

High Reliability Hallogtic® Hall-Effect Sensors



OMH090, OMH3019, OMH3020, OMH3040, OMH3075, OMH3131 (B, S versions)



Ceramic Package

Features:

- Designed for non-contact switching operations
- Operates over a broad range of supply voltages
- Excellent temperature stability operates in harsh environments
- Suitable for military and space applications
- Processing patterned after class B or S of MIL-STD-883
- Through Hole 0.40" [10.16 mm] lead length minimum
- ESD Rating of Class 3B per MIL-STD-883G, M3015.7, HB model.

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 Hallogtic® silicon chip. Included on-chip is a band-gap voltage regulator that allows operation with a wide range of supply voltages. These 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.

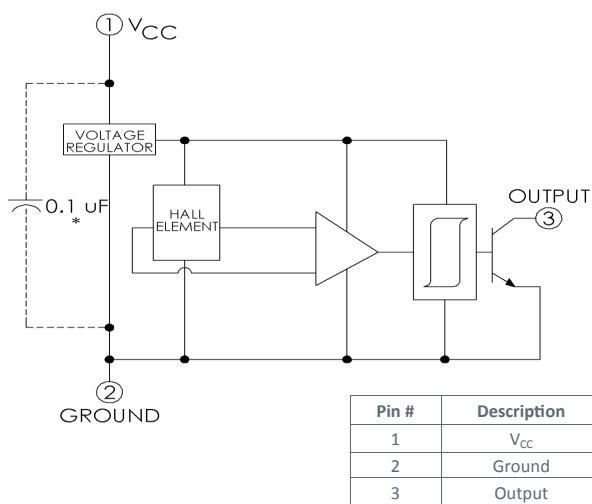
The **Uni-Polar** turns on with a (logic level "0") after a sufficient magnetic field from the south pole of a magnet approaches the symbolized face of the device (operating point) and turns off (logic level "1") after the magnetic field reaches a minimum value. The **Bi-Polar** device turns on (logic 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.

B and S devices are processed to OPTEK's military screening program patterned after MIL-STD-883. This product has passed Radiation Hardness testing up to 350 Krad (si) per MIL-STD-883 method 1019.6 and up to 150 Krad (si) for ELDRS.

Contact your local representative or OPTEK for more information.

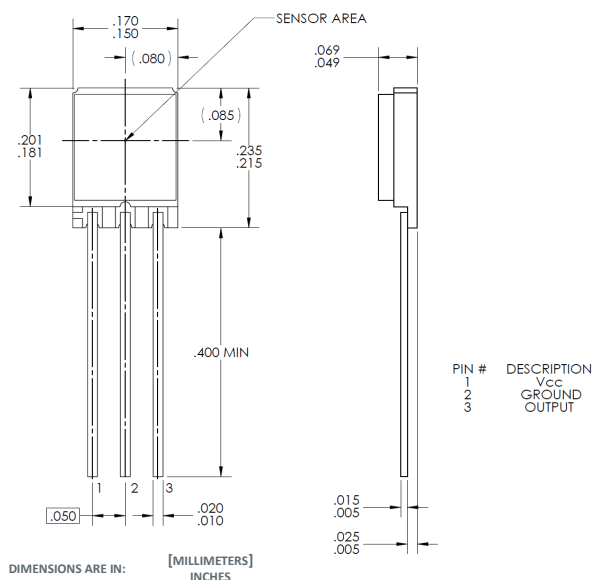
Applications:

- Non-contact switching operations
- Brushless DC motors
- Multiple pole magnets



* Add capacitor for stable operation

Lead finish = Solder Dipped (Sn 63/37)



General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
www.optekinc.com | www.ttelectronics.com

High Reliability Halloglic® Hall-Effect Sensors



OMH090, OMH3019, OMH3020, OMH3040,
OMH3075, OMH3131 (B, S versions)

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ 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 +150°C |
| Lead Soldering Temperature (1/8 in. (3.2 mm) from case for 5 seconds 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.

