

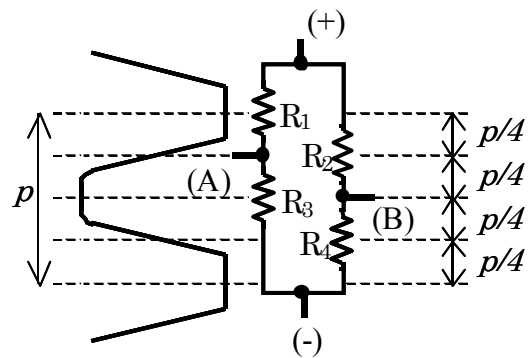
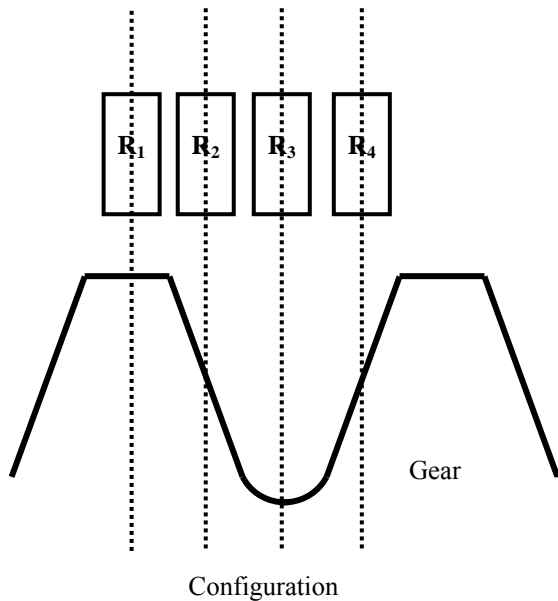
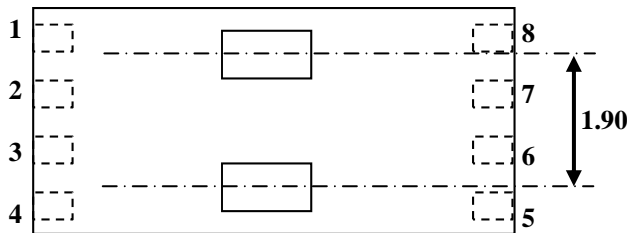


MS-0042

Semiconductor Magnetoresistive Element

Semiconductor Magnetoresistive Element Composition

MS-0042 is used as rotation sensor for gear (module: $M=0.4$), combining bias magnet.
 MS-0042 generates A/B phase and Za/Zb phase analog outputs, rotating the gear. (MS-0042 includes 2 sensor chips in 1 package for A/B phase and Za/Zb phase.)
 The pitch between one sensor and the other is 1.90mm.



Equivalent Circuit

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Junction Temperature	Tj	-40	150	°C	
Storage Temperature	Tstg	-40	150	°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			490	mW	Ta=25°C
Operating Temperature	Topr	-40		125	°C	

