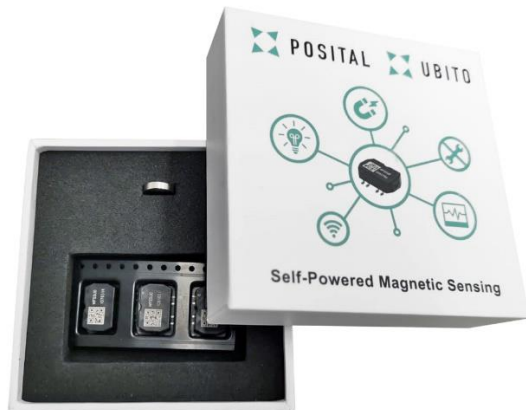


DATA SHEET  
WIEGAND SENSOR SAMPLE KIT



Test the integration and performance of our **WFS-U0 Wiegand Sensor** in your applications with our **Wiegand Sensor Sample Kit**. Each kit comprises three **WFS-U0 Wiegand Sensors** and a **diametral magnet**.

- Wiegand Sensor for energy harvesting multiturm encoders using the Wiegand effect to generate energy from a rotating magnetic field<sup>1</sup>
- Optimized for operation with the multiturm counter module iC-PMX from iC-Haus
- In surface mounted technology suitable for reflow process, RoHS 2 compatible
- 2,5 mm wire distance from top of seating plane
- High Pulse energy with typical 140 nJ average pulse energy
- Machine readable serial number provides perfect traceability

## 1. Signal Characteristics

Item No.	Parameter	Symbol	Min.	Typ.	Max.	Unit	Remarks
101	Pulse peak-voltage	$U_P$	5.3	6.5		V	Valid for each trigger configuration i (Figure 4) with $U_{P_i, Average} - 4\sigma \geq U_{P, min}$ , analysis over 4*1000 pulses @20 – 27°C @6.8 ± 1% nF
102	Pulse slew rate	$S_R$	200			V/ms	@20 – 27°C, 30% - 70% $U_P$
103	Pulse energy	$E_P$		140		nJ	@6.8 ± 1% nF
104	Temperature drift $V_{peak}$	$T_D$		-0,008		V/K	

## 2. Electrical Characteristics

Item No.	Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
201	Coil resistance	R	250	270	290	$\Omega$	@20 - 27°C, DC
202	Temp. Coefficient of Resistor	$TC_R$		$3,9 \cdot 10^{-3}$		1/K	
203	Coil inductance	L	10.5		14.5	mH	measured @1 kHz with magnet (polarity) parallel to wire axis.

<sup>1</sup> Devices and processes for energy harvesting by Wiegand wire within position encoders are protected by several worldwide patents (such as WO 2004/046735 A1) and require licensing by the inventors and applicants.



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### 3. Environmental

Item No.	Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
301	Ambient operating temperature range	$T_a$	-40		+125	°C	
302	Relative humidity	rF			90%		No condensation
303	Shock Resistance	$S_r$			100	g	half sine 6 ms, EN 60068-2-27
304	Permanent shock resistance	$S_{rp}$			10	g	half sine 16 ms, EN 60068-2-29
305	Vibration Resistance	$V_r$			10	g	10 Hz-1000 Hz, EN 60068-2-6
306	Insulation Resistance	$R_{ISO}$	600			MΩ	Insulation resistance between pin and housing @ 1KV, FGluxe 1577 isolation multimeter
307	Contact discharge	$D_c$			6	kV	IEC 61000-4-2
308	Air charge	$D_A$			8	kV	IEC 61000-4-2
309	Max. allowed external magnetic field to be applied to sensor not in operation	$B_{exmax}$			5	mT	e.g. important for storage and handling
310	Storage Temperature	$T_s$	-40		+85	°C	
311	Recommended Floor life				4	Wks	Equivalent to MSL2a.

### 4. Measurement Conditions

Item No.	Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
401	Magnetic flux density at Wire	Bw	8.75		9.15	mT	Measured at wire axis
402	Distance magnet to wire	Wd	8.4	8.5	8.6	mm	Measured from wire to magnet surface, valid for FRABA magnet only!
403	x and y assembly tolerance		-0.15		0.15		Measured from sensor centre – rotational axis
404	Magnet eccentricity				0.1	mm	
405	Load capacitor	$C_L$	6.7	6.8	6.9	nF	In parallel with IC-PMX (Figure 2)
406	Magnet rotation speed	v		1,000		rpm	
407	Input resistance	$R_M$		10		MΩ	Measurement device
408	Input capacitance	$C_M$		12		pF	Measurement device

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**Remarks**

Magnet type: Diametral magnet, SmCo, dimensions  $\varnothing 8 \times 2.5$  mm (Figure 6), article number 10034032

Data measured under ideal measuring conditions. Test setup is isolated from the external magnetic fields or other ferromagnetic components.