| Part Number | Hi-Reliability Halloglic® Sensor | Operate Point Gauss Min / Typ / Max | Release Point Gauss Min / Typ / Max | Hysteresis Gauss Min / Typ / Max | V_{CC} (Volts) Min / Max | Package |
|-------------|----------------------------------|--|--|-------------------------------------|-------------------------------|--------------|
| OMH090B | Uni-Polar Non-Latching | 50/90/180 | 30 / 65 / 160 | 10 / 30 / 60 | 4.5 / 24.0 | Through Hole |
| OMH090S | | | | | | |
| OMH3019B | | | | | | |
| OMH3019S | | 175 / 300 / 500 | 125 / 235 / 420 | 30 / 100 / 155 | | |
| OMH3020B | | 70 / 220 / 350 | 50 / 180 / 330 | 15 / 55 / 200 | | |
| OMH3020S | | | | | | |
| OMH3040B | | 70 / 150 / 200 | 50 / 115 / 180 | 10 / 35 / 60 | | |
| OMH3040S | | | | | | |
| OMH3131B | | 20 / 60 / 95 | 10 / 45 / 85 | 5 / 15 / 40 | | |
| OMH3131S | | | | | | |
| OMH3075B | Bi-Polar Latching | 50 / 150 / 250 | -250 / -150 / -50 | 100 / 250 / 500 | | |
| OMH3075S | | | | | | |

General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
www.optekinc.com | www.ttelectronics.com

High Reliability Hallogtic® Hall-Effect Sensors



OMH090, OMH3019, OMH3020, OMH3040,
OMH3075, OMH3131 (B, S versions)

Electrical Characteristics ($V_{CC} = 4.5\text{ V to }24\text{ V}$, $T_A = 25^\circ\text{ C}$ unless otherwise noted) OMH090, OMH090B, OMH090S Uni-Polar

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|----------|---------------------------------------|----------------|----------------|-------------------|-------|--|
| B_{OP} | Magnetic Operate Point ⁽¹⁾ | 45 50 20 | - 90 - | 210 180 180 | Gauss | -55°C +25°C +125°C |
| B_{RP} | Magnetic Release Point | 25 30 25 | - 65 - | 150 160 140 | Gauss | -55°C +25°C +125°C |
| B_H | Magnetic Hysteresis | 5 10 | - 30 | 95 60 | Gauss | -55°C +25°C & +125°C |
| I_{CC} | Supply Current | - - - | - 5 - | 9 11 5 | mA | -55°C, $V_{CC} = 24\text{ V}$, Output On, $B \geq 250\text{ Gauss}$ +25° +125°C |
| V_{OL} | Output Saturation Voltage | - - | - 125 | 300 400 | mV | -55°C, $V_{CC} = 4.5\text{ V}$, $I_{OL} = 30\text{ mA}$, $B \geq 250\text{ Gauss}$ +25°C & +125°C |
| I_{OH} | Output Leakage Current | - - - | - 0.50 - | 10 11 12 | μA | -55°C, $V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 250\text{ Gauss}$ +25° +125°C |
| t_r | Output Rise Time | - | 0.13 | 1.00 | μs | $R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 14\text{ V}$ (guaranteed not tested) |
| t_f | Output Fall Time | - | 0.14 | 1.00 | μs | |

Electrical Characteristics ($V_{CC} = 4.5\text{ V to }24\text{ V}$, $T_A = 25^\circ\text{ C}$ unless otherwise noted) OMH3019, OMH3019B, OMH3019S Uni-Polar

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|----------|---------------------------------------|------------|----------|------------|-------|--|
| B_{OP} | Magnetic Operate Point ⁽¹⁾ | 175 - | 300 - | 500 575 | Gauss | +25°C -55°C & +125°C |
| B_{RP} | Magnetic Release Point | 125 100 | 235 - | 420 - | Gauss | +25°C -55°C & +125°C |
| B_H | Magnetic Hysteresis | 30 20 | 100 - | 155 - | Gauss | +25°C -55°C to +125°C |
| I_{CC} | Supply Current | - | 5 | 9 | mA | $V_{CC} = 24\text{ V}$, Output On, $B \leq 50\text{ Gauss}$ |
| V_{OL} | Output Saturation Voltage | - | 125 | 300 | mV | $V_{CC} = 4.5\text{ V}$, $I_{OL} = 15\text{ mA}$, $B \geq 500\text{ Gauss}$ |
| I_{OH} | Output Leakage Current | - | 0.10 | 1.0 | μA | $V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B < 50\text{ Gauss}$ |
| t_r | Output Rise Time | - | 0.13 | 1 | μs | $R_L = 460\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$ (guaranteed not tested) |
| t_f | Output Fall Time | - | 0.14 | 1 | μs | |

Notes:

(1) South pole facing symbolized surface.

