



# ATS278

## Two Phase Hall Effect Latch With FG Output

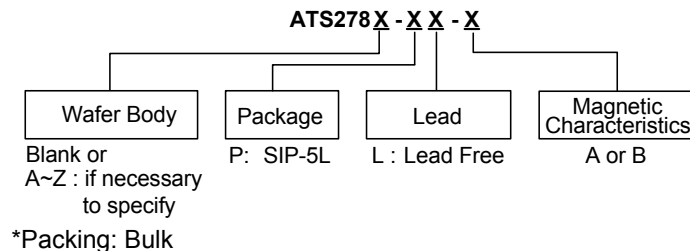
### ■ Features

- On-chip Hall plate
- Operating voltage: 3.5V~20V
- Internal bandgap regulator allows temperature compensated operations and a wide operating voltage range
- High output sinking capability up to 400mA for driving large load
- Built-in protection diode only for chip reverse power connecting
- Frequency Generation (FG) output
- Package: SIP-5L

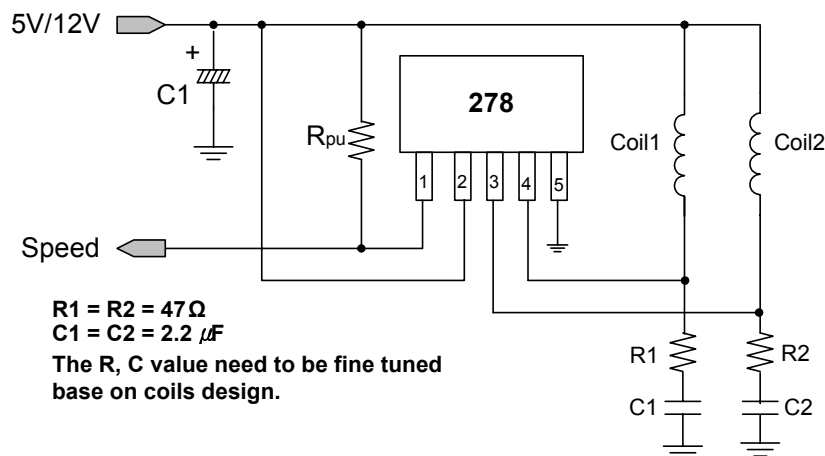
### ■ Applications

- Dual-coil Brush-less DC Motor
- Dual-coil Brush-less DC Fan
- Revolution Counting
- Speed Measurement

### ■ Ordering Information



### ■ Typical Application Circuit



5V/12V DC Brush-less Fan with FG output function

### ■ General Description

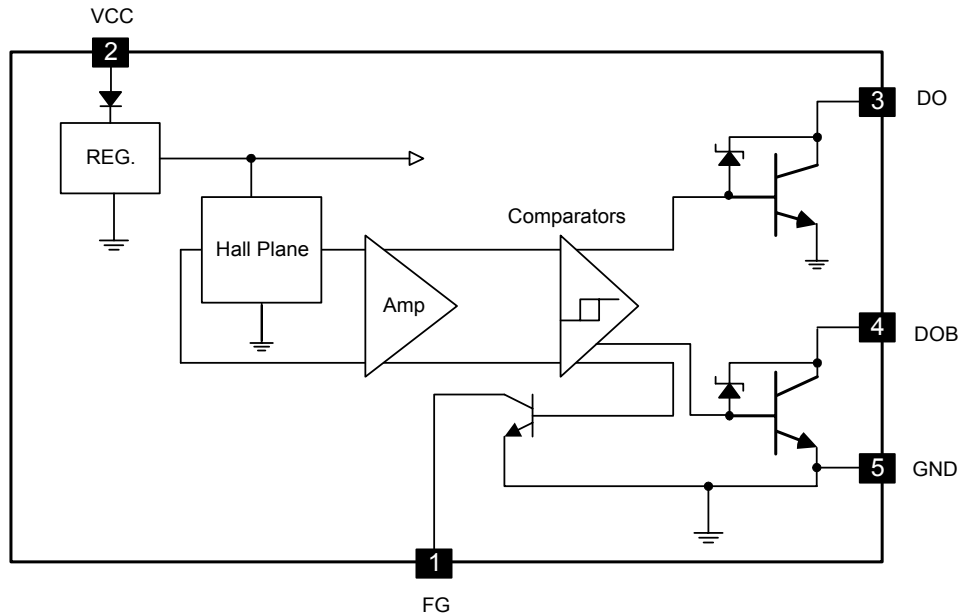
ATS278 is an integrated Hall sensor with two output drivers and rotor speed output, typically designed for electronic commutation of two-phase brush-less DC fan applications.

