

SONY**DM-111A****Magneto-Resistance Element****Description**

The DM-111A is a highly sensitive magnetic resistance element, composed of an evaporated ferromagnetic alloy on a silicon substrate. The element can be used for detection of rotational speed and for detection of angle of rotation and as a detection of position.

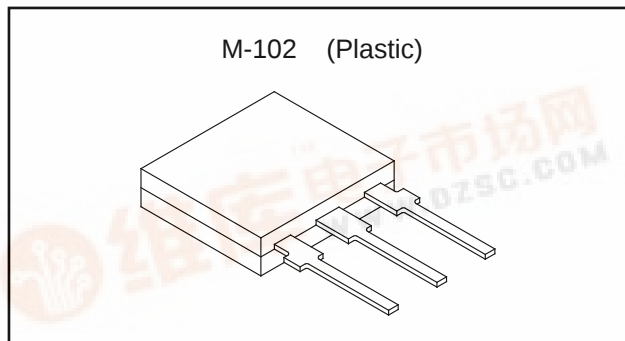
Features

- Low power consumption
38 μ W (Typ.) at $V_{CC}=5V$
- Low magnetic field and high sensitivity
75mVp-p (Typ.) at $V_{CC}=5V$
and $H=4000A/m$
- High reliability
Ensured through silicon nitride protective filming

Absolute Maximum Ratings ($T_a=25^{\circ}C$)

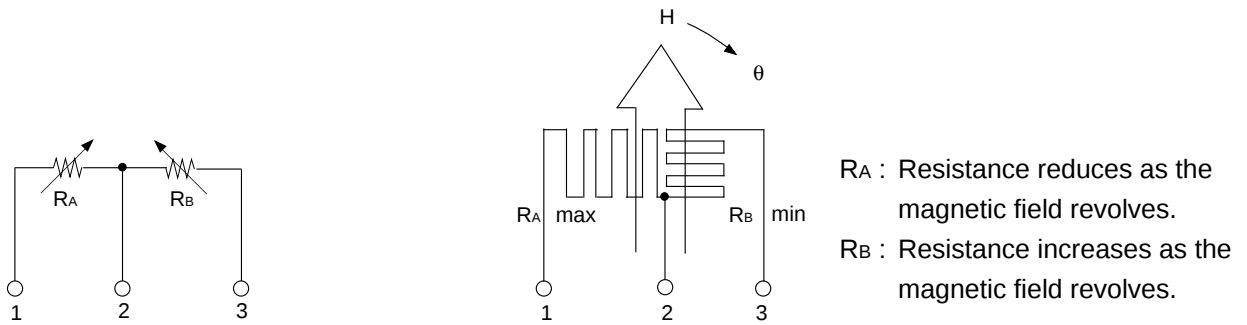
- | | | | |
|-------------------------|-----------|-------------|-------------|
| • Supply voltage | V_{CC} | 10 | V |
| • Operating temperature | T_{opr} | -40 to +80 | $^{\circ}C$ |
| • Storage temperature | T_{stg} | -50 to +100 | $^{\circ}C$ |

Recommended Operating Condition	5	V
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**Electrical Characteristics**($T_a=25^{\circ}C$)

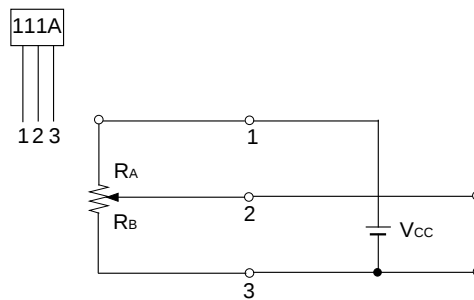
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Total resistance	R_T	$H=4000A/m, \theta=45^{\circ}$	500	650	800	$k\Omega$
Midpoint potential	V_C	$V_{CC}=5V, H=4000A/m$ Revoiving magnetic field	2.47	2.50	2.53	V
Output voltage	V_O	$V_{CC}=5V, H=4000A/m$ Revoiving magnetic field	30	75		mVp-p

