High Reliability Hallogic® 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 Hallogic® 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.

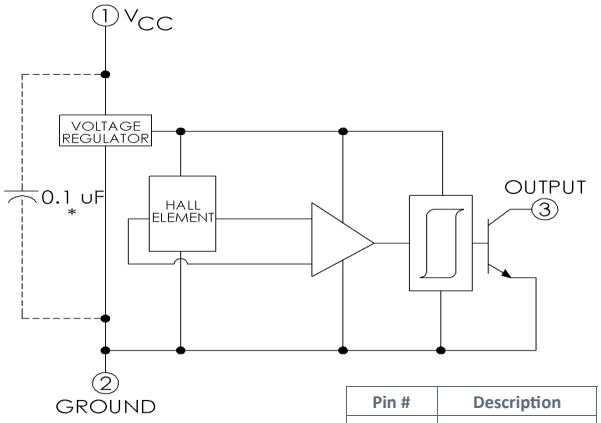
The **Uni-Polar** turns on with a (logic level "0") after a sufficient magnetic field from the south pole of a magnet approaches the symbolized face of the device (operating point) and turns off (logic level "1") after the magnetic field reaches a minimum value. The **Bi-Polar** device turns on (logic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

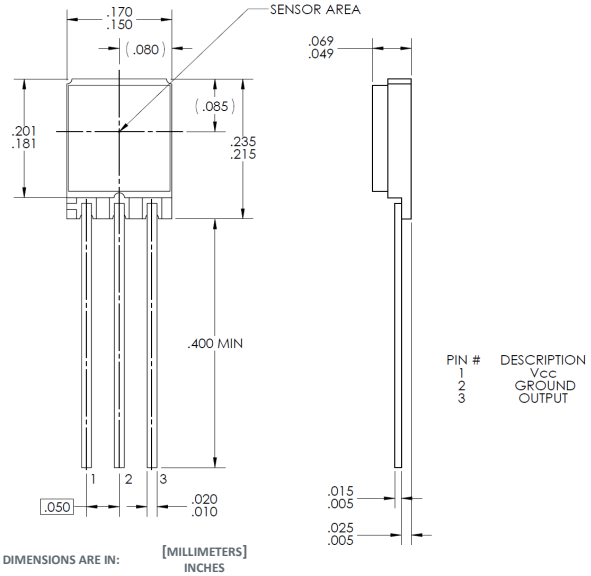
- Non-contact switching operations
- Brushless DC motors
- Multiple pole magnets



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

* 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.

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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 +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 Hallogic® 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		175 / 300 / 500	125 / 235 / 420	30 / 100 / 155		
OMH3019S						
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						

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Electrical Characteristics (V_{CC} = 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)	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 V, Output On, B≥250 Gauss +25° +125°C
V_{OL}	Output Saturation Voltage	- -	- 125	300 400	mV	-55°C,V_{CC} = 4.5 V, I_{OL} = 30 mA,B≥250 Gauss +25°C & +125°C
I_{OH}	Output Leakage Current	- - -	- 0.50 -	10 11 12	µA	-55°C,V_{CC} = 24 V, V_{OUT} =24 V, B≤250 Gauss +25° +125°C
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	-	0.14	1.00	µs	

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 -	500 575	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 V, Output On, B ≤ 50 Gauss
V_{OL}	Output Saturation Voltage	-	125	300	mV	V_{CC} = 4.5 V, I_{OL} = 15 mA, B ≥ 500 Gauss
I_{OH}	Output Leakage Current	-	0.10	1.0	µA	V_{CC} = 24 V, V_{OUT} = 24 V, B < 50 Gauss
t_r	Output Rise Time	-	0.13	1	µs	R_L = 460 Ω, C_L = 20 pF, V_{CC} = 12 V (guaranteed not tested)
t_f	Output Fall Time	-	0.14	1	µs	

Notes:

(1) South pole facing symbolized surface.

