



# Monza<sup>®</sup> 4 UHF Gen 2 RFID Tag Chips

WITH TRUE3D<sup>™</sup> AND QT<sup>™</sup> TECHNOLOGIES

# The Monza 4 Tag Chip Family

The Monza 4 family builds upon the industry's de facto UHF Gen 2 standard, Impinj's Monza tag chips, by ushering in new levels of RFID privacy (QT™ technology), tag orientation insensitivity (True3D™ antenna technology), read & write performance, and memory capability.

The read and write range improvements support superior performance in tags of all sizes for applications such as supply chain, retail, apparel, asset tracking, and more.

True3D antenna technology further adds to those performance improvements by enabling better, smaller, and less expensive tags that extend RFID benefits to more markets.

Finally, the Monza 4 family comes with a variety of memory options, including both extended EPC and User memory.

## Monza 4D



Monza 4D tag chips provide 128 bits of EPC memory, 32 bits of User memory, and a serialized TID. For applications where large memory is not required,

Monza 4D offers superior sensitivity, True3D antenna support and a unique TID within a more standard memory size.

## Monza 4E



Monza 4E tag chips offer up to 496 bits of EPC memory, 128 bits of User memory, and a serialized TID to provide fast access to a larger memory, as well as meet the

needs of applications requiring greater than 96 bit EPC numbers. Monza 4E also provides True3D antenna support.

## Monza 4QT



Monza 4QT tag chips offer 512 bits of user memory, 128 bits of EPC memory, block permalock capability, a serialized TID, and True3D antenna support. The extended User memory options support applications where

users cannot count on a database connection. The 512 bits of User memory enables a portable, but private database to travel with the tag. Monza 4QT also provides Impinj's patent-pending QT™ technology, which protects data confidentiality and consumer privacy.

Note: The same antenna design will work across all three Monza 4 chip models, as they have identical antenna port interfaces and electrical characteristics.

## Packaged Monza 4 Tag Chips

Extend the advantages of Monza 4-powered tags to printed circuit board (PCB) applications and ruggedized tag designs through the use of our packaged parts. Packaged Monza 4 tag chips are supported by standard surface mount assembly techniques, meaning easy integration into products designed with PCBs, as well as other applications where soldered connections are preferred. Impinj utilizes a  $\mu$ DFN package, making it the industry's smallest and lowest profile tag chip part.



Monza 4 tag chips encapsulated in 8-pin  $\mu$ DFN packages accommodate surface-mount assembly and enable ruggedized tag designs.

# Monza<sup>®</sup> 4 UHF RFID Tag Chips

*The New Standard in Performance and Privacy*

*Featuring True3D<sup>™</sup> antenna technology and QT<sup>™</sup> technology*

The Monza 4 family of tag chips delivers unique privacy, performance, and memory benefits that address even the most challenging of RFID applications.

Providing superior sensitivity combined with excellent interference rejection, support for omni-directional antennas (True3D<sup>™</sup> antenna technology), innovative privacy features (QT<sup>™</sup> technology), and expanded memory options, Monza 4 tag chips set a new standard in RFID.



Monza<sup>®</sup> 4 tag chips continue the family legacy of innovation and quality, bringing advances in read and write reliability, support for true omni-directional antenna designs, unique privacy protection features and larger memories to the industry's most flexible and best performing tag chips.



## Impinj's Monza 4 tag chips feature:

- > True3D<sup>™</sup> antenna technology—two fully independent antenna ports enable the creation of tags without blind spots
- > QT<sup>™</sup> technology, featuring public and private data profiles that support confidentiality of business-sensitive data and assure consumers of privacy
- > Memory options to support large user-memory (512 bits with block permalock) or EPC-memory (496 bits) applications
- > Gen 2 compliant custom features that facilitate inventory of hard-to-read tags and rapid access of serial numbers
- > Industry's best read and write sensitivity combined with excellent interference rejection to yield outstanding read and write reliability
- > EPCglobal UHF Gen 2 and ISO 18000-6C compliant

# True3D™ Antenna Technology

SEE WHAT YOU'VE BEEN MISSING



**Monza 4 tag chips** possess a unique, patent-pending architecture that provides two fully independent antenna ports—enabling high performance, true omnidirectional tags for the first time.