Equivalent Circuit

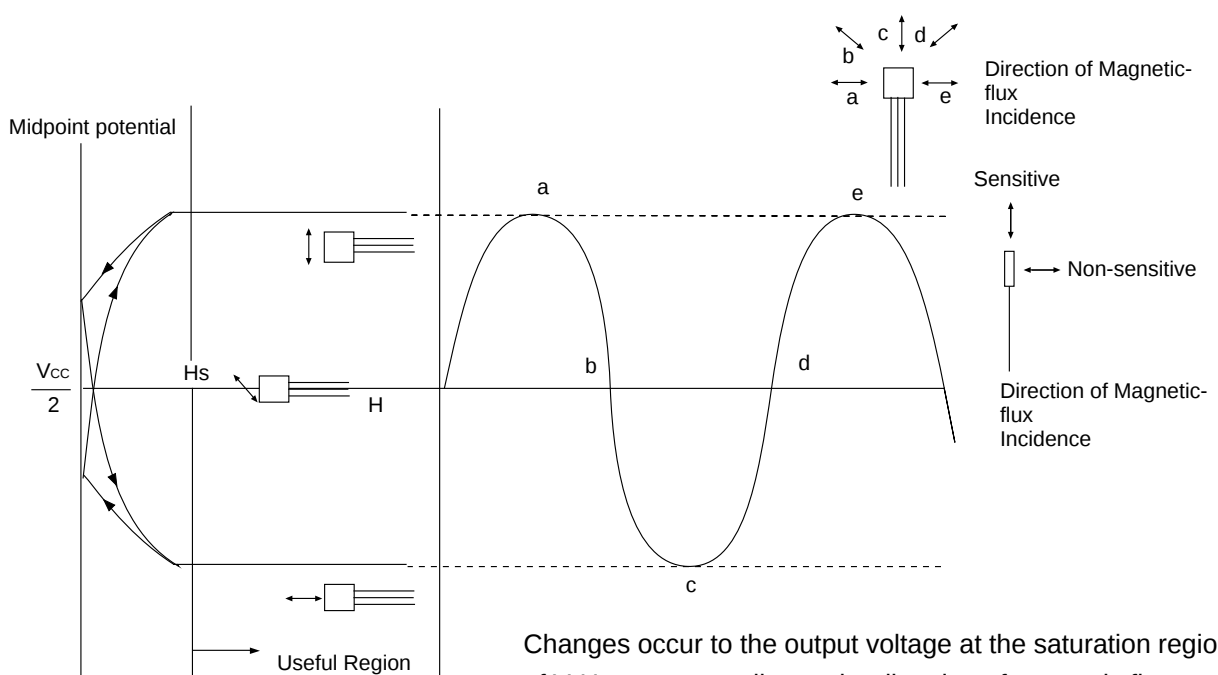


Introduction

1) Power supplying pin output pin



2) Sensitive direction vs. Midpoint potential

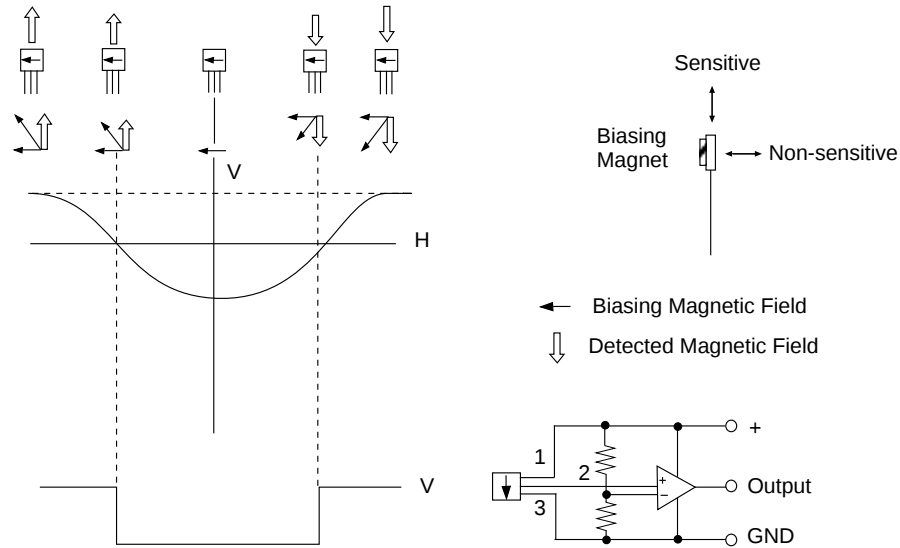


Changes occur to the output voltage at the saturation region of V-H curve according to the direction of magnetic flux.

