SENSORS

November 2017

TMR Angle Sensor

TAS series

TMR Angle Sensors

Product compatible with RoHS directive

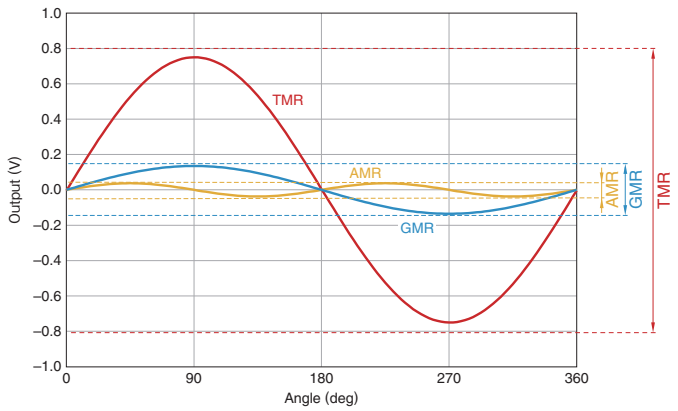
Overview of the TAS series

FEATURES

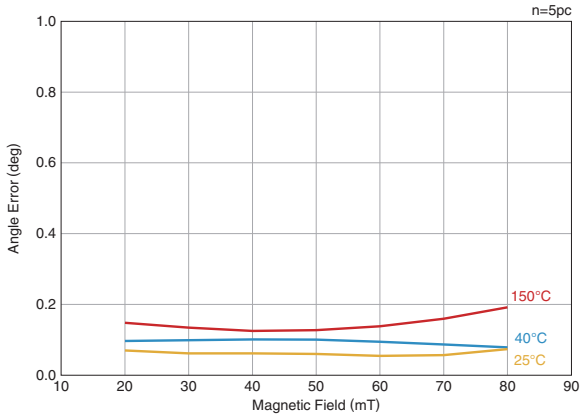
Magnetic Angle Sensor including TMR (Tunnel Magneto-Resistance) based on magnetic record sensing technology in HDD head. High-output, high-accuracy, and high-stability with low aging deterioration. Innovative TMR sensors are available in a compact package.

- High output at 1.5Vp-p/3.0Vp-p @5V
- Good angular accuracy of ±0.6deg. (1.5Vp-p differential output@5V), ±0.8deg. (3.0Vp-p differential output@5V)
- Low temperature drifts
- Low power consumption
- Detections can be made from 0 to 360°

〈Output wave pattern comparison〉TAS2141-AAAB (1.5Vp-p differential output)



〈Angle error graph〉TAS2141-AAAB (1.5Vp-p differential output)



20 times the AMR element, 6 times the GMR element, 500 times the Hall element

APPLICATION

- Steering angles
- Pedal opening, throttle valve opening
- Brushless motors
- Motors for wipers, etc.

RoHS Directive Compliant Product: See the following for more details.https://product.tdk.com/info/en/environment/rohs/index.html

TAS series

Part Number Construction

T	A	S	2	1	4	1	-	A	A	A	B
(1)	(2)	(3)	(4)	(5)	(6)	(7)		(8)	(9)	(10)	(11)

(1) Sensor technology

T	TMR

(2) Typical Application

A	Angle

(3) Sensor type

S	Sensor only

(4) Bridge/System

2	2
4	4

(5) Bridge type

1	Full bridge

(6) Sensor axes

4	XY

(7) Internal code

0	0
1	1
2	2
3	3

(8) Sensor packege

A	TSSOP8
B	TSSOP16

(9) Grade

A	Automotive

(10) Specials

A	none

(11) Product internal code

A	1
B	2

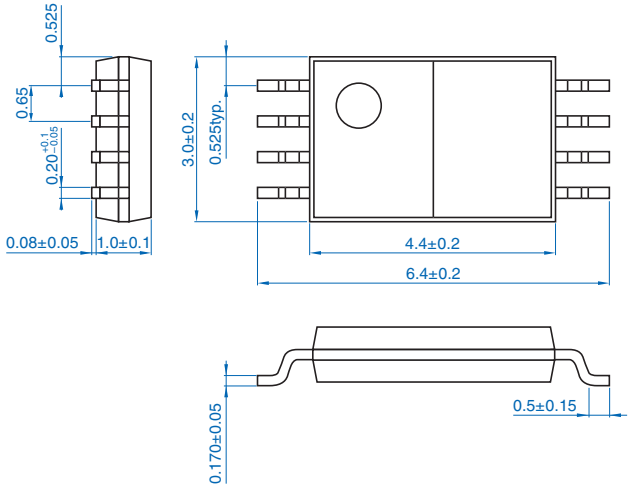
PRODUCT LINEUP

TAS2141-AAAB: 1.5Vp-p differential output@5V
TAS2143-AAAA: 3.0Vp-p differential output@5V
TAS4140-BAAB: 1.5Vp-p differential output@5V, (Corresponding to Redundancy)
TAS4142-BAAB: 3.0Vp-p differential output@5V, (Corresponding to Redundancy)

