RFID Systems
Product Specifications

Overview

Texas Instruments Radio Frequency Identification Systems is an industry leader in RFID technology, and the world's largest integrated manufacturer of TI-RFid™ tags, TI-RFid smart labels, and TI-RFid reader systems. With more than 1 billion RFID tags manufactured, TI-RFid technology is used in a broad range of RFID applications worldwide. TI is an active member of many standards bodies, including ISO, ISO/IEC, ECMA International, ETSI, and several national standardization bodies working to drive the adoption of global standards for RFID technology.

HF Reader ICs

Part Number	TRF7960	TRF7961
Operating Frequency	13.56 MHz	13.56 MHz
Supported Protocols	ISO 15693 ISO 18000-3 (Mode 1) ISO 14443A & B	ISO 15693 ISO 18000-3 (Mode 1)
Operating Voltage	2.7 V to 5.5 Vdc	2.7 to 5.5 Vdc
Current Consumption	Transmit: 200mW @ 120 mA, typ. 100mW @ 70 mA, typ. Active (RX only): 10 mA, typ. Stand-by: 120 µA Power down: <1 µA	Transmit: 200mW @ 120 mA, typ. 100mW @ 70 mA, typ. Active (RX only): 10 mA, typ. Stand-by: 120 µA Power down: <1 µA
Transmitter Power	Adjustable power, 100mW or 200mW at 5 Vdc	Adjustable power, 100mW or 200mW at 5 Vdc
Transmitter Modulation	ASK, adjustable 8% to 30% OOK	ASK, adjustable 8% to 30% OOK
Communication Interface	Parallel 8-bit or 4-wire SPI	Parallel 8-bit or 4-wire SPI
Operating Temperature	–40°C to +110°C	–40°C to +110°C
Storage Temperature	–55°C to +150°C	–55°C to +150°C
Package	32-pin QFN (5 mm × 5 mm)	32-pin QFN (5 mm × 5 mm)
Packing / Delivery	Tape-on Reel, 250 or 3000 per reel	Tape-on Reel, 250 or 3000 per reel

LF Reader Types

Part Number	TMS3705A1DRG4	RI-RFM-003B	RI-RFM-007B	RI-RFM-008B	RI-ACC-008B
Type	IC (SO 16)	Mini RFM Module	High-Performance RFM	Remote Antenna RFM	Antenna Tuning Board
Typical Read Range*	up to 20 cm	up to 60 cm	up to 200 cm	up to 200 cm	up to 200 cm
Interface	I/O	I/O	I/O**	I/O**	Antenna Terminals
Operating Frequency	134.2 kHz	134.2 kHz	134.2 kHz	134.2 kHz	134.2 kHz
Operating Voltage	4.5Vdc...5.5Vdc	5Vdc	7Vdc...24Vdc	7Vdc...24Vdc	
Part Number	**RI-CTL-MB2B**	**RI-CTL-MB6B**	**RI-STU-MRD1**	**RI-STU-251B**	
Type	Digital Contr. Module	Digital Contr. Module	Reader Module	Reader/Writer	
Typical Read Range*			up to 30 cm	up to 200 cm	
Interface	RS-232, USB	RS-422/485, USB	(RS-232, TTL level)	RS-232/422/485	
Operating Frequency			134.2 kHz	134.2 kHz	
Operating Voltage	7Vdc...25Vdc	7Vdc...25Vdc	5Vdc	10Vdc...24Vdc	

* Dependent on the configuration used, the RF regulation in country of use and the environmental condition
** Modules RI-CTL-MB2B/RI-CTL-MB6B have to be combined with RFM modules

LF Antenna Types

Part Number	RI-ANT-S01C, RI-ANT-S02C	RI-ANT-P02A	RI-ANT-G01E	RI-ANT-G02E	RI-ANT-G04E
Type	Stick	Stick	Gate	Gate	Gate
Inductance	27µH	116µH	27µH	27µH	26µH
Dimensions	140 ± 2 × 21 ± 2 (dia.) mm	133 ± 1 × 21.3 ± 1 (dia.) mm	715 × 270 × 25 mm	200 × 200 × 25 mm	1018 × 518 × 47 mm
Operating Temperature	–30 to 70°C	–30 to 70°C	–30 to 60°C	–30 to 60°C	–30 to 60°C
Protection Class	IP66	IP65	IP65	IP65	IP44

