

## Description

The AH332XQ is an AECQ100 qualified high-voltage Hall-effect unipolar switch IC designed for position and proximity sensing in automotive applications such as in seat and seatbelt buckle, steering lock/immobilization, gear stick, transmission actuator and gear position, HVAC compression, wiper, door/trunk closure, etc. To support a wide range of the 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 AH332XQ 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 overcurrent limit and a Zener clamp.

The single open-drain output can be switched on with South 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 the magnetic flux density B is lower than the release point (B<sub>RP</sub>).

The magnetic operating and release polarity is opposite for SOT23 (Type S) and SC59 packages. The SOT23 (Type S), SIP-3 (Ammo Pack), and SIP-3 (Bulk Pack) packages require south pole to the part marking side to operate while SC59 requires south pole to the non-part marking side.

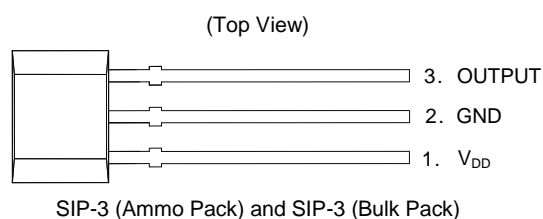
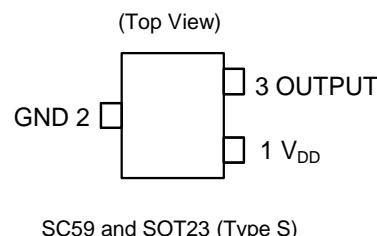
## Features

- Unipolar Operation
- High Sensitivity: B<sub>OP</sub> and B<sub>RP</sub> of 30G to 275G and 20G to 250G Typical
- Single Open-Drain Output with Overcurrent Limit
- 3.0V to 28V Operating Voltage Range
- 40V Load Dump Protection
- Resistant to Physical Stress
- 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 +150°C Operating Temperature
- High ESD HBM: 8kV, CDM: 1kV
- AEC-Q100 Grade 0 Qualified
- Industry Standard SC59, SOT23 (Type S), SIP-3 (Ammo Pack) and SIP-3 (Bulk Pack) Packages
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The AH332XQ is suitable for automotive applications requiring specific change control; this part is AEC-Q100 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

- 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.

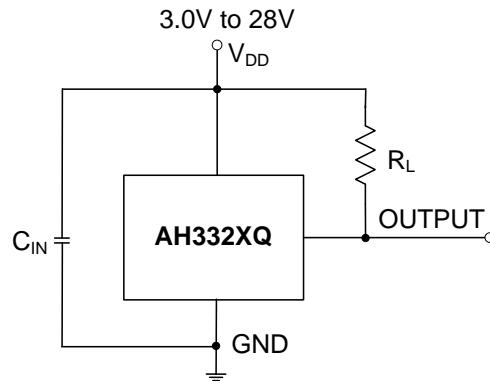
## Pin Assignments



## Applications

- Position and proximity sensing in automotive applications
- Seat positions
- Seatbelt buckles
- Steering locks/immobilization
- Gear sticks
- HVAC compression
- Transmission actuators
- Transmission gear positions
- Wipers
- Sunroofs and windows
- Door/trunk closures
- Door locks
- Contactless switches

## Typical Applications Circuit



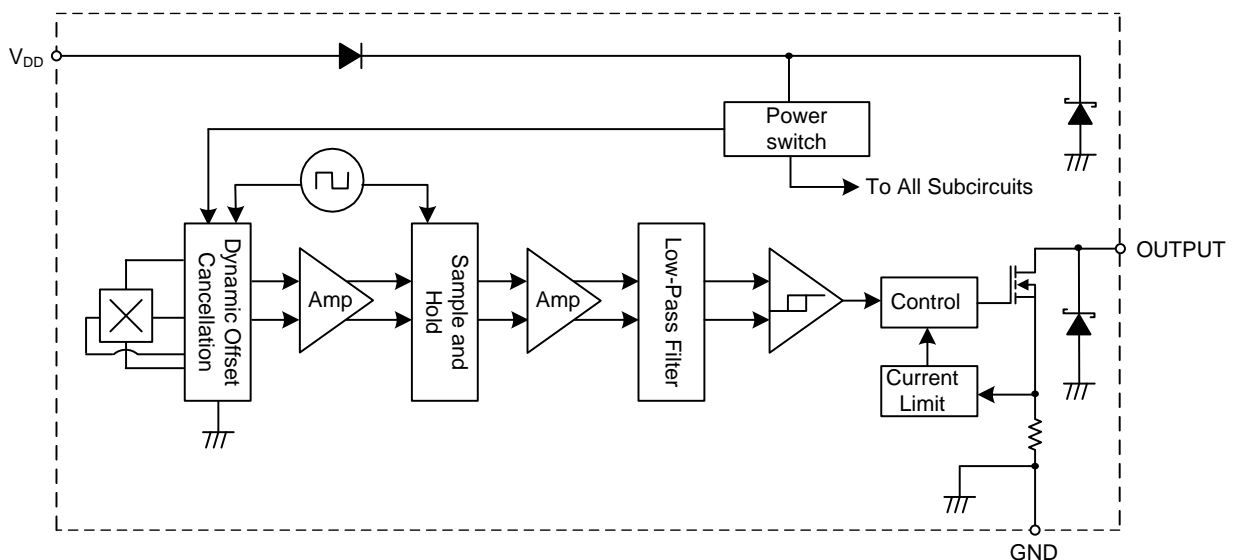
Note: 4.  $C_{IN}$  is for power stabilization and to strengthen the noise immunity. The recommended capacitance is 10nF to 100nF.  $R_L$  is the pullup resistor.

