

Single Phase Hall Effect Latch

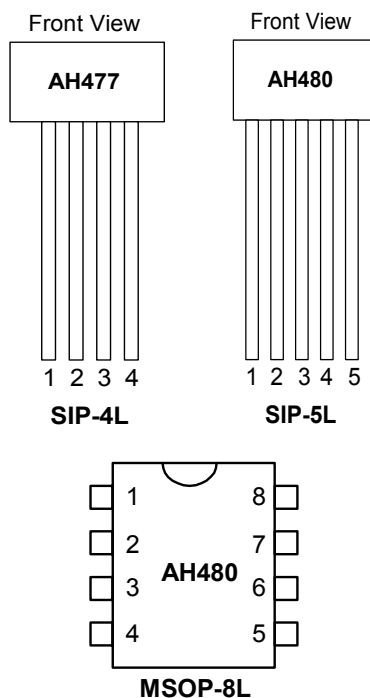
■ Features

- On-chip Hall sensor
- Bi-direction H type output drivers for single coil
- Internal bandgap regulator allows temperature compensated operations and a wide operating voltage range
- High output sourcing/sinking capability up to 350mA
- Operating voltage: 3.5V~20V
- Low output switching current noise
- Auto-shutdown and auto-restart provided (AH480)
- SIP-4L package for AH477; SIP-5L, MSOP-8L packages for AH480

■ Applications

- Single-coil Brush-less DC Fan
- Single-coil Brush-less DC Motor

■ Pin Configuration



■ General Description

AH477/480 is the integrated Hall sensor with output drivers designed for electrical commutation of brush-less DC motor application. The devices are included as follows: on-chip Hall voltage generator for magnetic sensing; the error amplifier that amplifies the Hall voltage; a comparator is to provide switching hysteresis for noise rejection; the bi-direction drivers for sinking and driving large current load. Internal bandgap regulator is used to provide temperature compensated bias for internal circuits and allows a wide operating supply voltage range. On top of that, AH480 provides auto shutdown and auto restart function for the DC fan to consume less power in the lock up condition.

If a magnetic flux density larger than threshold B_{op} , DO is turned to sink and DOB is turned to drive. The output state is held until a magnetic flux density reversal falls below B_{rp} causing DO to be turned to drive and DOB turned to sink.

AH477/480 is rated for operation over-temperature range from -20°C to 85°C and voltage range from 3.5V to 20V. The devices are available in low cost die forms or rugged SIP-4/5L and MSOP-8L.

■ Pin Descriptions

(1) SIP-4L(AH477)

Name	P/I/O	Pin #	Description
Vcc	P	1	Positive Power Supply
DO	O	2	Output Pin
DOB	O	3	Output Pin
Vss	P	4	Ground

(2) SIP-5L(AH480)

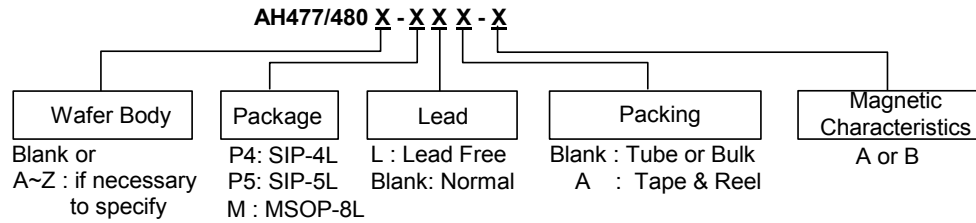
Name	P/I/O	Pin #	Description
CT	I/O	1	Timing Capacitor
Vcc	P	2	Positive Power Supply
DO	O	3	Output Pin
DOB	O	4	Output Pin
Vss	P	5	Ground

(3) MSOP-8L(AH480)

Name	P/I/O	Pin #	Description
Vss	P	1, 2	Ground
CT	I/O	3	Timing Capacitor
FG	O	4	Frequency Generator
Vcc	P	5, 6	Positive Power Supply
DO	O	7	Output Pin
DOB	O	8	Output Pin