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

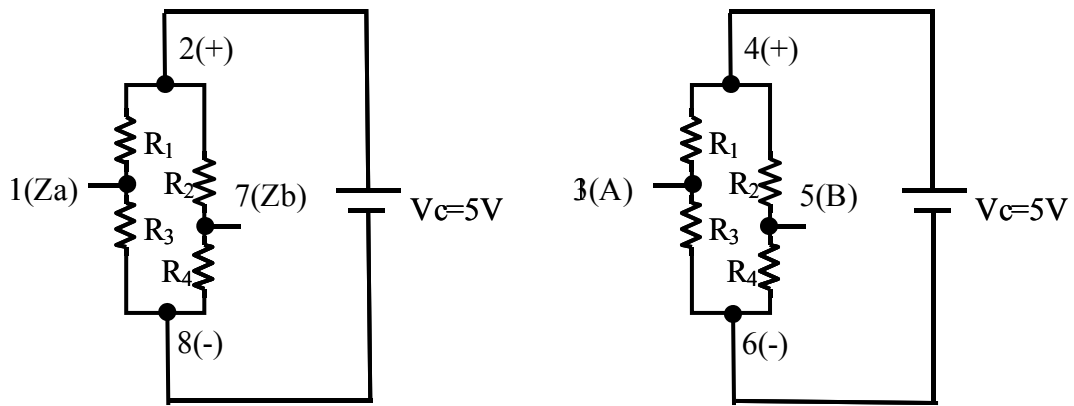
Magnetic & Electrical Characteristics

Ta=25°C

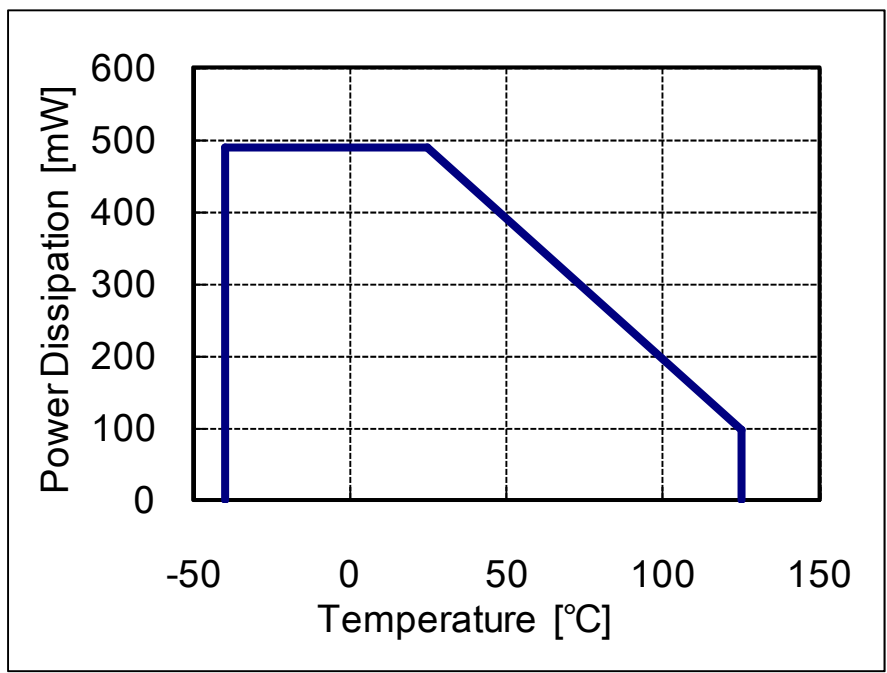
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Input Resistance	Rin(0)	Ic=1mA B=0T	290		420	Ω	*1
Output Resistance	Rout(0)	Ic=1mA B=0T	290		420	Ω	*1
Input Resistance Change Ratio	$\Delta R_{in}/R_{in}$	Ic=1mA B=0/0.45T	130			%	*2
Output Resistance Change Ratio	$\Delta R_{out}/R_{out}$	Ic=1mA B=0/0.45T	130				
Phase-A Voltage	V _A (0)	Vc=5V, B=0T	2.46	2.50	2.54	V	*3
Phase-B Voltage	V _B (0)	Vc=5V, B=0T	2.46	2.50	2.54	V	*3
Phase-A Voltage	V _A (B)	Vc=5V, B=0T	2.46	2.50	2.54	V	*4
Phase-B Voltage	V _B (B)	Vc=5V, B=0T	2.46	2.50	2.54	V	*4

(1T=10kGauss)

