

Features and Benefits

Chopper Stabilized Amplifier Stage
 CMOS for Optimum Stability, Quality and Cost
 Dual Output
 Phase/Direction Detection (B)

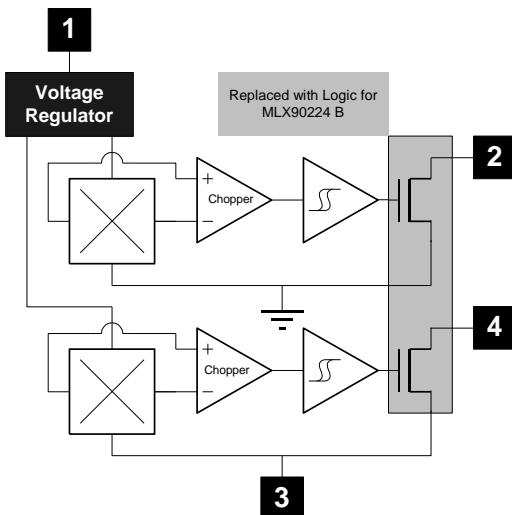
Applications

Direction Detector
 Speed Sensor
 Shaft Encoding
 Position Sensing

Ordering Information

Ordering Information			
Part No.	Temperature Code	Package Code	Packing Form
MLX90224EVA-ABA-000-BU	E(-40°C to 85°C)	VA	BU (Bulk)

1. Functional Diagram



	MLX90224
Pin 1	V _{DD}
Pin 2	Latch Plate 1
Pin 3	GND
Pin 4	Latch Plate 2

2. Description

The MLX90224 is a dual Hall effect latch. It includes two Hall effect latch functions of which typical thresholds are +/- 2.0 mT. In each latch, the magnetic flux detection is performed by a switched silicon Hall plate.

The MLX90224LVA-ABA output transistor will be "latched on" (B_{OP}) in the presence of a sufficiently strong South pole magnetic field facing the marked side of the package. Similarly, the output will be "latched off" (B_{RP}) in the presence of a North field. Spacing on the plates is 1.85mm.

The output structure is an Open-Drain NMOS transistor with a capability of 25 mA and protected against short-circuits.

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3. Glossary of Terms

Gauss, Tesla: Two units to quantify a magnetic flux density. Conversion: 1 mT = 10 Gauss

Bop: B Operating Point: When the magnetic flux density increases and reaches the Bop value, the output switches on. This value is in Gauss.

Brp: B Release Point: When the magnetic flux density decreases and reaches the Brp value, the output switches off. This value is in Gauss.

4. Absolute Maximum Ratings

Supply Voltage, V_{DD}	24 V
Supply Current, I_{DD}	50 mA
Output Current, I_{OUT}	40 mA
Output Short-Circuit Current	150 mA
Operating Temperature Range, T_A	-40°C to 150°C
Maximum Junction Temp, T_J	+ 175°C
Magnetic Flux Density	Infinite

Exceeding the absolute maximum ratings may cause permanent damage. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

5. MLX90224 Electrical Specifications

DC Operating Parameters $T_A = -40^{\circ}\text{C}$ to 85°C , $V_{DD} = 4.5\text{V}$ to 24V (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Supply Voltage	V_{DD}	Operating	4.5		24	V
Supply Voltage Ramp up			1.5			V/ms
Supply Current	I_{DD}		5.0	7.5	10	mA
Output Current	I_{OUT}	$B > B_{OP}$			20	mA
Saturation Output Voltage	V_{SAT}	$B > B_{OP}$, $I_{OUT} = 20\text{ mA}$		200	400	mV
Output Voltage	V_{OUT}	$B < B_{RP}$			24	V
Output Leakage	I_{LEAK}				10	μA
Oscillator Frequency	F_{OSC}			150		kHz
Refresh Time	T_r			10		μS

