MLV Series Low Voltage Pressure Sensors

Features

- 1 to 30 inH2O & 5 to 150 PSI Pressure Ranges
- 5V Operation
- High Output
- Low Power Consumption
- Excellent Position Sensitivity
- Low Warm-Up Shift
- Enhanced Front to Back Linearity
- Protective Parylene Coating Option

Applications

- Medical Breathing
- Environmental Controls
- HVAC
- Industrial Controls
- Portable/Hand-Held Equipment

General Description

The MLV Series Compensated Sensor is based on All Sensors' CoBeam^{2} ™ Technology. The device provides a high output signal at a low operating voltage while maintaining comparable output levels to traditional equivalent compensated millivolt sensors operating at higher voltages. This lower supply voltage gives rise to improved warm-up shift while the CoBeam^{2} Technology itself reduces package stress susceptibility resulting in improved overall long term stability. The technology also vastly improves position sensitivity compared to conventional single die devices.

These calibrated and compensated sensors give an acurate and stable output over a wide temperature range. This series is intended for use with non-corrosive, non-ionic working fluids such as air, dry gases and the like. A protective parylene coating is optionally available for moisture/harsh media protection. The output is also ratiometric to the supply voltage and designed to operate at 5.0 volts DC.

Standard Pressure Ranges

Device	Operating Range	Proof Pressure	Burst Pressure	Nominal Span
MLV-L01D	±1 inH2O	100 inH2O	300 inH2O	7 mV
MLV-L02D	±2 inH2O	100 inH2O	300 inH2O	10 mV
MLV-L05D	±5 inH2O	200 inH2O	300 inH2O	15 mV
MLV-L10D	±10 inH2O	200 inH2O	300 inH2O	20 mV
MLV-L20D	±20 inH2O	200 inH2O	500 inH2O	20 mV
MLV-L30D	±30 inH2O	200 inH2O	800 inH2O	20 mV
MLV-005D	±5 PSI	10 PSI	30PSI	25 mV
MLV-015D	±15 PSI	60 PSI	120 PSI	37.5 mV
MLV-015A	0 - 15 PSIA	60 PSI	120 PSI	37.5 mV
MLV-030D	±30 PSI	90 PSI	150 PSI	37.5 mV
MLV-100D	±100 PSI	200 PSI	250 PSI	41.67 mV
MLV-150D	±150 PSI	200 PSI	250 PSI	37.5 mV

Equivalent Circuit

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Pressure Sensor Maximum Ratings	
Supply Voltage (Vs)	12 Vdc
Common Mode Pressure	
InH2O Devices (L01, L02, L05, L10, L20, L30)	10 psig
PSI Devices (005, 015, 030, 100, 150)	50 psig
Lead Temperature (soldering 2-4 sec.)	270 °C

Environmental Specifications	
Temperature Ranges	
Compensated	0°C to 50°C
Operating	-25°C to 85 °C
Storage	-40°C to 125 °C
Humidity Limits	0 to 95% RH (non condensing)

Performance Characteristics for MLV Series (InH2O)

All parameters are measured at 5.0 volt excitation and room temperature unless otherwise specified. Pressure measurements are with positive pressure applied to PORT B (the only port for the single port configuration packages).

Parameter	Min	Typ	Max	Units	Notes
Output Span					
L01D @ 1 inH2O	6.0	7.0	8.0	mV	4
L02D @ 2 inH2O	9.0	10.0	11.0	mV	4
L05D @ 5 inH2O	14.0	15.0	16.0	mV	4
L10D @ 10 inH2O	19.0	20.0	21.0	mV	4
L20D @ 20 inH2O	19.0	20.0	21.0	mV	4
L30D @ 30 inH2O	19.0	20.0	21.0	mV	4
Span Temperature Shift (0°C to 50°C)	-	-	±250	uV	1
Offset Voltage @ Zero Diff. Pressure	-	-	±500	uV	-
Offset Temperature Shift (0°C to 50°C)					
L01D, L02D, L05D	-	-	±250	uV	1
L10D, L20D, L30D	-	-	±200	uV	1
Offset Warm-up Shift	-	-	±50.0	uV	2
Offset Position Sensitivity (1g)					
L01D	-	-	±20.0	uV	6
L02D	-	-	±15.0	uV	6
L05D, L10D, L20D, L30D	-	-	±10.0	uV	6
Offset Long Term Drift (One Year)					
L01D, L02D, L05D	-	±150	-	uV	-
L10D, L20D, L30D	-	±100	-	uV	-
Linearity, Hysteresis Error	-	0.10	0.30	%FSS	3
Response Time (10% to 90% Pressure Response)	-	500	-	us	-
Front to Back Linearity	-	0.75	-	%FSS	5
Input Resistance	-	12.0	-	k ohm	-
Output Resistance	-	3.0	-	k ohm	-

Performance Characteristics for MLV Series (PSI)

All parameters are measured at 5.0 volt excitation and room temperature unless otherwise specified. Pressure measurements are with positive pressure applied to PORT B (the only port for the single port configuration packages). Pressure is applied to Port A for absolute devices in A-Package.