## Pin Descriptions

Packages: SC59, SOT23 (Type S), SIP-3 (Ammo Pack) and SIP-3 (Bulk Pack)

Pin Number	Pin Name	Function
1	V <sub>DD</sub>	Power Supply Input
2	GND	Ground
3	OUTPUT	Output Pin

## Functional Block Diagram



## Absolute Maximum Ratings (Notes 5 & 6) (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Symbol	Characteristic	Value	Unit
V <sub>DD</sub>	Supply Voltage (Note 6)	40	V
V <sub>DDR</sub>	Reverse Supply Voltage	-18	V
V <sub>OUT_MAX</sub>	Output Pin Off Voltage (Note 6)	32	V
I <sub>OUT</sub>	Continuous Output Current	60	mA
I <sub>OUT_R</sub>	Reverse Output Current	-50	mA
B	Magnetic Flux Density	Unlimited	
P <sub>D</sub>	Package Power Dissipation	SIP-3 (Ammo Pack)	mW
		SIP-3 (Bulk Pack)	
		SC59 and SOT23 (Type S)	
T <sub>S</sub>	Storage Temperature Range	-65 to +165	°C
T <sub>J</sub>	Maximum Junction Temperature	+170	°C
ESD HBM	Electrostatic Discharge Withstand Capability—Human Body Model	8	kV
ESD CDM	Electrostatic Discharge Withstand Capability—Charged Device Model	1	kV

- Notes:
- Stresses greater than those listed under *Absolute Maximum Ratings* can cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions* is not implied. Exposure to *Absolute Maximum Ratings* for extended periods can affect device reliability.
  - The absolute maximum V<sub>DD</sub> of 40V 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 over 100ms.

## Recommended Operating Conditions (@T<sub>A</sub> = -40°C to +150°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Rating	Unit
V <sub>DD</sub>	Supply Voltage	Supply voltage, between V <sub>DD</sub> and GND pins	3.0 to 28	V
T <sub>A</sub>	Operating Temperature Range	Operating ambient temperature range	-40 to +150	°C

## Electrical Characteristics (Notes 7 & 8) (@T<sub>A</sub> = -40°C to +150°C, V<sub>DD</sub> = 3V to 28V, unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>OUT_ON</sub>	Output On Voltage	I <sub>OUT</sub> = 20mA, B > B <sub>OP</sub>	—	0.2	0.4	V
I <sub>OUT_OFF</sub>	Output Leakage Current (When Output Is Off)	V <sub>OUT</sub> = 28V, B < B <sub>RP</sub> , output off	—	< 0.1	10	μA
I <sub>DD</sub>	Supply Current	Output open, T <sub>A</sub> = +25°C	—	3	4	mA
		Output open, T <sub>A</sub> = -40°C to +150°C	—	—	5	mA
I <sub>DD_R</sub>	Reverse Supply Current	V <sub>DD</sub> = -18V, T <sub>A</sub> = +25°C	—	0.001	—	mA
		V <sub>DD</sub> = -18V, T <sub>A</sub> = -40°C to +150°C	—	0.001	2.3	mA
t <sub>P_ON</sub>	Device Power-On Time (Startup Time)	V <sub>DD</sub> ≥ 3V, B > B <sub>OP</sub> (Note 7)	—	10	—	μs
f <sub>C</sub>	Chopping Frequency	V <sub>DD</sub> ≥ 3V (Note 9)	—	500	—	kHz
t <sub>D</sub>	Response Time Delay (Time from Magnetic Threshold Reached to the Start of the Output Rise or Fall)	(Note 9)	—	4	—	μs
t <sub>R</sub>	Output Rising Time (External Pullup Resistor R <sub>L</sub> and Load Capacitance Dependent)	R <sub>L</sub> = 1kΩ, C <sub>L</sub> = 20pF (Note 9)	—	0.2	1	μs
t <sub>F</sub>	Output Falling Time (Internal Switch Resistance and Load Capacitance Dependent)	R <sub>L</sub> = 1kΩ, C <sub>L</sub> = 20pF (Note 9)	—	0.1	1	μs
I <sub>OCL</sub>	Output Current Limit	B > B <sub>OP</sub> (Note 10)	30	—	55	mA
V <sub>Z</sub>	Zener Clamp Voltage	I <sub>DD</sub> = 5mA, T <sub>A</sub> = +25°C	28	—	—	V

- Notes:
- When power is initially turned on, V<sub>DD</sub> must be within its correct operating range (3.0V to 28V) to guarantee the output sampling. The output state is valid after the startup time of 10μs typical from the operating voltage reaching 3V.
  - Typical values are defined at T<sub>A</sub> = +25°C, V<sub>DD</sub> = 12V. 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 limits the output current I<sub>OUT</sub> to current limit of I<sub>OCL</sub>.