On-chip Hall sensor will generate Hall voltage due to magnetics sensing. The amplifier will amplify the Hall voltage. The Schmitt trigger determines switching hysteresis and then control internal driver's on/off to sink load current. Meanwhile, An internal bandgap regulator is used to provide stable bias due to temperature-compensation. FG pin will provide switching frequency of driver. Major feature is to minimize the external components by building-in FG output transistor.

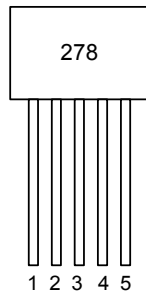
If a magnetic flux density larger than threshold  $B_{op}$ , DO is turned on (low) and DOB is turned off (high). The output state is held until a magnetic flux density reversal falls below  $B_{rp}$  causing DO to be turned off and DOB turned on.

## Two Phase Hall Effect Latch With FG Output

### ■ Block Diagram



### ■ Pin Configuration



( Front View )

- 1 : FG
- 2 : VCC
- 3 : DO
- 4 : DOB
- 5 : GND

Name	P/I/O	Pin #	Description
FG	O	1	Frequency detection output
VCC	P	2	Positive power input
DO	O	3	Driver Output
DOB	O	4	Driver Output ( Inverting )
GND	P	5	Ground

## Two Phase Hall Effect Latch With FG Output

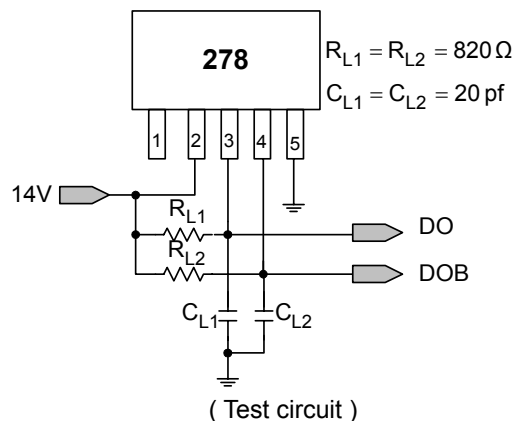
### ■ Absolute Maximum Ratings

Characteristics		Symbol	Values	Unit
Supply voltage		$V_{CC}$	20	V
Reverse $V_{CC}$ Polarity Voltage		$V_{RCC}$	-20	V
Magnetic flux density		B	Unlimited	
Output "on" current	Continuous	$I_c$	0.4	A
	Hold		0.5	
	Peak (Start Up)		0.7	
Sink current of FG		$I_{FG}$	40	mA
Operating temperature range		$T_a$	-20~+85	°C
Storage temperature range		$T_s$	-65~+150	°C
Package Power Dissipation		PD	550	mW

### ■ Electrical Characteristics ( $T_a=+25^{\circ}\text{C}$ )

Characteristic	Symbol	Conditions	Min	Typ	Max	Unit
Supply Voltage	VCC		3.5	----	20	V
Output Saturation Voltage	Vce(sat)	Vcc=14V, IL=300mA	----	300	800	mV
Output Zener Breakdown	Vz*			46		V
Output Leakage Current	Icex	Vce=14V, Vcc=14V	----	<0.1	10	μA
Supply Current	Icc	Vcc=20V, Output Open	----	16	25	mA
Output Rise Time	tr	Vcc=14V, RL=820Ω, CL=20pF (Test Circuit)	----	3.0	10	μs
Output Falling Time	tf	Vcc=14V, RL=820Ω, CL=20pF (Test Circuit)	----	0.3	1.5	μs
Switch Time Differential	Δt	Vcc=14V, RL=820Ω, CL=20pF (Test Circuit)	----	3.0	10	μs
FG saturation voltage	$V_{FG}$	Vcc=14V, IL=20 mA	----	200	700	mV

\*Note: The Vz may vary with the inductance/resistance of DC Fan. In order to reduce the risk of dynamic operation, the capacitor/resistor is recommended to add below the DO/DOB as Application Circuit (on page 1).