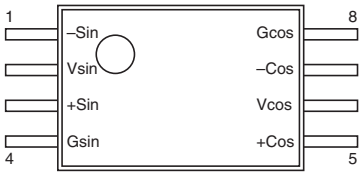
Product name	Sensor technology	Typical application	Sensor type	Bridge/ System	Bridge type	Sensor axes	Internal code	Sensor packege	Grade	Specials	Product internal code
TAS2141-AAAB	TMR	Angle	Sensor only	2	Full bridge	XY	1	TSSOP8	Automotive	none	1
TAS2143-AAAA	TMR	Angle	Sensor only	2	Full bridge	XY	2	TSSOP8	Automotive	none	1
TAS4140-BAAB	TMR	Angle	Sensor only	4	Full bridge	XY	0	TSSOP16	Automotive	none	1
TAS4142-BAAB	TMR	Angle	Sensor only	4	Full bridge	XY	1	TSSOP16	Automotive	none	1

TAS2141-AAAB(1.5Vp-p differential output@5V, 2 Full Bridge)

SHAPE & DIMENSIONS (TSSOP8)



Pin assignment



NO.	Function
1	–Sin
2	Vsin
3	+Sin
4	Gsin
5	+Cos
6	Vcos
7	–Cos
8	Gcos

Dimensions in mm

ABSOLUTE MAXIMUM RATINGS

Items	Parameter	Conditions	min.	typ.	max.	Unit
Vcc	Supply Voltage				6.5	Volt
Hex	External Magnetic field	≤5min			200	mT [1]
ESD HBM	ESD tolerance: Human Body Model				4000	Volt
ESD MM	ESD tolerance: Machine Model				400	Volt
T opt	Operating Ambient Temperature		–40		150	°C
T stg	Storage Temperature		–55		150	°C
T reflow	Reflow Temperature				260	°C

[1] 1mT = 795.8A/m.

RECOMMENDED OPERATING CONDITIONS

Items	Parameter	Conditions	min.	typ.	max.	Unit
Vcc	Supply Voltage		3	5	5.5	Volt
T opt	Operating Ambient Temperature		–40	25	150	°C
Hex	External Magnetic field		20		80	mT

ELECTRICAL CHARACTERISTICS

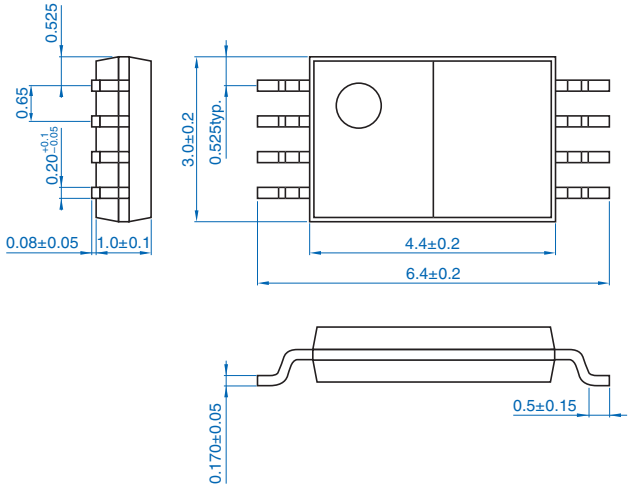
TOPT=25°C, BEXT=30mT, VSIN=2.7 to 5.5V. VCOS=2.7 to 5.5V unless otherwise specified

Items	Parameter	Conditions	min.	typ.	max.	Unit
R bridge	Bridge Resistance	T opt=25°C, Hex=30mT	4	5	6	kΩ
V out	Differential Output Voltage Peak to Peak per Vcc	T opt=25°C, Hex=30mT	0.24	0.3	0.36	V/V
Angle Error (After compensation)		T opt=–40°C to 150°C Nominal Magnetic Range: 20mT to 80mT			0.6	deg
Orthogonality		T opt=–40°C to 150°C, 20mT to 80mT	87	90	93	deg
V offset	Differenlial Output Offset as an "initial offset"	per supply Voltage, 20mT to 80mT	–5	—	5	mV/V
TC output	Temperature Coefficient of Differential Output	T opt=–40°C to 150°C, 20mT to 80mT	–0.135	–0.115	–0.095	%/K
TC R bridge	Temperature Coefficient of Bridge Resistance	T opt=–40°C to 150°C, 20mT to 80mT	–0.070	–0.050	–0.030	%/K
Hyst.	Hysteresis of Output Voltage	more than Hex=20mT	No Hysteresis			
k	Amplitude Synchronism ratio	T opt=25°C, Hex=30mT	97	100	103	%
TCk	Temperature Coefficient of Amplitude Synchronism	T opt=–40°C to 150°C, 20mT to 80mT	–0.015		0.015	%/K