LF Transponders

Part Number	RI-TRP-R9BK, RI-TRP-W9WK, RI-TRP-M9WK	RI-TRP-RR3P, RI-TRP-WR3P, RI-TRP-REHP, RI-TRP-WEHP	RI-INL-RR2B, RI-TRP-WR2B, RI-INL-DR2B, RI-TRP-RE2B/WE2B	RI-INL-R9QM, RI-INL-W9QM	RI-TRP-R9VS, RI-TRP-W9VS
Type	12 mm Wedge	23 mm Glass	32 mm Glass	24 mm Disk	Mount-on-Metal
Memory Types Available	R/O (64 bit), R/W (80 bit) Multi (32-bit UID, 208-bit R/W)	R/O (64 bit), R/W (80 bit)	R/O (64 bit), R/W (80 bit) MPT (1360 bit)	R/O (64 bit), R/W (80 bit)	R/O (64 bit), R/W (80 bit)
Typical Read Range*	up to 20 cm	up to 60 cm	up to 100 cm	up to 50 cm	up to 120 cm
Operating Frequency	134.2 kHz	134.2 kHz	134.2 kHz	134.2 kHz	134.2 kHz
Dimensions	12 × 6 × 3 mm	3.85 × 23.1 mm	3.85 × 31.2 mm	24 mm dia.	102 × 36 × 16.5 mm
Protection Class	IP68	Hermetically Sealed	Hermetically Sealed		IP67
Case Material	Plastic Compound	Glass	Glass		PP

Part Number	RI-TRP-R9QL, RI-TRP-W9QL	RI-TRP-R9UR, RI-TRP-W9UR	RI-TRP-RF0B, RI-TRP-WF0B	RI-TRP-R4FF, RI-TRP-W4FF	RI-TRP-R9TD, RI-TRP-W9TD
Type	30 mm Disk	85 mm Disk	Keyring Tag	Card	120 mm Cylindrical
Memory types available	R/O (64 bit), R/W (80 bit)	R/O (64 bit), R/W (80 bit)	R/O (64 bit), R/W (80 bit)	R/O (64 bit), R/W (80 bit)	R/O (64 bit), R/W (80 bit)
Typical Read Range*	up to 60 cm	up to 150 cm	up to 60 cm	up to 100 cm	up to 200 cm
Operating Frequency	134.2 kHz	134.2 kHz	134.2 kHz	134.2 kHz	134.2 kHz
Dimensions	29.4 × 8.4 mm	85.5 × 5.5 mm	10.5 × 37.5 mm	85.5 × 54 × 1.3 mm	21 × 121 mm
Protection Class	IP67	IP53	Hermetically Sealed	ISO 7810	IP67
Case Material	POM	ASA	ABS, Glass	PVC	PEI

* Dependent on the configuration used, the RF regulation in country of use and the environmental condition

PaLFI – Passive Low Frequency Interface

Part Number	TMS37157
Communication Interfaces	SPI, RFID, Direct Microcontroller Access via RFID
Operating Frequency	134.2kHz
Wired Communication Interface	3-wire SPI
Operating Voltage	2V to 3.6Vdc
Current Consumption	Active Mode Max: 150µA Power Down Mode: 60nA
Battery Charge Current	Max: 2mA
Memory	32-bit Unique Serial Number 968-bit EEPROM User Memory 8-bit Selective Address
Operating Temperature	–40°C to 85°C
Storage Temperature	–40°C to 125°C
Package	16-Pin VQFN (4 mm × 4 mm)
Packing / Delivery	Tape-on Reel, 3000 per reel

Texas Instruments
RFID

HF Packaged Transponders

Part Number	RF-HDT-DVBE	RF-HDT-DVBB	RI-TH1-CB1A
Type	22 mm Coin Overmolded	22 mm Coin Overmolded	Vicinity Card
Available Memory	256 bits organized in 8 × 32-bit blocks	2k bits organized in 64 × 32-bit blocks	2k bits organized in 64 × 32-bit blocks
Operating Frequency	13.56 MHz ± 300 kHz	13.56 MHz ± 300 kHz	13.56 MHz ± 200 kHz
Dimensions	Ø 22 ± 0.2 mm × 3 ± 0.2 mm	Ø 22 ± 0.2 mm × 3 ± 0.2 mm	85.6 mm × 54 mm × 0.76 mm (according ISO 7810)
Case Material	PPS, black	PPS, black	PVC (Polyvinyl chloride), white

