



**THE DATASHEET OF  
OHS3140U**



# Hallogic Hall-Effect Sensors

OH090U, OH180U, OH360U

OHN3000 series, OHS3000 series

OHN3100 series, OHS3100 series



Through Hole

## Features:

- Designed for non-contact switching operations
- Operates over broad range of supply voltages (4.5 V to 24 V)
- Operates with excellent temperature stability in harsh environments
- Drive capability up to 7 TTL loads

## 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. 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 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 latch device turns on (logic level “0”) in the presence of a magnetic south pole and turn 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 reflective object sensor
- Assembly line automation
- Machine automation
- Machine safety
- End of travel sensor
- Door sensor

Ordering Information	
Through Hole	Configuration
OH090U	Unipolar non-latching
OH180U	
OH360U	
OHN3113U (Obsolete)	
OHN3019U (Obsolete)	
OHS3019U (Obsolete)	
OHN3020U	
OHS3020U	
OHN3120U	
OHS3120U	
OHN3030U (Obsolete)	
OHS3030U	
OHS3130U (Obsolete)	
OHS3131U	
OHN3040U	
OHS3040U	
OHN3140U	
OHS3140U	

Ordering Information	
Through Hole	Configuration
OHN3075U (Obsolete)	Bi-Polar latching
OHS3075U	
OHN3175U (Obsolete)	
OHS3175U	
OHS3177U	



RoHS

### General Note

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OHN3100 series, OHS3100 series



## Electrical Specifications

**Absolute Maximum Ratings** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

Supply Voltage, $V_{CC}$	25 V						
Storage Temperature Range, $T_S$	$-65^\circ\text{C}$ to $+160^\circ\text{C}$						
Operating Temperature Range, $T_A$	<table border="0"> <tr> <td>OHN30__U</td> <td><math>-20^\circ\text{C}</math> to <math>+85^\circ\text{C}</math></td> </tr> <tr> <td>OHS30__U</td> <td><math>-40^\circ\text{C}</math> to <math>+125^\circ\text{C}</math></td> </tr> <tr> <td>OH090/180/360U</td> <td><math>-40^\circ\text{C}</math> to <math>+150^\circ\text{C}</math></td> </tr> </table>	OHN30__U	$-20^\circ\text{C}$ to $+85^\circ\text{C}$	OHS30__U	$-40^\circ\text{C}$ to $+125^\circ\text{C}$	OH090/180/360U	$-40^\circ\text{C}$ to $+150^\circ\text{C}$
OHN30__U	$-20^\circ\text{C}$ to $+85^\circ\text{C}$						
OHS30__U	$-40^\circ\text{C}$ to $+125^\circ\text{C}$						
OH090/180/360U	$-40^\circ\text{C}$ to $+150^\circ\text{C}$						
Lead Soldering Temperature (1/8 in. (3.2 mm) from case for 5 sec. with soldering iron)	$260^\circ\text{C}^{(1)}$						
Output ON Current, $I_{SINK}$	25 mA						
Output OFF Voltage, $V_{OUT}$	25 V						
Magnetic Flux Density, B	Unlimited						

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

### OH090U Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$B_{OP}$	Magnetic Operate Point <sup>(1)</sup>	0	90	180	Gauss	
$B_{RP}$	Magnetic Release Point	-100	65	100	Gauss	
$B_H$	Magnetic Hysteresis	10	25	100	Gauss	
$I_{CC}$	Supply Current	-	6	9	mA	$V_{CC} = 24\text{ V}$ , Output Off
$V_{OL}$	Output Saturation Voltage	-	100	300	mV	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$ , $B \geq 180\text{ Gauss}$
$I_{OH}$	Output Leakage Current	-	0.5	10.0	$\mu\text{A}$	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq -100\text{ Gauss}$
$t_r$	Output Rise Time	-	0.21	1.00	$\mu\text{s}$	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 14\text{ V}$
$t_f$	Output Fall Time	-	0.10	1.00	$\mu\text{s}$	

