

## HALL EFFECT BIPOLAR LATCHING SWITCH IC CYD3601A

The CYD3601A is a bipolar Hall Effect switch with a latched digital output. The built-in dynamic offset cancellation of pre-amplifier stage achieves optimal symmetrical magnetic sensing. This Hall Effect IC is optimal for DC brushless fan applications. The supply voltage range is from 2.5V to 18V and maximum output current is 25mA.

### FEATURES

- 2.5V to 18V power supply
- Built-in dynamic offset cancellation
- Small size, convenient installing
- High balance and low thermal drift
- magnetic sensing
- **ROHS Compliant**

### TYPICAL APPLICATIONS

- Brushless DC motor
- VCD/DVD loader, CD/DVD-ROM
- Contactless switch
- Cover detector
- Speed measurement
- Home applications
- Home safety

### Ordering Information

Package	Ordering no.	Mark	Packing	Temperature range
SOT23-3L	CYD3601A-LH	01A	3000/reel	-40°C ~ +125°C
TO92-3L	CYD3601A-UA	01A	500-1000units/pack	-40°C ~ +125°C

### Absolute Maximum Rating

Parameter	Symbol	Value	Unit
Supply voltage	$V_{CC}$	20	V
Max. power consumption	$P_D$	TO92-3L(UA)=550, SOT23-3L(LH)=300	mW
Operating temperature range	$T_A$	-40 ~ +125	°C
Storage temperature range	$T_S$	-50 ~ +150	°C
Max. Output current	$I_{omax}$	25	mA

### ELECTRICAL CHARACTERISTICS

$T_A=25^{\circ}\text{C}$ ,  $V_{DD}=12\text{V}$

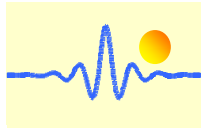
Parameter	Symbol	Test conditions	min	typical	max	Unit
Supply voltage	$V_{CC}$		2.5	-	18	V
Output sink voltage	$V_{OL}$	$I_{out}=15\text{mA}$	-	0.3	0.5	V
Output Breakdown voltage	$V_{BV}$		18	22	30	V
Supply current	$I_{DD}$	Output open@12V	-	6	8	mA

### MAGNET CHARACTERISTICS

( $V_{DD}=12\text{V DC}$ ,  $T_A=+25^{\circ}\text{C}$ )

Parameter	Symbol	min	typical	max	Unit
Operating point	$B_{CP}$	-	15	35	Gauss
Release point	$B_{RP}$	-35	-15	-	Gauss
Hysteresis	$B_H$	20	30	60	Gauss

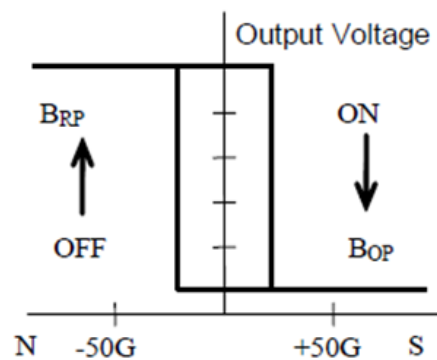
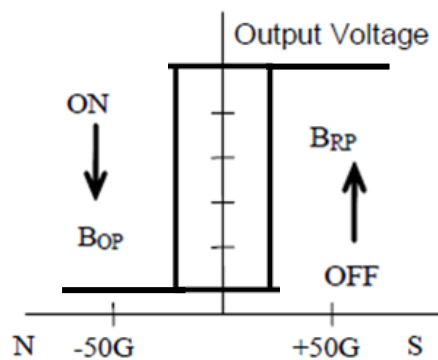
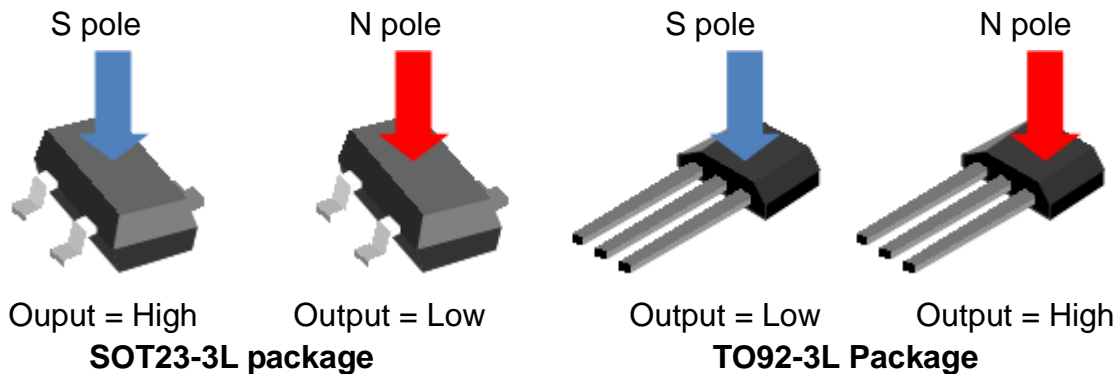
**NOTE:** Need a serial resistor for 24V application,  $1\text{mT}=10\text{GS}$