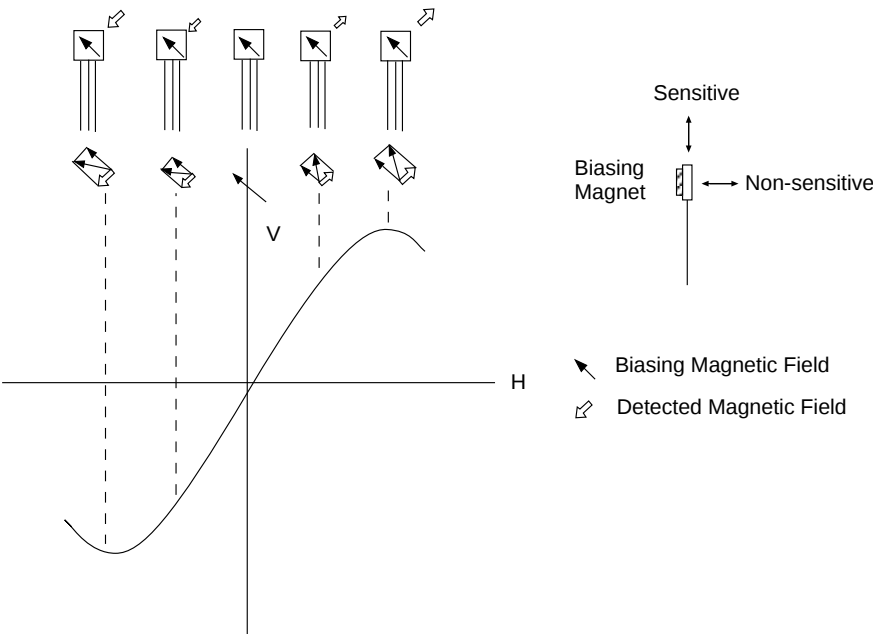
These changes provide for the operation.

- With one rotation of magnetic flux, signals for 2 periods are obtained.

3) 0° Biasing magnetic field
(Switching use)

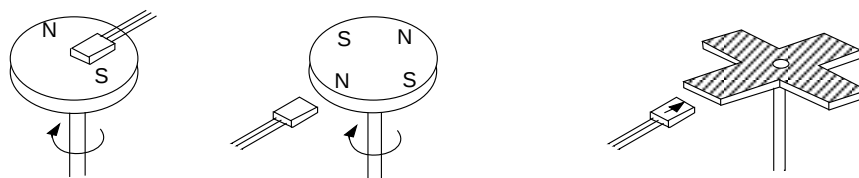


4) 45° Biasing magnetic field
(Analog use)

