

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 OH180U OH360U OHN3020U OHS3020U OHN3120U OHS3120U OHS3030U OHS3131U OHN3040U OHS3040U OHN3140U OHS3140U	Unipolar non-latching

Ordering Information	
Through Hole	Configuration
OHS3075U OHS3175U OHS3177U	Bi-Polar latching



RoHS

General Note

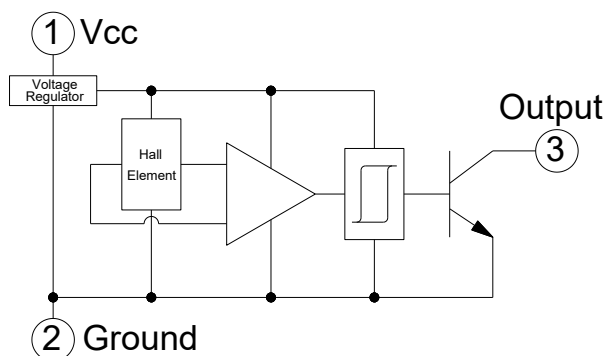
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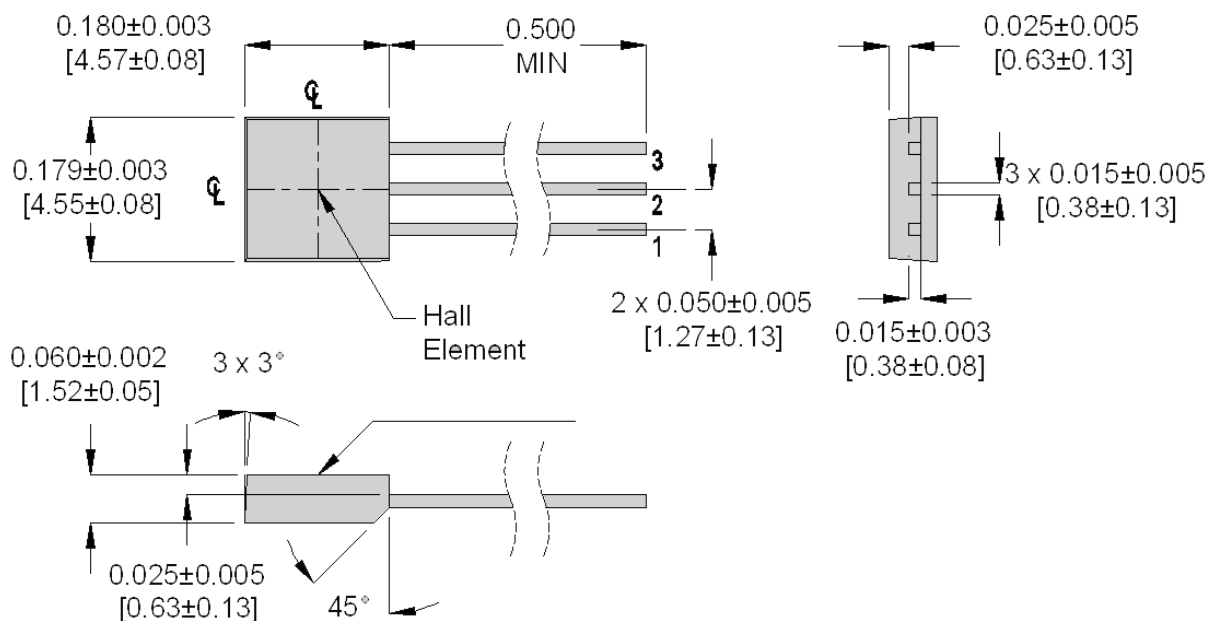
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Pin #	Transistor
1	V _{CC}
2	Ground
3	Output



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

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 $+160^\circ\text{C}$
Operating Temperature Range, T_A	OHN30__U OHS30__U OH090/180/360U -20°C to $+85^\circ\text{C}$ -40°C to $+125^\circ\text{C}$ -40°C to $+150^\circ\text{C}$
Lead Soldering Temperature (1/8 in. (3.2 mm) from case for 5 sec. with soldering iron) ⁽¹⁾	260° C
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 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 ⁽¹⁾	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	μA	$V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq -100\text{ Gauss}$
t_r	Output Rise Time	-	0.21	1.00	μs	$R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 14\text{ V}$
t_f	Output Fall Time	-	0.10	1.00	μs	