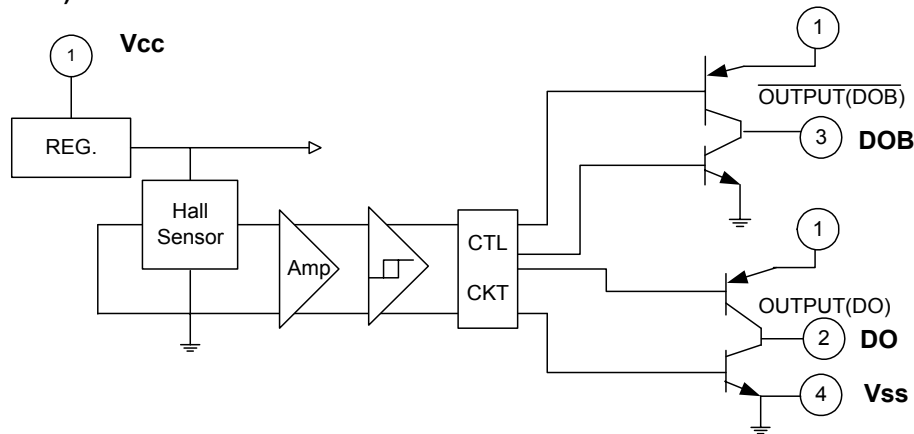
Single Phase Hall Effect Latch

Ordering Information

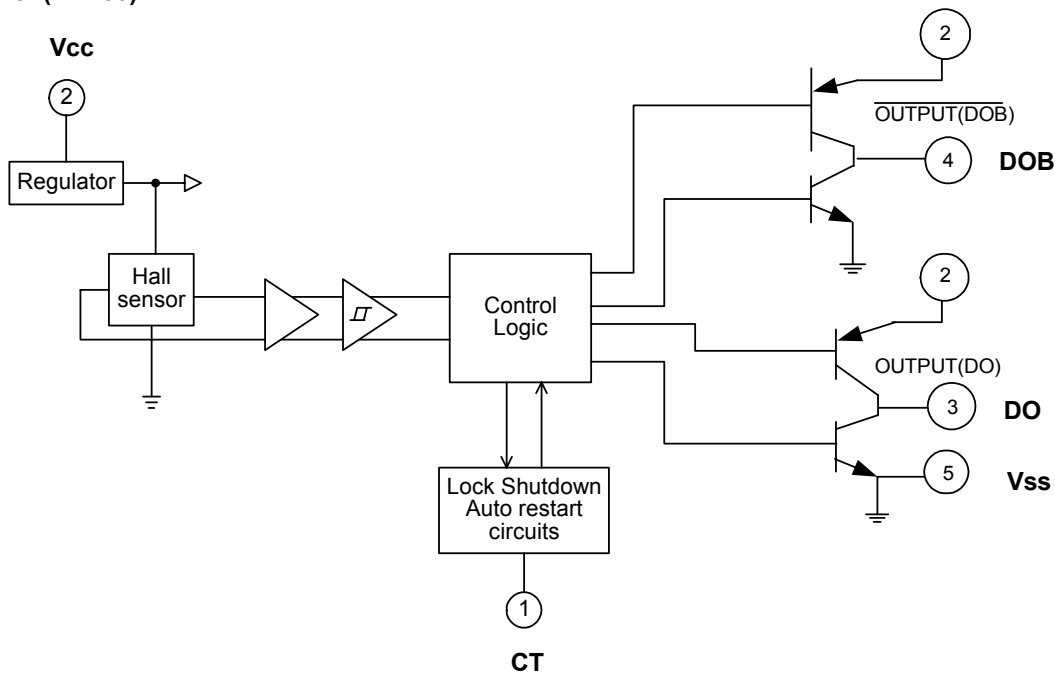


Block Diagrams

(1) SIP-4L(AH477)



