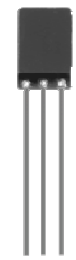
Hallogic Hall Effect Sensors — Hi-Reliability

OMH090/B/S, OMH3019/B/S, OMH3020/B/S, OMH3040/B/S, OMH3075/B/S, OMH3131/B/S

Ceramic Package



Features:

- Designed for non-contact switching operations
- Operates over a broad range of supply voltages
- Excellent temperature stability to operate in harsh environments
- Processing patterned after class B or S of MIL-STD-883
- Suitable for military and space applications
- 0.50” (12.700 mm) lead length

Description:

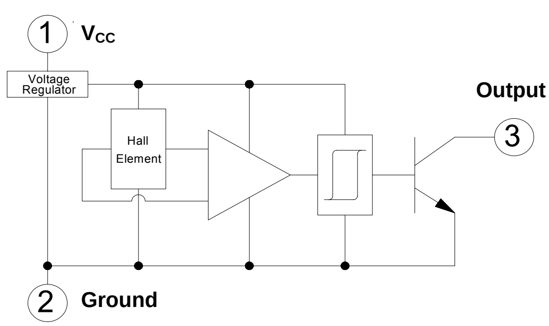
These Hall-effect devices contain a monolithic integrated circuit which incorporates a Hall element, a linear amplifier, a threshold amplifier, and Schmitt trigger on a single Hallogic® silicon chip. Included on-chip is a band gap voltage regulator to allow operation with a wide range of supply voltages. The devices feature logic level output and provide up to 21 mA of sink current. This allows direct driving of more than 7 TTL loads or any standard logic family using power supplies ranging from 4.5 to 24 volts. Output amplitude is constant at switching frequencies from DC to over 200 kHz.

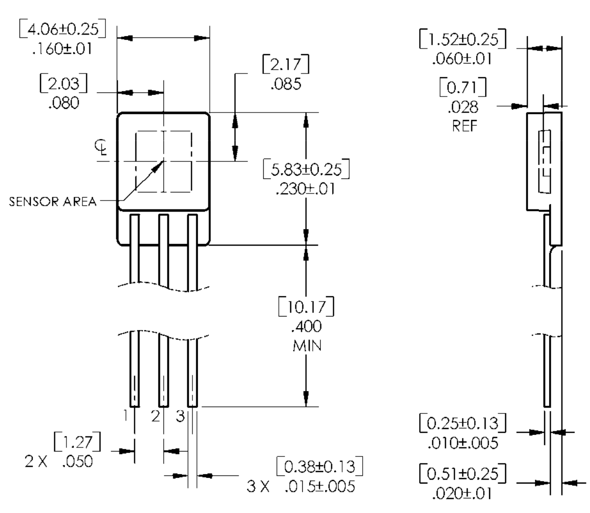
The Uni-Polar turns on with a (logic level “0”) with after a sufficient magnetic field from the south pole of a magnet approached the symbolized face of the device (Operating Point) and turns off (logic level “1”) after the magnetic field reached a minimum value. The Bi-Polar device turns on (logic level “0”) in the presence of a magnetic south pole and turns off (logic level “1”) when subjected to a magnetic north pole. Both magnetic poles are necessary for operation for Bi-Polar devices. This feature makes these sensors ideal for applications in non-contact switching operations, brushless DC motors and for use with multiple pole magnets.

Applications:

- Non-contact switching operations
- Brushless DC motors
- Multiple pole magnets
- Non-contact reflective object sensor
- Assembly line automation
- Machine automation

Pin #	Description
1	V_{CC}
2	Ground
3	Output





DIMENSIONS ARE IN INCHES AND [MILLIMETERS].

RoHS

Absolute Maximum Ratings (T_A=25°C unless otherwise noted)

Supply Voltage, V_{cc}	25 V
Storage Temperature Range, T_S	-65°C to +150°C
Operating Temperature Range, T_A	-55°C to +125°C
Lead Soldering Temperature (1/8 in. (3.2 mm) from case for 5 sec. with soldering iron)	260°C[(1)]
Output ON Current, I_{SINK}	25 mA
Output OFF Voltage, V_{OUT}	25 V
Magnetic Flux Density, B	Unlimited

Notes:
(1) Heat sink leads during hand soldering.