# Magnetic Characteristics (Notes 11 & 12) ( $T_A = -40^{\circ}\text{C}$ to $+150^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$ to $28\text{V}$ , unless otherwise specified)

Part Number	Symbol	Parameter	Min	Typ	Max	Unit	Output Type
AH3322Q	BOPS (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Operation Point	15	30	45	Gauss	Open-Drain
	BRPS (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Release Point	5	20	35		
	BHY ( $ B_{OPX}  -  B_{RPX} $ )	Hysteresis (Note 13)	5	10	17		
AH3323Q	BOPS (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Operation Point	38	55	72	Gauss	Open-Drain
	BRPS (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Release Point	20	35	50		
	BHY ( $ B_{OPX}  -  B_{RPX} $ )	Hysteresis (Note 13)	12	20	28		
AH3324Q	BOPS (South pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Operation Point	60	80	100	Gauss	Open-Drain
	BRPS (South pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Release Point	40	60	80		
	BHY ( $ B_{OPX}  -  B_{RPX} $ )	Hysteresis (Note 13)	14	20	29		
AH3325Q	BOPS (South pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Operation Point	80	100	120	Gauss	Open-Drain
	BRPS (South pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Release Point	60	80	100		
	BHY ( $ B_{OPX}  -  B_{RPX} $ )	Hysteresis (Note 13)	15	20	31		

- 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 startup 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.
  - Maximum and minimum hysteresis is guaranteed by design, process control, and characterization.

# Magnetic Characteristics (Notes 11 & 12) ( $T_A = -40^{\circ}\text{C}$ to $+150^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$ to $28\text{V}$ , unless otherwise specified) (continued)

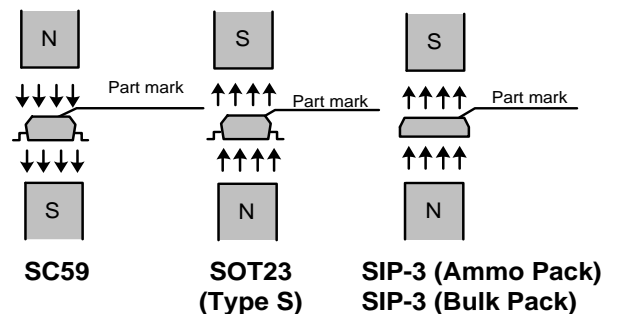
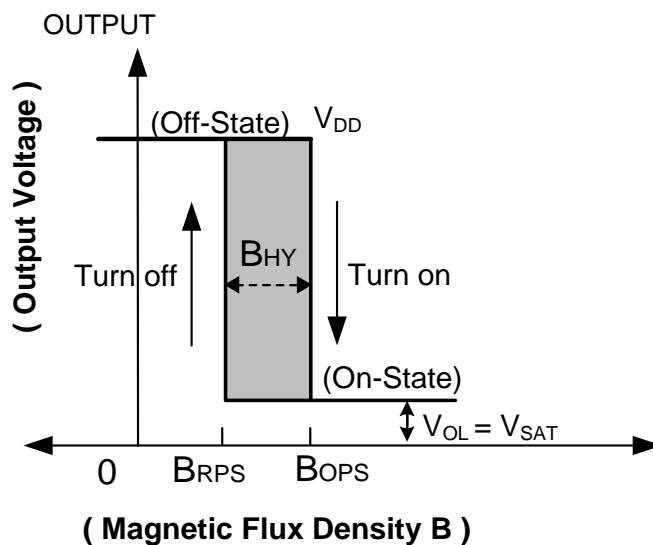
Part Number	Symbol	Parameter	Min	Typ	Max	Unit	Output Type
AH3326Q	BOPS (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Operation Point	65	100	135	Gauss	Open-Drain
	BRPS (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Release Point	50	85	120		
	BHY ( $ B_{OPX}  -  B_{RPX} $ )	Hysteresis (Note 13)	8	15	25		
AH3327Q	BOPS (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Operation Point	95	115	140	Gauss	Open-Drain
	BRPS (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Release Point	70	90	120		
	BHY ( $ B_{OPX}  -  B_{RPX} $ )	Hysteresis (Note 13)	18	25	36		
AH3328Q	BOPS (South pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Operation Point	130	150	180	Gauss	Open-Drain
	BRPS (South pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Release Point	105	125	160		
	BHY ( $ B_{OPX}  -  B_{RPX} $ )	Hysteresis (Note 13)	16	25	33		
AH3329Q	BOPS (South Pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Operation Point	150	175	200	Gauss	Open-Drain
	BRPS (South pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Release Point	125	150	180		
	BHY ( $ B_{OPX}  -  B_{RPX} $ )	Hysteresis (Note 13)	18	25	35		

- 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 startup 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.
  - Maximum and minimum hysteresis is guaranteed by design, process control, and characterization.