OH180U Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B_{OP}	Magnetic Operate Point ⁽¹⁾	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	μA	$V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 0\text{ Gauss}$
t_r	Output Rise Time	-	0.21	1.00	μs	$R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 14\text{ V}$
t_f	Output Fall Time	-	0.10	1.00	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)

OH360U Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
$B_{OP}^{(1)}$	Magnetic Operate Point	235	300	465	Gauss	
B_{RP}	Magnetic Release Point	120	235	325	Gauss	
B_H	Magnetic Hysteresis	30	65	200	Gauss	
I_{CC}	Supply Current	-	6	9	mA	$V_{CC} = 24\text{ V}$, Output Off
V_{OL}	Output Saturation Voltage	-	100	300	mV	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 20\text{ mA}$, $B \geq 465\text{ Gauss}$
I_{OH}	Output Leakage Current	-	0.1	10.0	μA	$V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 120\text{ Gauss}$
t_r	Output Rise Time	-	0.21	1.00	μs	$R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 14\text{ V}$
t_f	Output Fall Time	-	0.10	1.00	μs	

OHN3020U, OHS3020U, OHN3120U, OHS3120U Uni-Polar

SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
$B_{OP}^{(1)}$	Magnetic Operate Point	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	μA	$V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 50\text{ Gauss}$
t_r	Output Rise Time		-	0.21	1.00	μs	$R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$
t_f	Output Fall Time		-	0.10	1.00	μs	

Notes:

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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)

OHS3030U Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B _{OP}	Magnetic Operate Point ⁽¹⁾ OHS3030	-	205	250	Gauss	+25° C
B _{RP}	Magnetic Release Point OHS3030	0	160	-	Gauss	+25° C
B _H	Magnetic Hysteresis OHS3030	20	45	-	Gauss	+25° C
I _{CC}	Supply Current	-	4	7	mA	$V_{CC} = 24\text{ V}$, Output Off, $B \leq 0\text{ Gauss}$
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	μA	$V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 50\text{ Gauss}$
t _r	Output Rise Time	-	0.21	1.00	μs	$R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$
t _f	Output Fall Time	-	0.10	1.00	μs	

OHS3131U Uni-Polar

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	TEST CONDITIONS
B _{OP}	Magnetic Operate Point ⁽¹⁾ OHS3131	-75	-	95	Gauss	+25° C
	OHS3131	-75	-	135		-40° C to +125° C
B _{RP}	Magnetic Release Point OHS3131	-95	-	85	Gauss	+25° C
	OHS3131	-135	-	125		-40° C to +125° C
B _H	Magnetic Hysteresis OHS3131	10	-	-	Gauss	+25° C
	OHS3131	10	-	-		-40° C to +125° C
I _{CC}	Supply Current	-	4	7	mA	$V_{CC} = 24\text{ V}$, Output Off, $B \leq 0\text{ Gauss}$
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	μA	$V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq 50\text{ Gauss}$
t _r	Output Rise Time	-	0.21	1.00	μs	$R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$
t _f	Output Fall Time	-	0.10	1.00	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)

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

SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
B_{OP}	Magnetic Operate Point ⁽¹⁾	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	μA	$V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq -50\text{ Gauss}$
t_r	Output Rise Time		-	0.21	1.00	μs	$R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$
t_f	Output Fall Time		-	0.10	1.00	μs	

OHS3075U, OHS3175U **Bi-Polar Latch**

SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
B_{OP}	Magnetic Operate Point ⁽¹⁾	OHS3075	50	100	250	Gauss	+25° C
		OHS3175	25	-	170		+25° C
		OHS3175	10	-	260		-40° C to +125° C
B_{RP}	Magnetic Release Point	OHS3075	-250	-100	-50	Gauss	+25° C
		OHS3175	-170	-	-25		+25° C
		OHS3175	-260	-	-10		-40° C to +125° C
B_H	Magnetic Hysteresis	OHS3075	100	200	500	Gauss	+25° C
		OHS3175	100	-	-		+25° 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	μA	$V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq -250\text{ Gauss}$
t_r	Output Rise Time		-	0.21	1.00	μs	$R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$
t_f	Output Fall Time		-	0.10	1.00	μs	

