

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.
- Leads are Gold Plated and are RoHS compliant, except for B and S versions, which are SN 63/37 solder dipped.

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.

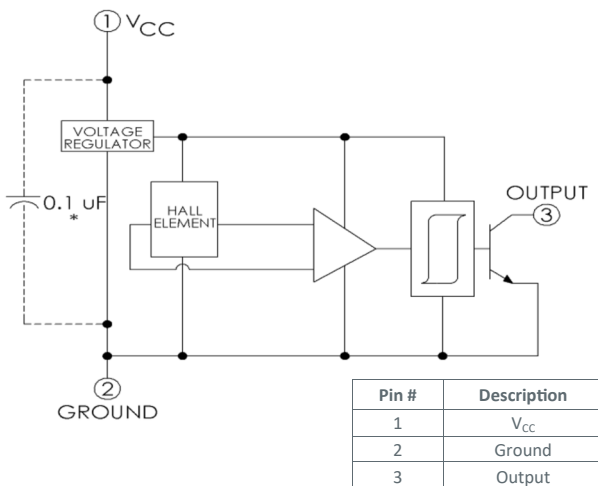
The **Uni-Polar** turns on with a (logic level "0") after a sufficient magnetic field from the south pole of a magnet approaches the symbolized face of the device (operating point) and turns off (logic level "1") after the magnetic field reaches a minimum value. The **Bi-Polar** device turns on (logic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

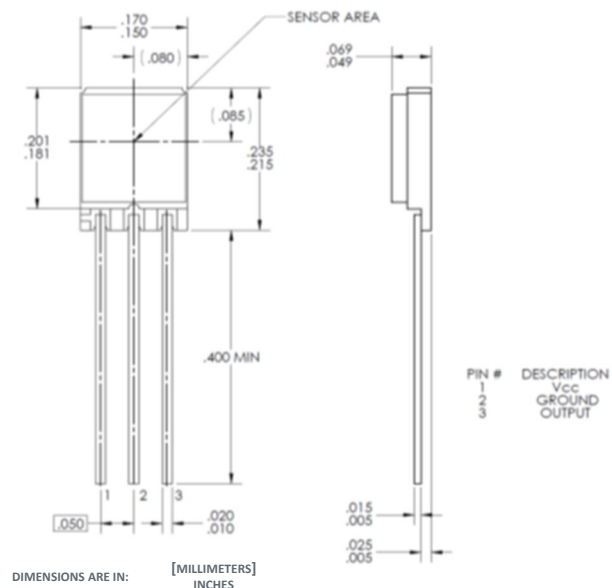
Contact your local representative or OPTEK for more information.

Applications:

- Non-contact switching operations
- Brushless DC motors
- Multiple pole magnets
- Non-contact reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor



* Add capacitor for stable operation



General Note

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Electrical Specifications

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.

Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted)

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 Specifications

Electrical Characteristics ($V_{CC} = 4.5 \text{ V}$ to 24 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 Off, $B \geq 30 \text{ Gauss}$ +25 °C +125 °C
V_{OL}	Output Saturation Voltage	- -	- 125	300 400	mV	-55 °C, $V_{CC} = 4.5 \text{ V}$, $I_{OL} = 30 \text{ mA}$, $B \geq 200 \text{ Gauss}$ +25 °C & +125 °C
I_{OH}	Output Leakage Current	- - -	- 0.50 -	10 11 12	μA	-55 °C, $V_{CC} = 24 \text{ V}$, $V_{OUT} = 24 \text{ V}$, $B \leq 30 \text{ Gauss}$ +25 °C +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	$R_L = 820 \Omega$, $C_L = 20 \text{ pF}$, $V_{CC} = 14 \text{ V}$ (guaranteed not tested)

Electrical Characteristics ($V_{CC} = 4.5 \text{ V}$ to 24 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 Off, $B \leq 125 \text{ Gauss}$
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	$V_{CC} = 24 \text{ V}$, $V_{OUT} = 24 \text{ V}$, $B \leq 125 \text{ Gauss}$
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	$R_L = 460 \Omega$, $C_L = 20 \text{ pF}$, $V_{CC} = 12 \text{ V}$ (guaranteed not tested)

Notes:

(1) South pole facing symbolized surface.