Ordering Information

Part #	Hi-Reliability Hallogic® Sensor	Operate Point Gauss Min / Typ / Max	Release Point Gauss Min / Typ / Max	Hysteresis Gauss Min / Typ / Max
OMH090	Uni-Polar Non-Latching	50 / 90 / 180	30 / 60 / 160	5 / 30 / 70
OMH090B				
OMH090S				
OMH3019	Uni-Polar Non-Latching	175 / 420 / 500	125 / 220 / 420	30 / 100 / 155
OMH3019B				
OMH3019S				
OMH3020	Uni-Polar Non-Latching	70 / 220 / 350	50 / 165 / 330	15 / 55 / 200
OMH3020B				
OMH3020S				
OMH3040	Uni-Polar Non-Latching	70 / 150 / 200	50 / 115 / 180	10 / 35 / 60
OMH3040B				
OMH3040S				
OMH3075	Bi-Polar Latching	50 / 150 / 250	-250 / -150 / -50	100 / 300 / 500
OMH3075B				
OMH3075S				
OMH3131	Bi-Polar Latching	20 / 60 / 95	10 / 45 / 85	5 / 15 / 40
OMH3131B				
OMH3131S				

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Phone: (972) 323-2200 or (800) 341-4747 FAX: (972) 323-2396 sensors@optekinc.com www.optekinc.com

Electrical Characteristics (Vcc = 4.5 V to 24 V, T_A = 25° C unless otherwise noted)

OMH090, OMH090B, OMH090S Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B_{OP}	Magnetic Operate Point(1)	50	90	180	Gauss	+25°C
B_{RP}	Magnetic Release Point	30	60	160	Gauss	+25°C
B_H	Magnetic Hysteresis	5	30	70	Gauss	+25°C
Icc	Supply Current	-	5	9	mA	V_{cc} = 24 V, Output On, B ≤ 250 Gauss
V_{OL}	Output Saturation Voltage	-	125	300	mV	V_{cc} = 4.5 V, I_{OL} = 20 mA, B ≥ 250 Gauss
I_{OH}	Output Leakage Current	-	0.50	10	µA	V_{cc} = 24 V, V_{OUT} = 24 V, B ≤ 250 Gauss
t_r	Output Rise Time	-	0.13	1.00	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 14 V (guaranteed not tested)
t_f	Output Fall Time	-	0.19	1.00	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 14 V (guaranteed not tested)

Electrical Characteristics (Vcc = 4.5 V to 24 V, T_A = 25° C unless otherwise noted)

OMH3019, OMH3019B, OMH3019S Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B_{OP}	Magnetic Operate Point(1)	175	300	500	Gauss	+25°C
B_{RP}	Magnetic Release Point	125	235	420	Gauss	+25°C
B_H	Magnetic Hysteresis	30	100	155	Gauss	+25°C
Icc	Supply Current	-	5	9	mA	V_{cc} = 24 V, Output On, B ≤ 50 Gauss
V_{OL}	Output Saturation Voltage	-	125	300	mV	V_{cc} = 4.5 V, I_{OL} = 20 mA, B ≥ 500 Gauss
I_{OH}	Output Leakage Current	-	0.10	10	µA	V_{cc} = 24 V, V_{OUT} = 24 V, B < 50 Gauss
t_r	Output Rise Time	-	0.13	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)
t_f	Output Fall Time	-	0.19	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)

Notes:
(1) South pole facing symbolized surface.

Electrical Characteristics (Vcc = 4.5 V to 24 V, T_A = 25° C unless otherwise noted)
OMH3020, OMH3020B, OMH3020S Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B_{OP}	Magnetic Operate Point[1]	70	230	350	Gauss	+25°C
B_{RP}	Magnetic Release Point	50	180	330	Gauss	+25°C
B_H	Magnetic Hysteresis	20	50	280	Gauss	+25°C
Icc	Supply Current	-	4	7	mA	V_{cc} = 24 V, Output On, B ≤ 50 Gauss
V_{OL}	Output Saturation Voltage	-	100	400	mV	V_{cc} = 4.5 V, I_{OL} = 20 mA, B ≥ 350 Gauss
I_{OH}	Output Leakage Current	-	0.10	10	µA	V_{cc} = 24 V, V_{OUT} = 24 V, B ≤ 50 Gauss
t_r	Output Rise Time	-	0.21	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)
t_f	Output Fall Time	-	0.10	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)