### OH180U Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$B_{OP}$	Magnetic Operate Point <sup>(1)</sup>	70	180	290	Gauss	
$B_{RP}$	Magnetic Release Point	0	140	230	Gauss	
$B_H$	Magnetic Hysteresis	20	40	120	Gauss	
$I_{CC}$	Supply Current	-	6	9	mA	$V_{CC} = 24\text{ V}$ , Output Off
$V_{OL}$	Output Saturation Voltage	-	100	300	mV	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$ , $B \geq 290\text{ Gauss}$
$I_{OH}$	Output Leakage Current	-	0.5	10.0	$\mu\text{A}$	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq 0\text{ Gauss}$
$t_r$	Output Rise Time	-	0.21	1.00	$\mu\text{s}$	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 14\text{ V}$
$t_f$	Output Fall Time	-	0.10	1.00	$\mu\text{s}$	

Notes:

(1) South pole facing symbolized surface.

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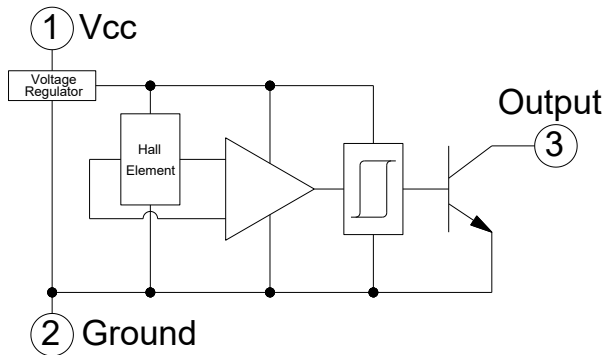
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# Hallogic Hall-Effect Sensors

