

## Description

AH1801 is a Micropower, Ultra-sensitive Hall Effect Switch, which is with two Hall effect plates and a output driver, mainly designed for battery-operation, hand-held equipment (such as Cellular and Cordless Phone, PDA). The total operation power is down to 24μW in the 3V supply.

Either north or south pole of sufficient strength will turn the output off. The output will be turned on under no magnetic field.

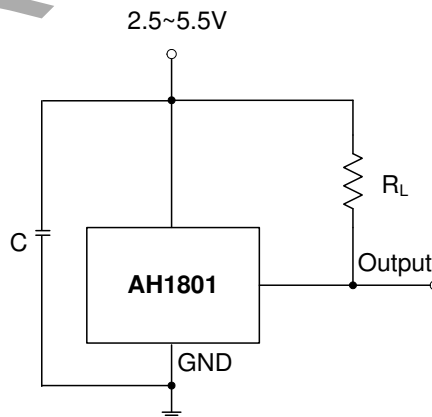
While the magnetic flux density (**B**) is larger than operate point (**Bop**), the output will be turned off, the output is held until **B** is lower than release point (**Brp**), then turned on.

## Features

- Micropower Operation
- Operation with North or South Pole
- 2.5V to 5.5V Battery Operation
- Inverted Output-on without Magnet Present
- 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
- Low Profile 3 Pin SC59 (Commonly Known as SOT23 in Asia) and DFN2020-3, DFN2020-6 Packages
- ESD (HBM) > 5KV for DFN2020-3 and DFN2020-6 > 6KV for SC59
- SC59, DFN2020-3 and DFN2020-6: Available in "Green" Molding Compound (No Br, Sb)
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

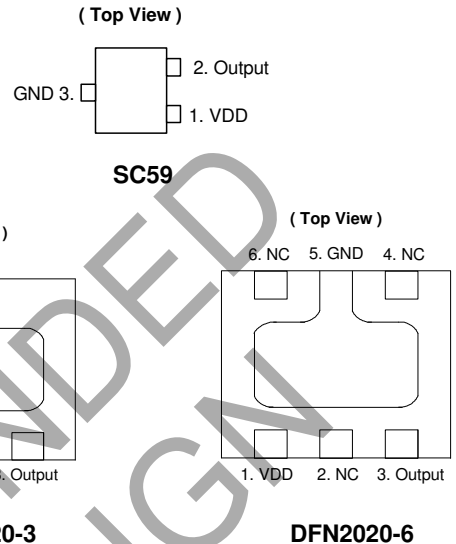
- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3.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

## Typical Applications Circuit



- Notes:
4. C is for power stabilization and to strengthen the noise immunity, the recommended capacitance is 10nF to 100nF. RL is the pull-up resistor, the recommended resistance is 10KΩ to 100KΩ.