Electrical Characteristics (Vcc = 4.5 V to 24 V, T_A = 25° C unless otherwise noted)
OMH3040, OMH3040B, OMH3040S Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B_{OP}	Magnetic Operate Point[1]	70	150	200	Gauss	+25°C
B_{RP}	Magnetic Release Point	50	115	180	Gauss	+25°C
B_H	Magnetic Hysteresis	10	35	60	Gauss	+25°C
Icc	Supply Current	-	4	7	mA	V_{cc} = 24 V, Output On, B ≤ 250 Gauss
V_{OL}	Output Saturation Voltage	-	100	300	mV	V_{cc} = 4.5 V, I_{OL} = 20 mA, B ≥ 250 Gauss
I_{OH}	Output Leakage Current	-	0.10	10	µA	V_{cc} = 24 V, V_{OUT} = 24 V, B ≤ 250 Gauss
t_r	Output Rise Time	-	0.21	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)
t_f	Output Fall Time	-	0.10	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)

Notes:
(1) South pole facing symbolized surface.

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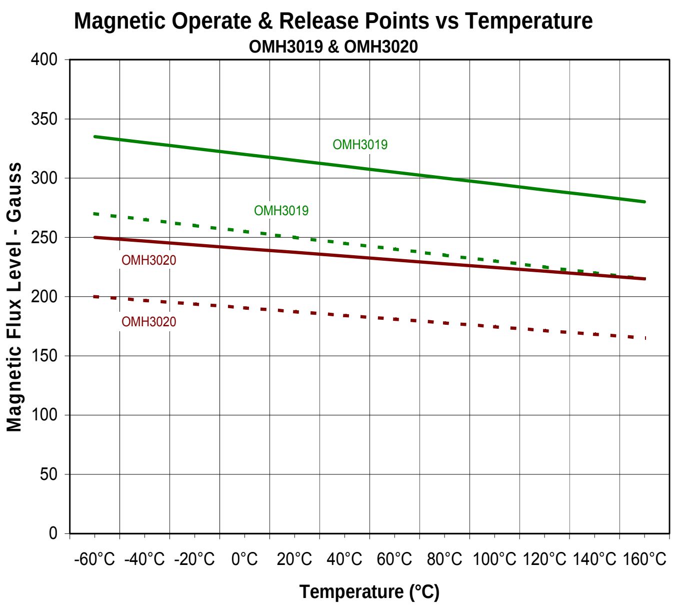
Electrical Characteristics (Vcc = 4.5 V to 24 V, T_A = 25° C unless otherwise noted)
OMH3075, OMH3075B, OMH3075S Bi-Polar Latching

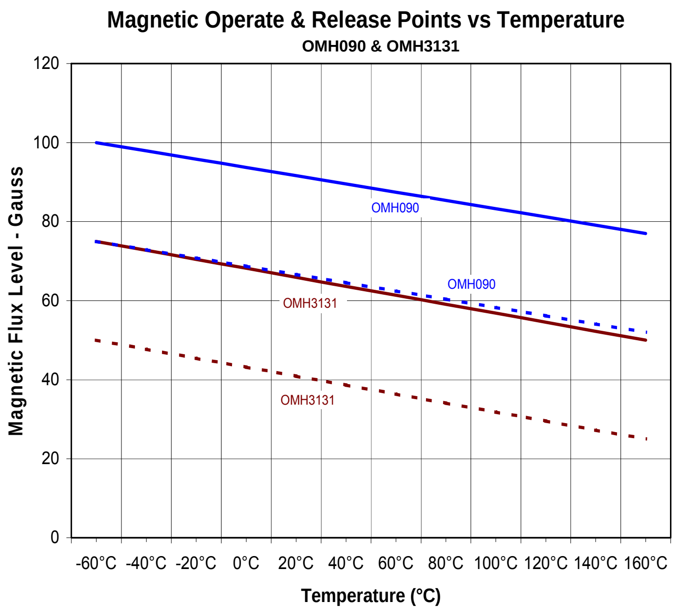
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B_{OP}	Magnetic Operate Point[1]	50	100	250	Gauss	+25°C
B_{RP}	Magnetic Release Point	-250	-100	-50	Gauss	+25°C
B_H	Magnetic Hysteresis	100	200	500	Gauss	+25°C
Icc	Supply Current	-	4	7	mA	V_{cc} = 24 V, Output On, B ≤ 250 Gauss
V_{OL}	Output Saturation Voltage	-	100	400	mV	V_{cc} = 4.5 V, I_{OL} = 20 mA, B ≥ 250 Gauss
I_{OH}	Output Leakage Current	-	0.10	10	µA	V_{cc} = 24 V, V_{OUT} = 24 V, B ≤ 250 Gauss
t_r	Output Rise Time	-	0.21	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)
t_f	Output Fall Time	-	0.10	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)