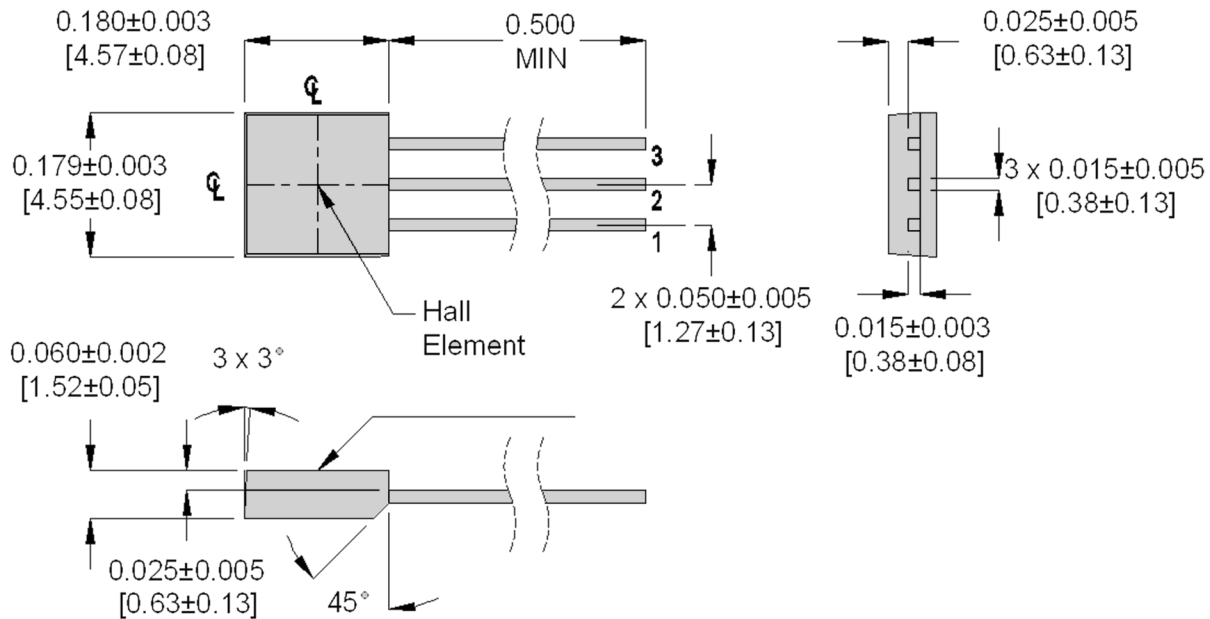
OH090U, OH180U, OH360U

OHN3000 series, OHS3000 series

OHN3100 series, OHS3100 series



Pin #	Transistor
1	V <sub>CC</sub>
2	Ground
3	Output



NOTE: The Hall Element is located 0.013" beneath the top surface of the package.  
The back of the package is denoted by the 45° angle at the base of the plastic body.

DIMENSIONS ARE IN INCHES AND [MILLIMETERS].

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## Electrical Specifications

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

### OH360U Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B <sub>OP</sub>	Magnetic Operate Point <sup>(1)</sup>	235	300	465	Gauss	
B <sub>RP</sub>	Magnetic Release Point	120	235	325	Gauss	
B <sub>H</sub>	Magnetic Hysteresis	30	65	200	Gauss	
I <sub>CC</sub>	Supply Current	-	6	9	mA	$V_{CC} = 24\text{ V}$ , Output Off
V <sub>OL</sub>	Output Saturation Voltage	-	100	300	mV	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$ , $B \geq 465\text{ Gauss}$
I <sub>OH</sub>	Output Leakage Current	-	0.1	10.0	$\mu\text{A}$	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq 120\text{ Gauss}$
t <sub>r</sub>	Output Rise Time	-	0.21	1.00	$\mu\text{s}$	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 14\text{ V}$
t <sub>f</sub>	Output Fall Time	-	0.10	1.00	$\mu\text{s}$	

### OHN3113U (Obsolete) Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B <sub>OP</sub>	Magnetic Operate Point <sup>(1)</sup>	-	-	510	Gauss	$-20^\circ\text{ C TO }85^\circ\text{ C}$
B <sub>RP</sub>	Magnetic Release Point	20	-	-	Gauss	$-20^\circ\text{ C TO }85^\circ\text{ C}$
B <sub>H</sub>	Magnetic Hysteresis	10	-	-	Gauss	$-20^\circ\text{ C TO }85^\circ\text{ C}$
I <sub>CC</sub>	Supply Current	-	4	7	mA	$V_{CC} = 24\text{ V}$ , Output Off, $B \leq 25\text{ Gauss}$
V <sub>OL</sub>	Output Saturation Voltage	-	100	400	mV	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$ , $B \geq 450\text{ Gauss}$
I <sub>OH</sub>	Output Leakage Current	-	0.1	10.0	$\mu\text{A}$	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq 25\text{ Gauss}$
t <sub>r</sub>	Output Rise Time	-	0.21	1.00	$\mu\text{s}$	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 12\text{ V}$
t <sub>f</sub>	Output Fall Time	-	0.10	1.00	$\mu\text{s}$	

Notes:

(1) South pole facing symbolized surface.

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## Electrical Specifications

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

**OHN3019U (Obsolete) & OHS3019U (Obsolete)**

**Uni-Polar**

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$B_{OP}$	Magnetic Operate Point <sup>(1)</sup>	175	300	500	Gauss	+25° C
$B_{RP}$	Magnetic Release Point	125	235	450	Gauss	+25° C
$B_H$	Magnetic Hysteresis	50	65	-	Gauss	+25° C
$I_{CC}$	Supply Current	-	4	7	mA	$V_{CC} = 24\text{ V}$ , Output Off, $B \leq 125\text{ Gauss}$
$V_{OL}$	Output Saturation Voltage	-	100	400	mV	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$ , $B \geq 500\text{ Gauss}$
$I_{OH}$	Output Leakage Current	-	0.1	10.0	$\mu\text{A}$	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq 100\text{ Gauss}$
$t_r$	Output Rise Time	-	0.21	1.00	$\mu\text{s}$	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 12\text{ V}$
$t_f$	Output Fall Time	-	0.10	1.00	$\mu\text{s}$	

