

RFID ASSET TRACKING SOLUTIONS

NPI INNOVATION

SEPTEMBER 2023



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RFID ASSET TRACKING SOLUTIONS

Molex's Asset Tracking Solutions offer RFID tags in a variety of frequencies and designs to enable cost-effective, versatile, efficient and accurate monitoring of valuable inventory and assets.

Key Product Information

Category: RFID Tags

Operating Frequency: 13.56 MHz (HF) or 860 to 960 MHz (UHF)



[View Product Landing Page](#)

[Datasheet](#)

Series

13509	HF D14.5 RFID Tag for Non-Metallic Surfaces
13511	HF D22 RFID Tag for Non-Metallic Surfaces
13512	HF D10 RFID Tag for Metal Surfaces
13513	HF D22 RFID Tag for Metal Surfaces
13514	HF D30 RFID Tag for Metal Surfaces
13515	HF D34 896-bit RFID Tag for Metal Surfaces
13516	UHF 53 by 44 RAIN RFID Tag for Metal Surfaces
13517	UHF Brick RFID Tag for Metal Surfaces
13518	UHF Mini Brick RFID Tag for Metal Surfaces
13519	UHF Mini Brick RFID Tag for Metal Surfaces
13521	HF D29 RFID Label for Metal Surfaces
13522	HF Dual-Frequency RFID Label for Non-Metallic Surfaces
13523	HF Ferrite RFID Tag for Metal Surfaces
13524	UHF D34 512 RFID Tag for Metal Surfaces
13525	HF D34 1152-bit RFID Tag for Metal Surfaces
13526	HF Cable Tie RFID Tag for Non-Metallic Surfaces
13527	HF Molded PCB RFID Tag for Non-Metallic Surfaces
13528	UHF Flexible RFID Tag for Non-Metallic Surfaces

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VITAL PRODUCT INFORMATION

Molex Series	Molex Product Name	Frequency Band	Operating Freq. (MHz)	Packaging Format	Approx. Read Range in m/ft. HF: FEIG NFC Reader UHF: 4W EIRP. LOS	Applicable Surface	Attachment Method	Memory (bits)
13516	53 by 44 RFID Tag for Metal Surfaces	UHF	865-928 (Global)	Hard tag	7.9/26	Metal	Adhesive (Not Included) Screw (Not Included)	EPC: 128 TID: 96 User memory: 32
13528	Flexible RFID Tag for Non-Metallic Surfaces	UHF	860-960 (Global)	Flexible tag	7.9/26	Non-metal	Adhesive (Not Included), Other	EPC: 128 TID: 96 User memory: 512
13517	Brick RFID Tag for Metal Surfaces	UHF	902-928 (US)	Hard tag	16.8/55	Metal	Adhesive (Not Included) Screw (Not Included)	User memory: 32
13518	Mini Brick RFID Tag for Metal Surfaces	UHF	902-928 (US)	Hard tag	7.9/26	Metal	Adhesive (Not Included)	User memory: 32
13519	EVO RFID Tag for Metal Surfaces	UHF	902-928 (US)	Hard tag	15.8/52	Metal	Adhesive (Not Included) Screw (Not Included)	User memory: 32
13524	D34 512 RFID Tag for Metal Surfaces	UHF	902-928 (US)	Hard tag	2.0/6.5	Metal	Adhesive (Not Included) Screw (Not Included)	User memory: 512

MARKETS AND APPLICATIONS



Healthcare

- Inventory control
- Equipment and personnel tracking
- Out-of-bed detection and fall detection
- Ensuring patients receive correct medications and medical devices
- Preventing distribution of counterfeit drugs and medical devices
- Patient Monitoring



Industrial

- Asset and inventory tracking
- Logistics
- Real-time Location (RTL) systems
- Supply chain visibility



Automotive

- Device and rental unit tracking
- Vehicles with equipment tracking

FREQUENTLY ASKED QUESTIONS

What is an active RFID tag?

An active RFID tag has an onboard power source (usually a battery) and an active transmitter.

What is a passive RFID tag?

Passive RFID tags are typically made up of two parts: an integrated circuit and an antenna. There are no additional moving parts or batteries.

What are low-frequency (LF) RFID tags?