**5. Test Circuit**

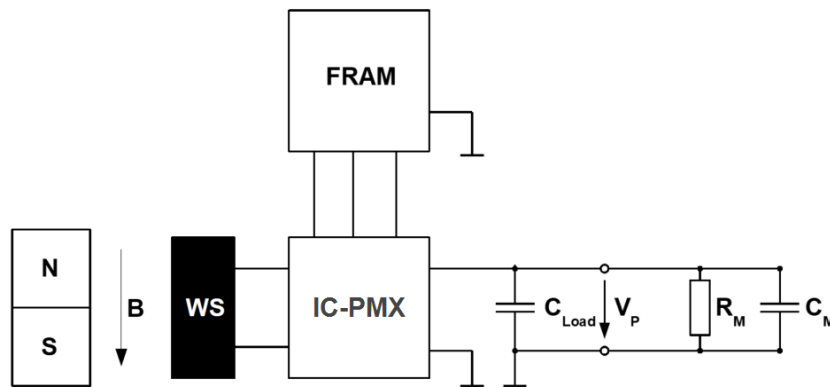


Figure 1

**6. Typical Signal Wave**

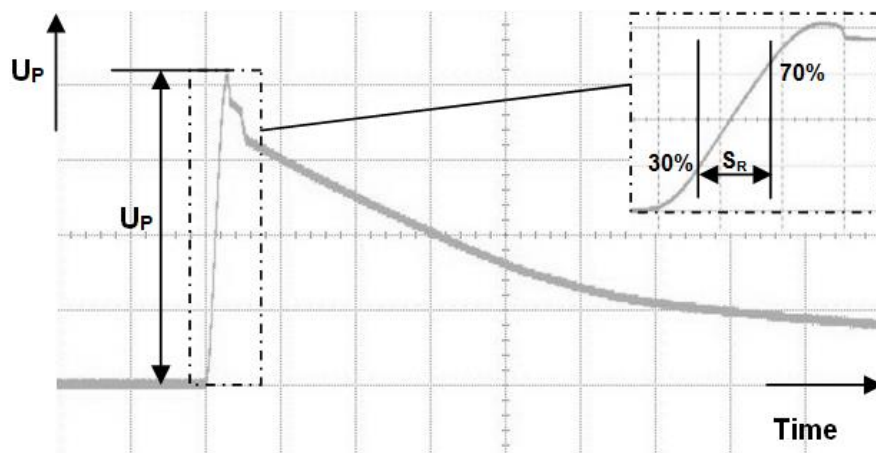


Figure 2

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7. Declaration Trigger Point

