

通过MAGICSTRAP® 来实现印刷电路板的智能化

村田制作所



Green IT award颁奖 2013.9



株式会社村田制作所のRFID用（电子标签）主要的元件“MAGICSTRAP®”在JEITA（一般社团法人电子信息技术产业协会）的Green IT委员会（原Green IT推进协会）主办的2013Green IT颁奖中，获得了会长奖。

我公司的RFID（射频识别标签）用的关键装置“MAGICSTRAP®”因为使“电子设备的生命周期的可追溯性”成为可能，能够为“通过IT达到社会的节能”作出广泛的贡献因而获得了评价。

MAGICSTRAP®の原理

- 在电路板中追加最小尺寸的RFID标签功能。
- 被放进机罩中，或者包装后，都能够读取。

PCBにRFIDタグ機能を!



MAGICSTRAP®の主要概念

对电子设备的生命周期从研发初期到寿终正寝进行跟踪追溯。

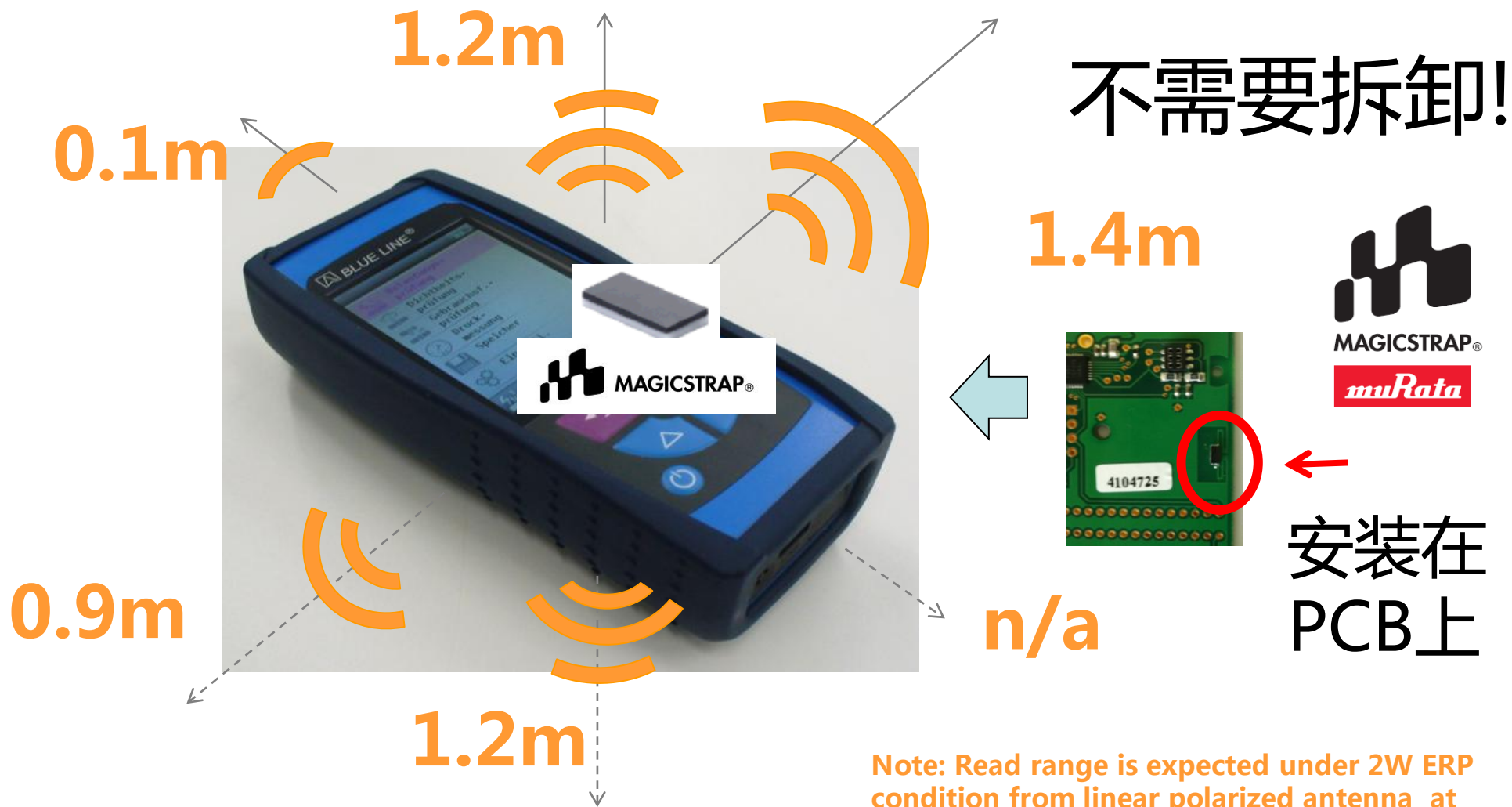


组装后的可读范 (2 wERP)

X

Z

Y



Note: Read range is expected under 2W ERP condition from linear polarized antenna at 865MHz.

