



# PT3616

## Hi-sensitivity Hall-effect Latch

### Applications

- DC brushless motors
- CAM shaft sensors
- Rotating speed measurement
- Magnetic encoders
- Automotive systems
- Home appliances

### Features

- 3.8V to 24V wide operation voltage
- High sensitivity
- Built-in dynamic offset cancellation
- Small size
- High balance and low thermal drift magnetic sensing
- Lead length 18.7mm ( UL type )
- Automotive grade component's reliability test condition meet AEC-Q qualification
- ISO 7637 Compatible

### Ordering information

- PT3616-PA-T  
Package(PA):UA or UL or LH  
Temperature(T): A or K

### Specifications

#### Absolute Maximum Ratings (Ta=25°C)

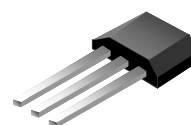
Parameter	Symbol	Conditions	Rating	Unit
Maximum supply voltage	$V_{DDMAX}$		28	V
Allowable power dissipation	$P_D$	TO-92(UA)	550 <sup>*1</sup>	mW
		TO-92(UL)	550 <sup>*1</sup>	mW
		SOT-23(LH)	300 <sup>*1</sup>	mW
Operating temperature range	$T_A$	Suffix 'A'	-40~+150	°C
		Suffix 'K'	-40~+125	°C
Storage temperature range	$T_S$		-55~+150	°C
Relative Humidity	$R_H$		20~90	%
Max. output current	$I_{OMAX}$		50	mA

\*1: On 50mm x 50mm x 1.6mm glass epoxy board

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P/N: PT3616-XX-X

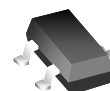
TO92-3L (UA)



TO92-3L (UL)



SOT23-3L (LH)



**PROLIFIC TECHNOLOGY INC.**

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**Electrical Characteristics (T<sub>A</sub>=+25°C, V<sub>DD</sub>=12V)**

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Units
Supply Voltage	V <sub>DD</sub>		3.8		24	V
Output Sink Voltage	V <sub>OL</sub>	@ I <sub>OUT</sub> =20mA		130	280	mV
Output Leakage Current	I <sub>OH</sub>	Output switch off			0.1	uA
Output Clamp Voltage	V <sub>BV</sub>			28	30	V
Supply Current	I <sub>DD</sub>	Output open		4	6	mA

**Magnetic Characteristics (T<sub>A</sub>=+25°C, V<sub>DD</sub>=12V)**

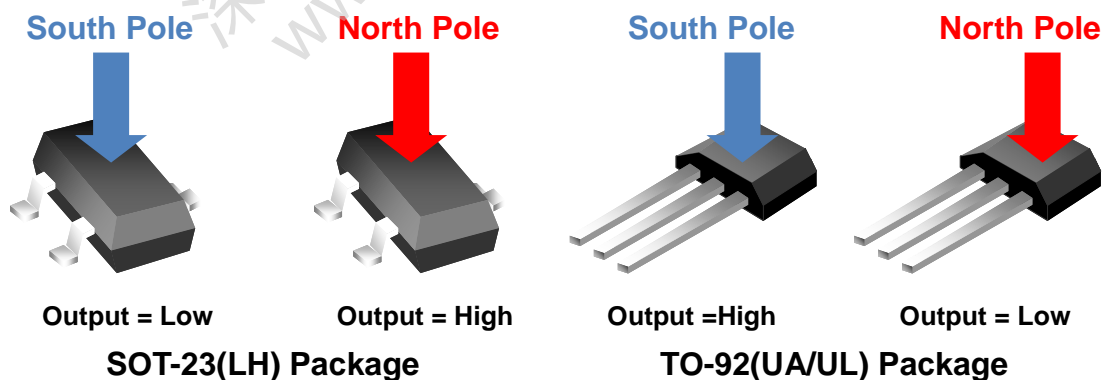
Operate Point	B <sub>OP</sub>		10	26	45	G
Release Point	B <sub>RP</sub>		-45	-26	-10	G
Hysteresis	B <sub>HYS</sub>		45	52	70	G

