TITANTAG™ Biscuit

Frequency	**HF (13.56MHz)**
Protocol	**ISO18000-3** **ISO15693**
Region	**Global**
Dimensions (mm)	**W49 H21 T3.1**
Silicon chip	**ICODE SLI-X**
Memory (bits)	**TOTAL 1,024 bits** **32 blocks, 32 bits per block** **UID 64 bits**
Metal friendly	**On/off metal**
Reads up to centimeters	**10** (On metal) **5** (Off metal)
Operating temperature	**-45<>85℃**
Storage temperature	**-45<>150℃**
IP class	**IP68**
Year of release	**2010**
Product code	**49213MT**

ISO15693 (HF)	Silicon chips	W*H*T (mm)	Read (up to centimeters)	
			On metal	Off metal
Biscuit	ICODD SLI-X	49*21*3.1	10	5
Biscuit AC	ICODE SLI-X	49*21*3.1	10	5
5527NM	ICODD SLI-X	55*27*1.4	0	15
5527MT	ICODD SLI-X	55*27*3.1	15	5
Board1NM	ICODD SLI-X	106*40*3.1	n/a	20
Board1MT	ICODD SLI-X	106*40*4.1	20	5
Board2	ICODD SLI-X	113*54*1.4	n/a	25

[1] Biscuit Feature

[2] Biscuit Dimensions (mm)

T=3.1mm

30.04

Φ3.2   Φ4.8

21

49.4
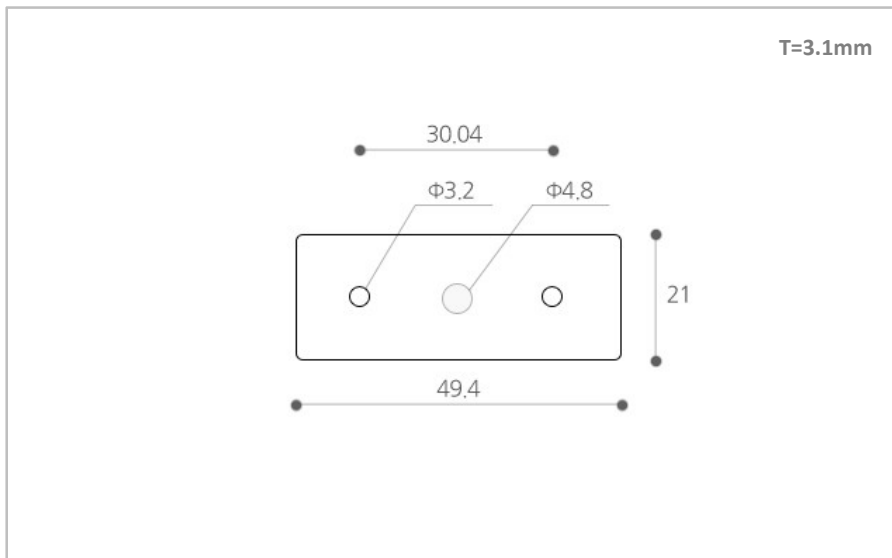
[3] Key materials and processes

Silicon chip ICODE SLI-X

•3rd generation of ICODE SLI, followed by SLI2, based on ISO 15693 and ISO 18000-3
•Best selling and dominant IC in ISO15693 and 18000-3
•1024 bits, organized in 32 blocks of 4 bytes each
•50 years data retention
•Write endurance of 100,000cycles

http://www.nxp.com/documents/data_sheet/SL2S2002_SL2S2102.pdf

Antenna PCB FR4, Copper etched, Gold plated

• FR4 (Fire retardant 4, composed of woven fiberglass cloth with an epoxy resin binder) – Most stable and widely applied antenna materials in recent 30 years worldwide, with highest durability and consistent electrical property
• Copper etched antenna has much higher accuracy with lower tolerance than aluminum etched antenna and conductive ink printed antenna, which makes tag performance more consistent with lower read range variance.
• Gold is plated on chip bonded area of copper etched antenna, in order to enhance chip adhesion on antenna as well as electrical interconnection with antenna.

Packaging Double layer PCBs, laminated under high temperature and pressure

• Tag antenna has convoluted structure of two or three layers with copper ground plane, so tag is composed of double layer PCBs, tightly combined and laminated under high pressure and temperature of 200℃ for >2 hours.
• Many tag makers copy TITANTAG™ in appearance, but they can not copy tags' durability and read consistency.
• Surface of PCBs is coated with TOYO (black) PSR, best of kind which can protect it against electrical stress and water ingression.

