AH1802

MICROPOWER, ULTRA-SENSITIVE OMNIPOLAR HALL-EFFECT SENSOR SWITCH

Features

- Micropower operation
- Operation with magnetic field of either north or south pole (omnipolar)
- 2.5V to 5.5V 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
- SC59/ Low profile DFN2020, DFN2015 packages
- ESD (HBM) > 5KV for DFN2020-6, DFN2020-3 and DFN2015H4-3
  > 6KV for SC59
- SC59 (commonly known as SOT23 in Asia), DFN2020-6, DFN2020-3 and DFN2015H4-3: Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 1)

General Description

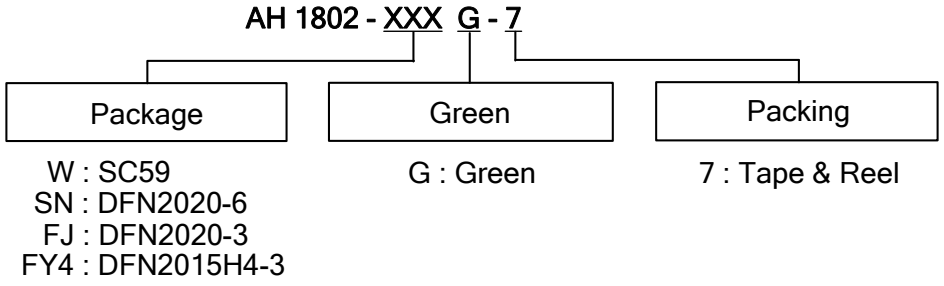
AH1802 is comprised of two Hall effect plates and an open-drain output driver, mainly designed for battery-operation, hand-held equipment (such as Cellular and Cordless Phone, PDA). The total power consumption in normal operation is typically 24μW with a 3V power source.

Either north or south pole of sufficient strength will turn the output on. The output will be turned off under no magnetic field. While the magnetic flux density **(B)** is larger than operating point **(Bop)**, the output will be turned on (low), the output is held until **B** is lower than release point **(Brp)**, then turned off.

Applications

- Cover switch in clam-shell cellular phones
- Cover switch in Notebook PC/PDA
- Contact-less switch in consumer products

Ordering Information



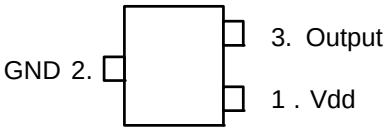
Device	Package Code	Packaging (Note 2)	7" Tape and Reel	
			Quantity	Part Number Suffix
AH1802-WG-7	W	SC59	3000/Tape & Reel	-7
AH1802-SNG-7	SN	DFN2020-6	3000/Tape & Reel	-7
AH1802-FJG-7	FJ	DFN2020-3	3000/Tape & Reel	-7
AH1802-FY4G-7	FY4	DFN2015H4-3	3000/Tape & Reel	-7

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied, see *EU Directive 2002/95/EC Annex Notes*.
2. 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.

Pin Assignments

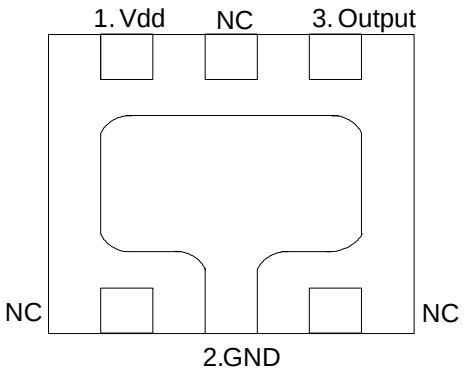
(1) SC59

(Top View)



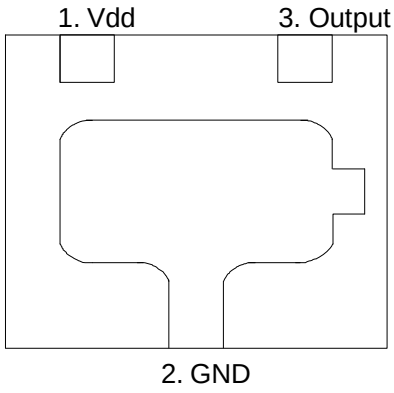
(2) DFN2020-6

(Bottom view)



