

# SPS1M001

## Product Preview

# Battery Free Wireless Sensor

## Quality Control Water Intrusion Sensor

ON Semiconductor's family of Battery Free Wireless Sensors are UHF RFID wireless sensors which use the MagnusS2<sup>®</sup> Sensor IC and can perform moisture and proximity sensing functions in a variety of applications. These are designed for use in enclosed areas where size and accessibility is at a premium.

The quality control water intrusion sensor is specifically designed for the passive sensing of moisture in finished goods as a form of leak detection. The sensors can be placed in specific areas of the object and greatly simplifies the quality control test for leaks. This Battery Free Wireless Sensor can reduce the number of missed defects and significantly improve the quality of manufacturing lines.

### Features

- Single IC, Battery Free Wireless Moisture Sensing
- Small form factor package: 76 x 20 x 2.0 mm
- 64 bit TID and 128bit EPC + 144 bit User Defined Memory
- EPC Class 1 Gen 2 v.2.0.0 ISO 18 000–6C Compliant
- Designed for use on Metal
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

### MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise noted)

Rating	Symbol	Max	Unit
Human Body Model (Note 1)	ESD	±1	kV

### THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Junction and Storage Temperature range	T <sub>J</sub> , T <sub>stg</sub>	-20 to +60	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Non-repetitive current pulse at T<sub>A</sub> = 25°C, per JS-001 waveform



ON Semiconductor<sup>®</sup>

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RF TAG 166X20 MM  
CASE 888AH/AJ

### ORDERING INFORMATION

See detailed ordering and shipping information on page 3 of this data sheet.

This document contains information on a product under development. ON Semiconductor reserves the right to change or discontinue this product without notice.

# SPS1M001

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency	f	860		960	MHz
Read Sensitivity	R <sub>sens</sub>	-16			dBm
Identification	TID	64			Bit
	EPC	128			
	ROM	144			

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## Moisture Sensing

The SPS1M001 is a wireless battery free sensor. The SPSM001 incorporates an integrated RF antenna allowing it to harvest energy and report back wet environments from a standard UHF compliant reader. The sensor includes a strong and easy to apply adhesive backing.

The SPS1M001 generates sensor codes from 0 to 31. With as little as one drop of water (0.05 ml) placed on the sensor yields a sensor value 5 codes lower than the dry test. Due to the Smart Passive Sensors' self-tuning capability, the sensor also shifts over frequency as it tunes itself to maximize

reflected power to the reader. This makes it important to account for the frequency at which the sensor was read. For both the wet and dry tests seen in Figure 1, the resulting sensor values shifted around 5 codes over the FCC frequency range of 902–928 MHz. This factor must be accounted for in the reader software in order to ensure reliable wet vs. dry reads. For more information on how Smart Passive Sensors generate sensor codes, please refer to Application Note AND9209/D.