Parameter	Min	Typ	Max	Units	Notes
Output Span					
005D @ 5 PSI	24.75	25.0	25.25	mV	4
015D @ 15 PSI	37.13	37.50	37.88	mV	4
015A @ 15 PSIA	37.13	37.50	37.88	mV	4
030D @ 30 PSI	37.13	37.50	37.88	mV	4
100D @ 100 PSI	41.25	41.67	42.08	mV	4
150D @ 150 PSI	37.08	37.50	37.92	mV	4
Span Temperature Shift (0°C to 50°C)	-	-	±1.0	%FSS	1
Offset Voltage @ Zero Diff. Pressure					
005D @ 5 PSI	-	-	125	uV	-
015D @ 15 PSI	-	-	125	uV	-
015A @ 15 PSIA	-	-	208	uV	-
030D @ 30 PSI	-	-	125	uV	-
100D @ 100 PSI	-	-	125	uV	-
150D @ 150 PSI	-	-	125	uV	-
Offset Warm-Up Shift	-	±20		uV	2
Offset Long Term Drift (one year)	-	±100	-	uV	-
Linearity, Hysteresis Error	-	0.20	0.50	%FSS	3
Response Time (10% to 90% Pressure Response)	-	500	-	us	-
Front to Back Linearity	-	2.5	-	%FSS	5
Input Resistance	-	12.0	-	k ohm	-
Output Resistance	-	3.0	-	k ohm	-

Specification Notes

NOTE 1: Shift is relative to 25°C.

NOTE 2: Shift is within the first hour of excitation applied to the device.

NOTE 3: Measured at one-half full scale rated pressure using best straight line curve fit.

NOTE 4: The span is the algebraic difference between full scale output voltage and the offset voltage.

NOTE 5: Front-Back Linerity computed as: $\mathrm{Lin}_{FB} = \left(\left| \frac{\mathrm{Span}_{Front}}{\mathrm{Span}_{Back}} \right| - 1 \right) \cdot 100\%$

NOTE 6: Parameter is characterized and not 100% tested.

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How To Order

A Package

Example: MLV-L02D-A6BBF-N

MLV-[ ]-A6[ ][ ][ ]-[ ]

Series

Pressure Range

Option	Description
L01D	1 inH2O
L02D	2 inH2O
L05D	5 inH2O
L10D	10 in H2O
L20D	20 in H2O
L30D	30 in H2O
005D	5 PSI
015D	15 PSI
015A	15 PSIA
030D	30 PSI
100D	100 PSI
150D	150 PSI

Port Cut Configuration

Option	Description
A	No Port Cut
B	Two Ports Cut 0.085"
C	Two Ports Cut 0.100"
D	Two Ports Cut 0.150"
E	One Port (A) Cut 0.080"
F	One Port (A) Cut 0.370"

Port Fittings

Option	Description
A	No Fittings
B	Barb Fitting Port A Only
C	Barb Fitting Port B Only
D	Barb Fittings Ports A & B

Lead Configuration

Option	Description
F	Flat (Straight)
Q	Right Angle 0.075"
R	Right Angle 0.100"
J	Jogged Bend

Coating

Option	Description
N	No Coating
P	Parylene Coating

(See NOTE 1 below)

E Package

Example: MLV-L02D-E1ND-N

MLV-[ ]-E[ ][ ][ ]-[ ]

Series

Pressure Range

Option	Description
L01D	1 inH2O
L02D	2 inH2O
L05D	5 inH2O
L10D	10 in H2O
L20D	20 in H2O
L30D	30 in H2O
005D	5 PSI
015D	15 PSI
015A	15 PSIA
030D	30 PSI

Port Orientation

Option	Description
1	Dual Port Same Side
2	Dual Port Opposite Side
G	Single Port (Gage)

Lid Style

Option	Description
N	Non-Barbed
B	Barbed

Lead Type

Option	Description
S	SIP
D	DIP
J	J-Lead SMT
L	Low Profile DIP

Coating

Option	Description
N	No Coating
P	Parylene Coating

TABLE 1: Available E-Series Package Configurations

Port Orientation	Non-Barbed Lid				Barbed Lid			
	Lead Style				Lead Style			
	SIP	DIP	J Lead SMT	Low Profile DIP	SIP	DIP	J Lead SMT	Low Profile DIP
Dual Port Same Side	E1NS	E1ND	E1NJ	N/A	E1BS	E1BD	N/A	N/A
Dual Port Opposite Side	E2NS	E2ND	E2NJ	N/A	E2BS	E2BD	N/A	N/A
Single Port (Gage)	EGNS	EGND	EGNJ	EGNL	EGBS	EGBD	EGBJ	EGBL

NOTE 1) Parylene Coating: Parylene coating provides a moisture barrier and protection from some harsh media. Consult factory for applicability of Parylene for the target application and sensor type.