## Pin Assignments



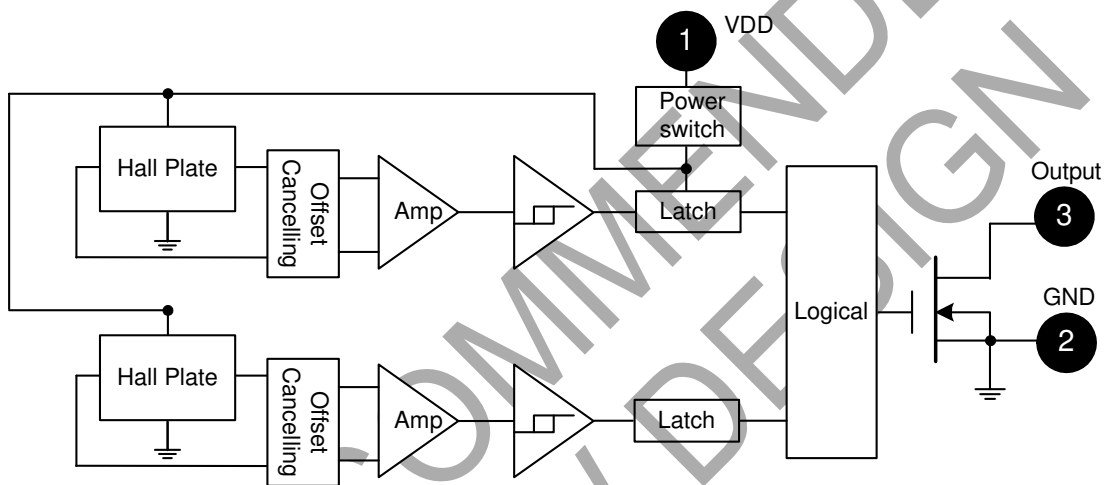
## Applications

- Cellular Phone
- PDA
- Cordless Phone

## Pin Descriptions

Pin Name	P/I/O	Description
VDD	P/I	Power Supply Input
GND	P/I	Ground
Output	O	Output Pin
NC		No Connected

## Functional Block Diagram



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

Symbol	Parameter	Rating	Unit
V <sub>DD</sub>	Supply Voltage	7	V
B	Magnetic Flux Density	Unlimited	
T <sub>S</sub>	Storage Temperature Range	-65 to +150	°C
P <sub>D</sub>	Package Power Dissipation	SC59	mW
		DFN2020-3	
		DFN2020-6	
T <sub>J</sub>	Maximum Junction Temperature	+150	°C

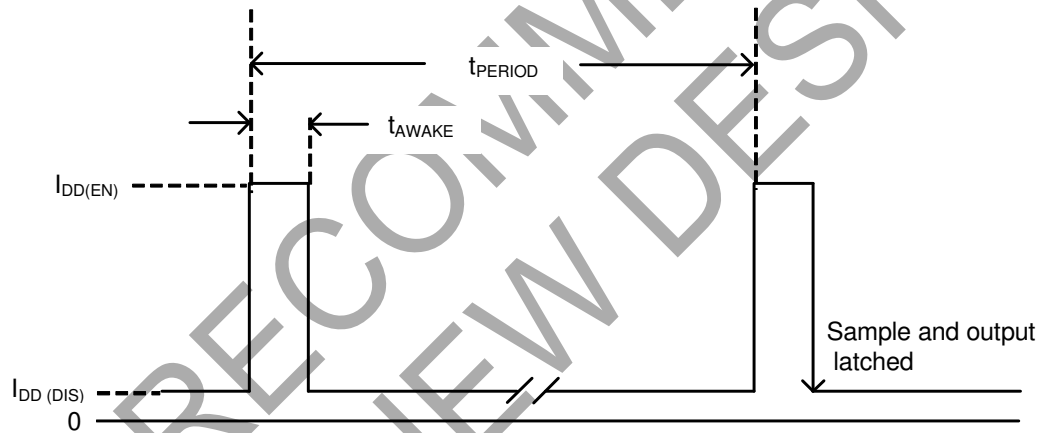
## Recommended Operating Conditions (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Symbol	Parameter	Conditions	Rating	Unit
V <sub>DD</sub>	Supply Voltage	Operating	2.5 to 5.5	V
T <sub>A</sub>	Operating Temperature Range	Operating	-40 to +85	°C

**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 3\text{V}$ , unless otherwise specified.)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{OUT}$	Output On Voltage	$I_{OUT} = 1\text{mA}$	-	0.1	0.3	V
$I_{OFF}$	Output Leakage Current	$V_{OUT} = 5.5\text{V}$ , Output off	-	<0.1	1	$\mu\text{A}$
$I_{DD(EN)}$	Supply Current	Chip enable, $T_A = +25^\circ\text{C}$ , $V_{DD} = 3\text{V}$	-	3	6	mA
		Chip enable, $T_A = -40$ to $+85^\circ\text{C}$ , $V_{DD} = 2.5\text{V}$ to $5.5\text{V}$	-	3	9	mA
$I_{DD(DIS)}$		Chip disable, $T_A = +25^\circ\text{C}$ , $V_{DD} = 3\text{V}$	-	5	10	$\mu\text{A}$
		Chip disable, $T_A = -40$ to $+85^\circ\text{C}$ , $V_{DD} = 2.5\text{V}$ to $5.5\text{V}$	-	5	18	$\mu\text{A}$
$I_{DD(AVG)}$		Average supply current, $T_A = +25^\circ\text{C}$ , $V_{DD} = 3\text{V}$	-	8	16	$\mu\text{A}$
	Average supply current, $T_A = -40$ to $+85^\circ\text{C}$ , $V_{DD} = 2.5$ to $5.5\text{V}$	-	8	27	$\mu\text{A}$	
$t_{AWAKE}$	Awake Time	(Note 5)	-	75	150	$\mu\text{s}$
$t_{PERIOD}$	Period	(Note 5)	-	75	150	ms
D.C.	Duty Cycle		-	0.1	-	%

