

# RI-I02-112X-03 Tag-it™ HF-I Plus Transponder Inlays Large Rectangle

Check for Samples: [RI-I02-112A-03](#)

## 1 Features

- ISO/IEC 15693-2, -3; ISO/IEC 18000-3 Compliant
- 13.56-MHz Operating Frequency
- 2048-Bit User Memory in 64 blocks × 32-Bit
- User and Factory Lock Per Block
- Application Family Identifier (AFI)
- Data Storage Format Identifier (DSFID)
- Combined Inventory Read Block Command

## 2 Applications

- Product Authentication
- Library
- Supply-Chain Management
- Asset Management
- Ticketing/Stored Value

## 3 Description

Texas Instruments Tag-it™ HF-I plus transponder inlays consist of 13.56-MHz high-frequency (HF) transponders that are compliant with the ISO/IEC 15693 and ISO/IEC 18000-3 global open standards. These products offer a user-accessible memory of 2048 bits, organized in 64 blocks, and an extensive command set available in six different antenna shapes, with frequency offset for integration into paper, PVC, or other substrates.

The Tag-it HF-I plus transponder inlays are manufactured with TI's patented laser tuning process to provide consistent read performance. Prior to delivery, the transponders undergo complete functional and parametric testing in order to provide the high quality that customers have come to expect from TI.

The Tag-it HF-I plus transponder inlays are well suited for a variety of applications including, but not limited to, product authentication, library, supply-chain management, asset management, and ticketing/stored value applications.

### Device Information<sup>(1)</sup>

PART NUMBER	PACKAGE	BODY SIZE (NOM)
RI-I02-112A-03	TFF	45.00 mm x 76.00 mm
RI-I02-112B-03	TFF	45.00 mm x 76.00 mm

(1) For all available packages, see the orderable addendum at the end of the datasheet.



## 4 Revision History

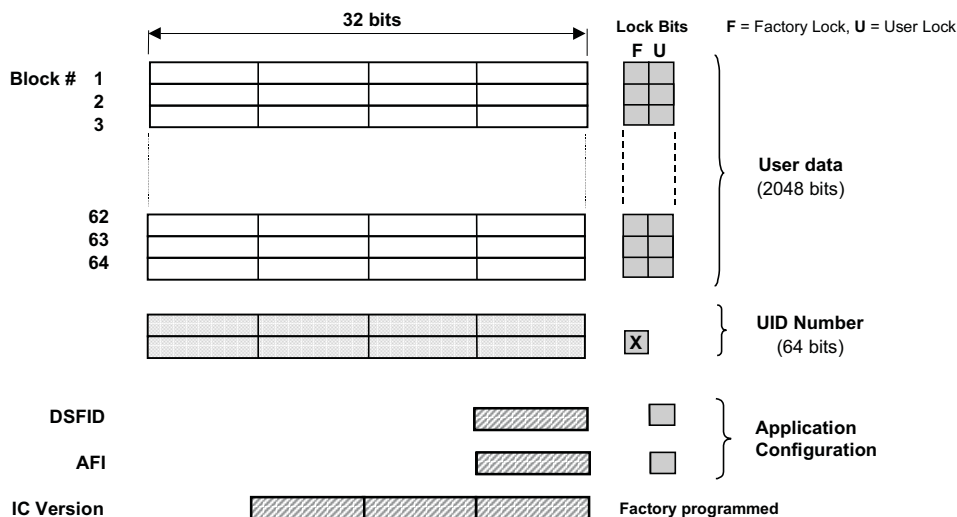
### Changes from Revision A (April 2010) to Revision B

### Page

- |  |   |
|--|---|
| • Changed feature from 64 bits x 32-bit blocks to 64 blocks x 32-Bit ..... | 1 |
| • Changed spec from 64 bits x 32-bit blocks to 64 blocks x 32-Bit .....    | 3 |

## 5 Pin Configuration and Functions

### Memory Organization



## 6 Specifications

**Table 1. Specifications<sup>(1)</sup>**

	PART NUMBER	
	RI-I02-112A-03	RI-I02-112B-03
Supported standard	ISO/IEC 15693-2, -3; ISO/IEC 18000-3	
Recommended operating frequency	13.56 MHz	
Passive resonance frequency (at 25°C)	13.86 MHz ±200 kHz (includes frequency offset to compensate further integration into paper)	14.4 MHz ±200 kHz (includes frequency offset to compensate PVC lamination)
Typical required activation field strength to read (at 25°C)	94 dBμA/m <sup>(2)</sup>	94 dBμA/m <sup>(3)</sup>
Typical required activation field strength to write (at 25°C)	97 dBμA/m <sup>(2)</sup>	97 dBμA/m <sup>(3)</sup>
Factory-programmed read-only number	64 bits	
Memory (user programmable)	2k bits organized in 64 blocks × 32-Bit	
Typical programming cycles (at 25°C)	100,000	
Data retention time (at 55°C)	>10 years	
Simultaneous identification of tags	Up to 50 tags per second (reader/antenna dependent)	
Antenna size	45 mm × 76 mm (~1.77 in × ~2.99 in)	
Foil width	48 mm ± 0.5 mm (1.89 in ± 0.02 in)	
Foil pitch	96 mm +0.1 mm/–0.4 mm (~3.78 in)	
Thickness	Chip area: 0.34 mm ±0.02 Antenna area (AI both sides): 0.085 mm ±0.01 Antenna area (AI one side): 0.075 mm ±0.008	
Base material	Substrate: PET (polyethylenetherephthalate); Antenna: aluminum	
Smallest bending radius allowed	18 mm (~0.71 in)	
Operating temperature	–25°C to 70°C	
Storage temperature (single inlay)	–40°C to 85°C (warping may occur at upper temperature range)	
Storage temperature (on reel)	–40°C to 40°C	

