

无电池无线传感器

安森美半导体的无电池无线传感器系列为UHF RFID无线传感器，使用MagnusS2[®]传感器IC，并且可在尺寸和可接入性要求较高的各种应用中，执行湿度/距离检测功能，或温度/距离检测功能。

无电池无线传感器将检测到的湿度检测/湿度或温度信息数字化，再由符合UHF RFID Gen 2标准的读取器读取这些信息。传感器标签将在FCC定义的UHF波段或ETSI UHF波段内工作。

产品特性

- 单一IC，无电池无线检测
- 小型封装
- 64位TID和128位EPC + 144位用户定义存储器
- 兼容EPC 1类2代v.2.0.0 ISO 18 000-6C
- 此类器件无铅、无卤/无BFR，且符合RoHS。

MAXIMUM RATINGS (T_A = 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 (Note 2)	T _J , T _{stg}	-40 to +85	°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.

(参考譯文)

如果电压超过最大额定值表中列出的值范围，器件可能会损坏。如果超过任何这些限值，将无法保证器件功能，可能会导致器件损坏，影响可靠性。

1. Non-repetitive current pulse at T_A = 25°C, per JS-001 waveform.
2. Shelf Life – minimum 2 years from date of manufacturing.

本文档包含某些正在开发的产品信息。安森美半导体有权更改或停止供应这些产品，恕不另行通知。

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Device	Frequency (MHz)		Read Sensitivity (dBm)	TID (Bits)	EPC (Bits)	ROM (Bits)
	Min	Max	Min	Min	Min	Min
SPS1M001	860	960	-16	64	128	144
SPS1M002	860	960	-16	64	128	144
SPS1M003	860	960	-16	64	128	144
SPS2T001	860	960	-16	64	128	176

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.

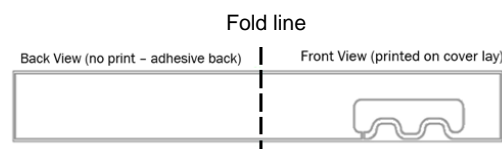
(参考譯文)

除非另有说明，“电气特性”表格中列出的是所列测试条件下的产品性能参数。如果在不同条件下运行，产品性能可能与“电气特性”表格中所列性能参数不一致。

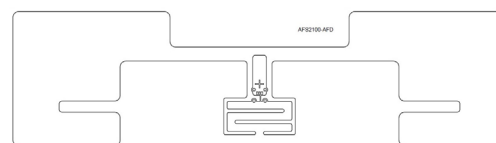


ON Semiconductor[®]

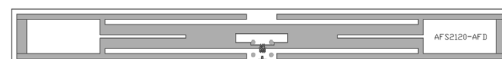
www.onsemi.cn



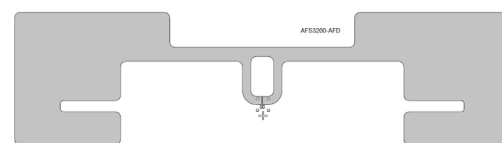
SPS1M001 – CASES 888AH/888AJ



SPS1M002 – CASES 888AD/888AE



SPS1M003 – CASES 888AB/888AC



SPS2T001 – CASES 888AF/888AG

ORDERING INFORMATION

See detailed ordering and shipping information on page 4 of this data sheet.

SPSx系列

传感器标签说明

SPS1M001 – 质量控制用浸水检测传感器标签

质量控制用浸水检测传感器标签专门设计用于对成品湿度进行无源检测，是一种泄漏检测器件。传感器可放置在物体的特定区域内，极大地简化了对于泄漏的质量控制检测。这款无电池无线传感器可减少遗漏缺陷数量，显著提高生产线的质量。

SPS1M002 – 湿度检测传感器标签

湿度检测传感器标签专门设计用于对各种表面和成品(如塑料、木材和石膏)的湿度进行无源检测。传感器标签将湿度检测/湿度信息数字化，再由符合UHF RFID Gen 2标准的读取器读取这些信息。这款无电池无线传感器可大幅提升最终产品的可靠性，为工业环境中的部署提供诸多好处。

