

Description

The AH1883 micropower Omnipolar Hall Effect switch IC is designed for portable and battery powered equipment such as cellular phones, cordless phones, camcorders, PDA's, and portable PC's. Based on two high sensitivity Hall Effect plates and chopper stabilized architecture, the AH1883 provides reliable solution over the whole operating range.

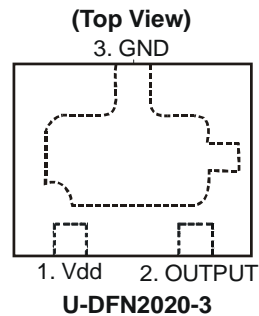
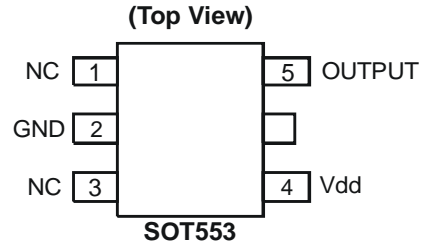
To support portable and battery powered equipment the design has been optimized to operate from 1.65V to 3.3V and consumes 13uW typical with a supply of 1.8V. To minimize PCB space the AH1883 includes a push-pull output structure, therefore does not require an external pull up resistor, and is packaged in small low profile SOT553 and U-DFN2020-3 packages.

Either North or South pole of sufficient strength will turn the output on. When the magnetic flux density (**B**) is larger than operate (**Bop**) the output is switched on. The output is turned off when B becomes lower than the release point (**Brp**). The output will remain off when there is no magnetic field.

Features

- Micropower operation
- Operation with North or South Pole
- 1.65V to 3.3V battery operation
- Chopper stabilized
 - Superior temperature stability
 - Extremely Low Switch-Point Drift
 - Insensitive to Physical Stress
- Good RF noise immunity
- -40°C to 85°C operating temperature
- ESD (HBM) > 6kV in SOT553 and U-DFN2020-3
- Small low profile packages: SOT553 and U-DFN2020-3
- "Green" Molding Compound

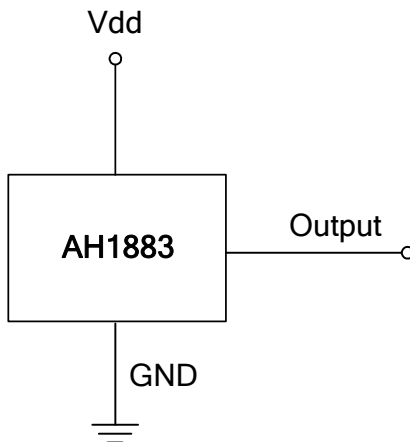
Pin Assignments



Applications

- Cellular phone
- PDA
- Portable PCs – Netbook, Notebook, Tablets
- Camcorders
- Cordless phone
- Handheld game consoles
- Proximity detection and contact-less switch applications

