

## Description

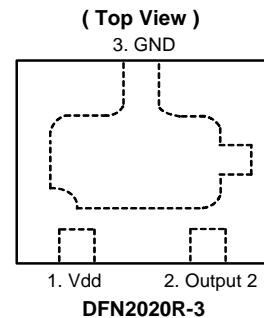
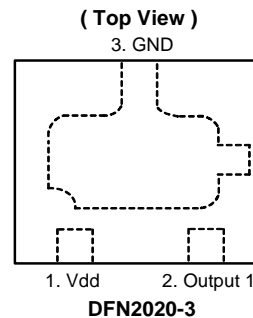
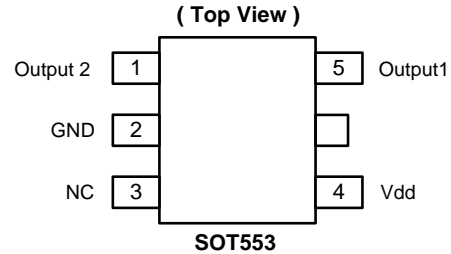
The AH1888 micro power Omni-polar Hall Effect switch IC designed for portable and battery powered equipment such as cellular phones, PDA' s and portable PC' s. Based on two sensitive Hall Effect plates and chopper stabilized architecture the AH1888 provides a reliable solution over the whole operating range. To support portable and battery powered equipment the design has been optimized to operate over the supply range of 1.65V to 3.3V and consumes only 12.6uW with a supply of 1.8V.

The outputs are switched 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. 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. The AH1888-ZG has two outputs, output one pulls low when switched on and output two is inverted. The AH1888-FJG provides output one and AH1888-FJRG provides output two.

## Features

- Omni-polar (north or south pole) operation
- Single or dual output options
- Internal output pull up capability
- Micropower operation
- 1.65V to 3.3V 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 (HBM) >4KV for SOT553
- ESD (HBM) >5KV for DFN2020-3 and DFN2020R-3
- Package: SOT553, DFN2020-3 and DFN2020R-3
- "Green" Molding Compound

## Pin Assignments

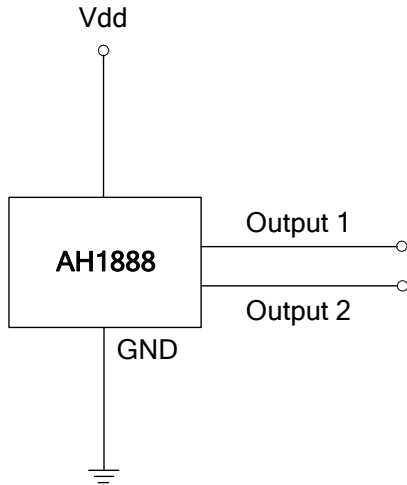


## Applications

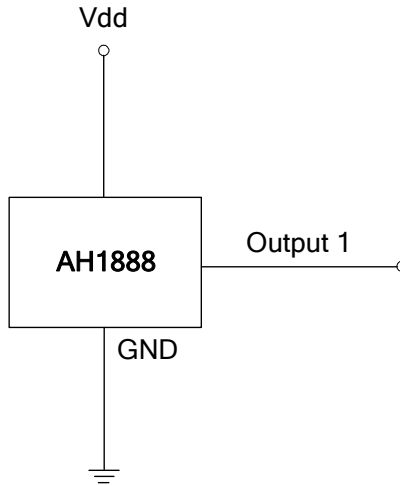
- Cellular phone
- Portable PC and PDAs
- Camcorders
- Cordless phone
- Contactless switch in consumer products