**Magnetic Characteristics** (Notes 11 & 12) ( $T_A = -40^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$ ,  $V_{DD} = 3.0\text{V}$  to  $28\text{V}$ , unless otherwise specified) (continued)

Part Number	Symbol	Parameter	Min	Typ	Max	Unit	Output Type
AH3320Q	$B_{OPS}$ (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Operation Point	180	210	240	Gauss	Open-Drain
	$B_{RPS}$ (South pole to the part marking side for SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages; South pole to the non-part marking side for SC59 package. See diagram below)	Release Point	155	185	220		
	$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis (Note 13)	17	25	35		
AH3321Q	$B_{OPS}$ (South pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Operation Point	235	275	300	Gauss	Open-Drain
	$B_{RPS}$ (South pole to the part marking side of SOT23 (Type S) and SIP-3 (Ammo Pack), SIP-3 (Bulk Pack) packages)	Release Point	210	250	275		
	$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis (Note 13)	17	25	36		

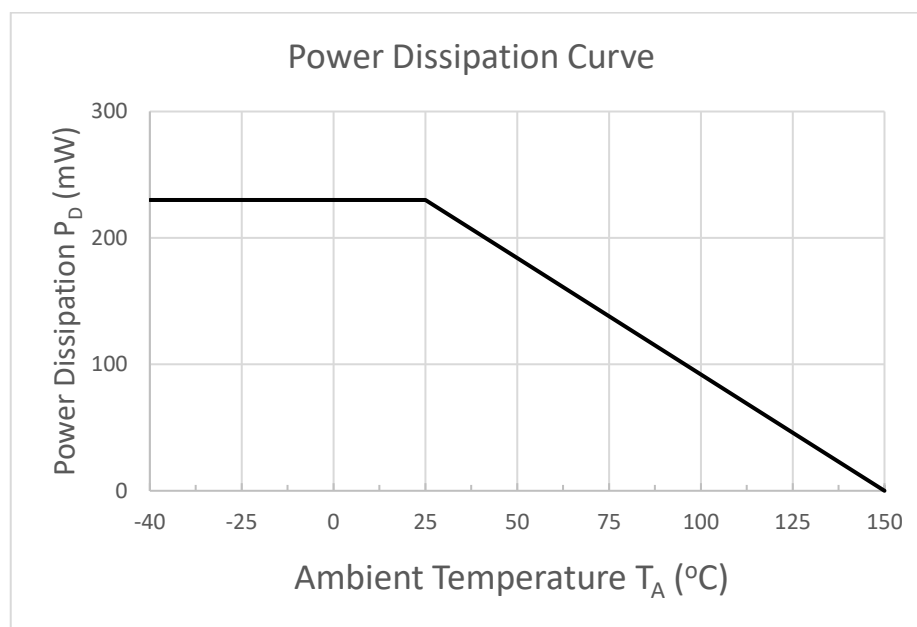
- Notes:
- When power is initially turned on,  $V_{DD}$  must be within its correct operating range (3.0V to 28V) to guarantee the output sampling. The output state is valid after the startup time of  $10\mu\text{s}$  typical from the operating voltage reaching 3V.
  - Typical values are defined at 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



## Thermal Performance Characteristics

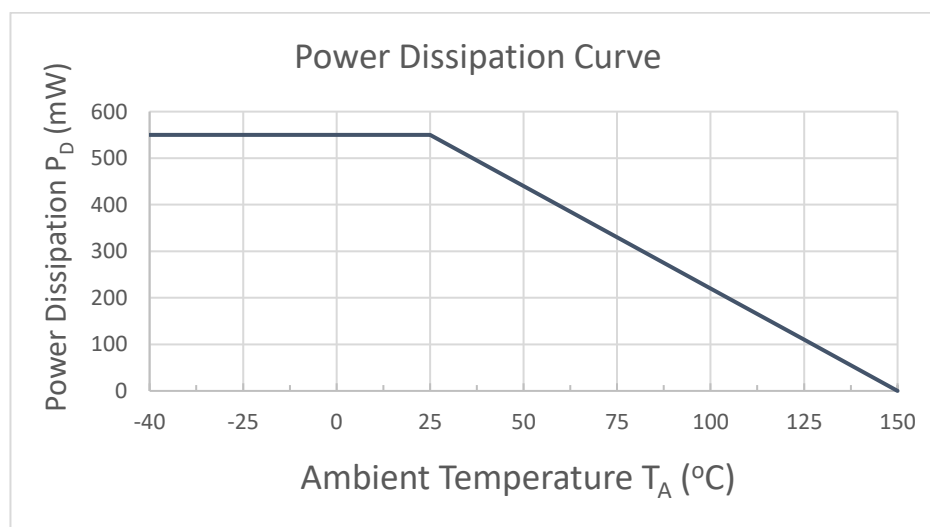
### (1) Package Types: SC59 and SOT23 (Type S)

