

PRODUCT DATASHEET

Confidex Ironside™



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1. PRODUCT DESCRIPTION

The patent pending solution of Confidex Ironside™ tag provides totally new benchmark for low-cost passive RFID in its size and durability (IP68) to various customer requirements. The tag can be mounted easily on any metallic surfaces either with industrial adhesive or mechanically e.g. with pop rivets. Ironside's performance enables several on-metal identification challenges to be solved which earlier where impossible with passive RFID. Ironside has passed the rigorous testing requirements for the Aerospace Standard AS5678 specification. It is used successfully in RFID implementations globally for tracking assets from steel pallets to train wagons.

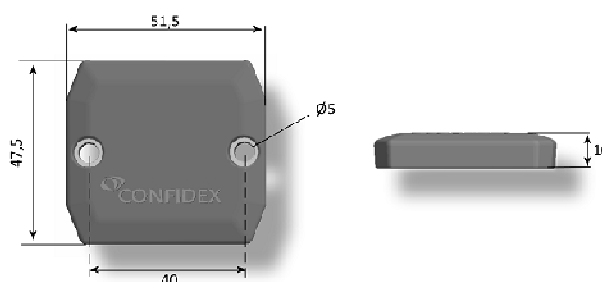
1.1 SPECIFICATION DATA

Device type	Class 1 Generation 2 passive UHF RFID transponder
Air interface protocol	EPCGlobal Class1 Gen2 ISO 18000-6C
Operational frequency	865-869 MHz (EU), 902-928MHz (US), 952-955 MHz (JPN) or 865-955 MHz (Global)*
IC options	NXP UCODE G2XM Impinj Monza4QT*
EPC memory	up to 240 bit or 128 bit*
EPC memory content	Unique number encoded as a default
Extended memory	512 bit
TID	64-bit
Read range	up to 6-7 m / 20-23 ft, reader power 2W ERP or up to 6-9 m /20-29ft, reader power 2W ERP* (dependent on application)
Applicable surface materials	Metal surfaces, functional also on other surfaces
Encapsulation material	Dark grey thermoplastic elastomer
Weight	22 g
Delivery format	Single
Amount in box	500 pcs (default)
Standard compliancy	SAE AS5678
Product is RoHS compliant	

1.2 DIMENSIONS

**General dimensions
 (Width x Height x
 Thickness)**

51.5 x 47.5 x 10.0 mm / 2.03 x 1.87 x 0.39 in



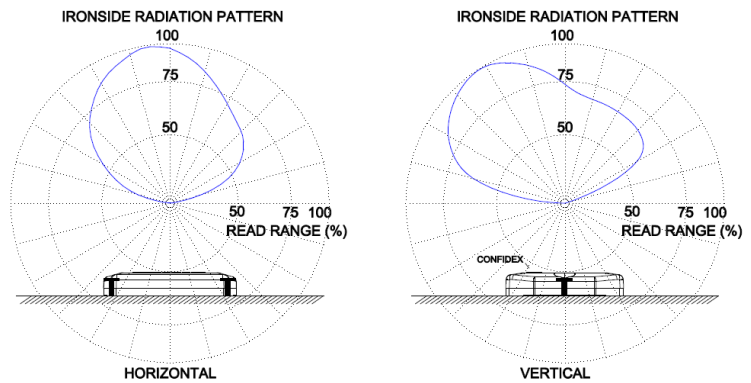
1.3 ELECTRICAL PERFORMANCE

	Max read range on metal in different frequency areas with 2W ERP		
	865-869MHz EU	902-928MHz US	952-955MHz JPN
Ironside ETSI G2XM	6 m / 20 ft	< EU read range	< EU read range
Ironside FCC G2XM	< FCC read range	6 m / 20 ft	< FCC read range
Ironside JPN G2XM	< JPN read range	< JPN read range	7 m / 23 ft
Ironside Global M4	9 m / 29 ft	6 m / 20 ft	8 m / 26 ft

* Read ranges are theoretical values that are calculated for non-reflective environment, in where antennas with optimum directivity are used with maximum allowed operating power according to ETSI EN 302 208 (2W ERP).