General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
www.optekinc.com | www.ttelectronics.com

High Reliability Hallogtic® Hall-Effect Sensors



OMH090, OMH3019, OMH3020, OMH3040,
OMH3075, OMH3131 (B, S versions)

Electrical Characteristics ($V_{CC} = 4.5\text{ V to }24\text{ V}$, $T_A = 25^\circ\text{ C}$ unless otherwise noted)

OMH3020, OMH3020B, OMH3020S Uni-Polar

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|----------|---------------------------------------|----------|----------|------------|-------|--|
| B_{OP} | Magnetic Operate Point ⁽¹⁾ | 70 - | 220 - | 350 425 | Gauss | +25°C -55°C & +125°C |
| B_{RP} | Magnetic Release Point | 50 25 | 180 - | 330 - | Gauss | +25°C -55°C & +125°C |
| B_H | Magnetic Hysteresis | 15 10 | 55 - | 200 - | Gauss | +25°C -55°C & +125°C |
| I_{CC} | Supply Current | - | 4 | 7 | mA | $V_{CC} = 24\text{ V}$, Output On, $B \leq 50\text{ Gauss}$ |
| V_{OL} | Output Saturation Voltage | - | 100 | 400 | mV | $V_{CC} = 4.5\text{ V}$, $I_{OL} = 15\text{ mA}$, $B \geq 350\text{ Gauss}$ |
| I_{OH} | Output Leakage Current | - | 0.10 | 10 | μA | $V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 50\text{ Gauss}$ |
| t_r | Output Rise Time | - | 0.21 | 1 | μs | $R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$ (guaranteed not tested) |
| t_f | Output Fall Time | - | 0.10 | 1 | μs | |

Electrical Characteristics ($V_{CC} = 4.5\text{ V to }24\text{ V}$, $T_A = 25^\circ\text{ C}$ unless otherwise noted)

OMH3040, OMH3040B, OMH3040S Uni-Polar

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|--------------|---------------------------------------|-------------|----------------|----------------|-------|--|
| B_{OP} | Magnetic Operate Point ⁽¹⁾ | 70 75 | 150 - | 200 270 | Gauss | +25°C -55°C & +125°C |
| B_{RP} | Magnetic Release Point | 50 25 | 115 - | 180 210 | Gauss | +25°C -55°C & +125°C |
| B_H | Magnetic Hysteresis | 10 20 | 35 - | 60 - | Gauss | +25°C -55°C & +125°C |
| I_{CC} | Supply Current | - - | 4 - | 8 8 10 | mA | +25°C, $V_{CC} = 24\text{ V}$, Output On, $B \geq 300\text{ Gauss}$ +125°C -55°C |
| V_{OL} | Output Saturation Voltage | - | 100 | 400 | mV | $V_{CC} = 4.5\text{ V}$, $I_{OL} = 20\text{ mA}$, $B \geq 250\text{ Gauss}$ |
| I_{OH} | Output Leakage Current | - - - | - 0.10 - | 11 10 12 | μA | -55°C, $V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 75\text{ Gauss}$ +25°C, $V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 100\text{ Gauss}$ +125°C, $V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 75\text{ G}$ |
| t_r | Output Rise Time | - | 0.21 | 1 | μs | $R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$ (guaranteed not tested) |
| Notes: t_f | Output Fall Time | - | 0.10 | 1 | μs | |

(1) South pole facing symbolized surface.

General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
www.optekinc.com | www.ttelectronics.com

High Reliability Hallogig[®] Hall-Effect Sensors



OMH090, OMH3019, OMH3020, OMH3040,
OMH3075, OMH3131 (B, S versions)

Electrical Characteristics ($V_{CC} = 4.5\text{ V to }24\text{ V}$, $T_A = 25^\circ\text{ C}$ unless otherwise noted)

