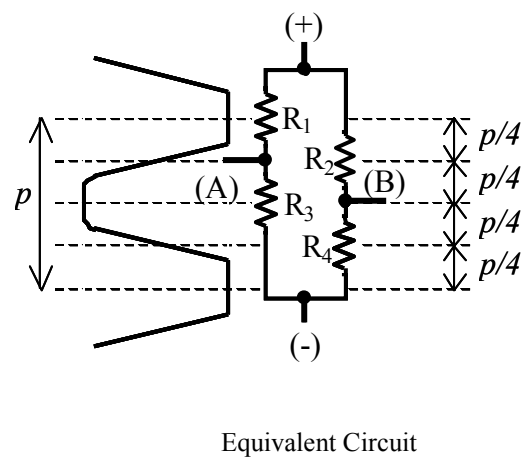
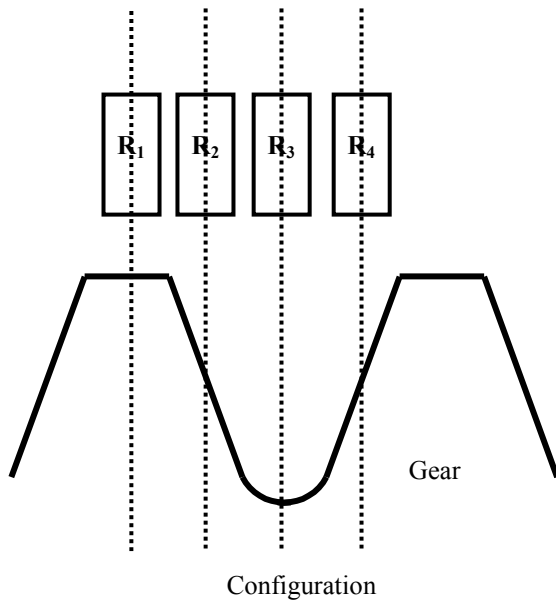


MS-0041

Semiconductor Magnetoresistive Element

Semiconductor Magnetoresistive Element Composition

MS-0041 is used as rotation sensor for gear (module: $M=0.4$), combining bias magnet.
 MS-0041 generates A/B phase analog outputs, rotating the gear.



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Junction Temperature	T_j	-40	150	$^{\circ}\text{C}$	
Storage Temperature	T_{stg}	-40	150	$^{\circ}\text{C}$	

Note) Stresses beyond these listed values may cause permanent damage to the device.

Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Max. Input Power	PD			460	mW	$T_a=25^{\circ}\text{C}$
Operating Temperature	T_a	-40		125	$^{\circ}\text{C}$	

Note) Stresses beyond these listed values may cause permanent damage to the device.

Magnetic & Electrical Characteristics
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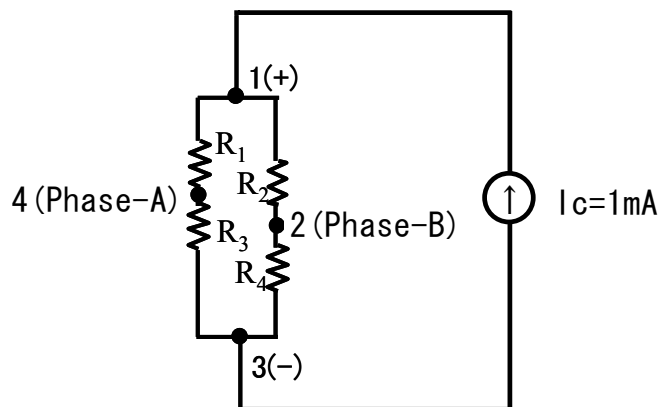
Condition: Ta =25°C

