

## Description

The AH3582 is a high voltage high sensitivity Hall Effect Omnipolar switch IC designed for proximity, position and level sensing in industrial and consumer home appliances and personal care applications. To support wide range of demanding applications, the design has been optimized to operate over the supply range of 3.0V to 28V. With chopper stabilized architecture and an internal bandgap regulator to provide temperature compensated supply for internal circuits, the AH3582 provides a reliable solution over the whole operating range. For robustness and protection, the device has a reverse blocking diode with a Zener clamp on the supply. The output has an over current limit and a Zener clamp.

The internally pulled-up output can be switched on with either South or North pole of sufficient strength. When the magnetic flux density (**B**) perpendicular to the package is larger than the operate point (**B<sub>OP</sub>**) the output is switched on (pulled low) and is held on until magnetic flux density **B** is lower than the release point (**B<sub>RP</sub>**).

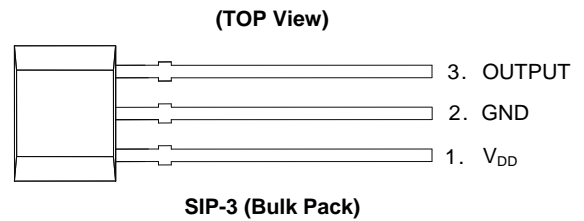
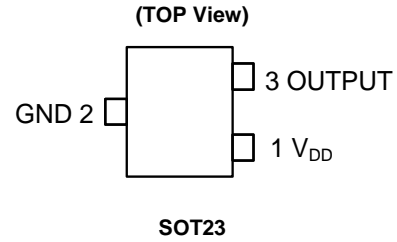
## Features

- Omnipolar Operation
- High Sensitivity: **B<sub>OP</sub>** and **B<sub>RP</sub>** of  $\pm 40G$  and  $\pm 25G$  Typical
- Internally Pull-up Resistor on the Output with Over Current Limit
- 3.0V to 28V Operating Voltage Range
- Chopper Stabilized Design Provides
  - Superior Temperature Stability
  - Minimal Switch Point Drift
  - Enhanced Immunity to Stress
- Good RF Noise Immunity
- Reverse Blocking Diode
- Zener Clamp on Supply and Output Pins
- -40°C to +125°C Operating Temperature
- ESD: HBM > 6kV
- Industry Standard SOT23 and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) Packages
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

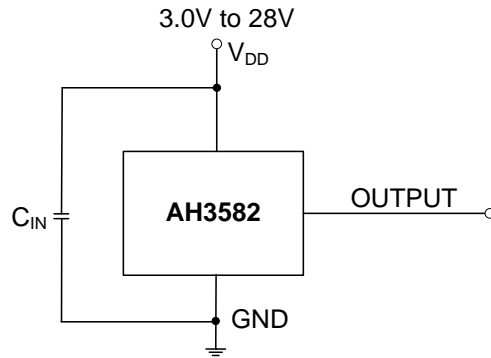
## Pin Assignments



## Applications

- Position and Proximity Sensing in Industrial Applications
- Applications
- Open and Close Detect
- Position Detect
- Level Detect
- Flow Meters
- Contact-less Switches

## Typical Applications Circuit



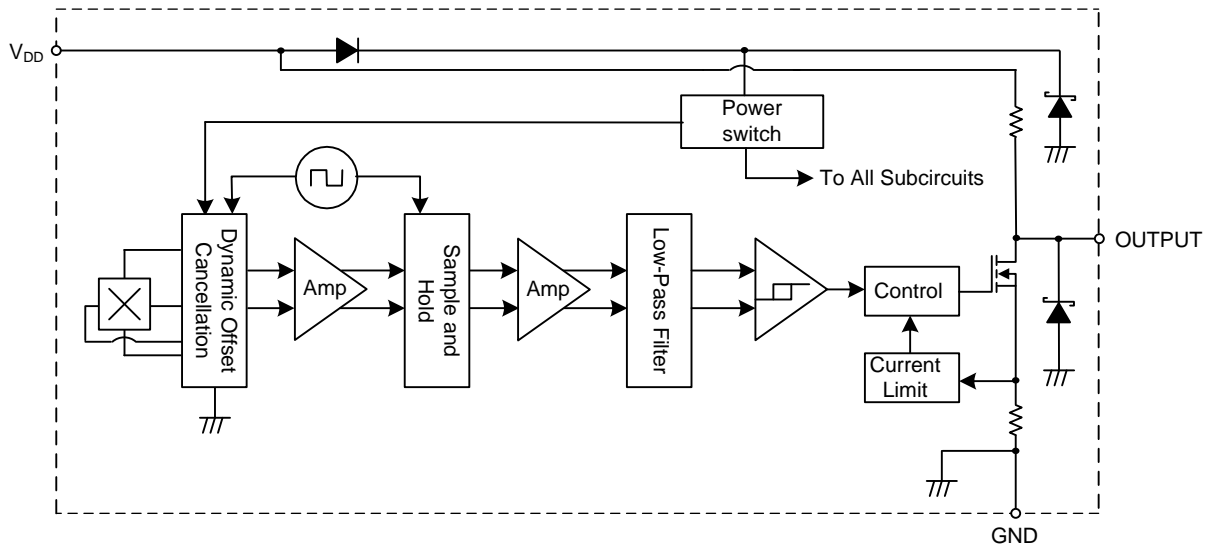
Note: 4.  $C_{IN}$  is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 10nF ~ 100nF.