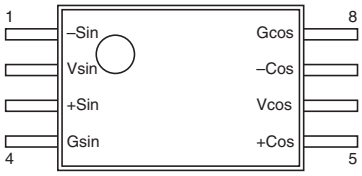
* LT=-40°C., RT=25°C., HT=150°C

TAS2143-AAAA(3.0Vp-p differential output@5V, 2 Full Bridge)

SHAPE & DIMENSIONS (TSSOP8)



Pin assignment



NO.	Function
1	–Sin
2	Vsin
3	+Sin
4	Gsin
5	+Cos
6	Vcos
7	–Cos
8	Gcos

Dimensions in mm

ABSOLUTE MAXIMUM RATINGS

Items	Parameter	Conditions	min.	typ.	max.	Unit
Vcc	Supply Voltage				6.5	Volt
Hex	External Magnetic field	≤5min			200	mT [1]
ESD HBM	ESD tolerance: Human Body Model				4000	Volt
ESD MM	ESD tolerance: Machine Model				400	Volt
T opt	Operating Ambient Temperature		–40		150	°C
T stg	Storage Temperature		–55		150	°C
T reflow	Reflow Temperature				260	°C

[1] 1mT = 795.8A/m.

RECOMMENDED OPERATING CONDITIONS

Items	Parameter	Conditions	min.	typ.	max.	Unit
Vcc	Supply Voltage		3	5	5.5	Volt
T opt	Operating Ambient Temperature		–40	25	150	°C
Hex	External Magnetic field		20		80	mT

ELECTRICAL CHARACTERISTICS

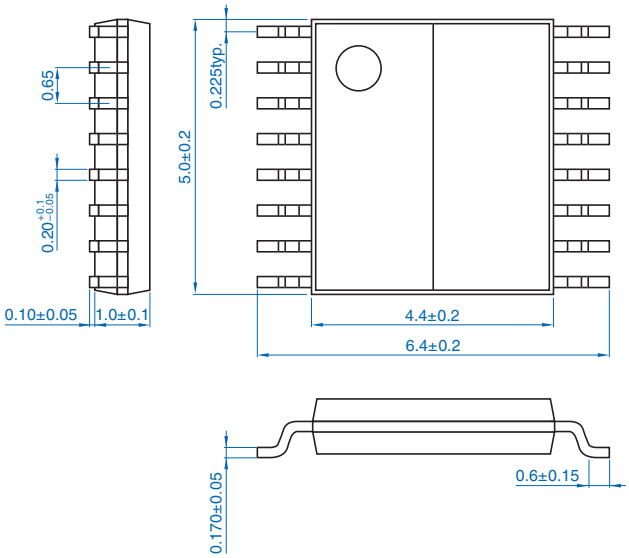
TOPT=25°C, BEXT=30mT, VSIN=2.7 to 5.5V. VCOS=2.7 to 5.5V unless otherwise specified

Items	Parameter	Conditions	min.	typ.	max.	Unit
R bridge	Bridge Resistance	T opt=25°C, Hex=30mT	4	5	6	kΩ
V out	Differential Output Voltage Peak to Peak per Vcc	T opt=25°C, Hex=30mT	0.54	0.6	0.67	V/V
Angle Error (After compensation)		T opt=–40°C to 150°C Nominal Magnetic Range: 20mT to 80mT			0.8	deg
Orthogonality		T opt=–40°C to 150°C, 20mT to 80mT	87	90	93	deg
V offset	Differenlial Output Offset as an "initial offset"	per supply Voltage, 20mT to 80mT	–5	—	5	mV/V
TC output	Temperature Coefficient of Differential Output	T opt=–40°C to 150°C, 20mT to 80mT	–0.115	–0.095	–0.075	%/K
TC R bridge	Temperature Coefficient of Bridge Resistance	T opt=–40°C to 150°C, 20mT to 80mT	–0.070	–0.050	–0.030	%/K
Hyst.	Hysteresis of Output Voltage	more than Hex=20mT	No Hysteresis			
k	Amplitude Synchronism ratio	T opt=25°C, Hex=30mT	97	100	103	%
TCk	Temperature Coefficient of Amplitude Synchronism	T opt=–40°C to 150°C, 20mT to 80mT	–0.015		0.015	%/K

