TN0280
Technical note

Migrating from the LRI2K to the LRI1K RFID IC

Introduction

The purpose of this document is to give an overview of the features implemented in the LRI2K and the LRI1K, and highlight their differences in order to help customers to switch from LRI2K to LRI1K in their application.

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1 RF interface

Both LRI2K and LRI1K support all data rates and modulation defined in the ISO 15693 standard.

Table 1. ISO 15693 RF Interface modes

Modulation and data transfer	LRI2K	LRI1K
10% / 100% modulation	both	both
1/4 and 1/256 pulse coding	both	both
Manchester coding 1 sub carrier/ 2 subcarrier	both	both
High datarate / low datarate	6.6 kbit / 26 kbit/s	6.6 kbit / 26 kbit/s

2 Built-in tuning capacitor

Table 2 summarizes the built in tuning capacitor value available for LRI2K and LRI1K.

Table 2. Internal tuning capacitor

Parameter	LRI2K	LRI1K
Internal tuning capacitor value	21 pF, 23.5 pF, 28.5 pF or 97 pF	21 pF

Customers using LRI2K in 21pF version can use LRI1K as a direct replacement without needing to retune their antenna.

For customers using any other LRI2K tuning capacitor version, a redesign of the antenna will be necessary to restore the desired tuning frequency.

3 Memory mapping

Table 3 summarizes the memory mapping information for LRI2K and LRI1K.

Table 3. Memory mapping

Features	LRI2K	LRI1K
UID	64 bits	64 bits
Memory size	2048 bits	1024 bits
Block size	32 bits	32 bits
Memory array last address	3Fh	1Fh
RF programming time t_W including verify	5.8 ms	5.8 ms
Erase/write cycles	1 million	1 million

4 RF commands supported

LRI2K and LRI1K support the same command set.

Table 4. RF commands

Command	LRI2K	LRI1K
Inventory	Yes	Yes
Stay quiet	Yes	Yes
Read single block	Yes	Yes
Write single block	Yes	Yes
Lock block	Yes	Yes
Read multiple block	Up to 64 blocks	Up to 32 blocks
Select	Yes	Yes
reset to ready	Yes	Yes
Write AFI	Yes	Yes
Lock AFI	Yes	Yes
Write DSFID	Yes	Yes
Lock DSFID	Yes	Yes
Get system info	See *Section 5*	See *Section 5*
Get Multiple block security status	Up to 64 blocks	Up to 32 blocks(1)
Kill	Yes	Yes
Write kill	Yes	Yes
Lock Kill	Yes	Yes
Fast Read Single block	Yes	Yes
Fast read Multiple Block	Up to 64 blocks with roll over	Up to 32 blocks with roll over
Fast Inventory Initiated	Yes	Yes
Inventory Initiated	Yes	Yes
Initiate	Yes	Yes
Fast initiate	Yes	Yes

1. See LRI1K datasheet for a description of get multiple block security status

5 GET SYSTEM INFO command differences

Table 5. Difference between LRI2K and LRI1K answer to GET SYSTEM INFO

Parameter	LRI2K	LRI1K
Memory size	033Fh	031Fh
IC reference (6 most significant bits)	00 100b = 08h	01 0000b = 16d

6 Die description

As described in the technical notes TN0052 *LRI2K die description* and TN0252 *LRI1K die description*, the wafer, die features, pad number and pad positioning are identical for LRI2K and LRI1K.

As a consequence, LRI1K can be used as a direct replacement for LRI2K regarding the design of the antenna connections.

However, you must pay attention to the value of the LRI2K tuning capacitor used in the application (see *Section 2*).

7 Delivery form

Table 6 summarizes the available delivery forms for LRI2K and LRI1K.

Table 6. Delivery form

Delivery form	LRI2K	LRI1K
Unsawn wafer	Yes	
180 µm sawn and bumped wafer	Yes	Yes
MLP 2X3	Yes	

LRI1K is delivered only in sawn and bumped wafers.

8 Revision history

Table 7. Document revision history

Date	Revision	Changes
24-Apr-2010	1	Initial release.