6. MLX90224 Sensor Specific Specifications

DC Operating Parameters $T_A = -40^{\circ}\text{C}$ to 85°C , $V_{DD} = 4.5\text{V}$ to 16V (unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Operate Point	B _{OP}	-40°C to 85°C, $V_{DD} = 4.5\text{V}$ to 16V	0.5	2.5	5.5	mT
Release Point	B _{RP}	-40°C to 85°C, $V_{DD} = 4.5\text{V}$ to 16V	-5.5	-2.5	-0.5	mT
Hysteresis	B _{HYS}	-40°C to 85°C, $V_{DD} = 4.5\text{V}$ to 16V	2.5	4.0	6.5	mT

Note:

1 mT = 10 Gauss

7. General Description

The MLX90224 Speed and Direction Sensor is designed for use with multipole ring magnet targets having evenly distributed North and South magnetic poles on the circumference of the magnet. An example of the basic physical arrangement of the sensor and magnet is shown in Fig. 1. The MLX90224 has two digital output signals. Output S1 will provide a speed pulse from the changing magnetic flux at sensing element S1. Output S2 will provide a phase shifted output identical in pulse width and period to S1. The MLX90224EVA-ABA has latching magnetic Bop and Brp values of typically +/- 2mT.

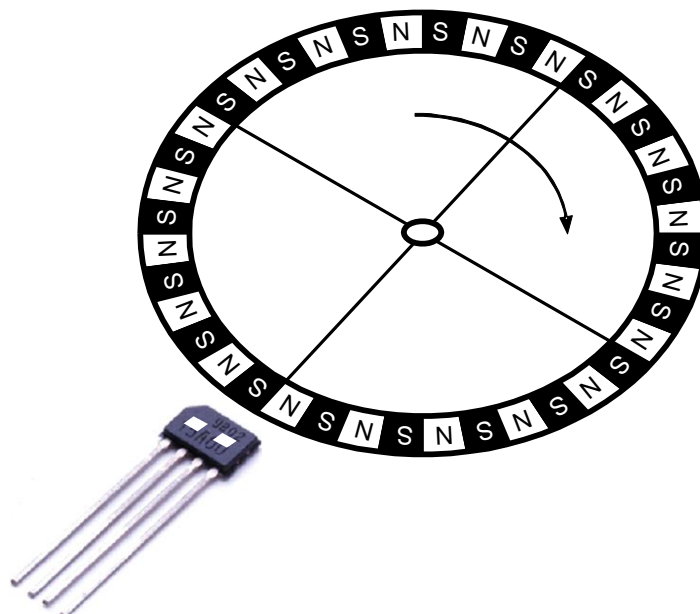
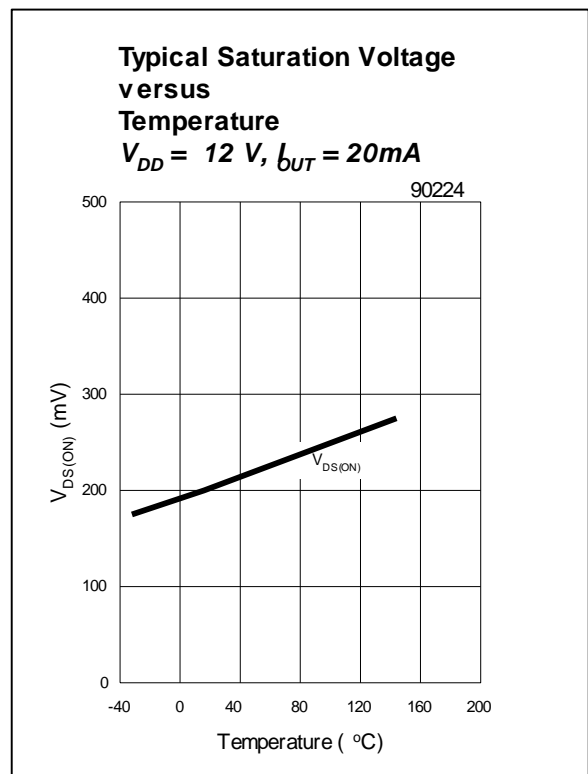
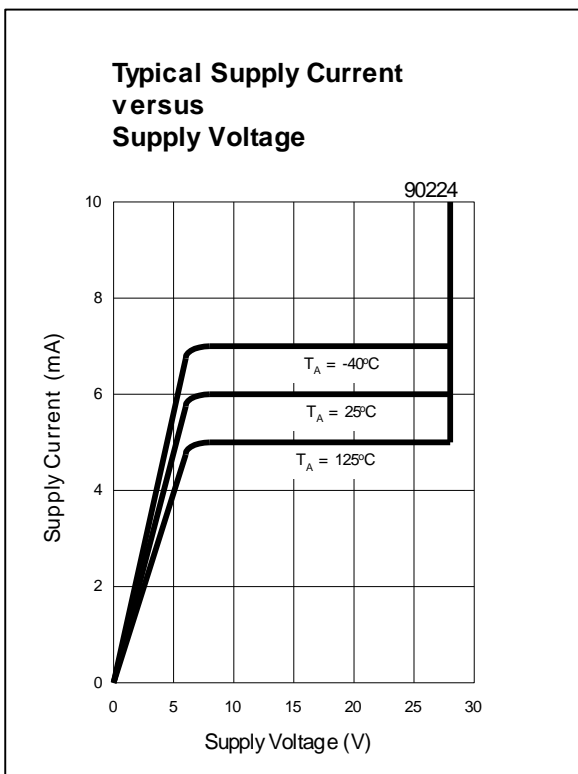
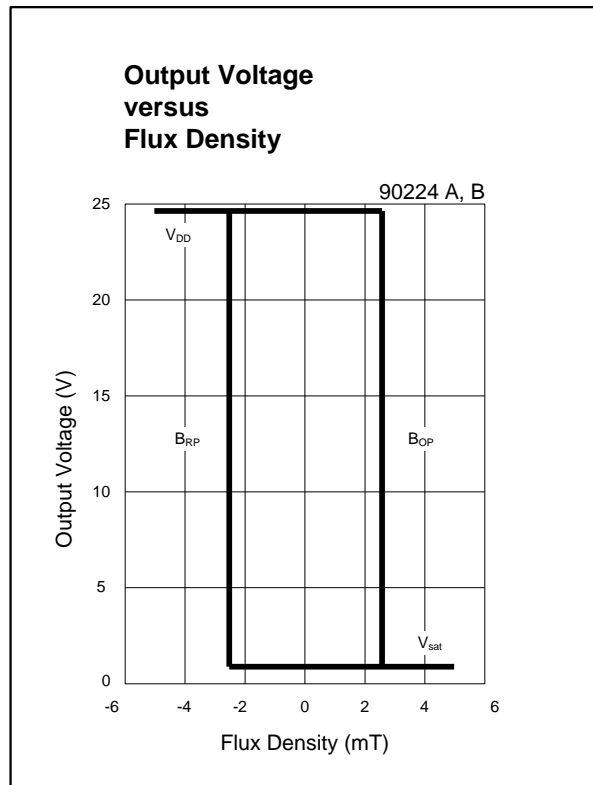
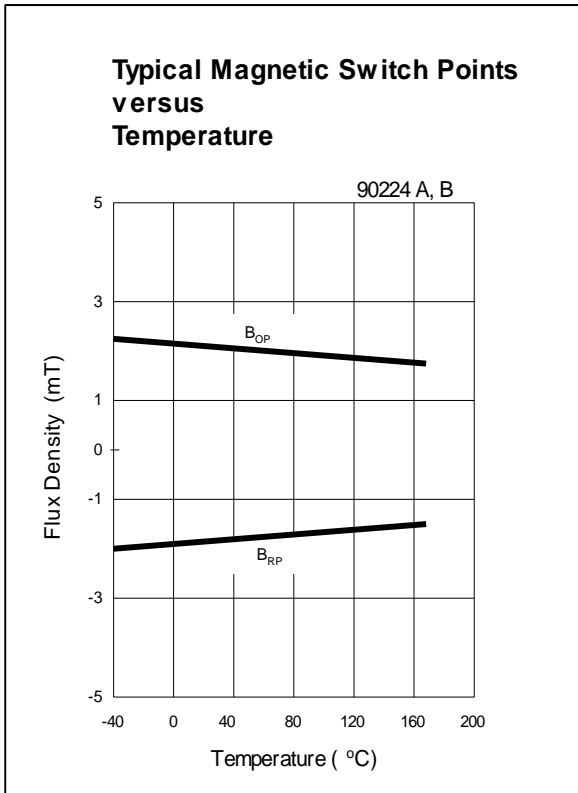
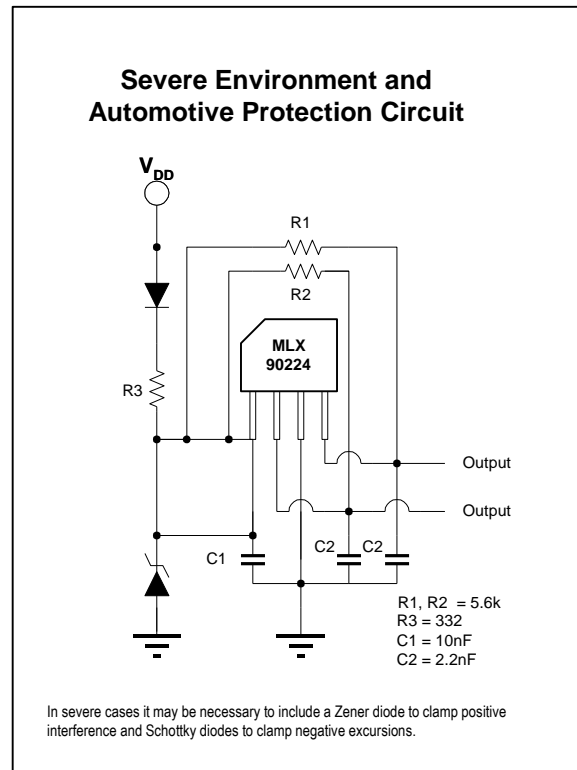