**OHN3020U, OHS3020U, OHN3120U, OHS3120U**

**Uni-Polar**

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS	
$B_{OP}$	Magnetic Operate Point <sup>(1)</sup>	OH_3020	70	230	350	Gauss	+25° C
		OHN3120	70	-	425		-20° C to +85° C
		OHS3120	35	-	450		-40° C to +125° C
$B_{RP}$	Magnetic Release Point	OH_3020	50	180	330	Gauss	+25° C
		OHN3120	50	-	405		-20° C to +85° C
		OHS3120	25	-	430		-40° C to +125° C
$B_H$	Magnetic Hysteresis	OH_3020	20	50	-	Gauss	+25° C
		OHN3120	20	-	-		-20° C to +85° C
		OHS3120	20	-	-		-40° C to +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	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$ , $B \geq 350\text{ Gauss}$	
$I_{OH}$	Output Leakage Current	-	0.1	10.0	$\mu\text{A}$	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq 50\text{ Gauss}$	
$t_r$	Output Rise Time	-	0.21	1.00	$\mu\text{s}$	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 12\text{ V}$	
$t_f$	Output Fall Time	-	0.10	1.00	$\mu\text{s}$		

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OH090U, OH180U, OH360U

OHN3000 series, OHS3000 series

OHN3100 series, OHS3100 series



## Electrical Specifications

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

**OHN3030U (Obsolete), OHS3030U, & OHS3130U (Obsolete) Uni-Polar**

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B <sub>OP</sub>	Magnetic Operate Point <sup>(1)</sup>	OH_3030	-	205	250	Gauss +25° C +25° C -40° C to +125° C
		OH_3130	-	-	150	
		OHS3130	-	-	200	
B <sub>RP</sub>	Magnetic Release Point	OH_3030	0	160	-	Gauss +25° C +25° C -40° C to +125° C
		OH_3130	-150	-	-	
		OHS3130	-200	-	-	
B <sub>H</sub>	Magnetic Hysteresis	OH_3030	20	45	-	Gauss +25° C +25° C -40° C to +125° C
		OH_3130	20	-	-	
		OHS3130	20	-	-	
I <sub>CC</sub>	Supply Current	-	4	7	mA	$V_{CC} = 24\text{ V}$ , Output Off, $B \leq 0\text{ Gauss}$
V <sub>OL</sub>	Output Saturation Voltage	-	100	400	mV	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$ , $B \geq 200\text{ Gauss}$
I <sub>OH</sub>	Output Leakage Current	-	0.1	10.0	μA	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq 50\text{ Gauss}$
t <sub>r</sub>	Output Rise Time	-	0.21	1.00	μs	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 12\text{ V}$
t <sub>f</sub>	Output Fall Time	-	0.10	1.00	μs	

**OHS3131U Uni-Polar**

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B <sub>OP</sub>	Magnetic Operate Point <sup>(1)</sup>	OH_3131	-75	-	95	Gauss +25° C -40° C to +125° C
		OHS3131	-75	-	135	
B <sub>RP</sub>	Magnetic Release Point	OH_3031	-95	-	85	Gauss +25° C -40° C to +125° C
		OHS3131	-135	-	125	
B <sub>H</sub>	Magnetic Hysteresis	OH_3031	10	-	-	Gauss +25° C -40° C to +125° C
		OHS3131	10	-	-	
I <sub>CC</sub>	Supply Current	-	4	7	mA	$V_{CC} = 24\text{ V}$ , Output Off, $B \leq 0\text{ Gauss}$
V <sub>OL</sub>	Output Saturation Voltage	-	100	400	mV	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$ , $B \geq 200\text{ Gauss}$
I <sub>OH</sub>	Output Leakage Current	-	0.1	10.0	μA	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq 50\text{ Gauss}$
t <sub>r</sub>	Output Rise Time	-	0.21	1.00	μs	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 12\text{ V}$
t <sub>f</sub>	Output Fall Time	-	0.10	1.00	μs	