## Typical Application Circuit

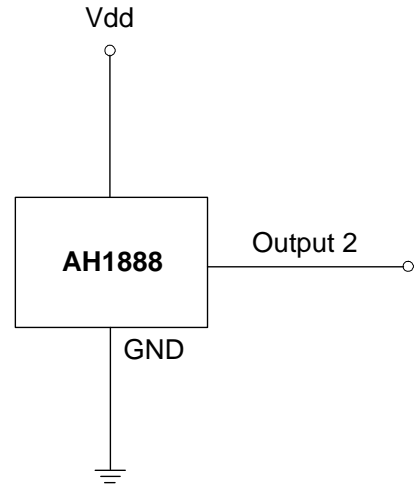
(1) SOT553



(2) DFN2020-3



(3) DFN2020R-3

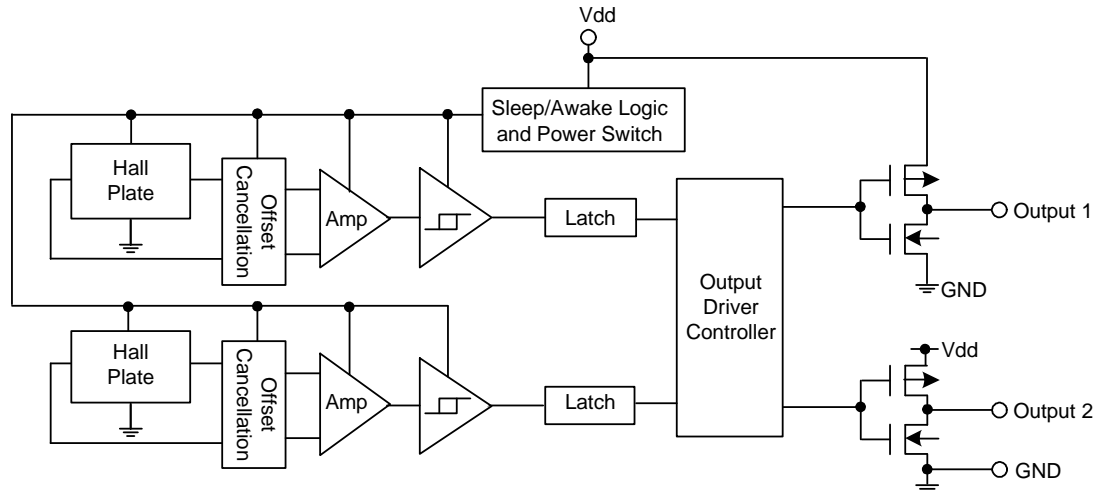


## Pin Descriptions

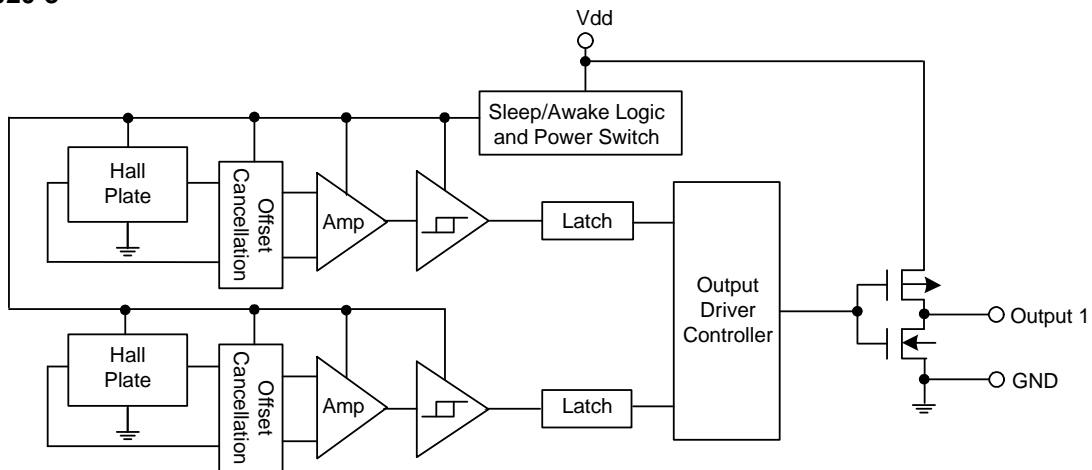
Pin Name	P/I/O	Description
Vdd	P/I	Power Supply Voltage
GND	P/I	Ground
Output 1	O	Output Pin ( Active Low )
Output 2	O	Output Pin ( Active High )

