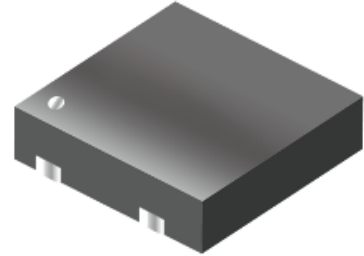


# KTM1304

## Omnipolar Switching Sensor with CMOS output interface

The KTM1304 is an Omnipolar magnetic switch integrated with Tunneling Magnetoresistance (TMR) technology and CMOS process for use in industrial and consumer switch applications. The IC internally includes a TMR bridge, a voltage regulator for operation with supply voltage from 1.8V to 5.5V, digital logic control module, threshold adjustment module, Schmitt trigger and a push-pull output. If the magnetic flux density parallel to the part marking surface is larger than operating point (BOP), the output will be turned on; if it is less than releasing point (BRP), the output will be turned off.

The KTM1304 family provides a variety of package to customers: DFN2x2-3L for surface mount .



### Absolute Maximum Ratings

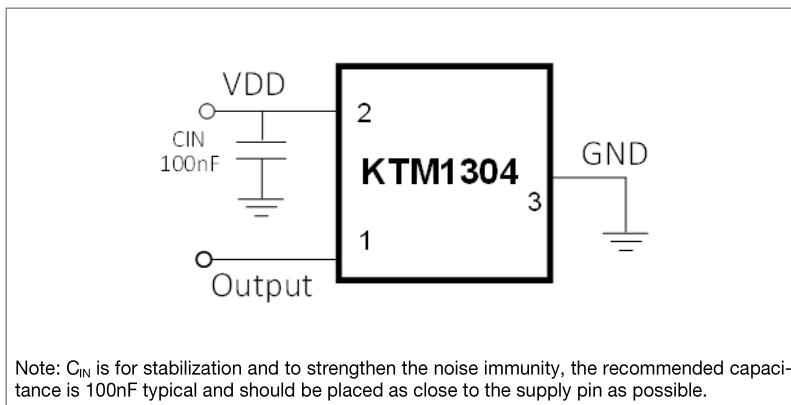
In accordance with the absolute maximum rating system (IEC60134).

Symbol	Parameter	Min.	Max.	Unit
V <sub>CC</sub>	Supply voltage	-0.3	6.0	V
I <sub>Output</sub>	Output drive current	-	5	mA
B	Withstand magnetic field <5 min	-	3000	G
T <sub>junction</sub>	Maximum junction temperature	-	+150	°C
T <sub>stg(others)</sub>	Storage temperature	-50	+150	°C
T <sub>working</sub>	Working temperature	-40	+125	°C
T <sub>reflow</sub>	Reflow soldering temperature	-	+260	°C
ESD <sub>HBM</sub>	Human body model ESD	-	8000	V

Stresses beyond those listed under "Absolute maximum ratings" may cause permanent damage to the device.