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

**OHN3040U, OHS3040U, OHN3140U, OHS3140U Uni-Polar**

SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
$B_{OP}$	Magnetic Operate Point <sup>(1)</sup>	OH_3040	70	150	220	Gauss	+25° C
		OHN3140	45	-	260		-20° C to +85° C
		OHS3140	45	-	270		-40° C to +125° C
$B_{RP}$	Magnetic Release Point	OH_3040	50	115	180	Gauss	+25° C
		OHN3140	25	-	240		-20° C to +85° C
		OHS3140	25	-	250		-40° C to +125° C
$B_H$	Magnetic Hysteresis	OH_3040	20	35	-	Gauss	+25° C
		OHN3140	20	-	-		-20° C to +85° C
		OHS3140	20	-	-		-40° C to +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	$V_{CC} = 4.5\text{ V}$ , $I_{OL} = 20\text{ mA}$ , $B \geq 200\text{ Gauss}$
$I_{OH}$	Output Leakage Current		-	0.1	10.0	$\mu\text{A}$	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq -50\text{ Gauss}$
$t_r$	Output Rise Time		-	0.21	1.00	$\mu\text{s}$	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 12\text{ V}$
$t_f$	Output Fall Time		-	0.10	1.00	$\mu\text{s}$	

**OHN3075U (Obsolete), OHS3075U, OHN3175U (Obsolete), OHS3175U Bi-Polar Latch**

SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
$B_{OP}$	Magnetic Operate Point <sup>(1)</sup>	OH_3075	50	100	250	Gauss	+25° C
		OH_3175	25	-	170		+25° C
		OHN3175	15	-	180		-20° C to +85° C
		OHS3175	10	-	260		-40° C to +125° C
$B_{RP}$	Magnetic Release Point	OH_3075	-250	-100	-50	Gauss	+25° C
		OH_3175	-170	-	-25		+25° C
		OHN3175	-180	-	-15		-20° C to +85° C
		OHS3175	-260	-	-10		-40° C to +125° C
$B_H$	Magnetic Hysteresis	OH_3075	100	200	500	Gauss	+25° C
		OH_3175	100	-	-		+25° C
		OHN3175	80	-	-		-20° C to +85° C
		OHS3175	50	-	-		-40° C to +125° C
$I_{CC}$	Supply Current		-	4	7	mA	$V_{CC} = 24\text{ V}$ , Output Off, $B \leq -250\text{ Gauss}$
$V_{OL}$	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		-	0.1	10.0	$\mu\text{A}$	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq -250\text{ Gauss}$
$t_r$	Output Rise Time		-	0.21	1.00	$\mu\text{s}$	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 12\text{ V}$
$t_f$	Output Fall Time		-	0.10	1.00	$\mu\text{s}$	

Notes:

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

### OHS3177U Bi-Polar Latch

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS	
$B_{OP}$	Magnetic Operate Point <sup>(1)</sup>	OH_3177	50	-	150	Gauss	+25° C -40° C to +125° C
		OHS3177	25	-	200		
$B_{RP}$	Magnetic Release Point	OH_3177	-150	-	-50	Gauss	+25° C -40° C to +125° C
		OHS3177	-200	-	-25		
$B_H$	Magnetic Hysteresis	OH_3177	100	-	-	Gauss	+25° C -40° C to +125° C
		OHS3177	50	-	-		
$I_{CC}$	Supply Current	-	4	7	mA	$V_{CC} = 24\text{ V}$ , Output Off, $B \leq -250\text{ Gauss}$	
$V_{OL}$	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	-	0.1	10.0	$\mu\text{A}$	$V_{CC} = 24\text{ V}$ , $V_{OUT} = 24\text{ V}$ , $B \leq -250\text{ Gauss}$	
$t_r$	Output Rise Time	-	0.21	1.00	$\mu\text{s}$	$R_L = 820\ \Omega$ , $C_L = 20\text{ pF}$ , $V_{CC} = 12\text{ V}$	
$t_f$	Output Fall Time	-	0.10	1.00	$\mu\text{s}$		

#### Notes:

(1) South pole facing symbolized surface.