OMH3075, OMH3075B, OMH3075S Bi-Polar Latching

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|----------|---------------------------------------|--------------|---------------|-------------------|-------|---|
| B_{OP} | Magnetic Operate Point ⁽¹⁾ | 50 25 | 150 - | 250 275 | Gauss | +25°C -55°C & +125°C |
| B_{RP} | Magnetic Release Point | -250 -275 | -150 - | -50 -25 | Gauss | +25°C -55°C & +125°C |
| B_H | Magnetic Hysteresis | 100 50 | 250 - | 500 - | Gauss | +25°C -55°C & +125°C |
| I_{CC} | Supply Current | - - | 4 - | 8 8 10 | mA | +25°C, $V_{CC} = 24\text{ V}$, (Output On), $B \geq -250\text{ Gauss}$ +125°C -55°C |
| V_{OL} | Output Saturation Voltage | - - - | - 100 - | 500 400 400 | mV | -55°C +25°C, $V_{CC} = 4.5\text{ V}$, $I_{OL} = 20\text{ mA}$, $B \geq 250\text{ Gauss}$ +125°C |
| I_{OH} | Output Leakage Current | - | 0.10 | 1.0 | μA | $V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq -250\text{ Gauss}$ |
| t_r | Output Rise Time | - | 0.21 | 1 | μs | $R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$ (guaranteed not tested) |
| t_f | Output Fall Time | - | 0.10 | 1 | μs | |

Electrical Characteristics ($V_{CC} = 4.5\text{ V to }24\text{ V}$, $T_A = 25^\circ\text{ C}$ unless otherwise noted)

OMH3131, OMH3131B & OMH3131S Uni-Polar

| SYMBOL | PARAMETER | MIN | TYP | MAX | UNITS | TEST CONDITIONS |
|----------|---------------------------------------|----------|---------|-----------|-------|--|
| B_{OP} | Magnetic Operate Point ⁽¹⁾ | 20 10 | 60 - | 95 150 | Gauss | +25°C -55°C to +125°C |
| B_{RP} | Magnetic Release Point | 10 5 | 45 - | 85 145 | Gauss | +25°C -55°C to +125°C |
| B_H | Magnetic Hysteresis | 5 5 | 15 - | 40 145 | Gauss | +25°C -55°C to +125°C |
| I_{CC} | Supply Current | - | 4 | 7 | mA | $V_{CC} = 24\text{ V}$, Output On, $B > 250\text{ Gauss}$ |
| V_{OL} | Output Saturation Voltage | - | 100 | 400 | mV | $V_{CC} = 4.5\text{ V}$, $I_{OL} = 15\text{ mA}$, $B \geq 250\text{ Gauss}$ |
| I_{OH} | Output Leakage Current | - | 0.10 | 10 | μA | $V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 0\text{ Gauss}$ |
| t_r | Output Rise Time | - | 0.21 | 1 | μs | $R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$ (guaranteed not tested) |
| t_f | Output Fall Time | - | 0.10 | 1 | μs | |

Notes:

(1) South pole facing symbolized surface.

General Note

TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
www.optekinc.com | www.ttelectronics.com

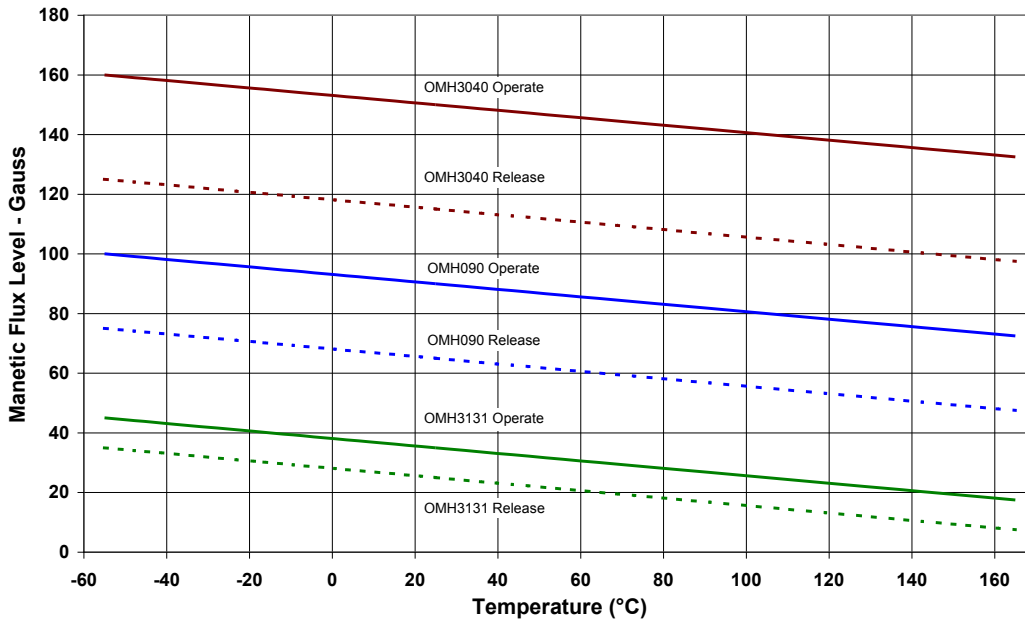
High Reliability Halloglic® Hall-Effect Sensors