This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

### Application circuit schematic



### Features

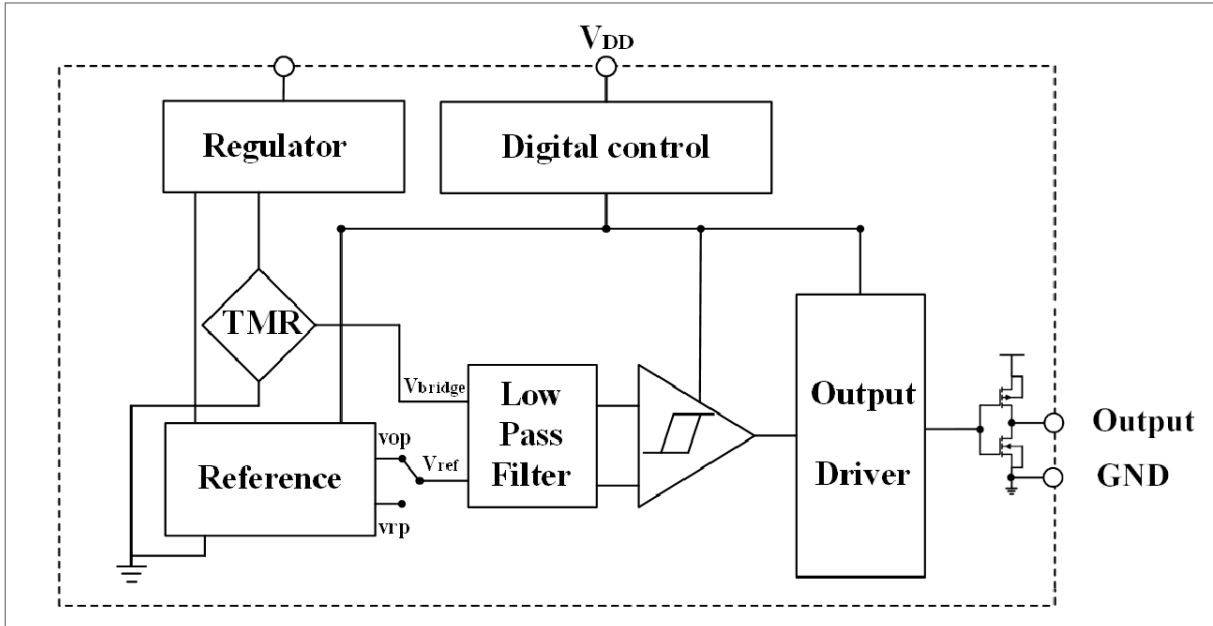
- TMR+CMOS Monolithic Structure
- Ultra low power consumption
- Wide operating voltage range
- Selectable Magnetic Field Threshold
- Magnetic Type: Omni-polar
- CMOS output interface
- Operation temperature range from -40°C to +125°C
- Excellent ESD performance

### Application

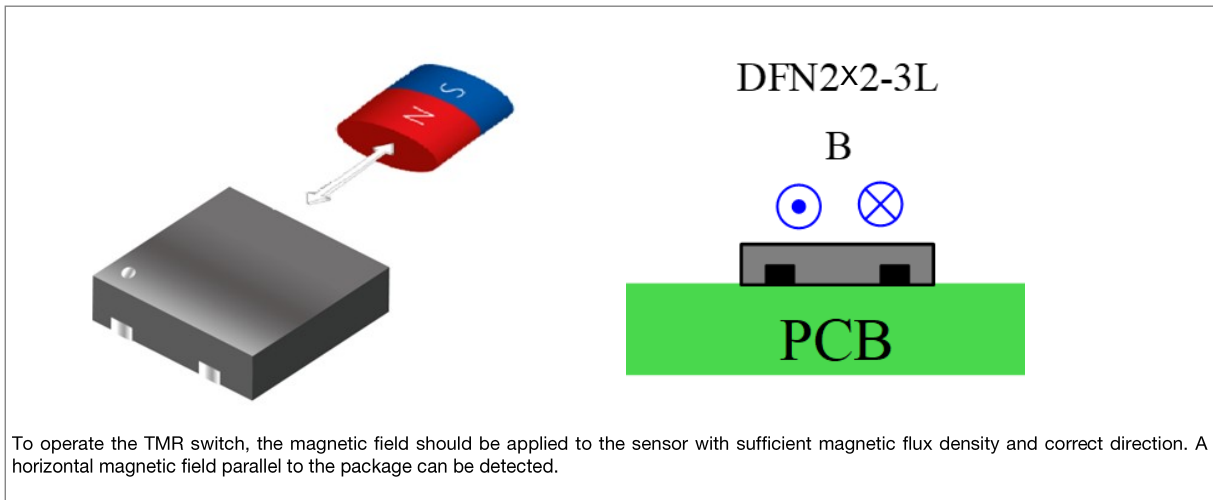
- Water meter, gas meter, flow meter
- non-contact detection
- Electronic lock, valve position detection
- Laptop and Tablet Switch Detection
- TWS headset, mobile phone