SPS1M003 – 高灵敏度湿度检测传感器标签

高灵敏度湿度检测传感器标签专门设计用于对不与标签接触的湿气进行无源检测。这款标签的灵敏度很高，可以透过多层材料检测湿度，因此特别适用于标签无法直接置于检测区域的情况。传感器标签将湿度检测/湿度信息数字化，再由符合UHF RFID Gen 2标准的读取器读取这些信息。这款无电池无线传感器可为多种应用环境中的部署提供诸多好处。

SPS2T001 – 温度检测传感器标签

温度检测传感器标签专门设计用于对标签所处环境的温度进行无源检测。传感器标签将检测到的温度信息数字化，再由符合UHF RFID Gen 2标准的读取器读取这些信息。这款无电池无线传感器可为工业和农业环境中的部署提供诸多好处。

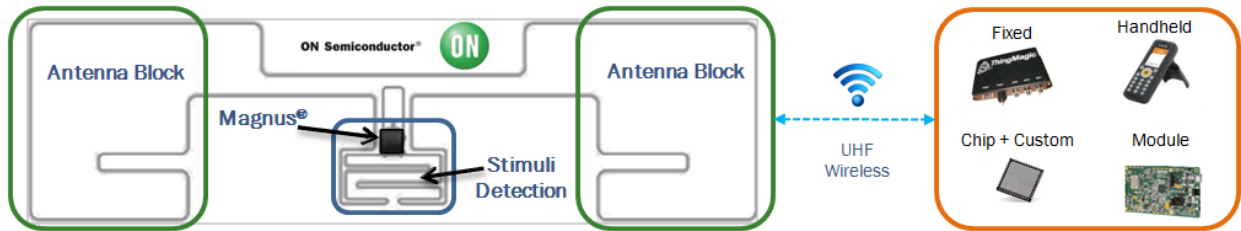
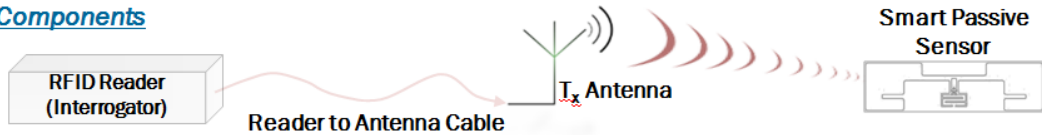


Figure 1. Battery Free Wireless Sensor Functional Block Diagram

Ecosystem Components

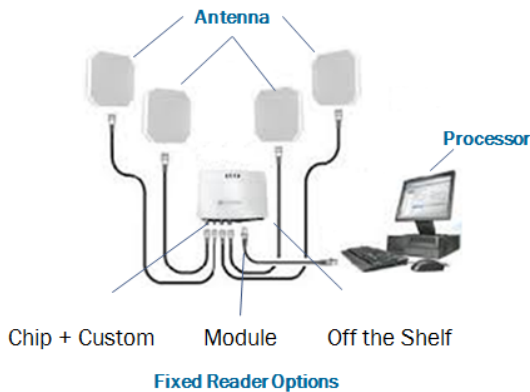


Fixed (Plug-in) Form Factors

- AC powered processor w/ separate display & wired antenna
- Pros:** Long range, Fast read time, Customizable software, Continuous/Automated Reading
- Cons:** Increased engineering time for ecosystem setup

Handheld (Portable) Form Factor

- Battery powered processor/display/antenna all-in-one
- Pros:** Portable, No connections, Easy setup, Simple interface
- Cons:** Reduced range, Longer read time



Fixed Reader Options



Handheld Reader + Antenna + Processor all in one

Figure 2. Battery Free Wireless Sensor Ecosystem Components

SPSx系列

可使用SPS1M-EVK无电池无线传感器手持式评估板，对传感器标签在最终应用中的性能进行评估。系统包含手持式读取器、充电器、托架和传感器标签样品。读取器预装了应用软件，只需单击按钮，即可

读取传感器标签并报告结果。如果读取器需要读取多个传感器标签，则会测量报告了最高接收功率的标签，而忽略其他标签。如需更多关于SPS1M-EVK操作的详细信息，请参阅[EVBUM2324/D](#)。

