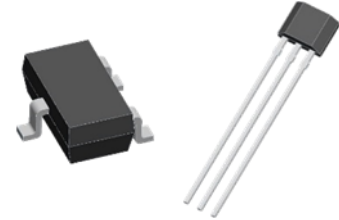


# KTM1302

## Omnipolar Switching Sensor with open drain output interface

The KTM1302 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 an open drain 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 KTM1302 family provides a variety of package to customers: SOT-23-3L for surface mount and TO-92S flat for through-hole mount.



### Absolute Maximum Ratings

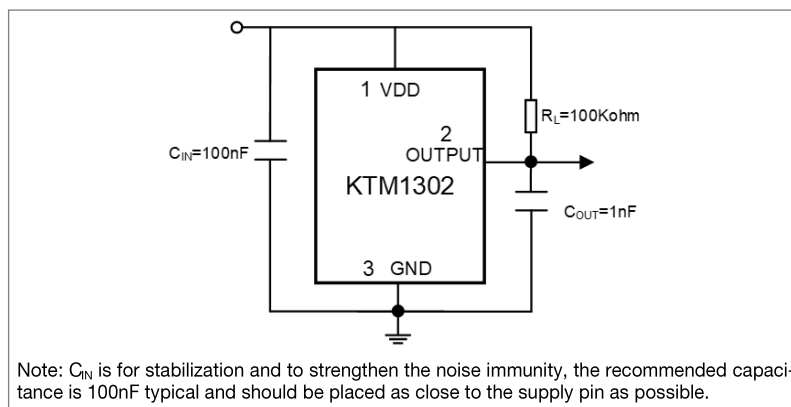
In accordance with the absolute maximum rating system (IEC60134).

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	+85	°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

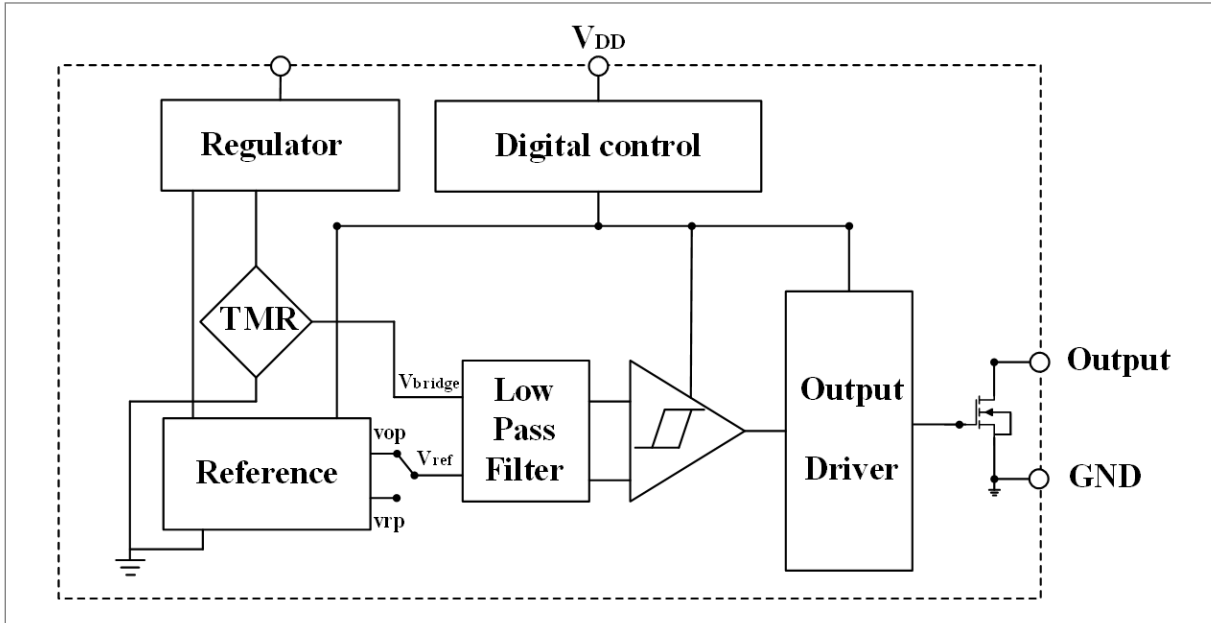
- TMR+CMOS Monolithic Structure
- Ultra low power consumption
- Wide operating voltage range
- Selectable Magnetic Field Threshold
- Magnetic Type: Omni-polar
- Open drain output interface
- Operation temperature range from -40 °C to +85 °C
- Excellent ESD performance