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

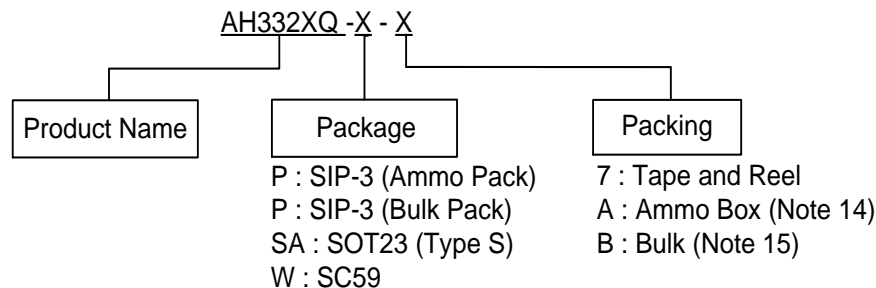


### (2) Package Types: SIP-3 (Ammo Pack) and SIP-3 (Bulk Pack)

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	Package	Part Number Suffix	Packing	
				Qty.	Carrier
AH3322Q-P-A	P	SIP-3 (Ammo Pack)	-A	4,000	Ammo Box
AH3322Q-P-B	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3322Q-SA-7	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel
AH3322Q-W-7	W	SC59	-7	3,000	7" Tape & Reel
AH3323Q-P-A	P	SIP-3 (Ammo Pack)	-A	4,000	Ammo Box
AH3323Q-P-B	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3323Q-SA-7	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel
AH3323Q-W-7	W	SC59	-7	3,000	7" Tape & Reel
AH3324Q-P-B	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3324Q-SA-7	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel
AH3325Q-P-B	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3325Q-SA-7	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel
AH3326Q-P-A	P	SIP-3 (Ammo Pack)	-A	4,000	Ammo Box
AH3326Q-P-B	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3326Q-SA-7	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel
AH3326Q-W-7	W	SC59	-7	3,000	7" Tape & Reel
AH3327Q-P-A	P	SIP-3 (Ammo Pack)	-A	4,000	Ammo Box
AH3327Q-P-B	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3327Q-SA-7	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel
AH3327Q-W-7	W	SC59	-7	3,000	7" Tape & Reel
AH3328Q-P-A	P	SIP-3 (Ammo Pack)	-A	4,000	Ammo Box
AH3328Q-P-B (Future Product)	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3328Q-SA-7 (Future Product)	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel
AH3329Q-P-B (Future Product)	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3329Q-SA-7 (Future Product)	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel
AH3320Q-P-B (Future Product)	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3320Q-SA-7 (Future Product)	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel
AH3321Q-P-B (Future Product)	P	SIP-3 (Bulk Pack)	-B	1,000	Bulk
AH3321Q-SA-7 (Future Product)	SA	SOT23 (Type S)	-7	3,000	7" Tape & Reel

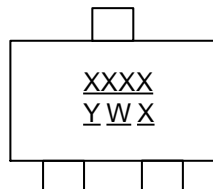
Notes: 14. Ammo Box is for SIP-3 Spread Lead.  
 15. Bulk is for SIP-3 Straight Lead.



## Marking Information

### (1) Package Type: SOT23 (Type S)

#### (Top View)

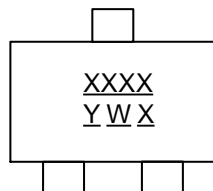


XXXX : Identification Code  
Y : Year 0 to 9 (ex: 3 = 2023)  
W : Week : A to Z : week 1 to 26;  
           a to z : week 27 to 52; z represents  
           week 52 and 53  
X : Internal Code

Part Number	Package	Identification Code
AH3322Q-SA-7	SOT23	S2AQ
AH3323Q-SA-7	SOT23	S2BQ
AH3324Q-SA-7	SOT23	S2CQ
AH3325Q-SA-7	SOT23	S2DQ
AH3326Q-SA-7	SOT23	S2EQ
AH3327Q-SA-7	SOT23	S2FQ
AH3328Q-SA-7	SOT23	S2GQ
AH3329Q-SA-7	SOT23	S2HQ
AH3320Q-SA-7	SOT23	S2JQ
AH3321Q-SA-7	SOT23	S2KQ