**Functional block diagram**

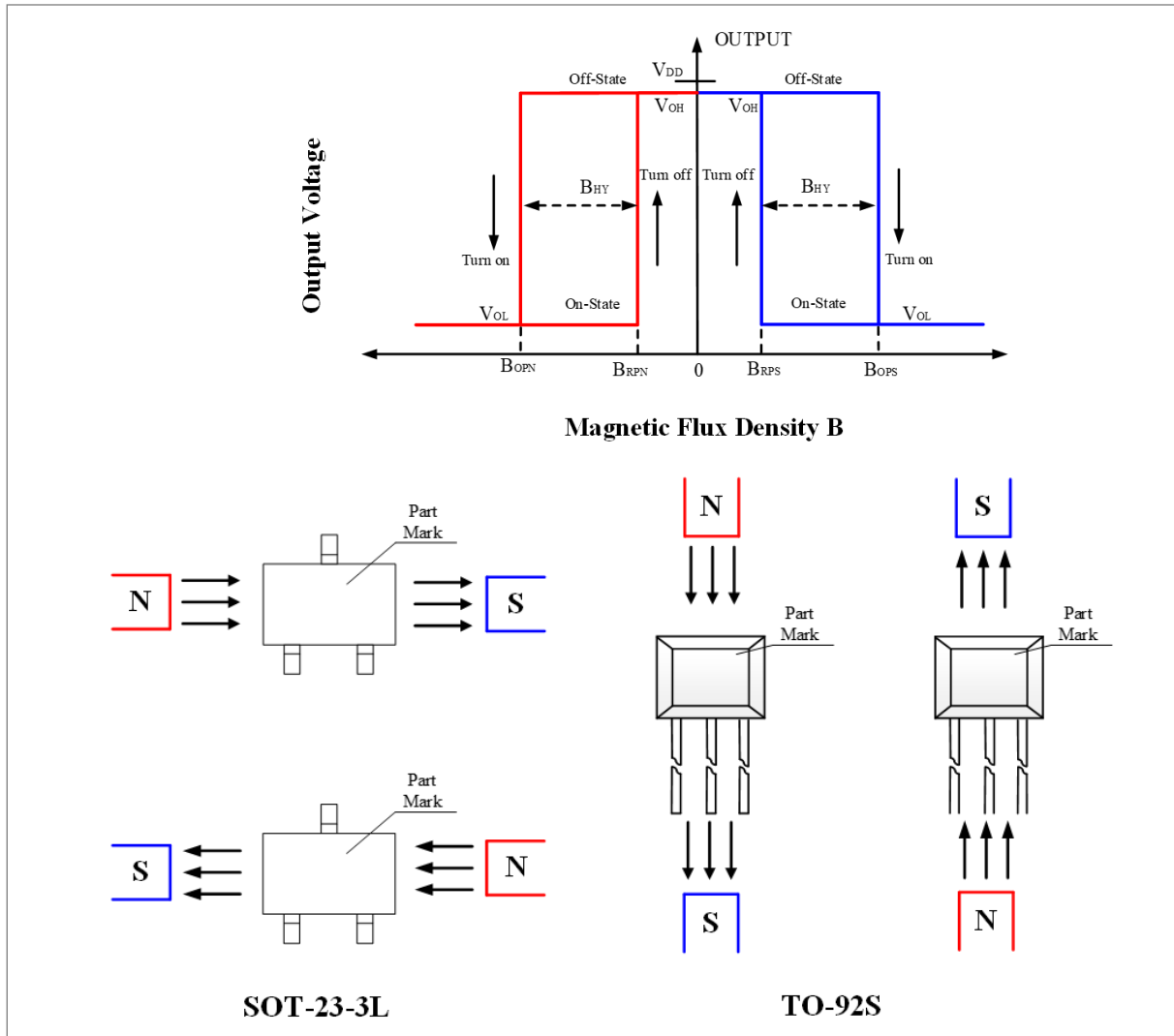


**Switching output characteristics**



To operate the TMR switch, the magnetic field should be applied to the sensor with sufficient magnetic flux density and correct direction. A horizontal magnetic field parallel to the package can be detected.

### Output characteristics



### Electrical Data

T<sub>amb</sub> = +25°C, V<sub>DD</sub> = 3.0 V; unless otherwise specified.