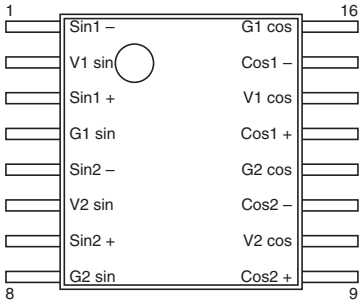
* LT=-40°C., RT=25°C., HT=150°C

TAS4140-BAAB (1.5Vp-p differential output@5V, 4 Full Bridge(Corresponding to Redundancy))

SHAPE & DIMENSIONS (TSSOP16)



Pin assignment



NO.	Function
1	Sin1 –
2	V1 sin
3	Sin1 +
4	G1 sin
5	Sin2 –
6	V2 sin
7	Sin2 +
8	G2 sin
9	Cos2 +
10	V2 cos
11	Cos2 –
12	G2 cos
13	Cos1 +
14	V1 cos
15	Cos1 –
16	G1 cos

Dimensions in mm

ABSOLUTE MAXIMUM RATINGS

Items	Parameter	Conditions	min.	typ.	max.	Unit
Vcc	Supply Voltage				6.5	Volt
Hex	External Magnetic field	≤5min			200	mT [1]
ESD HBM	ESD tolerance: Human Body Model				4000	Volt
ESD MM	ESD tolerance: Machine Model				400	Volt
T opt	Operating Ambient Temperature		–40		150	°C
T stg	Storage Temperature		–55		150	°C
T reflow	Reflow Temperature				260	°C

[1] 1mT = 795.8A/m.

RECOMMENDED OPERATING CONDITIONS

Items	Parameter	Conditions	min.	typ.	max.	Unit
Vcc	Supply Voltage		3	5	5.5	Volt
T opt	Operating Ambient Temperature		–40	25	150	°C
Hex	External Magnetic field		20		80	mT

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TOPT=25°C, BEXT=30mT, VSIN=2.7 to 5.5V. VCOS=2.7 to 5.5V unless otherwise specified

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R bridge	Bridge Resistance	T opt=25°C, Hex=30mT	4	5	6	kΩ
V out	Differential Output Voltage Peak to Peak per Vcc	T opt=25°C, Hex=30mT	0.24	0.3	0.36	V/V
Angle Error (After compensation)		T opt=–40°C to 150°C Nominal Magnetic Range: 20mT to 80mT			0.6	deg
Orthogonality		T opt=–40°C to 150°C, 20mT to 80mT	87	90	93	deg
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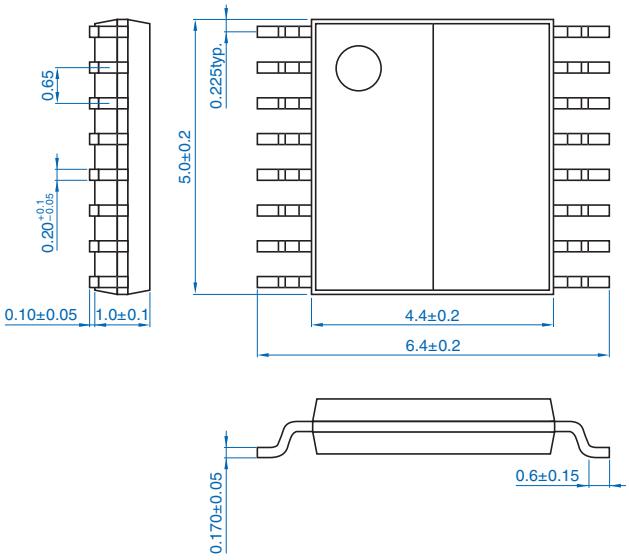
TAS4142-BAAB(3.0Vp-p differential output@5V, 4 Full Bridge(Corresponding to Redundancy))

SHAPE & DIMENSIONS (TSSOP16)



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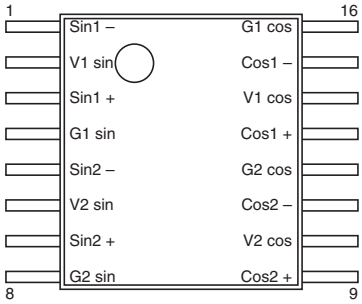

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9	Cos2 +
10	V2 cos
11	Cos2 –
12	G2 cos
13	Cos1 +
14	V1 cos
15	Cos1 –
16	G1 cos

Dimensions in mm

ABSOLUTE MAXIMUM RATINGS

Items	Parameter	Conditions	min.	typ.	max.	Unit
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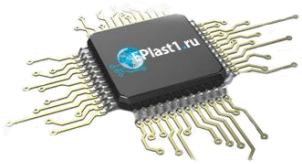
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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