### (2) Package Type: SC59

#### (Top View)



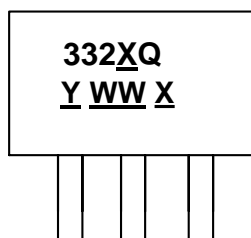
XXXX : Identification Code  
Y : Year 0 to 9 (ex: 3 = 2023)  
W : Week : A to Z : week 1 to 26;  
           a to z : week 27 to 52; z represents  
           week 52 and 53  
X : Internal Code

Part Number	Package	Identification Code
AH3322Q-W-7	SC59	S3AQ
AH3323Q-W-7	SC59	S3BQ
AH3326Q-W-7	SC59	S3EQ
AH3327Q-W-7	SC59	S3FQ

## Marking Information (continued)

### (3) Package Types: SIP-3 (Ammo Pack)/SIP-3 (Bulk Pack)

(Top View)



332XQ : Identification Code

Y : Year : 0 to 9 (ex: 3 = 2023)

WW : Week : 01 to 52, "52" represents  
week 52 and 53

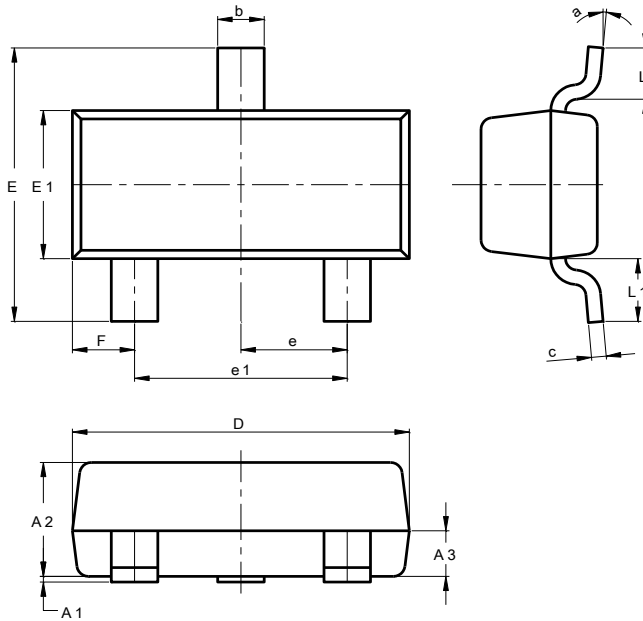
X : Internal Code

Part Number	Package	Identification Code
AH3322Q-P-A	SIP-3 (Ammo Pack)	3322Q
AH3322Q-P-B	SIP-3 (Bulk Pack)	3322Q
AH3323Q-P-A	SIP-3 (Ammo Pack)	3323Q
AH3323Q-P-B	SIP-3 (Bulk Pack)	3323Q
AH3324Q-P-B	SIP-3 (Bulk Pack)	3324Q
AH3325Q-P-B	SIP-3 (Bulk Pack)	3325Q
AH3326Q-P-A	SIP-3 (Ammo Pack)	3326Q
AH3326Q-P-B	SIP-3 (Bulk Pack)	3326Q
AH3327Q-P-A	SIP-3 (Ammo Pack)	3327Q
AH3327Q-P-B	SIP-3 (Bulk Pack)	3327Q
AH3328Q-P-A	SIP-3 (Ammo Pack)	3328Q
AH3328Q-P-B	SIP-3 (Bulk Pack)	3328Q
AH3329Q-P-B	SIP-3 (Bulk Pack)	3329Q
AH3320Q-P-B	SIP-3 (Bulk Pack)	3320Q
AH3321Q-P-B	SIP-3 (Bulk Pack)	3321Q

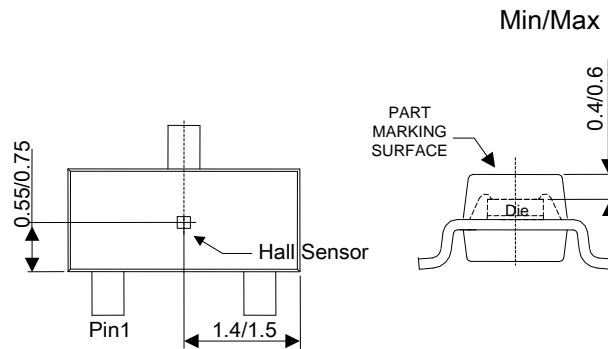
## Package Outline Dimensions (All dimensions in mm.)

