



Flow Sensor

BM47DHA

Bestow Mascot

Features

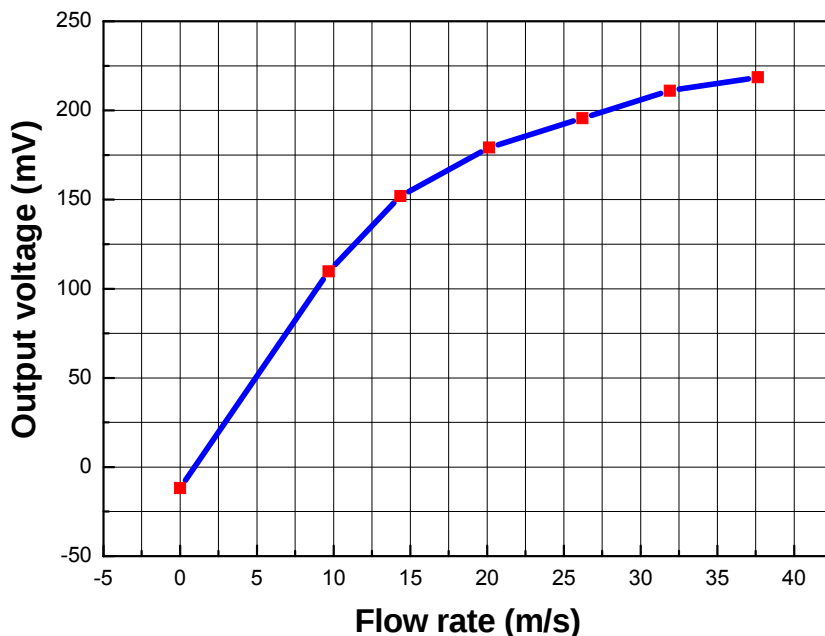
- Suitable for liquid flow, gas flow and differential pressure applications
- Bigger output DC voltage: 100mV~3V
- Flow speed range compatible to mainstream product, and customized
- High precision: $\leq \pm 3\%$
- Fast response: $\leq 15\text{ms}$
- High impact resistance: $>5000\text{g}$
- Wide working temperature: $-55\text{ }^{\circ}\text{C} \sim +125\text{ }^{\circ}\text{C}$

Applications

- Water flow and coal gas flow measurement
- Air-mass meter (MAF) in engine air-intake control
- Fuel consumption monitoring for diesel generators and engines
- Mass flow, differential pressure, and air velocity monitoring in HVAC
- Medical respirators and ventilators
- Drug delivery and biomedical analytical tools

Product Description

The BM47DHA is a thermal film flow meter based on MEMS (micro-electromechanical systems) technology. The broad flow speed range and high precision of the BM47DHA to be applied to automobile, industry, consumer electronic and medical applications widely.

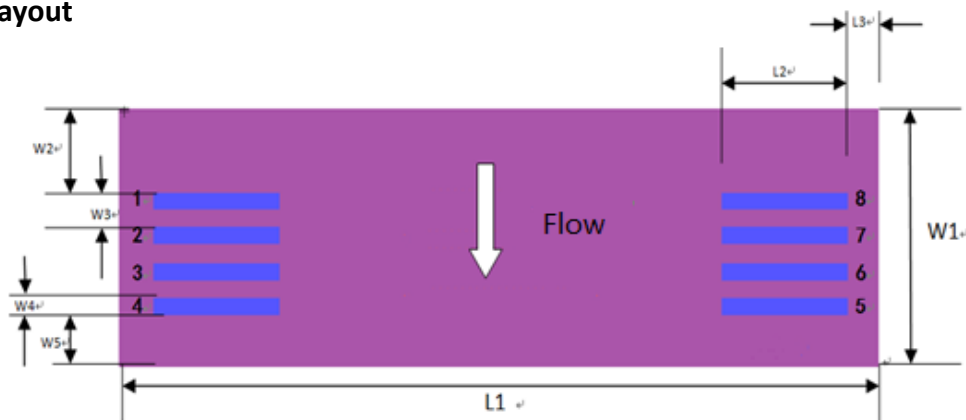
Typical output curve**Specification**

Parameter	Specification			Unit	Condition
	Min.	Typ.	Max.		
					(All Nominal Test Conditions Unless Otherwise Stated) $V_{in} = 24\text{ V}$, Temperature = $25\text{ }^{\circ}\text{C}$.
Resistance					
V_{in+} and V_{in-}	3	3.5	4	$\text{k}\Omega$	