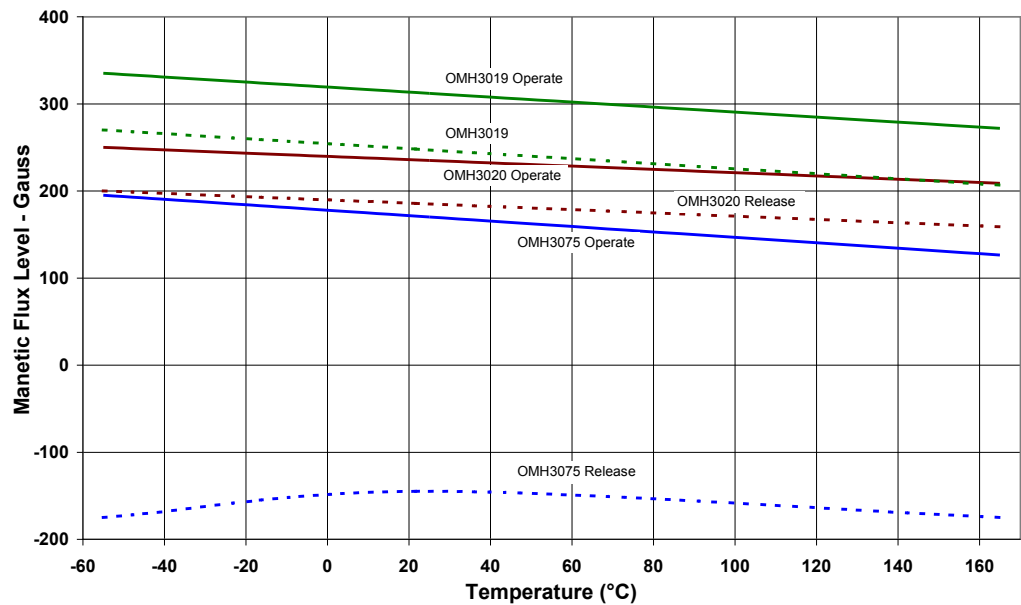
OMH090, OMH3019, OMH3020, OMH3040, OMH3075, OMH3131 (B, S versions)

OMH090, OMH3019, OMH3020, OMH3040, OMH3075, OMH3131 (B, S)