## Two Phase Hall Effect Latch With FG Output

### ■ Magnetic Characteristics( Ta=+25°C)

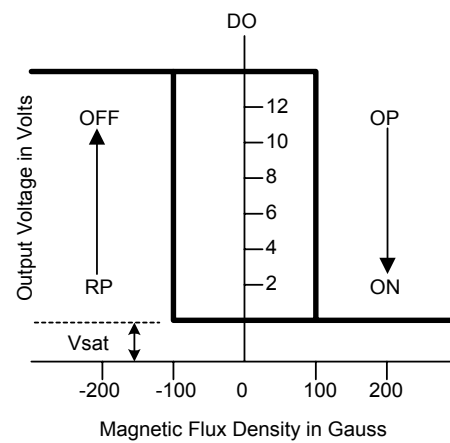
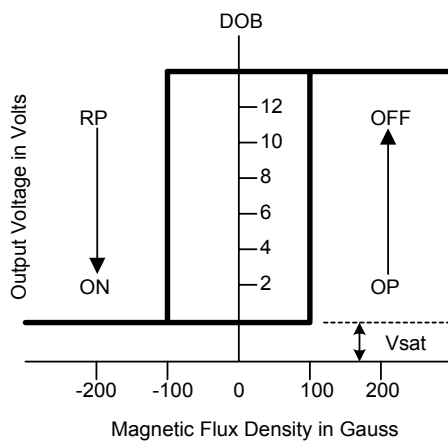
(1mT=10 Gauss)

#### A grade

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Operate Point	B <sub>OP</sub>	10	-	60	Gauss
Release Point	B <sub>RP</sub>	-60	-	-10	Gauss
Hysteresis	B <sub>HYS</sub>	-	75	-	Gauss

#### B grade

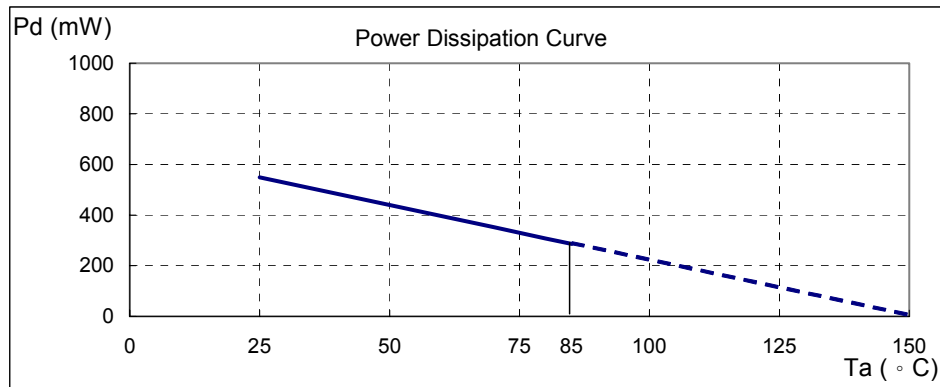
Characteristic	Symbol	Min.	Typ.	Max.	Unit
Operate Point	B <sub>OP</sub>	5	-	80	Gauss
Release Point	B <sub>RP</sub>	-80	-	-5	Gauss
Hysteresis	B <sub>HYS</sub>	-	75	-	Gauss



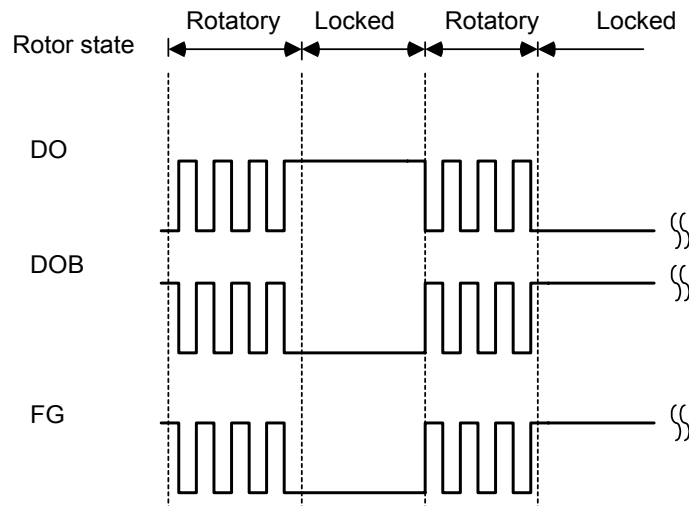
## Two Phase Hall Effect Latch With FG Output