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Electrical Characteristics (V_{CC} = 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 -	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
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} = 15 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	

Electrical Characteristics (V_{CC} = 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 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
Icc	Supply Current	- -	4 -	8 8 10	mA	+25°C, V_{CC} = 24 V, Output On, B ≥ 300 Gauss +125°C -55°C
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 -	11 10 12	µA	-55°C, V_{CC} = 24V, V_{OUT} = 24V, B ≤ 75 Gauss +25°C, V_{CC} = 24V, V_{OUT} = 24V, B ≤ 100 Gauss +125°C ,V_{CC} = 24V, V_{OUT} = 24V, B ≤ 75 G
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	

Notes:
(1) South pole facing symbolized surface.

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Electrical Characteristics (V_{CC} = 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 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 V, (Output On), B ≥ -250 Gauss +125°C -55°C
V_{OL}	Output Saturation Voltage	- - -	- 100 -	500 400 400	mV	-55°C +25°C, V_{CC} = 4.5 V, I_{OL} = 20 mA, B ≥ 250 Gauss +125°C
I_{OH}	Output Leakage Current	-	0.10	1.0	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	

Electrical Characteristics (V_{CC} = 4.5 V to 24 V, T_A = 25° 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 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	

Notes:
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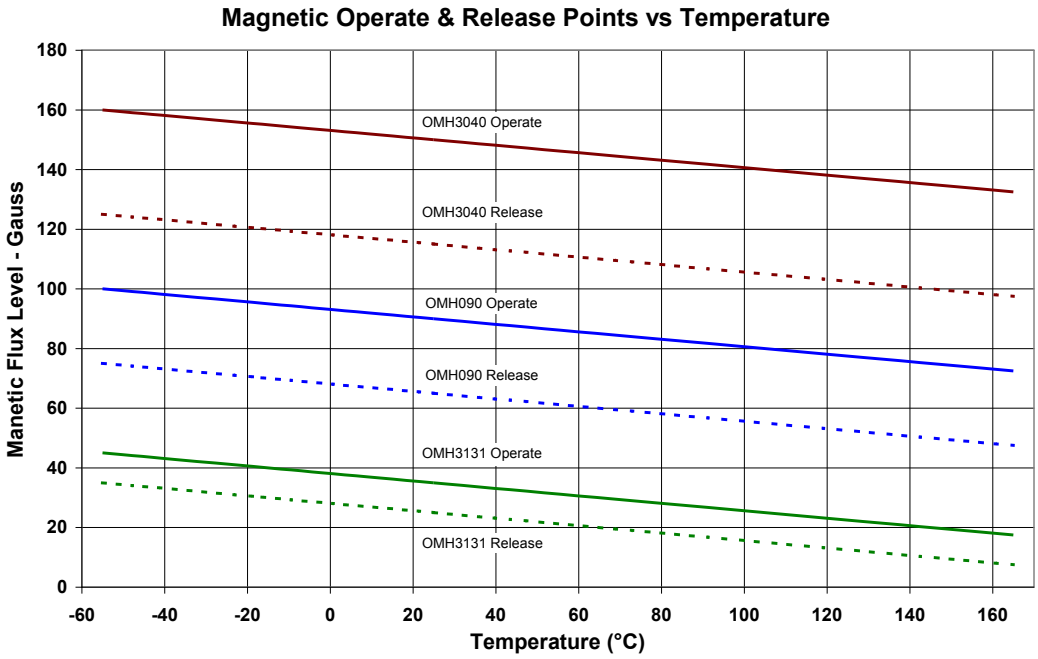