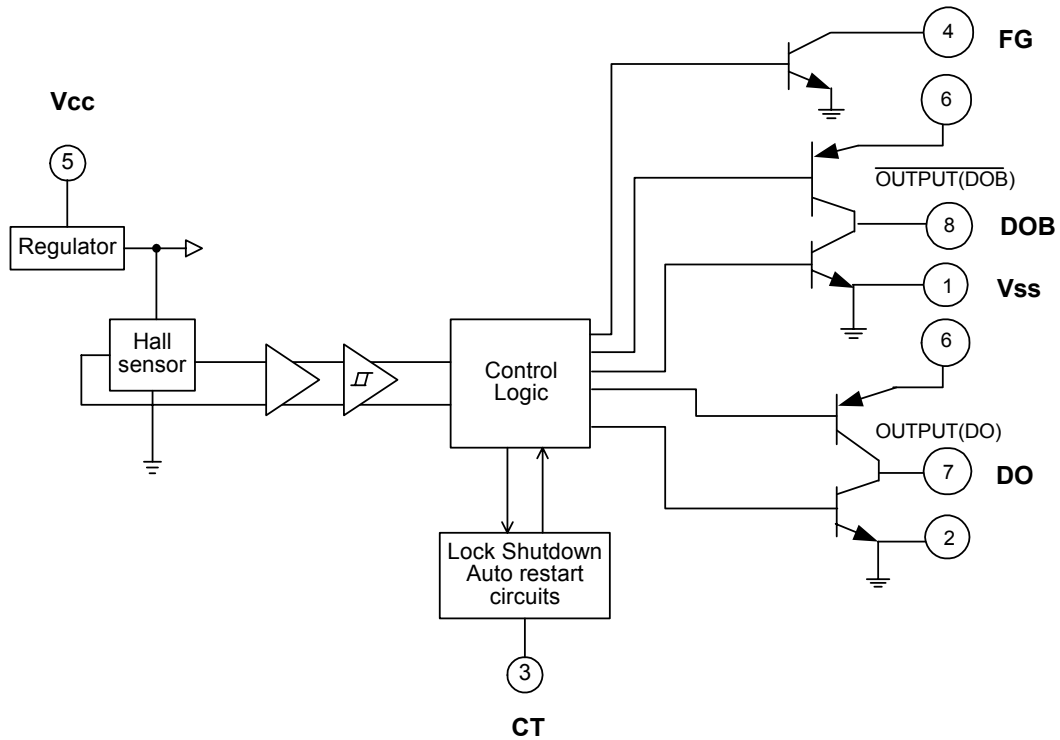
(2) SIP-5L(AH480)



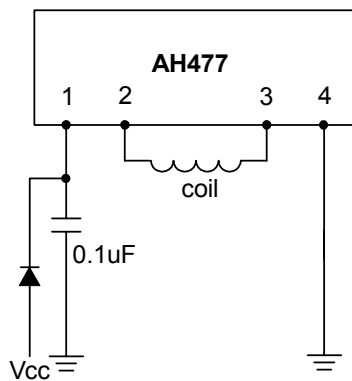
Single Phase Hall Effect Latch

■ Block Diagrams (Continued)

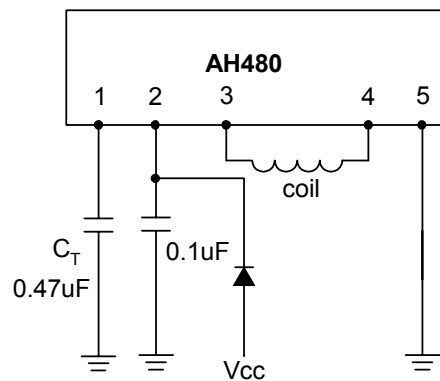
(3) MSOP-8L (AH480)



■ Application Circuit



AH477, SIP-4L



AH480, SIP-5L



Single Phase Hall Effect Latch

■ Absolute Maximum Ratings (at Ta=25°C)

Characteristics		Symbol	Values	Unit
Supply voltage		V _{CC}	20	V
Magnetic flux density		B	Unlimited	
Output "on" current	Continuous	I _c	250	mA
	Hold		300	
	Peak (Start Up)		600	
Output junction breakdown voltage		V _{CEO}	V _{CC} + 3V _{BE}	V
Operating temperature range		T _a	-20~+85	°C
Storage temperature range		T _s	-65~+150	°C
Package Power Dissipation	SIP-4L	P _D	550	mW
	SIP-5L		550	
	MSOP-8L		350	

(Note 1) Ground pin must connect to large area copper on PCB as possible.