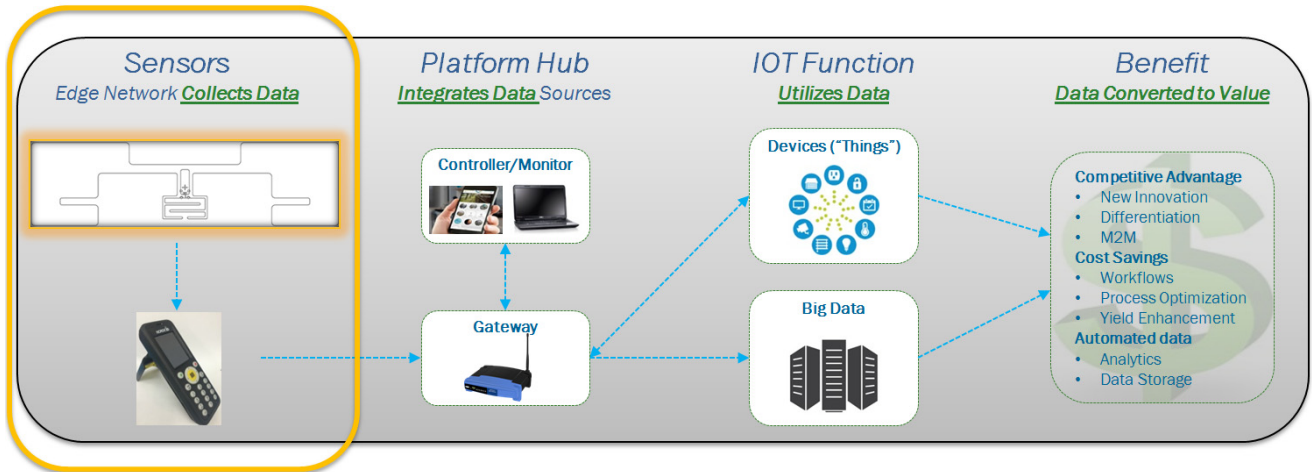


Figure 3. SPS1M-EVK Evaluation Kit within an IoT System

可使用SensorRF-GEVK IoT开发平台，探索和开发相应的应用程序来使用布置在Magnus-S芯片周围的无电池无线传感器。这款开发套件集成了平台中心的各

项功能，可使用外部天线收集传感器数据，然后将这些数据无缝整合到多个后端网络接口。

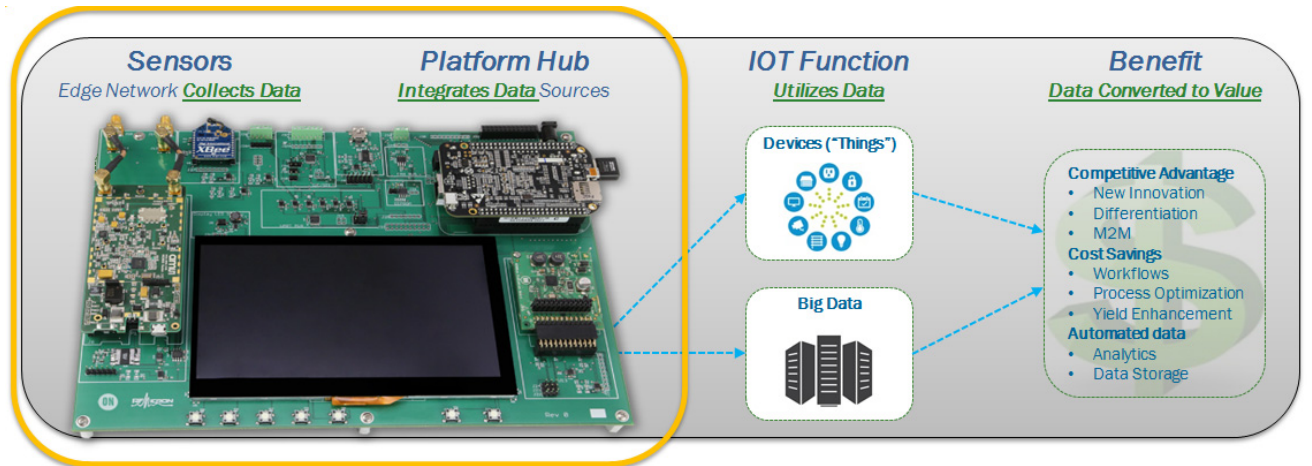




Figure 4. SensorRF-GEVK Developers Kit within an IoT System

SPSx系列

Readers with Verified Functionality for ON Semiconductor Smart Passive Sensor Tags

Manufacturer	Model <small>(click for link to full spec)</small>	Type	Max Power (dBm)	Max Power (W)	Dimensions (mm)	# Antennas (Max)	Reads Temperature	Reads Moisture	Reads Pressure
NordicID	 Morphic or SPS1M-EVK	Handheld	27	0.5	147 x 54 x 35	1	Yes	Yes	Yes
	Merlin	Handheld	30	1	250 x 105 x 175	1	Yes	Yes	Yes
	AR52	Fixed	30	1	210 x 121 x 31	16	Yes	Yes	Yes
ThingMagic	M6	Fixed	31.5	1.4	190 x 178 x 34	4	Lower Resolution ²	Yes	Yes
	M6e	Module	31.5	1.4	69 x 43 x 7.5	4	Lower Resolution ²	Yes	Yes