**Magnetic Characteristics (T<sub>A</sub>=-40°C~150°C, V<sub>DD</sub>=12V)**

Operate Point	B <sub>OP</sub>		9		50	G
Release Point	B <sub>RP</sub>		-50		-9	G
Hysteresis	B <sub>HYS</sub>		35		72	G

**Output Behavior versus Polarity (T<sub>A</sub>=-40°C~150°C, V<sub>DD</sub>=3.8V~24V)**

Parameters	Test Conditions(LH)	Output(LH)	Test Conditions(UA/UL)	Output(UA/UL)
South pole	B<Brp	Low	B>Bop	High
North pole	B>Bop	High	B<Brp	Low



**General Specifications**

The PT3616 is designed for magnetic actuating using a bipolar magnetic field. 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 application. The

supply voltage range is from 3.8V to 24V and the maximum output current is 50mA.

This Hall effect sensor IC integrate the sensor, pre-amplifier with dynamic offset cancellation and the hysteresis comparator in single chip. The architecture block diagram is shown in Fig. 1.

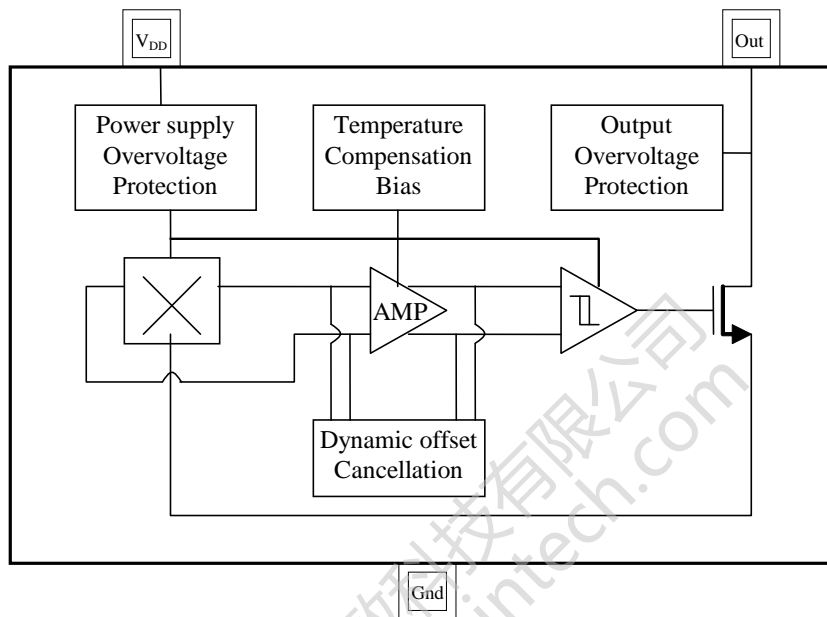
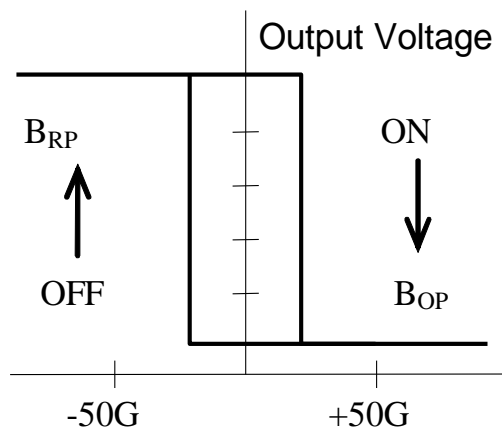
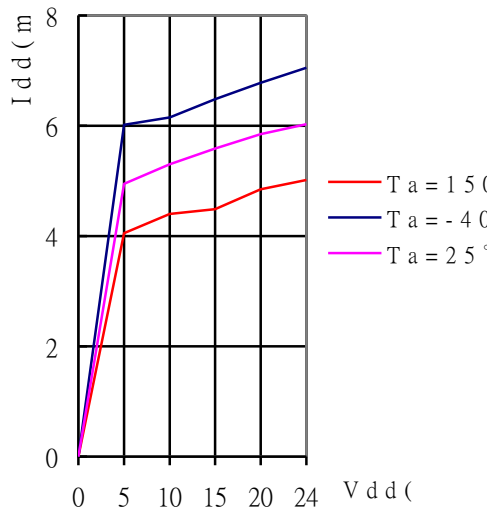
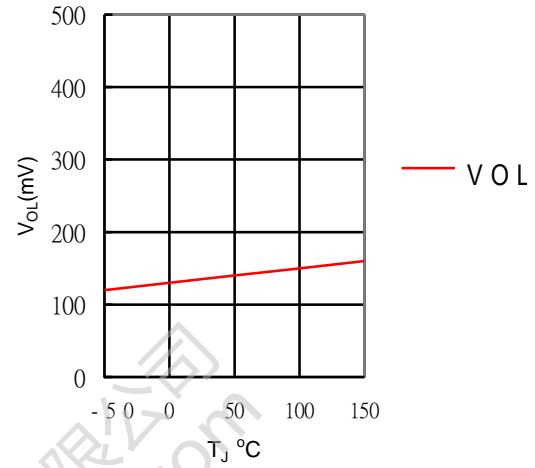
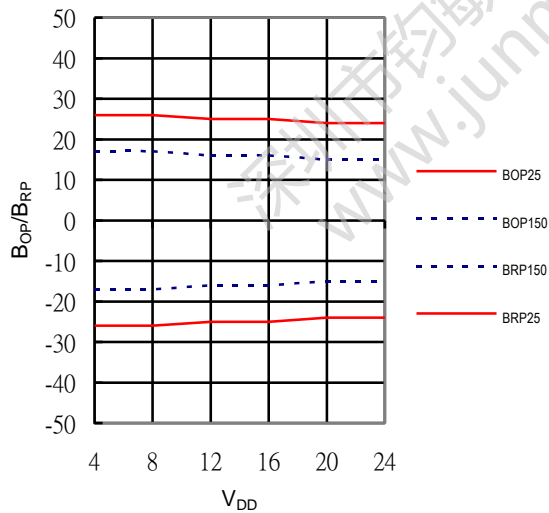
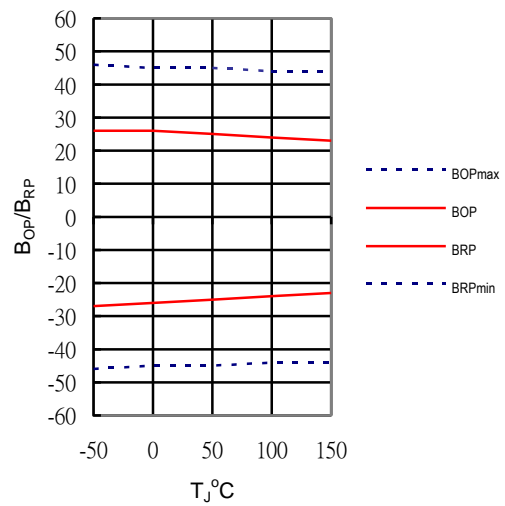