### ■ Performance Characteristics (SIP5)

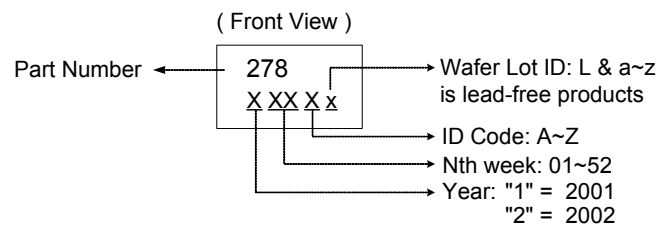
Ta (°C)	25	50	60	70	80	85	90	95	100
Pd (mW)	550	440	396	352	308	286	264	242	220
Ta (°C)	105	110	115	120	125	130	135	140	150
Pd (mW)	198	176	154	132	110	88	66	44	0



### ■ Timing Diagram



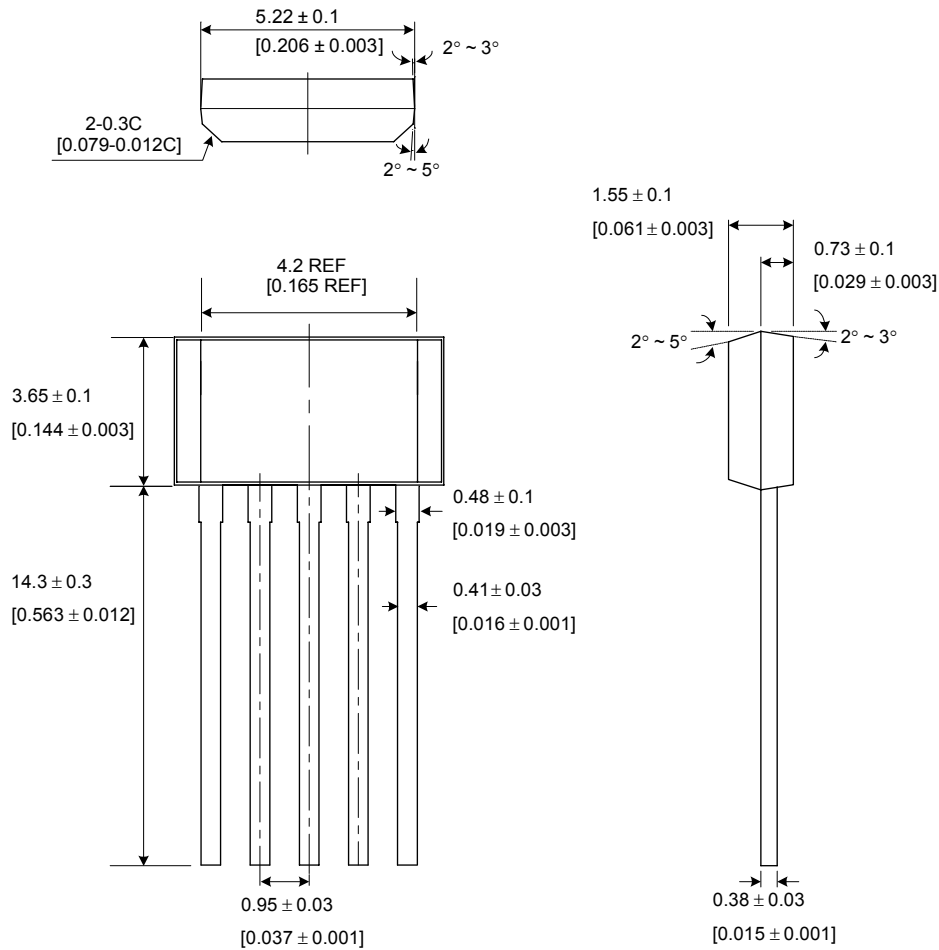
### ■ Marking Information



## Two Phase Hall Effect Latch With FG Output

### ■ Package Information

Package type: SIP-5L (unit: mm / [inch])



### ■ Location of Sensing Point