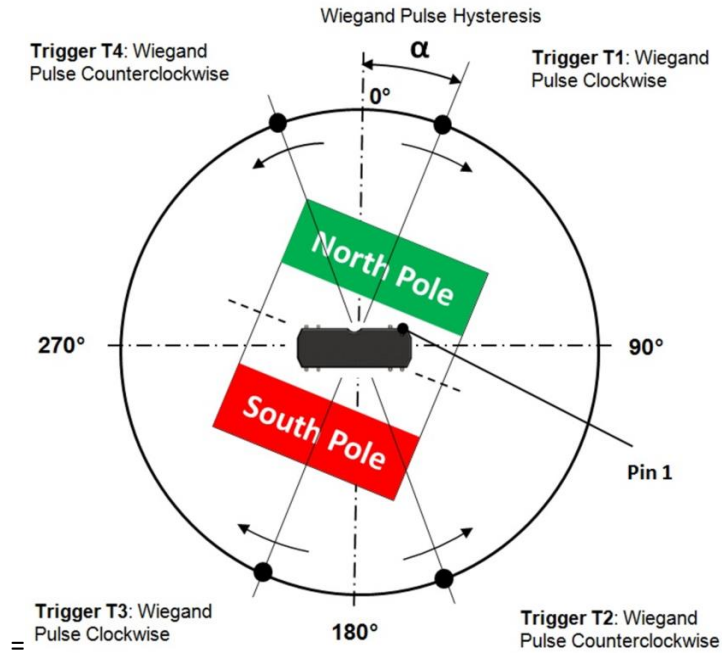
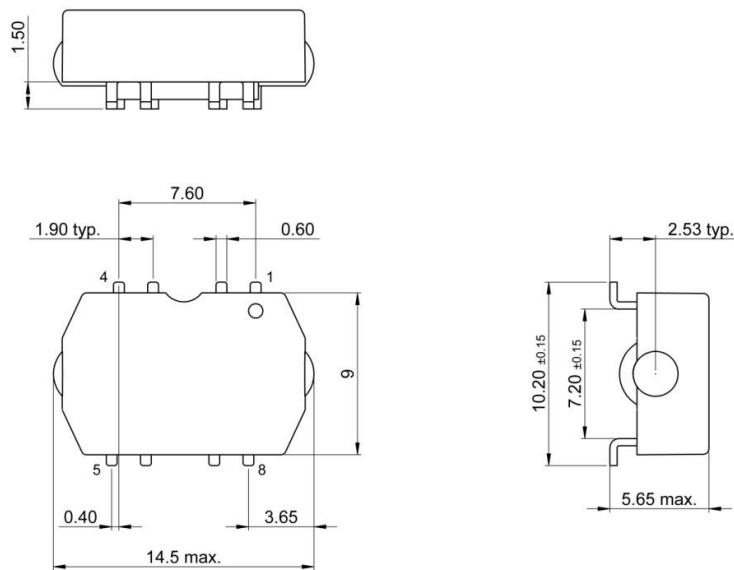


Figure 3

8. Component Dimension Type: WFS



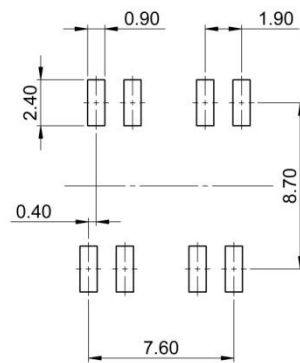
Coplanarity tolerance of leads 0.1 mm.  
All dimension in mm.

(All dimensions are before soldering)

Figure 4

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**9. Land Pattern Dimensions**



All dimension in mm.

Figure 5

Item No.	Parameter	Sym- bol	Min.	Typ.	Max	Unit	Conditions
1001	Sensor terminals			Pin 1 / Pin 2 and Pin 5 / Pin 6			Pin 1 / Pin2: coil-winding start Pin 5 / Pin 6: coil-winding end Pin 3,4,7,8 not used
1002	Sensor mass			1.17		g	

**Remarks**

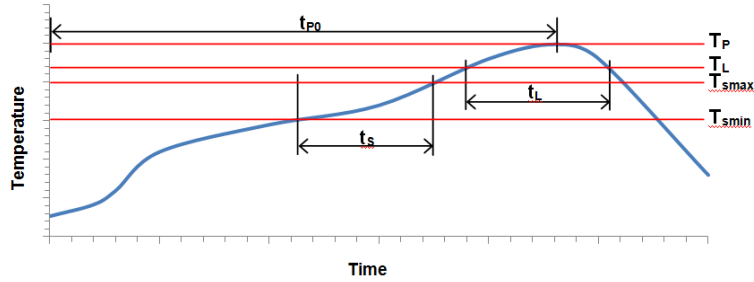
Pin material Cu, mass 0.029 g, results in a theoretical thermal energy surge of  $\Delta Q \approx 2 \text{ W}$  for each contact pin (390  $\text{W}/(\text{kg}\cdot\text{K})$  and  $\Delta T_{\text{reflow}}$  of 170 K.