■ Electrical Characteristics (Ta=+25°C, Vcc=14V)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Supply Voltage	V _{cc}	—	3.5	—	20	V
Output Saturation Voltage	V _{ce(sink)}	V _{cc} =14V, I _c =200mA	—	500	800	mV
	V _{ce(drive)}	V _{cc} =14V, I _c =200mA	V _{cc} -1.5	—	V _{cc}	V
FG Saturation Voltage	V _{ce}	V _{cc} =14V, I _{FG} =20mA	—	0.3	0.7	V
Supply Current	I _{cc}	V _{cc} =20V, Output Open	—	12	25	mA
Output Rise Time	t _r	V _{cc} =14V, R _L =820Ω, C _L =20pF	—	1.0	5.0	μs
Output Falling Time	t _f	V _{cc} =14V, R _L =820Ω, C _L =20pF	—	0.3	1.5	μs
Switch Time Differential	Δt	V _{cc} =14V, R _L =820Ω, C _L =20pF	—	1.0	5.0	μs
Charge Current	I _{CT}	—	—	2.8	—	uA
Limiting Voltage	V _{CTL1}	—	—	2.8	—	V
Limiting Voltage	V _{CTL2}	—	—	1.8	—	V
On Time	T _{ON}	C _T =0.47μF	—	150	—	ms
Duty Ratio	D _R	T _{OFF} / T _{ON}	6	7	8	

■ Magnetic Characteristics (Ta=+25°C)

(1mT = 10 Gauss)

A grade

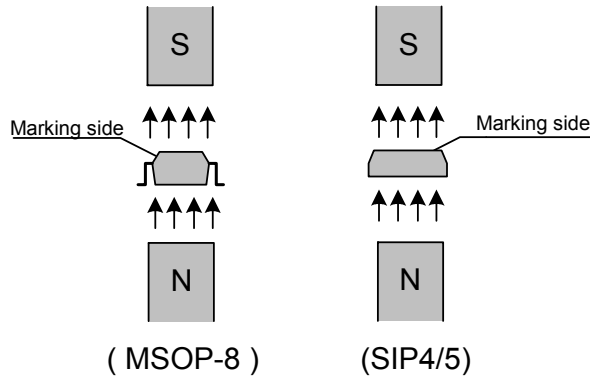
Characteristic	Symbol	Min.	Typ.	Max.	Unit
Operate Point	B _{op}	5	-	70	Gauss
Release Point	B _{rp}	-70	-	-5	Gauss
Hysteresis	B _{hy}	-	70	-	Gauss

B grade

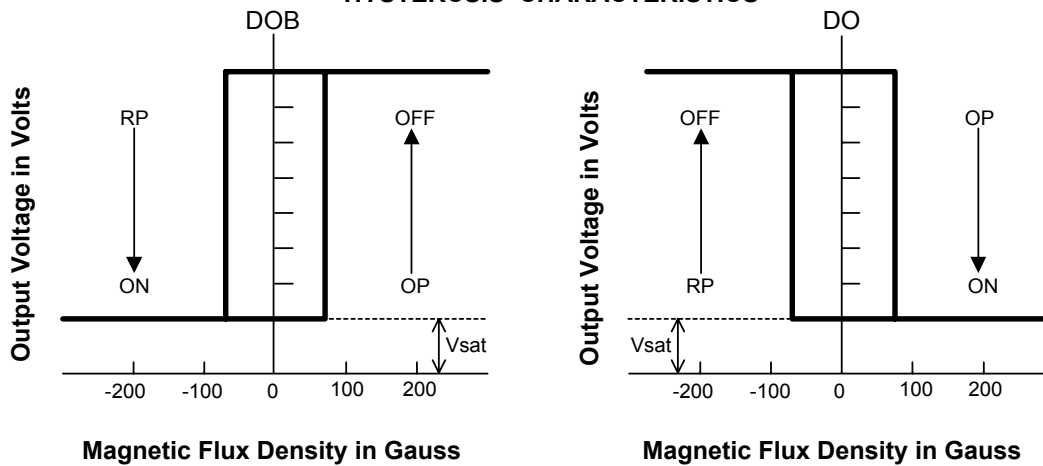
Characteristic	Symbol	Min.	Typ.	Max.	Unit
Operate Point	B _{op}	-	-	100	Gauss
Release Point	B _{rp}	-100	-	-	Gauss
Hysteresis	B _{hy}	-	70	-	Gauss