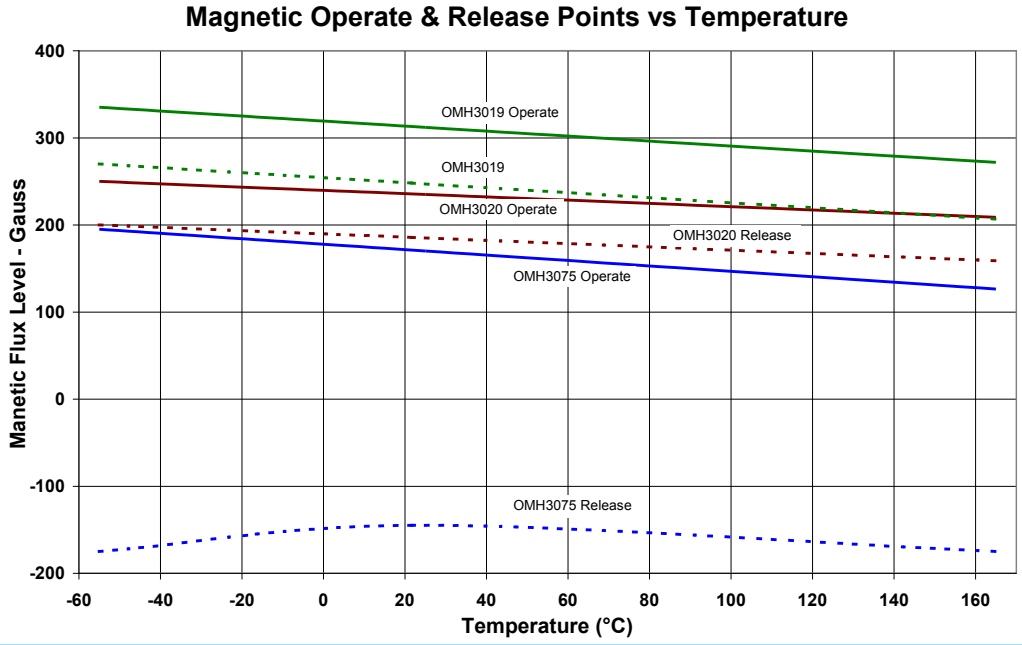

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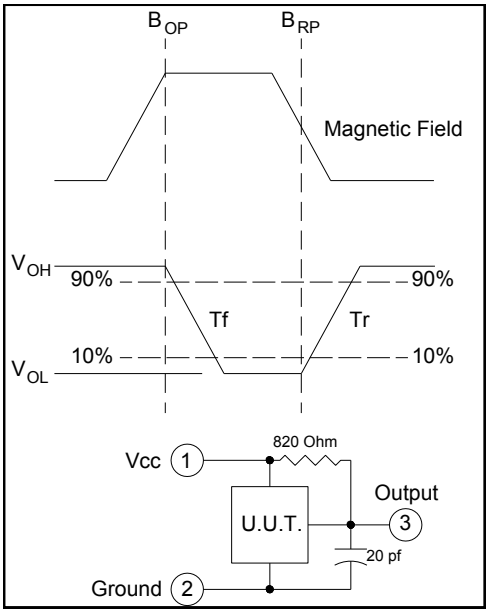