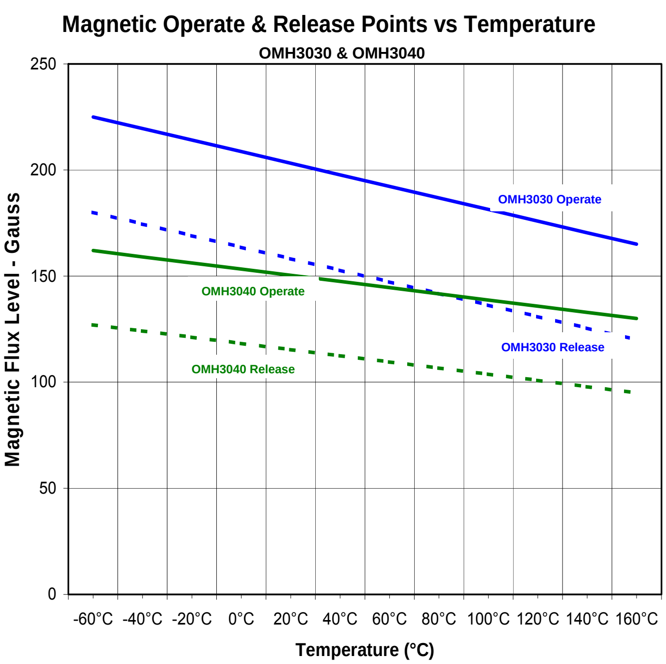
Electrical Characteristics (Vcc = 4.5 V to 24 V, T_A = 25° C unless otherwise noted)
OMH3131, OMH3131B & OMS3131S Uni-Polar

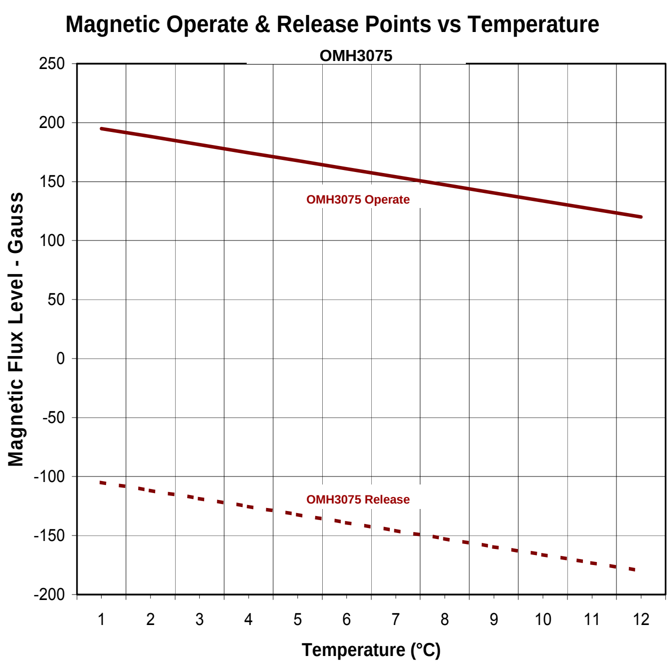
SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B_{OP}	Magnetic Operate Point[1]	20	60	95	Gauss	+25°C
B_{RP}	Magnetic Release Point	10	45	85	Gauss	+25°C
B_H	Magnetic Hysteresis	5	15	40	Gauss	+25°C
Icc	Supply Current	-	4	7	mA	V_{cc} = 24 V, Output On, B > 250 Gauss
V_{OL}	Output Saturation Voltage	-	100	400	mV	V_{cc} = 4.5 V, I_{OL} = 15 mA, B ≥ 250 Gauss
I_{OH}	Output Leakage Current	-	0.10	10	µA	V_{cc} = 24 V, V_{OUT} = 24 V, B ≤ 0 Gauss
t_r	Output Rise Time	-	0.21	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)
t_f	Output Fall Time	-	0.10	1	µs	R_L = 820 Ω, C_L = 20 pF, V_{cc} = 12 V (guaranteed not tested)

Notes:
(1) South pole facing symbolized surface.