### Application

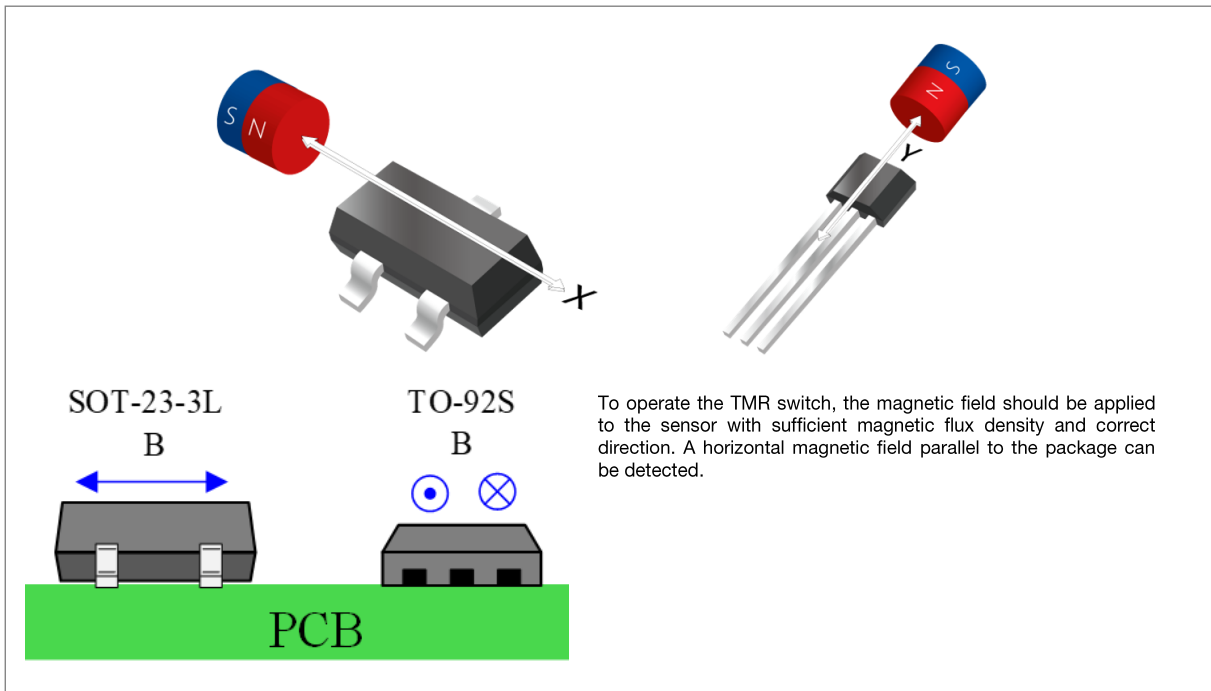
- Water meter, gas meter, flow meter
- non-contact detection
- Electronic lock, valve position detection
- Laptop and Tablet Switch Detection
- TWS headset, mobile phone



