



## New Product Announcement

### AH1902 – Package Addition

## AH1902: Low Voltage High Performance Micropower Omnipolar Hall Effect Switch Family

The AH1902 is a low voltage high performance micropower Omnipolar function Hall-Effect switch designed for consumer equipment ranging from portable and battery powered to home appliances and industrial applications.

The AH1902 extends the solution options and flexibility provided by AH189x, AH1812, AH1903 and AH3360 family of Omnipolar and Unipolar devices.

Although designed for variety of applications, it is optimized to operate over the supply range of 1.6V to 3.6V and consumes an average current of 4.3uA typical at 1.8V.

Based on chopper stabilized architecture and a ESD rating of 8kV the device provides a reliable and robust solution over the whole operating range.

To help achieve the small solution and to minimize component placement, the device has an internal push-pull output structure and is available in a small low profile X1-DFN1216, ultra thin X2-DFN2015-6 and leaded SOT553 packages.



### The Diodes Advantage

The AH1902 provides a small, simple and flexible contactless switch solution for multiple applications.

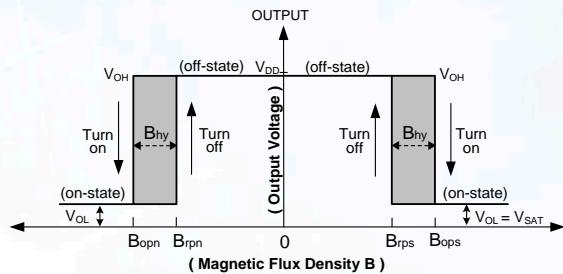
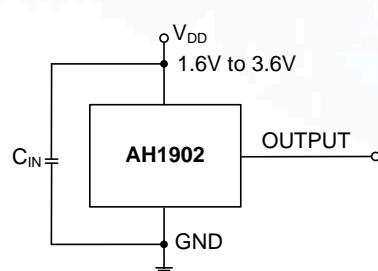
- **Omnipolars/Unipolar function and operating switch point options**
  - Omnipolar AH1902 : Operates with either a North or South pole
  - Internal push-pull output structure - No external pull-up required- Minimal external component
- **Designed for portable battery powered equipment, home appliances and industrial applications**
  - Supply voltage optimized to 1.6V to 3.6V to support battery applications
  - Micropower operation with an average supply current of 4.3uA at 1.85V
- **High performance and reliability**
  - Tight operating window (less magnetic spread)
  - Chopper stabilized design to provide minimal switch point drift and superior temperature stability
  - Operating temperature range -40°C to 85°C
  - High ESD rating of 8kV for VDD, GND and Output pins
- **Small solution in low profile or industry standard packages**
  - Small low profile X1-DFN1216 (1.2mm x 1.6mm x 0.5mm))
  - Ultra thin X2-DFN2015-6 (2mm x 1.5mm x 0.39mm) max height 0.4mm
  - Small low profile leaded SOT553 (1.6mm x1.6nn x1.6mm)

### Applications

- Tablets, E-readers and ultrabooks,
- Cellphones slide/flip and smart cover
- Handheld game consoles
- Home appliances and industrial contactless switches
- Safety and security

## Typical Applications Circuit

**AH1902 Omnipolar**



Note:  $C_{in}$  is for power stabilization and to strengthen the noise immunity,  $C = 100nF$  or higher must be used.

## Electrical Characteristics

| Part Number  | Function  | Output Type      | Operating Voltage (V) | Average Supply Current (uA) | Chopper Stabilized | ESD | Max. Operating Point (Bop) (Gauss) | Min Release Point (Brp) (Gauss) | Temp Range (°C) | Package Outlines |
|--------------|-----------|------------------|-----------------------|-----------------------------|--------------------|-----|------------------------------------|---------------------------------|-----------------|------------------|
| AH1902-FA-7  | Omnipolar | Single Push-pull | 1.6 to 3.6            | 4.3                         | Yes                | 8kV | ±47                                | ±13                             | -40 to 85       | X1-DFN1216-4     |
| AH1902-FT4-7 |           |                  |                       |                             |                    |     |                                    |                                 |                 | X2-DFN2015-6     |
| AH1902-Z-7   |           |                  |                       |                             |                    |     |                                    |                                 |                 | SOT553           |

## Ordering Information

| Device       | Packaging <sup>(1)</sup> | Part mark ID | Reel size | Tape width | Quantity |
|--------------|--------------------------|--------------|-----------|------------|----------|
| AH1902-FA-7  | X1-DFN1216-4             | F2           | 7"        | 8mm        | 3000     |
| AH1902-FT4-7 | X1-DFN1216-4             | D2           | 7"        | 8mm        | 3000     |
| AH1902-FT4-7 | SOT553                   | D2           | 7"        | 8mm        | 3000     |

<sup>(1)</sup> "Green" mold compound with Lead Free Finish/RoHS Compliant packages.

EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. No purposely added lead. Halogen and Antimony free. Please visit our website at [http://www.diodes.com/products/lead\\_free.html](http://www.diodes.com/products/lead_free.html).



## Product Portfolio – Omnipolar Hall Effect Switches

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| Part   | Output                 | Output Type  | Operating Voltage | Average Supply Current | Operating Point Bop |             |            | Release Point Brp |             |            | Temp Range  | Package                                |                                       |
|--------|------------------------|--------------|-------------------|------------------------|---------------------|-------------|------------|-------------------|-------------|------------|-------------|--|---------------------------------------|
|        |                        |              |                   |                        | (Gauss)             |             |            | (Gauss)           |             |            |             |  |                                       |
|        |                        |              | (V)               | (µA)                   | Min                 | Typ         | Max        | Min               | Typ         | Max        | °C          |  |                                       |
| AH180  | Single                 | Open Drain   | 2.5 to 5.5        | 8                      | -60                 | -40         | 60         | 10                | 0           | -30        | -10         | -40 to +85                             | DFN2020-3, DFN2020-6, SC59, SIP3      |
| AH180N | Single                 | Open Drain   | 2.5 to 5.5        | 8                      | -50                 | 35<br>-35   | 50         | 10                | 25<br>-25   | -10        | -10         | -40 to +85                             | SOT553, TSOT23, SC59                  |
| AH1801 | Single                 | Open-Drain   | 2.5 to 5.5        | 8                      | -60                 | -40         | 60         | 10                | 30<br>-30   | -10        | -10         | -40 to +85                             | DFN2020-3, DFN2020-6, SC59            |
| AH1802 | Single                 | Open Drain   | 2.5 to 5.5        | 8                      | 20<br>-40           | 28<br>-28   | 40         | 10                | 20<br>-20   | -10        | -10         | -40 to +85                             | DFN2015H4, DFN2020-3, DFN2020-6, SC59 |
| AH1803 | Single                 | Open Drain   | 2.5 to 5.5        | 8                      | 20<br>-40           | 28<br>-28   | 40         | 10                | 20<br>-20   | -10        | -10         | -40 to +85                             | DFN2020-6, SC59                       |
| AH1804 | Single                 | Push-Pull    | 2.5 to 3.6        | 12                     | 20<br>-60           | 40<br>-40   | 60<br>-20  | 15                | 32<br>-32   | -15        | -15         | -40 to +85                             | DFN1216, SC59                         |
| AH9247 | Single                 | Int. Pull-up | 2.5 to 5.5        | 10                     | 0<br>-55            | 30<br>-30   | 55<br>0    | 5                 | 20<br>-20   | -5         | -5          | 40 to +85                              | SOT23, DFN2020-3, SIP3                |
| AH9248 | Single                 | Open Drain   | 2.5 to 5.5        | 10                     | 0<br>-55            | 30<br>-30   | 55<br>0    | 5                 | 20<br>-20   | -5         | -5          | 40 to +85                              | DFN2020-3, SIP3                       |
| AH1806 | Single                 | Open-Drain   | 2.5 to 3.6        | 8                      | 15<br>-45           | 30<br>-30   | 45<br>-15  | 10                | 20<br>-20   | 40<br>-10  | -10         | -40 to +85                             | SC59 SOT553                           |
| AH1808 | Single                 | Open Drain   | 2.5 to 3.6        | 8                      | 20<br>-60           | 40<br>-40   | 60<br>-20  | 10                | 30<br>-30   | 50<br>-10  | -10         | -40 to +85                             | SC59, SOT553                          |
| AH1807 | Single                 | Open Drain   | 2.5 to 5.5        | 8                      | 50<br>-115          | 80<br>-80   | 115<br>-50 | 40<br>-100        | 65<br>-65   | 100<br>-45 | -40 to +125 | SC59, SOT553, SIP-3                    |                                       |