#### General Note

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# Hallogic Hall-Effect Sensors

OH090U, OH180U, OH360U

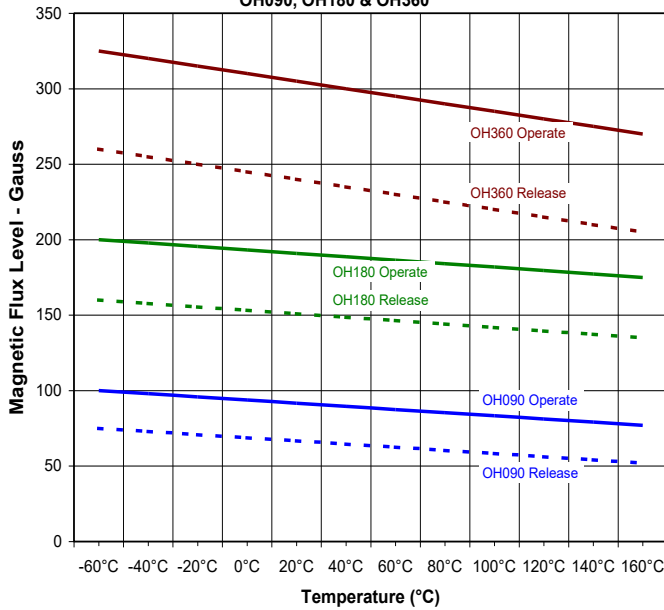
OHN3000 series, OHS3000 series

OHN3100 series, OHS3100 series

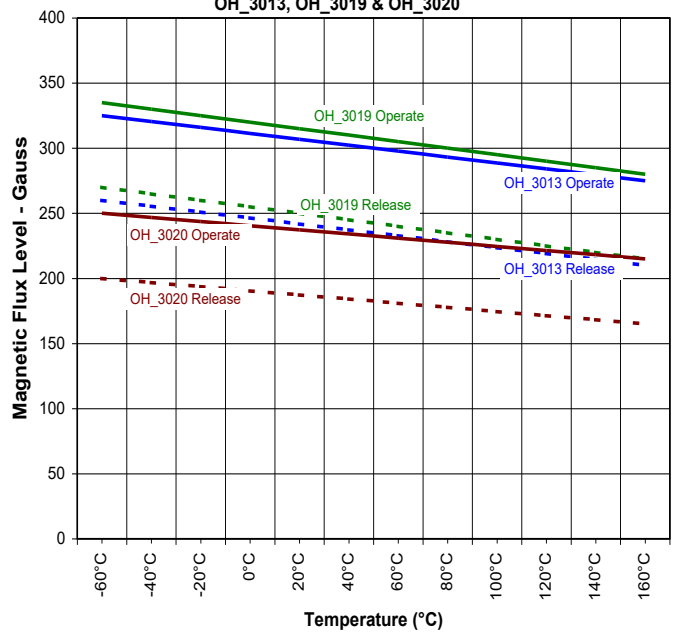


## Typical Operate & Release Points

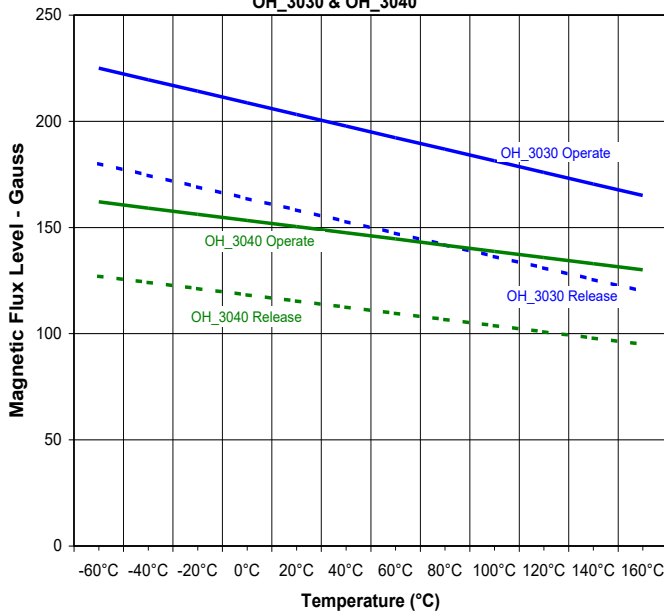
Magnetic Operate & Release Points vs Temperature  
OH090, OH180 & OH360