LF RFID tags have a frequency of 30 to 300kHz, enabling them to read data within a few centimeters/inches of transmission.

What are high-frequency (HF) RFID tags?

HF RFID tags have a frequency of 3 to 30 MHz, with a primary frequency range of ~13.5 MHz that is used for RFID applications.

What are near-field communication (NFC) tags?

NFC tags are essentially a subset of HF RFID tags. An NFC tag is a passive device that functions without a power supply of its own and is dependent on an active device for operations. It can act as a reader as well as a tag.

What are ultra-high-frequency (UHF) tags?

UHF RFID tags have a frequency ranging from 300 MHz up to a maximum of 3 GHz. However, most UHF RFID systems operate between the 860 and 960 MHz bands. This is a result of the communication protocol standards put in place by GS1 as well as frequency regulatory standards set by individual countries/regions.

PRODUCT FEATURES AND ADVANTAGES

IP68 Rating

Meets industry standard protection from water and dust ingress for use in harsh environments

Tags in Multiple Package Sizes

From 53.00 by 44.00mm to 83.00 by 25.00mm, and 3.00 to 12.50mm in thickness; accommodates a wide range of applications

Global Frequency

From 860 to 960 MHz; accommodates a wide range of applications globally

Customizable Appearance

Ensures easy identification, with laser or inkjet engraving available



53 x 44 RAIN RFID Tag for Metal Surfaces



Flexible RFID Tag for Metal Surfaces

Key Specifications

Frequency	865 to 928 MHz
Band	Ultra-High-Frequency (UHF)
Read Range	2.0 to 16.8m/6.5 to 55 ft.
User Memory	EPC 128 bit/TID 96 bit
Attachment Method	Adhesive and/or screw; Cable Tie
Operating Temperatures	-40 to +85°C

Additional Resources

Web Overview Page	www.molex.com/link/rfid.html
Datasheet	987652-5941.pdf (molex.com) (Global) 987652-5942.pdf (molex.com) (US) 987652-5943.pdf (molex.com)
Training Presentation	RFID Asset Tracking Solutions_PRES.pdf
Global Product Manager	David Falla, RFBU, DSS

PRODUCT FEATURES AND ADVANTAGES (CONT'D)

IP68 Rating

Meets industry standard protection from water and dust ingress for use in harsh environments

Tags in Multiple Package Sizes

From 50.00 by 25.00mm to 54.00 by 36.00mm, and 6.00 to 12.50 mm in thickness; accommodates a wide range of applications

FCC-US Frequency

From 902 to 928 MHz; accommodates a wide range of applications in the US

Customizable Appearance

Ensures easy identification, with laser or inkjet engraving available



Brick RFID Tag for Metal Surfaces



Mini-Brick RFID Tag for Metal Surfaces

PRODUCT FEATURES AND ADVANTAGES (CONT'D)

IP68 Rating

Meets industry standard protection from water and dust ingress for use in harsh environments

Tags in Multiple Package Sizes

From 78.00 by 21.00mm to 34.00mm in diameter, and 6.00 to 11.00mm in thickness; accommodates a wide range of applications

FCC-US Frequency

From 902 to 928 MHz; accommodates a wide range of applications in the US

Customizable Appearance

Ensures easy identification, with laser or inkjet engraving available



EVO RFID Tag for Metal Surfaces



D34 512-bit RFID Tag for Metal Surfaces

PRODUCT FEATURES AND ADVANTAGES

Hard Tags

Offer the ability to attach to metal or non-metallic surfaces with either adhesive or a screw

Tags in Multiple Available Sizes from 10.00 to 34.00mm in Diameter

Accommodate a wide range of applications and feature 896 to 2,000 bits of memory

Industrial-grade plastic over molding

Is designed to withstand harsh conditions

Customizable appearance

Ensures easy identification, with laser or inkjet engraving available



D14.5 RFID Tag for Non-Metallic Surfaces



D34 896-bit RFID Tag for Metal Surfaces

Key Specifications	
Frequency	13.56 MHz
Band	High frequency (HF)
Read Range	16.76 to 29.97mm/.66 to 1.18 in.
User Memory	896 to 2,000 bits
Attachment Method	Adhesive and/or screw
Operating Temperatures	-40 to +85°C