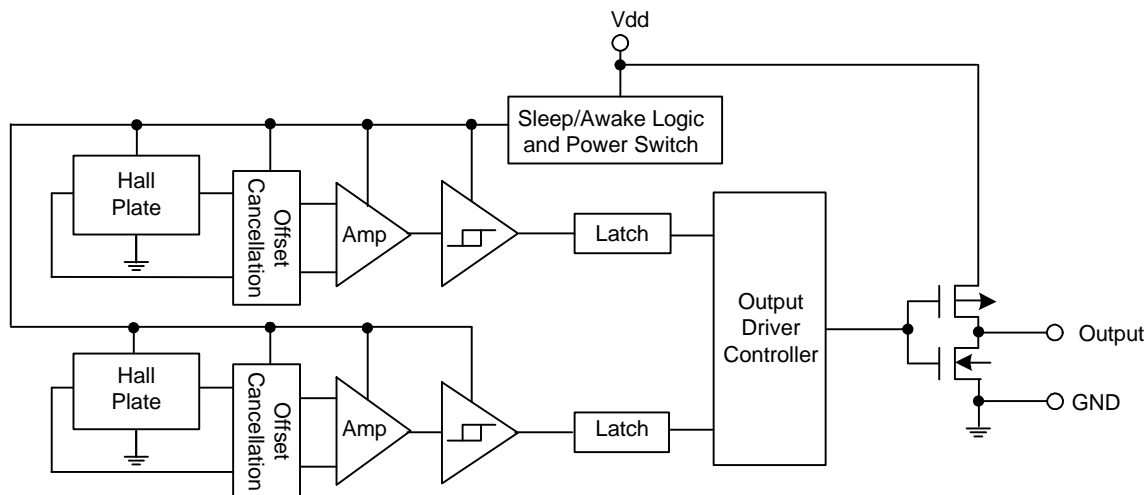
Typical Application Circuit



Pin Descriptions

| Pin Name | P/I/O | Pin # | Description |
|----------|-------|-------|---------------------------|
| NC | | 1 | No Connection |
| GND | P/I | 2 | Ground |
| NC | | 3 | No Connection |
| Vdd | P/I | 4 | Power Supply Voltage |
| Output | O | 5 | Output Pin (active Low) |

Functional Block Diagram



Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$, Note 1)

| Symbol | Characteristics | Values | Unit |
|-----------------|------------------------------|-------------|------|
| V _{DD} | Supply voltage | 5 | V |
| B | Magnetic flux density | Unlimited | |
| T _S | Storage Temperature Range | -65 to +150 | °C |
| P _D | Package Power Dissipation | 230 | mW |
| T _J | Maximum Junction Temperature | 150 | °C |

Notes: 1. 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

Recommended Operating Conditions ($T_A = 25^\circ\text{C}$)

| Symbol | Parameter | Conditions | Rating | Unit |
|-----------------|-----------------------------|------------|-------------|------|
| V _{DD} | Supply Voltage | Operating | 1.65 to 3.3 | V |
| T _A | Operating Temperature Range | Operating | -40 to +85 | °C |

Electrical Characteristics ($T_A = 25^\circ\text{C}$, V_{DD} = 1.8V, unless otherwise specified)

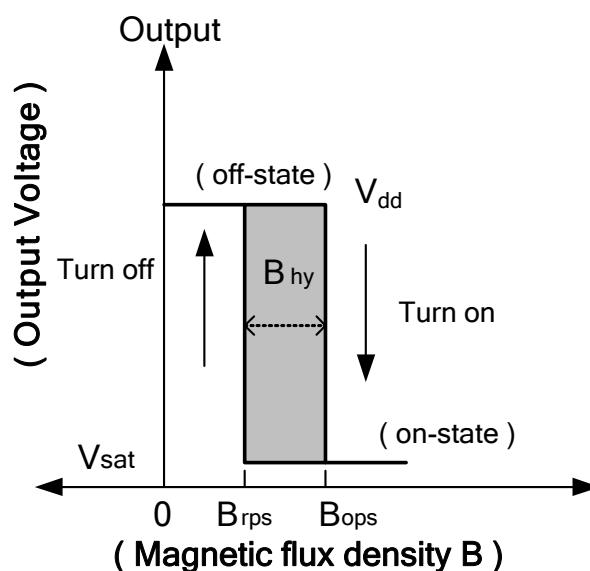
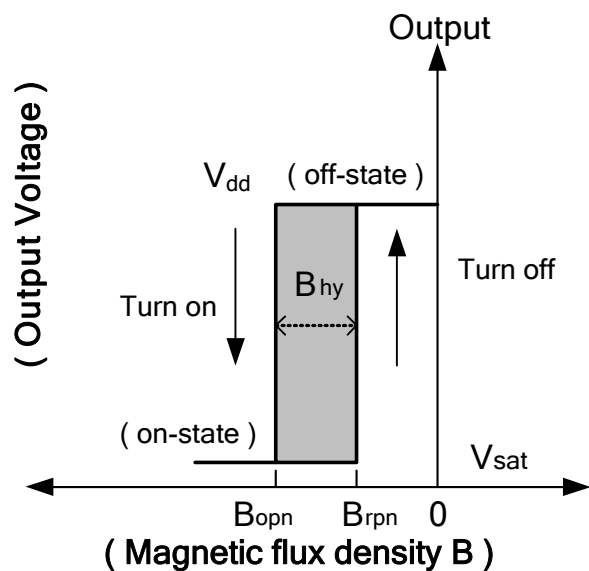
| Symbol | Characteristic | Conditions | Min | Typ. | Max | Unit |
|-----------------------|-------------------------------|-------------------------|----------------------|------|-----|------|
| V _{OH} | Output On Voltage (High side) | I _O = -0.5mA | V _{DD} -0.2 | - | - | V |
| V _{OL} | Output On Voltage (Low side) | I _O = 0.5mA | - | - | 0.2 | V |
| I _{DD} (en) | Supply Current | Chip enable | - | 2 | 4 | mA |
| I _{DD} (dis) | | Chip disable | - | 5 | 8 | µA |
| I _{DD} (avg) | | average supply current | - | 7 | 12 | µA |
| T _{awake} | Awake Time | | - | 50 | 100 | µs |
| T _{period} | Period | | - | 50 | 100 | ms |
| D.C. | Duty Cycle | | - | 0.1 | - | % |

