AH1802

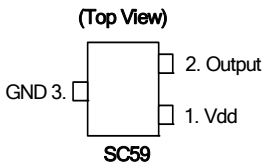
MICROPOWER, ULTRA-SENSITIVE OMNIPOLAR HALL-EFFECT SENSOR SWITCH

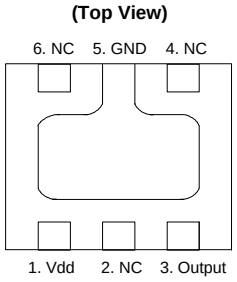
Description

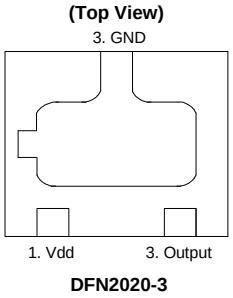
The AH1802 is a ultra-sensitivity, micropower Omnipolar Hall Effect switch IC designed for portable and battery powered equipment such as cellular phones, PDA's and portable PC's. Based on two sensitive Hall Effect plates and a chopper stabilized architecture the AH1802 provides a reliable solution over the whole operating range. To support portable and battery powered equipment the design has been optimized to operate over the supply range of 2.5V to 5.5V and consumes only 24uW with a supply of 3V.

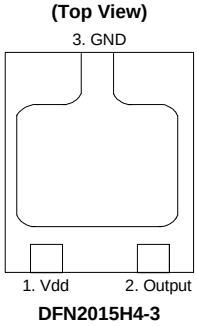
The single open drain output can switched on with either a north or south pole of sufficient strength. When the magnetic flux density (B) is larger than operate point (Bop) the output is switched on (pulled low). The output is turned off when B becomes lower than the release point (Brp). The output will remain off when there is no magnetic field.

Pin Assignments









Features

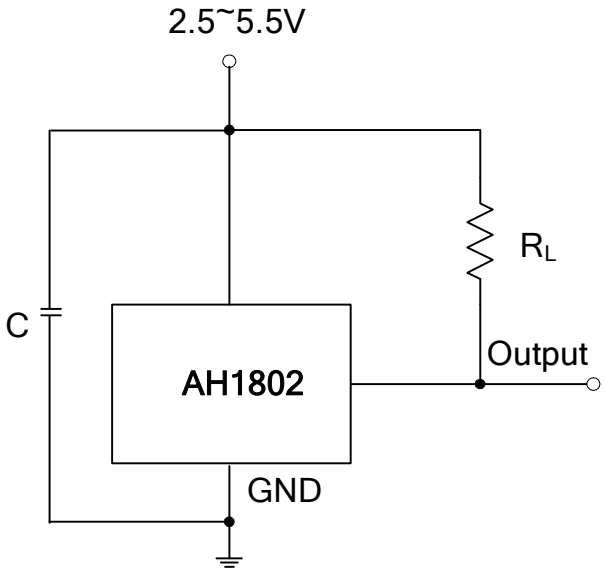
- Omni-polar (north or south pole) operation
- High sensitivity
- Single open drain output
- Micropower operation
- 2.5V to 5.5V operating range
- Chopper stabilized design provides
  - Superior temperature stability
  - Minimal switch point drift
  - Enhanced immunity to stress
- Good RF noise immunity
- -40°C to 85°C operating temperature
- ESD＞5kV for DFN2020-6, DFN2020-3 and DFN2015H4-3
  ESD＞6kV for SC59
- Low profile SC59, DFN2020-6, DFN2020-3 and DFN2015H4-3 packages
- "Green" Molding Compound (Note 1)

Applications

- Cover switch in clam-shell or slide type cellular phones
- Display switch for portable PCs
- On/Off switch for PDAs and digital cameras
- Contact-less switch in consumer products

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.