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Electrical Specifications

Electrical Characteristics ($V_{CC} = 4.5 \text{ V}$ to 24 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 Off, $B \leq 50 \text{ Gauss}$
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 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 10	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 Off, $B \leq 50 \text{ Gauss}$ +125 °C -55 °C
V_{OL}	Output Saturation Voltage	-	100	400	mV	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 20 \text{ mA}$, $B \geq 200 \text{ Gauss}$
I_{OH}	Output Leakage Current	- - -	- 0.10 -	11 10 12	μA	-55 °C, $V_{CC} = 24 \text{ V}$, $V_{OUT} = 24 \text{ V}$, $B \leq 25 \text{ Gauss}$ +25 °C, $V_{CC} = 24 \text{ V}$, $V_{OUT} = 24 \text{ V}$, $B \leq 50 \text{ Gauss}$ +125 °C, $V_{CC} = 24 \text{ V}$, $V_{OUT} = 24 \text{ V}$, $B \leq 25 \text{ Gauss}$
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.

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Electrical Specifications

Electrical Characteristics ($V_{CC} = 4.5 \text{ V}$ to 24 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 Off), $B \leq -250$ Gauss +125 °C -55 °C
V_{OL}	Output Saturation Voltage	- - -	- 100 -	500 400 400	mV	-55 °C +25 °C, $V_{CC} = 4.5 \text{ V}$, $I_{OL} = 20 \text{ mA}$, $B \geq 250$ Gauss +125 °C
I_{OH}	Output Leakage Current	-	0.10	1.0	μA	$V_{CC} = 24 \text{ V}$, $V_{OUT} = 24 \text{ V}$, $B \leq -250$ 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 ($T_A = 25^\circ \text{C}$ 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 Off, $B \leq 10$ Gauss
V_{OL}	Output Saturation Voltage	-	100	400	mV	$V_{CC} = 4.5 \text{ V}$, $I_{OL} = 15 \text{ mA}$, $B \geq 95$ Gauss
I_{OH}	Output Leakage Current	-	0.10	10	μA	$V_{CC} = 24 \text{ V}$, $V_{OUT} = 24 \text{ V}$, $B \leq 10$ 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.