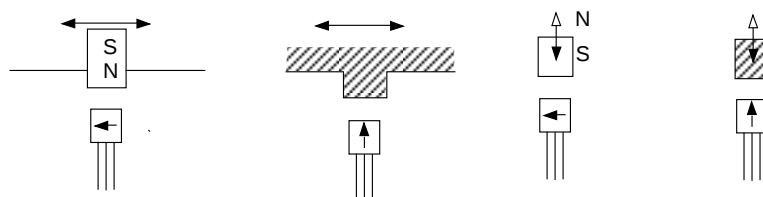


Applications

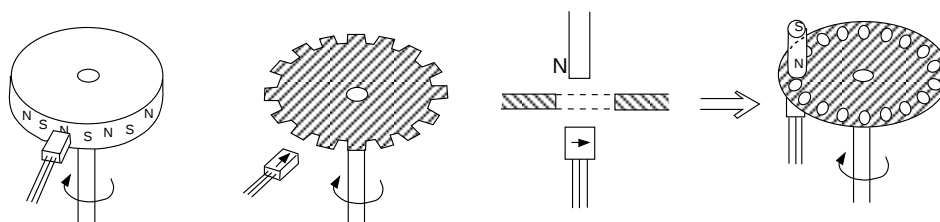
1. Detection of revolution



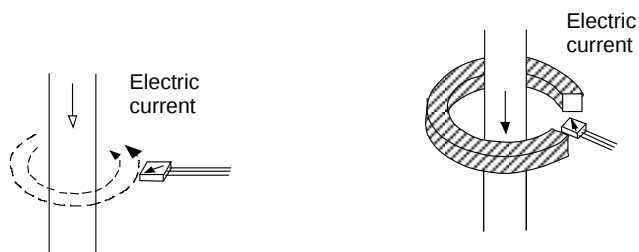
2. Position detecting



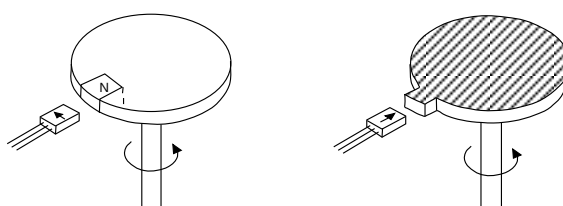
3. Angular detection of rotating wheel



4. Reading out of analog value



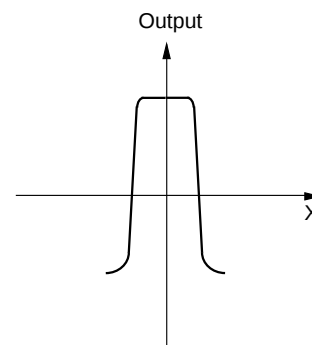
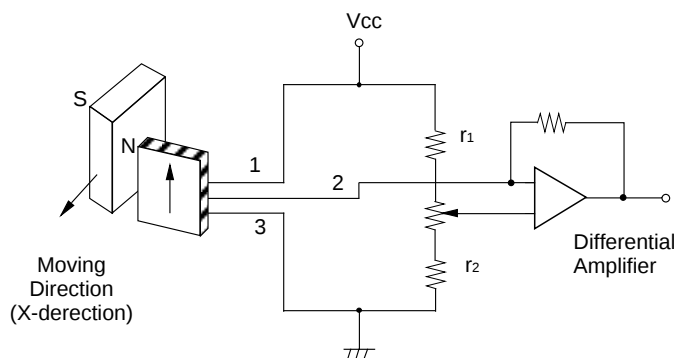
5. Position detecting of revolving element



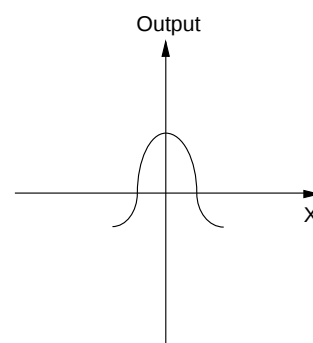
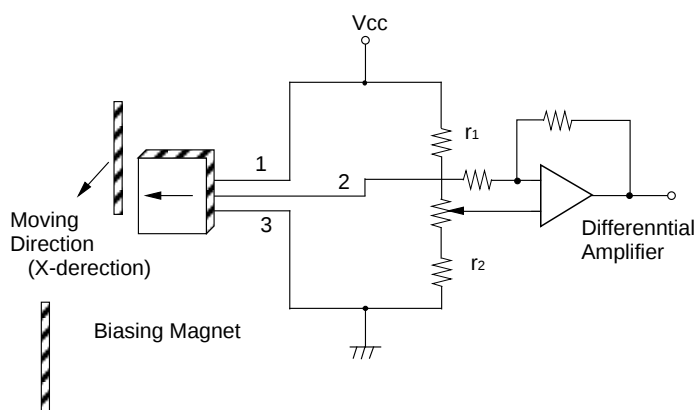
 Magnetic conductors