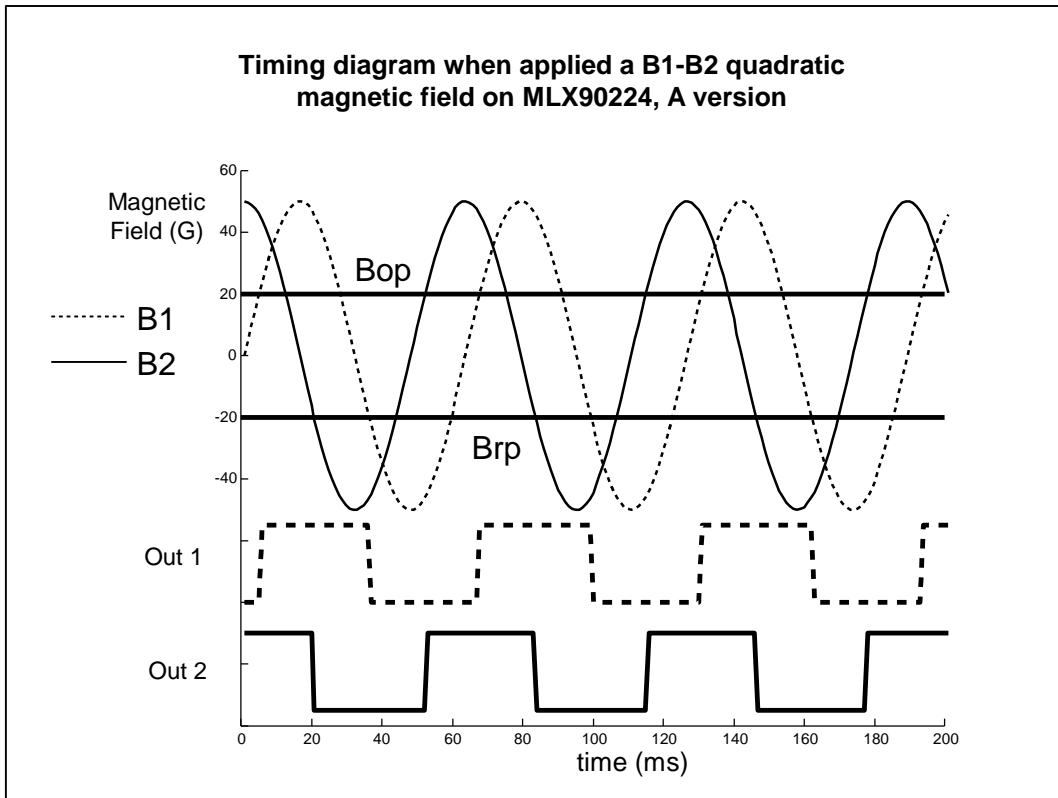
Figure 1: Application with a multipole ring magnet

