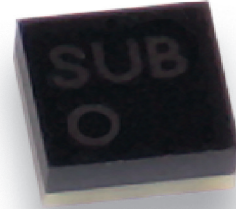# AFF756

MagnetoResistive Field Sensor

The AFF756 is a low noise magnetic field sensor based on the Anisotropic-MagnetoResistive (AMR) effect.

The sensor contains a Wheatstone bridge including a flip coil for offset correction. This measurement principle also reduces the temperature coefficient of the offset by a factor of 100.

The AFF756 is available as an LGA package (RoHS-conform) for SMD assembly.

Product Overview

Article description	Package	Delivery Type
AFF756AMA-AE	LGA8	Tape on reel

Quick Reference Guide

Symbol	Parameter	Min.	Typ.	Max.	Unit
V_{CC}	Supply voltage	1.2	5.0	9.0	V
R_B	Bridge resistance [1]	0.7	1.0	1.3	kΩ
S	Sensitivity (in range ±160 A/m)	8.0	10.0	12.0	$\frac{mV/V}{kA/m}$
I_F	Flip current (required)	±400	-	-	mA
R_F	Flip coil resistance	-	1.5	2.0	Ω

[1] Bridge resistance between pins 6 and 3; 5 and 2.

Absolute Maximum Ratings
In accordance with the absolute maximum rating system (IEC60134).

Symbol	Parameter	Min.	Max.	Unit
V_{CC}	Supply voltage	-20	+20	V
I_{Fmax}	Maximum flip current [2]	-1.0	+1.0	A
P_F	Maximum flip power dissipation	-	50	mW
T_{amb}	Ambient temperature	-40	+125	°C
T_{stg}	Storage temperature	-40	+125	°C
$V_{isolation}$	Voltage between bridge and flip coil	-200	+200	V

[2] 10 µs pulse, 400 µs pause.

Stresses beyond those listed under "Absolute maximum ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Features

– Based on the AnisotropicMagnetoResistive (AMR) effect
– Contains one Wheatstone Bridge
– Integrated flip coil
– Temperature range from -40 °C to +125 °C

Advantages

– Extreme sensitivity
– Wide range of magnetic field strength
– Low power consumption
– Low flip coil resistance
– Very good signal to noise ratio

Applications

– Compass
– Electronic navigation systems
– Battery powered applications
– Magnetometry
– Measurement of terrestrial magnetic field
– Traffic detection

ESD

Magnetic Data

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
H_{ext}	Operating magnetic field range		-800	-	+800	A/m
B_{RES}	Resolution	V_{CC} = 5 V; BW = 50 Hz	-	2.0	-	nT

Electrical Data of MR-Bridge

T_{amb} = 25 °C; V_{CC} = 5 V; unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{CC}	Supply voltage		1.2	5.0	9.0	V
S	Sensitivity	In the operating range of ±160 A/m	8.0	10.0	12.0	$\frac{mV/V}{kA/m}$
TC_S	Temperature coefficient of Sensitivity [1]	See Fig. 5	-0.32	-0.36	-0.40	%/K
R_B	Bridge resistance [2]		0.7	1.0	1.3	kΩ
TC_{RB}	Temperature coefficient of R_B [3]		0.22	0.26	0.30	%/K
V_{off}	Offset voltage per V_{CC}		-1.0	-	+1.0	mV/V
TC_{Voff}	Temperature coefficient of V_{off} [4]		-1.0	-	+1.0	µV/V/K
H_{off}	Magnetic offset per V_{CC}		-	0.15	-	A/m/V
N	Noise level	f > 100 Hz	-	10.0	20.0	nV/√Hz
$\varepsilon_{Lin,80}$	Linearity error @ ±160 A/m	-160 ≤ H_{ext} ≤ +160 A/m	-	0.15	0.25	% of FS
$\varepsilon_{Lin,240}$	Linearity error @ ±480 A/m	-480 ≤ H_{ext} ≤ +480 A/m	-	0.80	0.90	% of FS
$\varepsilon_{Lin,400}$	Linearity error @ ±800 A/m	-800 ≤ H_{ext} ≤ +800 A/m	-	2.30	2.70	% of FS

[1] $TC_S = 100 \cdot \dfrac{S_{(T2)} - S_{(T1)}}{S_{(T1)} \cdot (T_2 - T_1)}$ with T_1 = 25 °C; T_2 = 125 °C.