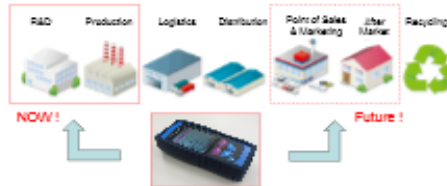
客户应用案例-PCB电路板管理

UHF RFID in Electronics

Use Cases of SYSTRONIK



Use case of Systronik



- O2M with own production
- Production partially by subcontractor
- tBAU: 10 - 50k pcs
- Closed loop (until now) - RFID only used in preview of O2M

S2600 Blue Line Series



- Product:
 - Portable Gas Sensor Tightness Checker
 - for regular heating systems check in private houses

Before



Printed Serial Number on sticker

- Fact:
- Printed serial number on sticker for traceability
 - In IC 1 (in circuit test), serial number was written into memory of controller, by connecting device to PC and then manually typing into memory
- Problems:
- Human errors
 - Sticker lost or unreadable
 - application of sticker only at end of PCBA process (reduced traceability data)

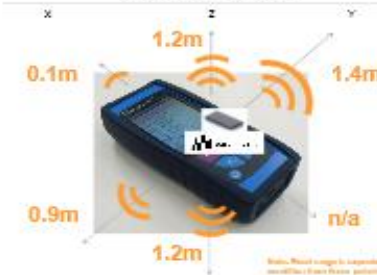
After



MAGICSTRAP on PCB

- Today:
- MAGICstrap on PCB
 - IC PC linked to components in placing process
 - Write calibration data in user memory of RFID
- Benefits:
- Advanced traceability
 - Calibration data available off-line and re-writable
 - No more human errors

Read Range



Screen shot of reader soft



Conclusion



- All use cases primarily located in production
- Subcontractor using even without selling PCB for higher price to end customer
- Further extension of RFID use already planned
- Step by step evolution
- ROI already through improvements in this step of value chain



And this is all just the beginning...



http://www.muRata.com

http://www.muRata.com/products/rfid.html



客户应用案例-PCB电路板管理



Last year, Jabil proposed using the RFID tags for subpieces, beyond storing board data. It says quickly and it manufacture the solution. PCB was, in opting to use tags is not pl already has.

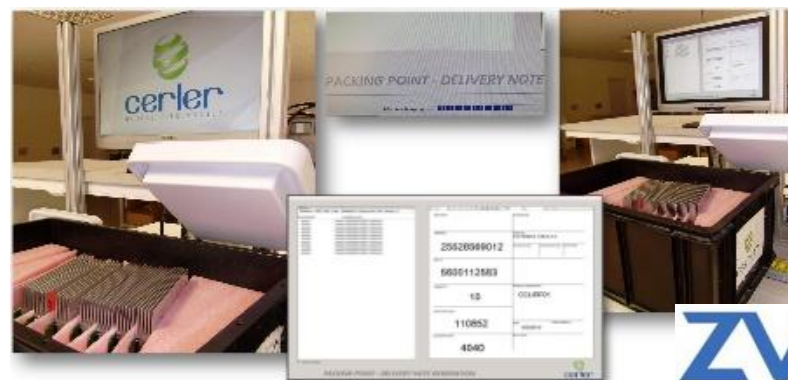
CISCO

...ion with Cisco. In addition, is, in order to verify that a sily, Favaro says, Cisco it. Authentication with RFID L since the company

Jabil proposes to maintain technology at 14 locations within its main production fac

JABIL

生産効率
80%改
善



WHOLE BOX READING AND DELIVERY NOTE GENERATION

合作企业的展示

IPC Apex Expo 2013,
San Diego, USA



Electronica 2012, Munich, Germany



试生产电路板中的内置事例



MAGIC-PCB®
Beta LAYOUT

Antenna design? Not necessary!

There is no need to design your own antenna in order to use your RFID chip.
Simply connect the existing PCB ground plane to your RFID chip.
Free download of design examples including the connection layout.

MAGIC-PCB®
Beta LAYOUT

What next?



MAGIC-PCB®
Beta LAYOUT

Acquire an RFID reader

Read/write the embedded chip using our UHF RFID Reader Kit



Only with PCB-POOL®!

Optionally for EVERY circuit board prototype order:

MAGIC-PCB®
The embedded RFID in your circuit board

FREE!



MAGIC-PCB®
Beta LAYOUT

In addition to the read/write modules, antennas, chips, and MAGIC-PCBs, our UHF RFID kit includes an extraordinary software package:

Only available with us!

SMART READER APP

- Read/write alphanumeric characters with a simple key stroke
- Is compatible with software such as Excel, WordPad, or your ERP system, without requiring any additional middleware
- Easy to link a tag memory with any website

READER SUITE

Intuitive configuration tools for testing and installation of RFID hardware

Further information:
www.magic-pcb.com/software

Enhance the range?

Up to 5 mm*
Without an antenna (as for MAGIC-PCB® overdelivery)

Increase the read/write range:

Up to approximately 10 cm*
Capacitive connection to an existing ground plane as an antenna

Up to several meters*
Electrical connection to an existing ground plane as an antenna; the RFID is readable - and written through housing and packaging

How much?

Free of charge A PCB-POOL® order worth more than €750 entitles you to a free RFID Starter Kit.