## Functional Block Diagram

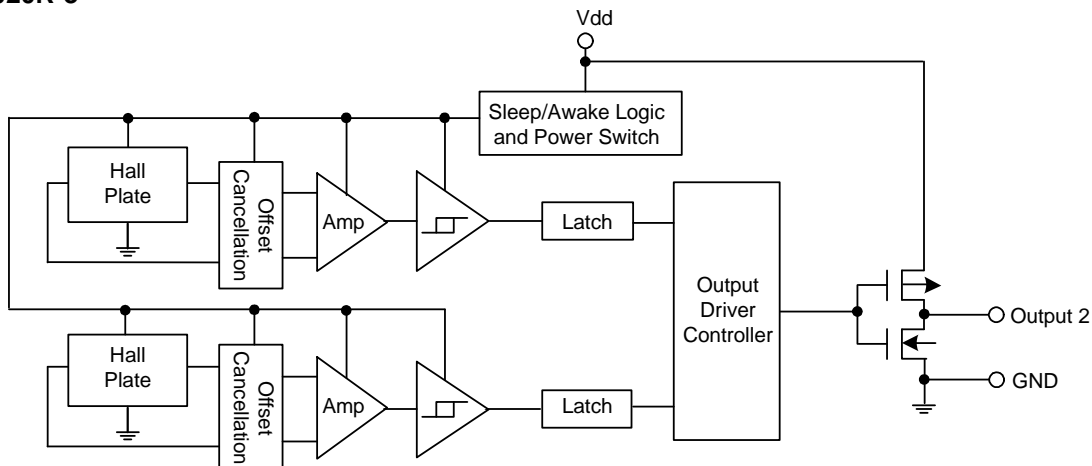
### (1) SOT553



### (2) DFN2020-3



### (3) DFN2020R-3



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

Symbol	Characteristics	Values	Unit
V <sub>DD</sub>	Supply voltage	5	V
B	Magnetic flux density	Unlimited	
T <sub>S</sub>	Storage Temperature Range	-65 to +150	°C
P <sub>D</sub>	Package Power Dissipation	230	mW
T <sub>J</sub>	Maximum Junction Temperature	150	°C

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

Symbol	Characteristic	Conditions	Rating	Unit
V <sub>DD</sub>	Supply Voltage	Operating	1.65 to 3.3	V
T <sub>A</sub>	Operating Temperature Range	Operating	-40 to +85	°C

### Electrical Characteristics ( $T_A = 25^\circ\text{C}$ , V<sub>DD</sub> = 1.8V, unless otherwise specified)

Symbol	Characteristic	Conditions	Min	Typ.	Max	Unit
V <sub>OH</sub>	Output On Voltage (High side)	I <sub>O</sub> = -0.5mA	V <sub>DD</sub> -0.2	-	-	V
V <sub>OL</sub>	Output On Voltage (Low side)	I <sub>O</sub> = 0.5mA	-	-	0.2	V
I <sub>DD</sub> (en)	Supply Current	Chip enable	-	2	4	mA
I <sub>DD</sub> (dis)		Chip disable	-	5	8	uA
I <sub>DD</sub> (avg)		Average supply current	-	7	12	uA
T <sub>awake</sub>	Awake Time	(Note 1)	-	50	100	μs
T <sub>period</sub>	Period	(Note 1)	-	50	100	ms
D.C.	Duty Cycle		-	0.1	-	%

