DATA SHEET
WIEGAND SENSOR WS-WFS-5-U0

- Wiegand Sensor for energy harvesting multiturn encoders using the Wiegand effect to generate energy from a rotating magnetic field*
- Optimized for operation with the multiturn 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

* The use of Wiegand Sensors, especially in rotary encoders, may be protected by worldwide patents of third parties and therefore may require licensing. For more information, please contact our support.

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 $U_{Pi,Average} - 4\sigma >= U_{P,min}$, 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	

*Whilst other capacitor values are possible, use with 6.8nF capacitance is recommended for optimal pulse performance.

2. Electrical Characteristics

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

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, FGluke 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	Input resistance	R_M		10		MΩ	Measurement device
407	Input capacitance	C_M		12		pF	Measurement device

Remarks

Magnet type: Diametral magnet, SmCo, dimensions ø 8 x 2.5 mm (Figure 1), article number 10034032

Data measured under ideal measuring conditions @2800rpm. Test setup is isolated from the external magnetic fields or other ferromagnetic components.

5. Magnet System

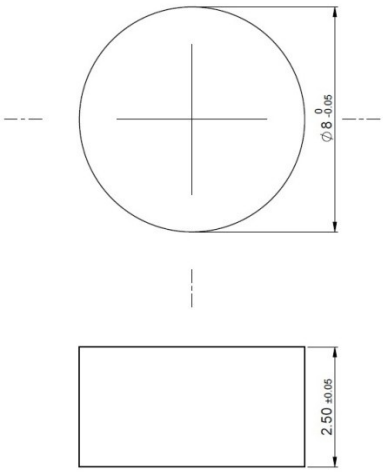


Figure 1

6. Test Circuit

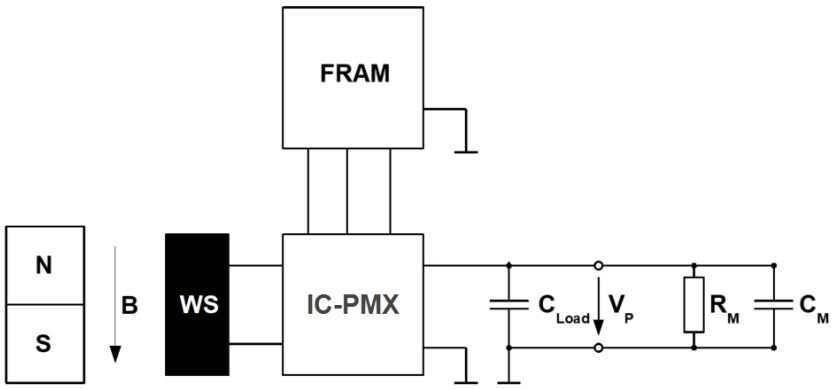


Figure 2

7. Typical Signal Wave

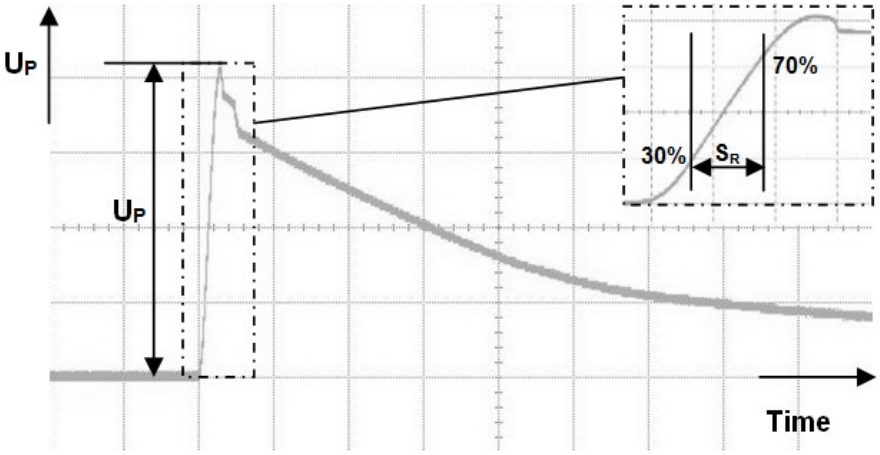


Figure 3

8. Declaration Trigger Point

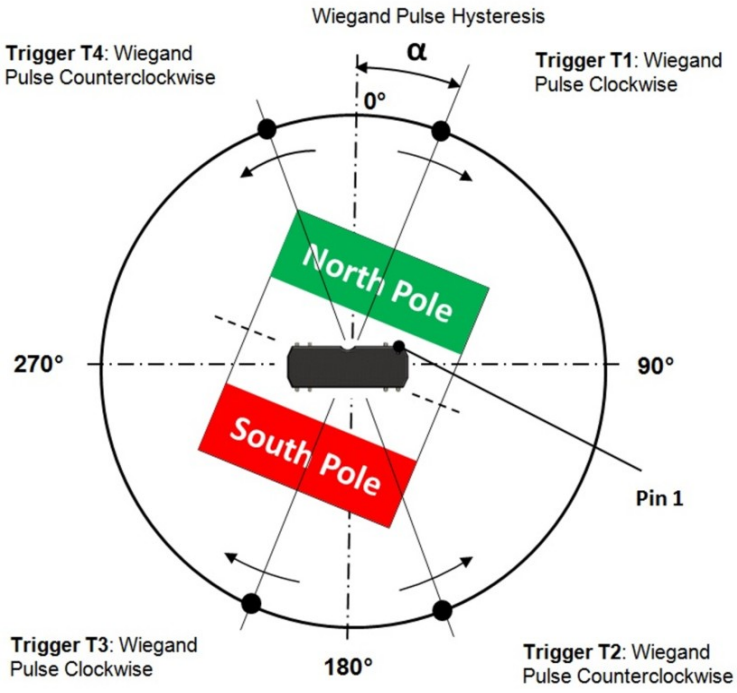
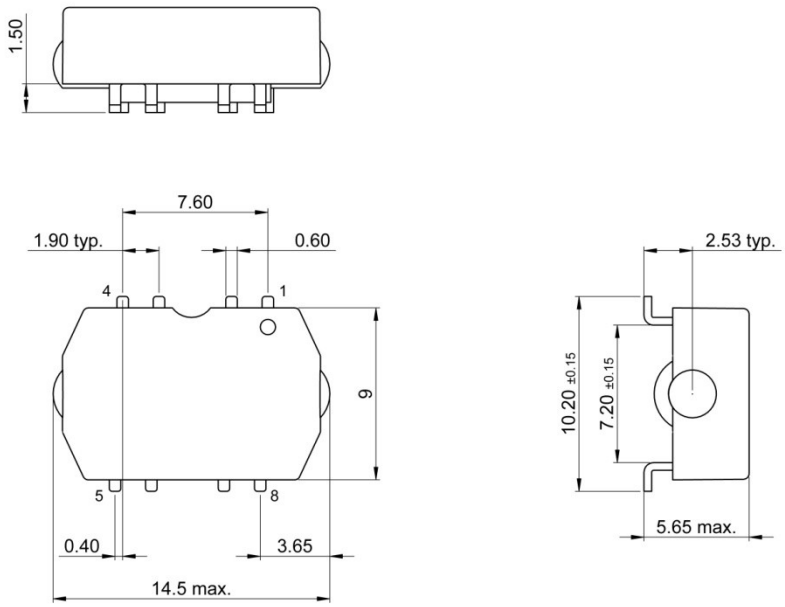


Figure 4

9. Component Dimension Type: WFS

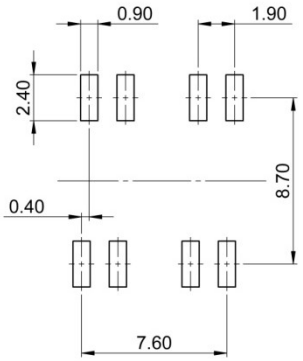


Coplanarity tolerance of leads 0.1 mm.

All dimension in mm.

(All dimensions are before soldering) Figure 5

10. Land Pattern Dimensions



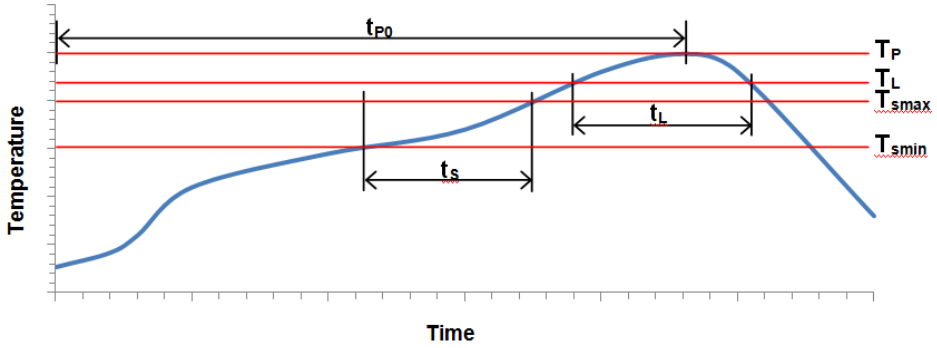
All dimension in mm.