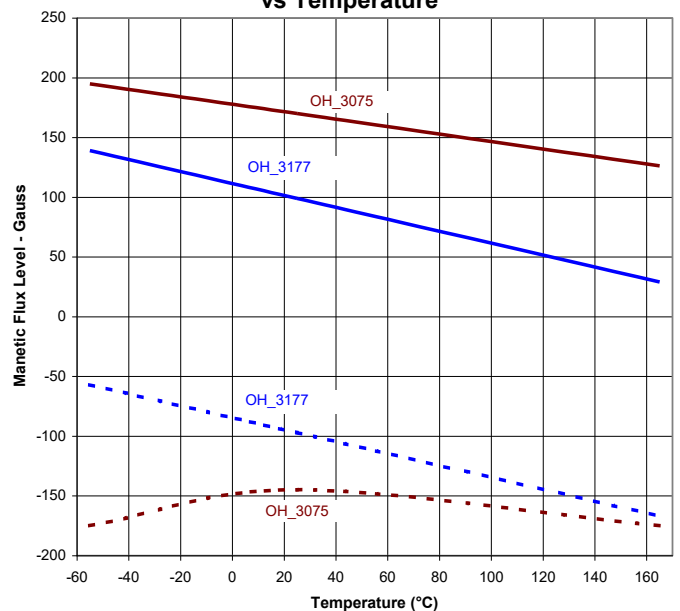
Magnetic Operate & Release Points vs Temperature  
OH\_3013, OH\_3019 & OH\_3020



Magnetic Operate & Release Points vs Temperature  
OH\_3030 & OH\_3040



Magnetic Operate & Release Points vs Temperature



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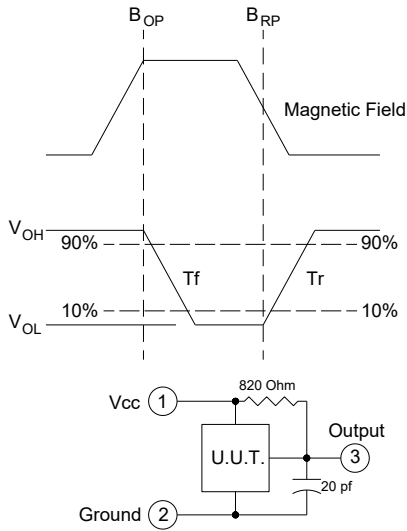
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# Hallogic Hall-Effect Sensors

