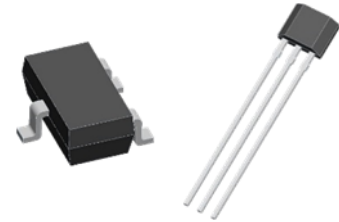


KTM1331

Latch Mode Switching Sensor with CMOS output interface

KTM1331 is a magnetic switch sensor integrating tunneling magnetoresistance (TMR) technology and CMOS technology. With the characteristics of high precision, high speed, low power consumption and high sensitivity, it is suitable for magnetic field switch detection of industrial electronics and consumer electronics. The internal circuit of the chip includes a voltage generator, a comparator, a digital logic control module, a threshold trimming module and a CMOS output circuit. KTM1331 has wide working voltage range and wide working temperature range. This series of chips can provide a variety of magnetic field thresholds, switching operating frequencies and packaging forms to suit various applications.

KTM1331 is a latching magnetic field detection switch, which can provide latching magnetic switch response with extremely low current consumption. It detects the magnetic field parallel to the surface of the chip package. When the magnetic field strength is greater than the operating point (BOP), the switch outputs a low level; when the magnetic field strength is lower than the release point (BRP), the switch outputs a high level. The chip can be operated in a supply voltage range from 1.8V to 5.5V and comes in standard SOT-23-3L and TO-92S packages.



Features

- Ultra low power consumption
- Wide operating voltage range
- Selectable Magnetic Field Threshold
- Magnetic Type: Latch mode
- CMOS output interface
- Operation temperature range from -40 °C to +85 °C
- Excellent ESD performance

Absolute Maximum Ratings

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

Symbol	Parameter	Min.	Max.	Unit
V _{CC}	Supply voltage	-0.3	6.0	V
I _{Output}	Output drive current	-	5	mA
B	Withstand magnetic field <5 min	-	3000	G
T _{junction}	Maximum junction temperature	-	+150	°C
T _{stg}	Storage temperature	-50	+150	°C
T _{working}	Working temperature	-40	+85	°C
T _{reflow}	Reflow soldering temperature	-	260	°C
ESD _{HBM}	Human body model ESD	-	8000	V

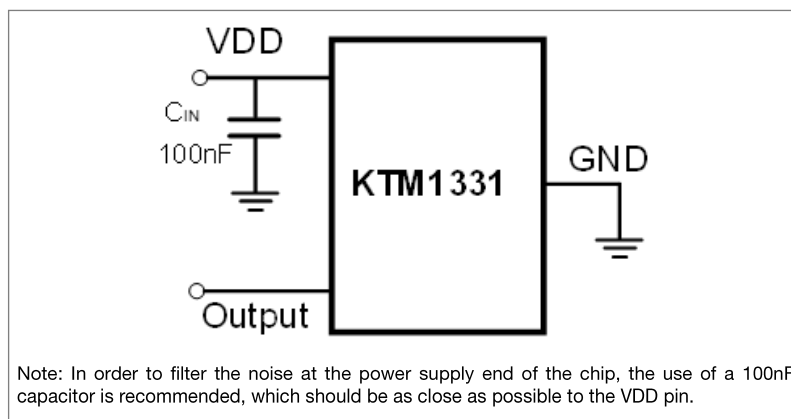
Stresses beyond those listed under "Absolute maximum ratings" may cause permanent damage to the device.

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.