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

### (1) Package Type: SOT23 (Type S)



SOT23 (Type S)			
Dim	Min	Max	Typ
A1	0.013	0.10	0.05
A2	0.90	1.025	1.00
A3	0.375	0.425	0.40
b	0.37	0.51	0.40
c	0.10	0.18	0.125
D	2.80	3.00	2.90
E	2.30	2.50	2.40
E1	1.20	1.40	1.30
e	0.89	1.03	0.915
e1	1.78	2.05	1.83
F	0.45	0.60	0.535
L1	0.45	0.61	0.55
L	0.25	0.55	0.40
a	0°	8°	--
All Dimensions in mm			

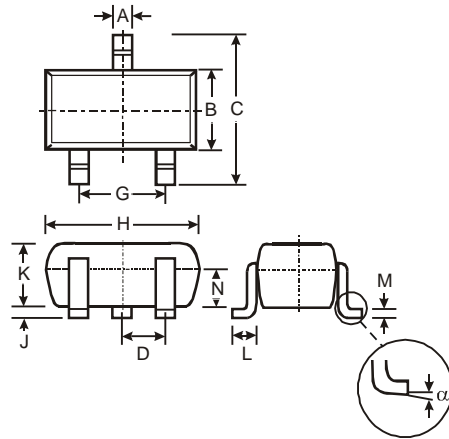


**Sensor Location**

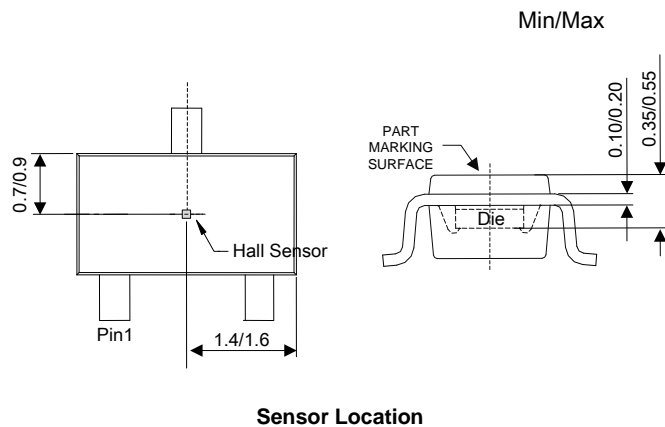
## Package Outline Dimensions (All dimensions in mm.) (continued)

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

### (2) Package Type: SC59



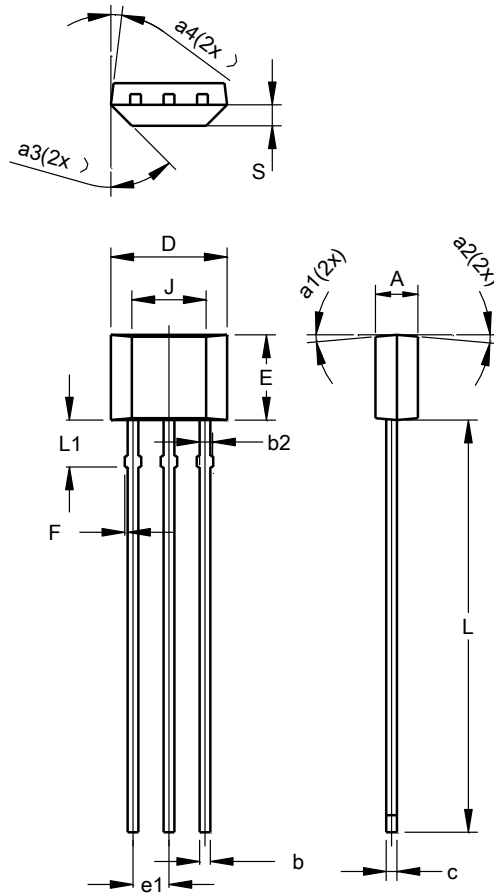
SC59			
Dim	Min	Max	Typ
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	-	-	0.95
E	-	-	1.90
G	-	-	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	8°	-
All Dimensions in mm			



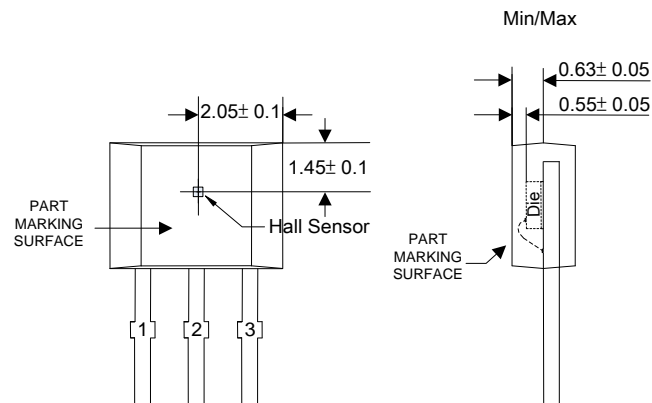
## Package Outline Dimensions (All dimensions in mm.) (continued)