1.4 RADIATION PATTERNS

Estimated radiation pattern when tag orientation towards reader antenna is optimized.



1.5 RESISTANCE AGAINST ENVIRONMENTAL CONDITIONS*

Typically values are valid for all tag versions. If not, applicable IC versions are marked

Operating temperature	-40°C to +85°C / -40°F to +185°F
Ambient temperature	-55°C to +105°C / -67°F to +221°F @ -55°C / -67°F for 3h
Peak temperature	+125°C / +257°F 1h duration
IP classification	IP68: - Complete protection against dust - Protection against continuous immersion in water (tested for 5 hours in 1 m [3.3 in] depth)
Weather ability	Good, incl. UV-resistance and sea water
Pressure resistance	170kPa for 10 min
Vibration resistance	Good: - JESD22-B103B, service condition 2; vibration that is aligned with tag thickness (z-axis). - RTCA DO-160 Rev E 8.5
Operational shock	RTCA DO-160 Rev E 7.2
Chemical resistance	No physical or performance changes in: - Salt water (salinity 10%, tested in 168h exposure) - NaOH (10%, pH 13, tested in 24h exposure) - Sulfuric acid (10%, pH 2, tested in 168h exposure) - Motor oil (tested in 168h exposure) Generally good against: Methanol (moderate concentrations), ethanol (moderate concentrations), glycerine, ethylene glycol, consistent grease, most acids, bases and tensides such as sulfuric acid 96%, nitric acid 10%, NaOH 50%, soap solution 30%. Testing recommended for hydrocarbons and some of the carboxylic acids. Acetone should be avoided.
Expected lifetime	Years in normal operating conditions

* Values in the table are the best recommendations; resistance against environmental conditions depends on the combination of all influencing factors, exposure duration and chemical concentrations. Thus, product's final suitability for certain environmental conditions is recommended to be tested. Contact Confidex for more specific information.

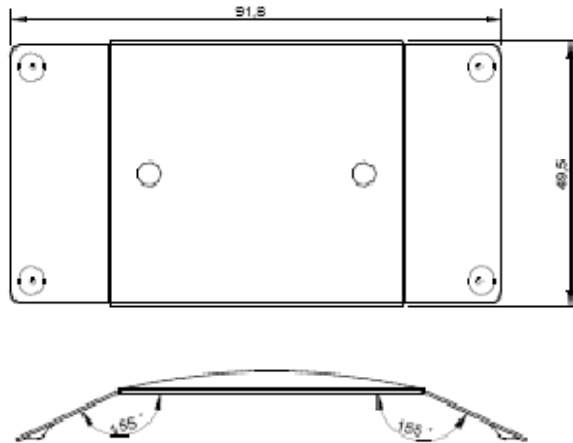
1.6 SUPPORTING COMPONENTS

3M background adhesive

Purpose	High performance adhesive for attaching Ironside on metal surfaces. Suitable for applications without shear forces pointing towards the tag and when tag application is done indoors.
Advantages	Quick and simple attachment method without additional tools
Size	Die-cut according to the tag shape
Type	3M 300LSE High performance acrylic adhesive
Delivery format	Attached to the tag

Ironside welding bracket

Purpose	Welding bracket for fixing Ironside on metal surfaces with spot welding.
Advantages	No need to make holes to the surface like with other mechanical attachment methods
Dimensions	91.8 x 49.5 mm / 3.61 x 1.95 in



Thickness when tag attached 18.5 mm / 0.73 in

Mechanical picture



Material Stainless steel
Weight 39g (when attached to the tag)
Delivery format Attached to the tag with two pop rivets

1.7 SUPPORTED SERVICES

There are several personalization options available for Confidex Ironside™ in order to “fine tune” the tag to match with the application requirements:

- Pre-encoding
- Laser engraving

For exact specifications, please refer “Personalization Datasheet”.

1.8 POSSIBLE APPLICATIONS

Metal surfaces Metal returnable transit items, metal containers, metal pallets, high value items, aerospace applications, train wagons, etc.