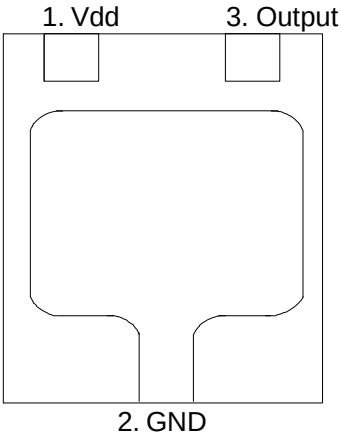
(3) DFN2020-3

(Bottom view)



(4) DFN2015H4-3

(Bottom view)

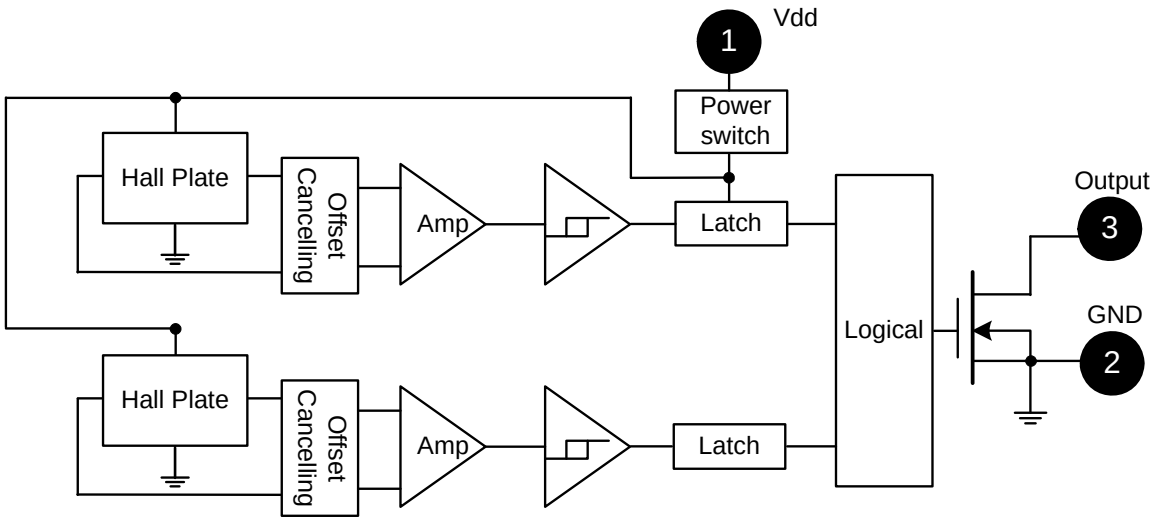


Notes: 3. NC is “No Connection” which is recommended to be tied to ground.

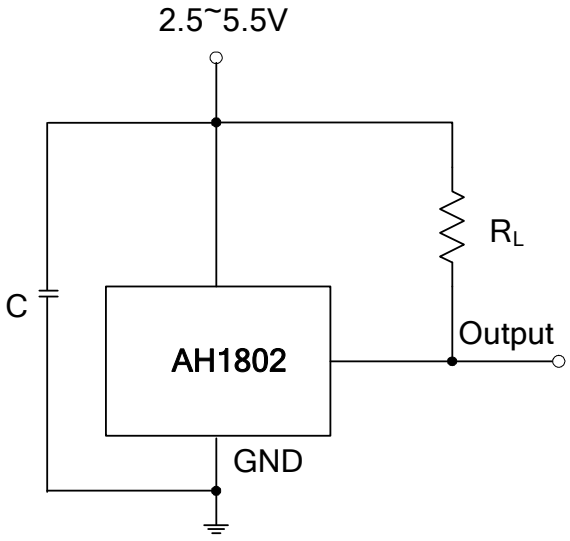
Pin Descriptions

Pin Name	P/I/O	Pin #	Description
Vdd	P/I	1	Power Supply Input
GND	P/I	2	Ground
Output	O	3	Output Pin

Block Diagram



Typical Circuit



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

Absolute Maximum Ratings (at T_A= 25°C)

Symbol	Characteristics	Values	Unit
Vdd	Supply voltage	7	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