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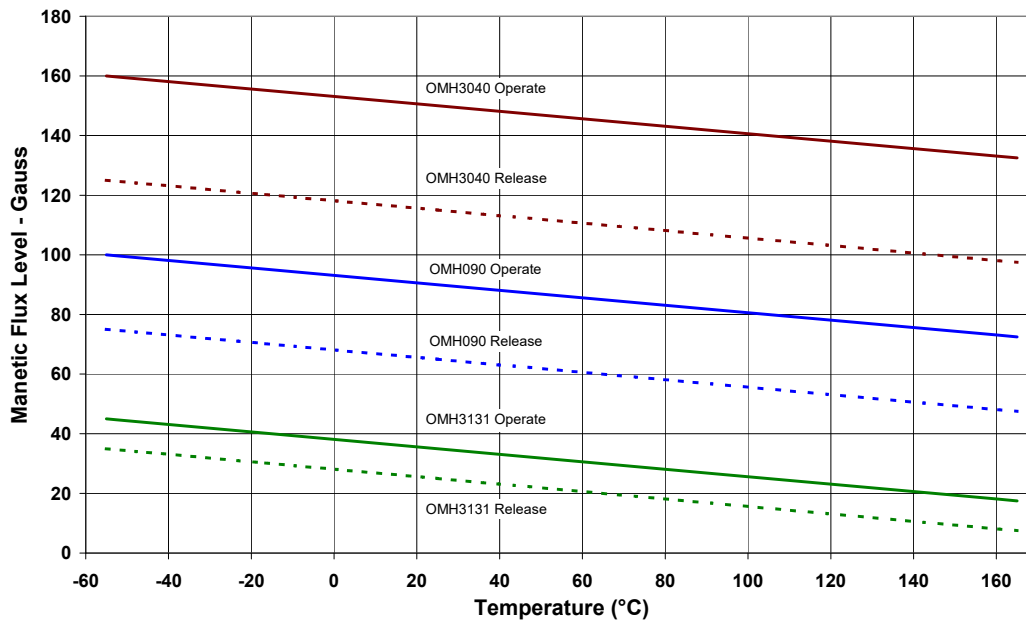
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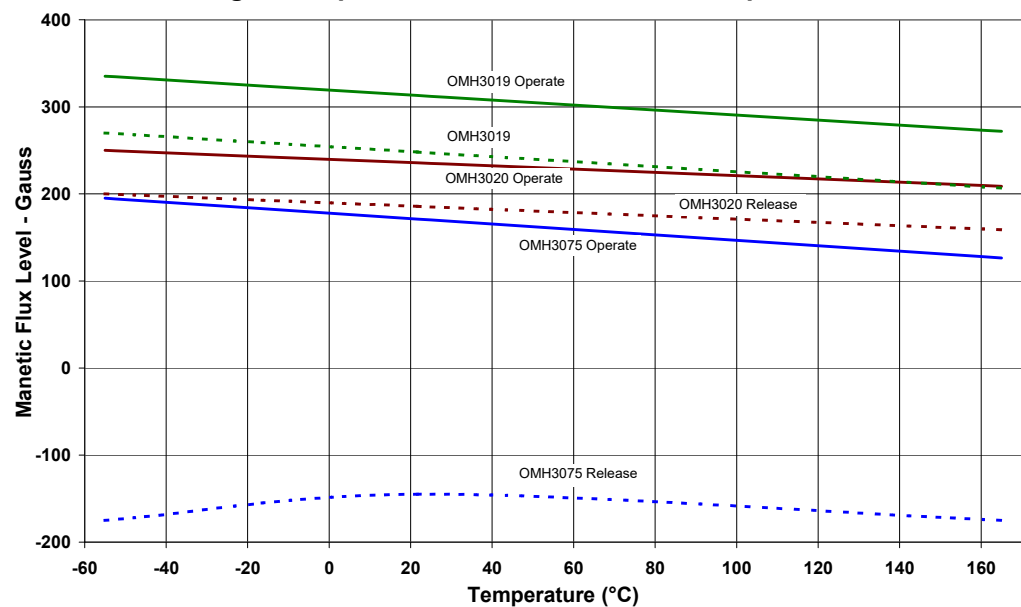
Performance

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Magnetic Operate & Release Points vs Temperature