2. INSTALLATION INSTRUCTIONS

2.1 TAG PLACEMENT

Ironside tag polarization is perpendicular to the Confidex text. In order to achieve the optimum performance Ironside must be placed on metal surface without covering its front side.

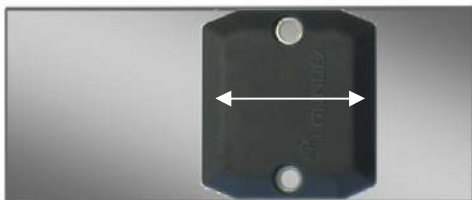
When selecting the location on metal surface, ensure the following:

- Select an even surface so that there is direct metal contact underneath the whole tag.
- The metal background should be preferably as large as possible and tag should be placed in the middle of the surface.
- If surface is small or tag should be installed to the surface edge, install the tag in such way that **most free metal area (approx. tag's sized area) is left on top of the tag** (see picture on the right side).

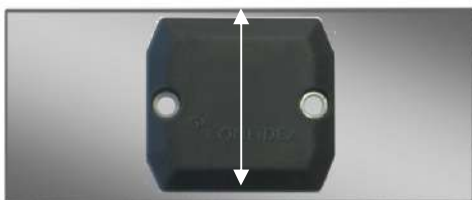


Example of optimizing the tag orientation on small metal area:

In the two pictures below a small horizontal metal part is shown. First picture shows better and recommended placement for Ironside; free metal area is left on top of the tag (in this case on the left side) which will enhance tag's RF performance. Below placement is not recommended if maximum tag performance should be reached. Note, polarization direction is varying when rotating the tag (see arrows in the pictures).



Recommended



Not recommended

Tag's eventual performance depends on the shape of the metal object; the above recommendations are valid for flat surfaces. Testing is needed to verify the performance in each case separately.

2.2 TAG FIXING METHODS

Mechanical fixing

Mechanical fixing ensures the best and most reliable grip in various use conditions. It's recommended to be used in every application that includes risk for high mechanical stress or low temperature during tag fixing. Ironside tag can be attached mechanically with:

- Screws (size M4)
- Pop rivets (size 4 mm)

Procedure: When fixing the tag with screw or rivets, start by drilling two holes on the surface 40mm apart from each other and fix the tag.

During fixing, make sure that there's no air gap left in between the tag and metal surface.

Adhesive fixing

- Silicone sealants
- 3M 300LSE acrylic adhesive

Silicone sealant adhesives like Dow Corning AS 7096 provide very high bond strength and resistance against mechanical stress. Usually, fixing must be done indoors in room temperature and in 50% humidity. Total curing time can be several days.

Procedure: When fixing the tag with sealant adhesive, insert a layer of sealant under the tag and press the tag on the surface. Increase the bond by adding extra sealant from the tag holes. **Insert max. 3mm layer of sealant under the tag and to the tag holes.**

Please refer silicone sealant supplier for exact product specifications.

3M adhesive: When mounting the tag with its adhesive background, clean and dry the surface for obtaining the maximum bond strength. Remove the liner and place the tag on the correct location. Ideal application temperature is from +21°C to +38°C (+70°F to +100°F), bond strength can be improved with firm application pressure and moderate heating from +38°C to +54°C (+100°F to +130°F). Application at temperatures below 10°C (50°F) is not recommended. Due to adhesive properties, the tag should be placed on even surface.

Additional fixing tools

- Welding bracket

When the application is too demanding for adhesives, but the metal surface can not be punched for screw or rivet fixing, welding the tag with special bracket is an option for attachment.

Procedure: Welding bracket will be spot welded on the metal surface. Dimples in the design will ease the welding. Tag is usually riveted to the bracket in advance so the bracket is ready to be used. Bracket design allows attachment on both flat and curved surfaces.

3. ORDER INFORMATION

Product number	Product name
3000071	Ironside ETSI NXP G2XM
3000072	Ironside FCC NXP G2XM
3000073	Ironside JPN NXP G2XM
3000319	Ironside Global M4
3000089	Ironside welding bracket
3000099	Ironside adhesive background

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