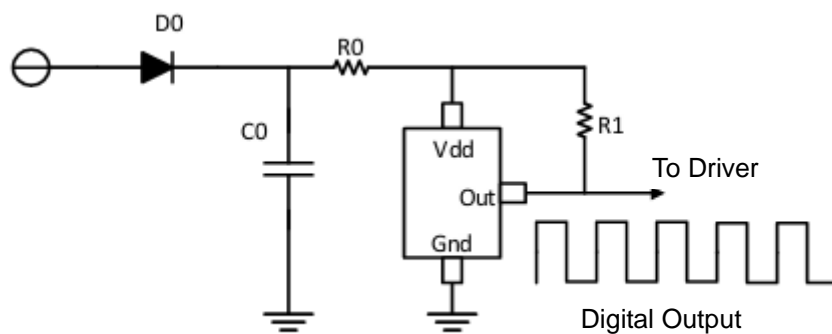
## Relation between output and applied magnetic field B

( $T_A = -40^{\circ}\text{C} \sim 125^{\circ}\text{C}$ ,  $V_{DD} = 2.5 \sim 18\text{VDC}$ )

Part number	CYD3601A-LH (SOT23-3L)		CYD3601A-UA (TO92-3L)	
Parameter	Condition	Output	Condition	Output
S pole	$B < B_{rp}$	High	$B > B_{op}$	Low
N pole	$B > B_{op}$	Low	$B < B_{rp}$	High

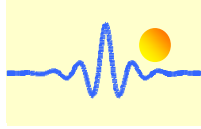


## Application circuit

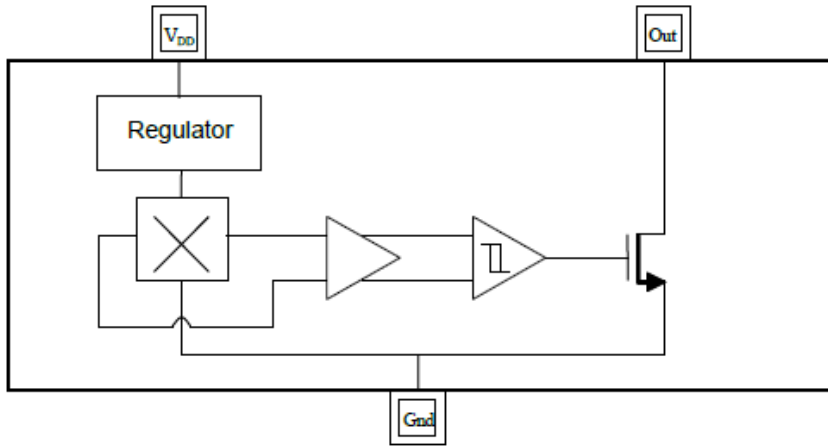


### NOTE:

- D0: general diode
- C0: decoupling capacitor  $1\mu\text{F}$  (recommended)
- R0:  $1\text{k}\Omega$ ,  $0.5\text{W}$  for power supply  $+24\text{VDC}$ ,  $0\Omega$  for power supply  $5\text{V}$ ,  $12\text{V}$  and  $15\text{VDC}$
- R1:  $0\text{k}\Omega$  (recommended)