Typical Application Circuit

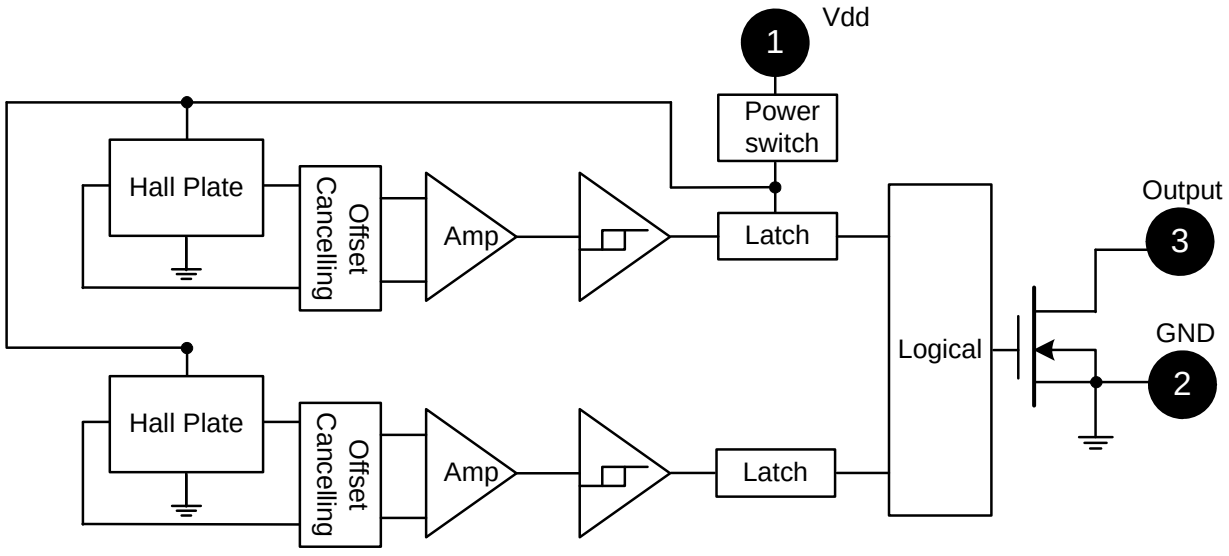


Pin Descriptions

Pin Name	P/I/O	Description
Vdd	P/I	Power Supply Input
GND	P/I	Ground
Output	O	Output Pin
NC		No connection (Note 2)

Notes: 2. NC is “No Connection”- recommendation is to connect the NC pin to ground externally.

Functional Block Diagram



Absolute Maximum Ratings (T_A = 25°C)

Symbol	Characteristics	Values	Unit
Vdd	Supply Voltage	7	V
B	Magnetic Flux Density	Unlimited	
Ts	Storage Temperature Range	-65 to +150	°C
P_D	Package Power Dissipation	230	mW
T_J	Maximum Junction Temperature	150	°C

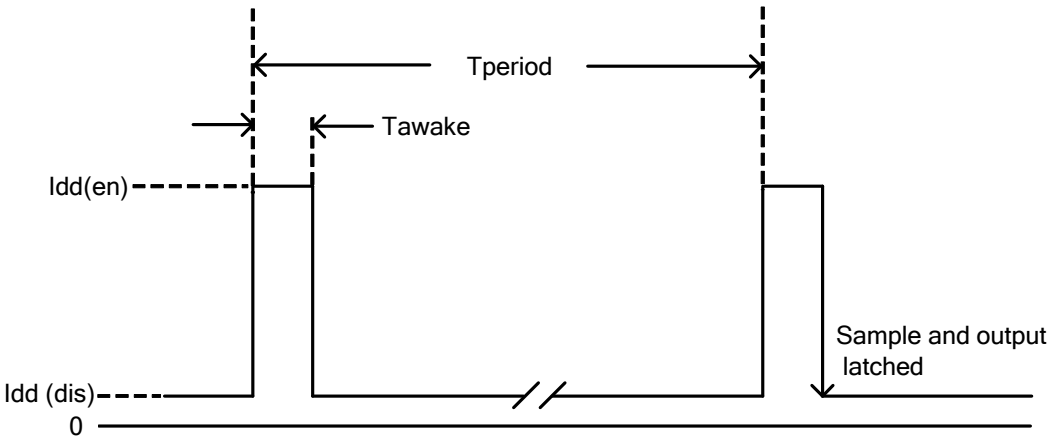
Recommended Operating Conditions (T_A = 25°C)

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

Electrical Characteristics (T_A = 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 3)	-	75	150	µs
Tperiod	Period	(Note 3)	-	75	150	ms
D.C.	Duty Cycle		-	0.1	-	%

Notes: 3. When power is initially turned on, Vdd must be within its correct operating range (2.5V to 5.5V) to guaranteed the output sampling. The output state is valid after the second operating cycle (typical 150ms).