Notes: 5. When power is initially on, the operating  $V_{DD}$  (2.5V to 5.5V) must be applied to be guaranteed for the output sampling. The output state is valid after the second operating phase (typical 150ms).

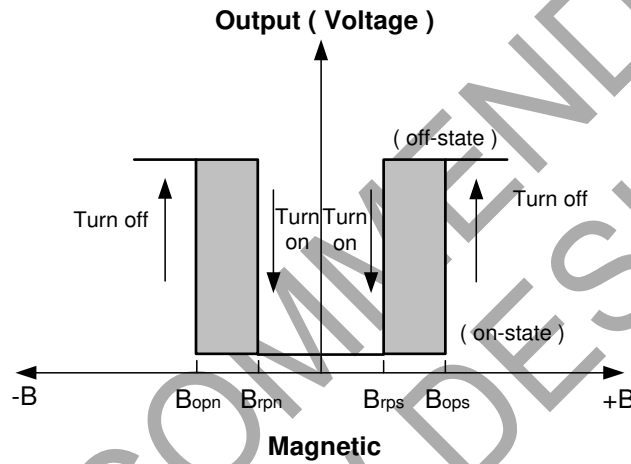


**Magnetic Characteristics** (@ $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 3\text{V}$ , unless otherwise specified.)

(1mT=10 Gauss)

Symbol	Characteristic	Min	Typ	Max	Unit
Bops(south pole to brand side)	Operate Point	-	40	60	Gauss
Bopn(north pole to brand side)		-60	-40	-	
Brps(south pole to brand side)	Release Point	10	30	-	
Brpn(north pole to brand side)		-	-30	-10	
Bhy( Bopx - Brpx )	Hysteresis	-	10	-	

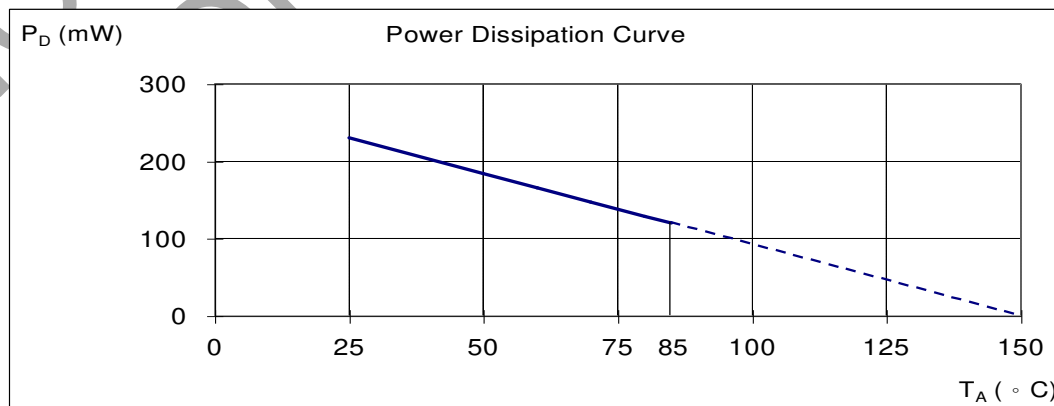
Notes: 6. Typical data is at  $T_A = +25^\circ\text{C}$ ,  $V_{DD} = 3\text{V}$ , and for design information only.  
7. Operate point and release point will vary with supply voltage and operating temperature.