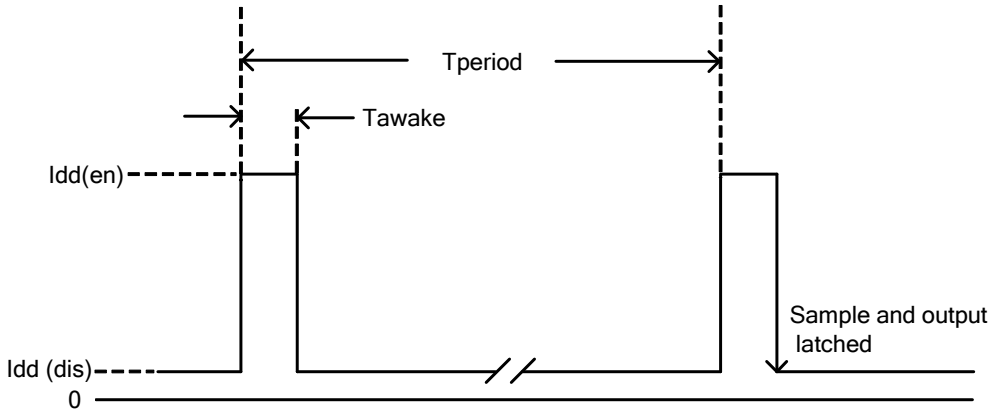
Recommended Operating Conditions (TA = 25°C)

Symbol	Parameter	Conditions	Rating	Unit
Vdd	Supply Voltage	Operating	2.5~5.5	V
T_A	Operating Temperature Range	Operating	-40 to +85	°C

Electrical Characteristics (TA = +25°C, Vdd = 3V; unless otherwise specified)

Symbol	Characteristic	Conditions	Min	Typ.	Max	Unit
Vout	Output On Voltage	Iout=1mA	-	0.1	0.3	V
Ioff	Output Leakage Current	Vout=5.5V, B < Brp	-	<0.1	1	µA
Idd(en)	Supply Current	Chip enable, T_A= 25°C, Vdd = 3V	-	3	6	mA
		Chip enable, T_A= -40~85°C, Vdd = 2.5~5.5V	-	3	10	mA
Idd(dis)		Chip disable, T_A= 25°C, Vdd = 3V	-	5	10	µA
		Chip disable, T_A= -40~85°C, Vdd = 2.5~5.5V	-	5	18	µA
Idd(avg)		Average supply current , T_A= 25°C, Vdd = 3V	-	8	16	µA
		Average supply current , T_A= -40~85°C, Vdd = 2.5~5.5V	-	8	23	µA
F_C	Chopping Frequency	For design information only	-	300	-	KHz
Tawake	Awake Time	(Note 5)	-	75	150	µs
Tperiod	Period	(Note 5)	-	75	150	ms
D.C.	Duty Cycle		-	0.1	-	%

Notes: 5. When power is initially on, the operating Vdd (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).

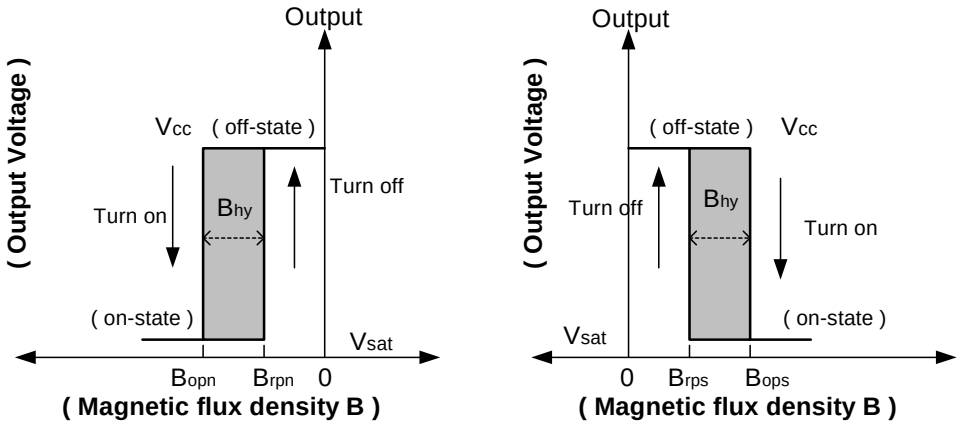


Magnetic Characteristics (TA=25°C, Vdd=3V, Note 6, 7)

(1mT=10 Gauss)