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■ Operation Characteristics

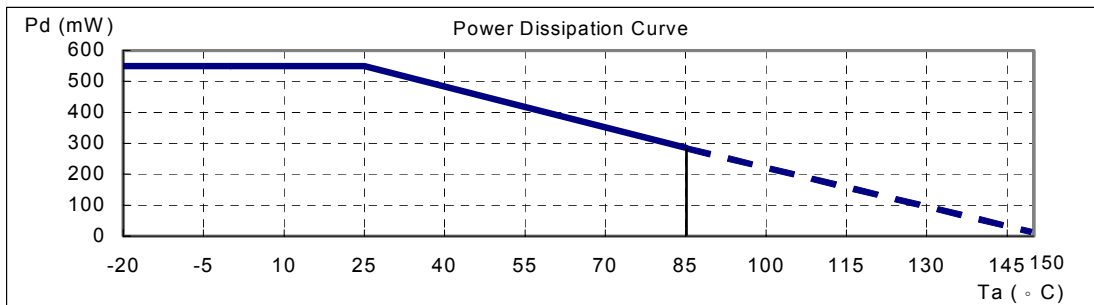


HYSTERESIS CHARACTERISTICS



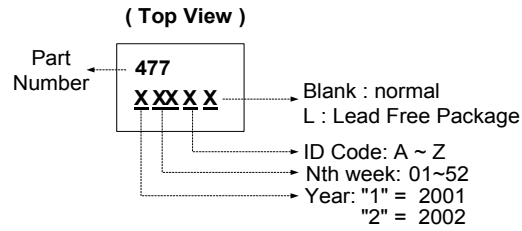
■ Performance Characteristics

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

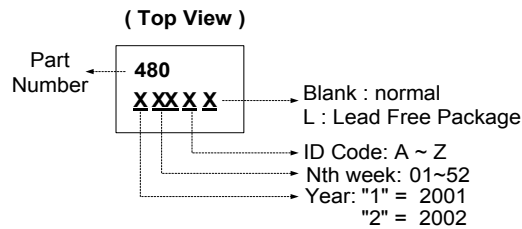


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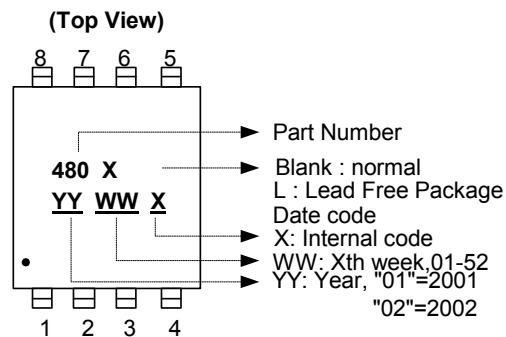
■ Marking Information



SIP-4L



SIP-5



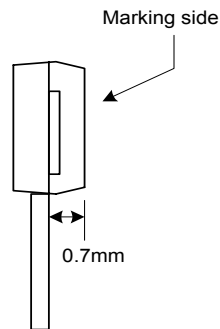
MSOP-8L

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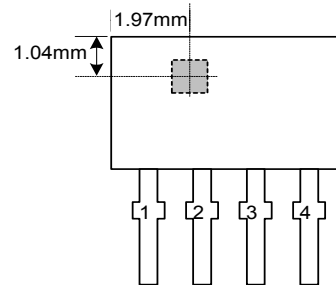
■ Package Information