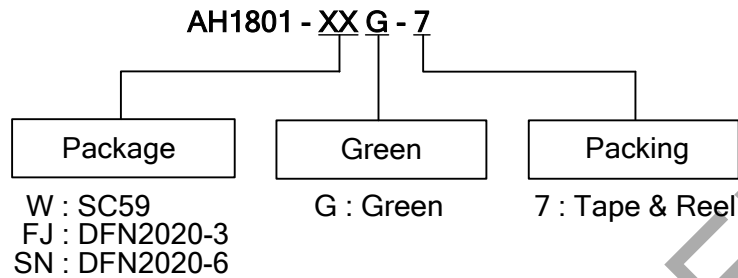
**Performance Characteristics**

(1) SC59 / DFN2020-3 / DFN2020-6

$T_A$ ( $^\circ\text{C}$ )	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



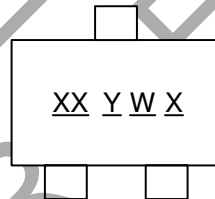
Part Number	Status (Note 9)	Package Code	Packaging (Note 8)	7" Tape and Reel	
				Quantity	Part Number Suffix
AH1801-WG-7	NRND	W	SC59	3000/Tape & Reel	-7
AH1801-FJG-7	NRND	FJ	DFN2020-3	3000/Tape & Reel	-7
AH1801-SNG-7	NRND	SN	DFN2020-6	3000/Tape & Reel	-7

Notes: 8. Pad layout as shown on Diodes Incorporated's suggested pad layout document, which can be found on our website at <http://www.diodes.com/package-outlines.html>.  
9. NRND = Not Recommended for New Design

## Marking Information

(1) SC59

( Top View )



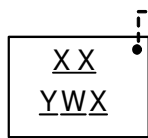
XX : Identification code  
 Y : Year 0~9  
 W : Week : A~Z : 1~26 week;  
 a~z : 27~52 week; z represents 52 and 53 week  
 X : A~Z : Green

Part Number	Package	Identification Code
AH1801	SC59	KB

## Marking Information (Cont.)

### (2) DFN2020-3

( Top View )



Pin 1 indicator

XX : Identification Code

Y : Year : 0~9

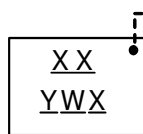
W : Week : A~Z : 1~26 week;  
 a~z : 27~52 week; z represents  
 52 and 53 week

X : A~Z : Green

Part Number	Package	Identification Code
AH1801	DFN2020-3	K1

### (3) DFN2020-6

( Top View )