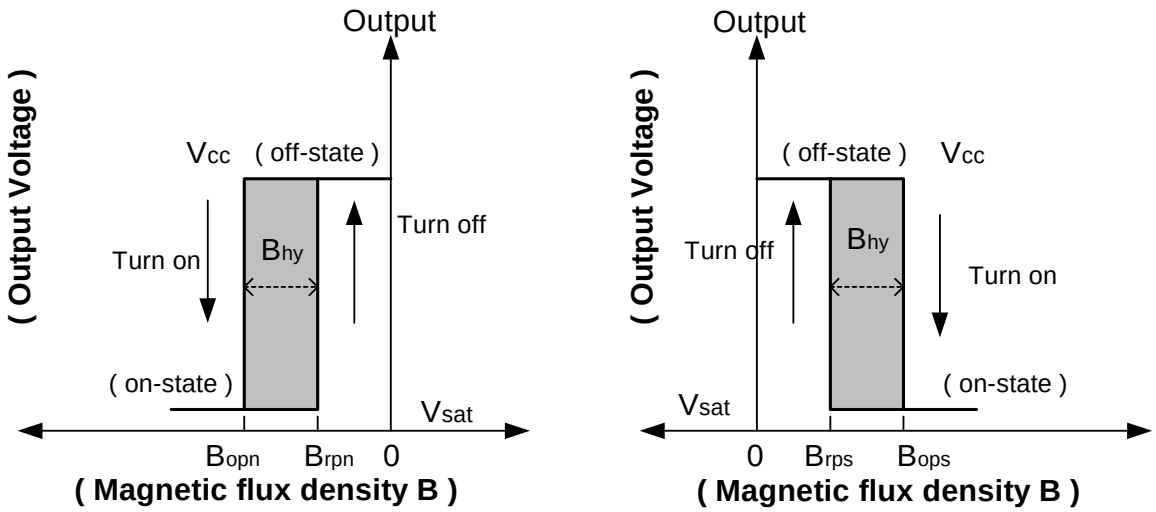


Magnetic Characteristics (T_A = 25°C, Vdd = 3V, Note 4 & 5)

(1mT=10 Gauss)

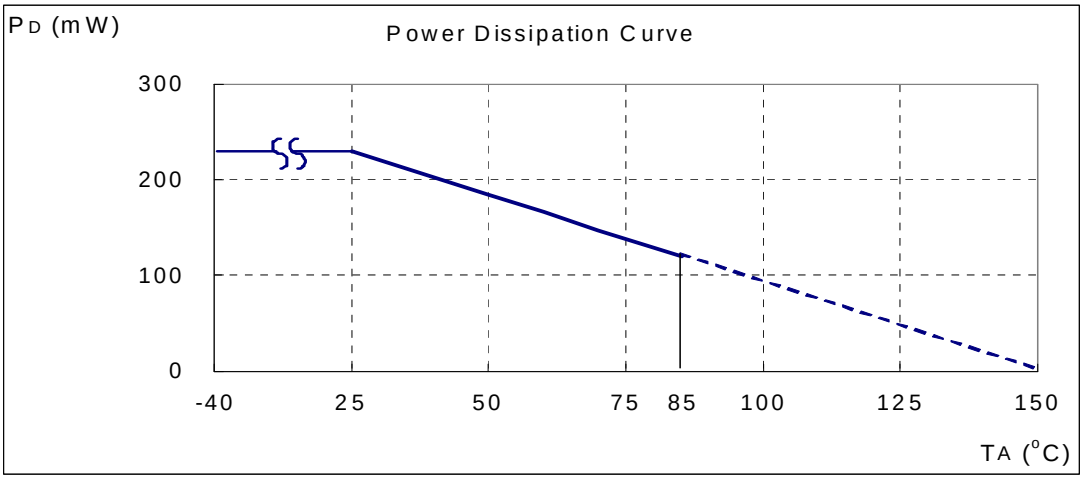
Symbol	Characteristic	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operate Point	20	28	40	Gauss
Bopn(north pole to brand side)		-40	-28	-20	
Brps(south pole to brand side)	Release Point	10	20	-	
Brpn(north pole to brand side)		-	-20	-10	
Bhy(|Bopx – Brpx|)	Hysteresis	5	8	-	

Notes: 4. Typical data is at T_A = 25°C, Vdd = 3V, and for design information only.
5. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.