Circuits

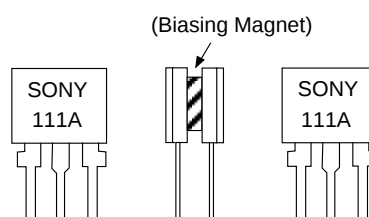
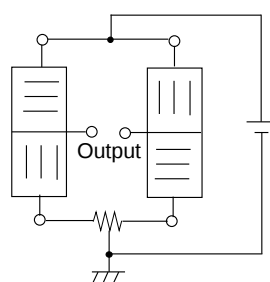
2), 3), 5)



1), 2), 3), 5)



Bridge Circuits



By coupling 2 pieces back to back and sticking them together in a bridge, the output voltage is doubled.

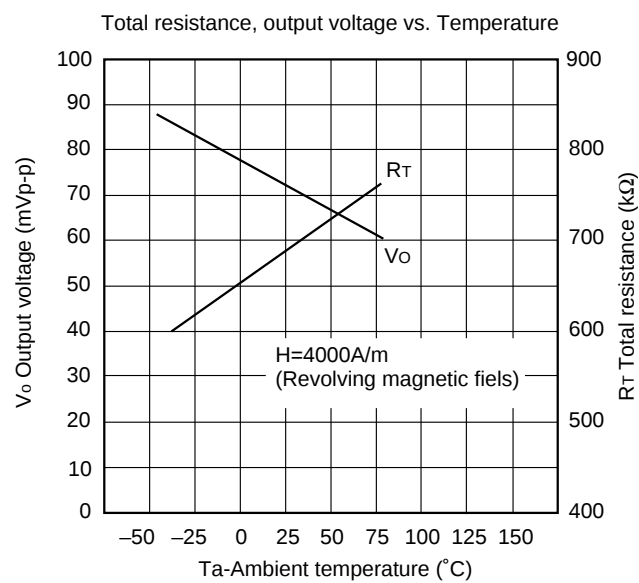
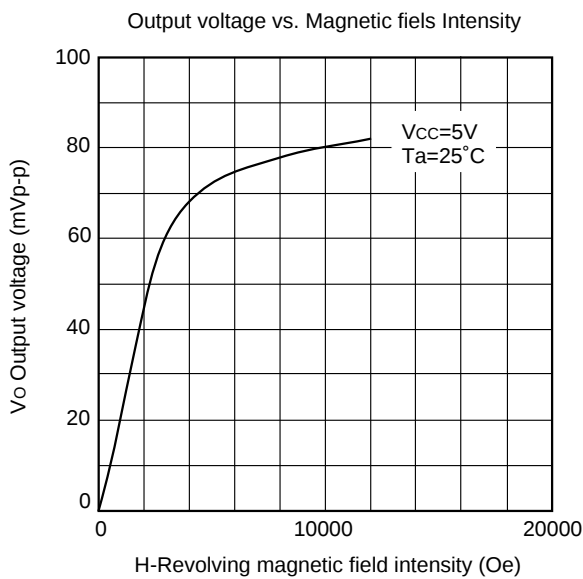
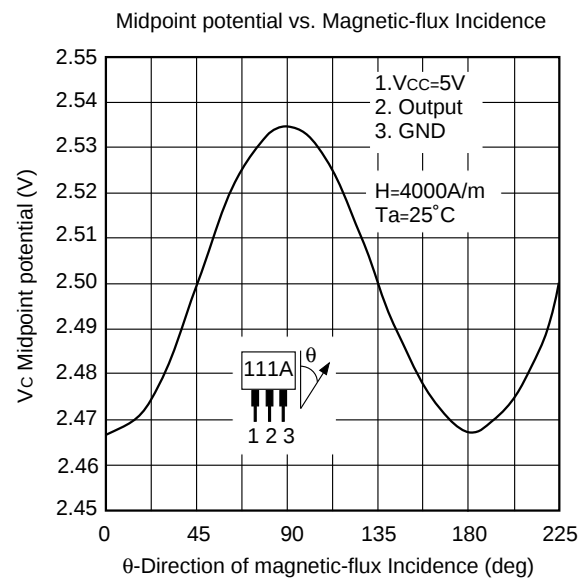
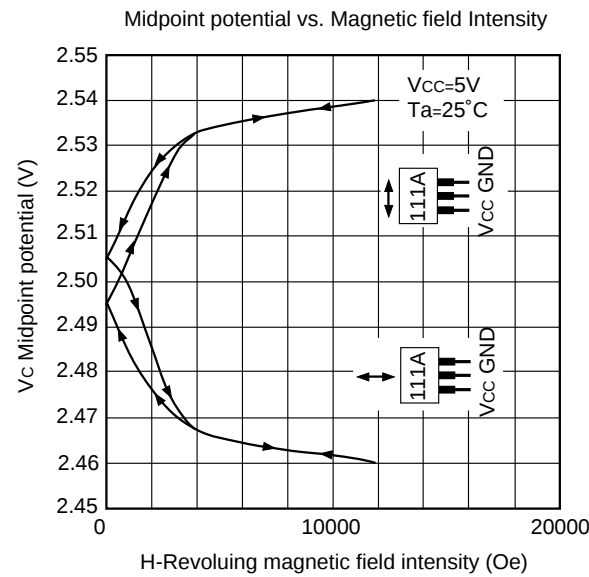
How to make a Biasing Magnetic Field