Tag-it™ HF-I Plus Transponders Inlay

Part Number	RI-I11-112A-03 (square)	RI-I11-112B-03 (square)	RI-I02-112A-03 (rectangle-lg)	RI-I02-112B-03 (rectangle-lg)	RI-I03-112A-03 (rectangle-mini)	RI-I15-112B-03 (rectangle-med)	RI-I16-112A-03 (circular)	RI-I17-112A-03 (CD/DVD)
Supported Standards	ISO 15693, ISO/IEC 18000-3 (Mode 1)							
Available Memory	2k bits organized in 64 × 32-bit blocks							
Factory Programmed	64 bits							
Resource Frequency	13.86 MHz	14.4 MHz	13.86 MHz	14.4 MHz	13.86 MHz	14.1 MHz	13.7 MHz	13.8 MHz
Frequency Offset for Lamination Material	Paper	PVC	Paper	PVC	Paper/PVC	Paper/PVC	Paper/PVC	Paper/PVC
Antenna Size (mm)	45 × 45	45 × 45	45 × 76	45 × 76	22.5 × 38	34 × 65	Ø 24.2	Ø 32.5
Foil Width (mm)	48 mm ±0.5 mm							
Delivery	Single row tape with 48-mm foil width wound on cardboard reel							

Tag-it™ HF-I Pro Transponder Inlays Features – Password Write/Password Kill Functionality

Part Number	RI-I11-114A-S1 (square)	RI-I11-114B-S1 (square)	RI-I02-114A-S1 (rectangle-lg)	RI-I02-114B-S1 (rectangle-lg)	RI-I03-114A-S1 (rectangle-mini)	RI-I16-114A-S1 (circular)	RI-I17-114A-S1 (CD/DVD)
Supported Standards	ISO 15693; ISO/IEC 18000-3 (Mode 1)						
Available Memory	256 bits organized in 8 × 32-bit blocks						
Factory Programmed	64 bits						
Resource Frequency	13.86 MHz	14.4 MHz	13.86 MHz	14.4 MHz	13.86 MHz	13.7 MHz	13.8 MHz
Frequency Offset for Lamination Material	Paper	PVC	Paper	PVC	Paper/PVC	Paper/PVC	Paper/PVC
Antenna Size (mm)	45 × 45	45 × 45	45 × 76	45 × 76	22.5 × 38	Ø 24.2	Ø 32.5
Foil Width (mm)	48 mm ±0.5 mm						
Delivery	Single row tape with 48-mm foil width wound on cardboard reel						

Tag-it™ HF-I Standard Transponder Inlays

Part Number	RI-I11-114A-01 (square)	RI-I11-114B-01 (square)	RI-I02-114A-01 (rectangle-lg)	RI-I02-114B-01 (rectangle-lg)	RI-I03-114-01 (rectangle-mini)	RI-I16-114A-01 (circular)	RI-I17-114A-01 (CD/DVD)
Supported Standards	ISO/IEC 15693; ISO/IEC 18000-3 (Mode 1)						
Available Memory	256 bits organized in 8 × 32-bit blocks						
Factory Programmed	64 bits						
Resource Frequency	13.86 MHz	14.2 MHz	13.86 MHz	14.4 MHz	13.86 MHz	13.7 MHz	13.8 MHz
Frequency Offset for Lamination Material	Paper	PVC	Paper	PVC	Paper/PVC	Paper/PVC	Paper/PVC
Antenna Size (mm)	45 × 45	45 × 45	45 × 76	45 × 76	22.5 × 38	Ø 24.2	Ø 32.5
Foil Width (mm)	48 mm ±0.5 mm						
Delivery	Single row tape with 48-mm foil width wound on cardboard reel						

Tag-it™ HF-I Family Die

Part number	RF-HDT-AJLE-G1	RF-HDT-WNME-M0	RF-HDT-AJLS-G1
HF-I Family	Standard	Standard	Pro
Die Supported Standards	ISO/IEC 15693; ISO/IEC 18000-3 (Mode 1)	ISO/IEC 15693; ISO/IEC 18000-3 (Mode 1)	ISO/IEC 15693; ISO/IEC 18000-3 (Mode 1)
Available Memory	256 bits organized in 8 × 32-bit blocks	256 bits organized in 8 × 32-bit blocks	256 bits organized in 8 × 32-bit blocks
Die Thickness	150µm	710–740µm	150µm
Wafer Processing	Bumped, Sawn, Grinded, Inked		Bumped, Sawn, Grinded, Inked
Bump Material	Gold (AU)		Gold (AU)

Applications

Partner with TI, the technology leader in application-specific RFID solutions, for turnkey end-to-end formulas to employ RFID in specific tracking models such as recycling, waste management and high value asset tracking – to name a few. The integration of TI-RFid™ products into proven application models, in conjunction with third party Developers Network partners gives customers the ability to adapt an end-to-end RFID asset tracking solutions for their business, without costly mistakes or development time. TI's RFID Application Solutions are state-of-the-art design and system models for unique vertical business needs that result in lower overall system cost and faster, more efficient roll-outs.

Learn more at **www.ti.com/rfid-applications**

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