Additional Resources	
Web Overview Page	www.molex.com/link/rfid.html
Datasheet	987652-5943.pdf (molex.com)
Training Presentation	RFID Asset Tracking Solutions_PRES.pdf
Global Product Manager	David Falla, RFBU, DSS

PRODUCT FEATURES AND ADVANTAGES (CONT'D)

RFID Labels

Permit low-profile asset and inventory tracking for metal or non-metallic surfaces

Dual-frequency RFID labels

Feature both high-frequency and ultra-high-frequency capability to accommodate NFC and RAIN technologies

Ferrite tags

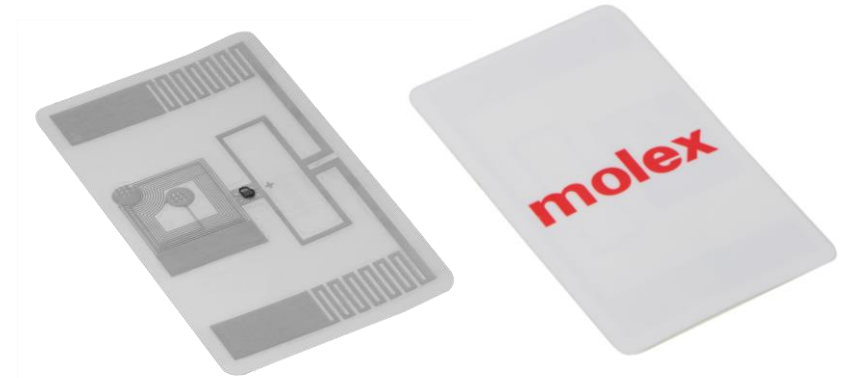
Come in a compact size of just 2.50 by 4.90mm to enable NFC functionality in an assembly

Superior heat tolerance

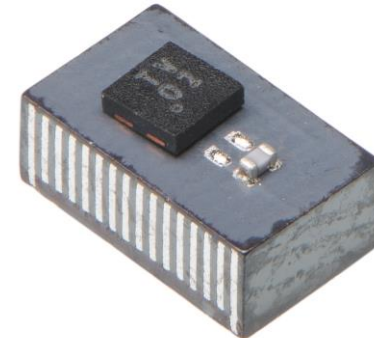
Permits storage temperatures between -60 and +200°C

IP65 rating

Meets industry standard protection from water and dust ingress for use in harsh environments



Dual-Frequency RFID Label for Non-Metallic Surfaces



Ferrite RFID Tag for Metal Surfaces

PRODUCT FEATURES AND ADVANTAGES (CONT'D)

Cable Tie Tags

Can be used to fasten tubes or loose items while providing NFC capability to aid in material workflow control or item tracking

One-time Use Design

Facilitates enhanced security through tamper-proof functionality

RFID Tag with Built-in Antenna and Chip

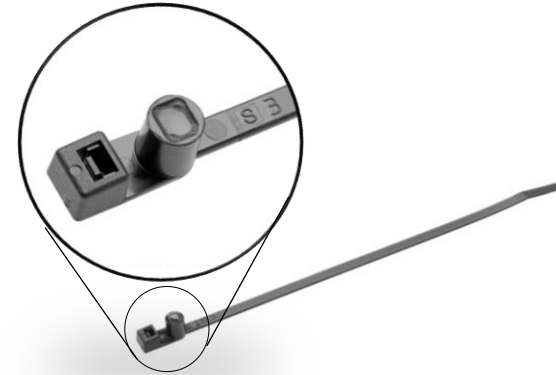
Adds and enables NFC functionality to a small and thin tag structure

IP68 Rating

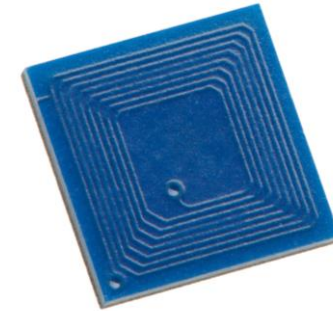
Meets industry standard protection from water and dust ingress for use in harsh environments

Molded PCB Design

Enhances protection for the chip and antenna while conferring superior heat tolerance to allow epoxy potting or plastic injection