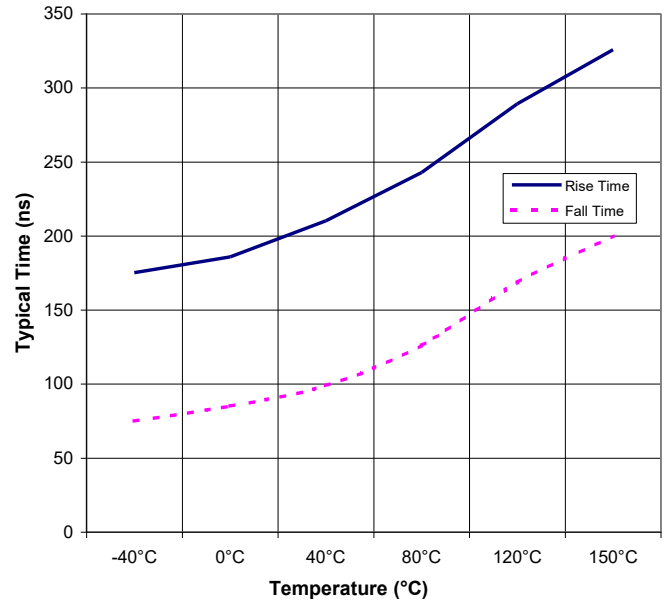
OH090U, OH180U, OH360U

OHN3000 series, OHS3000 series

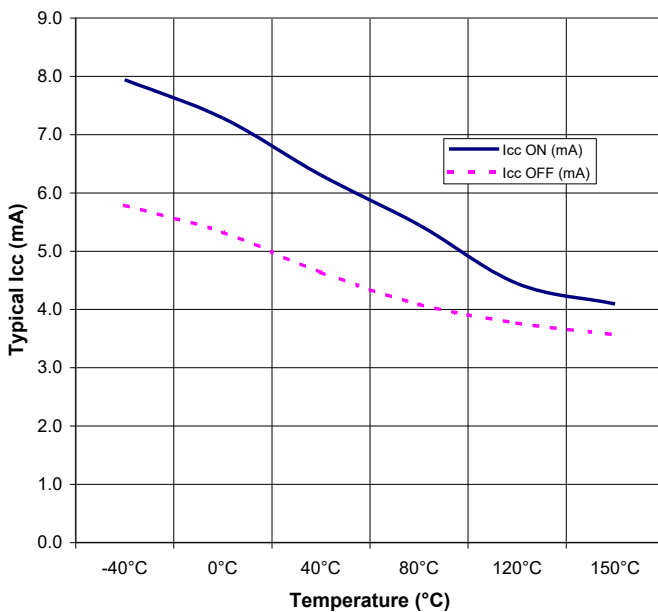
OHN3100 series, OHS3100 series



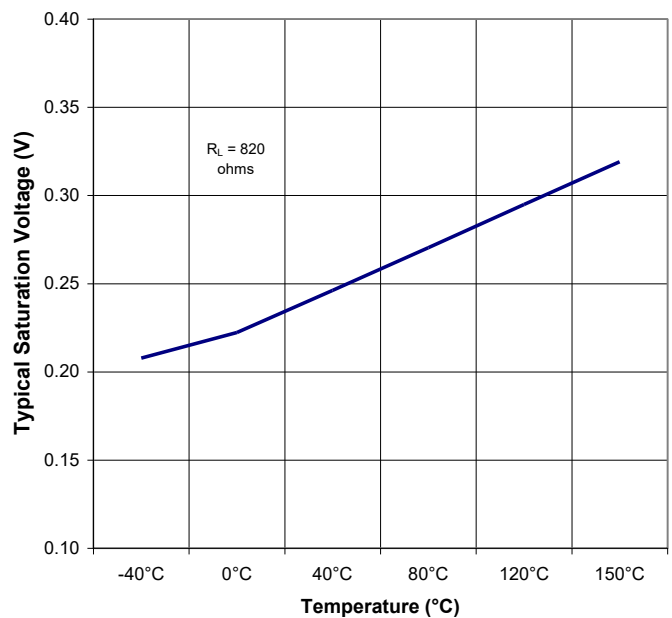
Rise & Fall Time vs Temperature



I<sub>cc</sub> vs Temperature



Saturation Voltage vs Temperature



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