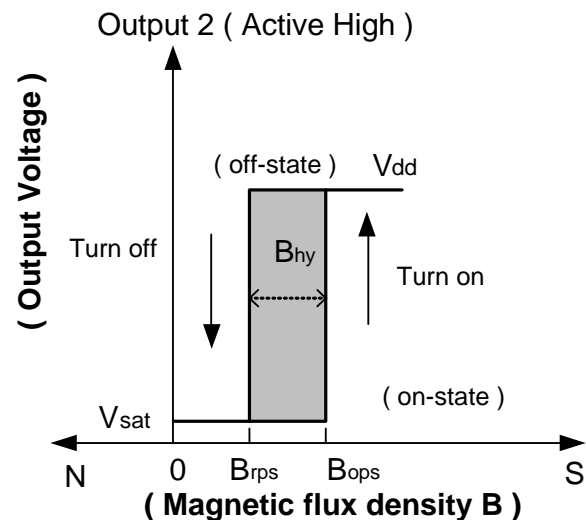
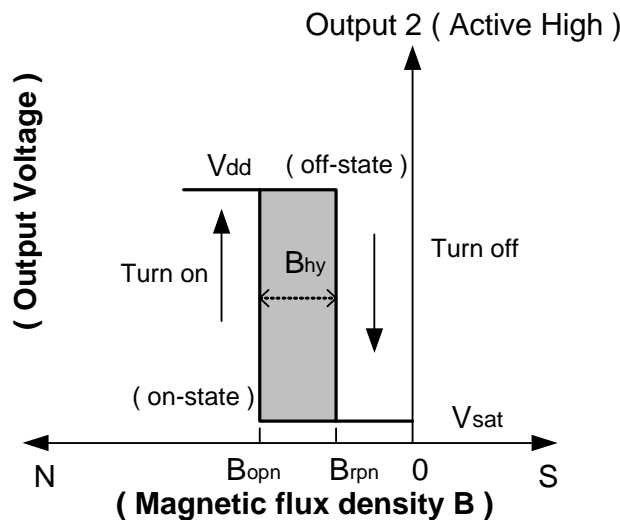
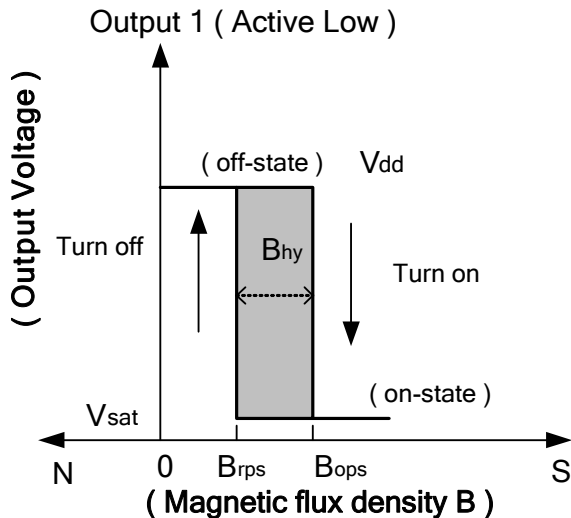
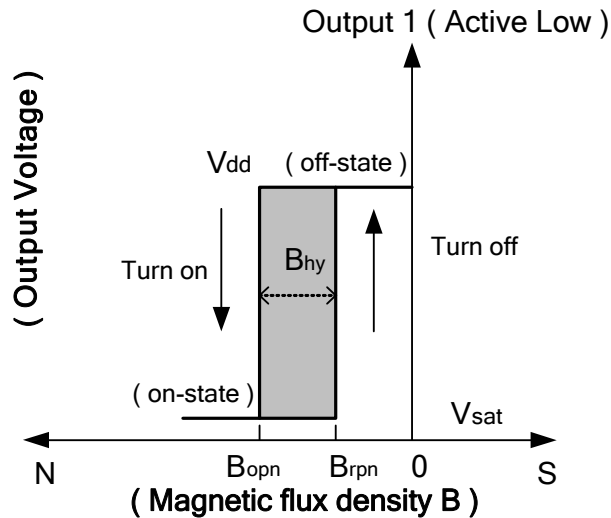
Notes: 1. When power is initially turned on, V<sub>DD</sub> must be within its correct operating range (1.65V to 3.3V) to guarantee the output sampling. The output state is valid after the second operating cycle (typical 100ms).