Impinj	Speedway	Fixed	32.5	1.8	190 x 175 x 30	4	Lower Resolution ²	Yes	Yes
Zebra	FX9500	Fixed	33	2	273 x 184 x 50	8	Lower Resolution ⁵	Yes	Yes
Thinkify	IR-265	Fixed	27	0.5	140 x 102 x 33	1	Yes	Yes	Yes
ON Semiconductor	 SensorRF-GEVK	SPS Developer Kit	30	1	279 x 216 x 51	2	Yes	Yes	Yes

ORDERING INFORMATION

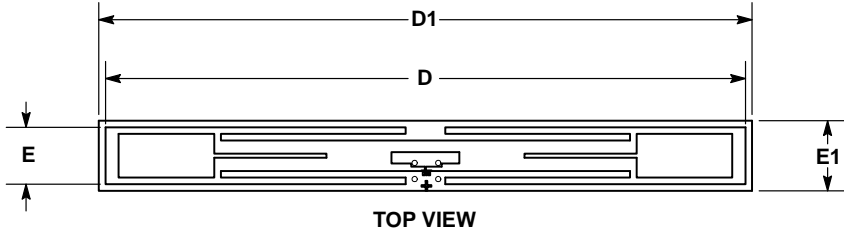
Device	Feature	UHF Band	Attach Material	Package Case Code	Shipping [†]
SPS1M001A	Moisture	FCC 902–928 MHz	Metal	888AJ	500 / Bulk Bag
SPS1M002A	Moisture		Non-metal	888AD	500 / Reel
SPS1M003A	Moisture		Non-metal	888AB	500 / Reel
SPS2T001A	Temperature		Non-metal	888AF	500 / Reel
SPS1M001B	Moisture	ETSI 866–868 MHz	Metal	888AH	500 / Bulk Bag
SPS1M002B	Moisture		Non-metal	888AE	500 / Reel
SPS1M003B	Moisture		Non-metal	888AC	500 / Reel
SPS2T001B	Temperature		Non-metal	888AG	500 / 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.

