SENSORS

November 2017

TMR Angle Sensor

TAS series

TMR Angle Sensors

Product compatible with RoHS directive

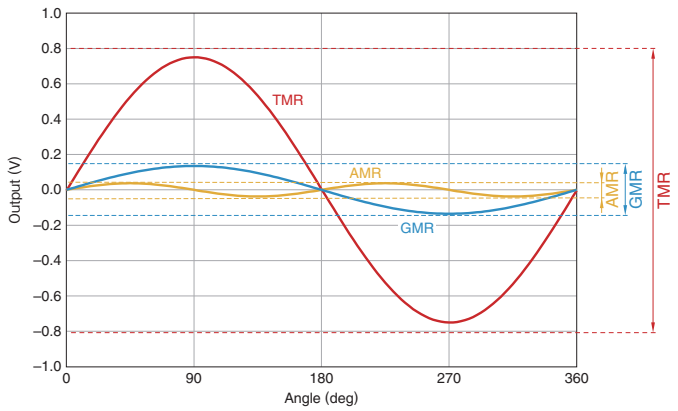
Overview of the TAS series

FEATURES

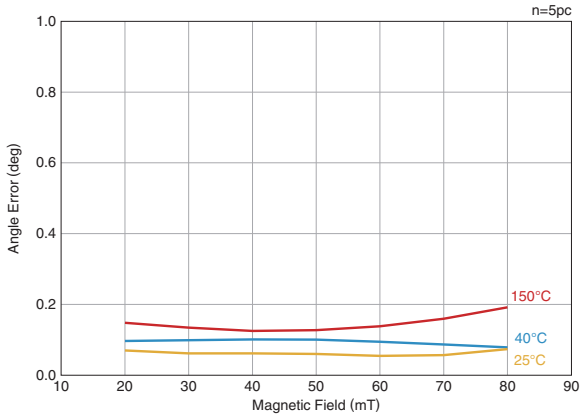
Magnetic Angle Sensor including TMR (Tunnel Magneto-Resistance) based on magnetic record sensing technology in HDD head. High-output, high-accuracy, and high-stability with low aging deterioration. Innovative TMR sensors are available in a compact package.

- 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

⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use.
Please note that the contents may change without any prior notice due to reasons such as upgrading.

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

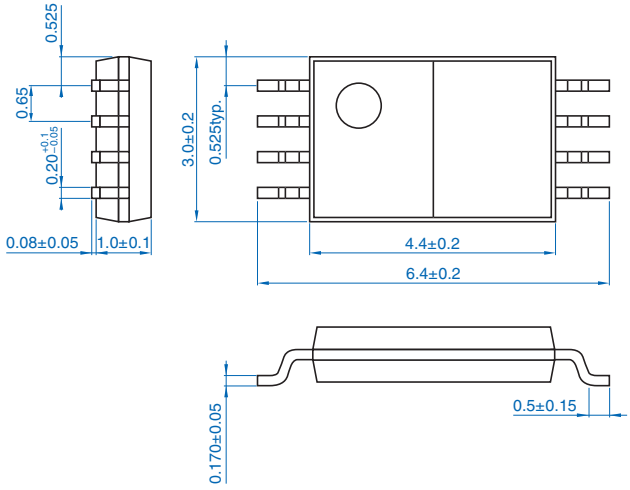
TAS2141-AAAB: 1.5Vp-p differential output@5V
TAS2143-AAAA: 3.0Vp-p differential output@5V
TAS4140-BAAB: 1.5Vp-p differential output@5V, (Corresponding to Redundancy)
TAS4142-BAAB: 3.0Vp-p differential output@5V, (Corresponding to Redundancy)

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

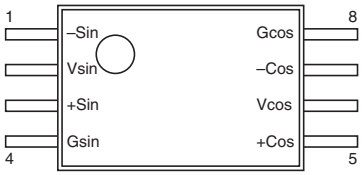
⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use.
Please note that the contents may change without any prior notice due to reasons such as upgrading.

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

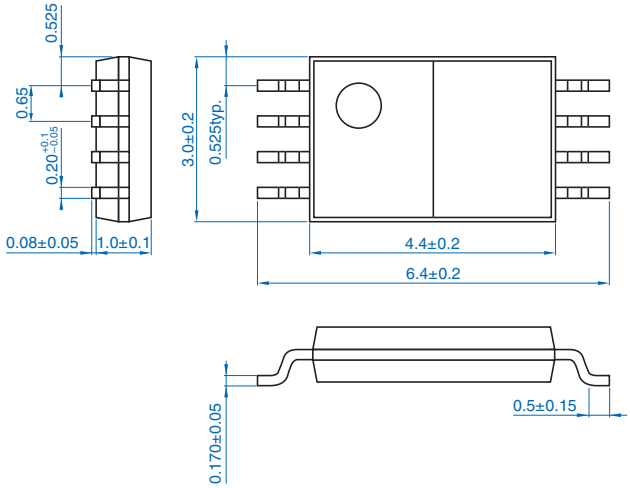
Items	Parameter	Conditions	min.	typ.	max.	Unit
R bridge	Bridge Resistance	T opt=25°C, Hex=30mT	4	5	6	kΩ
V out	Differential Output Voltage Peak to Peak per Vcc	T opt=25°C, Hex=30mT	0.24	0.3	0.36	V/V
Angle Error (After compensation)		T opt=–40°C to 150°C Nominal Magnetic Range: 20mT to 80mT			0.6	deg
Orthogonality		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

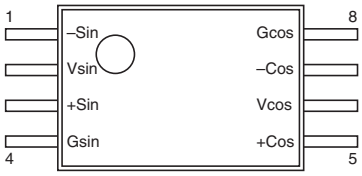
⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use.
Please note that the contents may change without any prior notice due to reasons such as upgrading.