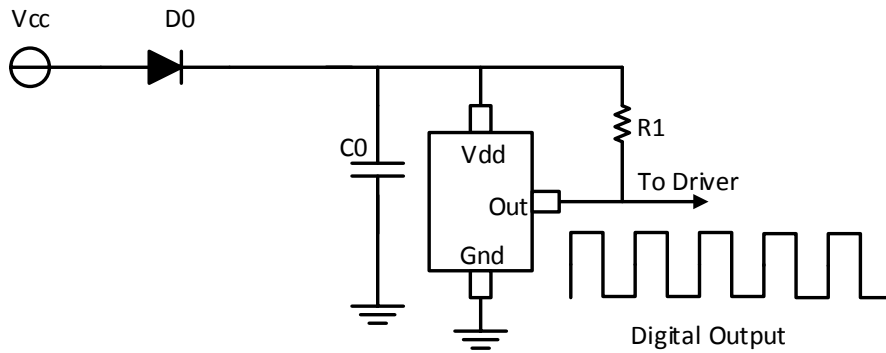
Fig. 1. Functional diagram

### Magnetic Flux v.s. Output Voltage



**I<sub>DD</sub> v.s.**

**Output sink voltage  
temperature**

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

**B<sub>OP</sub>, B<sub>RP</sub> versus temperature**


### Application circuits



NOTE :

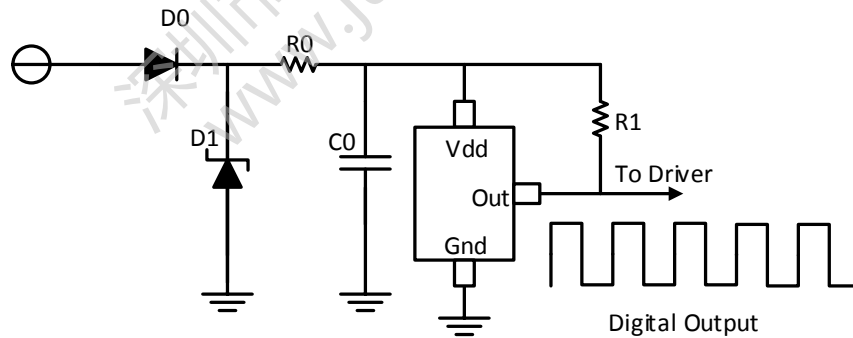
D0: general diode

C0: decoupling capacitor 0.1uF(recommended)

R1: 1K~10Kohm (recommended)

### EMC/ESD Application circuits

Following application circuit is recommended for EMC test (ISO 7637-1/2)



NOTE :

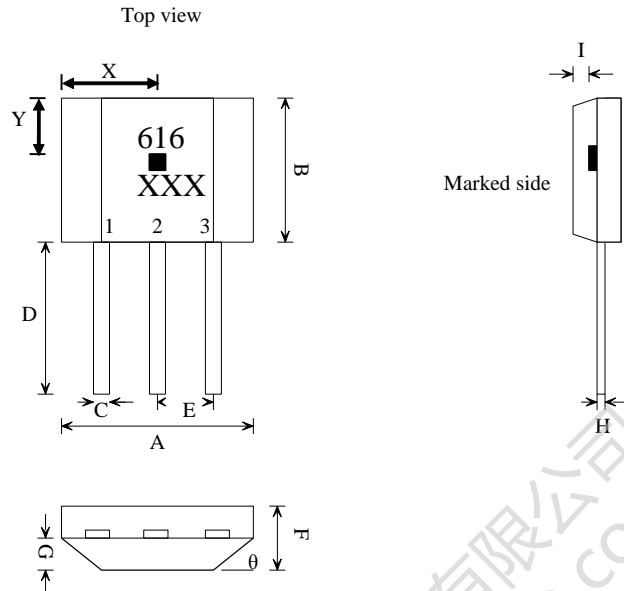
D0: general diode (400V/1A)

D1: zener diode (30V/5W)

C0 :decoupling capacitor 0.1uF(recommended)

R0 :150~270ohm

R1: 1K~10Kohm (recommended)