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Input Resistance	Rin(0)	Ic=1mA B=0T	270		375	Ω	*1
Output Resistance	Rout(0)	Ic=1mA B=0T	270		375	Ω	*1
Input Resistance Change Ratio	$\Delta R_{in}/R_{in}$	Ic=1mA B=0/0.45T	130			%	*2
Output Resistance Change Ratio	$\Delta R_{out}/R_{out}$	Ic=1mA B=0/0.45T	130			%	*2
Phase-A Voltage	V _A (0)	V _c =5V, B=0T	2.46	2.50	2.54	V	*3
Phase-B Voltage	V _B (0)	V _c =5V, B=0T	2.46	2.50	2.54	V	*3
Phase-A Voltage	V _A (B)	V _c =5V, B=0.45T	2.46	2.50	2.54	V	*4
Phase-B Voltage	V _B (B)	V _c =5V, B=0.45T	2.46	2.50	2.54	V	*4

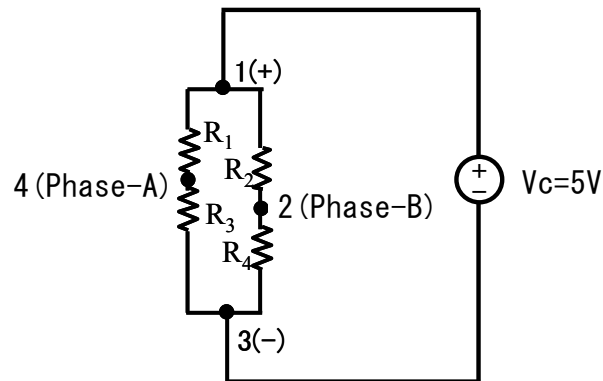
(1T=10kGauss)

*1 Rin(0): Resistance between 1pin(+) and 3pin(-) in B=0T
 Rout(0): Resistance between 4pin(A) and 2pin(B) in B=0T

*2 $\Delta R_{in}/R_{in} = (R_{in}(B)-R_{in}(0))/R_{in}(0)$ Rin(B): B=0.45T
 $\Delta R_{out}/R_{out} = (R_{out}(B)-R_{out}(0))/R_{out}(0)$ Rout(B): B=0.45T

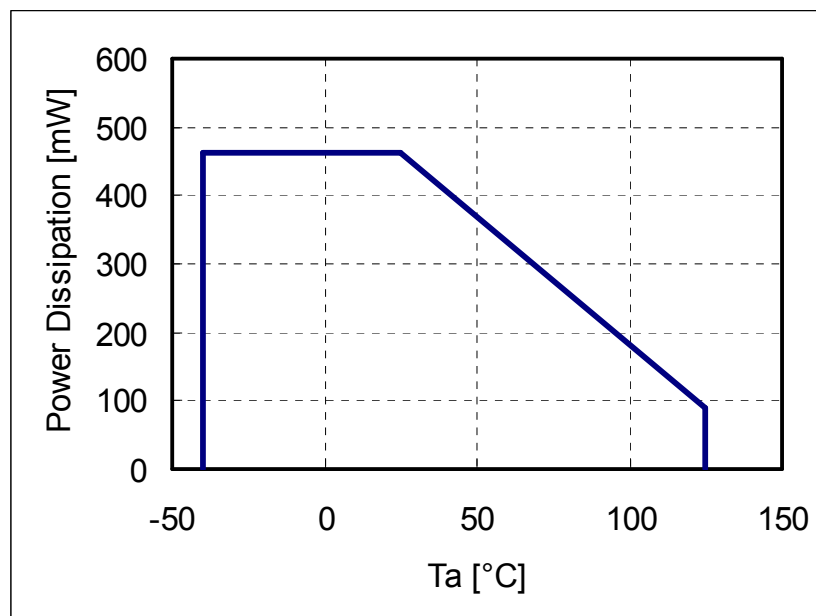
Measurement circuit of Rin(0), Rout(0), $\Delta R_{in}/R_{in}$, $\Delta R_{out}/R_{out}$

- *3 $V_A(0)$: The voltage at 4pin
 $V_B(0)$: The voltage at 2pin
 <Measurement conditions>
 1. $V_C=5V$ between 1pin and 3pin
 2. $B=0T$.
- *4 $V_A(B)$: The voltage at 4pin
 $V_B(B)$: The voltage at 2pin
 <Measurement conditions>
 1. $V_C=5V$ between 1pin and 3pin
 2. $B=0.45T$.