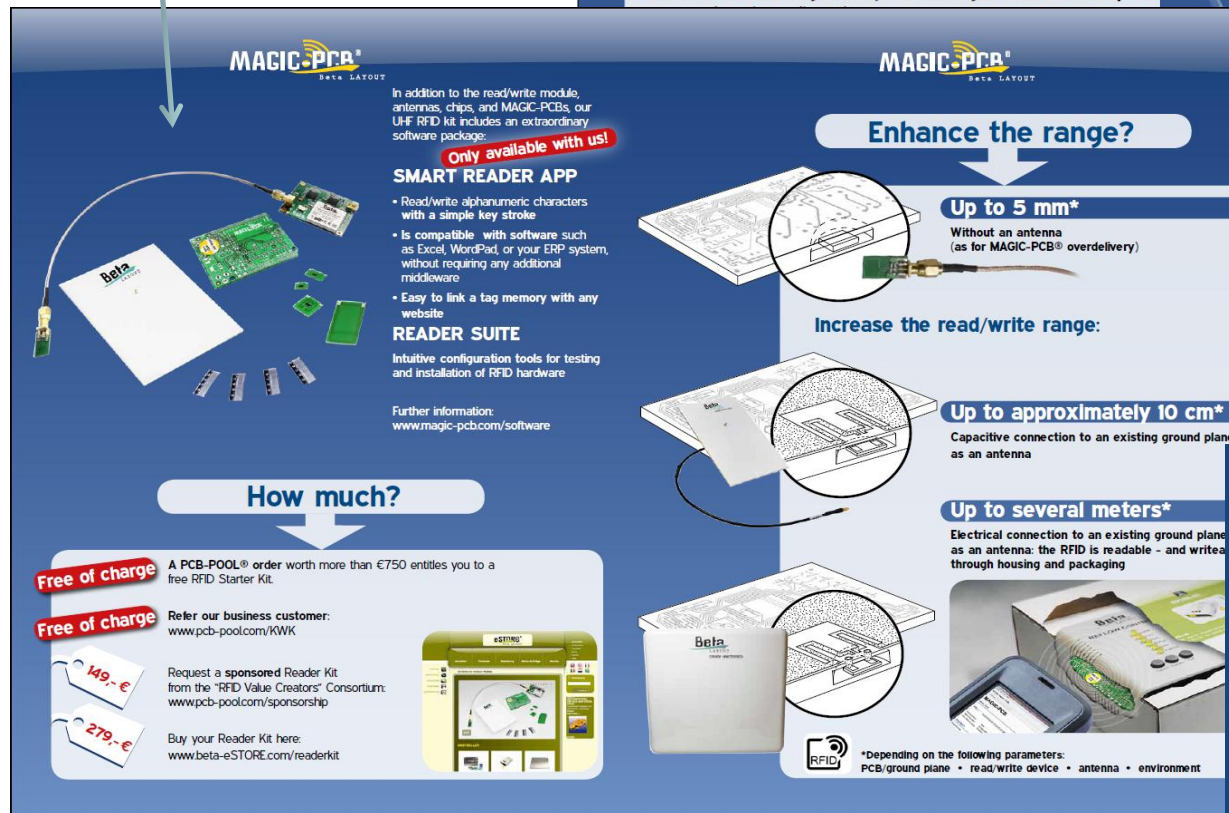
Free of charge Refer our business customer: www.pcb-pool.com/KWK

Request a **sponsored** Reader Kit from the "RFID Value Creators" Consortium: www.pcb-pool.com/sponsorship

Buy your Reader Kit here: www.beta-eSTORE.com/readerkit

RFID

*Depending on the following parameters:
PCB/ground plane • read/write device • antenna • environment

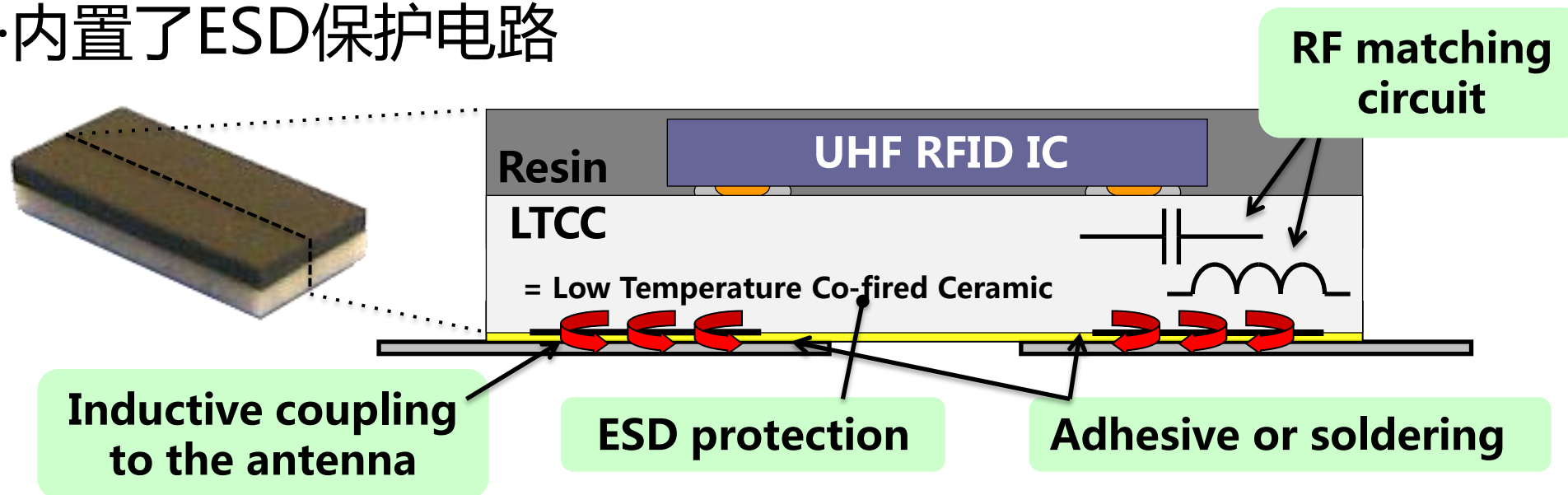


UHF MAGICSTRAP®

UHF频带 什么是MAGICSTRAP® ?