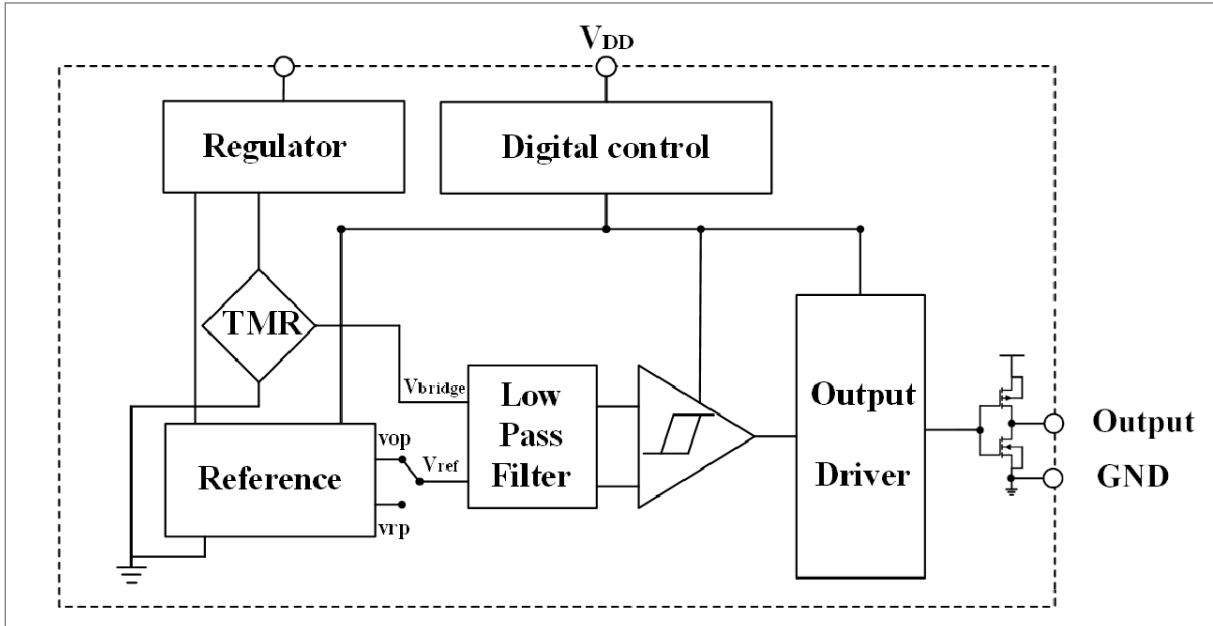
Application

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

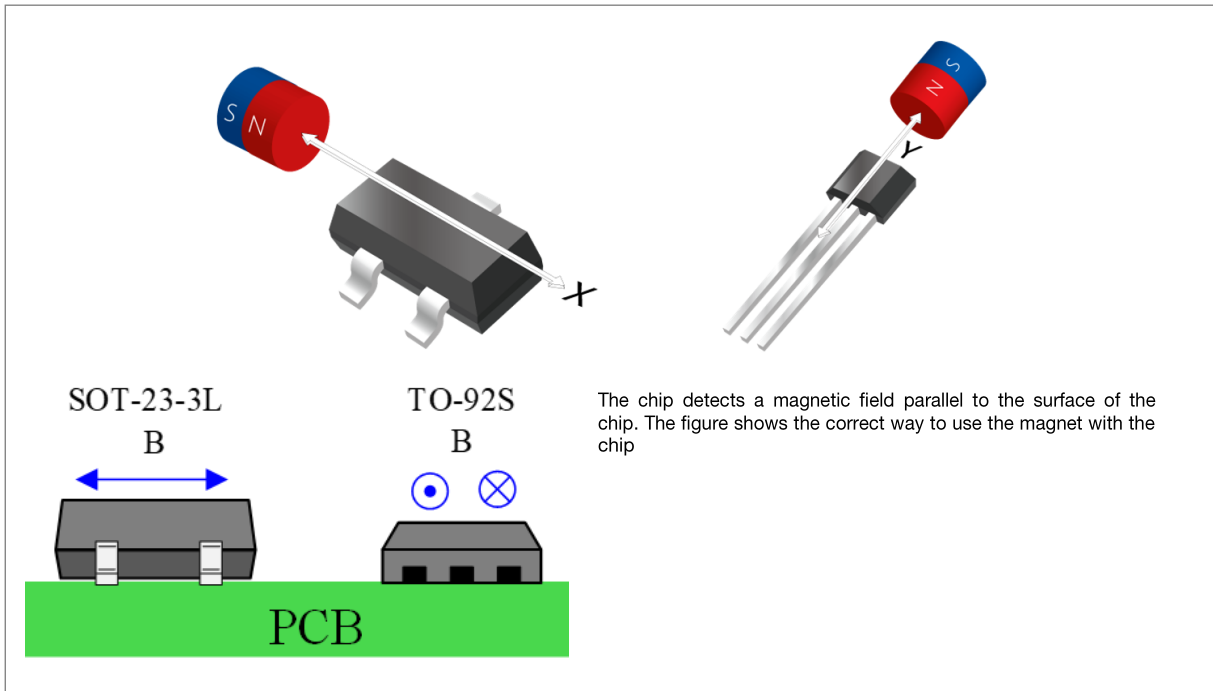
Application circuit schematic