(1) Package Type: SIP-4L

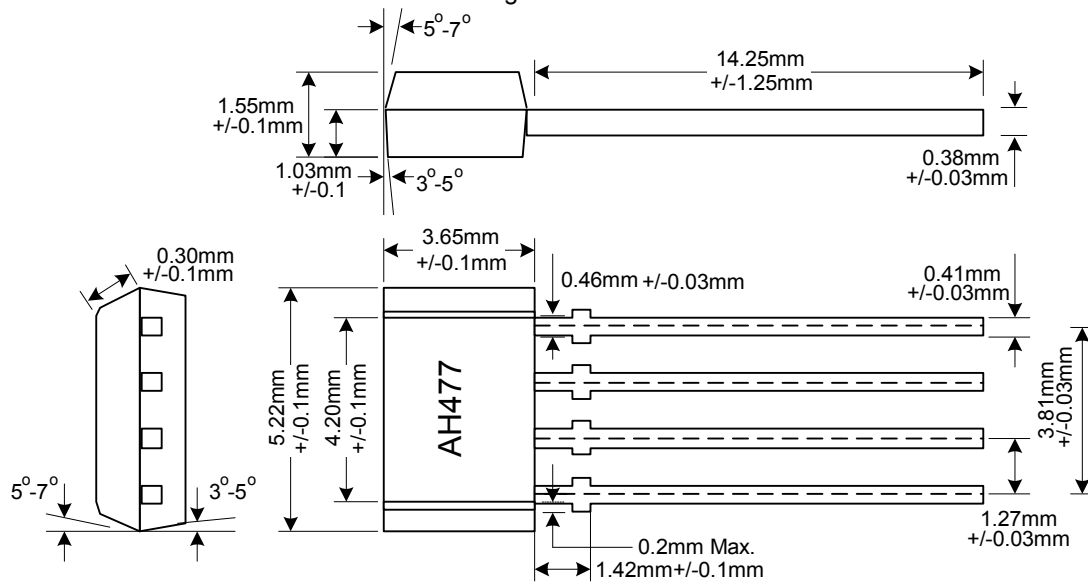
Active Area Depth



Package Sensor Location



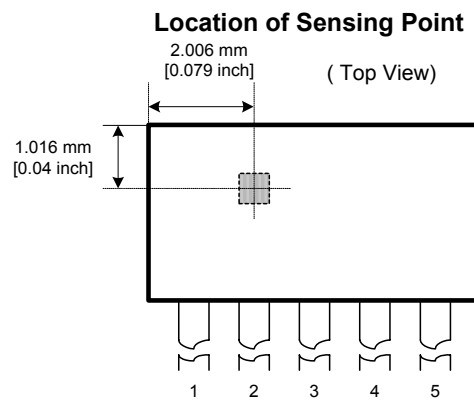
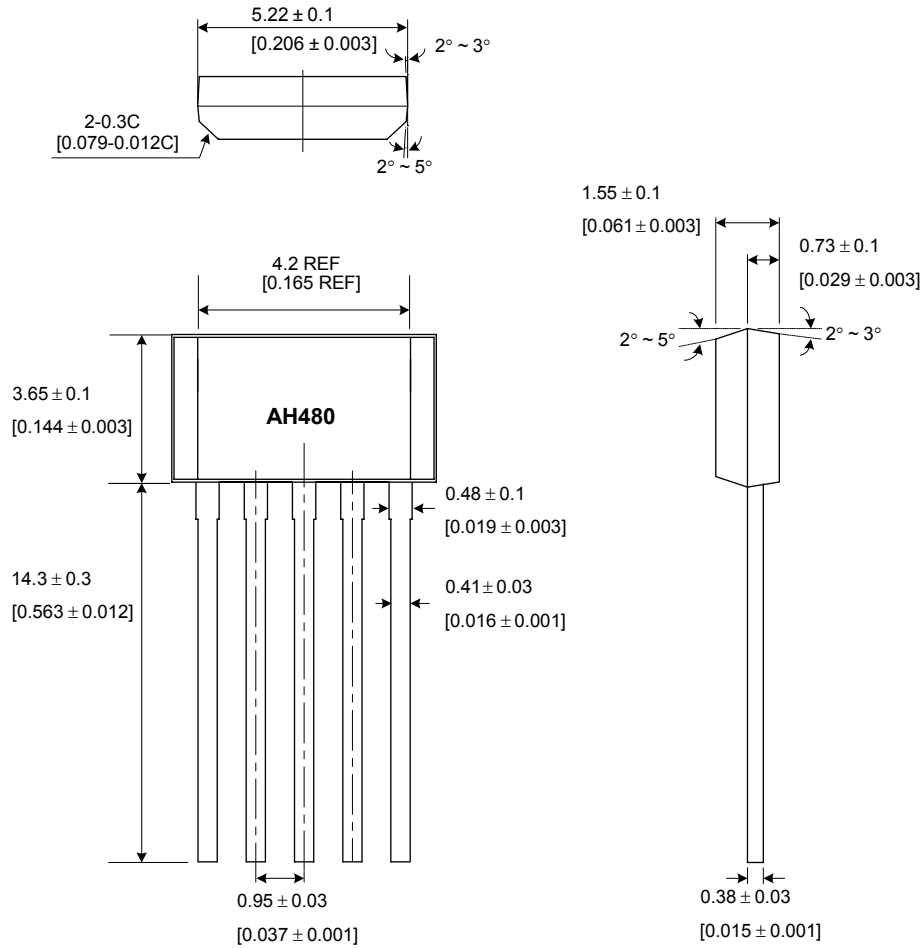
Package Dimension