Performance Characteristics

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

AH 1802 - XXX G – 7 - 01

Package	Green	Packing	Taping orientation
W : SC59 SN : DFN2020-6 FJ : DFN2020-3 FY4 : DFN2015H4-3	G : Green	7 : Tape & Reel	01: 180° rotation Note 8

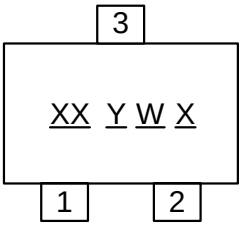
Device	Package Code	Packaging (Note 6 & 7)	7" Tape and Reel	
			Quantity	Part Number Suffix
AH1802-WG-7	W	SC59	3000/Tape & Reel	-7
AH1802-SNG-7	SN	DFN2020-6	3000/Tape & Reel	-7
AH1802-FJG-7	FJ	DFN2020-3	3000/Tape & Reel	-7
AH1802-FJG-7-01 (Note 8)	FJ	DFN2020-3	3000/Tape & Reel	-7
AH1802-FY4G-7	FY4	DFN2015H4-3	3000/Tape & Reel	-7

Notes:
6. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
7. 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.
8. AH1802-FJG-7-01 DFN2020-3 package taping orientation is rotated by 180° compared to standard part AH1802-FJG-7. See package orientation diagrams on page 10.

Marking Information

(1) SC59

(Top View)

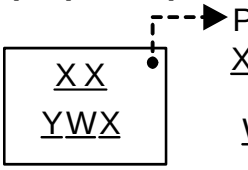


XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Green

Part Number	Package	Identification Code
AH1802	SC59	KC

(2) DFN2020-6

(Top View)

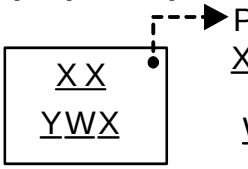


Pin 1 indicator
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Green

Part Number	Package	Identification Code
AH1802	DFN2020-6	KC

(3) DFN2020-3

(Top View)



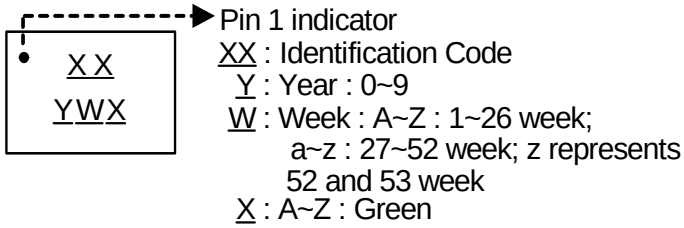
Pin 1 indicator
XX : Identification Code
Y : Year : 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents
52 and 53 week
X : A~Z : Green

Part Number	Package	Identification Code
AH1802	DFN2020-3	KE

Marking Information (Continued)

(4) DFN2015H4-3

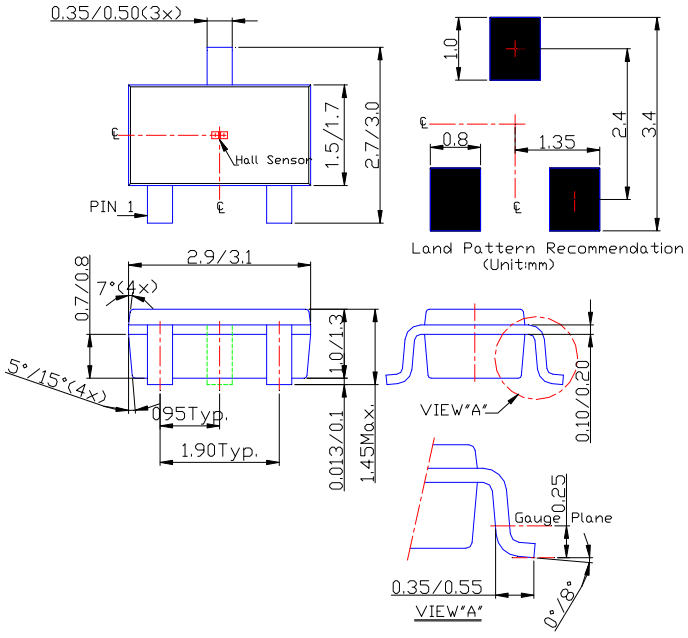
(Top View)