| AH1809 | Single                 | Open Drain   | 2.5 to 5.5        | 8                      | 90<br>-185          | 130<br>-130 | 185<br>-90 | 80<br>-170        | 115<br>-115 | 170<br>-80 | -40 to +125 | SC59, SOT553, SIP-3                    |                                       |
| AH1883 | Single                 | Push-Pull    | 1.65 to 3.3       | 7                      | -55                 | 37<br>-37   | 55         | 6                 | 29<br>-29   | -6         | -6          | -40 to +85                             | SOT553, U-DFN2020-3                   |
| AH1884 | Dual, Compl            | Push-Pull    | 1.65 to 3.3       | 7                      | -55                 | 37<br>-37   | 55         | 15                | 29<br>-29   | -15        | -15         | -40 to +85                             | SOT553                                |
| AH1886 | Dual, Compl            | Push-Pull    | 1.65 to 3.3       | 7                      | 18<br>-55           | 37<br>-37   | 59<br>-18  | 6                 | 29<br>-29   | -6         | -6          | -40 to +85                             | SOT553                                |
| AH1886 | Dual, Compl            | Push-Pull    | 1.65 to 3.3       | 7                      | 18<br>-55           | 37<br>-37   | 59<br>-18  | 15                | 29<br>-29   | -15        | -15         | -40 to +85                             | SOT553                                |
| AH1888 | Dual, Compl            | Push-Pull    | 1.65 to 3.3       | 7                      | -79                 | 61<br>-61   | 79         | 35                | 53<br>-53   | -35        | -35         | -40 to +85                             | SOT553, DFN2020-3                     |
| AH1891 | Dual, Compl            | Push-Pull    | 1.8 to 3.3        | 7                      | 20<br>-60           | 40<br>-40   | 60<br>-20  | 12                | 25<br>-50   | 50<br>-12  | -40 to +85  | U-WLB0808-4 (CSP)                      |                                       |
| AH1812 | Single                 | Push-Pull    | 1.6 to 3.6        | 4.3                    | 16<br>-40           | 30<br>-30   | 40<br>-16  | 11<br>-35         | 20<br>-20   | 35<br>-11  | -40 to +85  | X1-DFN1216-4                           |                                       |
| AH1892 | Single Prog.           | Push-Pull    | 1.6 to 3.6        | 4.3                    | LB: 18<br>LB: -55   | 35<br>-35   | 55<br>-18  | 12                | 25<br>-45   | 45<br>-12  | -40 to +85  | SOT553, X1-WLB0707-4<br>X1-WLB0808-4   |                                       |
| AH1898 |                        |              |                   |                        | HB: 43<br>HB: -80   | 60<br>-60   | 80<br>-43  | 35<br>-70         | 50<br>-50   | 70<br>-35  |             |  |                                       |
| AH1893 | Single                 | Push-Pull    | 1.6 to 3.6        | 4.3                    | 14<br>-42           | 30<br>-30   | 42<br>-14  | 9<br>-35          | 20<br>-20   | 35<br>-9   | -40 to +85  | SOT553, X1-DFN1216-4                   |                                       |
| AH1895 | Single                 | Push-Pull    | 1.6 to 3.6        | 4.3                    | 40<br>-80           | 60<br>-60   | 80<br>-40  | 35<br>-65         | 50<br>-50   | 65<br>-35  | -40 to +85  | SOT553, X1-DFN1216-4                   |                                       |
| AH1897 | Single                 | Push-Pull    | 1.6 to 3.6        | 4.3                    | 16<br>-40           | 30<br>-30   | 40<br>-16  | 11<br>-35         | 20<br>-20   | 35<br>-11  | -40 to +85  | X1-DFN1216-4                           |                                       |
| AH1902 | Single                 | Push-Pull    | 1.6 to 3.6        | 4.3                    | 23<br>-48           | 33<br>-33   | 48<br>-23  | 9<br>-35          | 23<br>-23   | 35<br>-9   | -40 to +85  | SOT553<br>X1-DFN1216-4<br>X2-DFN2015-6 |                                       |
| AH1903 | Single, Prog. Uni/Omni | Push-Pull    | 1.6 to 3.6        | 4.3                    | 23<br>-47           | 33<br>-33   | 48<br>-23  | 12<br>-35         | 23<br>-23   | 35<br>-12  | -40 to +85  | X1-DFN1216-4                           |                                       |
| AH1894 | Single Prog.           | Push-Pull    | 1.6 to 3.6        | 4.3                    | LB: 18<br>LB: -55   | 35<br>-35   | 55<br>-18  | 12<br>-45         | 25<br>-25   | 45<br>-12  | -40 to +85  | SOT553, X1-DFN1216-4                   |                                       |