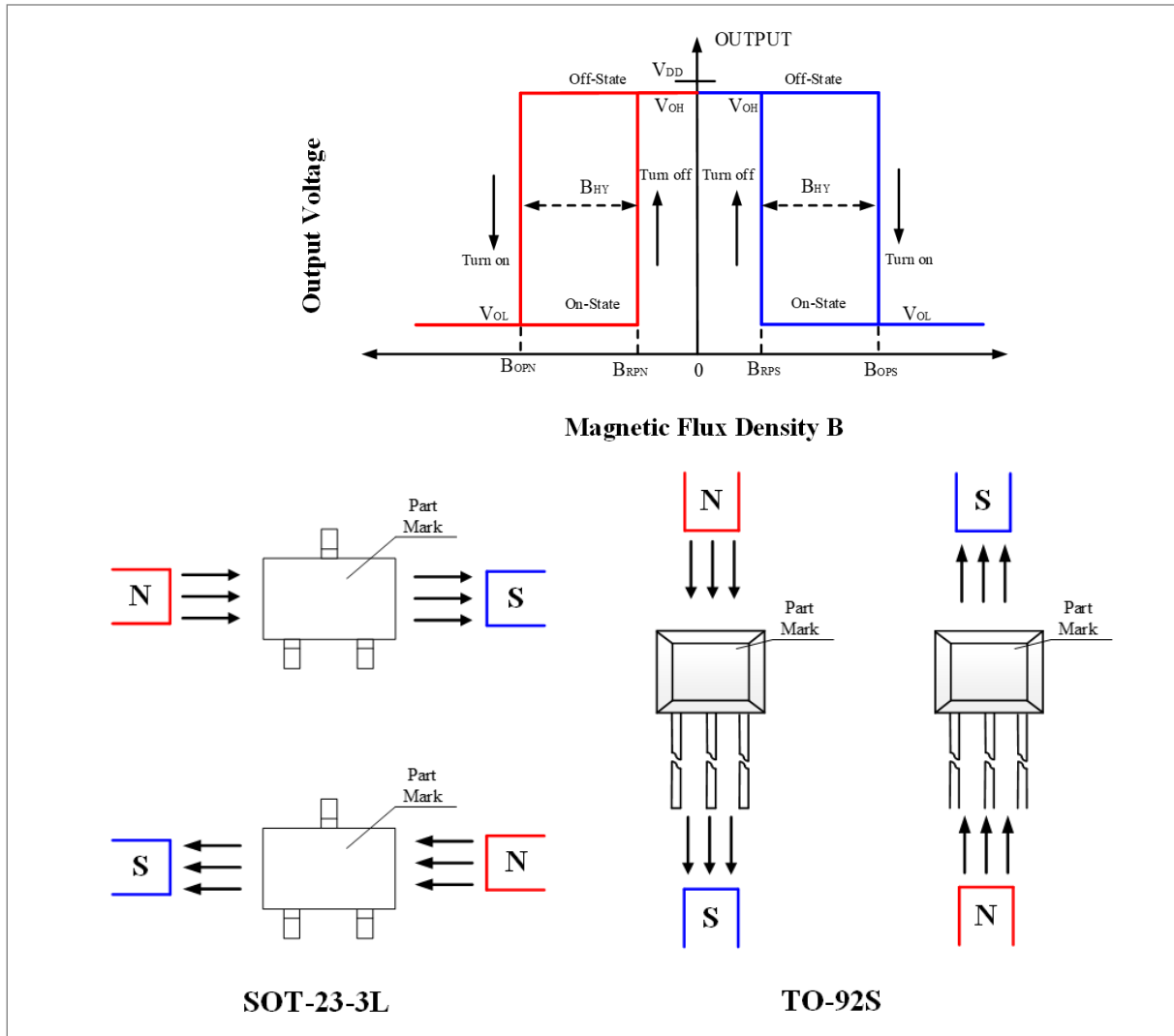
**Functional block diagram**



**Switching output characteristics**



### 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> - 0.015	-	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

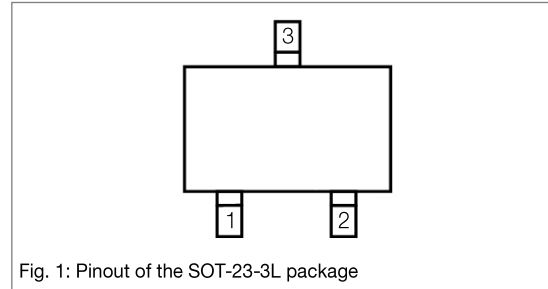
$T_{amb} = +25^{\circ}\text{C}$ ,  $V_{CC} = 3.0\text{V}$ ; unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
<b>KTM1302XA series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	40	45	50	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	31	36	41	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-50	-45	-40	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-41	-36	-31	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	9	-	
<b>KTM1302XB series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	28	30	36	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	16	21	26	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-36	-30	-26	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-26	-21	-16	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	9	-	
<b>KTM1302XC series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	15	18	24	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	9	12	15	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-24	-18	-15	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-15	-12	-9	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	6	-	
<b>KTM1302XD series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	6	9	12	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	3	6	9	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-12	-9	-6	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-9	-6	-3	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	3	-	
<b>KTM1302XE series</b>						
$B_{OPS}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	4	7	10	Gauss
$B_{RPS}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	1	4	7	
$B_{OPN}$	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-10	-7	-4	
$B_{RPN}$	Magnetic release point	$T_A = +25^{\circ}\text{C}$ , $V_{DD} = 3.0\text{V}$	-7	-4	-1	
$B_{HY} ( B_{OPX}  -  B_{RPX} )$	Hysteresis		-	3	-	