Cable Tie RFID Tag for Non-Metallic Surfaces



Molded PCB RFID Tag for Non-Metallic Surfaces

SPECIFICATIONS AND SUPPORTING INFORMATION

RFID Hard Tags

Reference Information

Packaging: Hard tag

Physical

Material: Black nylon
Operating Temperature: -40°C to 85°C
Storage Temperature: -40°C to 120°C

Electrical

RF Interface Protocol: ISO 15693/ISO 18000-3
Operating Frequency: 13.56 MHz
UID Memory: 64 bit

Specifications by Part Series

Part Series:	13509	13511	13512	13513	13514	13515	13525
Size (Diameter):	14.50mm	22.00mm	10.00mm	22.00mm	30.00mm	34.00mm	34.00mm
Read Range*:	24.89mm	24.89mm	20.07mm	29.97mm	29.97mm	29.97mm	29.97mm
User Memory:	896 bits	2000 bits	896 bits	896 bits	896 bits	896 bits	1152 bits
Application Surface:	Metal	Non-metallic	Metal	Metal	Metal	Metal	Metal
Attachment Method:	Adhesive	Adhesive	Adhesive	Adhesive Screw	Adhesive Screw	Adhesive Screw	Adhesive Screw

*Distance was read with production FEIG NFC HF Reader in a controlled environment. Read performance may vary in final application.

SPECIFICATIONS AND SUPPORTING INFORMATION

D29 RFID Label for Metal Surfaces

Reference Information

Series Number: 13521
Packaging: Roll-to-roll label

Physical

Material: White OPP
Applicable Surface: Metal
Attachment Method: Adhesive (included)
Operating Temperatures: -25° to 70°C
Storage Temperatures: -25° to 70°C

Electrical

RF Interface Protocol: ISO/IEC 14443A/
NFC Forum Type 2
Operating Frequency: 13.56 MHz
Read Range:* 20.07mm
Memory: UID 64 bits/user memory 1152 bits

Dual-Frequency RFID Label for Non-Metallic Surfaces

Reference Information

Series Number: 13522
Category: RAIN RFID (UHF) and NFC tag

Physical

Material: Acrylic
Applicable Surface: Non-metallic
Attachment Method: Adhesive (included)
Operating Temperatures: -25° to 70°C
Storage Temperatures: -25° to 70°C

Electrical

RF Interface Protocol
HF: ISO 15693/ISO 180003- M1/NFC Forum Type 5
UHF: ISO 18000-63/EPCTM Gen2v2
Operating Frequency
HF: 13.56 MHz
UHF: 860 to 890 MHz
Read Range
HF: 16.76mm*
UHF: 2.4m**
Memory
HF: UID 64 bits/user memory 2,048 bits
UHF: TID 96 bits/EPC 480 bits/user memory 2,048 bits

**Distance was read using a production FEIG NFC HF reader in a controlled environment. Read performance may vary in final application.*

***Distance was read using a production 4W EIRP LOS reader in a controlled environment. Read performance may vary in final application.*

SPECIFICATIONS AND SUPPORTING INFORMATION

Ferrite RFID Tag for Metal Surfaces

Reference Information

Series Number: 13523

Physical

Material: Ferrite
Applicable Surface: Metal
Attachment Method: SMT
Operating Temperatures: -40° to 85°C
Storage Temperatures: -60° to 200°C

Electrical

RF Interface Protocol: ISO/ICE 15693
Operating Frequency: 13.56 MHz
Read Range:* 29.97mm
Memory: UID 56 bits/user memory 2,048 bits

Cable Tie RFID Tag for Non-Metallic Surfaces

Reference Information

Series Number: 13526

Physical

Material: Black nylon
Attachment Method: Zip tie
Operating Temperatures: -20° to 85°C
Storage Temperatures: -20° to 85°C

Electrical

RF Interface Protocol: ISO 15693
Operating Frequency: 13.56 MHz
Read Range:* 22.10mm
Memory: UID 56 bits/user memory 2,048 bits

Molded PCB RFID Tag for Non-Metallic Surfaces

Reference Information

Series Number: 13527

Physical

Material: Ferrite
Applicable Surface: Non-metallic
Attachment Method: Adhesive or
Tag can be potted with epoxy or injection-molded
Operating Temperatures: -40° to 85°C
Storage Temperatures: -80° to 200°C
Size: 6.70 by 6.70 by 0.75mm