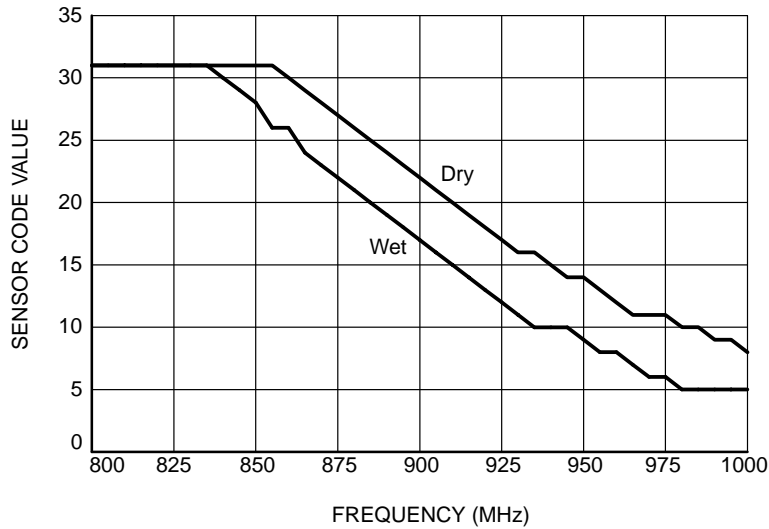


Figure 1. Sensor Code for Wet and Dry Conditions

# SPS1M001

## ORDERING INFORMATION

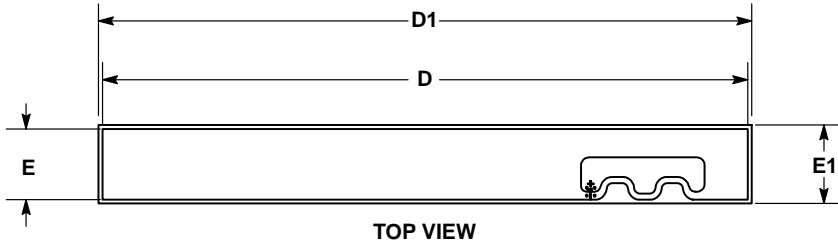
Device	UHF Band	Package Case Code	EPC Code	Shipping†
SPS1M002A	FCC 902–928 MHz	888AJ	undefined	500 / Bag
SPS1M002B	ETSI 866–868 MHz	888AH	undefined	500 / Bag
SPS1M002A–01	FCC 902–928 MHz	888AJ	–01	1000 / Reel
SPS1M002A–02	FCC 902–928 MHz	888AJ	–02	1000 / Reel
SPS1M002A–03	FCC 902–928 MHz	888AJ	–03	1000 / Reel
SPS1M002A–04	FCC 902–928 MHz	888AJ	–04	1000 / Reel
SPS1M002A–05	FCC 902–928 MHz	888AJ	–05	1000 / Reel
SPS1M002A–06	FCC 902–928 MHz	888AJ	–06	1000 / Reel
SPS1M002A–07	FCC 902–928 MHz	888AJ	–07	1000 / Reel
SPS1M002A–08	FCC 902–928 MHz	888AJ	–08	1000 / Reel
SPS1M002A–09	FCC 902–928 MHz	888AJ	–09	1000 / Reel
SPS1M002A–10	FCC 902–928 MHz	888AJ	–10	1000 / Reel

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

# SPS1M001

## PACKAGE DIMENSIONS

RF TAG 166.5x20mm  
CASE 888AH  
ISSUE O

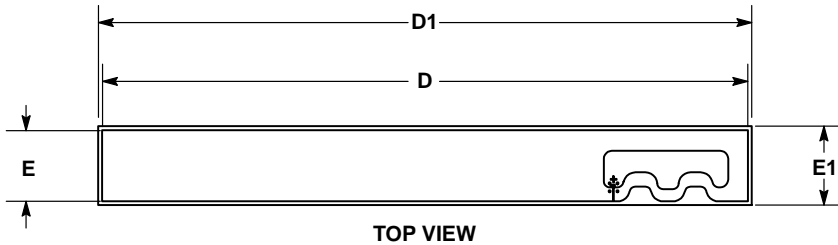


**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. ANTENNA SIZE DETERMINED BY DIMENSIONS D AND E.
4. LABEL SIZE DETERMINED BY DIMENSIONS D1 AND E1.
5. LABEL IS 0.076 THICK PET TAPE. ANTENNA IS 0.009 THICK ALUMINUM.

DIM	MILLIMETERS		
	MIN	NOM	MAX
D	165.40	165.50	165.60
E	17.90	18.00	18.10
D1	166.40	166.50	166.60
E1	19.90	20.00	20.10

RF TAG 165x20mm  
CASE 888AJ  
ISSUE O




**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. ANTENNA SIZE DETERMINED BY DIMENSIONS D AND E.
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5. LABEL IS 0.076 THICK PET TAPE. ANTENNA IS 0.009 THICK ALUMINUM.

DIM	MILLIMETERS		
	MIN	NOM	MAX
D	163.60	163.70	163.80
E	17.90	18.00	18.10
D1	165.60	165.70	165.80
E1	19.90	20.00	20.10

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