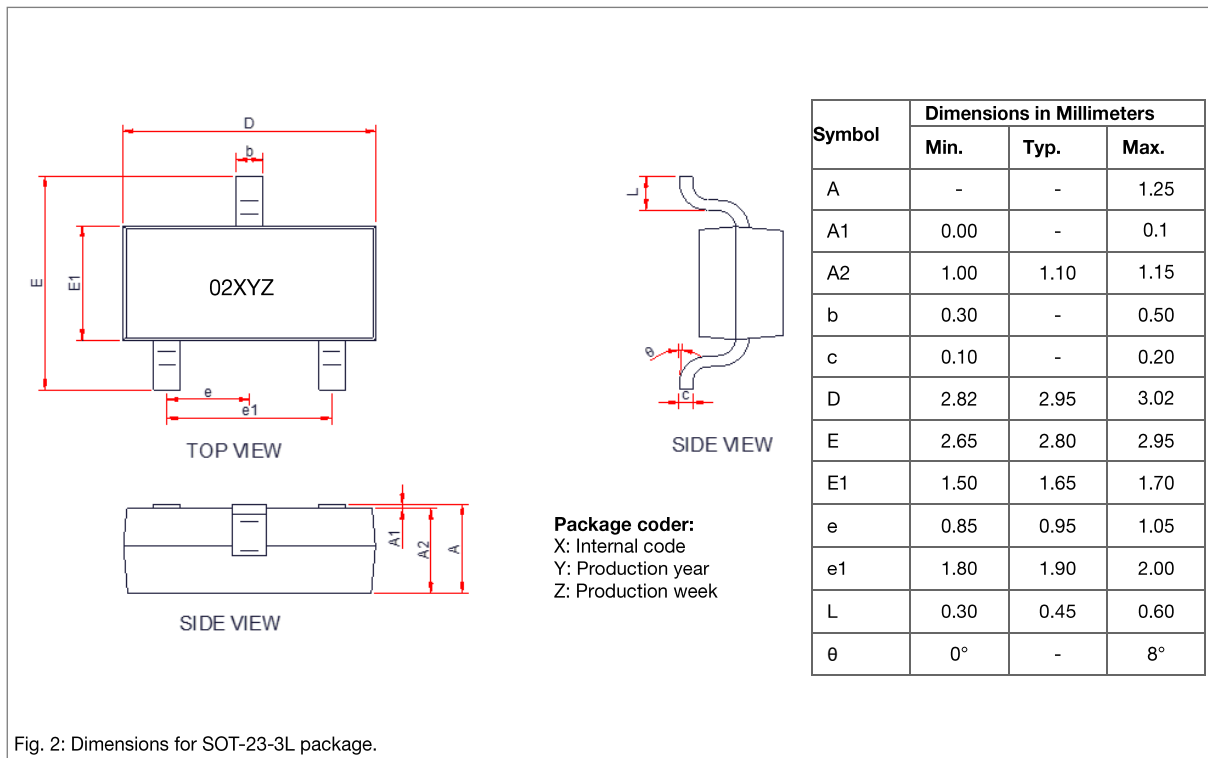
### SOT-23-3L

#### Pinout

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



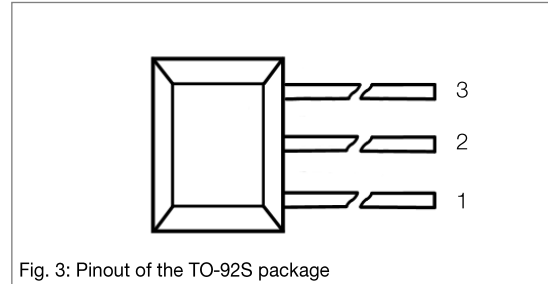
#### Dimensions



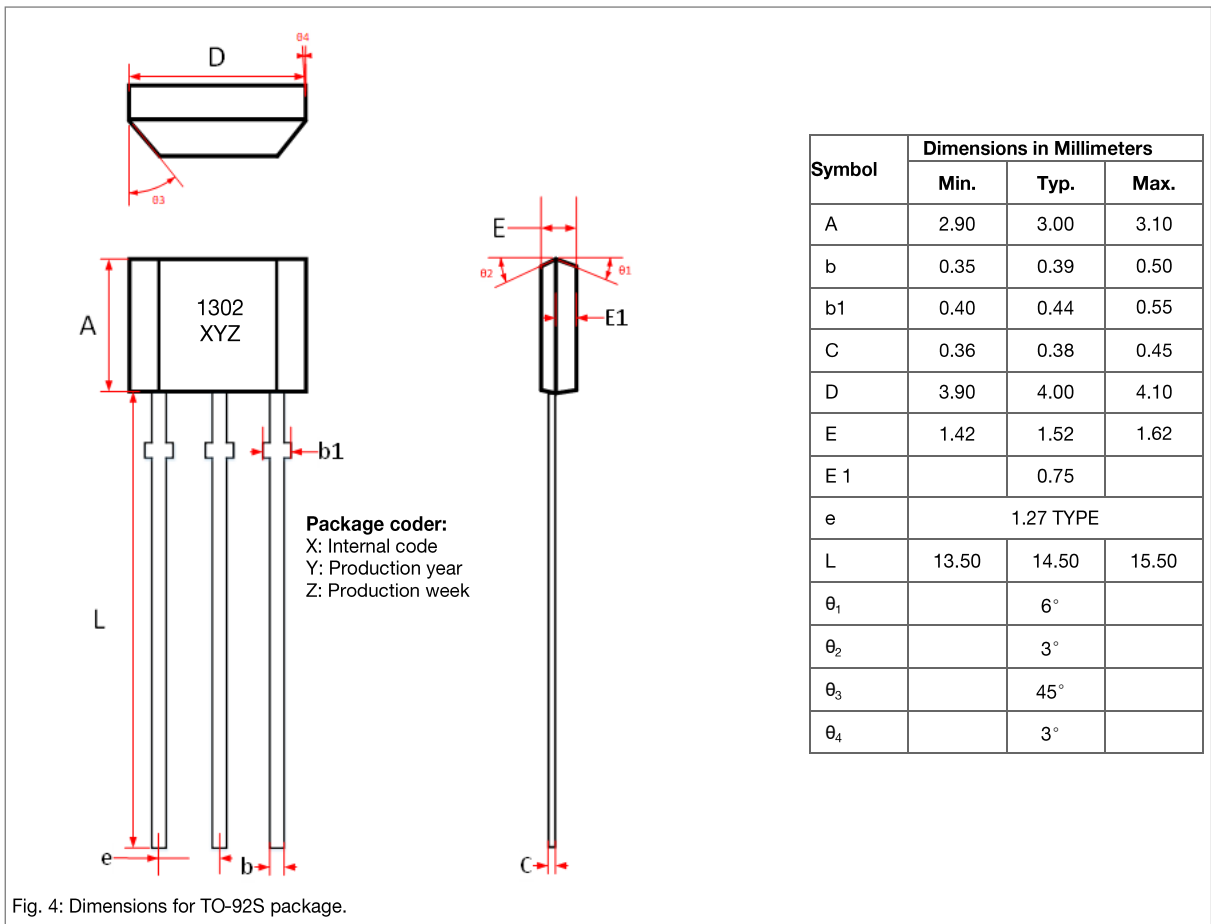
**TO-92S**

**Pinout**

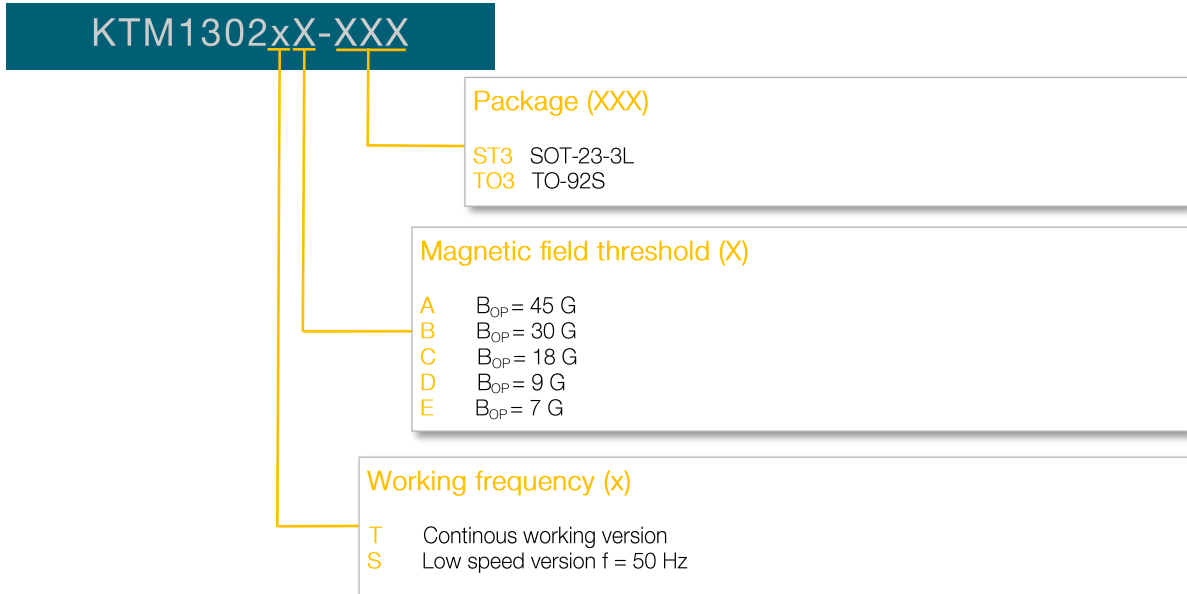
Pad	Symbol	Parameter
1	Output	Output voltage
2	GND	Ground
3	VDD	Supply voltage



**Dimensions**



**Additional Information on Ordering Code**



**Ordering information**

Model	Package form	Pin count	Magnetic Field Threshold (Bop)	Operating frequency	Temperature
KTM1302TA-ST3	SOT-23-3L	3	45 Gauss	Continuous	-40°C to +85°C
KTM1302TB-ST3	SOT-23-3L	3	30 Gauss	Continuous	-40°C to +85°C