[2] Bridge resistance between pins 2 and 5, 3 and 6.

[3] $TC_{RB} = 100 \cdot \dfrac{R_{B(T2)} - R_{B(T1)}}{R_{B(T1)} \cdot (T_2 - T_1)}$ with T_1 = 25 °C; T_2 = 125 °C.

[4] $TC_{Voff} = \dfrac{V_{off(T2)} - V_{off(T1)}}{T_2 - T_1}$ with T_1 = 25 °C; T_2 = 125 °C.

Electrical Data of Flip Coil and Test Connectors

T_{amb} = 25 °C; V_{CC} = 5 V; unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I_F	Flip current (required)	1 µs on, 1 ms off	±400	-	-	mA
t_{IF}	Flip pulse duration		-	1.0	2.0	µs
I_{Fmax}	Flip current (maximum)	10 µs on, 400 µs off	-	-	±1.0	A
R_F	Flip coil resistance		-	1.5	2.0	Ω
TC_{RF}	Temperature coefficient of R_F [5]		0.30	0.35	0.40	%/K

[5] $TC_{RF} = 100 \cdot \dfrac{R_{F(T2)} - R_{F(T1)}}{R_{F(T1)} \cdot (T_2 - T_1)}$ with T_1 = 25 °C; T_2 = 125 °C.

Dynamic Data

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
f	Frequency range		1	-	-	MHz

AFF756 in LGA-Housing

Pinning

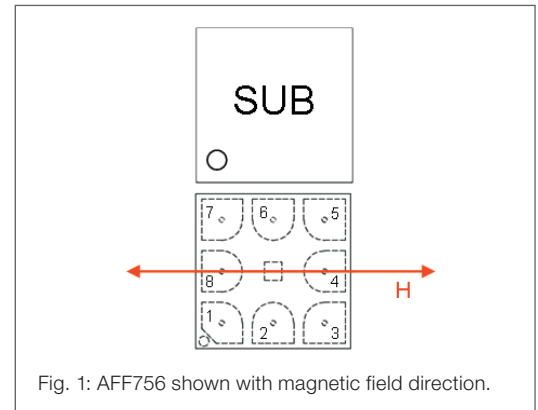| Pin	Symbol	Parameter
1	$+I_F$	Flip coil
2	$-V_o$	Negative output voltage
3	GND	Ground
4	N.C	Not connected
5	$+V_o$	Positive output voltage
6	V_{CC}	Supply voltage
7	$-I_F$	Flip coil
8	N.C	Not connected

Pin 1 is marked by a point on housing.

Fig. 1: AFF756 shown with magnetic field direction.

Marking

1st letter	Type of sensor	2nd letter	Calendar week	3rd letter	Year
S	AFF756	A	1 / 2	A	2009
		B	3 / 4	B	2010
		...	...	...	...