Magnetic Operate & Release Points vs Temperature



Magnetic Operate & Release Points vs Temperature



General Note
TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

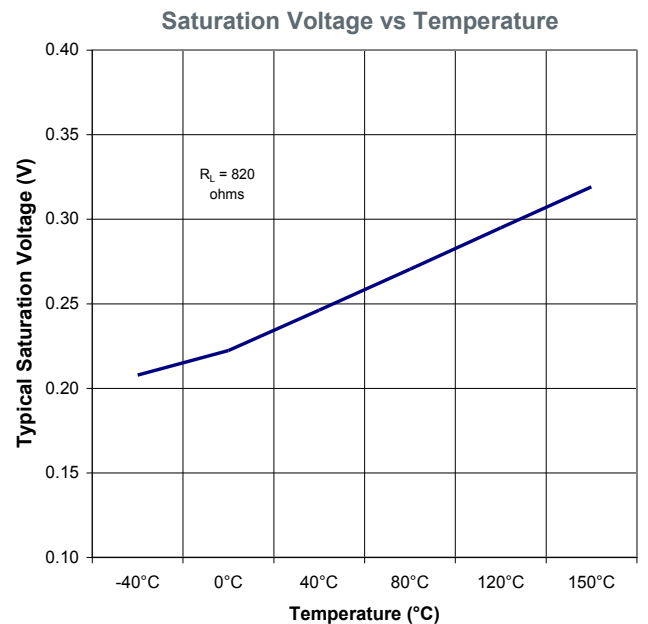
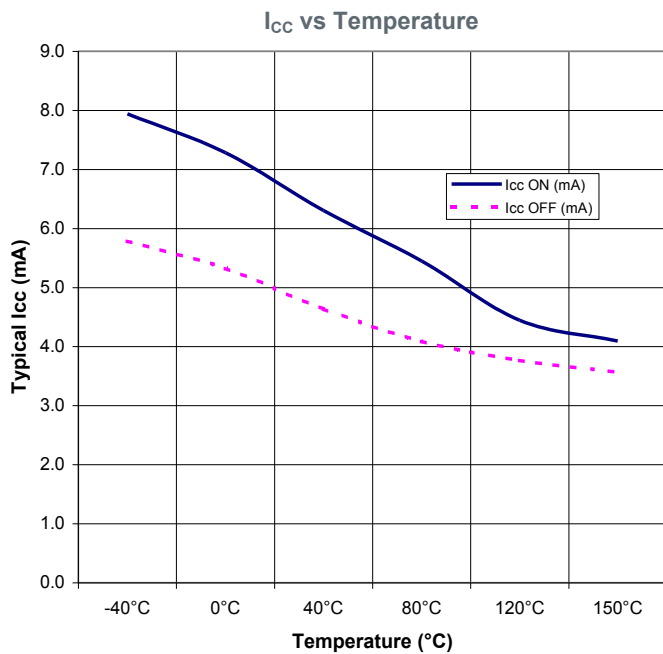
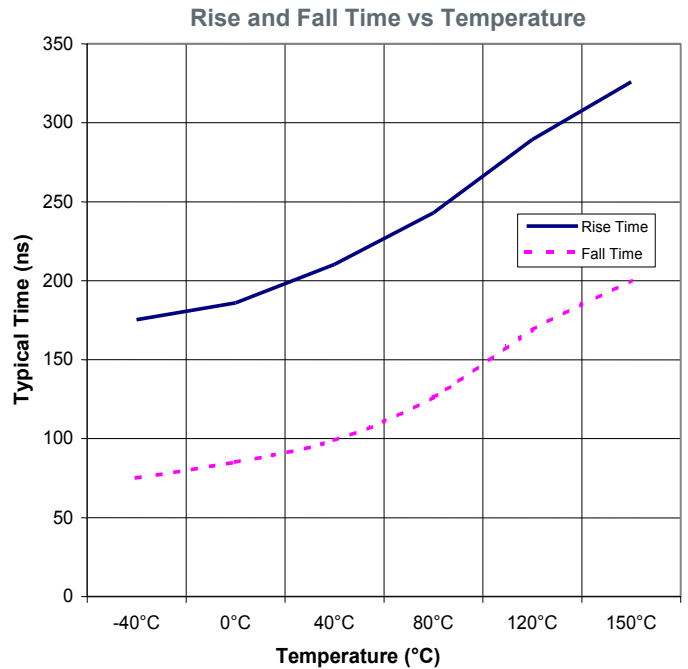
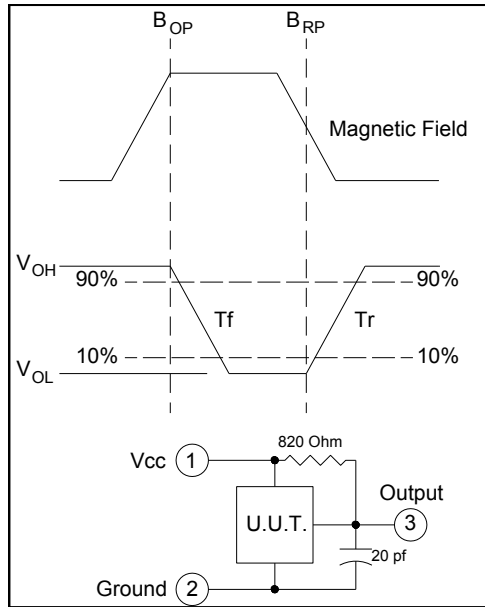
OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
www.optekinc.com | www.ttelectronics.com

High Reliability Hallogic® Hall-Effect Sensors



OMH090, OMH3019, OMH3020, OMH3040,
OMH3075, OMH3131 (B, S versions)

OMH090, OMH3019, OMH3020, OMH3040, OMH3075, OMH3131 (B, S)



General Note
TT Electronics reserves the right to make changes in product specification without notice or liability. All information is subject to TT Electronics' own data and is considered accurate at time of going to print.