- *1 Rin(0): Resistance between 2pin(+) and 8pin(-) in B=0T and
Resistance between 4pin(+) and 6pin(-) in B=0T
Rout(0): Resistance between 1pin(Za) and 7pin(Zb) in B=0T and
Resistance between 3pin(A) and 5pin(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
- *3 V_A(0): Output Voltage of 1pin(Za) with Vc=5V and B=0T and
Output Voltage of 3pin(A) with Vc=5V and B=0T
V_B(0): Output Voltage of 7pin(Zb) with Vc=5V and B=0T and
Output Voltage of 5pin(B) with Vc=5V and B=0T
- *4 V_A(B): Output Voltage of 1pin(Za) with Vc=5V and B=0.45T and
Output Voltage of 3pin(A) with Vc=5V and B=0.45T
V_B(B): Output Voltage of 7pin(Zb) with Vc=5V and B=0.45T and
Output Voltage of 5pin(B) with Vc=5V and B=0.45T



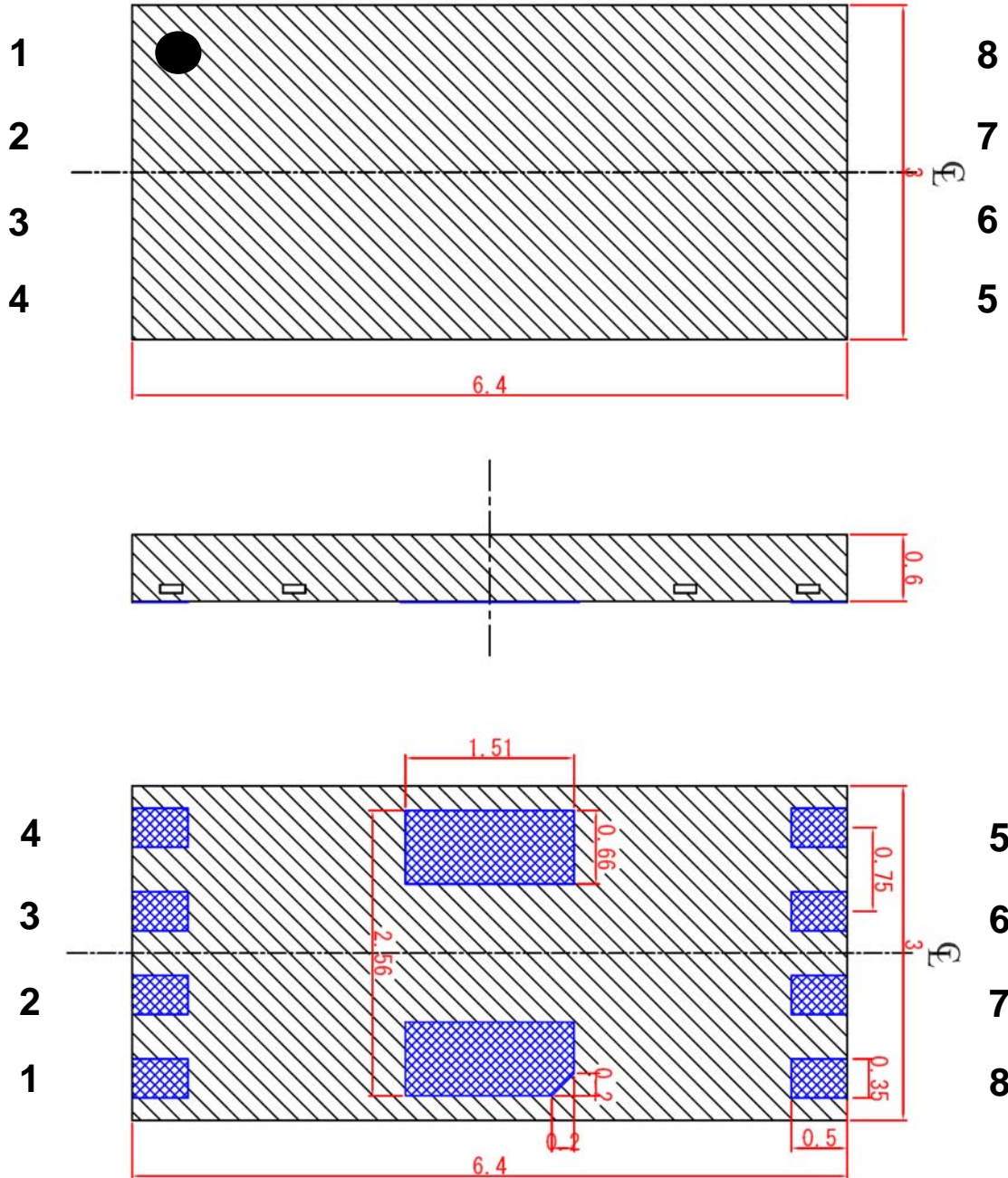
Power Dissipation



Power dissipation shows the power dissipation of 2 SMRE chips.