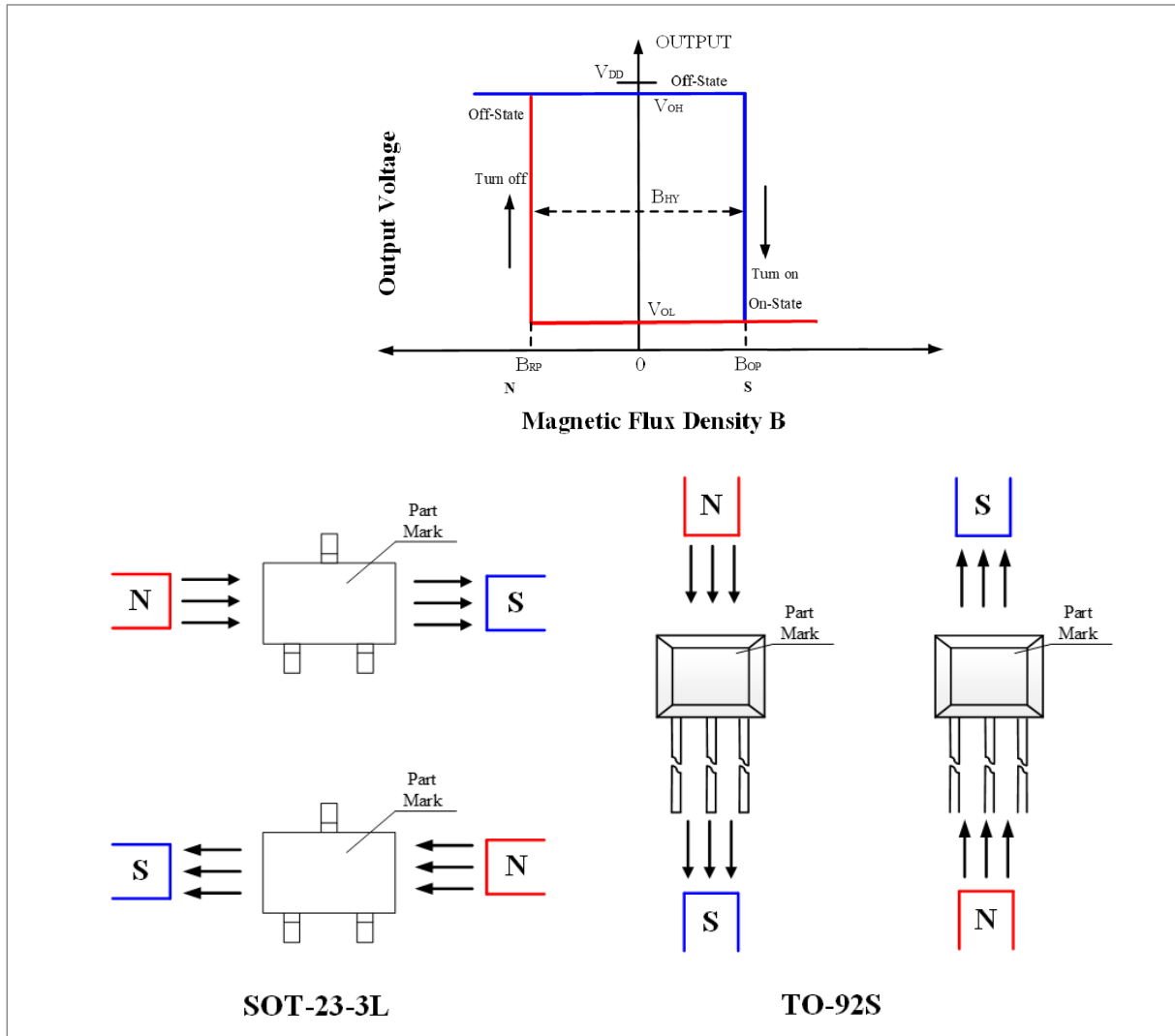
Functional block diagram



Switching output characteristics



Output characteristics



Electrical Data

T_{amb} = +25°C, V_{DD} = 3.0 V; unless otherwise specified.

