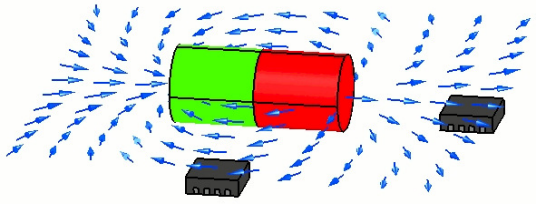
SUNSTAR传感与控制 http://www.sensor-ic.com/ TEL:0755-83376549 FAX:0755-83376182 E-MAIL:szss20@163.com

MS32 Switching Sensor



- **AMR Switching-Sensor**
- **TDFN Outline 2.5x2.5x0.8 mm^3**
- **Temperature Compensated Switching Point**
- **Low Power Consumption**

DESCRIPTION

The MS32 is a magnetic field sensor which is built in the form of a Wheatstone bridge. Each of its four resistors is made from *Permalloy,* a material that shows the *anisotropic magnetoresistance effect*. An unidirectional magnetic field in the surface parallel to the chip (x-y plane) along the y-axis will deliver a field dependent output signal. A **magnetic switching point**, which is almost **independent on temperature** is typically set to Hs=1.85 kA/m. In addition, the characteristic curve is linear over a wide magnetic field range. Thus, the new MS32 simplifies the adaption of the sensor to different mechanical and magnetical environments. The sensor die is packaged in a modern TDFN package.

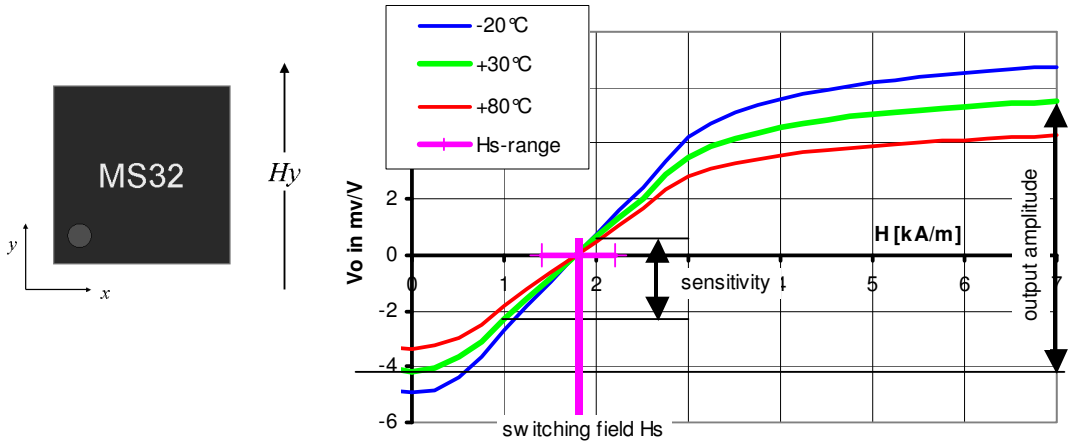


Figure 1: Characteristic curves for MS32 at different ambient temperatures (-20℃, +30℃, +80℃)

FEATURES

- Sensor Based on Solid State Magnetoresistance Effect
- Unipolar Signal Output
- Linear Field Response
- High Sensitivity, Low Hysteresis
- Temperature Compensated Switching Point
- Low Power Consumption Due to High Bridge Resistance
- Supply Voltage up to 30 V Allowed
- Small TDFN Package

APPLICATIONS

Contactless Position (Presence, Open/Close) Detection In :

- Industrial
- Consumer
- Automotive

Applications, like:

- Small Stroke Pneumatic Cylinders
- Cover Positions of Notebooks and Mobiles
- Doors, etc.

SUNSTAR自动化 http://www.sensor-ic.com/ TEL: 0755-83376489 FAX:0755-83376182 E-MAIL:szss20@163.com

SUNSTAR传感与控制 http://www.sensor-ic.com/ TEL:0755-83376549 FAX:0755-83376182 E-MAIL:szss20@163.com

MS32 Switching Sensor

CHARACTERISTIC VALUES

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Mechanical dimensions						
Length		X		2.5		mm
Width		Y		2.5		mm
Height		Z		0.75		mm
Pad size				0.25 x 0.30		mm^2
Operating limits						
Max. supply voltage		$V_{CC, MAX}$			30	V
Operating temperature		T_{OP}	-25		+85	℃
Storage temperature		T_{ST}	-25		+125	℃