## Pin Descriptions

Package: SOT23 and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

Pin Number	Pin Name	Function
1	$V_{DD}$	Power Supply Input
2	GND	Ground
3	OUTPUT	Output Pin

## Functional Block Diagram



**Absolute Maximum Ratings** (Notes 5 & 6) (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Symbol	Characteristic	Value	Unit	
$V_{DD}$	Supply Voltage (Note 6)	32	V	
$I_{DDR}$	Reverse Current ; $V_{DD} = -28\text{V}$	5	mA	
$V_{OUT\_MAX}$	Output Off Voltage (Note 6)	32	V	
$I_{OUT}$	Continuous Output Current	60	mA	
$I_{OUT\_R}$	Reverse Output Current	-50	mA	
B	Magnetic Flux Density	Unlimited		
$P_D$	Package Power Dissipation	SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)	550	mW
		SOT23	230	
$T_s$	Storage Temperature Range	-65 to +165	$^\circ\text{C}$	
$T_J$	Maximum Junction Temperature	+150	$^\circ\text{C}$	
ESD HBM	Electrostatic Discharge Withstand - Human Body Model (HBM)	6	kV	

- Notes:
- Stresses greater than the 'Absolute Maximum Ratings' specified above may cause permanent damage to the device. These are stress ratings only; functional operation of the device at these or any other conditions exceeding those indicated in this specification is not implied. Device reliability may be affected by exposure to absolute maximum rating conditions for extended periods of time.
  - The absolute maximum  $V_{DD}$  of 32V is a transient stress rating and is not meant as a functional operating condition. It is not recommended to operate the device at the absolute maximum rated conditions for any period of time.

**Recommended Operating Conditions** (@ $T_A = -40^\circ\text{C}$  to  $+125^\circ\text{C}$ , unless otherwise specified.)

Symbol	Parameter	Condition	Rating	Unit
$V_{DD}$	Supply Voltage	Operating	3.0 to 28	V
$T_A$	Operating Temperature Range	Operating	-40 to +125	$^\circ\text{C}$

**Electrical Characteristics** (Notes 7 & 8) (@ $T_A = -40^\circ\text{C}$  to  $+125^\circ\text{C}$ ,  $V_{DD} = 3\text{V}$  to  $28\text{V}$ , unless otherwise specified.)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$V_{OUT\_ON}$	Output ON Voltage	$I_{OUT} = 20\text{mA}$ , $B > B_{OP}$	-	0.2	0.4	V
$I_{LKG}$	Output Leakage Current (When output is off)	$V_{OUT} = 28\text{V}$ , $B < B_{RP}$ , Output off	-	<0.1	10	$\mu\text{A}$
$I_{DD}$	Supply Current	Output open, $T_A = +25^\circ\text{C}$	-	3	3.5	mA
		Output open, $T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$	-	-	4	mA
$R_{PU}$	Internal Pull-up Resistance	$T_A = -40^\circ\text{C}$ to $+125^\circ\text{C}$ ,	10	14	18	$\text{k}\Omega$
$t_{ST}$	Device Start-up Time	$V_{DD} \geq 3\text{V}$ , $B > B_{OP}$ (Note 7)	-	10	-	$\mu\text{s}$
$f_C$	Chopping Frequency	-	-	800	-	kHz
$t_D$	Response Time Delay (Time from Magnetic Threshold Reached to the Start of the Output Rise or Fall)	(Note 9)	-	3.75	-	$\mu\text{s}$
$t_R$	Output Rising Time (External Pull-Up Resistor $R_L$ and Load Capacitance Dependent)	$R_L = 1\text{k}\Omega$ , $C_L = 20\text{pF}$	-	0.2	1	$\mu\text{s}$
$t_F$	Output Falling Time (Internal Switch Resistance and Load Capacitance Dependent)	$R_L = 1\text{k}\Omega$ , $C_L = 20\text{pF}$	-	0.1	1	$\mu\text{s}$
$I_{OCL}$	Output Current Limit	$B > B_{OP}$ , (Note 10)	30	-	55	mA
$V_Z$	Zener Clamp Voltage	$I_{DD} = 5\text{mA}$	28	-	-	V