Package Information

□ Dimensional Outline Drawing (Unit:mm)



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

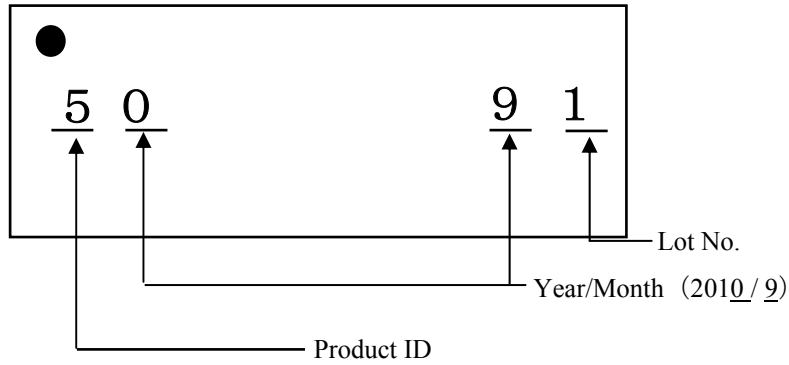
Reliability Test

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. ΔRin/Rin and ΔRout/Rout are over 130%
2	Operating Life Test	Ta=125°C (Vc:3.2V...Tj=150°C)	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

Marking

Marking is performed by laser.

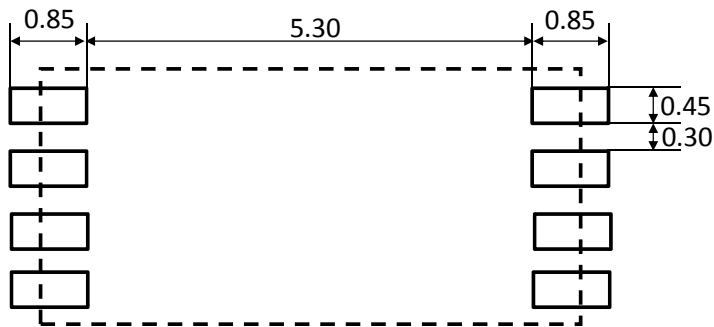
Ex.)



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	MS-0042			5	May
6				6	June
7				7	July
8				8	August
9				9	September
0				0	October
				A	November
				B	December

Land Pattern (reference)

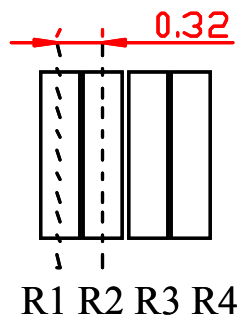
Unit: mm



*The center island is not be connected.

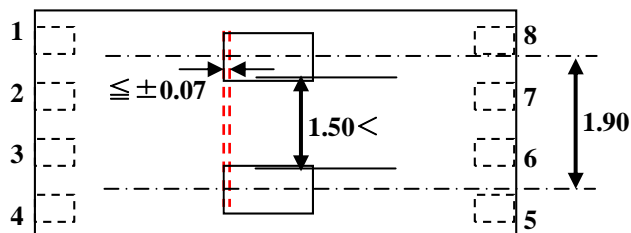
Sensor Arrangement (reference)

Unit: mm



Sensor Configuration (reference)

Unit: mm



The distance between one sensor and the other is over 1.5mm.
(This item is not assured, and not tested.)

The relative position error of 2 sensor chips in rotating direction is under 0.07mm.
(This item is not assured, and not tested.)

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