For many applications, consistent orientation of a tag with respect to a reader presents a challenge. And as the read range plot below left illustrates, tags based on conventional tag chips can have blind spots—angles at which they are virtually invisible to a reader, even with creative and advanced tag antenna designs.

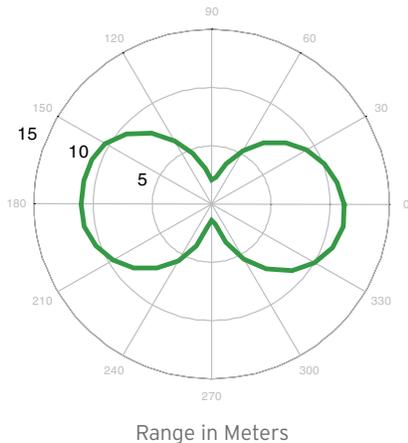
In the previous generation Monza 3 tag chips, a dual input structure enabled tags without blind spots for shorter range applications. The Monza 4 True3D antenna technology

introduces further improvements by providing true orientation insensitivity as well as outstanding read range performance.

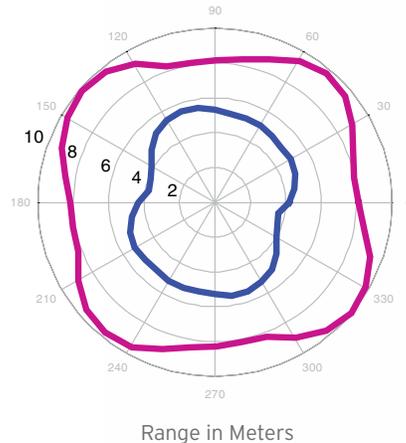
Compare the read range response of the Monza 4 tag (Impinj H42) below to the Monza 3 tag (Impinj H32) and conventional tag chip responses. The response pattern is circular, no angle has significantly lower sensitivity than any other. At every angle, the read range has increased significantly. And this doubling of read range performance comes in a very compact form factor tag.

With True3D antenna technology, readers see tags from any angle, resulting in higher read rates and smaller, less expensive tags—extending RFID benefits to more applications.

## Tag Read Range Response Performance Comparison



Tags based on conventional tag chips exhibit blind spots where read range drops significantly



True3D Monza 4 tag chip's True3D Antenna Technology removes blind spots and provides excellent read range

— H32 tag antenna with M3 tag chip



— H42 tag antenna with M4 tag chip



## Impinj Tag Antenna Reference Designs

Just as our Monza tag chips enable solutions that lead the industry, our tag antenna reference designs benefit from our unique approach to RFID as well.

One of the tag antenna's essential functions is to harvest energy from a reader to power the tag chip—and to do so in all regulatory environments. Impinj antenna designers, both because of their knowledge of RFID systems and the flexibility of our tag chips, have created a uniquely diverse suite of

tag antenna reference designs. These reference designs address short range through long range applications, target typical label form factors, adhere to volume manufacturing guidelines, and enable exceptional system performance.

All Impinj Monza 4 chip/antenna combinations work worldwide. Contact Impinj for specific tag antenna recommendations, or any of our outstanding inlay and label conversion partners for more information.

# QT™ Technology

CONTROL WHAT THE WORLD SEES

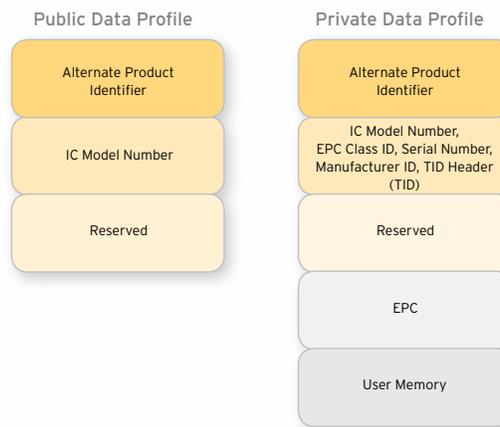


**The Monza 4QT chip** features Impinj's patent-pending QT technology—a unique ability to maintain two data profiles to support protection of business-sensitive data and consumer privacy. With QT technology, tag owners can use a private data profile to store confidential data, while a public data profile holds less sensitive information. The ability to switch between these two profiles is protected by the tag's access password, physical distance from a reader antenna via a short range mode, or both.