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

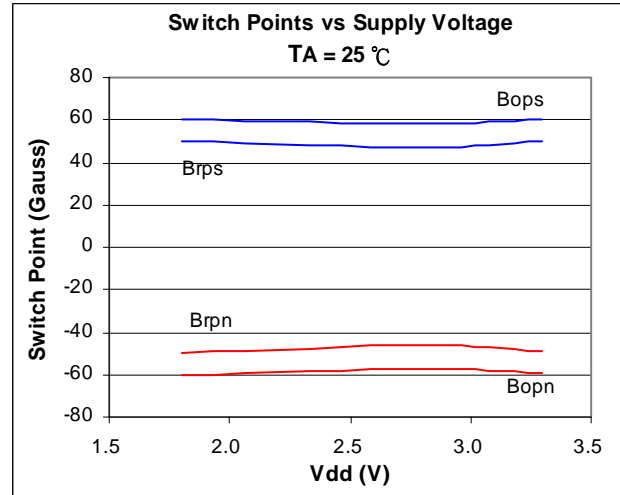
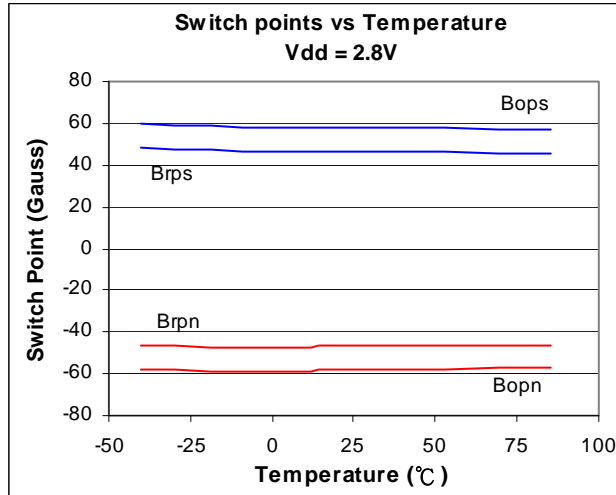
(1mT=10 Gauss)

Symbol	Characteristic	Min	Typ.	Max	Unit
Bops(south pole to brand side)	Operate Point	-	61	79	Gauss
Bopn(north pole to brand side)		-79	-61	-	
Brps(south pole to brand side)	Release Point	35	53	-	
Brpn(north pole to brand side)		-	-53	-35	
$B_{hy}( B_{opx}  -  B_{rpx} )$	Hysteresis	3	8	-	

Notes: 2. Typical data is at  $V_{dd} = 3\text{V}$ .  
3. The magnetic characteristics may vary with supply voltage, operating temperature and after soldering.