Magnetic Characteristics ($T_A = 25^\circ\text{C}$, $V_{dd} = 1.8\text{V}\sim 3.0\text{V}$, Note 2 & 3)

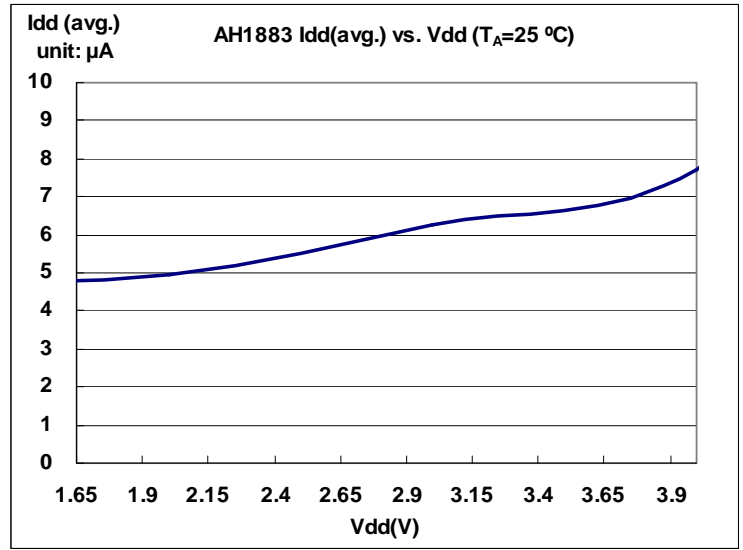
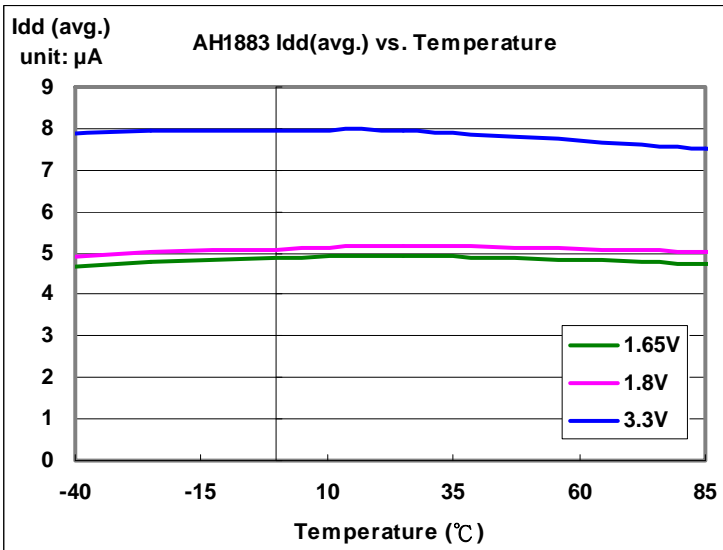
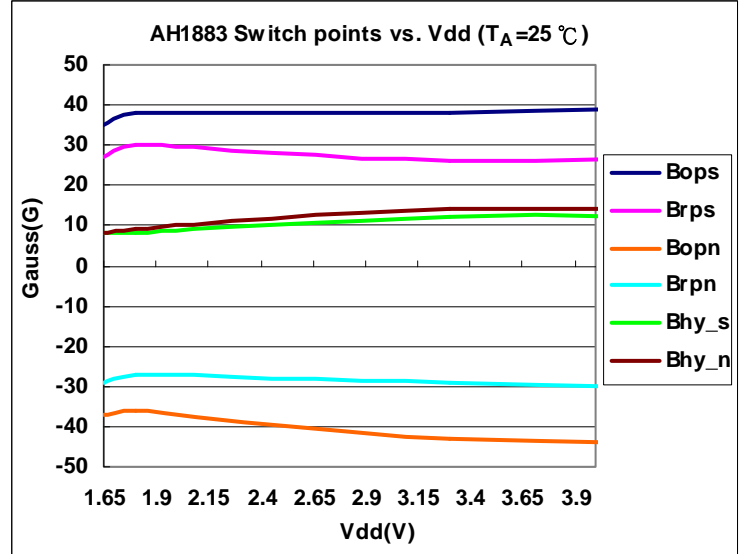
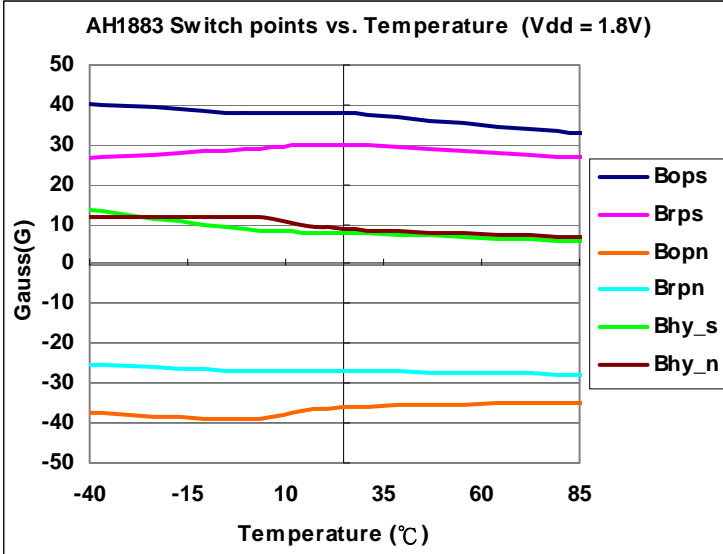
(1mT=10 Gauss)