SMD package, suitable for reflow process

RoHS 2 Compatible

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### 10. Reflow Profile



Item No.	Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
1101	Liquidous temperature	$T_L$		217		°C	Soldering paste material: Sn95.5Ag4Cu0.5
1102	Time maintained above $T_L$	$t_L$		60		s	
1103	Peak package body temperature	$T_P$		249		°C	
1104	Time 25 °C to $T_P$	$t_{p0}$		230		s	
1105	Preheat / Soak temperature min	$T_{smin}$		150		°C	
1106	Preheat / Soak temperature max	$T_{smax}$		200		°C	
1107	Time from $T_{smin}$ to $T_{smax}$	$t_s$		70		s	
1108	Ramp-up rate ( $T_L$ to $T_P$ )			0.9	3	K / s	
1109	Ramp-down rate ( $T_P$ to $T_L$ )			1.3	6	K / s	
1110	Reflow soldering speed	$v_s$		1000.0		mm / min	reflow soldering machine: Linie VX-nitro-3500 (Type 734)

### 11. Labeling Information

Laser-marked on top surface

Type and Serial Number

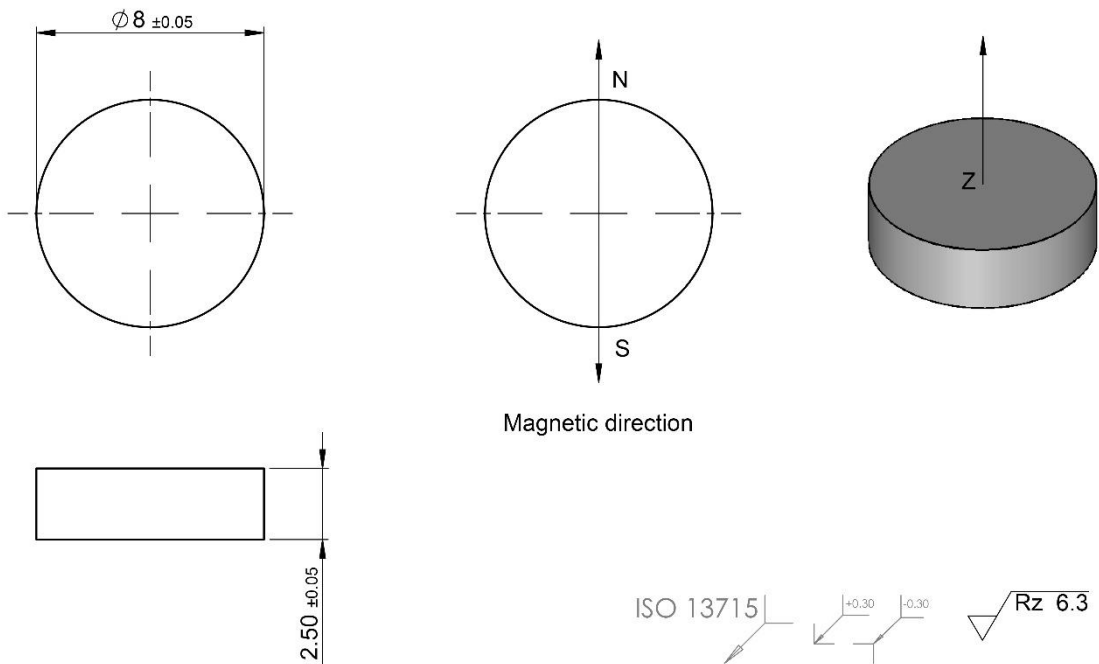
In human and machine-readable (Aztec code) format



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**12. Magnet**

Item No.	Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions	
501	Diameter	∅	7.95	8	8.05	mm		
502	Height		2.45	2.5	2.55	mm		
503	Magnetic direction	Diametral						
	Material	Sm2Co17 YXG-30H						
	Surface	Ni-Cu-Ni						
	Mass moment of inertia in Z-direction:	0.078 gcm <sup>2</sup>						
	Weight	0.98 g						
	Pre-annealed	2 hrs at 125°C						



(All dimensions in mm) Figure 6



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**13. Packaging Information**

3x WS-Sensor-WS-WFS-5-U0 on reel and 1x Diametral magnet in a box

Box dimensions 80x80x25mm

**14. Ordering Information**

Article Name	Article Number
WS-Wiegand Sensor Sample Kit	10058384

For orders of larger quantities, please contact our local representatives. Contact information can be found in Chapter 16 ("Contact information") or on our website.

**15. Revision History**

Rev.:	Date	By	Remarks
1.0	29.03.2023	EKE	Initial release, Wiegand sensor data as per WFS-5-U0 datasheet.

Editor: EKE

Reviewer: STY

Date: 29. 03. 2023

Module Type: WS-Wiegand Sensor Sample Kit





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All dimensions in [inch] mm. This drawing and the information contained is for general presentation purposes only. Please refer to the "Download" section for detailed technical drawings.

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