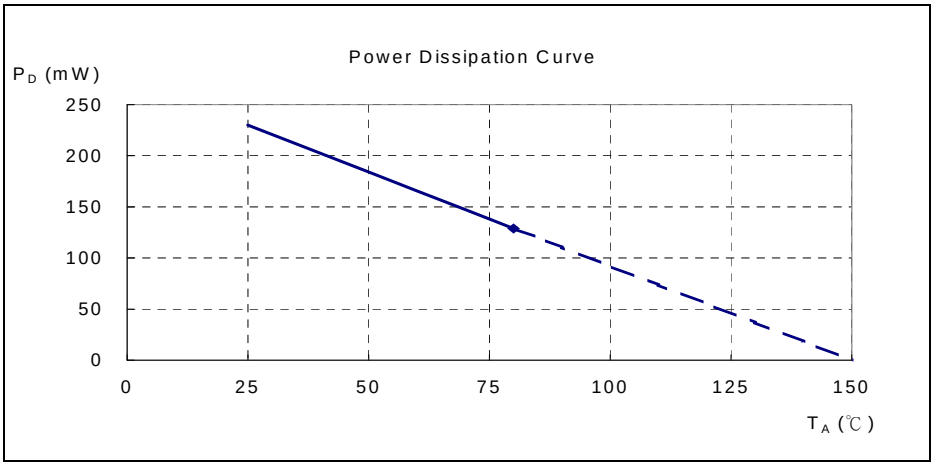
Symbol	Characteristic	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operate Point	20	28	40	Gauss
Bopn(north pole to brand side)		-40	-28	-20	
Brps(south pole to brand side)	Release Point	10	20	-	
Brpn(north pole to brand side)		-	-20	-10	
Bhy(|Bopx – Brpx|)	Hysteresis	5	8	-	

Notes: 6. Typical data is at T_A = 25°C, Vdd = 3V, and for design information only.
7. Operating point and release point will vary with supply voltage and operating temperature.



Performance Characteristics

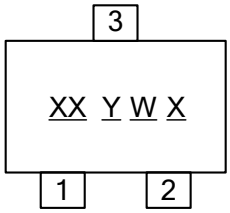
TA (°C)	25	50	60	70	80	85	90	100	110	120	130	140	150
PD (mW)	230	184	166	147	129	120	110	92	74	55	37	18	0



Marking Information

(1) SC59 (commonly known as SOT23 in Asia)

(Top View)

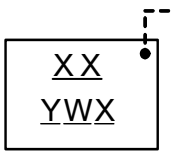


XX : Identification code
Y : Year 0~9
W : Week : a~z : 1~26 week;
A~Z : 27~52 week; Z represents
52 and 53 week
X : A~Z : Green

Part Number	Package	Identification Code
AH1802	SC59	KC

(2) DFN2020-6

(Top View)

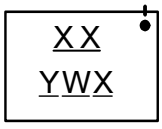


Pin 1 indicator
XX : Identification Code
Y : Year : 0~9
W : Week : a~z : 1~26 week;
A~Z : 27~52 week; Z represents
52 and 53 week
X : A~Z : Green

Part Number	Package	Identification Code
AH1802	DFN2020-6	KC

(3) DFN2020-3

(Top View)

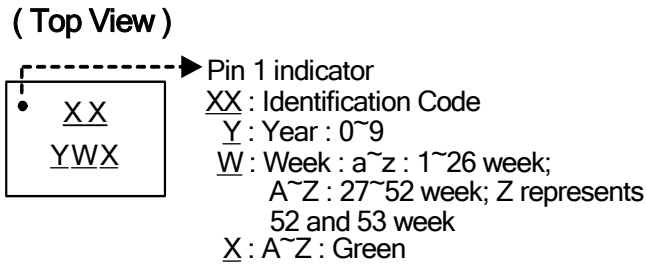


Pin 1 indicator
XX : Identification Code
Y : Year : 0~9
W : Week : a~z : 1~26 week;
A~Z : 27~52 week; Z represents
52 and 53 week
X : A~Z : Green

Part Number	Package	Identification Code
AH1802	DFN2020-3	KE

Marking Information (Continued)