Symbol	Parameter	Conditions	min.	typ.	max.	Unit
V _{CC}	Supply voltage	Working status	1.8	5.0	5.5	V
V _{OL}	Output low level	I _{OUT} = 1mA	-	0.02	0.1	V
V _{OH}	Output high level	I _{OUT} = 1mA	V _{DD} - 0.1	V _{DD} - 0.02	-	V
I _{DD,Avg}	Average current ¹⁾	TA = +25 °C, V _{DD} = 3.0 V	-	160.0	-	nA
I _{DD,Awake}	Awake state current ¹⁾	TA = +25 °C, V _{DD} = 3.0 V	-	2.0	-	µA
I _{DD,Sleep}	Sleep state current ¹⁾	TA = +25 °C, V _{DD} = 3.0 V	-	148.0	-	nA
T _{Awake}	Wake up time ¹⁾	Working status	-	40.0	-	µs
T _{Period}	Cycle ¹⁾	Working status	-	20.0	-	ms
I _{DD,Avg}	Average current ²⁾	TA = +25 °C, V _{DD} = 3.0 V	-	2.0	-	µA
F _S	Operating frequency ²⁾	Working status	-	5.0	-	kHz

¹⁾ Only for low speed version.

²⁾ Only for continuous working version.

Magnetic parameters

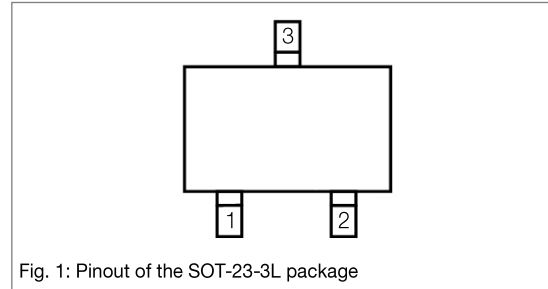
$T_{amb} = +25^{\circ}\text{C}$, $V_{CC} = 3.0\text{V}$; unless otherwise specified.

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
KTM1331XA series						
B_{OP}	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	39	45	52	Gauss
B_{RP}	Magnetic release point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	-52	-45	-39	
$B_{HY} (B_{OPX} - B_{RPX})$	Hysteresis		-	90	-	
KTM1331XB series						
B_{OP}	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	26	30	36	Gauss
B_{RP}	Magnetic release point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	-36	-30	-26	
$B_{HY} (B_{OPX} - B_{RPX})$	Hysteresis		-	60	-	
KTM1331XC series						
B_{OP}	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	12	17	22	Gauss
B_{RP}	Magnetic release point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	-22	-17	-12	
$B_{HY} (B_{OPX} - B_{RPX})$	Hysteresis		-	34	-	
KTM1331XD series						
B_{OP}	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	6	9	12	Gauss
B_{RP}	Magnetic release point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	-12	-9	-6	
$B_{HY} (B_{OPX} - B_{RPX})$	Hysteresis		-	18	-	
KTM1331XE series						
B_{OP}	Magnetic field operating point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	3	5	7	Gauss
B_{RP}	Magnetic release point	$T_A = +25^{\circ}\text{C}$, $V_{DD} = 3.0\text{V}$	-7	-5	-3	
$B_{HY} (B_{OPX} - B_{RPX})$	Hysteresis		-	10	-	