Parameter	Condition	Symbol	Min	Typ	Max	Unit
Sensor specification (V_{CC} = 5 V, T = 30 ℃)						
Supply voltage		V_{CC}		5	30	kA/m
Resistance		R_B	10300	11500		Ω
Offset		V_{OFF}/V_{CC}		-4	-1.5	mV/V
Sensitivity	1)	S	2	3		(mV/V)/(kA/m)
Output amplitude	2)	V_{MAX}	8			deg
Hysteresis (@ V_0=0) 3)		Hyst.			0.9	deg
Sensor specification (T = -25 ℃; +85℃; Conditions A & B) 6)						
TC of amplitude		TCSV	-0.36	-0.32	-0.28	%/K
TC of bridge resistance		TCBR	+0.27	+0.32	+0.37	%/K
Switching field 5)	4)	Hs	1.40	1.85	2.30	kA/m

All parameters are measured on wafer level.
1) average gradient in the range 1.0 - 2.0 kA/m
2) difference between output voltage/supply voltage measured at H = 7 kA/m and H = 0 kA/m
3) hysteresis [in kA/m] = hysteresis [in mV/V] /S
4) switching voltage = 0 mV/V
5) switching field = magnetic field at switching voltage
6) values at –25℃ can be determined by linear extrapolation from +30℃- and +85℃-values.

SUNSTAR自动化 http://www.sensor-ic.com/ TEL: 0755-83376489 FAX:0755-83376182 E-MAIL:szss20@163.com

SUNSTAR传感与控制 http://www.sensor-ic.com/ TEL:0755-83376549 FAX:0755-83376182 E-MAIL:szss20@163.com

MS32 Switching Sensor

MEASUREMENT CONDITIONS

Parameter	Symbol	Unit	Condition
A. Set Up Conditions			
ambient temperature	T	℃	T = 23 +/- 5 ℃ (unless otherwise noted)
supply voltage	V_{CC}	V	V_{CC} = 5 V
applied magnetic field	H_Y	kA/m	H_Y = -7 .. +7 kA/m; along y-direction; $\|H_X\|$ < 100 A/m Pre-magnetization along x-direction with H_X >= 3 kA/m
B. Parameter Definitions (T= -25 ℃, +85 ℃) see characteristic values 6)			
ambient temperatures	T	℃	T_1 = -25 , T_0 = +30 , T_2 = +85 ℃
TC of amplitude	TCSV	%/K	$TCV = \frac{1}{(T_2 - T_1)} \cdot \frac{V_a(T_2) - V_a(T_1)}{V_a(T_1)} \cdot 100\%$
TC of resistance	TCBR	%/K	$TCR = \frac{1}{(T_2 - T_1)} \cdot \frac{R(T_2) - R(T_1)}{R(T_1)} \cdot 100\%$
TC of offset	TCV_{OFF}	µV/(VK)	$TCVoff = \frac{Voff(T_2) - Voff(T_1)}{(T_2 - T_1)}$

BLOCK DIAGRAM

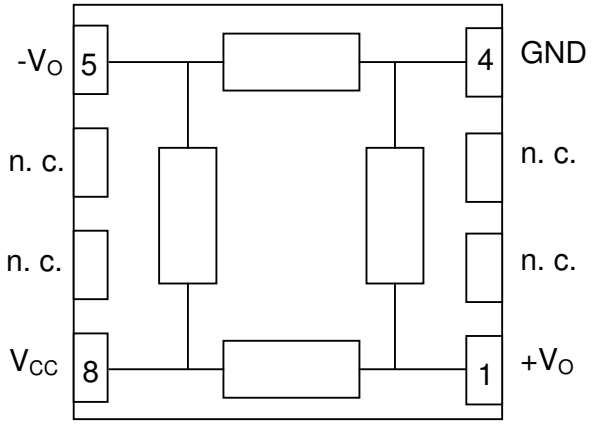


Figure 1: internal and external connections (TDFN, Chip)

SUNSTAR自动化 http://www.sensor-ic.com/ TEL: 0755-83376489 FAX:0755-83376182 E-MAIL:szss20@163.com

SUNSTAR传感与控制 http://www.sensor-ic.com/ TEL:0755-83376549 FAX:0755-83376182 E-MAIL:szss20@163.com