Symbol	Parameter	Conditions	min.	typ.	max.	Unit
V <sub>CC</sub>	Supply voltage	Working status	1.8	5.0	5.5	V
V <sub>OL</sub>	Output low level	I <sub>OUT</sub> = 1mA	-	0.008	0.05	V
V <sub>OH</sub>	Output high level	I <sub>OUT</sub> = 1mA	V <sub>DD</sub> - 0.05	V <sub>DD</sub> - 0.045	-	V
I <sub>DD,Avg</sub>	Average current <sup>1)</sup>	T <sub>A</sub> =+25 °C, V <sub>DD</sub> = 3.0 V	-	160.0	-	nA
I <sub>DD,Awake</sub>	Awake state current <sup>1)</sup>	T <sub>A</sub> =+25 °C, V <sub>DD</sub> = 3.0 V	-	1.9	-	µA
I <sub>DD,Sleep</sub>	Sleep state current <sup>1)</sup>	T <sub>A</sub> =+25 °C, V <sub>DD</sub> = 3.0 V	-	148.0	-	nA
T <sub>Awake</sub>	Wake up time <sup>1)</sup>	Working status	-	40.0	-	µs
T <sub>Period</sub>	Cycle <sup>1)</sup>	Working status	-	20.0	-	ms
I <sub>DD,Avg</sub>	Average current <sup>2)</sup>	T <sub>A</sub> =+25 °C, V <sub>DD</sub> = 3.0 V	-	1.9	-	µA
F <sub>S</sub>	Operating frequency <sup>2)</sup>	Working status	-	5.0	-	kHz

<sup>1)</sup> Only for low speed version.

<sup>2)</sup> Only for continuous working version.

**Magnetic parameters**

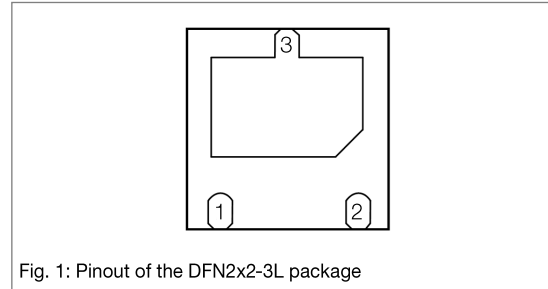
$T_{amb} = +25^{\circ}C$ ,  $V_{CC} = 3.0V$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>KTM1304XA series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	40	45	50	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	31	36	41	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-50	-45	-40	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-41	-36	-31	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	9	-	
<b>KTM1304XB series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	26	30	36	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	16	21	26	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-36	-30	-26	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-26	-21	-16	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	9	-	
<b>KTM1304XC series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	15	18	24	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	9	12	15	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-24	-18	-15	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-15	-12	-9	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	6	-	
<b>KTM1304XD series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	6	9	12	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	3	6	9	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-12	-9	-6	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-9	-6	-3	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	3	-	
<b>KTM1304XE series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	4	7	10	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	1	4	7	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-10	-7	-4	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}C$ , $V_{DD} = 3.0V$	-7	-4	-1	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	3	-	