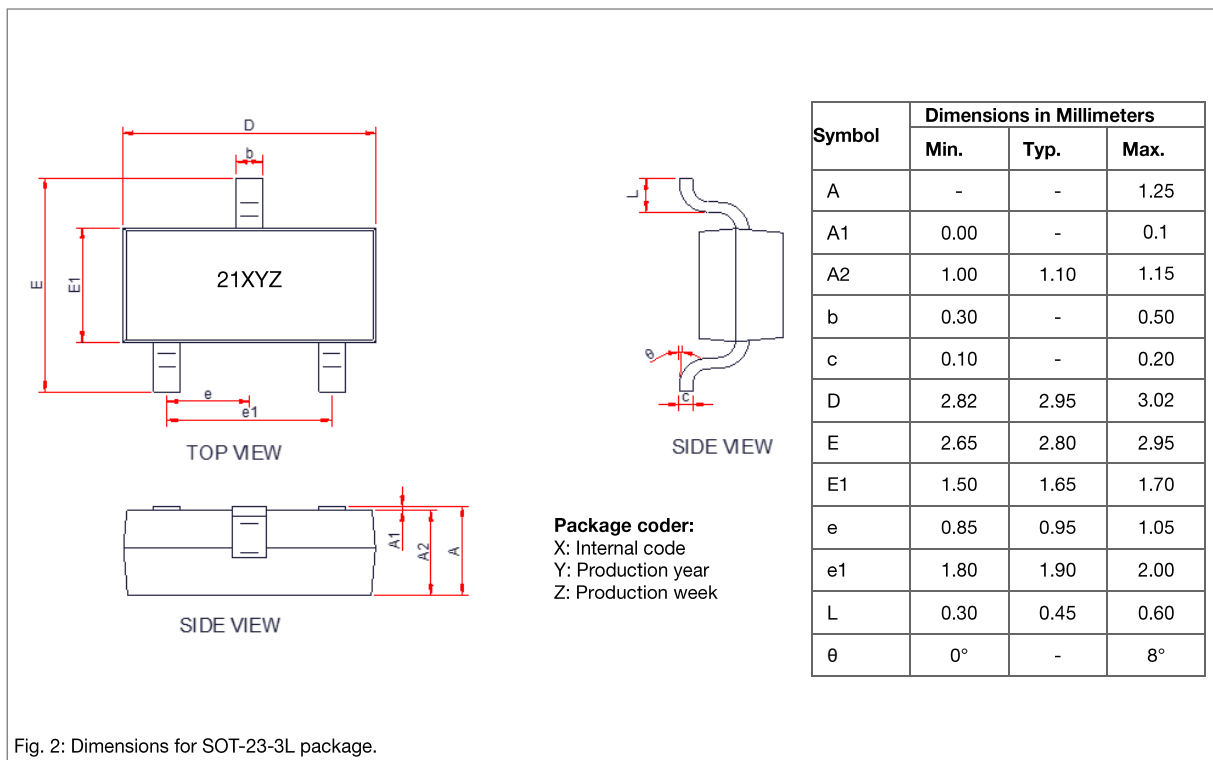
SOT-23-3L

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

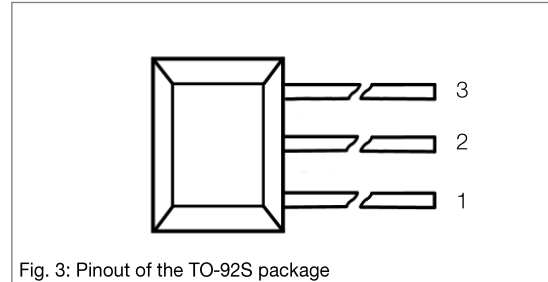