Chip bonding Wire bonded, aluminum or gold

• Unlike other tag makers using flip chip bonding or chip soldering, RFcamp has adopted wire bonding technology since year of 2004.
• Wire bonding, though most complicated and expensive chip bonding method, is most stable in electrical interconnection and most durable in mechanical and temperature stresses. It, with highest precision, is also best fit for working on complicated antenna patterns of double layer PCBs.

[4] Biscuit Durability

• **Temperature stress**

Test methods	Descriptions	Pass/Fail
150℃, 6hrs	Stored in convection oven at 150C, 6hrs	Pass
-45<>85℃, 50 cycles	Stored in temperature shock chamber for 50 cycles – One cycle includes 30 min. at-45C, 30 min, transition, 30min. at 85C and 30min. transition.	Pass
85℃/85%, 24hrs	Stored in humidity chamber at 85C/85%RH for 24 hours	Pass
Boling water, 6 hrs	Immersed in boiling water for 6 hours	Pass

• **Ingression** www.dsmt.com/resources/ip-rating-chart

IP Class	IP68	1.5 meter deep immersion, 1hr

• **Mechanical stress**

Test methods	Descriptions	Pass/Fail
Iron ball fall test	Free fall of 1kg iron ball from 1.5meters height on any side of tag - 50 times	Pass
Vibration	IEC60068-2-6/64	Pass
Drop& topple	IEC60068-2-31	Pass
Shock (acceleration)	IEC60068-2-22	Pass
Pressure	50 Bar on any side of tag, 50 times	Pass

• **Chemical stress**

Chemicals	Descriptions	Pass/Fail
Alkali	NaOH (10%, pH13)	Immersed 24 hrs.	Pass
Acid	Sulfuric acid (10%, pH2)	Immersed 24 hrs.	Pass
Petroleum	Gasoline, Diesel, Kerosene, lubricating oil	Immersed 24 hrs.	Pass
Alcohol	Methanol, Ethanol	Immersed 24 hrs.	Pass
Surfactant	Solvent for metal tool oils	Immersed 24 hrs.	Pass
Salt water	IEC60068-2-11	Pass

• **Electrical stress**

ESD	IEC61000-4-2 (LEVEL4 – 8KV)	PASS

• ~~**Radiation stress**~~ (N/A)

Gamma ray	kGy	

• ~~**Autoclave stress**~~ (N/A)

Autoclave conditions	Sterilization processes	

[5] Biscuit Options

• Chip encoding service

•Encodes tags with 4 multiple digits - from 16 bits (4 digits decimal or hex or ASCII) up to 480 bits (120 digits decimal or hex or ASCII) - upon customers' request.
•Unless requested by customer, all tags are encoded with 24 digits decimal (Date 8 digits + Serial 16 digits), before shipped to customers.   For example, code 201508140000000000001278 tells that tag was 1278th encoded on August 14, 2015.

* For special encoding service (e.g. TID to EPC or permanent lock), please ask RFcamp.

• Label& printing service

•Provides fast and reasonably priced custom label service with printing variable data, barcode and logo.
•Label material is water proof and "hard to tear off" polysynthetic.

• Laser engraving& direct printing service

•With CO2 laser, tag surface is precisely and permanently etched into variable data, barcode and logo with black and yellow contrast.
• With silk screen printing or pad printing method, tag surface is permanently printed with various colored logo or text.

• Backing adhesive

•Unless requested otherwise, RFcamp recommends and applies 3M468MP or 3M9472LE (Aka. 3M300LSE) double sided adhesive tapes for general applications. For harsh environments, RFcamp recommends 3M VHB tapes.
• For stronger adhesion, RFcamp suggests glue solutions such as Cemedine's Super X or Loctite's double compound epoxies.
• For special solution, please ask RFcamp.

• Fasteners& brackets

•For some small TITANTAGs, metal fastener may adversely affect tag read performance, so please ask RFcamp for suitable solution.
•Upon customer's request, RFcamp develops metal based brackets for special applications, with optimal tag performance.

• Encapsulations

•For special environment requiring enhanced chemical durability, RFcamp applies special coating materials over tag.
•Upon customer's request, RFcamp develops injection molded ruggedized case or rubber (polyurethane or silicone) based encapsulation.