ST1335D, ST1336D
ST1355D

5-Contact Memory Card IC 272-bit EEPROM
With Advanced Security Mechanisms and Inlock System

DATA BRIEF

- 5 V Single Supply Voltage
- Counting Capability (two options)
  - up to 32767 (8^5 -1)
  - 8 times reloadable, up to 4095 (8^4-1)
- Active Authentication Function (ST1335D/55D)
- Cipher Block Chaining Function (ST1355D)
- Memory Divided into :
  - 16 bits of Circuit Identification
  - 48 bits of Card Identification
  - 40 bits of Count Data
  - 16 bits for Validation Certificate
  - 24 bits of Transport Code
  - 64 bits of Issuer Data (ST1336D) or Authentication Secret Key (ST1335D/55D)
  - 32 bits of Anti-tearing Flags (optional)
  - 56 bits of User data (optionally not erasable)
- More than 500,000 Erase/Write Cycles
- More than 10 Years Data Retention
- 3.5 ms Programming Time at 5 V (typical)
- 500 µA Supply Current at 5 V (typical)
- 250 µA Stand-by Current at 5 V (typical)

Micromodule
(D15)

Wafer

DESCRIPTION

The members of the ST1335D/36D/55D family are principally designed for use in prepaid Phonecard applications. Each is a 272-bit EEPROM device, with associated security logic and special fuses to control memory access. The memory is arranged as a matrix of 34 x 8 cells, accessed in a serial bit-wise fashion for reading and programming, and in a byte-wise fashion for internal erasing. An on-chip

Figure 1. Logic Diagram

Table 1. Signal Names

CLK	Clock
RST	Reset
I/O	Serial Data Input / Output
VCC	Supply Voltage
GND	Ground

Complete data available under NDA.
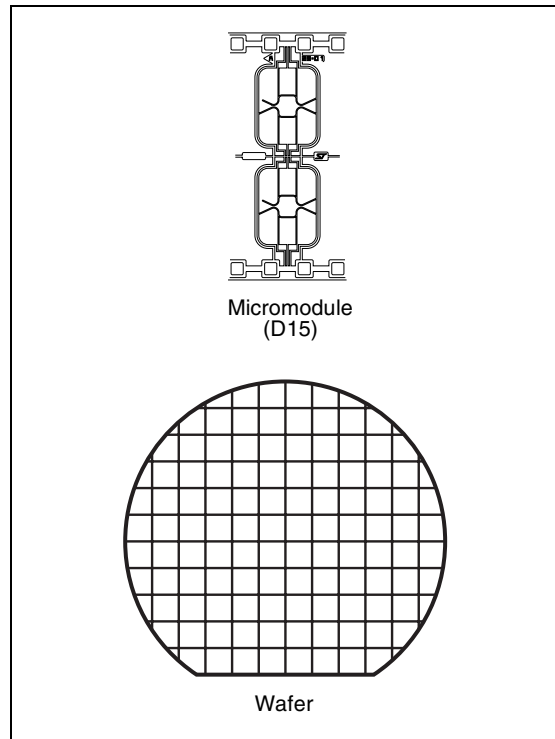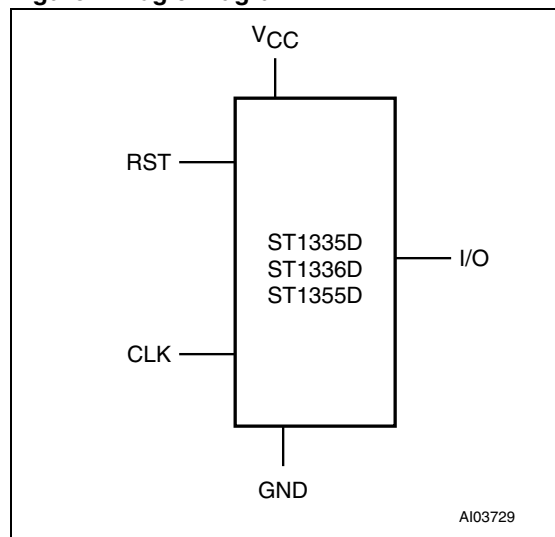
Figure 2. D15 Contact Connections