Fig. 3: Pinout of the TO-92S package

Dimensions

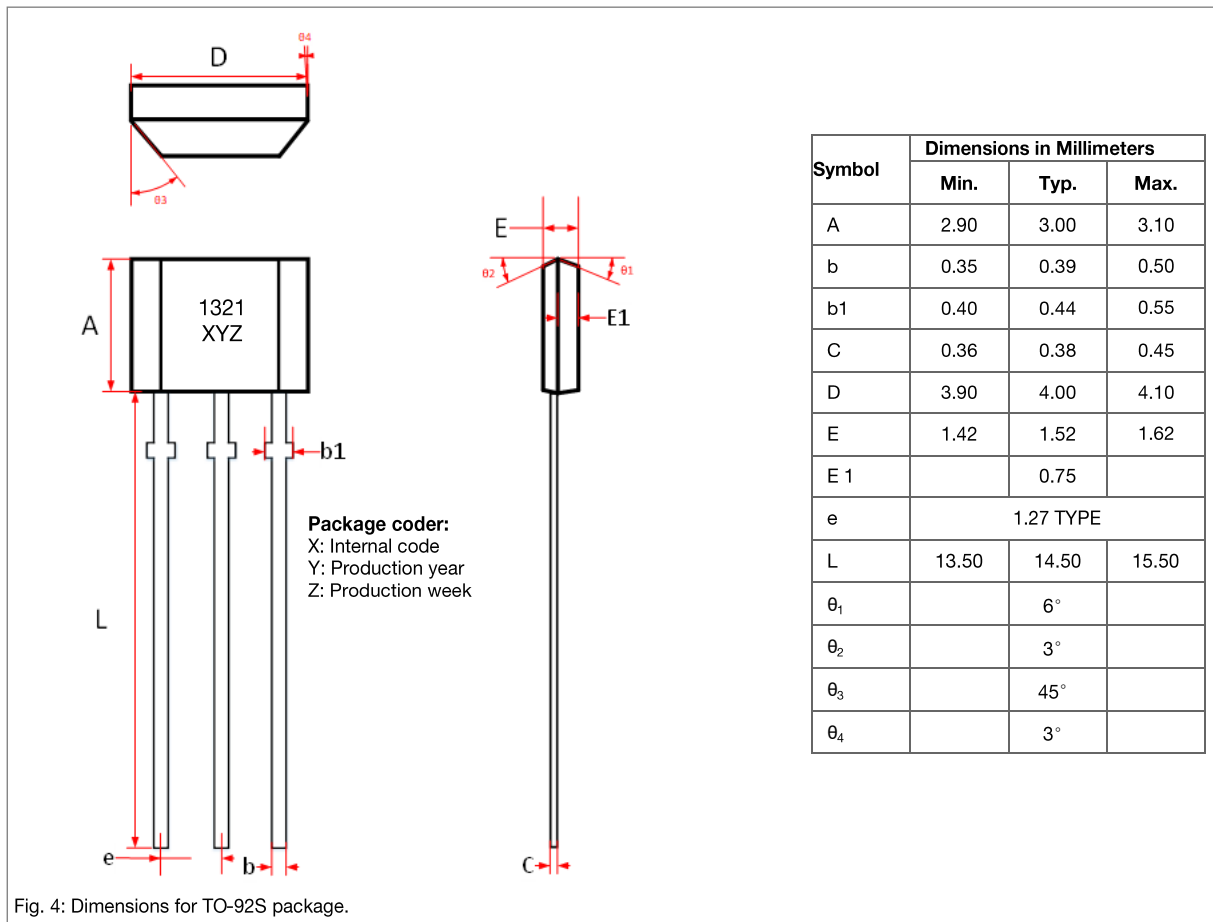
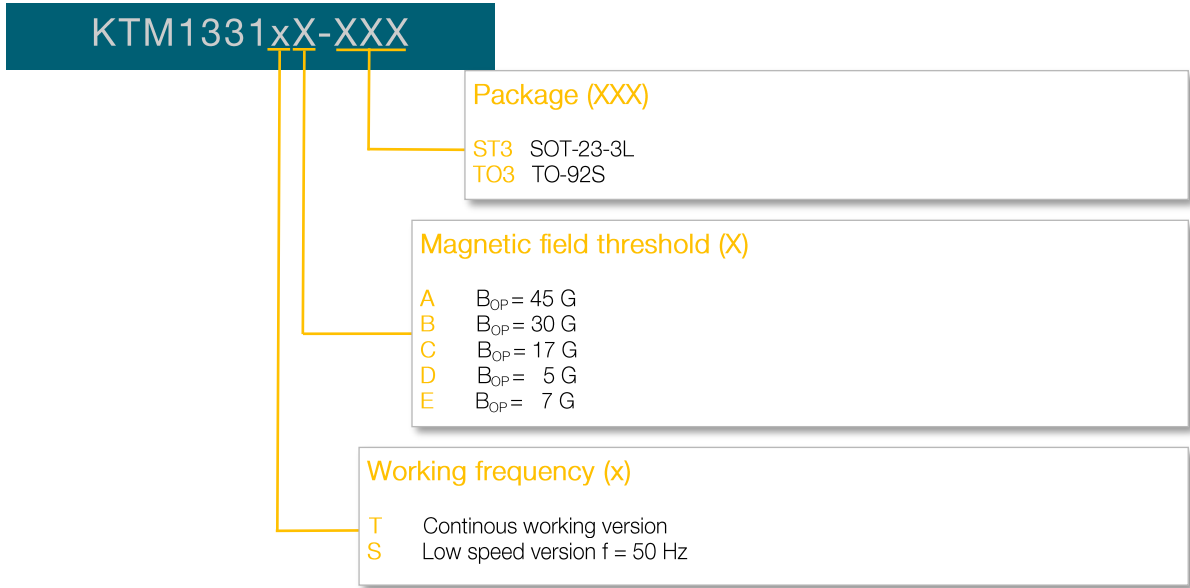