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### Product Portfolio – Unipolar Hall Effect Switches

| Part                  | Output                  | Output Type    | Operating Voltage | Average Supply Current | Typical Output Current | Grade/Output       | Operating Point Bop  |                       |                      | Release Point Brp  |                 |            | Temp Range      | Package                                |  |
|-----------------------|-------------------------|----------------|-------------------|------------------------|------------------------|--------------------|----------------------|-----------------------|----------------------|--------------------|-----------------|------------|-----------------|--|--|
|                       |                         |                |                   |                        |                        |                    | (Gauss)              |                       |                      | (Gauss)            |                 |            |                 |  |  |
|                       |                         |                |                   |                        |                        |                    | Min                  | Typ                   | Max                  | Min                | Typ             | Max        | (°C)            |  |  |
| AH182                 | Single                  | Open Drain     | 2.5 to 5.5        | 5                      | 10                     |                    | -                    | 40                    | 60                   | 10                 | 30              | -          | -40 to 85       | SC59, SIP-3L                           |  |
| AH183                 | Single                  | Open Drain     | 2.5 to 5.5        | 280                    | 10                     |                    | -                    | 40                    | 60                   | 10                 | 30              | -          | -40 to 85       | SC59, SIP-3L                           |  |
| AH337                 | Single                  | Open Drain     | 4.2 to 28         | 2000                   | 25                     |                    | 90                   | 120                   | 150                  | 30                 | 60              | 90         | -40 to 125      | SC59 SIP3                              |  |
| AH922                 | Single                  | Open Drain     | 3.0 to 22.0       | 3000                   | 25                     | -<br>B<br>C<br>85  | 80<br>45<br>-<br>135 | 110<br>95<br>25<br>65 | 140<br>135<br>-<br>- | 35<br>65<br>-<br>- | 95<br>75<br>115 | -40 to 125 | SOT23, TO-92S   |  |  |
| ATS137 <sup>(1)</sup> | Single                  | Open Collector | 3.5 to 20         | 5000                   | 25                     | A<br>B             | -<br>-               | -<br>130              | 100<br>10            | 10<br>-            | -<br>-          | -20 to 85  | SC59-3L SIP3-3L |  |  |
| AH1887                | Dual (North, South)     | Push-pull      | 1.65 to 3.3       | 7                      | 1                      | Output1<br>Output2 | -<br>-50             | 35<br>-35             | 50<br>-              | 6<br>-             | 20<br>-20       | -          | -40 to 85       | SOT553                                 |  |
| AH1889                | Dual (North, South)     | Push-pull      | 1.65 to 3.6       | 5000                   | 1                      |                    | -<br>-50             | 35<br>-35             | 50<br>-              | 6<br>-             | 20<br>-20       | -          | -40 to 85       | SOT553                                 |  |
| AH1903                | Single, Prog. Uni/ Omni | Push-pull      | 1.6 to 3.6        | 4.3                    | 1                      | Unipolar Mode      | 23                   | 33                    | 47                   | 12                 | 23              | 35         | -40 to 85       | X1-DFN1216-4                           |  |
| AH3360                | Single                  | Push-pull      | 1.6 to 3.6        | 4.3                    | 1                      |                    | 14                   | 30                    | 46                   | 9                  | 20              | 39         | -40 to 85       | X1-DFN1216-4<br>X2-DFN2015-6<br>SOT553 |  |

<sup>(1)</sup> ATS137: Not recommended for new design

Prog: Programmable  
Uni/Omni: Unipolar/Omnipolar

### To find out more information:

Omnipolar Portfolio Page:

[http://www.diodes.com/catalog/omnipolar\\_hall\\_effect\\_switches\\_113](http://www.diodes.com/catalog/omnipolar_hall_effect_switches_113)

Unipolar Portfolio page:

[http://www.diodes.com/catalog/unipolar\\_hall\\_effect\\_switches\\_112](http://www.diodes.com/catalog/unipolar_hall_effect_switches_112)

AH1902 Datasheet:

<http://www.diodes.com/datasheets/AH1902.pdf>