Part Number	Package	Identification Code
AH1802	DFN2015H4-3	KF

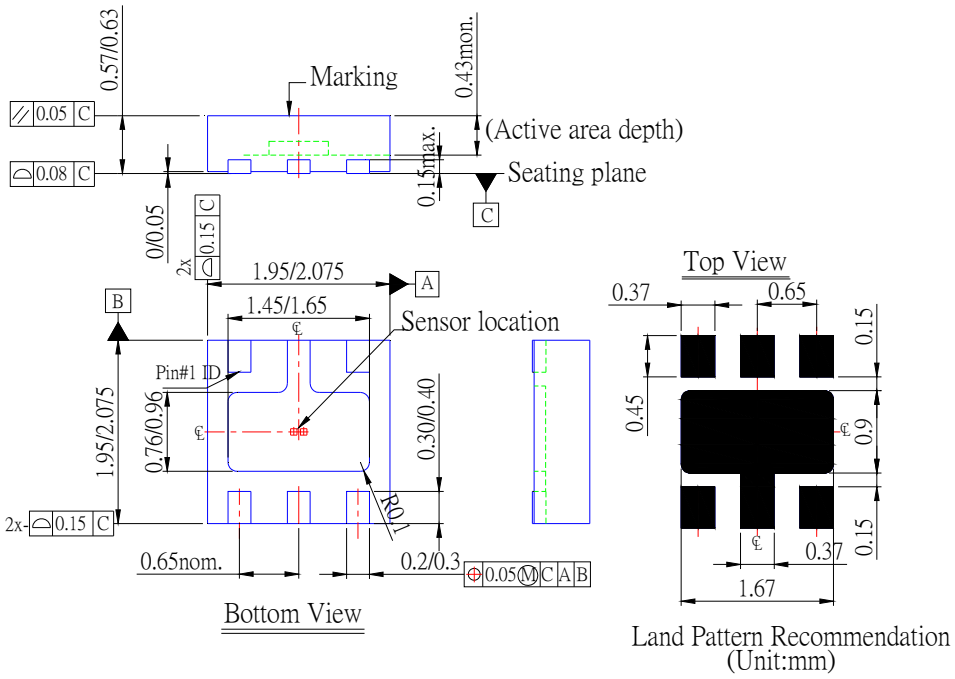
Package Outline Dimensions (All Dimensions in mm)

(1) Package Type: SC59

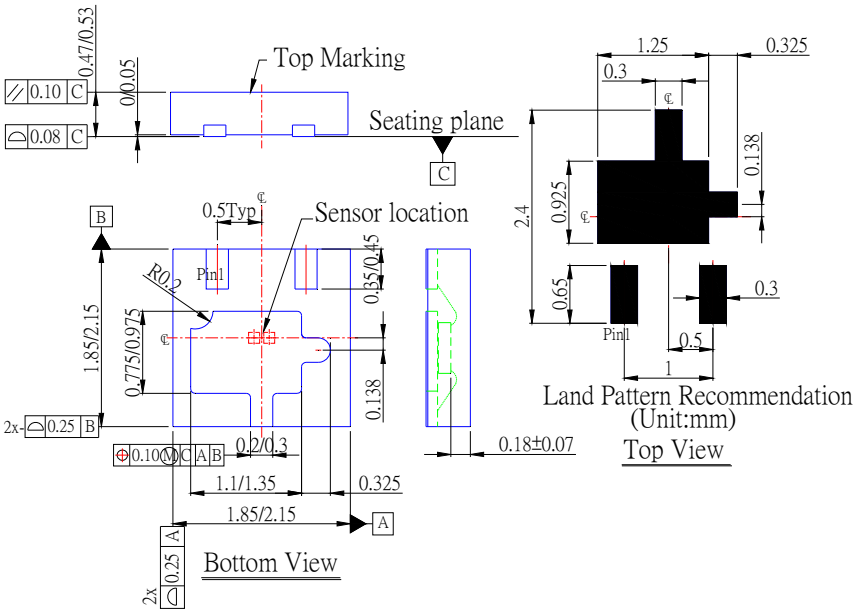


Package Outline Dimensions (Continued)