$V_{up-out+}$ and $V_{up-out-}$	65	75	85	k Ω	
$V_{down-out+}$ and $V_{down-out-}$	65	75	85	k Ω	
Performance					
Flow speed	1		40	m/s	
Precision		3%			
Response time	13	15	16	Ms	
Supply and Output					
Supply DC Voltage, V_{in}	12	24	30	V	
Working current	4	7	10	mA	
Output DC Voltage V_{up-out}	0		3	V	
Output DC Voltage $V_{down-out}$	0		3	V	
Reliability					
Impact resistance	5000			G	
Working and Store Temperature					
Working Temperature	-55		125	°C	
Store Temperature	-55		125	°C	

Pin Names and Description

Pin	Function	Description
1	$V_{up-out+}$	Flow upstream DC voltage output+ pin.
2	V_{in+}	Input DC voltage+ pin.
3	$V_{down-out+}$	Flow downstream output DC voltage+ pin.
4	NC+	Not connected pin.
5	NC-	Not connected pin.
6	$V_{down-out-}$	Flow downstream output DC voltage- pin.
7	V_{in-}	Input DC voltage- pin.
8	$V_{up-out-}$	Flow upstream DC voltage output- pin.

Die layout

Die size

Name	Size(μm)
L1	4450
L2	746
L3	180
W1	1340
W2	424
W3	180
W4	94
W5	267

Assembly requirements of BM47DHA

- Adhesive thickness should be less than 100 μm ;
- The chip should be mounted in the special designed flow channel;
- Chip mounting direction is perpendicular to the gas(or liquid) flow direction;
- The surface of the chip should be parallel to the channel.

Remark

- The chip package should be opened in a thousand-grade clean room;
- The wire bonding should be operated in a clean room after the package is opened;
- Contamination, pollution and touch should be avoided during the assembly process in clean room.

	BM	47	D	H	A	B	R	G
Company Prefix								
Bestow Mascot Technology Ltd.								
Series Name								
47: Flow Sensor								
Measure Type								
D- DC voltage output								
Precision								
H-High Precision N-Normal Precision								
Version								
Package								
B- Be customized								
Pack Type								
T-Tube R-Tape&Reel								
Plating Technologv								
Blank-Standard SnPb Plating								
R-RoHS compliant								
G-Green								

●General Precaution

- 1) Before you use our Products, you are requested to carefully read this document and fully understand its contents. BM shall not be in any way responsible or liable for failure, malfunction or accident arising from the use of any BM's Products against warning, caution or note contained in this document.
- 2) All information contained in this document is current as of the issuing date and subject to change without any prior notice. Before purchasing or using BM's Products, please confirm the latest information with a BM sales representative.

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- 1) Our Products are designed and manufactured for application in ordinary electronic equipments (such as AV equipment, OA equipment, telecommunication equipment, home electronic appliances, amusement equipment, etc.). If you intend to use our Products in devices requiring extremely high reliability (such as medical equipment, transport equipment, traffic equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or failure may cause loss of human life, bodily injury or serious damage to property ("Specific Applications"), please consult with the BM sales representative in advance. Unless otherwise agreed in writing by BM in advance, BM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of any BM's Products for Specific Applications.
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 - [a] Installation of protection circuits or other protective devices to improve system safety
 - [b] Installation of redundant circuits to reduce the impact of single or multiple circuit failure
- 3) Our Products are designed and manufactured for use under standard conditions and not under any special or extraordinary environments or conditions, as exemplified below. Accordingly, BM shall not be in any way responsible or liable for any damages, expenses or losses arising from the use of any BM's Products under any special or extraordinary environments or conditions. If you intend to use our Products under any special or extraordinary environments or conditions (as exemplified below), your independent verification and confirmation of product performance, reliability, etc, prior to use, must be necessary:
 - [a] Use of our Products in any types of liquid, including water, oils, chemicals, and organic solvents
 - [b] Use of our Products outdoors or in places where the Products are exposed to direct sunlight or dust
 - [c] Use of our Products in places where the Products are exposed to sea wind or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂