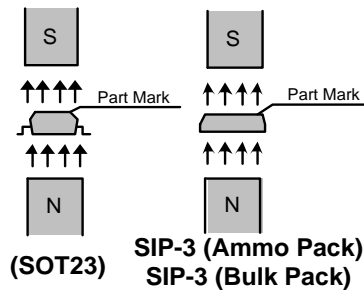
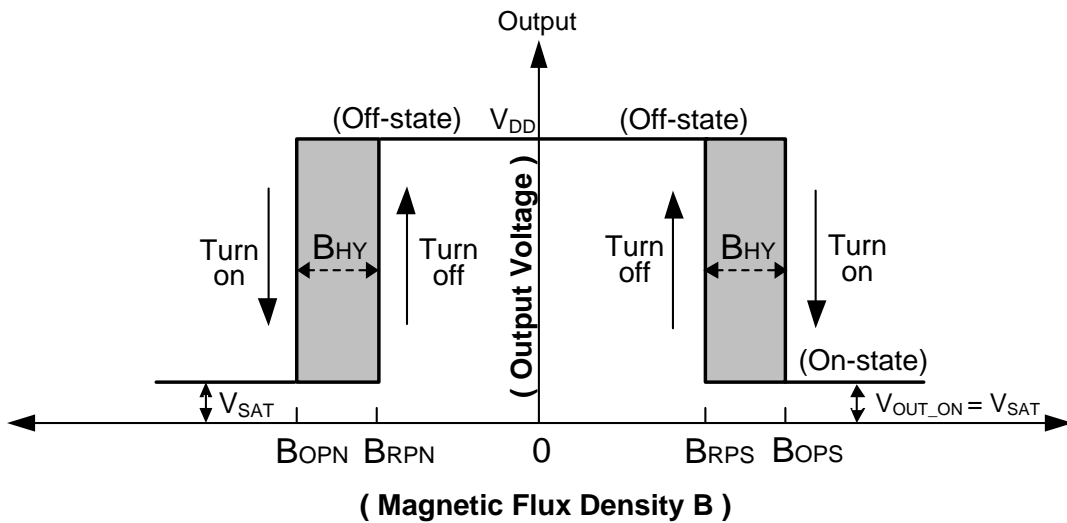
- Notes:
- When power is initially turned on,  $V_{DD}$  must be within its correct operating range (3.0V to 28V) to guarantee the output sampling. The output state is valid after the start-up time of  $10\mu\text{s}$  typical from the operating voltage reaching 3V.
  - Typical values are defined at  $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 12\text{V}$ . Maximum and minimum values over the operating temperature range is not tested in production but guaranteed by design, process control and characterization.
  - Guaranteed by design, process control and characterization. Not tested in production.
  - The device will limit the output current  $I_{OUT}$  to current limit of  $I_{OCL}$ .

**Magnetic Characteristics** (Notes 11 & 12) ( $T_A = -40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ ,  $V_{DD} = 3.0\text{V}$  to  $28\text{V}$ , unless otherwise specified.)

(1mT=10 Gauss)

Symbol	Parameter	Condition	Min	Typ	Max	Unit
$B_{OPS}$ (South pole to the part marking side)	Operation Point	$V_{DD} = 12\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	40	-	Gauss
		$T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	20	40	60	
$B_{OPN}$ (North pole to the part marking side)		$V_{DD} = 12\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	-40	-	
		$T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	-60	-40	-20	
$B_{RPS}$ (South pole to the part marking side)	Release Point	$V_{DD} = 12\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	-40	-	
		$T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	10	25	45	
$B_{RPN}$ (North pole to the part marking side)		$V_{DD} = 12\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	-25	-	
		$T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	-45	-25	-10	
$B_{HY}$ ( $ B_{OPX}  -  B_{RPX} $ )	Hysteresis (Note 13)	$V_{DD} = 12\text{V}$ , $T_A = +25^{\circ}\text{C}$	-	15	-	
		$T_A = -40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$	9	15	23	

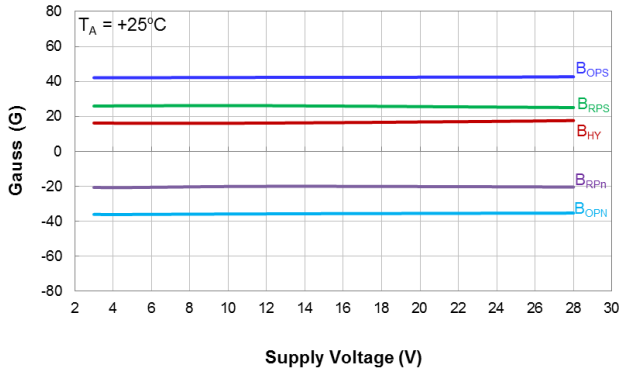
- Notes:
- When power is initially turned on,  $V_{DD}$  must be within its correct operating range (3.0V to 28V) to guarantee the output sampling. The output state is valid after the start-up time of 10us typical from the operating voltage reaching 3V.
  - Typical values are defined at  $T_A = +25^{\circ}\text{C}$ ,  $V_{DD} = 12\text{V}$ . Maximum and minimum values over the operating temperature range is not tested in production but guaranteed by design, process control and characterization.
  - Maximum and minimum hysteresis is guaranteed by design, process control and characterization.