- Stick a rubber of ferrite biasing magnet
- Position an element between the poles of the permanent magnet.

Notes on Application

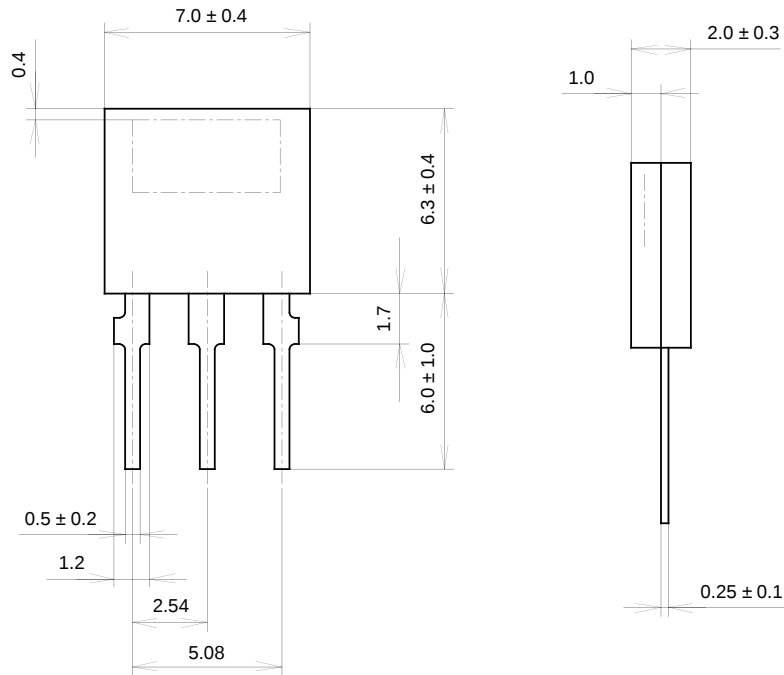
- Excute the solder of the lead line within 10 seconds at a temperature below 260°C
- To fix the ELEMENTS: When glue is used, DO NOT apply mechanical stress to the elements.
- Do not use this element in the dewy condition.

Example Representative Characteristics



Package Outline Unit : mm

M-102



SONY CODE	M-102
EIAJ CODE	_____
JEDEC CODE	_____

PACKAGE WEIGHT	0.24g
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