Notes:

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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)

OHS3177U Bi-Polar Latch

SYMBOL	PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITIONS
$B_{OP}^{(1)}$	Magnetic Operate Point	OHS3177 OHS3177	50 25	- -	150 200	Gauss	+25° C -40° C to +125° C
B_{RP}	Magnetic Release Point	OHS3177 OHS3177	-150 -200	- -	-50 -25	Gauss	+25° C -40° C to +125° C
B_H	Magnetic Hysteresis	OHS3177 OHS3177	100 50	- -	- -	Gauss	+25° C -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	μA	$V_{CC} = 24\text{ V}$, $V_{OUT} = 24\text{ V}$, $B \leq -250\text{ Gauss}$
t_r	Output Rise Time		-	0.21	1.00	μs	$R_L = 820\ \Omega$, $C_L = 20\text{ pF}$, $V_{CC} = 12\text{ V}$
t_f	Output Fall Time		-	0.10	1.00	μs	

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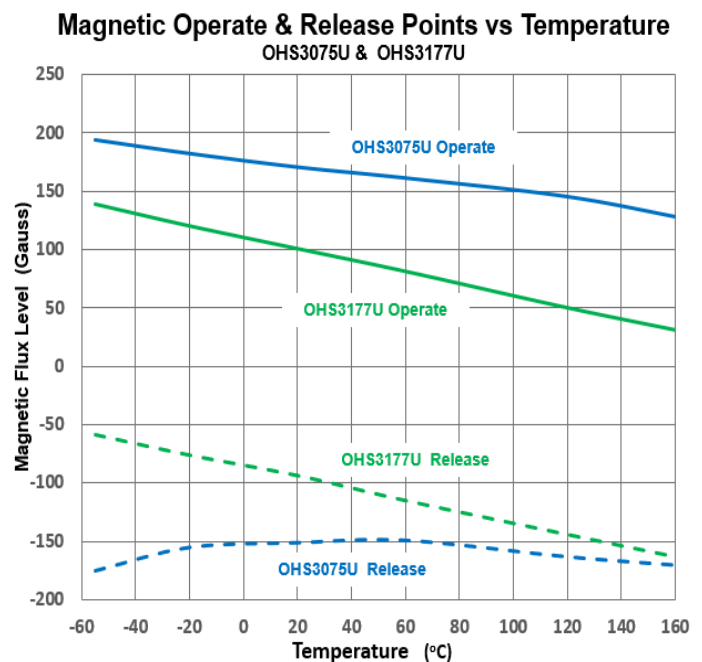
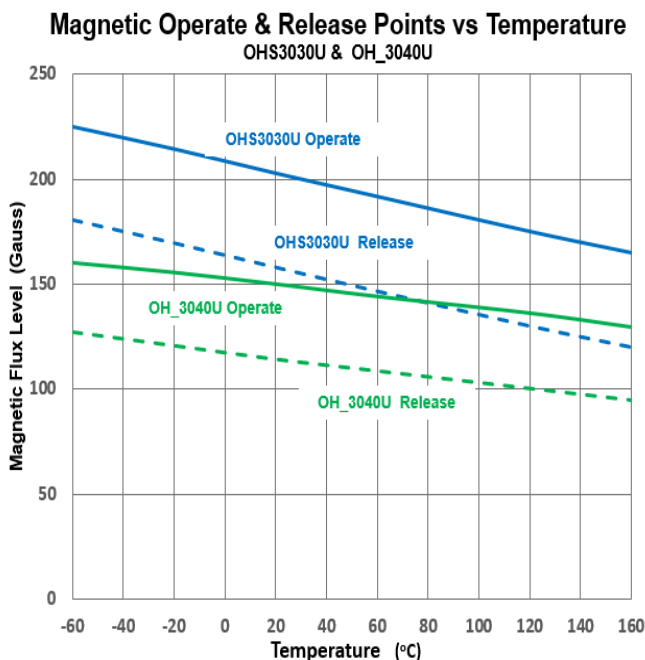
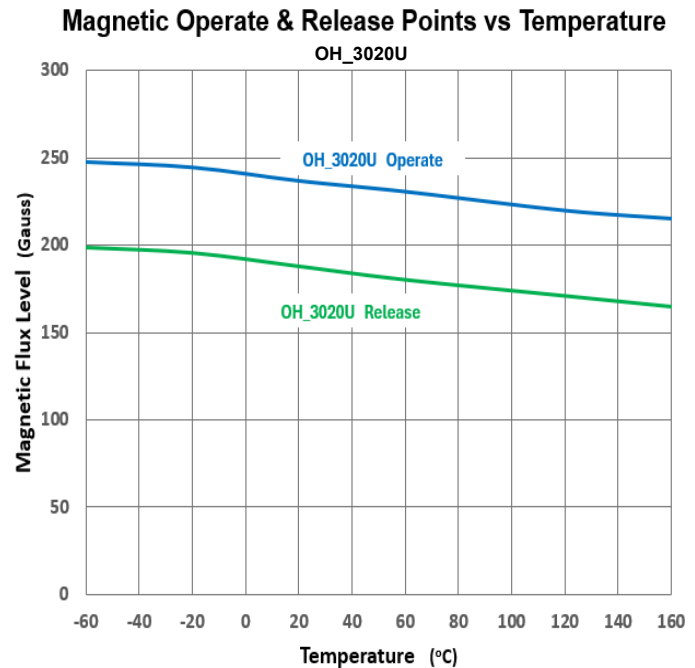
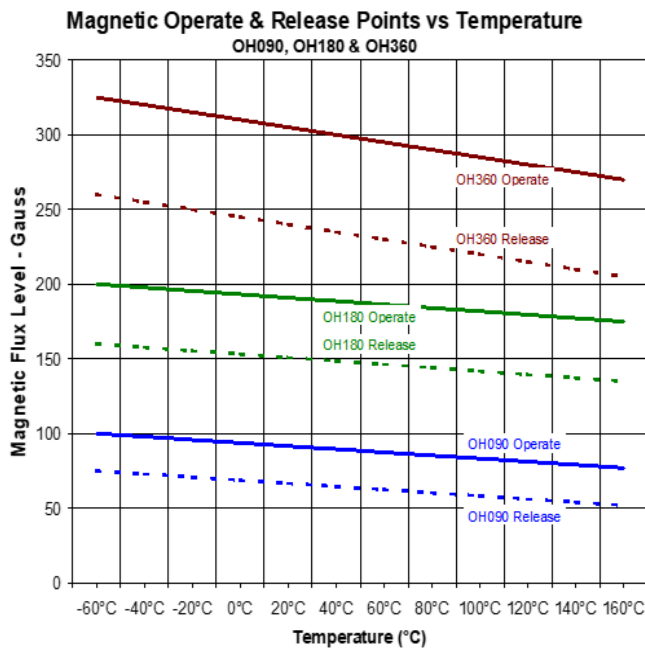
OH090U, OH180U, OH360U

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Typical Operate & Release Points



