300V; 1 to 5 V; 0 to 1000 SCCM