是实现了UHF频带电子标签的IC模块。

- 内置的IC符合世界标准EPC/g C1G2规格
- 阻抗变换功能覆盖的频率范围广
- 通过容量性结合可以用非导电性粘合剂来接续
- 内置了ESD保护电路

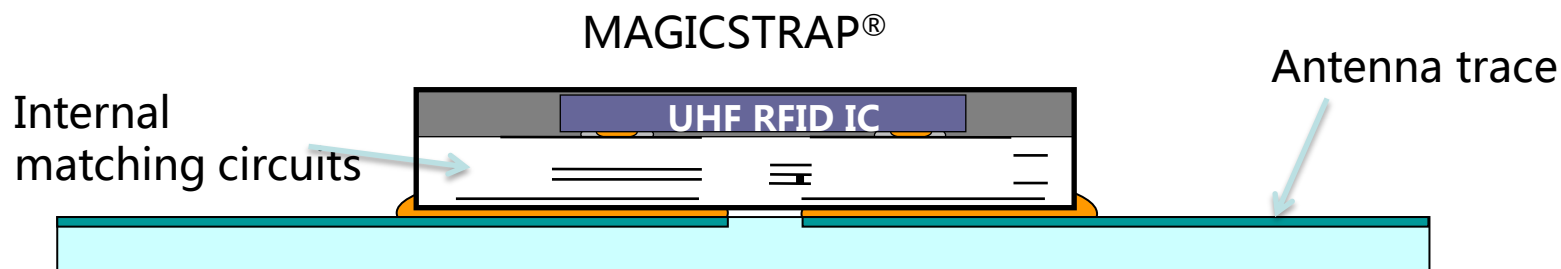


UHF频带MAGICSTRAP®的特征

MAGICSTRAP®中内置的高频整合电路涵盖了一般的电子标签的大部分的的天线功能。

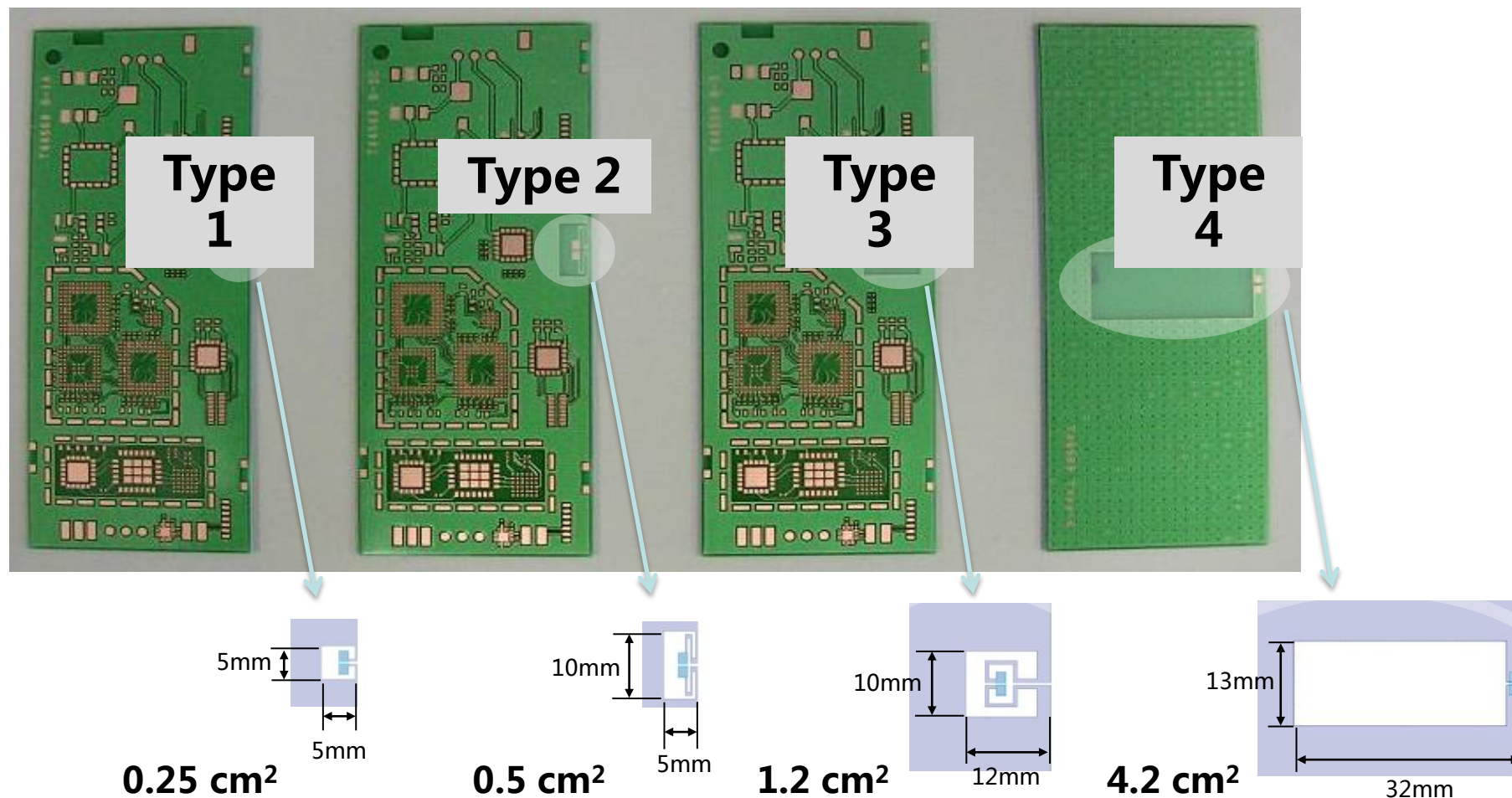
→外部天线简易化 → 为小型化做贡献

功能	一般的电子标签	MAGICSTRAP®的电子标签
和空间的无线电波交换	天线	天线
决定中心频率	天线	MAGICSTRAP®
阻抗整合·频带范围广	天线	MAGICSTRAP®