SPSx系列

PACKAGE DIMENSIONS

RF TAG 99.5x11.12mm
CASE 888AB
ISSUE O

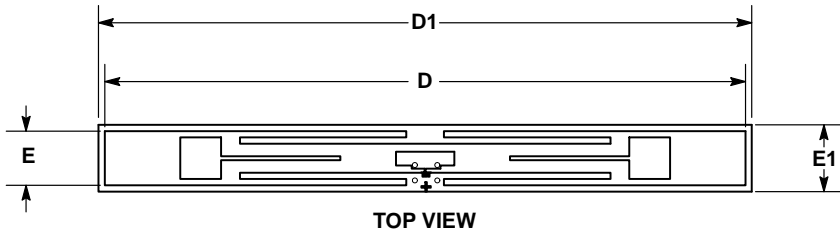


NOTES:

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	MAX
D	96.90	97.10
E	8.52	8.72
D1	98.50	99.50
E1	10.12	11.12

RF TAG 104.5x11.12mm
CASE 888AC
ISSUE O



NOTES:

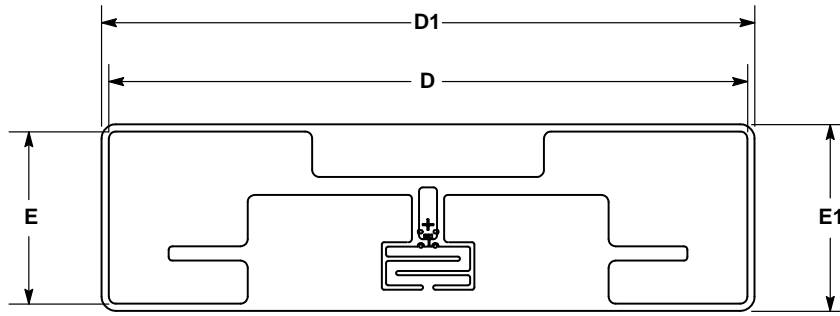
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2. CONTROLLING DIMENSION: MILLIMETERS.
3. ANTENNA SIZE DETERMINED BY DIMENSIONS D AND E.
4. LABEL SIZE DETERMINED BY DIMENSIONS D1 AND E1.
5. LABEL IS 0.076 THICK PET TAPE. ANTENNA IS 0.009 THICK ALUMINUM.

DIM	MILLIMETERS	
	MIN	MAX
D	101.90	102.10
E	8.52	8.72
D1	103.50	104.50
E1	10.12	11.12

SPSx系列

PACKAGE DIMENSIONS

RF TAG 91.5x26.5mm
CASE 888AD
ISSUE O



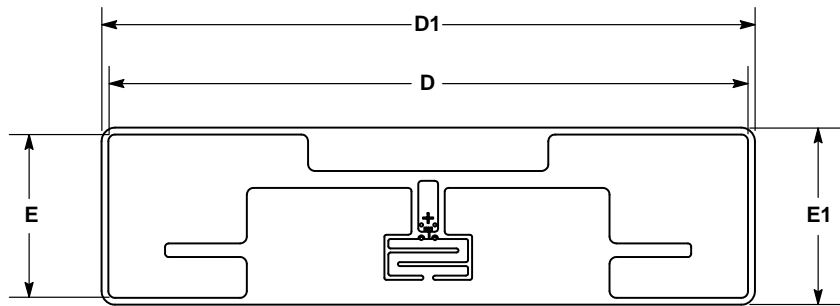
TOP VIEW

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	MAX
D	88.90	89.10
E	23.90	24.10
D1	90.50	91.50
E1	25.50	26.50

RF TAG 96.5x26.5mm
CASE 888AE
ISSUE O



TOP VIEW

NOTES:

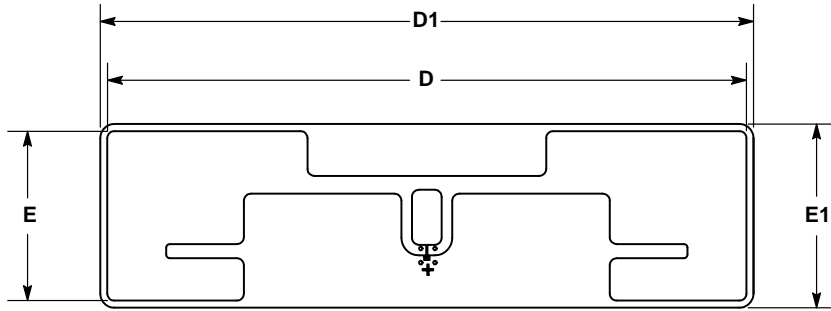
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2. CONTROLLING DIMENSION: MILLIMETERS.
3. ANTENNA SIZE DETERMINED BY DIMENSIONS D AND E.
4. LABEL SIZE DETERMINED BY DIMENSIONS D1 AND E1.
5. LABEL IS 0.076 THICK PET TAPE. ANTENNA IS 0.009 THICK ALUMINUM.