OPTEK Technology, Inc.
1645 Wallace Drive, Carrollton, TX 75006 | Ph: +1 972 323 2200
www.optekinc.com | www.ttelectronics.com

High Reliability Hallogic® Hall-Effect Sensors



OMH090, OMH3019, OMH3020, OMH3040,
OMH3075, OMH3131 (B, S versions)

| Issue | Change Description | Approval | Date |
|-------|---|------------------|----------|
| A | Initial Release | | 02/05 |
| A.1 | Put into new template. Required changes on all pages. Added new .jpg logo. Updated data and graphs | | 08/18/06 |
| B | Updated graphs and Typical Op and Rel points for OMH3075 | Sergio DeLaGarza | 03/09/07 |
| B.1 | Added sentence to Description last paragraph on front page | Sergio DeLaGarza | 06/06/07 |
| C | Added SMD versions | Sergio DeLaGarza | 05/21/08 |
| C.1 | Added Lead finish = Solder Dipped (Sn 63/37), added Rad Hard testing on page 1 | Sergio DeLaGarza | 07/31/08 |
| C.2 | Delete both SMD illustrations from cover page. Delete all –SM part numbers from table on page 2. | Sergio DeLaGarza | 2/18/09 |
| C.3 | Change test conditions for tests I_{CC} & I_{OH} . | Sergio DeLaGarza | 5/28/10 |
| C.4 | Change 100 Krad to 150 Krad. Update dimensions on through hole illustration. | Sergio DeLaGarza | 6/3/10 |
| D | Add 10 to Max for Supply Current at –55°C | Sergio DeLaGarza | 9/20/10 |
| E | Update schematic on page 1 and add “Add capacitor...” note. | Sergio DeLaGarza | 11/9/10 |
| F | Add ESD rating bullet to first page. Update limits for OMH090B,S, OMH3019B, S, OMH3020B, S & OMH3040B & S. Update the BH, BOP and BRP limits in the Electrical Characteristics charts. | Sergio DeLaGarza | 12/22/10 |
| G | Change 300 to 250 under Magnetic Hysteresis. Change - to 15 under TYP for BH on the Electrical Characteristics table for OMH3131, OMH3131B etc. | Sergio DeLaGarza | 1/7/11 |
| H | Move OMH3131B & S to the Uni-Polar section on the Part Number chart on page 2 | Sergio DeLaGarza | 11/8/11 |
| I | Update package outline on page 1, I_{CC} electrical test condition for OMH3075 & 3040 | Sergio DeLaGarza | 8/4/14 |
| J | Delete the surface mount.....lead length feature from page 1. | Sergio DeLaGarza | 11/2/15 |
| K | Updated Supply Current Test Conditions pg 5—changed Output On, $B \leq 250$ to Output Off, $B \leq -250$. And, Output Leakage Current from $B \leq 250$ to $B \leq -250$ | Mark Miller | 05/17/16 |
| K-1 | Pg 2 changed Operate Point Gauss for OMH090B from 70/90/200 to 50/90/180; pg 3 changed B_{OP} Min from 45, 70, 20 to 45, 50, 20 and Max from 210, 200, 180 to 210, 180, 180; pg 3 changed BRP Min from 30, 25 to 25, 30, 25 and Max from 180, 170 to 150, 180, 1400 and Test conditions changed “-55°C ^ + 25°C” to “-55°C”; pg 3 changed ICC Test conditions “+55°C, $V_{CC} = 24$ V, Output On, $B \leq 250$ Gauss” to “-55°C, $V_{CC} = 24$ V, Output On, $B \geq 250$ Gauss”; pg 5 changed ICC Test conditions from “+25°C, $V_{CC} = 24$ V, (Output Off), $B \leq -250$ Gauss” to “+25°C, $V_{CC} = 24$ V, (Output On), $B \geq -250$ Gauss” | Rodney Bailey | 08/17/16 |