Fig. 4: Dimensions for TO-92S package.

Additional Information on Ordering Code



Ordering information

Model	Package form	Pin count	Magnetic Field Threshold (Bop)	Operating frequency	Temperature
KTM1331TA-ST3	SOT-23-3L	3	45 Gauss	Continuous	-40°C to 85°C
KTM1331TB-ST3	SOT-23-3L	3	30 Gauss	Continuous	-40°C to 85°C
KTM1331TC-ST3	SOT-23-3L	3	18 Gauss	Continuous	-40°C to 85°C
KTM1331TD-ST3	SOT-23-3L	3	9 Gauss	Continuous	-40°C to 85°C
KTM1331TE-ST3	SOT-23-3L	3	5 Gauss	Continuous	-40°C to 85°C
KTM1331SA-ST3	SOT-23-3L	3	45 Gauss	50Hz	-40°C to 85°C
KTM1331SB-ST3	SOT-23-3L	3	30 Gauss	50Hz	-40°C to 85°C
KTM1331SC-ST3	SOT-23-3L	3	18 Gauss	50Hz	-40°C to 85°C
KTM1331SD-ST3	SOT-23-3L	3	9 Gauss	50Hz	-40°C to 85°C
KTM1331SE-ST3	SOT-23-3L	3	5 Gauss	50Hz	-40°C to 85°C
KTM1331TA-TO3	TO-92S	3	45 Gauss	Continuous	-40°C to 85°C
KTM1331TB-TO3	TO-92S	3	30 Gauss	Continuous	-40°C to 85°C
KTM1331TC-TO3	TO-92S	3	18 Gauss	Continuous	-40°C to 85°C
KTM1331TD-TO3	TO-92S	3	9 Gauss	Continuous	-40°C to 85°C
KTM1331TE-TO3	TO-92S	3	5 Gauss	Continuous	-40°C to 85°C
KTM1331SA-TO3	TO-92S	3	45 Gauss	50Hz	-40°C to 85°C
KTM1331SB-TO3	TO-92S	3	30 Gauss	50Hz	-40°C to 85°C
KTM1331SC-TO3	TO-92S	3	18 Gauss	50Hz	-40°C to 85°C
KTM1331SD-TO3	TO-92S	3	9 Gauss	50Hz	-40°C to 85°C
KTM1331SE-TO3	TO-92S	3	5 Gauss	50Hz	-40°C to 85°C

General Information

Product Status

Article	Status
KTM1331	The product is in series production.
Note	The status of the product may have changed since this data sheet was published. The latest information is available on the internet at www.sensitec.com .

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Changelist

Version	Description of the Change	Date
KTM1331.DSE.01	Distinction between continuous and low speed version added to electrical data	11/2024
KTM1331.DSE.00	Original (pp. 1-9)	09/2014

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