

Tag-it™ HF-I PLUS TRANSPONDER INLAYS SQUARE

Check for Samples: [RI-I11-112A-03](#), [RI-I11-112B-03](#)

FEATURES

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

APPLICATIONS

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



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.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of the Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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Table 1. SPECIFICATIONS⁽¹⁾

	PART NUMBER	
	RI-I11-112A-03	RI-I11-112B-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 \pm 200 kHz (includes frequency offset to compensate further integration into paper)	14.4 MHz \pm 200 kHz (includes frequency offset to compensate PVC lamination)
Typical required activation field strength to read (at 25°C)	98 dB μ A/m ⁽²⁾	98 dB μ A/m ⁽³⁾
Typical required activation field strength to write (at 25°C)	101 dB μ A/m ⁽²⁾	101 dB μ A/m ⁽³⁾
Factory-programmed read-only number	64 bits	
Memory (user programmable)	2k bits organized in 64-bit \times 32-bit blocks	
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 \times 45 mm (~1.77 in \times ~1.77 in)	
Foil width	48 mm \pm 0.5 mm (1.89 in \pm 0.02 in)	
Foil pitch	50.8 mm \pm 0.1 mm/–0.4 mm (2 in)	
Thickness	Chip area: 0.34 mm \pm 0.02 Antenna area (Al both sides): 0.085 mm \pm 0.01 Antenna area (Al one side): 0.075 mm \pm 0.008	
Base material	Substrate: PET (polyethyleneterephthalate); 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	
Delivery	Single-row tape wound on cardboard reel with 500-mm diameter Reel outer width: approximately 60 mm (~2.36 in) Reel inner width: approximately 50 mm (~1.97 in) Hub diameter: 76.2 mm (3 in)	
Typical quantity of good units per reel	5,000	

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

(2) After integration into paper

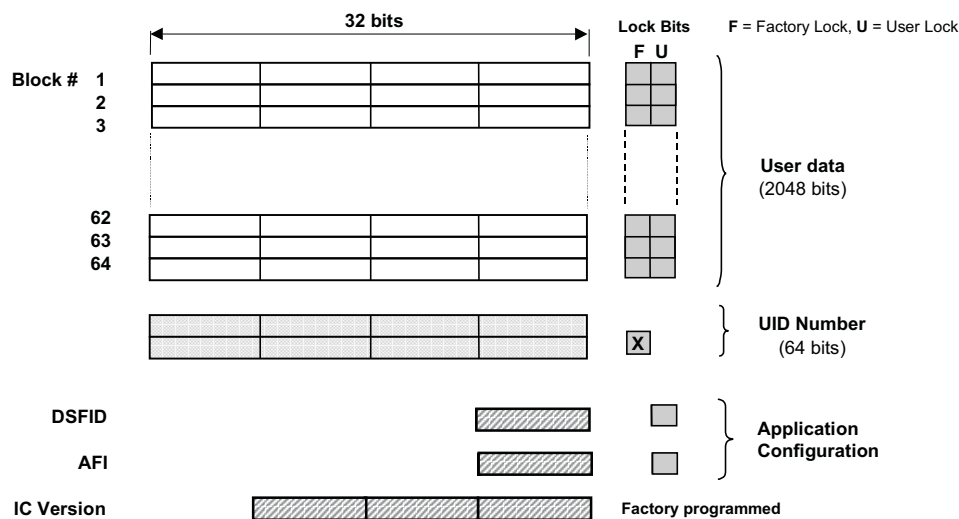
(3) After PVC lamination

Table 2. SUPPORTED COMMAND SET

REQUEST	REQUEST MODE ⁽¹⁾						
	REQUEST CODE	INVENTORY	ADDRESSED	NON-ADDRESSED	SELECT	AFI	OPT. FLAG
ISO 15693 Mandatory and Optional Commands							
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
TI Custom Commands							
Write_2_Blocks	0xA2	–	✓	✓	✓	–	1
Lock_2_Blocks	0xA3	–	✓	✓	✓	–	1

(1) ✓ = Implemented, – = Not applicable

MEMORY ORGANIZATION



PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
RI-I11-112A-03	ACTIVE	RFIDN	TFB	0	5000	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	-25 to 70		Samples
RI-I11-112A-30	OBSOLETE	RFIDN	TFB	0		TBD	Call TI	Call TI			
RI-I11-112B-03	NRND	RFIDN	TFB	0	5000	Pb-Free (RoHS)	Call TI	N / A for Pkg Type	-25 to 70		

(1) The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

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