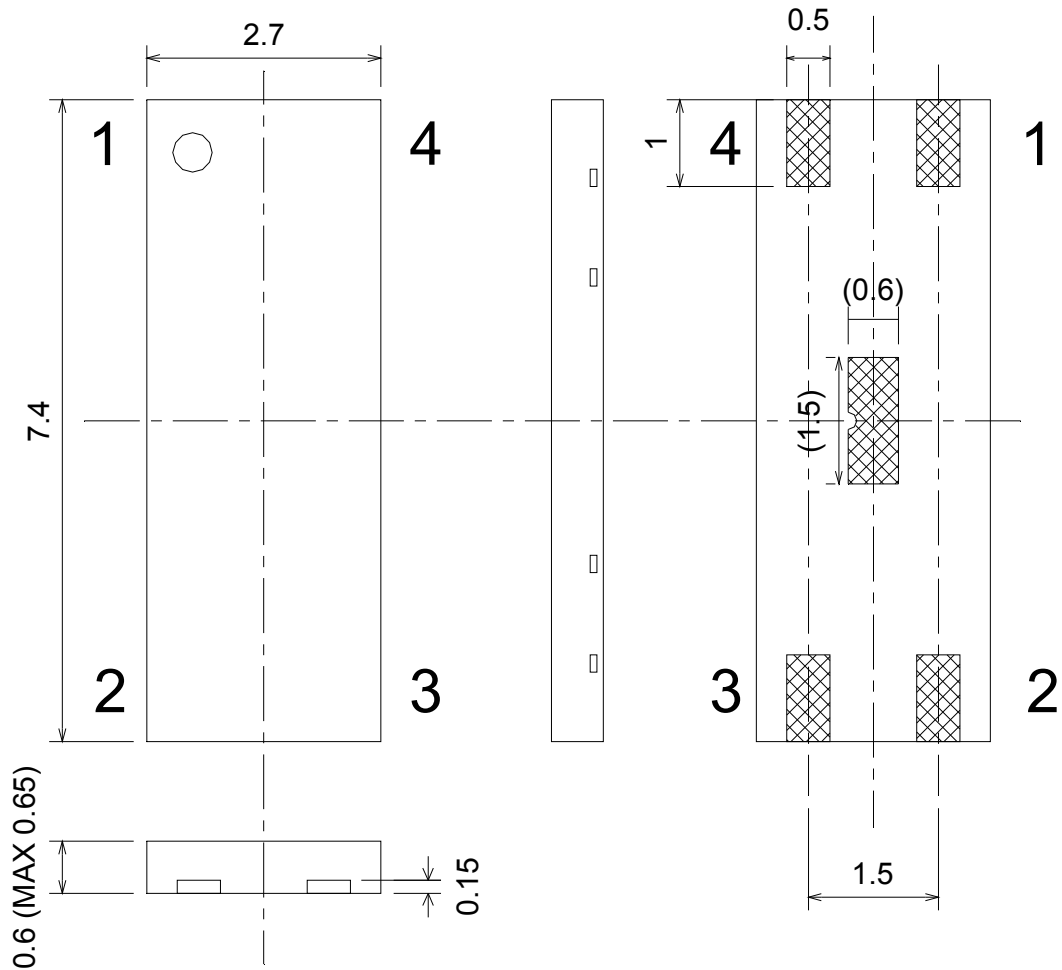
Measurement circuit of $V_A(0)$, $V_B(0)$, $V_A(B)$, $V_B(B)$