## Private/Public Profiles

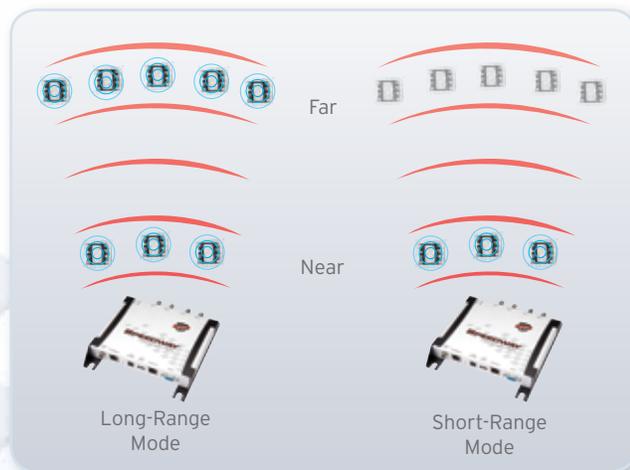
In the Private Data Profile, users have access to several data/memory blocks: a private EPC memory, a serial number, an alternate product identifier, a serialized tag identifier (STID), and User memory.

The Public Data Profile only contains the IC model information and the alternate product identifier. When a tag is switched to the Public Data Profile, all other data appears to be non-existent.



## Short-Range Mode

QT technology's Short-Range Mode adds a layer of physical protection to a user's private data by reducing the tag's read range to less than one-tenth of its normal range. So while a reader can always singulate the tag and read its currently exposed identifier (EPC or alternate product identifier) from normal range, any attempts to access the Private Data Profile from a distance will cause the tag to lose power and drop out of its dialog with the reader. The short-range feature ensures that protected information is not readable unless the tag is very close to a reader antenna.



## Monza 4 Tag Chip Models

Model	User Memory	EPC Memory	Serialized TID	True3D™ Technology	QT™ Technology
Monza 4D	32	128	✓	✓	
Monza 4E	128	up to 496	✓	✓	
Monza 4QT	512	128	✓	✓	✓

### Impinj Quality

Impinj hasn't become the defacto industry standard based on innovation alone. Our partners and customers depend on the quality they know Impinj delivers. Our rigorous production test methodology has raised the bar for the RFID industry. Each chip undergoes state-of-the-art testing at the wafer level both prior to and after temperature cycling to ensure only working parts make it to our inlay partners.

Monza tag chips are widely regarded as the industry's most consistent performer. And with the introduction of the Monza 4 family, further design improvements have eased mounting tolerances so as to significantly reduce read/write performance variations due to tag assembly. Benefits from Monza 4 tag chips in the assembly process include more consistent read/write tag performance, improved yield, and potentially reduced manufacturing costs.

Our custom tag antenna reference designs also have to pass in-depth characterization and benchmarking studies, including the evaluation of range, near- and far-field characteristics, interference effects, and loading conditions across the UHF spectrum and under a variety of use conditions to verify consistent tag performance for targeted applications.

The efforts Impinj undertakes to maintain quality result in the most consistent tag performance in the industry, and provide the reliability our customers have come to expect. Ask your sales representative for more information about these and other Impinj products.

### About Impinj, Inc.

Impinj, Inc. is the world's leading technical innovator in developing UHF Gen 2 RFID solutions for both item-level and supply-chain tagging. Impinj draws on its technical expertise and industry partnerships to deliver a wide range of products and solutions comprising high-performance tag chips, readers, reader chips, software, antennas, and systems integration. Impinj products provide unprecedented performance, integration and cost effectiveness to a global customer base across numerous vertical markets with applications including inventory management, asset tracking, authentication and serialization. For more information, visit [www.impinj.com](http://www.impinj.com).