Magnetic Operate & Release Points vs Temperature



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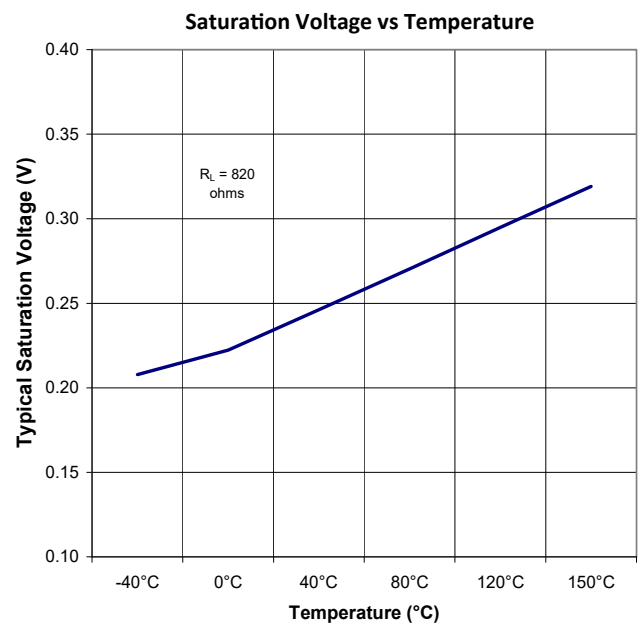
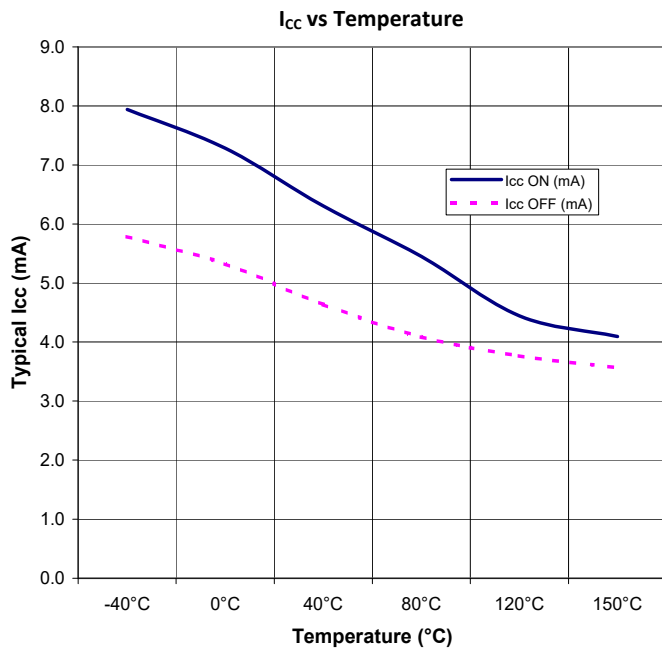
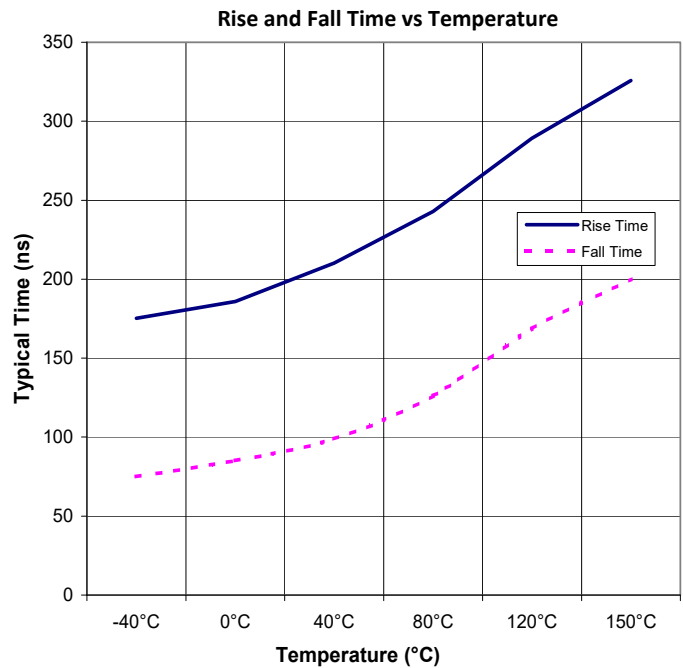
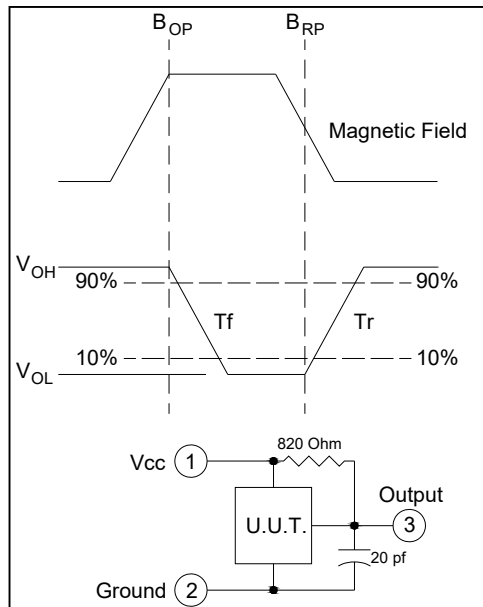
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Performance

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