| Symbol | Characteristic | Min | Typ. | Max | Unit |
|--------------------------------|----------------|-----|------|-----|-------|
| Bops(south pole to brand side) | Operate Point | - | 37 | 55 | Gauss |
| Bopn(north pole to brand side) | | -55 | -37 | - | |
| Brps(south pole to brand side) | Release Point | 6 | 29 | - | |
| Brpn(north pole to brand side) | | - | -29 | -6 | |
| Bhy(Bopx - Brpx) | Hysteresis | 3 | 8 | - | |

Notes: 2. Typical data is at $T_A = 25^\circ\text{C}$, $V_{dd} = 3\text{V}$, and for design information only.
3. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.



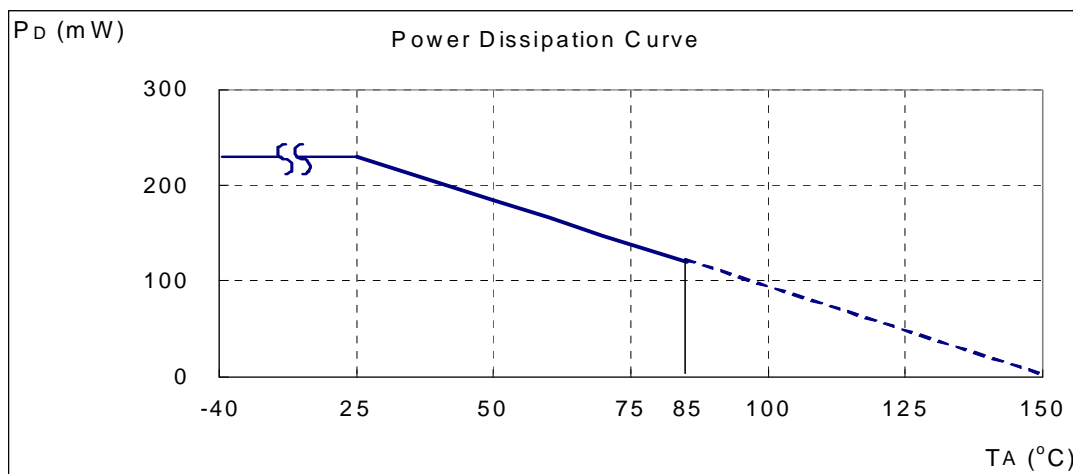
Typical Operating Characteristics



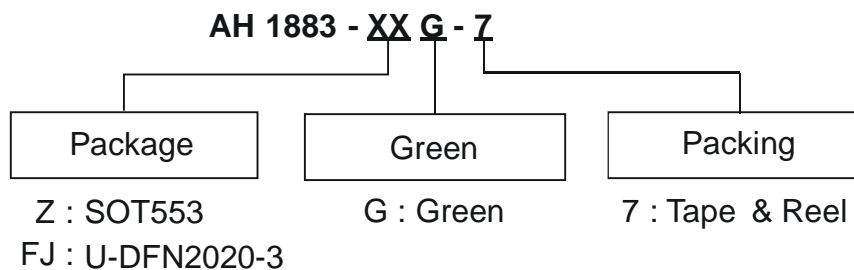
Performance Characteristics

For SOT553 and U-DFN2020-3

| | | | | | | | | | | | | | |
|---------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| T _A (°C) | 25 | 50 | 60 | 70 | 80 | 85 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |
| P _D (mW) | 230 | 184 | 166 | 147 | 129 | 120 | 110 | 92 | 74 | 55 | 37 | 18 | 0 |