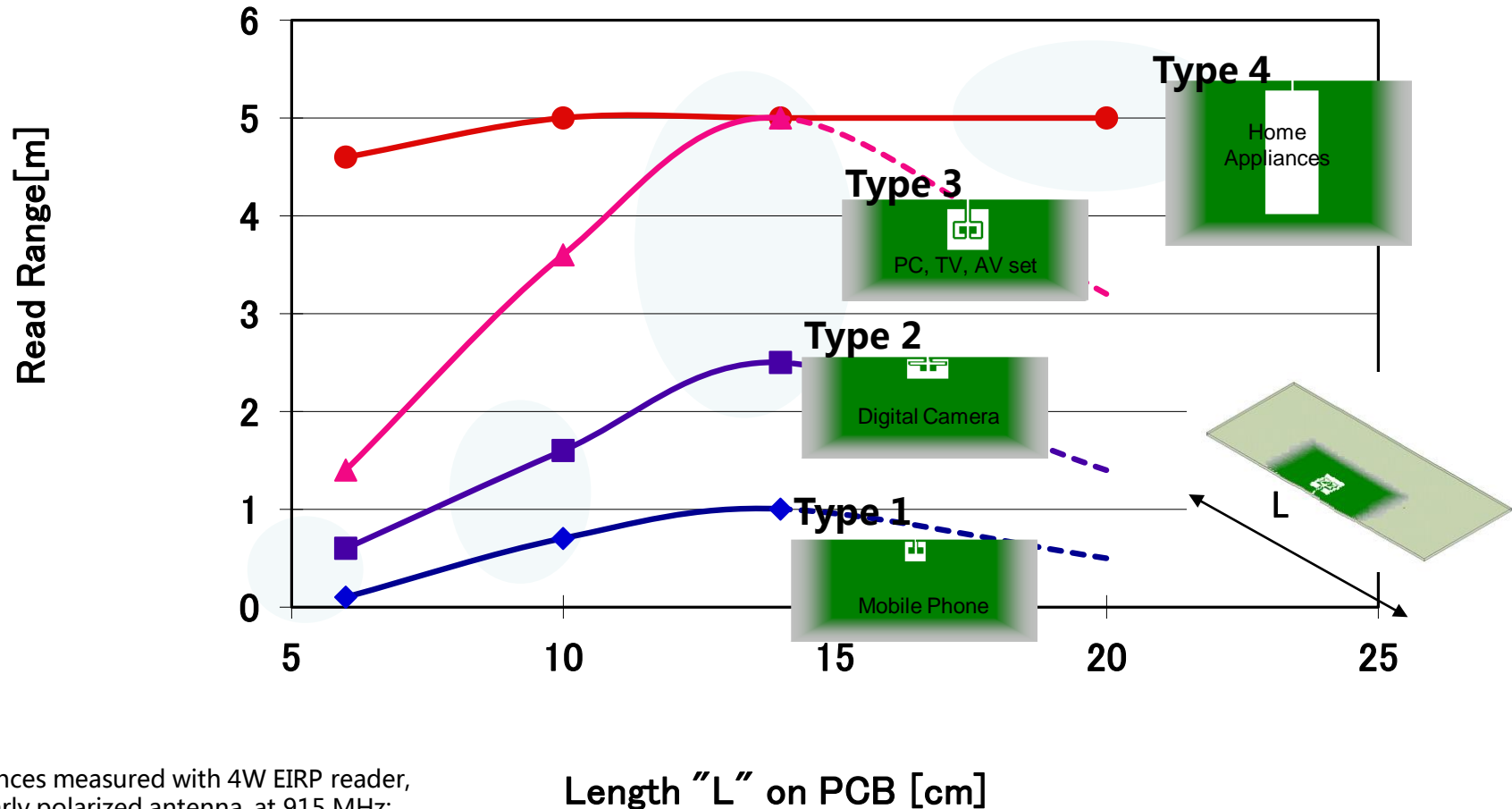
UHF频带MAGICSTRAP®的安装模式

对应读取距离和安装面积，提供了4种参考设计。



可预测的可读距离

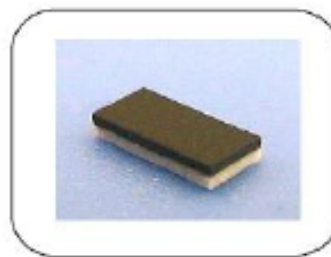
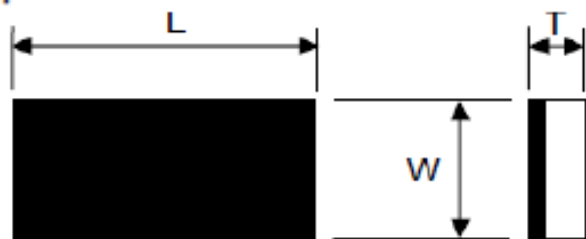
读写距离取决于Type和PCB有效接地面积。