Dimensions

Notes

1. if no other specification, all dimensions in: mm
2. dimensions of the pads are referenced to the pad center
3. active chip area
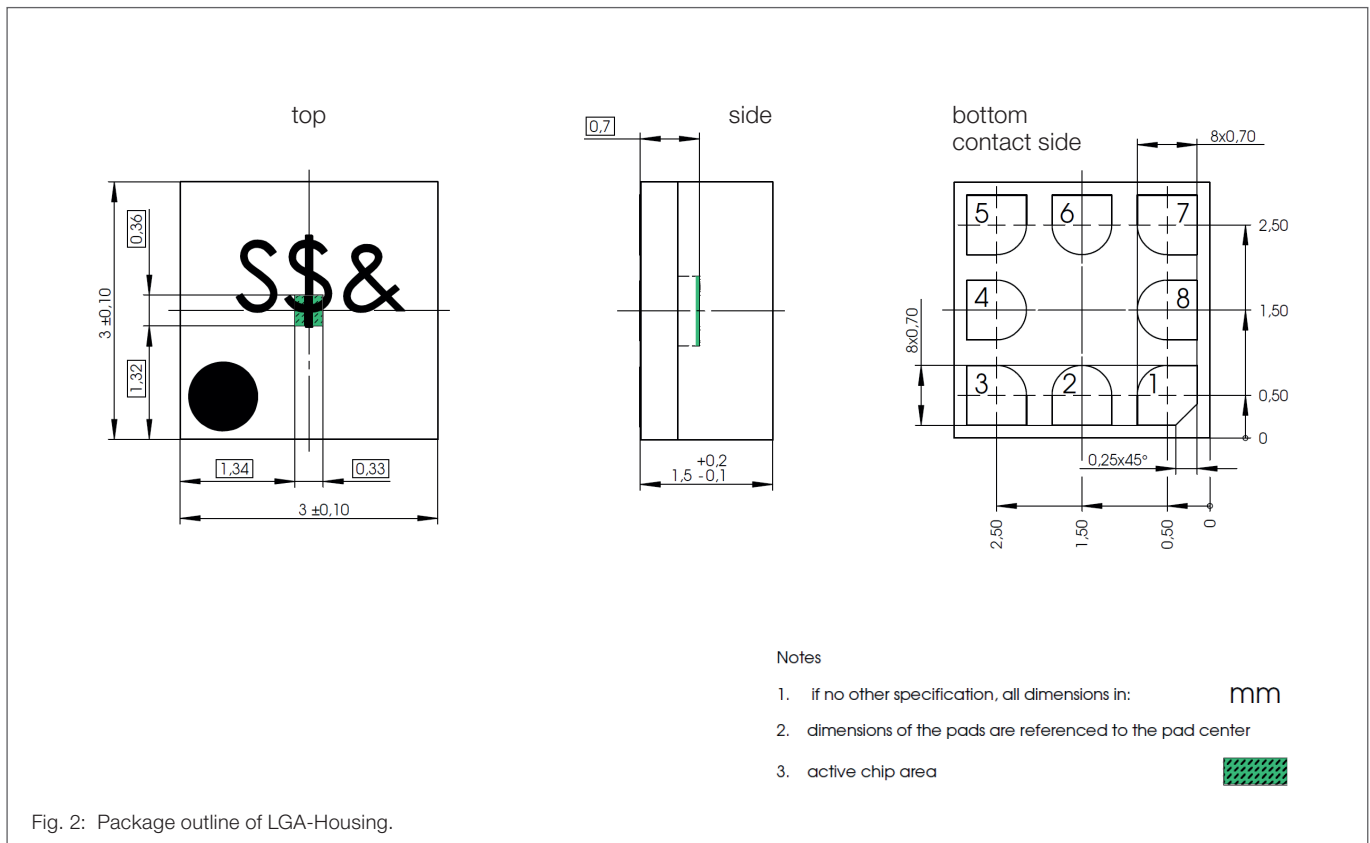
Fig. 2: Package outline of LGA-Housing.

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Subject to technical changes
March 01th 2024

General Information

Product Status

Article	Status
AFF756AMA-AE	The product is in series production.
Note	The status of the product may have changed since this data sheet was published. The latest information is available on the internet at www.sensitec.com.

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General Information

Application Information

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Changelist

Version	Description of the Change	Date
AFF765.DSE.10	Logo updated (pp. 1-5)	03/2024
AFF765.DSE00	Original (pp. 1-5	06/2014

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