Ordering Information



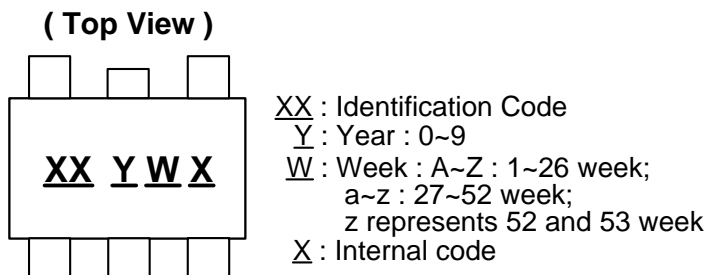
| Device | Package Code | Packaging (Note 4 & 5) | 7" Tape and Reel | |
|--------------|--------------|------------------------|------------------|--------------------|
| | | | Quantity | Part Number Suffix |
| AH1883-ZG-7 | Z | SOT553 | 3000/Tape & Reel | -7 |
| AH1883-FJG-7 | FJ | U-DFN2020-3 | 3000/Tape & Reel | -7 |



- Notes:
4. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
 5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

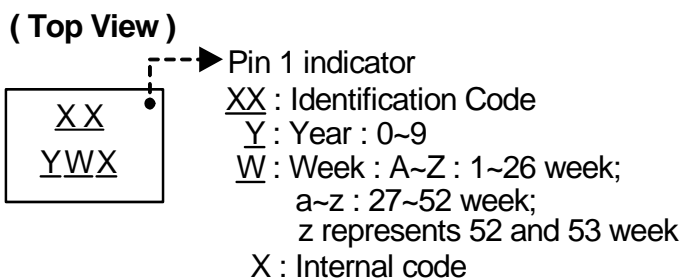
Marking Information

(1) SOT553



| Part Number | Package | Identification Code |
|-------------|---------|---------------------|
| AH1883 | SOT553 | KP |

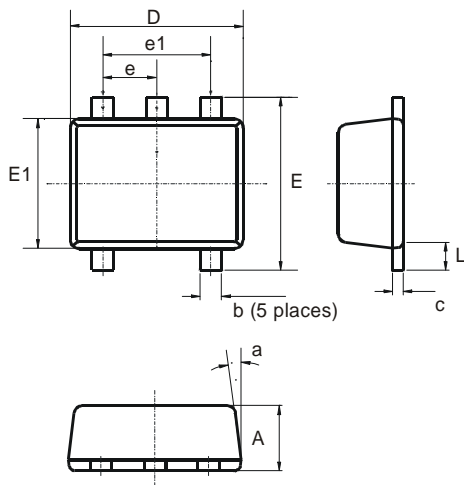
(2) U-DFN2020-3



| Part Number | Package | Identification Code |
|-------------|-------------|---------------------|
| AH1883 | U-DFN2020-3 | KP |

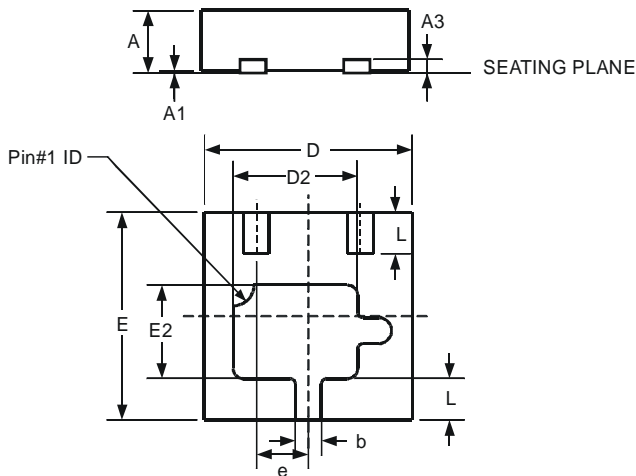
Package Outline Dimensions (All Dimensions in mm)