Note: distances measured with 4W EIRP reader, 6dBi circularly polarized antenna, at 915 MHz; MAGICSTRAP® using NXP G2XL/M

Length "L" on PCB [cm]

<Top View>



<Side View>



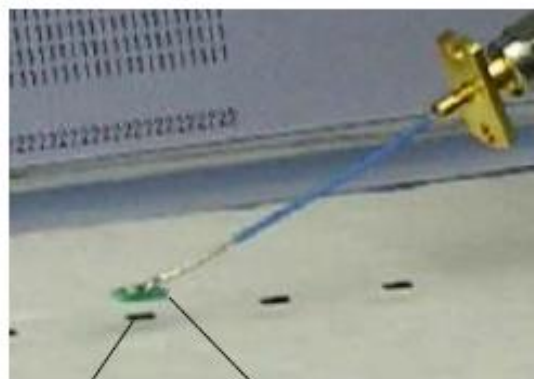
	L	W	T
LXMS31ACNA-***	3.2mm	1.6mm	0.55mm

P/N	Type	Z@866.5MHz	Z@915MHz
-009	Type 1	15-j45	25-j45
-010	Type 2	12-j107	12-j107
-011	Type 3	25-j200	25-j200
-012	Type 4	80-j405	80-j420

IC : NXP G2XM, 512bit user memory

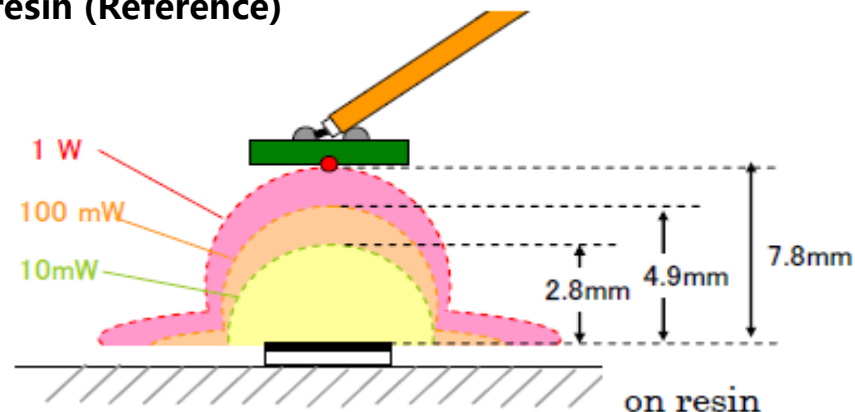
无需天线也能读取

近距离的话即使没有外部天线也可以读取

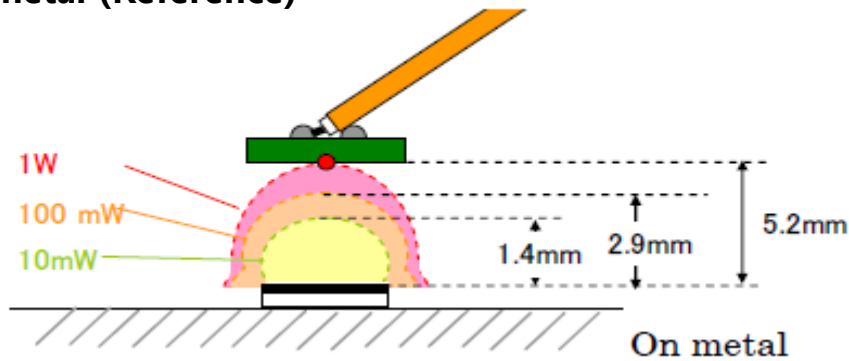


MAGICSTRAP® Antenna of reader (5 × 4mm)

On resin (Reference)



On metal (Reference)