MS32 Switching Sensor

SENSOR OUTLINE

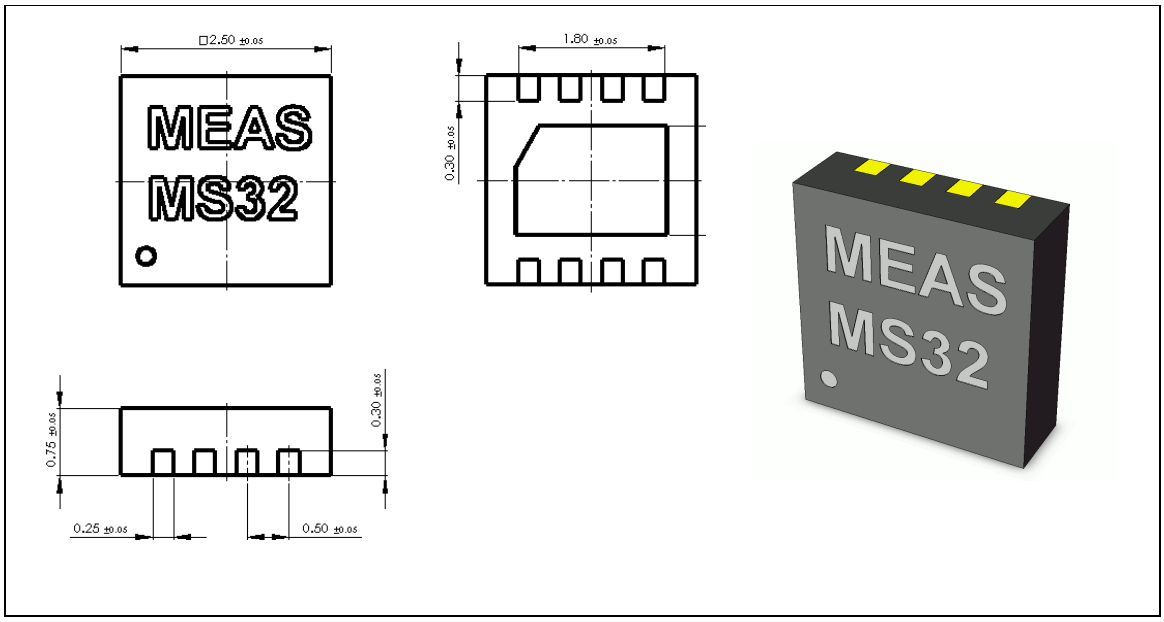


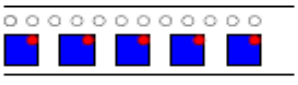
Figure 2: TDFN-outline

Pin assignment:

Pin	Symbol	Function
1	$+V_O$	positive output bridge
2	n. c.	not connected
3	n. c.	not connected
4	GND	ground
5	$-V_O$	negative output bridge
6	n. c.	not connected
7	n. c.	not connected
8	V_{CC}	supply voltage bridge

The bottom plate is designated to be a heat sink. It has no electrical connection to any pin.
The sensitive area is positioned in the center of the package.

TAPE AND REEL PACKAGING INFORMATION

Description	Size/Quantity	Note
Reel	7”	
Units/reel	3,000	MOQ
Pin 1 orientation on tape	Top-right of sprocket hole side	

SUNSTAR自动化 http://www.sensor-ic.com/ TEL: 0755-83376489 FAX:0755-83376182 E-MAIL:szss20@163.com

SUNSTAR传感与控制 http://www.sensor-ic.com/ TEL:0755-83376549 FAX:0755-83376182 E-MAIL:szss20@163.com

MS32 Switching Sensor

ORDERING INFORMATION

DEVICE	PACKAGE	PART NUMBER
Chip MS32 1)	wafer undiced	G-MRCH-022
MS32G 2)	TDFN 2.5 x 2.5	G-MRCH-017

1) MOQ is 1 wafer
2) MOQ is 1 reel

The information in this sheet has been carefully reviewed and is believed to be accurate; however, no responsibility is assumed for inaccuracies. Furthermore, this information does not convey to the purchaser of such devices any license under the patent rights to the manufacturer. Measurement Specialties, Inc. reserves the right to make changes without further notice to any product herein. Measurement Specialties, Inc. makes no warranty, representation or guarantee regarding the suitability of its product for any particular purpose, nor does Measurement Specialties, Inc. assume any liability arising out of the application or use of any product or circuit and specifically disclaims any and all liability, including without limitation consequential or incidental damages. Typical parameters can and do vary in different applications. All operating parameters must be validated for each customer application by customer's technical experts. Measurement Specialties, Inc. does not convey any license under its patent rights nor the rights of others.

SUNSTAR自动化 http://www.sensor-ic.com/ TEL: 0755-83376489 FAX:0755-83376182 E-MAIL:szss20@163.com