(2) Package Type: DFN2020-6

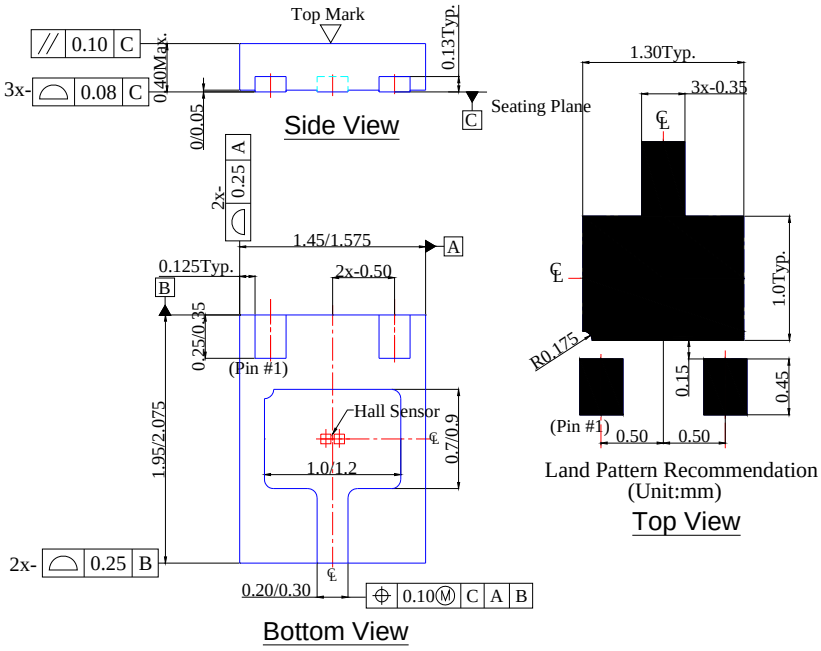


(3) Package type: DFN2020-3



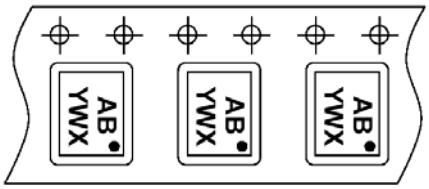
Package Outline Dimensions (Continued)

(4) Package type: DFN2015H4-3

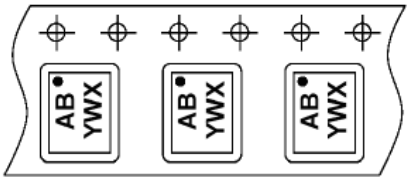


Taping Orientation

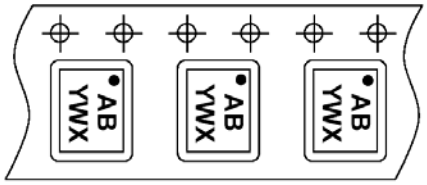
(1) DFN2020-6 and DFN2020-3 with standard taping orientation

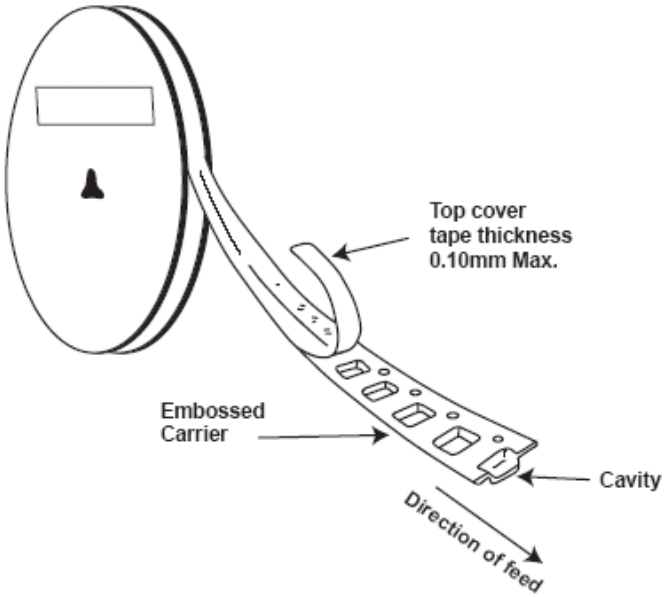


(2) DFN2020-3 with 180° rotation from standard taping orientation



(3) DFN2015H4-3





Notes: 9. 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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