A6 Package (Without Options)

Pinout (Gage)	Pinout (Absolute)
1) N/C	1) N/C
2) Vs	2) Vs
3) +Out	3) -Out
4) Gnd	4) Gnd
5) -Out	5) +Out
6) N/C	6) N/C

NOTES
1) Dimensions are in inches [mm].
2) For suggested pad layout, see drawing: PAD-09

A-Package: Port Cut Options

Example: MLV-L10D-A6xAF-N
└── Port Cut Options

A- No Port Cut Configuration

D- Two Ports Cut 0.150" Configuration

B- Two Ports Cut 0.085" Configuration

E- Port A cut 0.080" Configuration

C- Two Ports Cut 0.100" Configuration

F- Port A Cut 0.370" Configuration

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A-Package: Port Fitting Options

Example: MLV-L10D-A6DxF-N

Port Fitting Options

NOTE: Port Cut Configuration "D" Shown As Reference.

A- No Fittings Configuration

C- Barb Fitting Port B Only Configuration

B- Barb Fitting Port A Only Configuration

D- Barb Fitting Ports A and B Configuration

A-Package: Lead Bend Options

Example: MLV-L10D-A6AAx-N

Lead Bend Options

F- Flat (Straight) Configuration

R- Right Angle 0.100" Configuration

J- Jogged Bend Configuration

Q- Right Angle 0.075" Configuration

E1NS Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-01

E1BS Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-01

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E2NS Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-01

E2BS Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-01

EGNS Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-01

EGBS Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-01

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E1ND Package

Pinout

1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

NOTES
1) Dimensions are in inches [mm]
2) For suggested pad layout, see drawing: PAD-03

E1BD Package

Pinout

1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

NOTES
1) Dimensions are in inches [mm]
2) For suggested pad layout, see drawing: PAD-03

E2ND Package

Pinout

1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

NOTES
1) Dimensions are in inches [mm]
2) For suggested pad layout, see drawing: PAD-03

E2BD Package

Pinout

1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

NOTES
1) Dimensions are in inches [mm]
2) For suggested pad layout, see drawing: PAD-03

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EGND Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

NOTES
1) Dimensions are in inches [mm]
2) For suggested pad layout, see drawing: PAD-03

EGBD Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

NOTES
1) Dimensions are in inches [mm]
2) For suggested pad layout, see drawing: PAD-03

E1NJ Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

DETAIL A
SCALE 4 : 1

A

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-10

E2NJ Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

DETAIL A
SCALE 4 : 1

A

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-10

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EGNJ Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

DETAIL A
SCALE 4 : 1

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-10

EGBJ Package

Pinout
1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

DETAIL A
SCALE 4 : 1

NOTES
1)Dimensions are in inches [mm]
2)For suggested pad layout, see drawing: PAD-10

EGNL Package

Pinout

1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

NOTES
1) Dimensions are in inches [mm]
2) For suggested pad layout, see drawing: PAD-03

EGBL Package

Pinout

1) Gnd
2) +Out
3) Vs
4) -Out
5) Do Not Connect
6) Do Not Connect
7) Do Not Connect
8) Do Not Connect

NOTES
1) Dimensions are in inches [mm]
2) For suggested pad layout, see drawing: PAD-03

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Suggested Pad Layout

PAD-01

PAD-03

PAD-10

Package Characteristics

Package ID	Approximate Port Volume Port A	Port B	Units	Notes	Weight	Units	Notes
A6AAx	132	33.6	mm^3	1	9.3	Grams	2
A6BAx	119	20.3	mm^3	1	8.7	Grams	2
A6CAx	119	20.5	mm^3	1	8.8	Grams	2
A6DAx	120	21.3	mm^3	1	8.8	Grams	2
A6EAx	119	33.6	mm^3	1	8.9	Grams	2
A6FAx	125	33.6	mm^3	1	9.2	Grams	2
E1Nx	174	168	mm^3	-	1.2	Grams	-
E2Nx	174	168	mm^3	-	1.2	Grams	-
EGNx	1.4	168	mm^3	-	0.9	Grams	-

Package Notes
Note 1: Add 4.5 mm^3 per port with barb fitting.
Note 2: Add 0.15 gram per barb fitting.

Product Labeling

Example Device Label

* 5 PSI to 150 PSI devices may not be assembled with CoBeam²™ Technology.

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