8. Performance Graphs



9. Applications Information





10. Standard information regarding manufacturability of Melexis products with different soldering processes

Our products are classified and qualified regarding soldering technology, solderability and moisture sensitivity level according to following test methods:

Reflow Soldering SMD's (Surface Mount Devices)

- IPC/JEDEC J-STD-020
Moisture/Reflow Sensitivity Classification for Nonhermetic Solid State Surface Mount Devices (classification reflow profiles according to table 5-2)
- EIA/JEDEC JESD22-A113
Preconditioning of Nonhermetic Surface Mount Devices Prior to Reliability Testing (reflow profiles according to table 2)

Wave Soldering SMD's (Surface Mount Devices) and THD's (Through Hole Devices)

- EN60749-20
Resistance of plastic- encapsulated SMD's to combined effect of moisture and soldering heat
- EIA/JEDEC JESD22-B106 and EN60749-15
Resistance to soldering temperature for through-hole mounted devices

Iron Soldering THD's (Through Hole Devices)

- EN60749-15
Resistance to soldering temperature for through-hole mounted devices

Solderability SMD's (Surface Mount Devices) and THD's (Through Hole Devices)

- EIA/JEDEC JESD22-B102 and EN60749-21
Solderability

For all soldering technologies deviating from above mentioned standard conditions (regarding peak temperature, temperature gradient, temperature profile etc) additional classification and qualification tests have to be agreed upon with Melexis.