Figure 6

Item No.	Parameter	Symbol	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 ΔQ ≈ 2 W for each contact pin (390 W/(kg*K) and ΔT_reflow of 170 K.
SMD package, suitable for reflow process
RoHS 2 Compatible

11. 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)

12. Labeling and Ordering Information

Laser-marked on top surface in human and machine-readable **QR** code format

Encoding: Type [space] 7-digit serial number

i.e. WFS5U0 0123456

Article Name	Article No.
WS-Sensor-WS-WFS-5-U0-QR on Reel	10053593

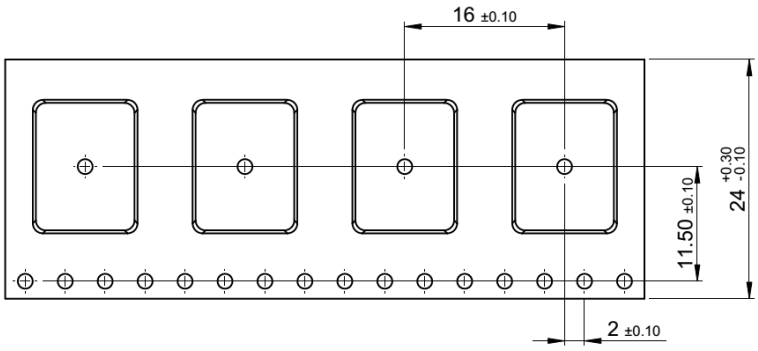
13. Packaging Information

Carrier tape (10054370) on 13-inch reel (10034119), in vacuum-sealed ESD bag

Standard packing quantity 700 pcs./reel

Connectors across to reel.

The packaging method may be different for non-standard quantities.



14. Revision History

Rev.:	Date	BY	Remarks
2.0	02.27.2018	MFO	Created UBITO standard product data sheet, copy from WFS-0-U0
2.1	19.10.2017	MFO	Updated Product Pictures
2.2	20.10.2017	MFO	Minor corrections: Title chapter 9 Label on product pictures
2.3	29.06.2018	TBE	Updated 203 Coil inductance and clarified conditions to “measured @10 kHz with magnet (polarity) parallel to wire axis.” 309 “Max. magnetic field exposure” wording changed to “Max. allowed external magnetic field to be applied to sensor not in operation” Added tray packing details Contact address for technical support team updated 403 definition changed to “x and y assembly tolerance”
2.4	20.12.2019	TBE	Title Changed ‘Wiegand wire sensor’ to ‚Wiegand sensor 101 Increased pulse count evaluation from 500 to 1000 Fig5 Added word ‘All dimensions before soldering’ 1002 Added ‘Sensor Mass’ to datasheet 311 added “Recommended floor life” to datasheet 309 maximum storage field strength reduced to 5mT Labelling Information image and Ordering Information updated.
2.5	21.04.2022	EKE	Updated logo. Page 1 picture changed from label version to laser-marked Section 12 wording updated. Section 13 wording updated, tray packaging removed. Section 14 article numbers updated. Section 16 details updated.
2.6	17.01.2025	EKE	Removed item 406 and re-numbered. Combined section 14 into section 12. Updated section 15 contact information. Updated end of document disclaimer.
2.7	14.04.2025	EKE	Updated licensing note on Pg. 1 Added RPM in section 4 remarks.
2.8	30.05.2025	EKE	Updated RPM in section 4 remarks. Removed Aztec article information in section 12.

Editor: EKE

Reviewer: TBE

Date: 30 May 2025

Module Type: WS-WFS-5-U0

15. Technical Information

For technical support, information about prices and terms of delivery please go to

https://www.posital.com/

https://ubito.com/

- support@fraba.com

All dimensions in [inch] mm. The information and figures contained are for general presentation purposes only. Please refer to https://ubito.com/en/resources for detailed technical drawings.