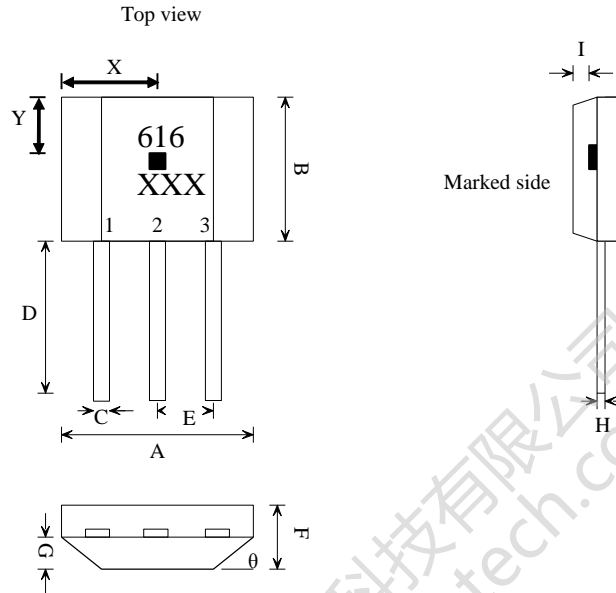
**Package Outline  
 TO-92(UA)**


Marking:  
 Part Number : 616  
 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
$\theta$		45°	
Sensor Location			
X	1.90	2.00	2.10
Y	0.90	1.00	1.10

**Package Outline**  
**TO-92(UL)**



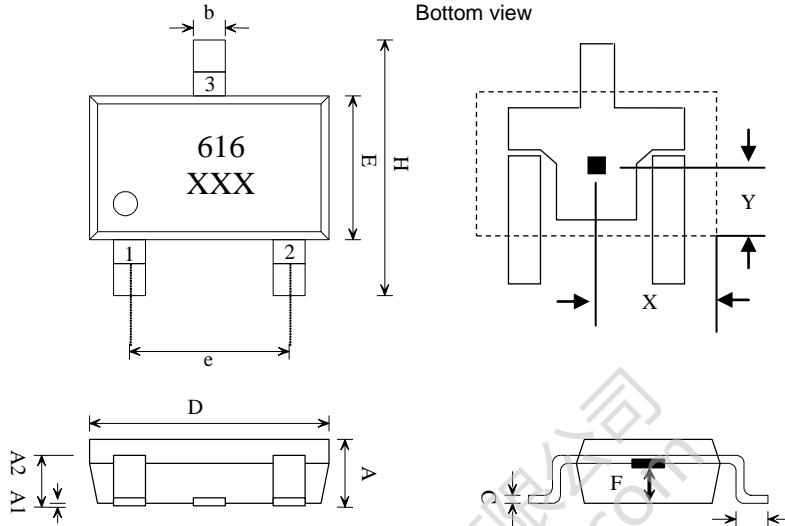
Marking:  
 Part Number : 616  
 Date Code : X(Year) XX(Week)

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	2.80	3.00	3.20
C	0.33	0.40	0.47
D	18.20	18.70	19.20
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	0.33	0.40	0.47
$\theta$		45°	
Sensor Location			
X	1.90	2.00	2.10
Y	0.90	1.00	1.10

**Package Outline**  
**SOT-23(LH)**

**Sensor Location**



Marking:  
Part Number : 616  
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	-	-
Sensor Location			
X	1.35	1.45	1.55
Y	0.85	0.95	1.05
F	0.35	0.50	0.65



**Order information**

Part Number	Temperature Range	Package Type	Package Qty	Prolific Type Code
PT3616UAK	-40°C~+125°C	TO92-3L	1000pcs/Bulk	PT3616E1OAG7D1
PT3616ULK	-40°C~+125°C	TO92-3L	1000pcs/Bulk	PT3616E1RAG7D1
PT3616LHK	-40°C~+125°C	SOT23-3L	3000pcs/Reel	PT3616E1SAG8D1
PT3616UAA	-40°C~+150°C	TO92-3L	1000pcs/Bulk	PT3616E1OAG7D2
PT3616ULA	-40°C~+150°C	TO92-3L	1000pcs/Bulk	PT3616E1RAG7D2
PT3616LHA	-40°C~+150°C	SOT23-3L	3000pcs/Reel	PT3616E1SAG8D2

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