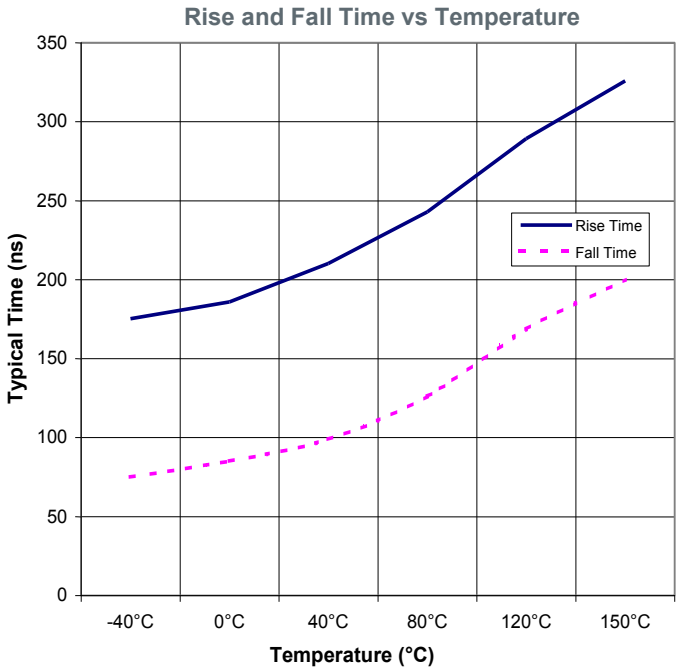

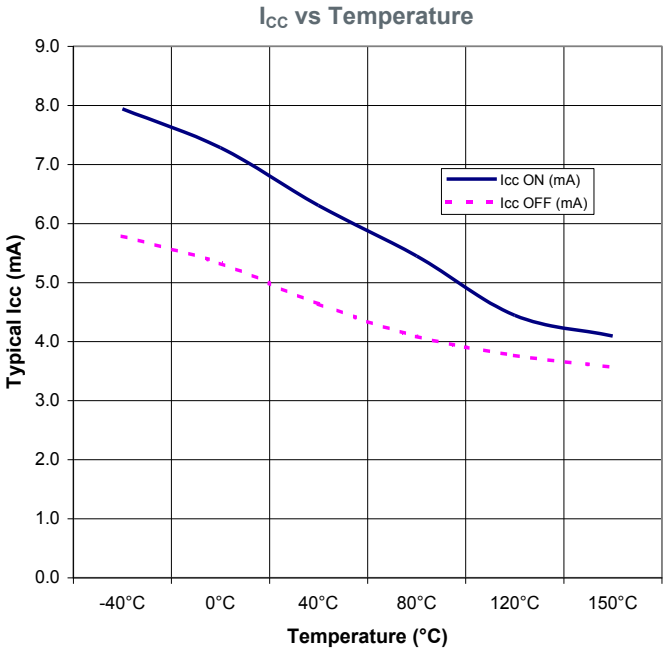

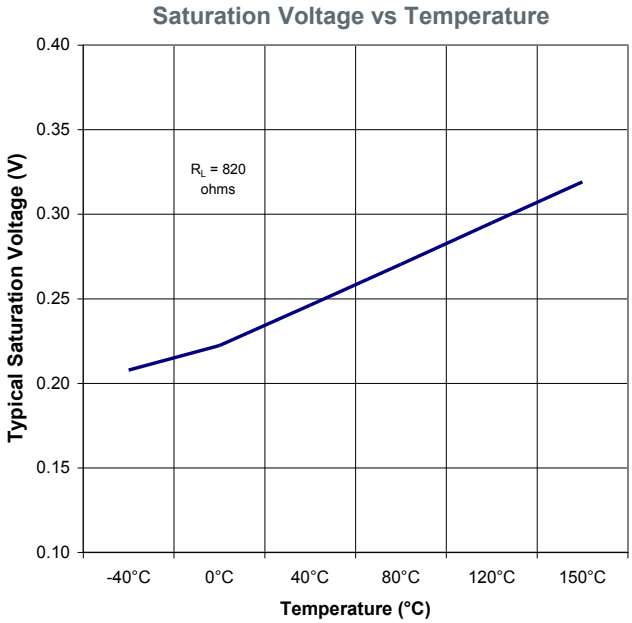

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Issue	Change Description	Approval	Date
A	Initial Release		02/05
A.1	Put into new template. Required changes on all pages. Added new .jpg logo. Updated data and graphs		08/18/06
B	Updated graphs and Typrical Op and Rel points for OMH3075	Sergio DeLaGarza	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 –55ºC	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, Icc 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 ≤ 250 to Output Off, B ≤ -250. And, Output Leakage Current from B ≤ 250 to B ≤ -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≤250 Gauss” to “-55°C,V_{CC} = 24 V, Output On, B≥250 Gauss”; pg 5 changed ICC Test conditions from “+25°C, V_{CC} = 24 V, (Output Off), B ≤ -250 Gauss” to “+25°C, V_{CC} = 24 V, (Output On), B ≥ -250 Gauss”	Rodney Bailey	08/17/16

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