KTM1302TC-ST3	SOT-23-3L	3	18 Gauss	Continuous	-40°C to +85°C
KTM1302TD-ST3	SOT-23-3L	3	9 Gauss	Continuous	-40°C to +85°C
KTM1302TE-ST3	SOT-23-3L	3	7 Gauss	Continuous	-40°C to +85°C
KTM1302SA-ST3	SOT-23-3L	3	45 Gauss	50Hz	-40°C to +85°C
KTM1302SB-ST3	SOT-23-3L	3	30 Gauss	50Hz	-40°C to +85°C
KTM1302SC-ST3	SOT-23-3L	3	18 Gauss	50Hz	-40°C to +85°C
KTM1302SD-ST3	SOT-23-3L	3	9 Gauss	50Hz	-40°C to +85°C
KTM1302SE-ST3	SOT-23-3L	3	7 Gauss	50Hz	-40°C to +85°C
KTM1302TA-TO3	TO-92S	3	45 Gauss	Continuous	-40°C to +85°C
KTM1302TB-TO3	TO-92S	3	30 Gauss	Continuous	-40°C to +85°C
KTM1302TC-TO3	TO-92S	3	18 Gauss	Continuous	-40°C to +85°C
KTM1302TD-TO3	TO-92S	3	9 Gauss	Continuous	-40°C to +85°C
KTM1302TE-TO3	TO-92S	3	7 Gauss	Continuous	-40°C to +85°C
KTM1302SA-TO3	TO-92S	3	45 Gauss	50Hz	-40°C to +85°C
KTM1302SB-TO3	TO-92S	3	30 Gauss	50Hz	-40°C to +85°C
KTM1302SC-TO3	TO-92S	3	18 Gauss	50Hz	-40°C to +85°C
KTM1302SD-TO3	TO-92S	3	9 Gauss	50Hz	-40°C to +85°C
KTM1302SE-TO3	TO-92S	3	7 Gauss	50Hz	-40°C to +85°C

## General Information

### Product Status

Article	Status
KTM1302	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
KTM1302.DSE.01	Distinction between continuous and low speed version added to electrical data	11/2024
KTM1302.DSE.00	Original (pp. 1-9)	09/2014

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