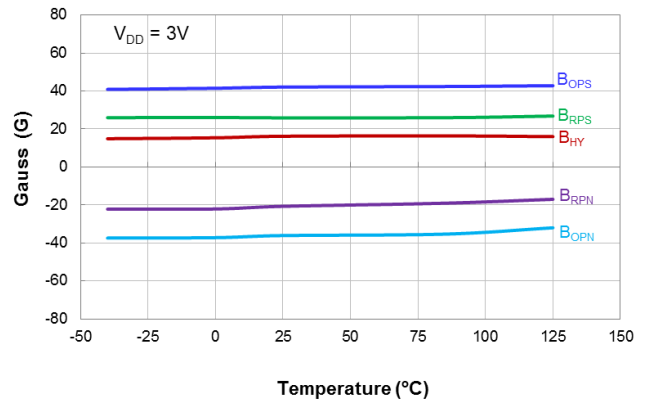
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**Typical Operating Characteristics**

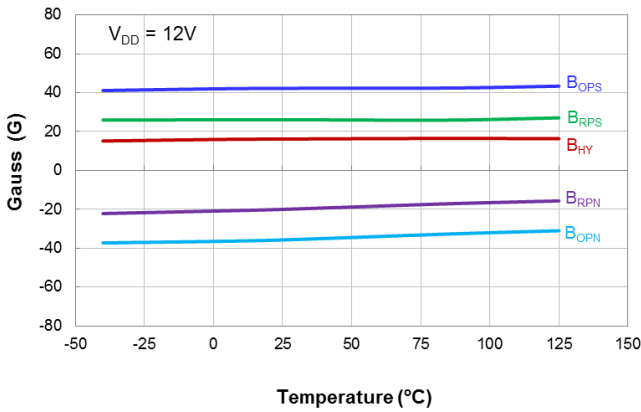
**Output Switch Operate and Release Points (Magnetic Thresholds) –  $B_{OPS}$  and  $B_{RPS}$**



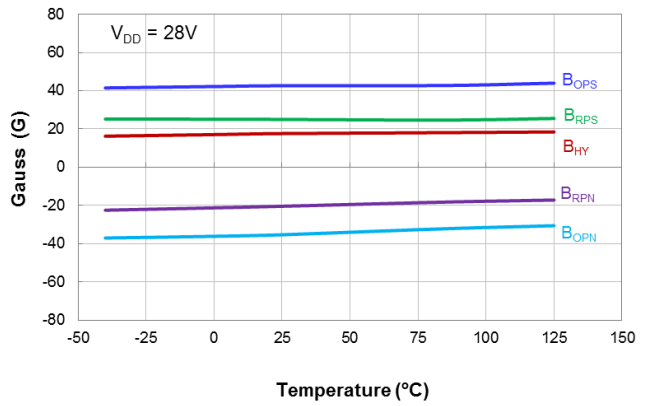
Switch Points  $B_{OPS}$  and  $B_{RPS}$  vs Supply Voltage