(1) For highest possible read-out coverage, operate readers at a modulation depth of 20% or higher.

(2) After integration into paper

(3) After PVC lamination

Table 1. Specifications<sup>(1)</sup> (continued)

	PART NUMBER	
	RI-I02-112A-03	RI-I02-112B-03
Delivery	Single-row tape wound on cardboard reel with 500-mm diameter Reel outer width: approximately 60 mm (about 2.36 inches) Reel inner width: approximately 50 mm (about 1.97 inches) Hub diameter: 76.2 mm (3 in)	
Typical quantity of good units per reel	5000	

Table 2. Supported Command Set

REQUEST	REQUEST MODE <sup>(1)</sup>						
	REQUEST CODE	INVENTORY	ADDRESSED	NON-ADDRESSED	SELECT	AFI	OPT. FLAG
<b>ISO 15693 Mandatory and Optional Commands</b>							
Inventory	0x01	✓	–	–	–	✓	0
Stay Quiet	0x02	–	✓	–	–	–	0
Read_Single_Block	0x20	✓	✓	✓	✓	✓	0/1
Write_Single_Block	0x21	–	✓	✓	✓	–	1
Lock_Block	0x22	–	✓	✓	✓	–	1
Read_Multi_Blocks	0x23	✓	✓	✓	✓	✓	0/1
Select Tag	0x25	–	✓	–	–	–	0
Reset to Ready	0x26	–	✓	✓	✓	–	0
Write_AFI	0x27	–	✓	✓	✓	–	1
Lock_AFI	0x28	–	✓	✓	✓	–	1
Write DSFID	0x29	–	✓	✓	✓	–	1
Lock DSFID	0x2A	–	✓	✓	✓	–	1
Get_System_info	0x2B	✓	✓	✓	✓	✓	0
Get_M_BLK_Sec_St	0x2C	✓	✓	✓	✓	✓	0
<b>TI Custom Commands</b>							
Write_2_Blocks	0xA2	–	✓	✓	✓	–	1
Lock_2_Blocks	0xA3	–	✓	✓	✓	–	1

(1) ✓ = Implemented, – = Not applicable

## 7 Device and Documentation Support

### 7.1 Related Links

The table below lists quick access links. Categories include technical documents, support and community resources, tools and software, and quick access to sample or buy.

**Table 3. Related Links**

PARTS	PRODUCT FOLDER	SAMPLE & BUY	TECHNICAL DOCUMENTS	TOOLS & SOFTWARE	SUPPORT & COMMUNITY
RI-I02-112A-03	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>
RI-I02-112B-03	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>	<a href="#">Click here</a>

### 7.2 Trademarks

Tag-it is a trademark of Texas Instruments.

### 7.3 Electrostatic Discharge Caution



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

### 7.4 Glossary

[SLYZ022](#) — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

## 8 Mechanical, Packaging, and Orderable Information

The following pages include mechanical packaging and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

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### Products

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Amplifiers	<a href="http://amplifier.ti.com">amplifier.ti.com</a>
Data Converters	<a href="http://dataconverter.ti.com">dataconverter.ti.com</a>
DLP® Products	<a href="http://www.dlp.com">www.dlp.com</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>
Clocks and Timers	<a href="http://www.ti.com/clocks">www.ti.com/clocks</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>
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RFID	<a href="http://www.ti-rfid.com">www.ti-rfid.com</a>
OMAP Applications Processors	<a href="http://www.ti.com/omap">www.ti.com/omap</a>
Wireless Connectivity	<a href="http://www.ti.com/wirelessconnectivity">www.ti.com/wirelessconnectivity</a>

### Applications

Automotive and Transportation	<a href="http://www.ti.com/automotive">www.ti.com/automotive</a>
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Consumer Electronics	<a href="http://www.ti.com/consumer-apps">www.ti.com/consumer-apps</a>
Energy and Lighting	<a href="http://www.ti.com/energy">www.ti.com/energy</a>
Industrial	<a href="http://www.ti.com/industrial">www.ti.com/industrial</a>
Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
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