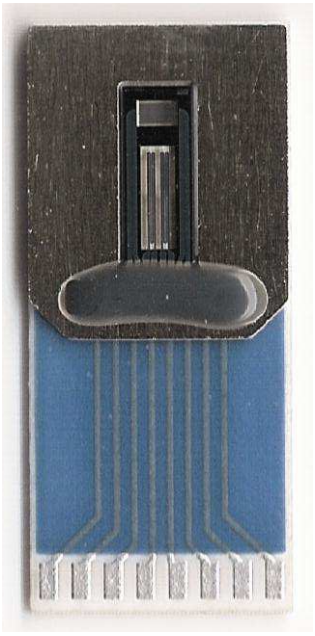

LMM-H03

Mass Air FLow Sensor

- **Hot Film Anemometer Component**
- **Highly reliable and long term stable**
- **Bi-directional airflow measurement**
- **Fast reaction time**
- **Manufactured according ISO TS16949**
- **Can be adapted to various flow channel geometries**
- **Can be used for almost all kind of gases and volatile substances**

Product Description

LMM-H03 is a thermodynamic sensing element for the bidirectional measurement of mass air flow in a well defined channel. It is dedicated for applications with high reliability requirements such as medical or industrial gas flow applications. Mounted directly within the flowing media the LMM-H03 is sensitive against the heat transfer on a micrometer scale. This heat transfer is detected by a micro-machined silicon device which is mounted on ceramic substrate defining the geometry of the sensing element.

The functional principle of the LMM-H03 is a hot film anemometer, which is the thin film version of the hot wire anemometer. A thin film heating element (heater) is heated to a defined temperature difference with respect to the air. At zero flow there is heat dissipation due to the thermal conductivity of the air. With applied flow the heat dissipation increases steadily with the flow rate.

The sensing element can be operated at Constant Power and Constant Voltage mode. However, it is recommended to operate LMM-H03 in the described Constant Temperature Difference (CTD) mode. In the CTD mode the electronics detects any change of the thermal equilibrium very quickly and compensates it by adjusting the power settings through the heaters. This allows a very reliable mass flow measurement with a very short time constant which is in the order of milliseconds.,

Features

- Highly reliable and long term stable
- Fast reaction time
- Can be adapted to various flow channel geometries
- Can be used for almost all kind of gases and volatile substances

Applications

- Engine Control
- Industrial gas flow measurement
- Leak detection in pressurized air systems
- Spirometer

Absolute Maximum Ratings

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Storage Temperature	T_{Store}	after bonding, with protected bond bads	-40	+25	+125	°C
Storage Temperature	T_{Store}	before bonding, unprotected bond bads	+10	+25	+40	°C
Maximum Current	I_{max}	at now flow, +25 °C ambient	–	–	20	mA

Operation Conditions

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operation Temperature	T_{Store}	after bonding, with protected bond bads	-40	+25	+125	°C
Heater Overtemperature	$\leftrightarrows T_{Heater}$	$\leftrightarrows T_{Heater} = T_{Heater} - T_{air}$		100	120	K

Sensing Properties

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Resistance Ambient Temperature Sensor 1	R_{ATS1}	*Pad 1+2,* T_{Amb} = +25 °C	1300	1700	2100	⎵
Resistance Heater 1	$R_{Heater1}$	*Pad 3+4,* T_{Amb} = +25 °C	40.0	45.0	50.0	⎵
Resistance Heater 2	$R_{Heater2}$	*Pad 5+6,* T_{Amb} = +25 °C	40.0	45.0	50.0	⎵
Resistance Ambient Temperature Sensor 2	R_{ATS2}	*Pad 7+8,* T_{Amb} = +25 °C	1300	1700	2100	⎵
Temperature Coefficient R_{ATS} and R_{Heater}	⇨	*measurement at* T_1 = 0 °C and T_2 = +100 °C	5500	6000	6500	ppm/K
TCR Match	⇆⇨	*measurement at* T_1 = 0 °C and T_2 = +100 °C	–	–	100	ppm/K