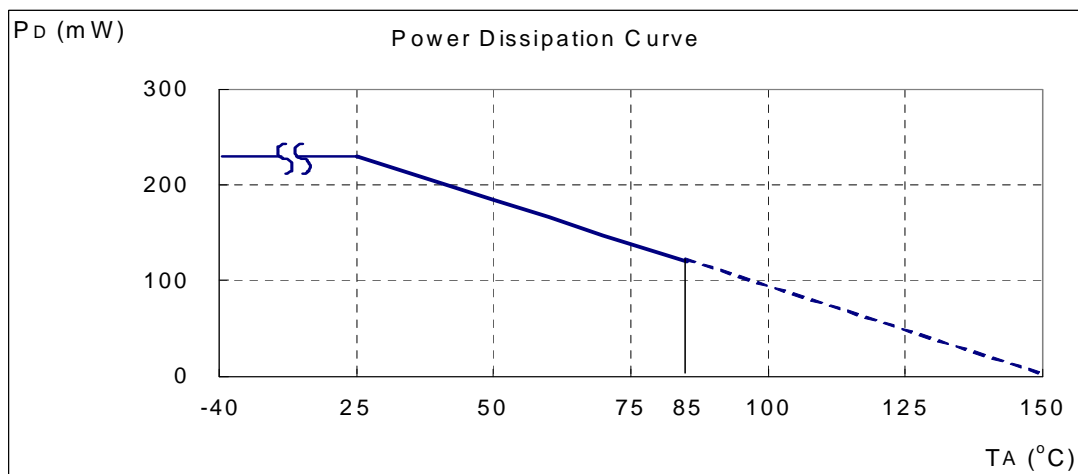
## Typical Characteristics



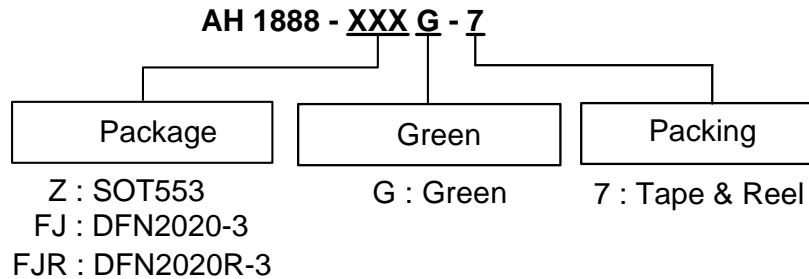
## Performance Characteristics




For SOT553, DFN2020-3 and DFN3030R-3

T <sub>A</sub> (°C)	25	50	60	70	80	85	90	100	110	120	130	140	150
P <sub>D</sub> (mW)	230	184	166	147	129	120	110	92	74	55	37	18	0



## Ordering Information



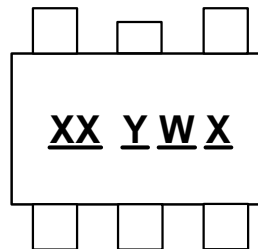
	Device	Package Code	Packaging (Note 4 & 5)	7" Tape and Reel	
				Quantity	Part Number Suffix
	AH1888-ZG-7	Z	SOT553	3000/Tape & Reel	-7
	AH1888-FJG-7	FJ	DFN2020-3	3000/Tape & Reel	-7
	AH1888-FJRG-7	FJR	DFN2020R-3	3000/Tape & Reel	-7

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](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

#### ( Top View )

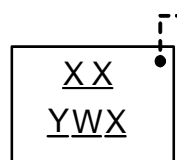


XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
           a~z : 27~52 week;  
           z represents 52 and 53 week  
X : A~Z : Green

Part Number	Package	Identification Code
AH1888	SOT553	KV

### (2) DFN2020-3 and DFN2020R-3

#### ( Top View )



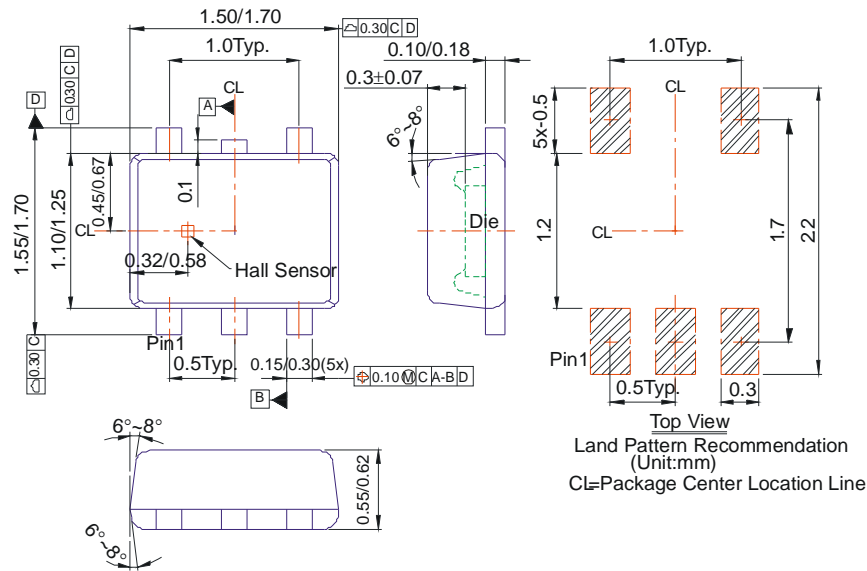
Pin 1 indicator  
XX : Identification Code  
Y : Year : 0~9  
W : Week : A~Z : 1~26 week;  
           a~z : 27~52 week;  
           z represents 52 and 53 week  
X : A~Z : Green