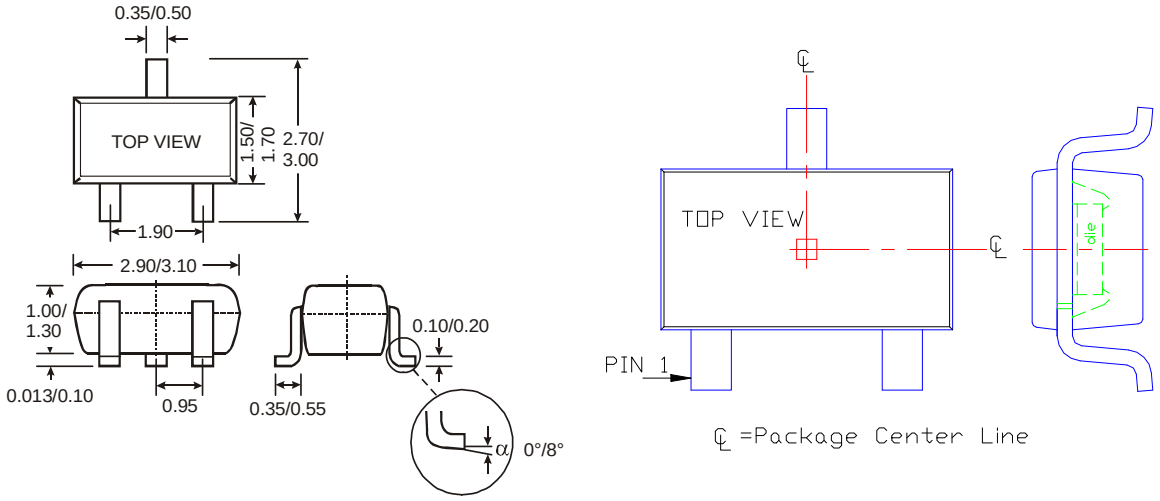
(4) DFN2015H4-3



Part Number	Package	Identification Code
AH1802	DFN2015H4-3	KF

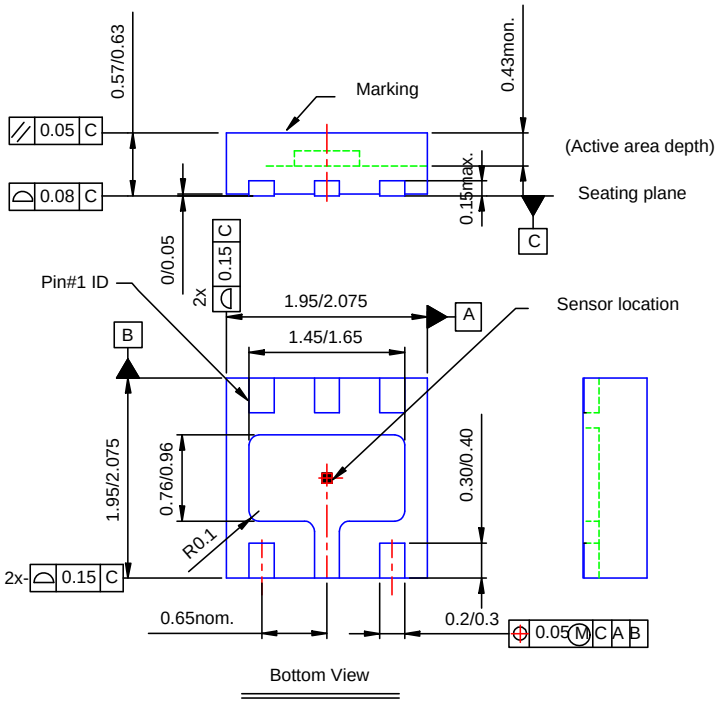
Package Information (All Dimensions in mm)

(1) Package type: SC59 (commonly known as SOT23 in Asia)

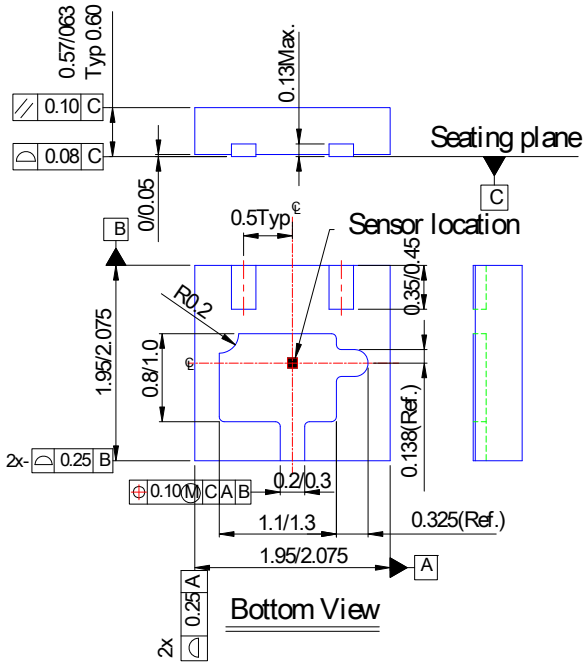


Package Information (Continued)