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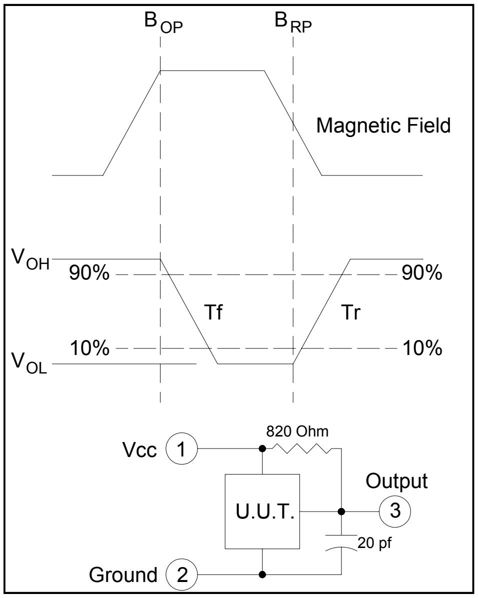
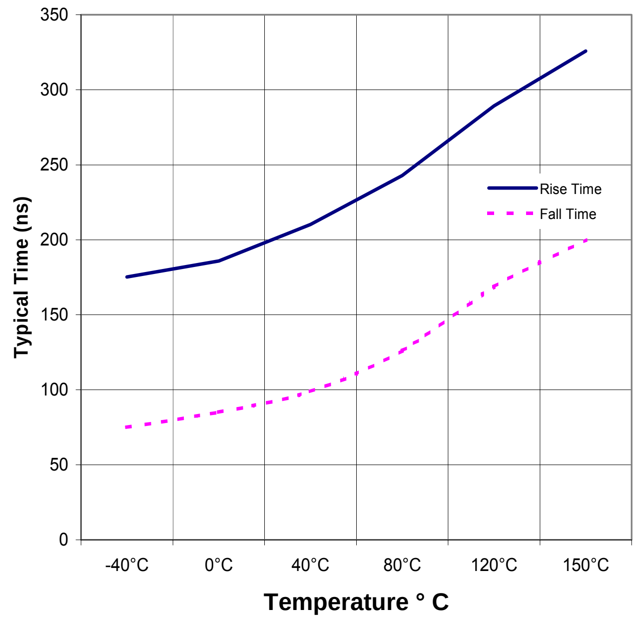
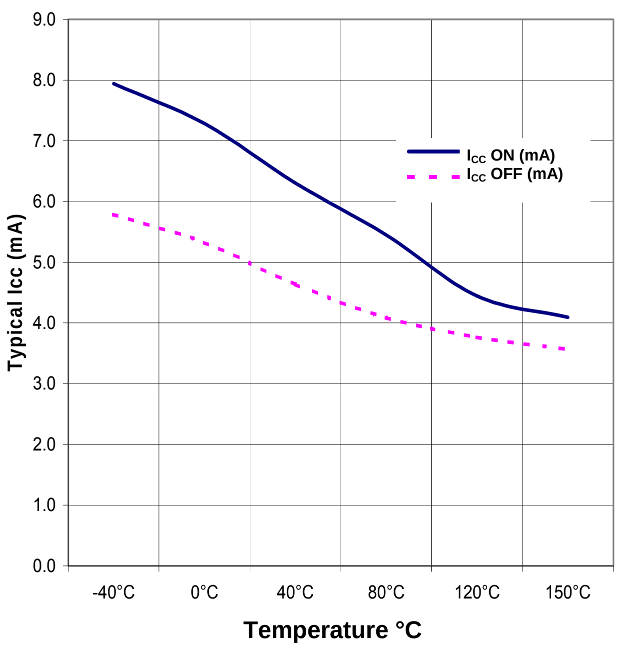


Rise & Fall Time vs Temperature



I_{CC} vs Temperature



Saturation Voltage vs Temperature