Part Number	Package	Identification Code
AH1888	DFN2020-3	KV
AH1888	DFN2020R-3	KW

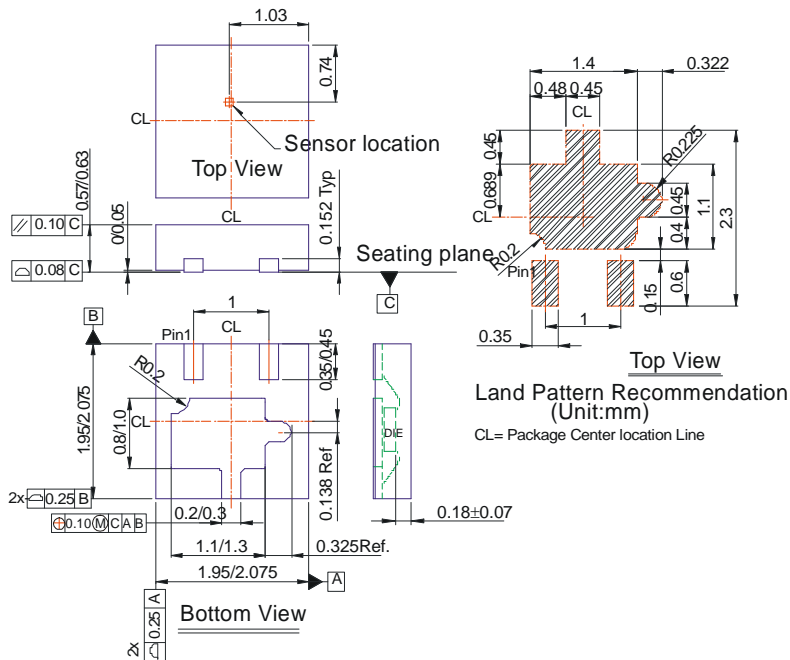


### Package Outline Dimensions (All Dimensions in mm)

**(1) Package Type: SOT553**



**(2) Package Type: DFN2020-3 and DFN2020R-3**

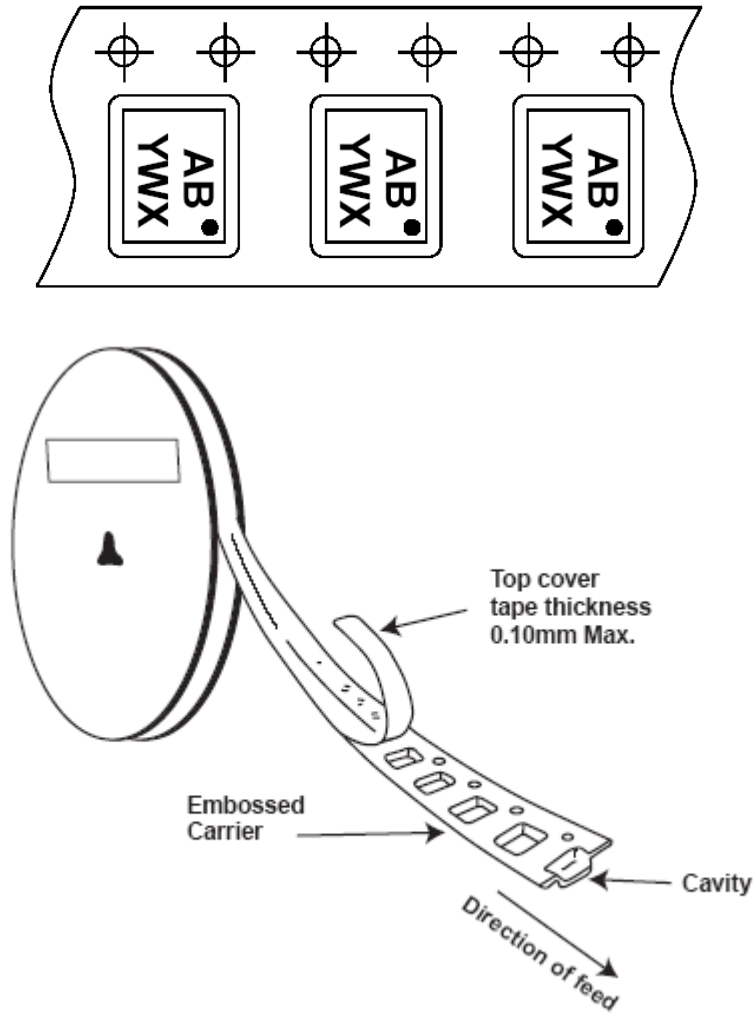


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**Taping Orientation (Note 6)**

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For DFN2020-3 and DFN2020R-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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