Switch Points  $B_{OPS}$  and  $B_{RPS}$  vs Temperature

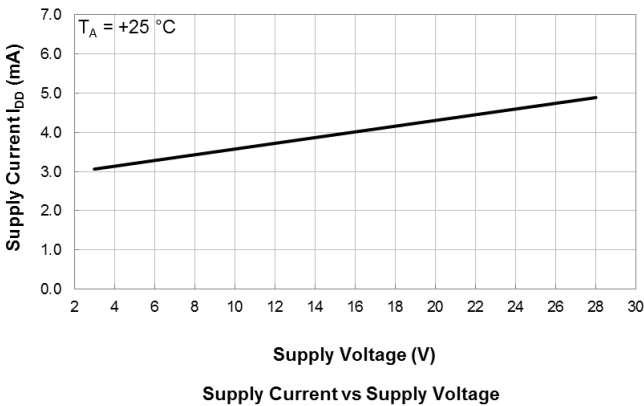


Switch Points  $B_{OPS}$  and  $B_{RPS}$  vs Temperature

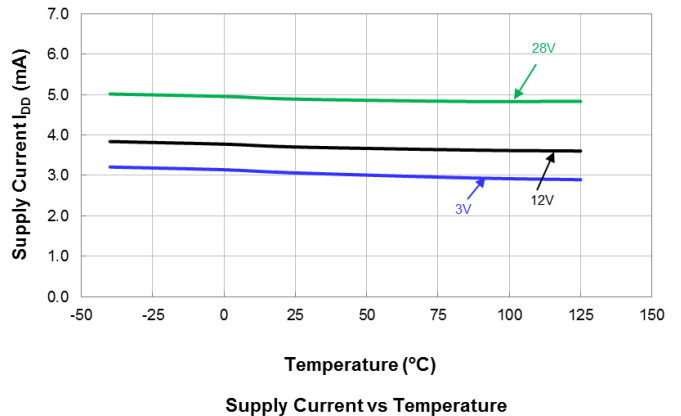


Switch Points  $B_{OPS}$  and  $B_{RPS}$  vs Temperature

**Supply Current**



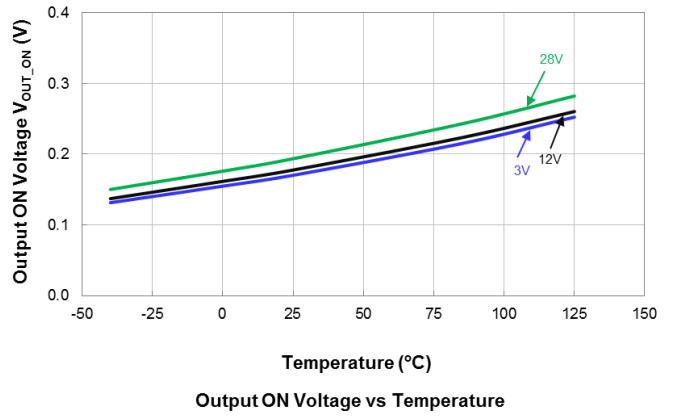
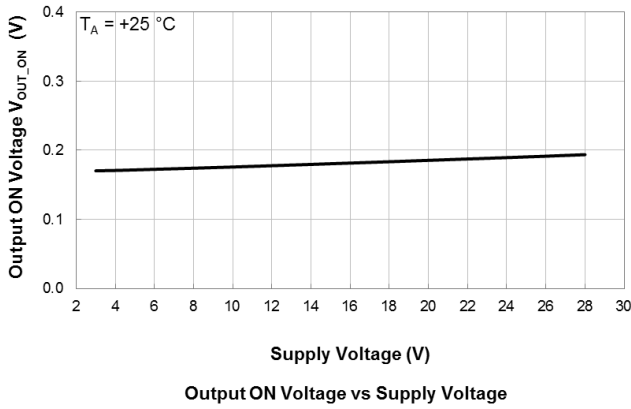
Supply Current vs Supply Voltage



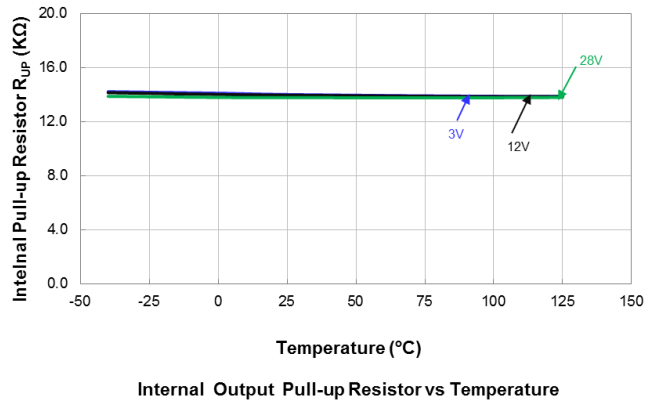
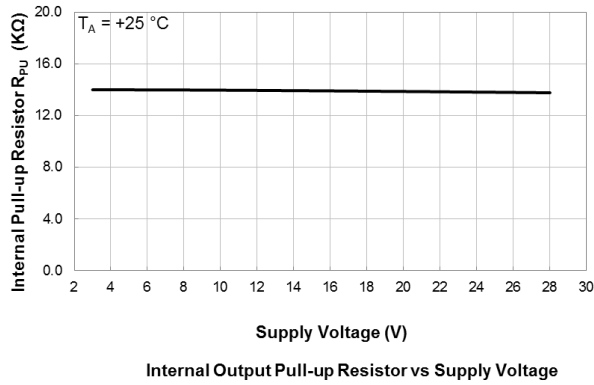
Supply Current vs Temperature

**Typical Operating Characteristics (Cont.)**

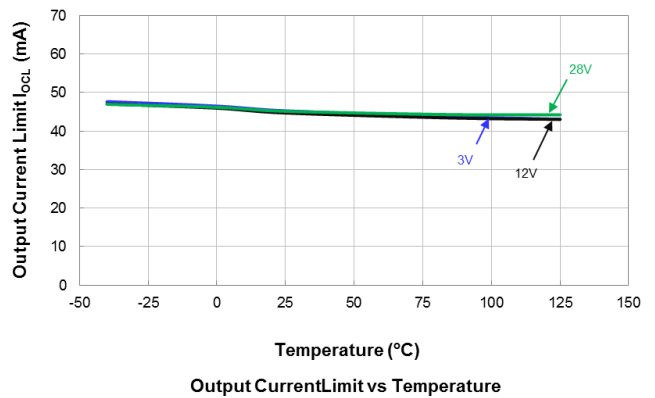
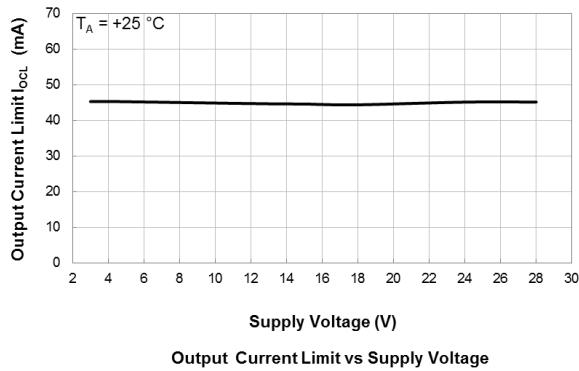
**Output Switch On Voltage**