Electrical

RF Interface Protocol: ISO/ICE 15693
Operating Frequency: 13.56 MHz
Read Range:* 29.97mm
Memory: UID 64 bits/user memory 2,048 bits

**Distance was read using a production FEIG NFC HF reader in a controlled environment. Read performance may vary in final application.*

SPECIFICATIONS AND SUPPORTING INFORMATION

RAIN RFID Tag for Metallic Surfaces

Reference Information

Series Number: 13516

Physical

Material: Gray Nylon

Applicable Surface: Metal

Attachment Method: Adhesive (not included, sold separately);
Screw (M5 is recommended, not included, sold separately)

Operating Temperatures: -40° to 85°C

Storage Temperatures: -40° to 120°C

Electrical

RF Interface Protocol: EPC Class1 Gen2 V2/ISO 18000-6C

Operating Frequency: 865 to 928 MHz

Read Range:* 7.9m

Memory: EPC 128 bits/TID 96 bits

Flexible RFID Tag for Non-Metallic Surfaces

Reference Information

Series Number: 13528

Physical

Material: Yellow thermoplastic vulcanizate (TPV)

Attachment Method: Cable tie (not included, sold separately)

Operating Temperatures: -40° to 70°C

Storage Temperatures: -40° to 70°C

Electrical

RF Interface Protocol: EPC Class1 Gen2 V2/ISO 18000-6C

Operating Frequency: 860 to 960 MHz

Read Range:* 7.9m

Memory: EPC 128 bits/TID 96 bits serialized

Brick RFID Tag for Metal Surfaces

Reference Information

Series Number: 13517

Physical

Material: Black PPS

Applicable Surface: Metal

Attachment Method: Adhesive (not included, sold separately);
Screw (M5 is recommended, not included, sold separately)

Operating Temperatures: -40° to 85°C

Storage Temperatures: -40° to 150°C

Electrical

RF Interface Protocol: EPC Class1 Gen2 V2/ISO 18000-6C

Operating Frequency: 902 to 928 MHz

Read Range:* 16.8m

Memory: EPC 128 bits/TID 96 bits

**Distance was read using a production FEIG NFC HF reader in a controlled environment. Read performance may vary in final application.*

SPECIFICATIONS AND SUPPORTING INFORMATION

Mini Brick RFID Tag for Metal Surfaces

Reference Information

Series Number: 13518

Physical

Material: Black nylon
Applicable Surface: Metal
Attachment Method: Adhesive (not included, sold separately)
Operating Temperatures: -40° to 85°C
Storage Temperatures: -40° to 120°C

Electrical

RF Interface Protocol: EPC Class1 Gen2 V2/ISO 18000-6C
Operating Frequency: 902 to 928 MHz
Read Range:* 7.9m
Memory: EPC 128 bits/TID 96 bits serialized

EVO RFID Tag for Metal Surfaces

Reference Information

Series Number: 13519

Physical

Material: Black nylon
Attachment Method: Adhesive (not included, sold separately);
Screw (M5 is not included, sold separately)
Operating Temperatures: -40° to 85°C
Storage Temperatures: -40° to 120°C

Electrical

RF Interface Protocol: EPC Class1 Gen2 V2/ISO 18000-6C
Operating Frequency: 902 to 928 MHz
Read Range:* 15.8m
Memory: EPC 128 bits/TID 96 bits

D34 512-Bit RFID Tag for Metal Surfaces

Reference Information

Series Number: 13524

Physical

Material: Black nylon
Applicable Surface: Metal
Attachment Method: Adhesive (not included, sold separately);
Screw (M4 is not included, sold separately)
Operating Temperatures: -40° to 85°C
Storage Temperatures: -40° to 100°C

Electrical

RF Interface Protocol: EPC Class1 Gen2 V2/ISO 18000-6C
Operating Frequency: 902to 928 MHz
Read Range:* 2.0m
Memory: EPC 128 bits/TID 96 bits serialized

**Distance was read using a production FEIG NFC HF reader in a controlled environment. Read performance may vary in final application.*



THANK YOU

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