

EM-3242 One-chip monolithic Rotation Angle Sensor

Preliminary Specification

These specifications are subject to change without notice

◆ Characteristics

Rotation Angle Sensor Device with Hall Element Inside

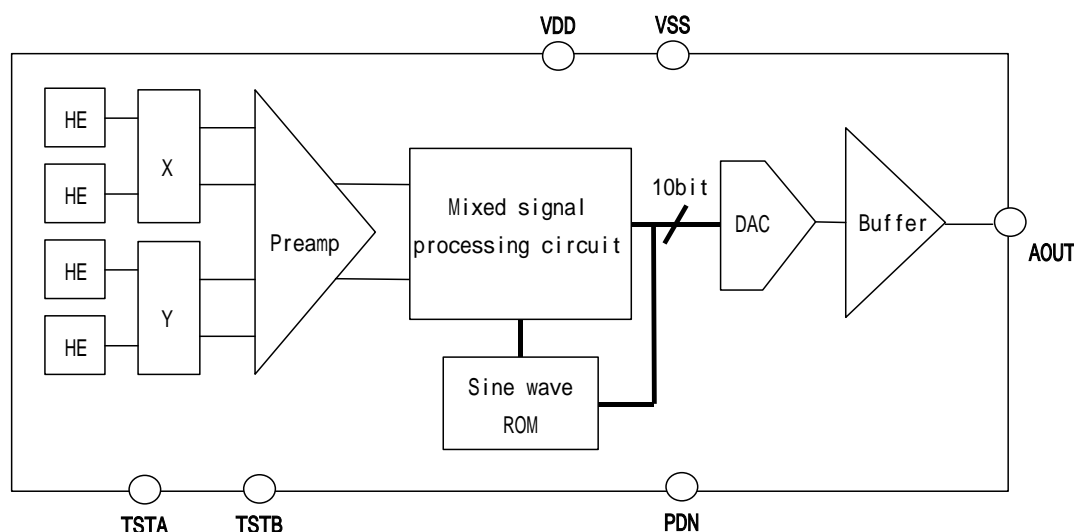
- Contact-less Angle Sensor function can be realized by small magnet and EM-3242
- Extremely small Temperature drift
- Super small package
- 3~5V single power supply



◆ Outline

EM3242 outputs analogue voltage proportionate to the angle, by the processing the Hall output which can be obtained from the plural Hall Elements formed on the silicon chip. Just by pairing the small magnet and EM3242, you can make up the contact-less angle sensor function which corresponds to 360degrees angle range. There are no particular restrictions on the magnet which fits together with EM-3242, and there is few change in the output voltage level or in the angle errors due to the temperature dependence of the magnet.

◆ Block Diagram



◆ Absolute Maximum Ratings

Symbol	Parameter	Min.	Max.	Unit	Notes
V_{DD}	Supply Voltage	-0.3	6.5	V	
V_{IN}	Input Voltage	0	$V_{DD} + 0.3$	V	PDN terminal
T_S	Storage Temperature Range	-40	105	°C	

◆ Recommended Operating Conditions

Symbol	Parameter	Min.	Typ.	Max.	Unit	Notes
V_{DD}	Supply Voltage	2.7	3.0	5.5	V	
T_A	Operating Temperature Range	-30		85	°C	

◆ **Electrical & Magnetic Specifications**

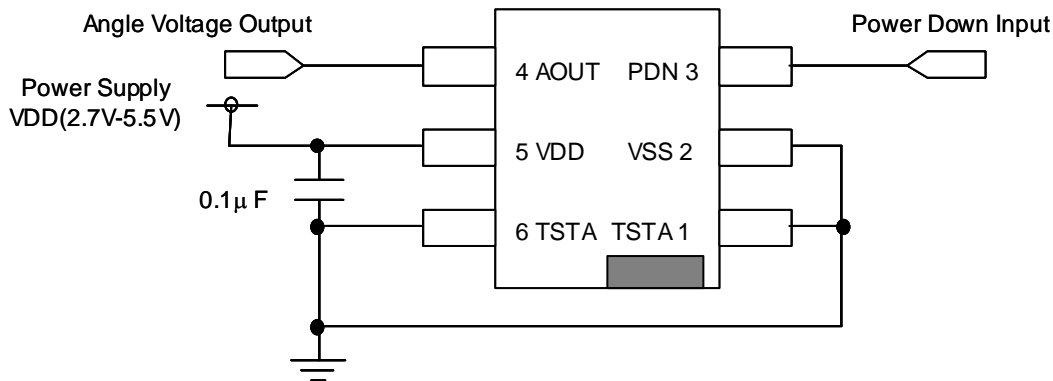
Condition is; $T_a=25$, $V_{DD}=3V$ if particular notes are not defined.

Symbol	Parameter	Min.	Typ.	Max.	Unit	Notes
B_{RANGE}	Detectable Magnetic Field Range	20	35	50	mT	
A_{RANGE}	Detectable angle range	0		360	Deg.	
A_{PREC}	Angle error	-3.5^{*1} -6.0^{*2}		3.5^{*1} 6.0^{*2}	Deg.	*1 $V_{DD}=3.0V@25$ *2 $V_{DD}=5.0V@25$
A_{RES}	Angle resolution		0.36		Deg.	*4
A_{TD}	Angle temperature drift ^{*3}	-1	0	+1	Deg.	@-30 ~ 85°C*3
INL	INL of output voltage ^{*4}			TBD		*4
T_{OUT}	Angle output cycle		40		μs	A/D Conversion Cycle
T_d	Signal delay time		100	130	μs	*4
V_{out}	Output Voltage Range	$0.1V_{DD}$		$0.9V_{DD}$	V	Ratiometric
I_{SUP}	Consumption Current		8	12	mA	While driving Sensor
I_{PD}				1	μA	While Power Down
T_{PD}	Start up time		680	850	μs	PDN:L H
I_{OUT}	Output Current	-0.3		0.3	mA	
C_L	Load Capability			200	pF	*4