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

### (3) 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			

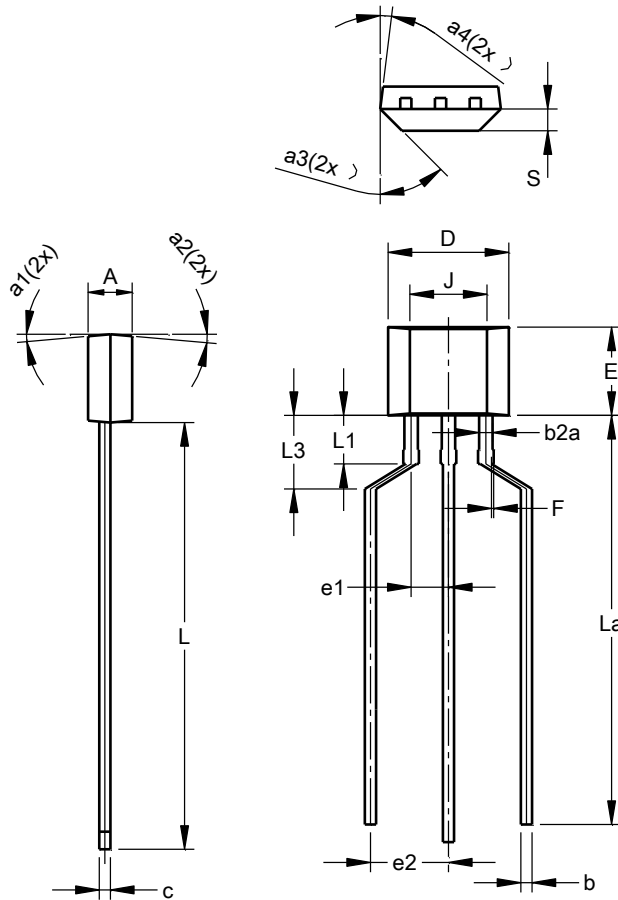


**Sensor Location**

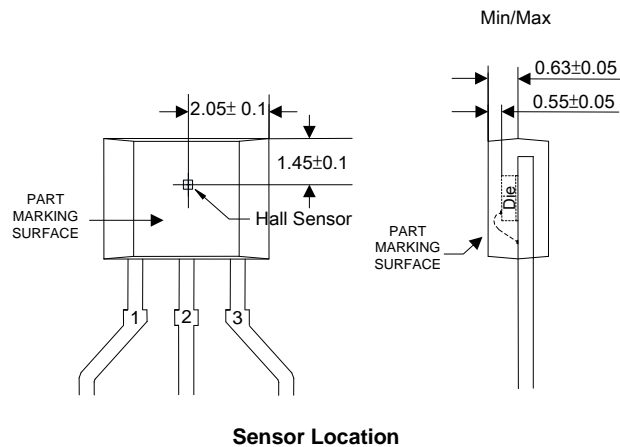
**Package Outline Dimensions** (All dimensions in mm.) (continued)

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

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



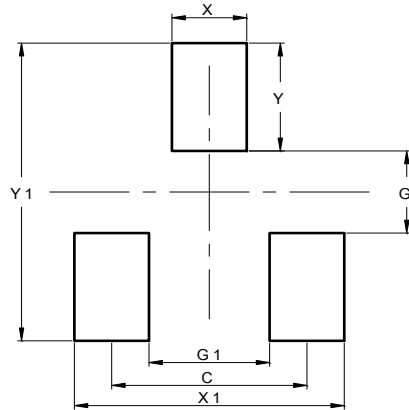
SIP-3 (Ammo Pack)			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
b	0.33	0.43	0.38
b2a	0.40	0.52	0.46
c	0.35	0.41	0.38
D	3.90	4.30	4.10
E	2.80	3.20	3.00
e1	1.24	1.30	1.27
e2	2.40	2.90	2.65
F	0.00	0.20	--
J	2.62 REF		
L	14.00	15.00	14.50
La	12.90	14.90	13.90
L1	1.55	1.75	1.65
L3	2.00	3.00	2.50
S	0.63	0.84	0.74
a1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



## Suggested Pad Layout

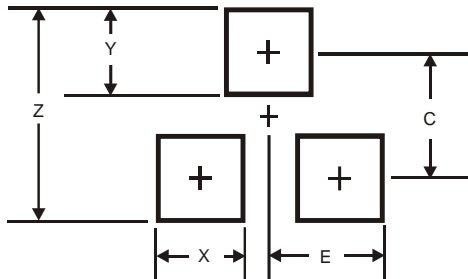
Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### (1) Package Type: SOT23 (Type S)



Dimensions	Value (in mm)
C	1.830
G	0.800
G1	1.130
X	0.700
X1	2.530
Y	1.050
Y1	2.900

### (2) Package Type: SC59



Dimensions	Value (in mm)
Z	3.4
X	0.8
Y	1.0
C	2.4
E	1.35

## Mechanical Data

- Moisture Sensitivity: SOT23 (Type S)/SC59 – Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 ③
- Weight: SIP-3 (Ammo Pack)/SIP-3 (Bulk Pack) – 0.077 grams (Approximate)  
SOT23 (Type S) – 0.009 grams (Approximate)  
SC59 – 0.015 grams (Approximate)

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