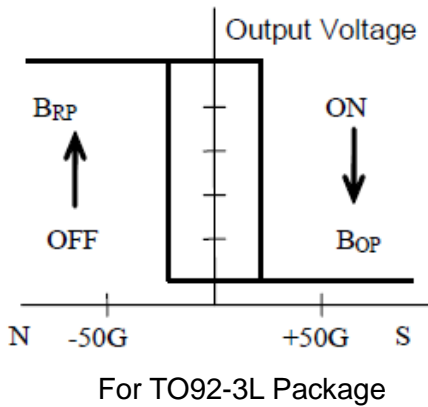


**BLOCK DIAGRAM**

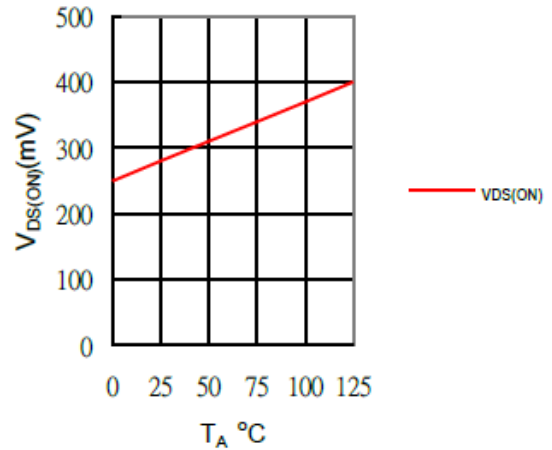


This Hall Effect Switch IC integrates the sensor, Pre-amplifier with dynamic offset cancellation and hysteresis comparator in single chip.

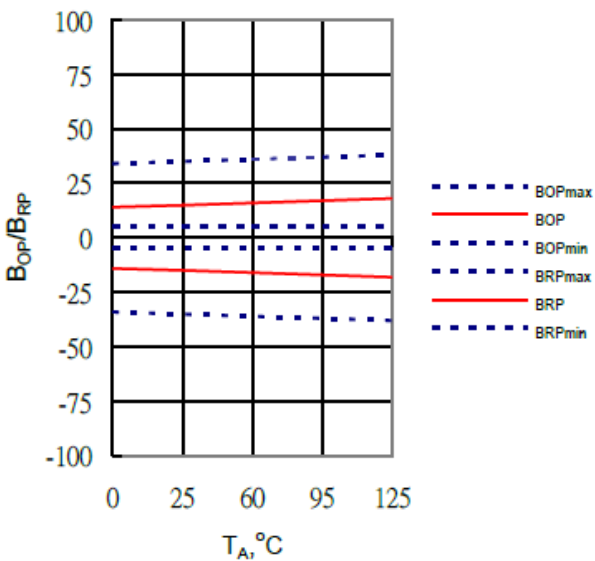
**Magnetic-electrical transfer characteristics**



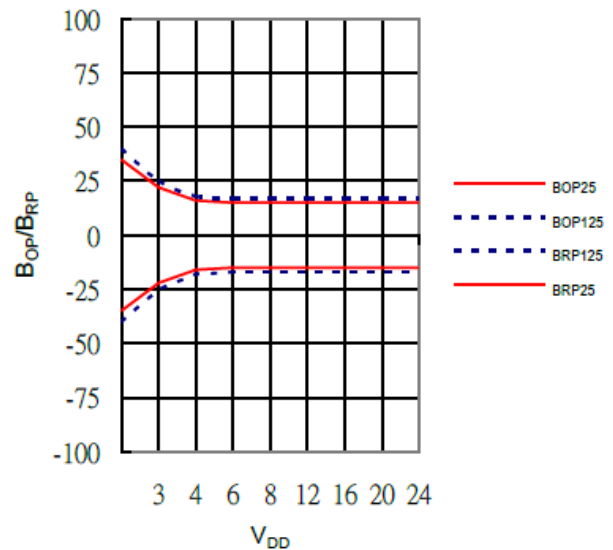
**Output sink voltage versus temperature**