稳定的读取性能（在村田已经完成了100%的筛选）

只有合格品才能出货

读取距离的基本一致

坚固

耐ESD性能

耐机械冲击

支持塑料成型工序

易操作

对安装位置的精确度要求不高（ $\pm 500\mu\text{m}$ ）

可以用焊料等导电性物质焊接，也可以用粘合剂等非导电性物质焊接（安装距离小于 $10\mu\text{m}$ ）

一般的SMD安装程序也能安装

MAGICSTRAP®与I2C 接口

无线设置、数据读取、故障记录



1. 电子设备的电源关闭时进行设置

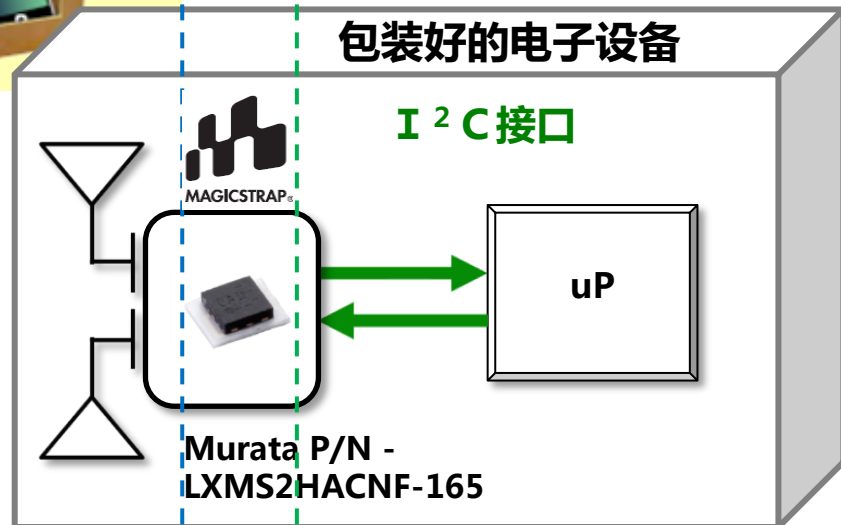


RFID读写器

供电指令和数据



2. 电子设备打开时设置成功并启动



可以替换的内置内存

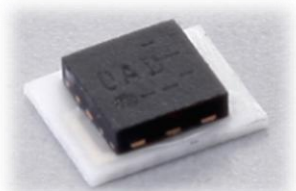
无线

双向通信

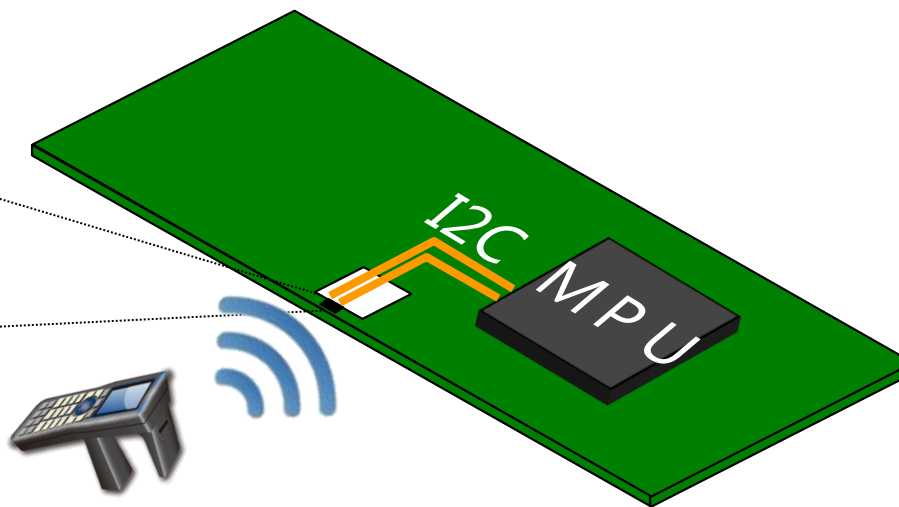
有线

功能图示

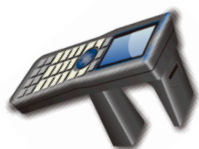
LXMS2HACNF-165



User memory : 3.3kbit
Interface : · RFID
 · I²C

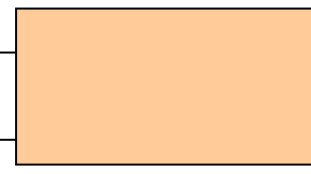


RFID读写器

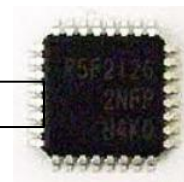


Read
Write

Antenna



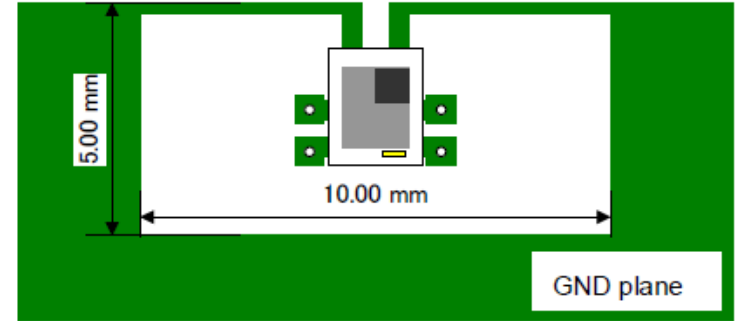
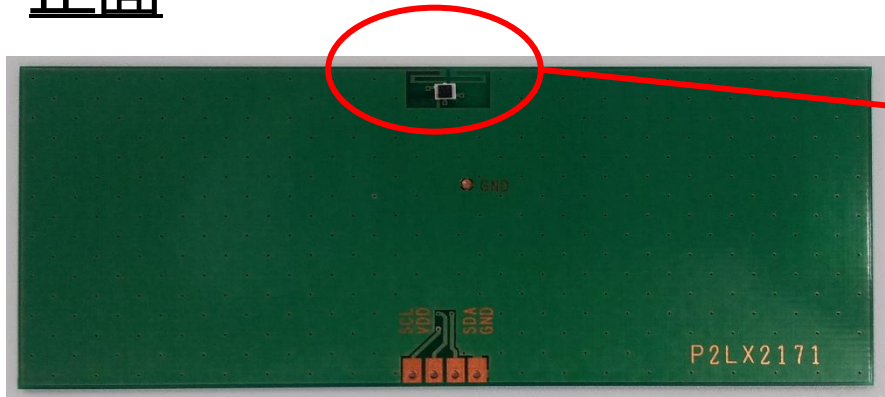
Read
Write