**Output Pull-Up Resistor (Internal)**



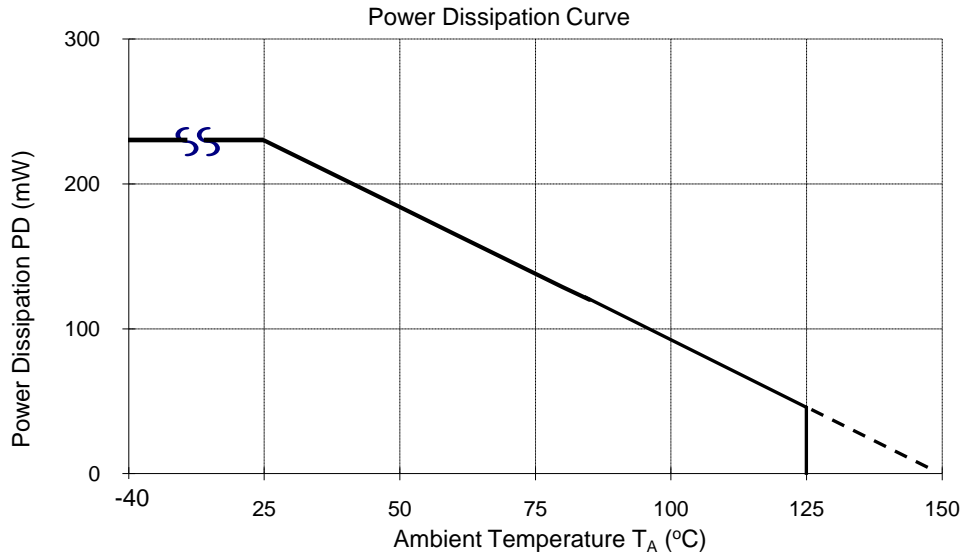
**Output Current Limit**



**Thermal Performance Characteristics**

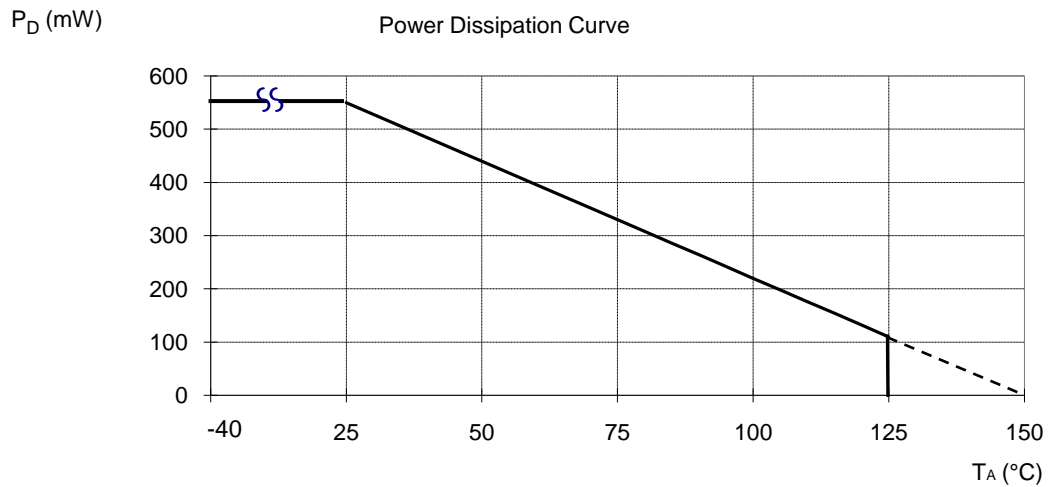
(1) Package Type: SOT23

T <sub>A</sub> (°C)	25	50	60	70	80	85	90	100	105	110	120	125	130	140	150
P <sub>D</sub> (mW)	230	184	166	147	129	120	110	92	83	74	55	46	37	18	0

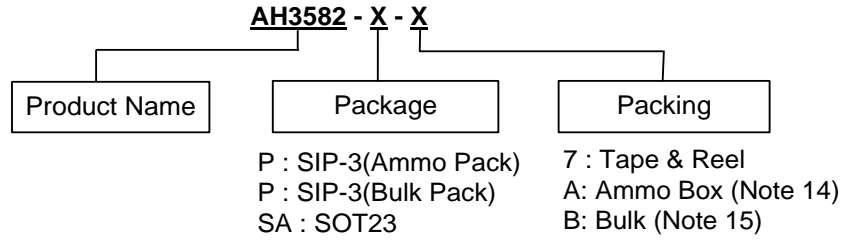


(2) Package Type: SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

T <sub>A</sub> (°C)	25	50	60	70	80	85	90	100	105	110	120	125	130	140	150
P <sub>D</sub> (mW)	550	440	396	362	308	286	264	220	198	176	132	110	88	44	0



## Ordering Information



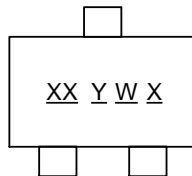
Part Number	Package Code	Packaging	Bulk		7" Tape and Reel		Ammo Box	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix	Quantity	Part Number Suffix
AH3582-P-A	P	SIP-3 (Ammo Pack)	NA	NA	NA	NA	4000/Box	-A
AH3582-P-B	P	SIP-3 (Bulk Pack)	1000	-B	NA	NA	NA	NA
AH3582-SA-7	SA	SOT23	NA	NA	3000/Tape & Reel	-7	NA	NA

Notes: 14. Ammo Box is for SIP-3 (Ammo Pack) Spread Lead.  
 15. Bulk is for SIP-3 (Bulk Pack) Straight Lead.