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■ Package Information (Continued)

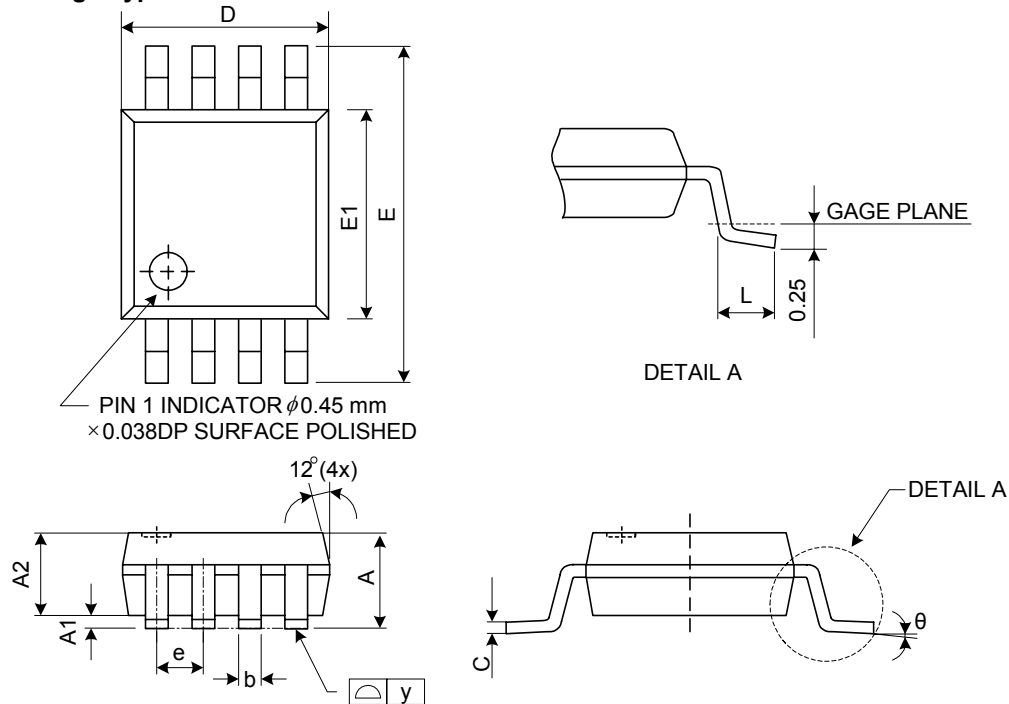
(2)Package Type: SIP-5L (unit: mm / [inch])



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■ Package Information (Continued)

(3)Package Type: MSOP-8L



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	0.81	1.02	1.22	0.032	0.040	0.048
A1	0.05	-	0.15	0.002	-	0.006
A2	0.76	0.86	0.97	0.030	0.034	0.038
b	0.28	0.30	0.38	0.011	0.012	0.015
C	0.13	0.15	0.23	0.005	0.006	0.009
D	2.90	3.00	3.10	0.114	0.118	0.122
E	4.80	4.90	5.00	0.189	0.193	0.197
E1	2.90	3.00	3.10	0.114	0.118	0.122
e	-	0.65	-	-	0.0256	-
L	0.40	0.53	0.66	0.016	0.021	0.026
y	-	-	0.076	-	-	0.003
θ	0°	3°	6°	0°	3°	6°

■ Location of Sensing Point