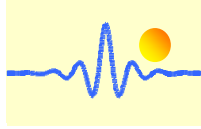


**B<sub>OP</sub>, B<sub>RP</sub>(Gauss) versus Temperature**

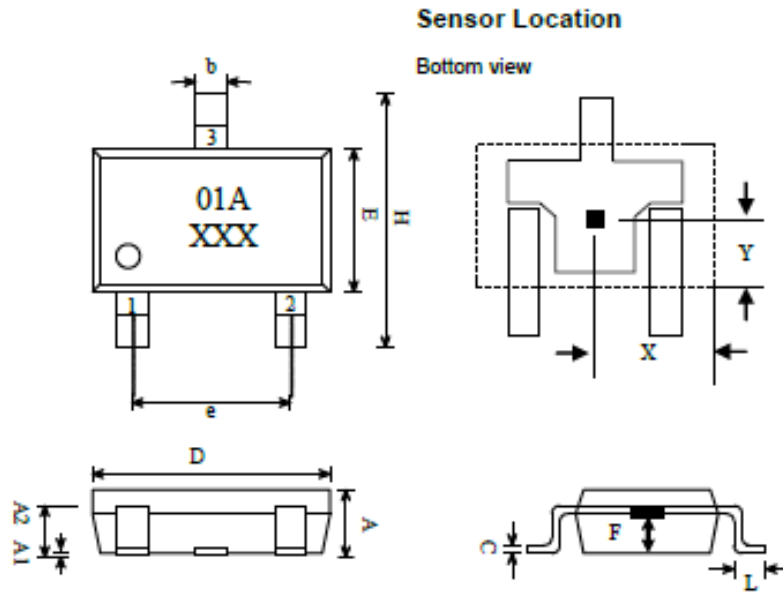


**B<sub>OP</sub>, B<sub>RP</sub>(Gauss) versus supply voltage**





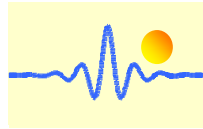
**Package Outline SOT23-3L(LH)**



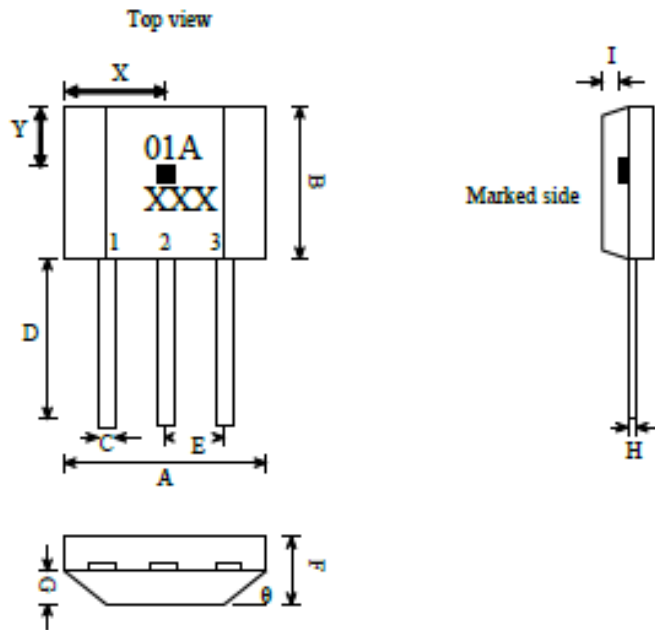
Marking:  
Part Number : 01A  
Date Code : X(Year) XX(Week)

- 1. VDD/DC power supply
- 2. OUT/output pin
- 3. GND/DC ground

SYMBOLS	DIMENSIONS IN MILLIMETERS(mm)		
	MIN	NOM	MAX
A	1.00	1.10	1.30
A1	0.00	-	0.10
A2	0.70	0.80	0.90
b	0.35	0.40	0.50
C	0.10	0.15	0.25
D	2.70	2.90	3.10
E	1.40	1.80	2.00
H	2.60	2.8	3.00
e	1.7	1.9	2.1
L	0.20	-	-
<b>Sensor Location</b>			
X	1.35	1.45	1.55
Y	0.85	0.95	1.05
F	0.35	0.50	0.65



**Package Outline T092-3L(UA)**



Marking:  
Part Number : 01A  
Date Code : X(Year) XX(Week)

- 1. VDD/DC power supply
- 2. GND/DC ground
- 3. OUT/output pin

SYMBOLS	DIMENSIONS IN MILLIMETERS(mm)		
	MIN	NOM	MAX
A	3.80	4.00	4.20
B	2.90	3.10	3.30
C	0.38	0.45	0.52
D	14.40	14.60	14.80
E	1.24	1.27	1.30
F	1.45	1.50	1.55
G	0.68	0.73	0.78
H	0.36	0.43	0.50
I	0.41	0.43	0.45
θ		45°	
<b>Sensor Location</b>			
X	1.90	2.00	2.10
Y	0.90	1.00	1.10