## Marking Information

### (1) Package Type: SOT23

( Top View )

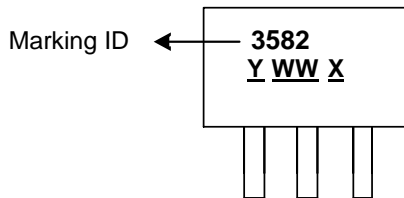


XX : Identification code  
 Y : Year 0 to 9  
 W : Week : A to Z : 1 to 26 week;  
       a to z : 27 to 52 week; z represents  
       52 and 53 week  
 X : Internal code

Part Number	Package	Identification Code
AH3582-SA-7	SOT23	ZB

### (2) Package Type: SIP-3 (Ammo Pack), SIP-3 (Bulk Pack)

( Top View )



Y : Year : 0~9  
 WW : Week : 01~52, "52" represents  
       52 and 53 week  
 X : Internal Code

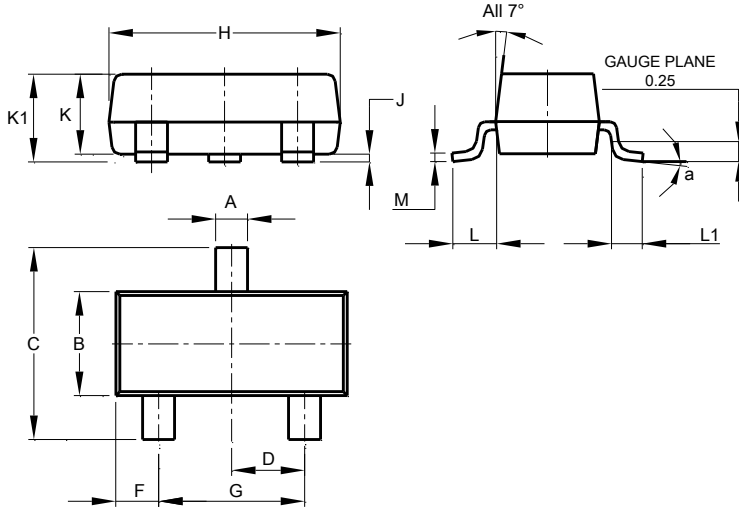
Part Number	Package	Identification Code
AH3582-P-A	SIP-3 (Ammo Pack)	3582
AH3582-P-B	SIP-3 (Bulk Pack)	3582



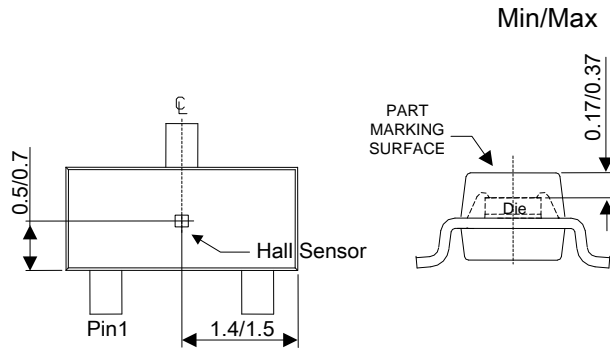
**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(1) Package Type: SOT23



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			



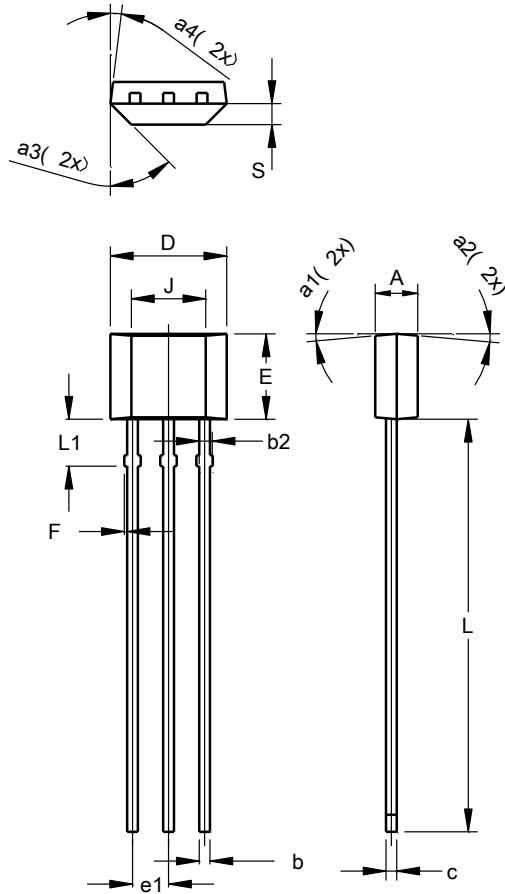
Sensor Location

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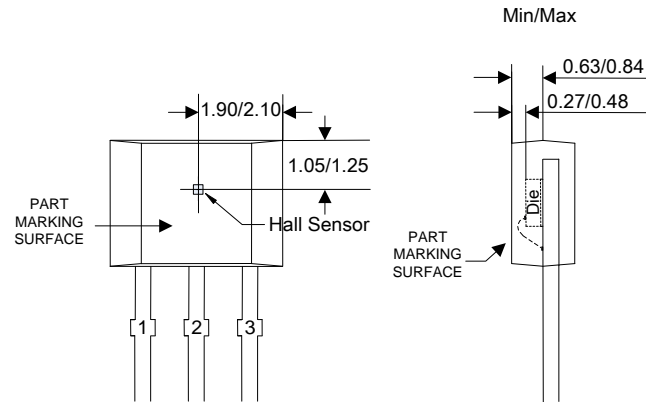
**Package Outline Dimensions (Cont.)**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(2) Package Type: SIP-3 (Bulk Pack)