Power Dissipation



Package Information

Dimensional Outline Drawing



Unit: mm

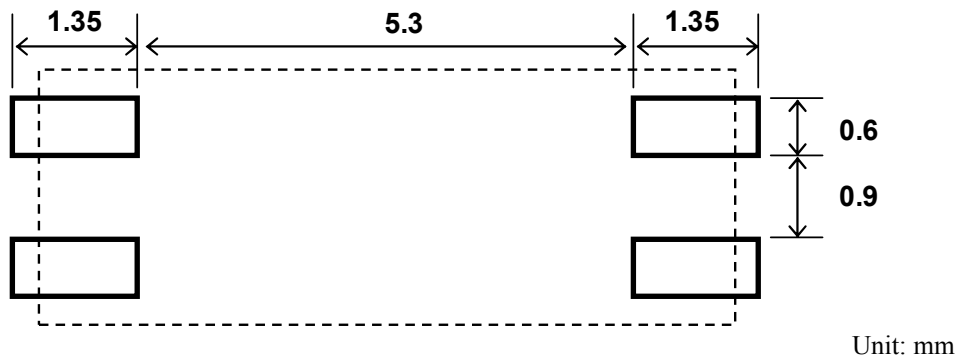
Material of terminals: Copper alloy

Material of plating: Sn 100%

*The tolerances of dimensions with no mentions is ± 0.1 mm

Note) The metal portions on the package side (support lead) and the center metal area (1.5mm×0.6mm) behind the package are connected to the internal circuits. The support lead and the metal area should be isolated from the external circuit and the other support lead.

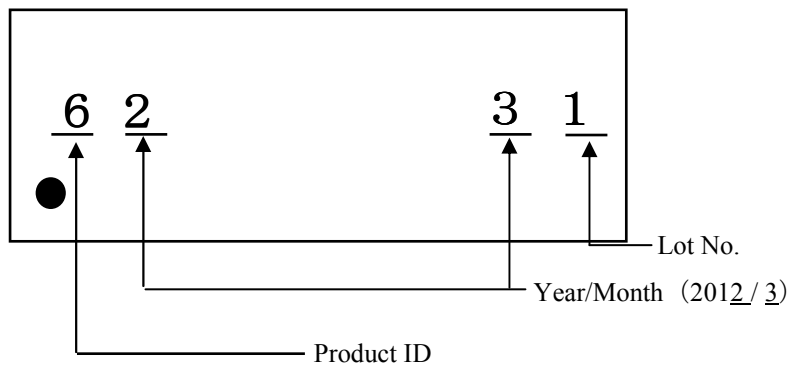
Recommended Land Pattern (reference)



Marking

Marking is performed by laser.

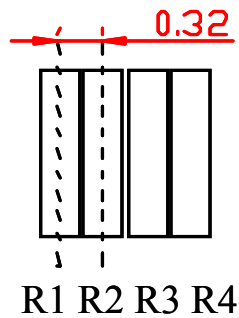
Ex.)



Product Distinction No		Year		Month	
Mark	Product ID	Mark	Corresponding YR.	Mark	Corresponding Mo.
1		0~9	The end figure of the Christian era	1	January
2				2	February
3				3	March
4				4	April
5				5	May
6	MS-0041			6	June
7				7	July
8				8	August
9				9	September
0				0	October
				A	November
				B	December

Sensor Arrangement (reference)

Unit: mm



RoHS Compliance

MS-0041 is compliant with RoHS Directive 2002/95/EC.

Reliability Test

No.	Parameter	Test Condition	n	Time	Criteria (Ta=25°C)
1	Temperature Humidity Storage	Ta=85°C Relative Humidity=85%	22	1000hr	1. Rin(0) and Rout(0) are within ±20% of initial value. 2. VA(0), VB(0), VA(B) and VB(B) are 2.50V ±0.06V. 3. ΔR/R is over 130%
2	Operating Life Test	Ta=125°C, Vc=4.2V	22	1000hr	Same as the above
3	High Temperature Storage	Ta=150°C	22	1000hr	Same as the above
4	Heat Cycle	-55°C → 25°C → 150°C 30min. ← 5min. ← 30min.	22	100Cycle	Same as the above

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