(2) Package type: DFN2020-6

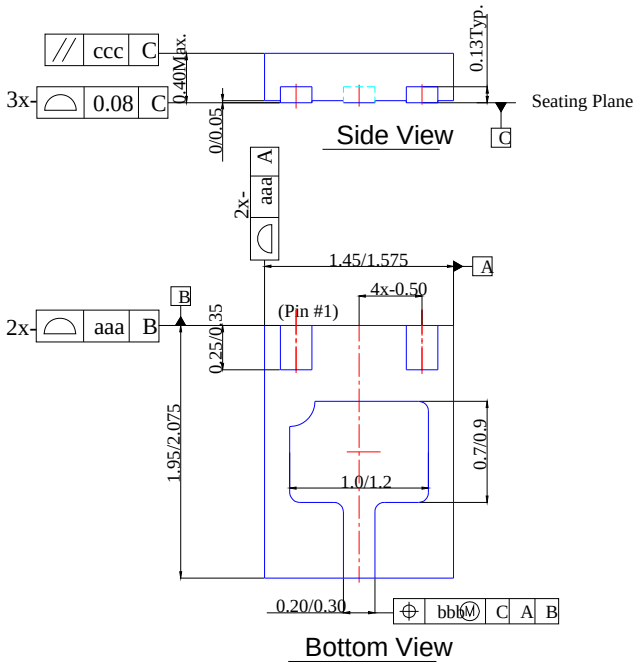


(3) Package type: DFN2020-3



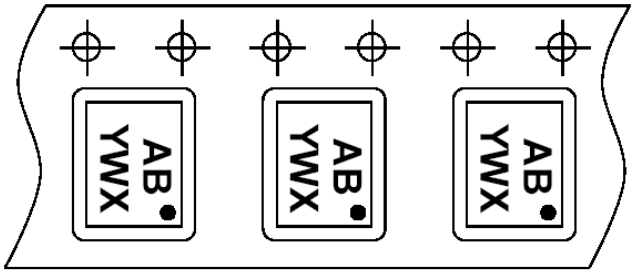
Package Information (Continued)

(4) Package type: DFN2015H4-3

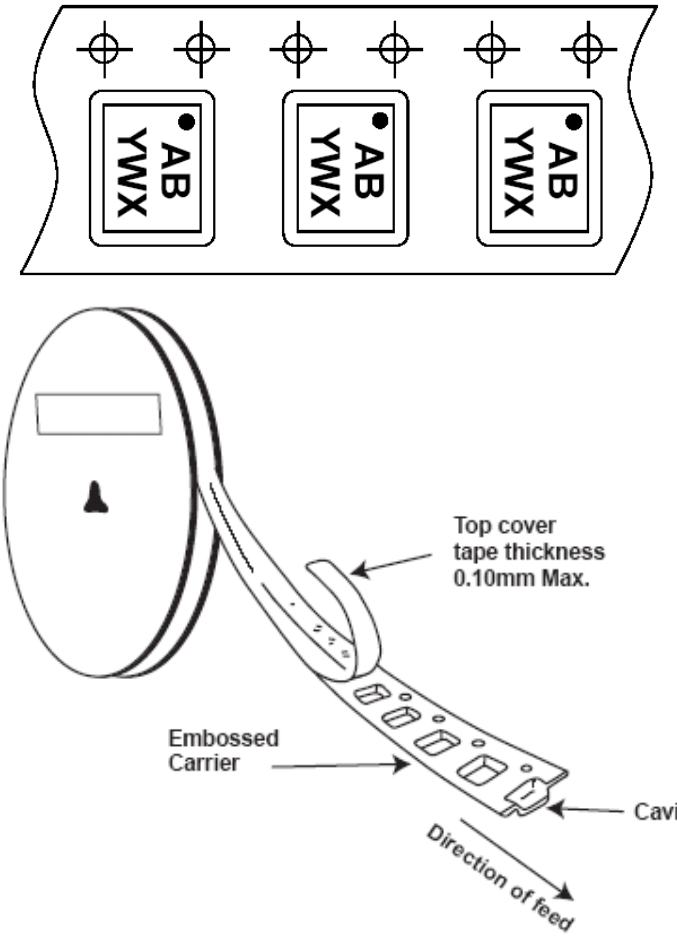


Taping Orientation

(1) DFN2020-6 and DFN2020-3



(2) DFN2015H4-3



Notes: 8. The taping orientation of the other package type can be found on our website at http://www.diodes.com/datasheets/ap02007.pdf.