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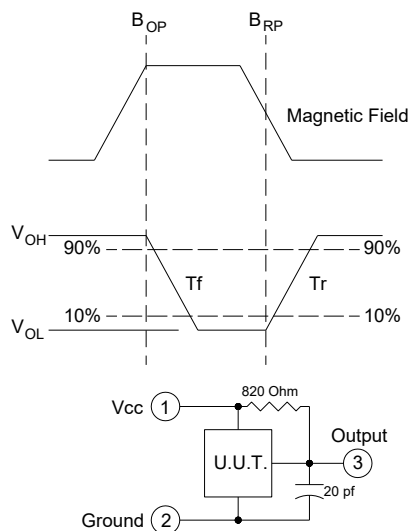
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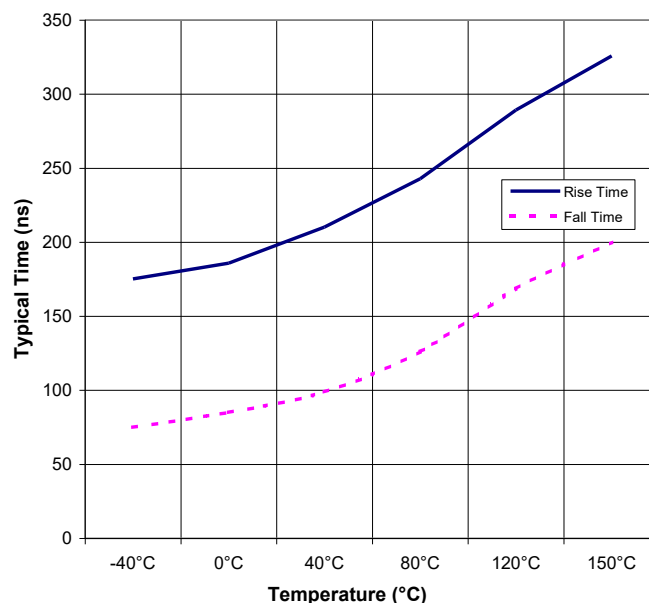
OHN3100 series, OHS3100 series



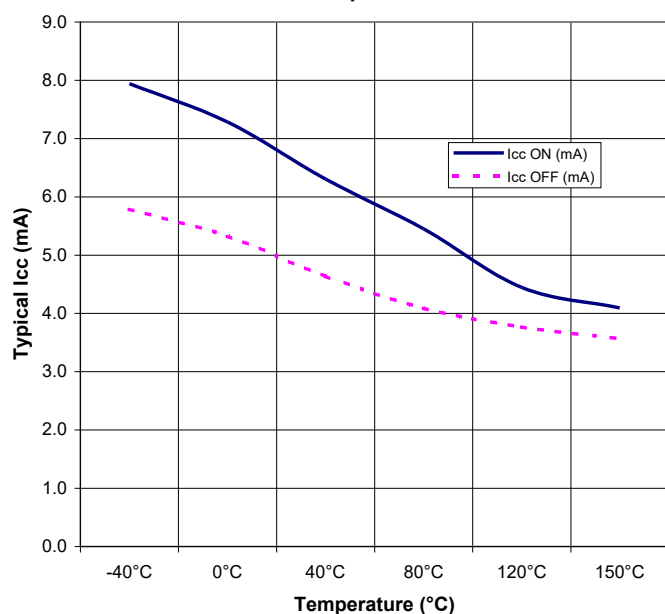
Typical Performance



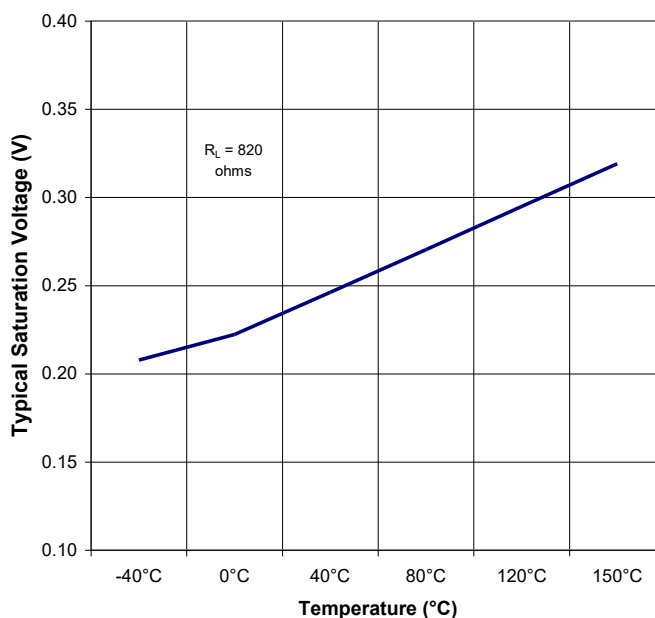
Rise & Fall Time vs Temperature



I_{cc} vs Temperature



Saturation Voltage vs Temperature



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