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

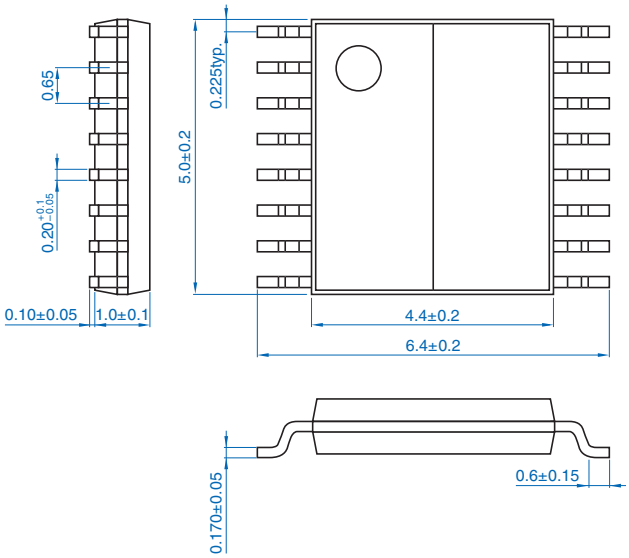
Items	Parameter	Conditions	min.	typ.	max.	Unit
R bridge	Bridge Resistance	T opt=25°C, Hex=30mT	4	5	6	kΩ
V out	Differential Output Voltage Peak to Peak per Vcc	T opt=25°C, Hex=30mT	0.54	0.6	0.67	V/V
Angle Error (After compensation)		T opt=–40°C to 150°C Nominal Magnetic Range: 20mT to 80mT			0.8	deg
Orthogonality		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

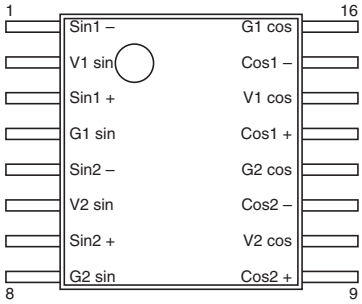
⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use.
Please note that the contents may change without any prior notice due to reasons such as upgrading.

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

ELECTRICAL CHARACTERISTICS

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

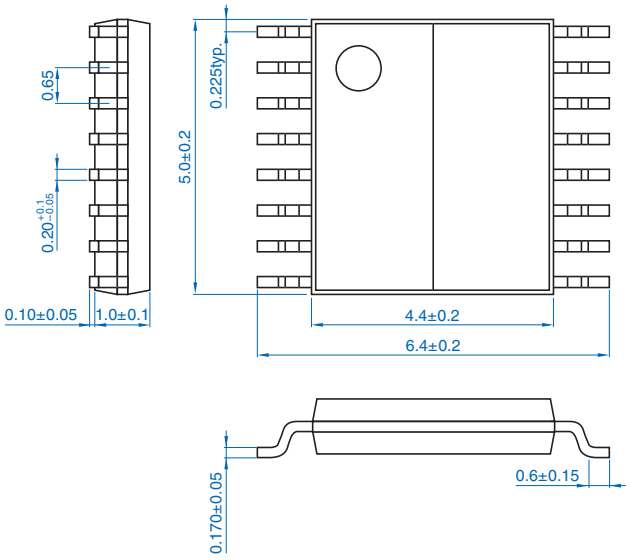
Items	Parameter	Conditions	min.	typ.	max.	Unit
R bridge	Bridge Resistance	T opt=25°C, Hex=30mT	4	5	6	kΩ
V out	Differential Output Voltage Peak to Peak per Vcc	T opt=25°C, Hex=30mT	0.24	0.3	0.36	V/V
Angle Error (After compensation)		T opt=–40°C to 150°C Nominal Magnetic Range: 20mT to 80mT			0.6	deg
Orthogonality		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

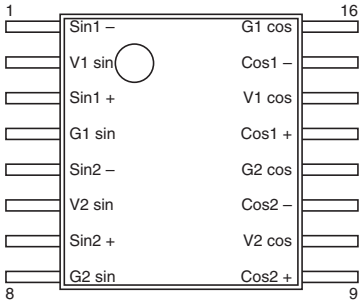
⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use.
Please note that the contents may change without any prior notice due to reasons such as upgrading.

TAS4142-BAAB(3.0Vp-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

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

⚠ Please be sure to request delivery specifications that provide further details on the features and specifications of the products for proper and safe use.
Please note that the contents may change without any prior notice due to reasons such as upgrading.

LifeElectronics
Живое партнерство

ООО «ЛайфЭлектроникс» **“LifeElectronics” LLC**

ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

Тел: +7 (812) 336 43 04 (многоканальный)
Email: org@lifeelectronics.ru

www.lifeelectronics.ru