DIM	MILLIMETERS	
	MIN	MAX
D	93.90	94.10
E	23.90	24.10
D1	95.50	96.50
E1	25.50	26.50

SPSx系列

PACKAGE DIMENSIONS

RF TAG 93x26.5mm
CASE 888AF
ISSUE O



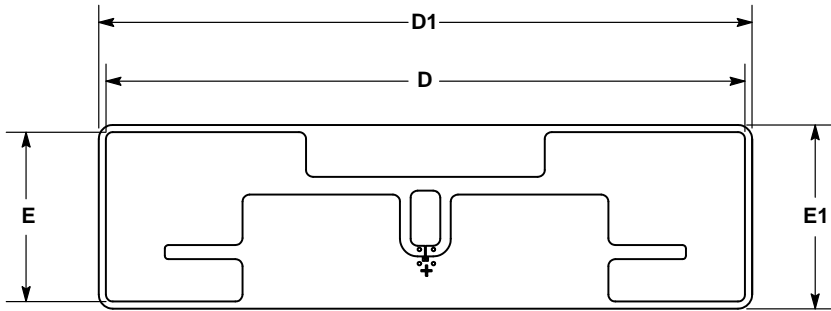
TOP VIEW

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	MAX
D	90.40	90.60
E	23.90	24.10
D1	92.00	93.00
E1	25.50	26.50

RF TAG 93x26.5mm
CASE 888AG
ISSUE O



TOP VIEW

NOTES:

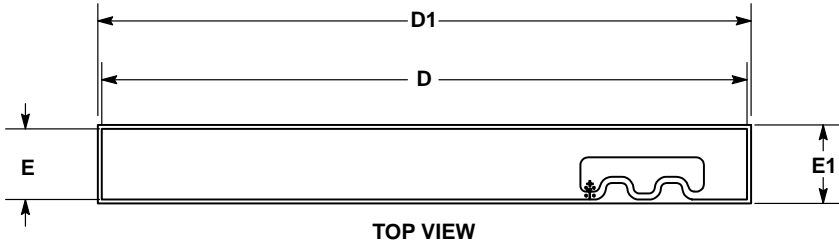
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2. CONTROLLING DIMENSION: MILLIMETERS.
3. ANTENNA SIZE DETERMINED BY DIMENSIONS D AND E.
4. LABEL SIZE DETERMINED BY DIMENSIONS D1 AND E1.
5. LABEL IS 0.076 THICK PET TAPE. ANTENNA IS 0.009 THICK ALUMINUM.

DIM	MILLIMETERS	
	MIN	MAX
D	90.40	90.60
E	23.90	24.10
D1	92.00	93.00
E1	25.50	26.50

SPSx系列

PACKAGE DIMENSIONS

RF TAG 166.5x20mm CASE 888AH ISSUE O

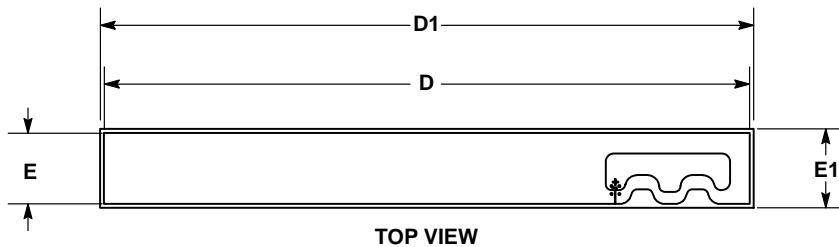


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1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS.
3. ANTENNA SIZE DETERMINED BY DIMENSIONS D AND E.
4. LABEL SIZE DETERMINED BY DIMENSIONS D1 AND E1.
5. LABEL IS 0.076 THICK PET TAPE. ANTENNA IS 0.009 THICK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