SIP-3 (Bulk Pack)			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
b	0.33	0.43	0.38
b2	0.40	0.508	0.46
c	0.35	0.41	0.38
D	3.90	4.30	4.10
E	2.80	3.20	3.00
e1	1.24	1.30	1.27
F	0.00	0.20	--
J	2.62 REF		
L	14.00	15.00	14.50
L1	1.55	1.75	1.65
S	0.63	0.84	0.74
a1	--	--	5°
a2	--	--	5°
a3	--	--	45°
a4	--	--	3°
All Dimensions in mm			



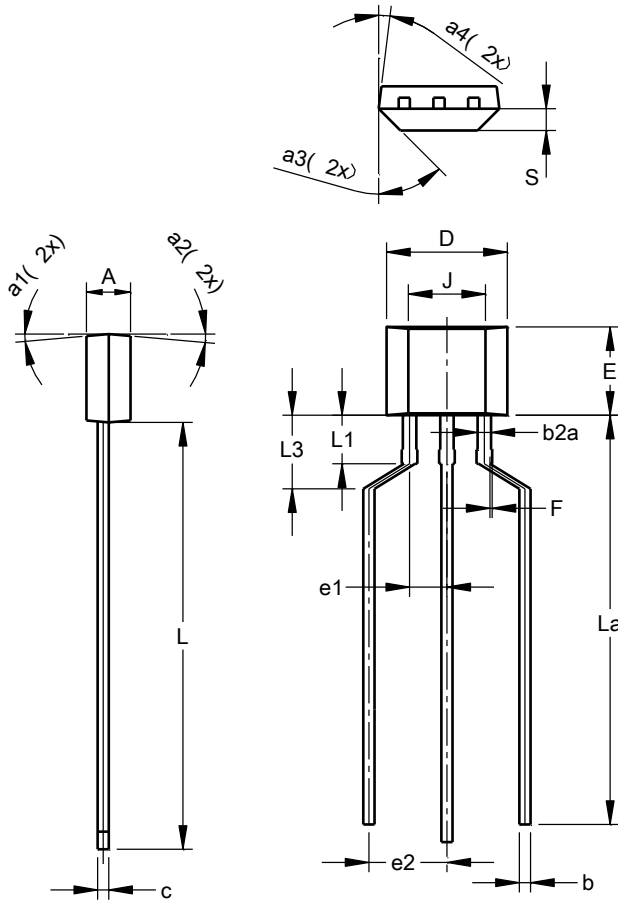
Sensor Location

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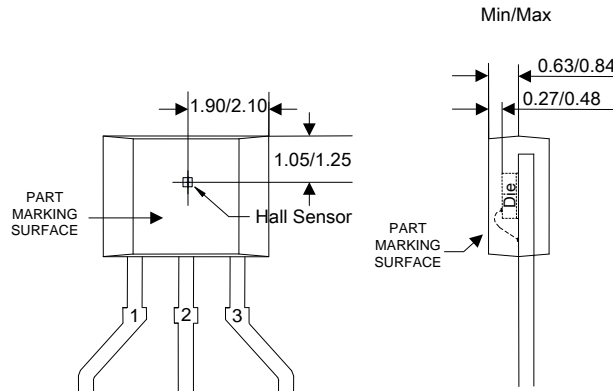
**Package Outline Dimensions (Cont.)**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**(3) Package Type: SIP-3 (Ammo Pack)**



SIP-3 (Ammo Pack)			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
b	0.33	0.43	0.38
b2a	0.40	0.52	0.46
c	0.35	0.41	0.38
D	3.90	4.30	4.10
E	2.80	3.20	3.00
e1	1.24	1.30	1.27
e2	2.40	2.90	2.65
F	0.00	0.20	--
J	2.62 REF		
L	14.00	15.00	14.50
La	12.90	14.90	13.90
L1	1.55	1.75	1.65
L3	2.00	3.00	2.50
S	0.63	0.84	0.74
a1	--	--	5°
a2	--	--	5°
a3	--	--	45°
a4	--	--	3°
All Dimensions in mm			



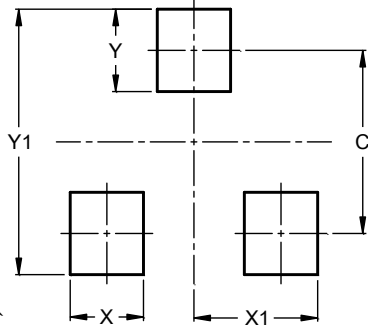
**Sensor Location**

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## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

(1) Package Type: SOT23



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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[www.diodes.com](http://www.diodes.com)

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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