- [d] Use of our Products in places where the Products are exposed to static electricity or electromagnetic waves
- [e] Use of our Products in proximity to heat-producing components, plastic cords, or other flammable items
- [f] Sealing or coating our Products with resin or other coating materials
- [g] Use of our Products without cleaning residue of flux (even if you use no-clean type fluxes, cleaning residue of flux is recommended); or Washing our Products by using water or water-soluble cleaning agents for cleaning residue after soldering
- [h] Use of the Products in places subject to dew condensation

- 4) The Products are not subject to radiation-proof design.
- 5) Please verify and confirm characteristics of the final or mounted products in using the Products.
- 6) In particular, if a transient load (a large amount of load applied in a short period of time, such as pulse) is applied, confirmation of performance characteristics after on-board mounting is strongly recommended. Avoid applying power exceeding normal rated power; exceeding the power rating under steady-state loading condition may negatively affect product performance and reliability.
- 7) De-rate Power Dissipation (Pd) depending on Ambient temperature (Ta). When used in sealed area, confirm the actual ambient temperature.
- 8) Confirm that operation temperature is within the specified range described in the product specification.
- 9) BM shall not be in any way responsible or liable for failure induced under deviant condition from what is defined in this document.

●**Precaution for Mounting / Circuit board design**

- 1) When a highly active halogen us (chlorine, bromine, etc.) flux is used, the residue of flux may negatively affect product performance and reliability.
- 2) In principle, the reflow soldering method must be used; if flow soldering method is preferred, please consult with the BM representative in advance. For details, please refer to BM Mounting specification

●**Precautions Regarding Application Examples and External Circuits**

- 1) If change is made to the constant of an external circuit, please allow a sufficient margin considering variations of the characteristics of the Products and external components, including transient characteristics, as well as static characteristics.
- 2) You agree that application notes, reference designs, and associated data and information contained in this document are presented only as guidance for Products use. Therefore, in case you use such information, you are solely responsible for it and you must exercise your own independent verification and judgment in the use of such information contained in this document. BM shall not be in any way responsible or liable for any damages, expenses or losses incurred by you or third parties arising from the use of such information.

●Precaution for Electrostatic

This Product is electrostatic sensitive product, which may be damaged due to electrostatic discharge. Please take proper caution in your manufacturing process and storage so that voltage exceeding the Products maximum rating will not be applied to Products. Please take special care under dry condition (e.g. Grounding of human body / equipment / solder iron, isolation from charged objects, setting of Ionizer, friction prevention and temperature / humidity control).

●Precaution for Storage / Transportation

1) Product performance and soldered connections may deteriorate if the Products are stored in the places where:

- [a] the Products are exposed to sea winds or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂
- [b] the temperature or humidity exceeds those recommended by BM
- [c] the Products are exposed to direct sunshine or condensation
- [d] the Products are exposed to high Electrostatic

2) Even under BM recommended storage condition, solder ability of products out of recommended storage time period may be degraded. It is strongly recommended to confirm solder ability before using Products of which storage time is exceeding the recommended storage time period.

3) Store / transport cartons in the correct direction, which is indicated on a carton with a symbol. Otherwise bent leads may occur due to excessive stress applied when dropping of a carton.

4) Use Products within the specified time after opening a humidity barrier bag. Baking is required before using Products of which storage time is exceeding the recommended storage time period.

●Precaution for Product Label

QR code printed on BM Products label is for BM's internal use only.

●Precaution for Disposition

When disposing Products please dispose them properly using an authorized industry waste company.

●Precaution for Foreign Exchange and Foreign Trade act

Since our Products might fall under controlled goods prescribed by the applicable foreign exchange and foreign trade act, please consult with BM representative in case of export.

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Version	Publication date	Pages	Revise Description
1.0	Feb.2015	9	Initial Document Release