Pin 1 indicator

XX : Identification Code

Y : Year : 0~9

W : Week : A~Z : 1~26 week;  
 a~z : 27~52 week; z represents  
 52 and 53 week

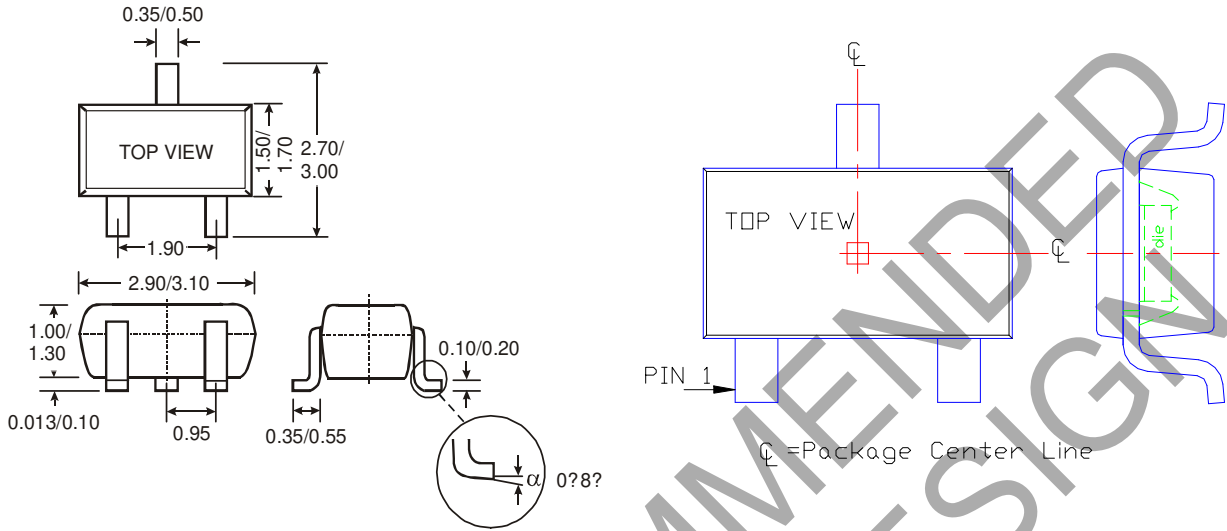
X : A~Z : Green

Part Number	Package	Identification Code
AH1801	DFN2020-6	KB

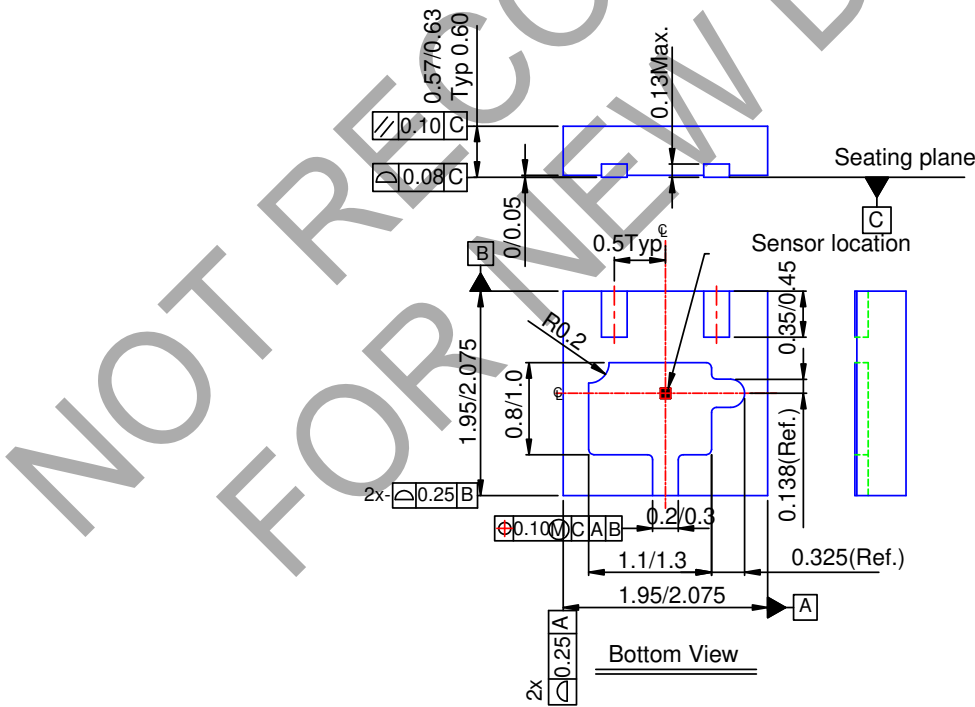
**Package Outline Dimensions** (All dimensions in mm.)