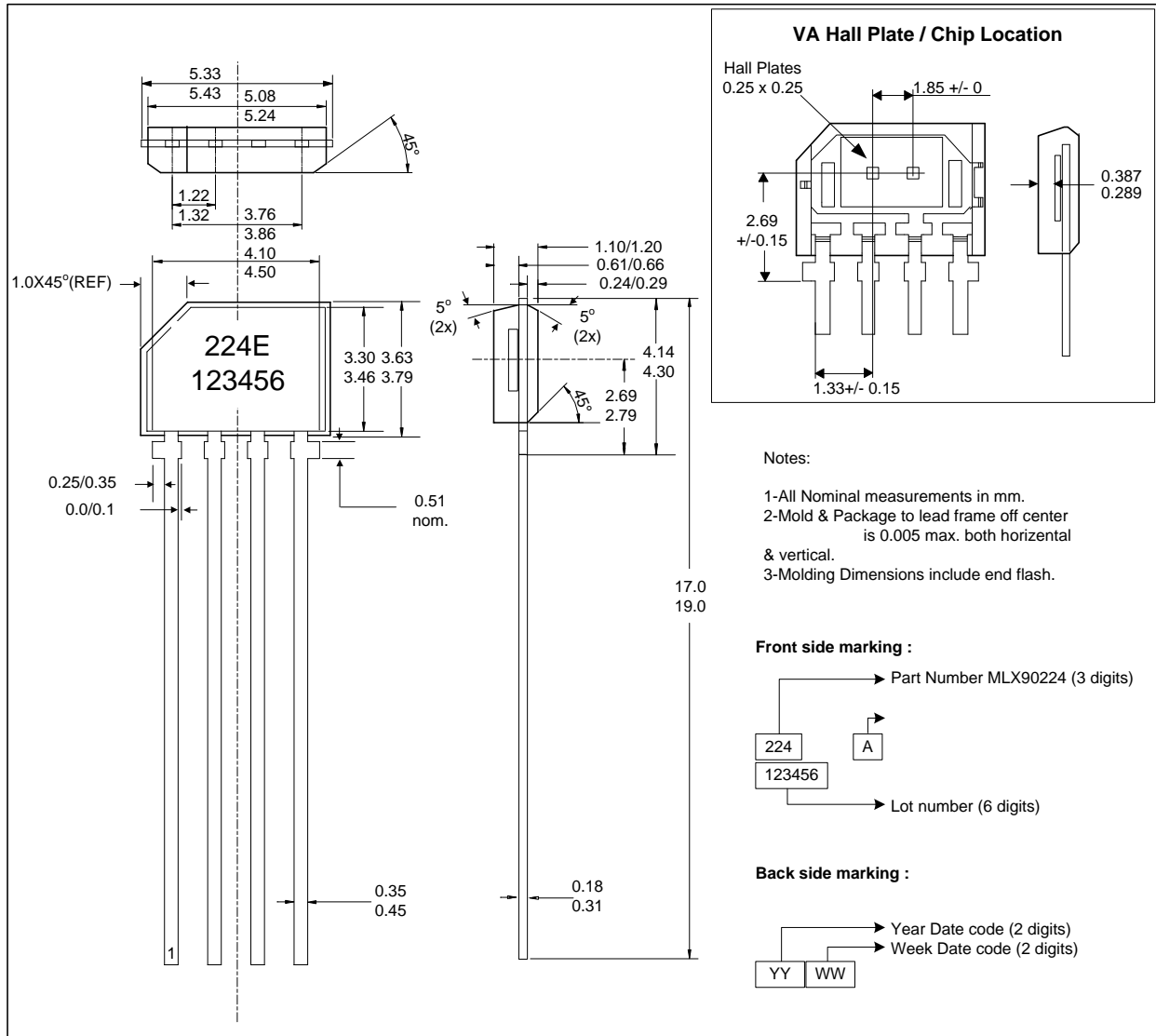
The application of Wave Soldering for SMD's is allowed only after consulting Melexis regarding assurance of adhesive strength between device and board.

Melexis is contributing to global environmental conservation by promoting **lead free** solutions. For more information on qualifications of **RoHS** compliant products (RoHS = European directive on the Restriction Of the use of certain Hazardous Substances) please visit the quality page on our website: <http://www.melexis.com/quality.aspx>

11. ESD Precautions

Electronic semiconductor products are sensitive to Electro Static Discharge (ESD). Always observe Electro Static Discharge control procedures whenever handling semiconductor products.

12. Package Information



13. Disclaimer

Devices sold by Melexis are covered by the warranty and patent indemnification provisions appearing in its Term of Sale. Melexis makes no warranty, express, statutory, implied, or by description regarding the information set forth herein or regarding the freedom of the described devices from patent infringement. Melexis reserves the right to change specifications and prices at any time and without notice. Therefore, prior to designing this product into a system, it is necessary to check with Melexis for current information. This product is intended for use in normal commercial applications. Applications requiring extended temperature range, unusual environmental requirements, or high reliability applications, such as military, medical life-support or life-sustaining equipment are specifically not recommended without additional processing by Melexis for each application.

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