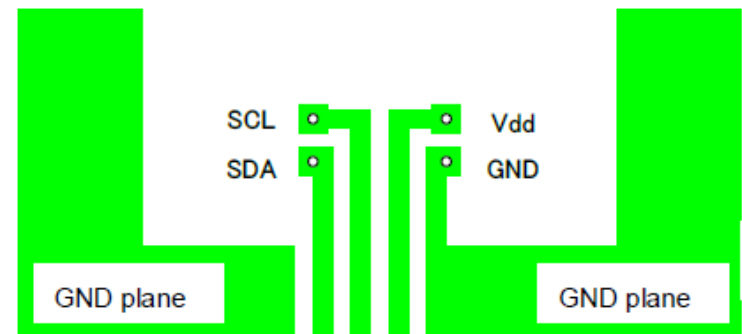
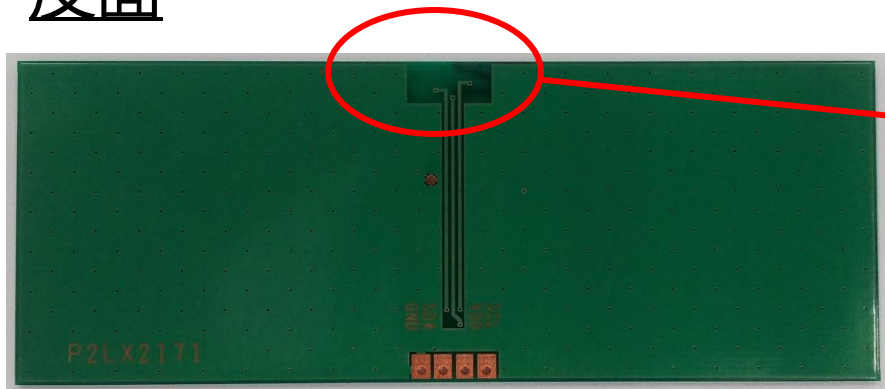
- 1) 用I2C 链接MCU和MAGICSTRAP[®]的内存
- 2) RFID 读写器也会链接MAGICSTRAP[®]的内存

安装图示

正面



反面



RFID的非局限性用途



不论是包装状态还是电源关闭状态都可以改变设置。

带I2C接口的

MAGICSTRAP®



- 应用实例
- 设定地域/语言
- 设定网络
- 设定接口
- 设定功率放大器
- 操作记录
- 设备校正
- 输入启动信号
- 传输原始数据



村田官网上的演示视频

<http://www.murata.co.jp/products/rfid/demonstration/index.html>

HF频带MAGICSTRAP®

HF MAGICSTRAP®是世界上最小的电子标签。内置天线，并且符合ISO15693标准。

	LXMSAPHA08-136	LXMS33HCNG-134
Appearance		
Standard	ISO15693	
Size	8.5mm x 8.5mm x 0.5mm	3.2mm x 3.2mm x 0.6mm
Thickness	0.5mm typ	0.6mm typ
Read range*	40mm	15mm

MAGICSTRAP®的用途

PCB电路板管理



MAGICSTRAP®
Turn your PCB into RFID tag!

Conventional PCB + MAGICSTRAP → Smart PCB with RFID Tag

- Traceability
- Inventory Control
- Anti-Counterfeit

Use case 1

Cloud service

RFID Reader/Writer

Assembly, Test, Shipment, Maintenance / Service, Recycle

Inside Factory Management, After Market

Murata Murata Manufacturing Co., Ltd.

Head Office: Nagatsuta-cho, Ayase-City, Kanagawa Prefecture, Japan
 TEL: +81 (0)42752-2111, FAX: +81 (0)42752-2112, E-mail: magicstrap@murata.com

单个产品管理



MAGICSTRAP®
One of the world smallest RFID tag.

Verification

Anti-counterfeit, Auto counting

For anything small

Tool management, Authentication, Creature management

	LXMS21NC401-147	LXMS21HC401-134
Appearance		
Standard	ISO/IEC 18000-6 Type C, EPC/2 C1G2	ISO15693
Frequency band	UHF	HF
Size	3.2 x 1.2mm	3.2 x 3.2mm
Thickness	0.2mm max.	0.2mm max.
Read range (ISO15693 compliant)	5mm	15mm

Murata Murata Manufacturing Co., Ltd.

Head Office: Nagatsuta-cho, Ayase-City, Kanagawa Prefecture, Japan
 TEL: +81 (0)42752-2111, FAX: +81 (0)42752-2112, E-mail: magicstrap@murata.com

请浏览本公司官网获取更多信息！

Product Pickup



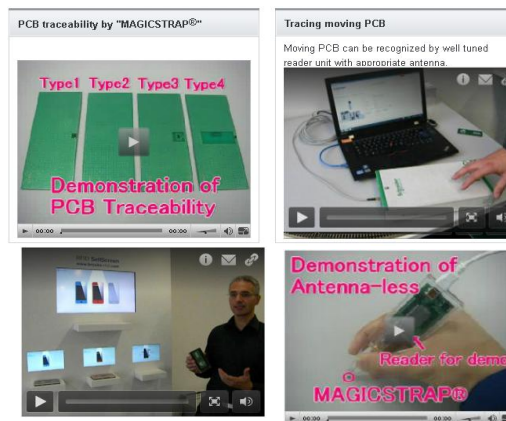
Data Sheets & Application Notes

UHF MAGICSTRAP® 3216 size

- UHF MAGICSTRAP® 3216 size Data Sheet (PDF: 280KB) UPDATE Nov, 2012
- UHF MAGICSTRAP® 3216 size Application Notes (PDF: 580KB) UPDATE Nov, 2012
- UHF MAGICSTRAP® 3216 size for antenna less use (PDF: 330KB) UPDATE Nov, 2012

RFID PCB

Product Demonstration Videos



Technical Articles & Presentations



Partners



MAGICSTRAP® Tutorial