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

**(1) SC59 (Commonly Known as SOT23 in Asia)**



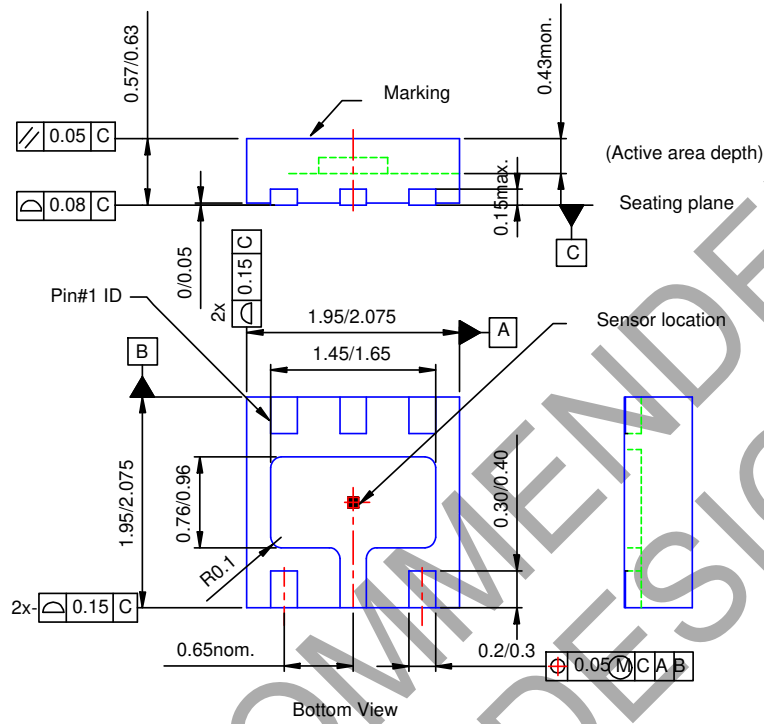
**(2) DFN2020-3**



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

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

**(3) DFN2020-6**

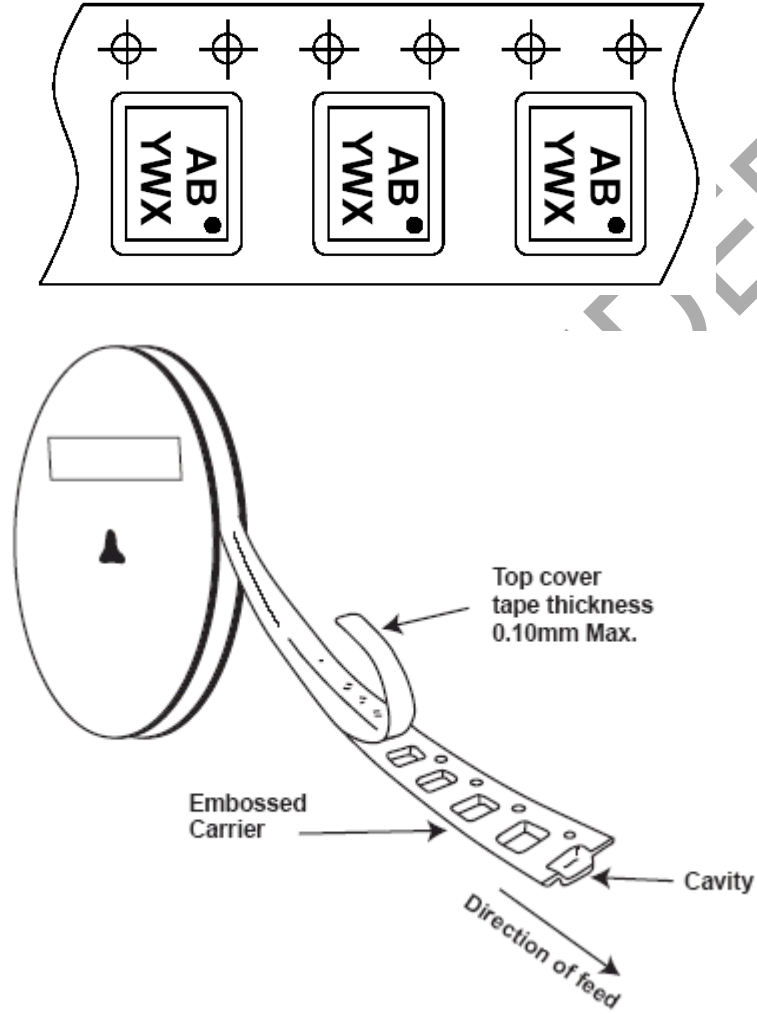


NOT RECOMMENDED FOR NEW DESIGN



## Taping Orientation

(1) DFN2020-3 and DFN2020-6



Notes: 10. 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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