*3) Based on Ambient Temperature = 25

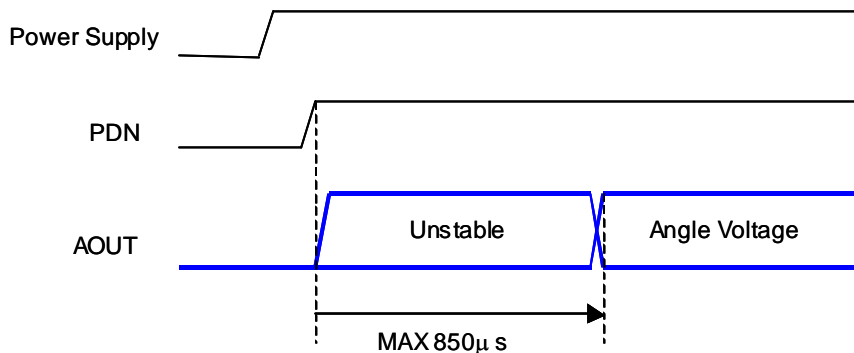
*4) This is a design assurance parameter. And this parameter will not be inspected in mass production.

◆ **Application Circuit (Example)**



* Bypass capacitor must be inserted between VDD and VSS.

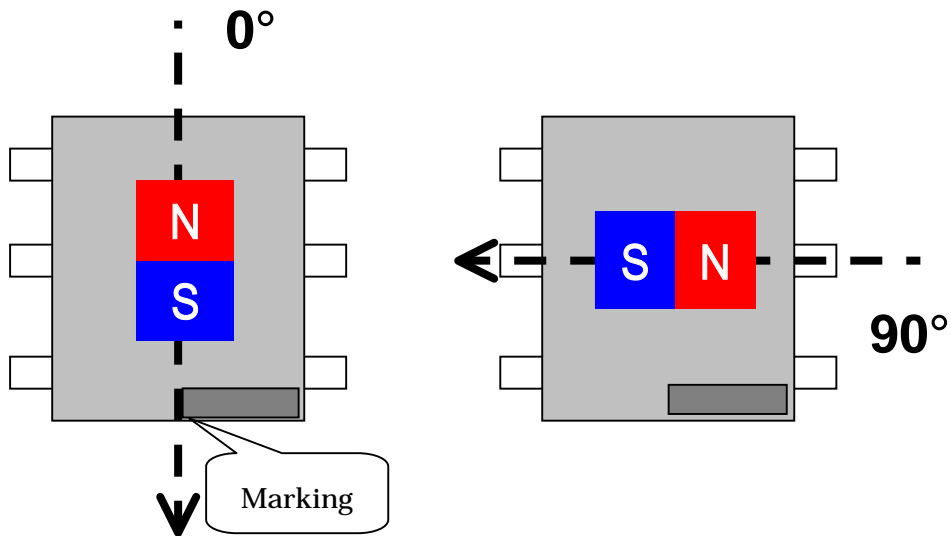
◆ **Output Timing**



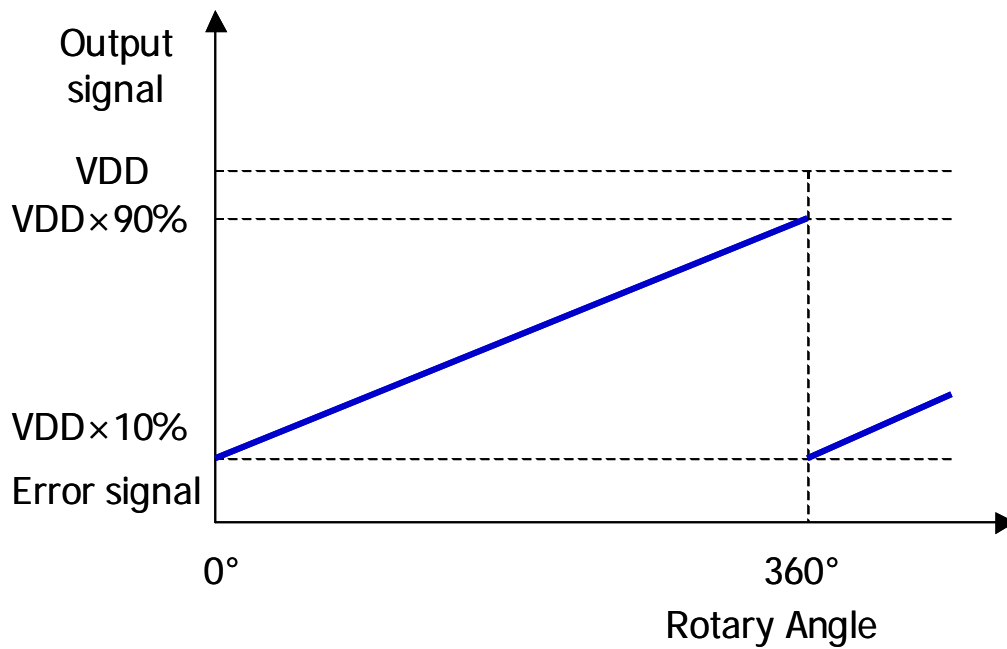
1) Please be noted that there is a certain period that the angle output voltage is unstable when EM3242 goes to the operation from power down (PDN) mode, as shown above.

2) PDN should be deactivated after VDD started up.

Magnet Direction and Output Voltage



Marking side defines the S polar as 0°, and the Output Voltage(AOUT) increases(Angle output increases) as the magnet rotates clockwise.



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