(1) Package Type: SOT553



| SOT553 | | | |
|-----------------------------|----------|------|------|
| Dim | Min | Max | Typ |
| A | 0.55 | 0.60 | 0.60 |
| c | 0.10 | 0.18 | 0.15 |
| D | 1.50 | 1.70 | 1.60 |
| E | 1.55 | 1.70 | 1.60 |
| E1 | 1.10 | 1.25 | 1.20 |
| L | 0.10 | 0.30 | 0.20 |
| b | 0.15 | 0.30 | 0.20 |
| e | 0.50 Typ | | |
| e1 | 1.00 Typ | | |
| a | 6° | 8° | 7° |
| All Dimensions in mm | | | |

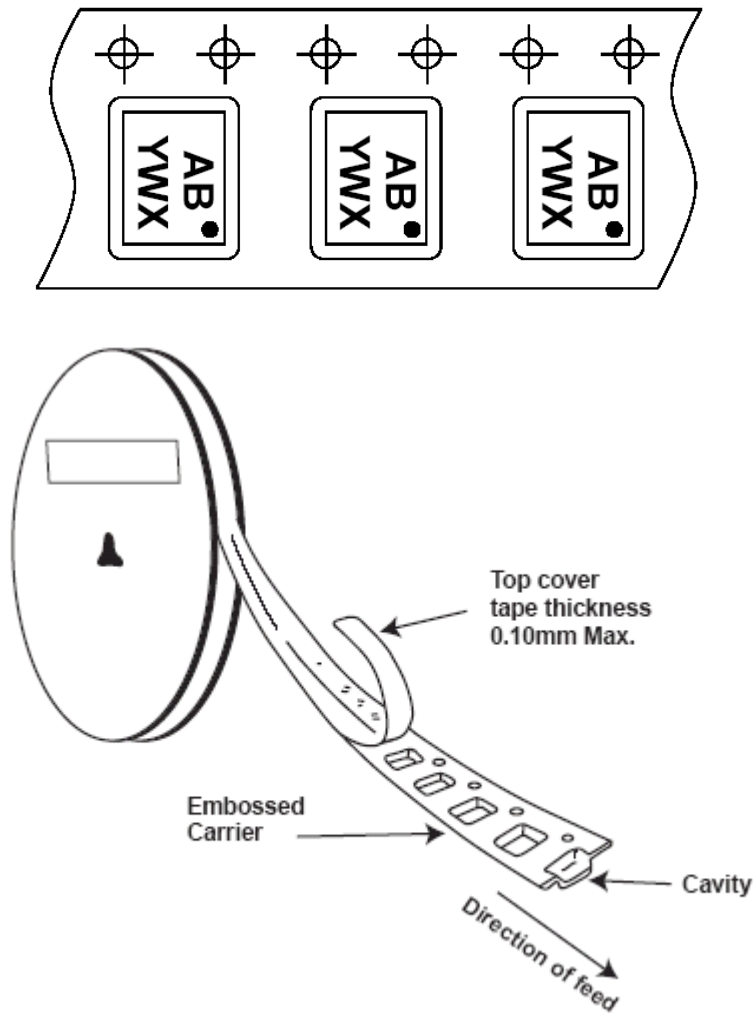
(2) Package Type: U-DFN2020-3



| U-DFN2020-3 | | | |
|-----------------------------|------|-------|-------|
| Dim | Min | Max | Typ |
| A | 0.57 | 0.63 | 0.60 |
| A1 | 0 | 0.05 | 0.02 |
| A3 | — | — | 0.152 |
| b | 0.20 | 0.30 | 0.25 |
| D | 1.95 | 2.075 | 2.00 |
| D2 | 1.10 | 1.30 | 1.20 |
| e | — | — | 0.50 |
| E | 1.95 | 2.075 | 2.00 |
| E2 | 0.80 | 1.00 | 0.90 |
| L | 0.35 | 0.45 | 0.40 |
| All Dimensions in mm | | | |

Taping Orientation (Note 6)

For U-DFN2020-3



Notes: 6. The taping orientation of the other package type can be found on our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

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