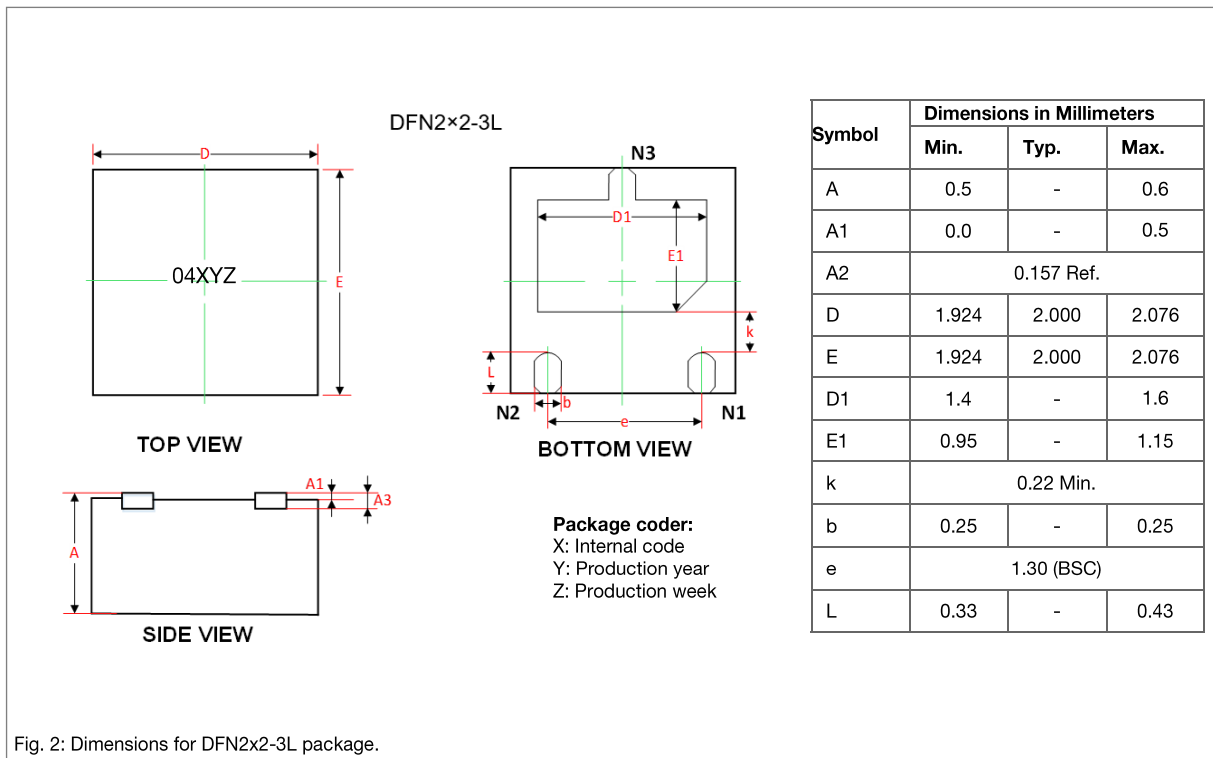
## DFN2x2-3L

### Pinout

Pad	Symbol	Parameter
1	VDD	Supply voltage
2	Output	Output voltage
3	GND	Ground

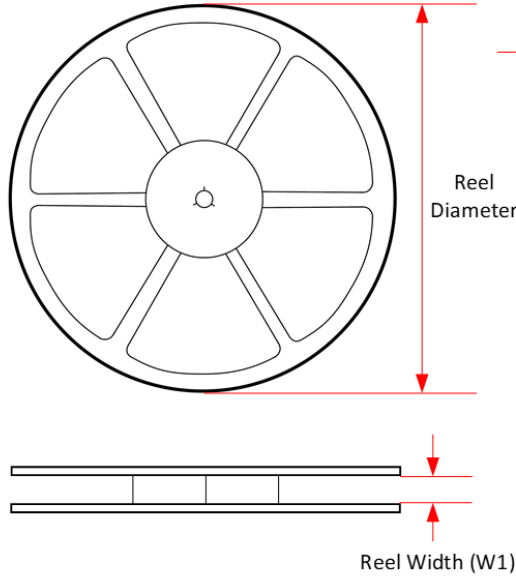


### Dimensions

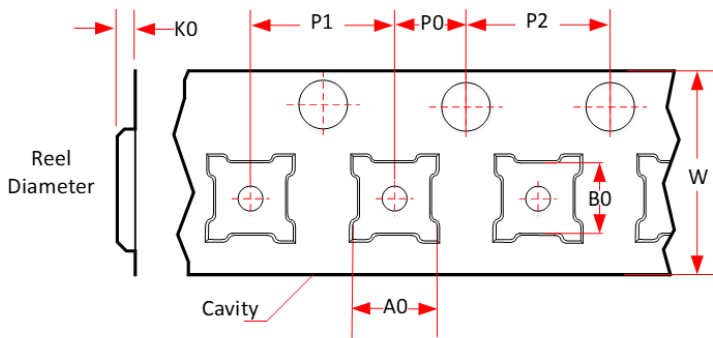


**Tape and Reel information**

**REEL DIMENSIONS**

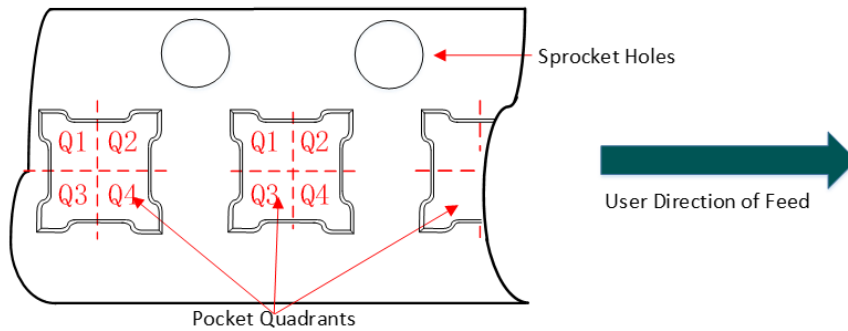


**TAPE DIMENSIONS**



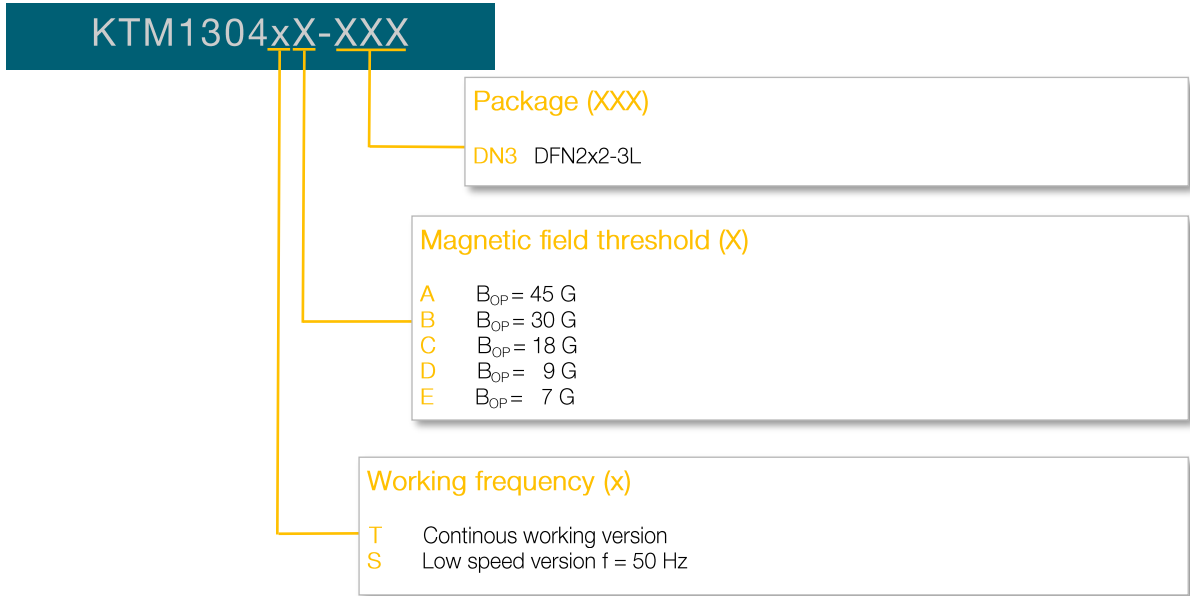
A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**



Package Type	Pins	SPQ	Reel Diameter	Reel Inside Width	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	P2 (mm)	P0 (mm)	W (mm)	Pin1 Direction
DFN2x2-3L	3	4000	180	9.5	2.64	2.2	0.75	4.00	4.00	2.00	8.00	Q1

**Additional Information on Ordering Code**



**Ordering information**

Model	Package form	Pin count	Magnetic Field Threshold (Bop)	Operating frequency	Temperature
KTM1304TA-DN3	DFN2x2-3L	3	45 Gauss	Continuous	-40°C to +125°C
KTM1304TB-DN3	DFN2x2-3L	3	30 Gauss	Continuous	-40°C to +125°C
KTM1304TC-DN3	DFN2x2-3L	3	18 Gauss	Continuous	-40°C to +125°C
KTM1304TD-DN3	DFN2x2-3L	3	9 Gauss	Continuous	-40°C to +125°C
KTM1304TE-DN3	DFN2x2-3L	3	7 Gauss	Continuous	-40°C to +125°C
KTM1304SA-DN3	DFN2x2-3L	3	45 Gauss	50 Hz	-40°C to +125°C
KTM1304SB-DN3	DFN2x2-3L	3	30 Gauss	50 Hz	-40°C to +125°C
KTM1304SC-DN3	DFN2x2-3L	3	18 Gauss	50 Hz	-40°C to +125°C
KTM1304SD-DN3	DFN2x2-3L	3	9 Gauss	50 Hz	-40°C to +125°C
KTM1304SE-DN3	DFN2x2-3L	3	7 Gauss	50 Hz	-40°C to +125°C

## General Information

### Product Status

Article	Status
KTM1304	The product is in series production.
<b>Note</b>	The status of the product may have changed since this data sheet was published. The latest information is available on the internet at <a href="http://www.sensitec.com">www.sensitec.com</a> .

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### Changelist

Version	Description of the Change	Date
KTM1304.DSE.01	Distinction between continuous and low speed version added to electrical data	11/2024
KTM1304.DSE.00	Original (pp. 1-9)	09/2014

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