ST1335D
ST1336D
ST1355D

V_CC   GND

RST

CLK   I/O

AI03732
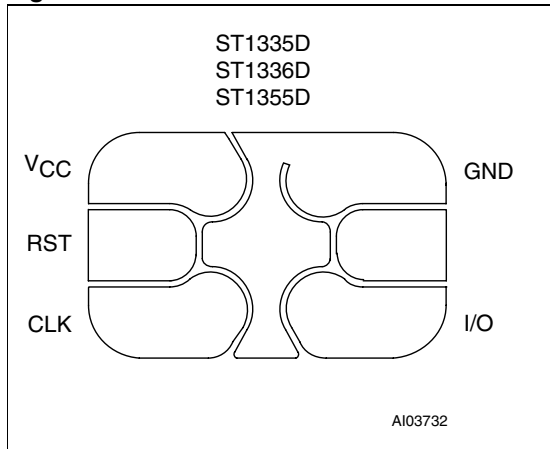
address counter provides an internal address space of up to 512 bits.

Each member of the ST1335D/36D/55D family has an identification data area, unit-counters (with an anti-tearing mechanism for reliable usage in open readers), a post validation certificate, an issuer area (ST1336D) or an authentication secret key area (ST1335D/55D), and a user area. This is summarized in Figure 3.

The validation certificate allows the recognition of the device by the appropriate security module. When the 8 times reloadable option is activated, the certificate and the reload counter (address 64d to 71d) can be used to allow the recognition of the circuit by the appropriate security module. This will allow the development of a reloadable card as the certificate value is refreshed each time the reload counter is incremented.

The anti-tearing mechanism guards against miscounts occurring when the card is prematurely extracted, while an operation is underway, in an open reader.

MODES

The device works in two distinct modes of operation:

– Issuer Mode: for the card manufacturer. allowing custom data to be written to the device, to initialize it before release to the end user.

– User Mode: for the end user of the card, with restricted, and controlled access to the device.

Before delivery, from ST to the card issuer, the device is placed in the Issuer Mode. This operation is performed by blowing the "test fuse".
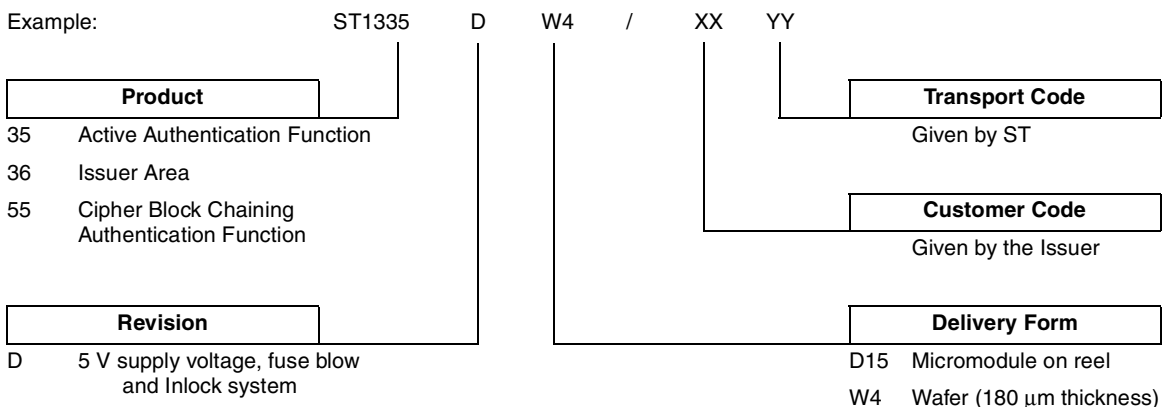
OPTIONS

Three options are available when ordering the device:

– The anti-tearing mechanism can be disconnected. In this case, the anti-tearing flag area from bit 288d to bit 319d is unused (Figure 3).

– The user area, from bit 320d to bit 375d, can be defined as "not erasable" in the User Mode.

– The reload mechanism can be activated. In this case, erasing a bit in the reload counter refreshes the certificate (CER). At this time, the certificate can be programmed with a new value.
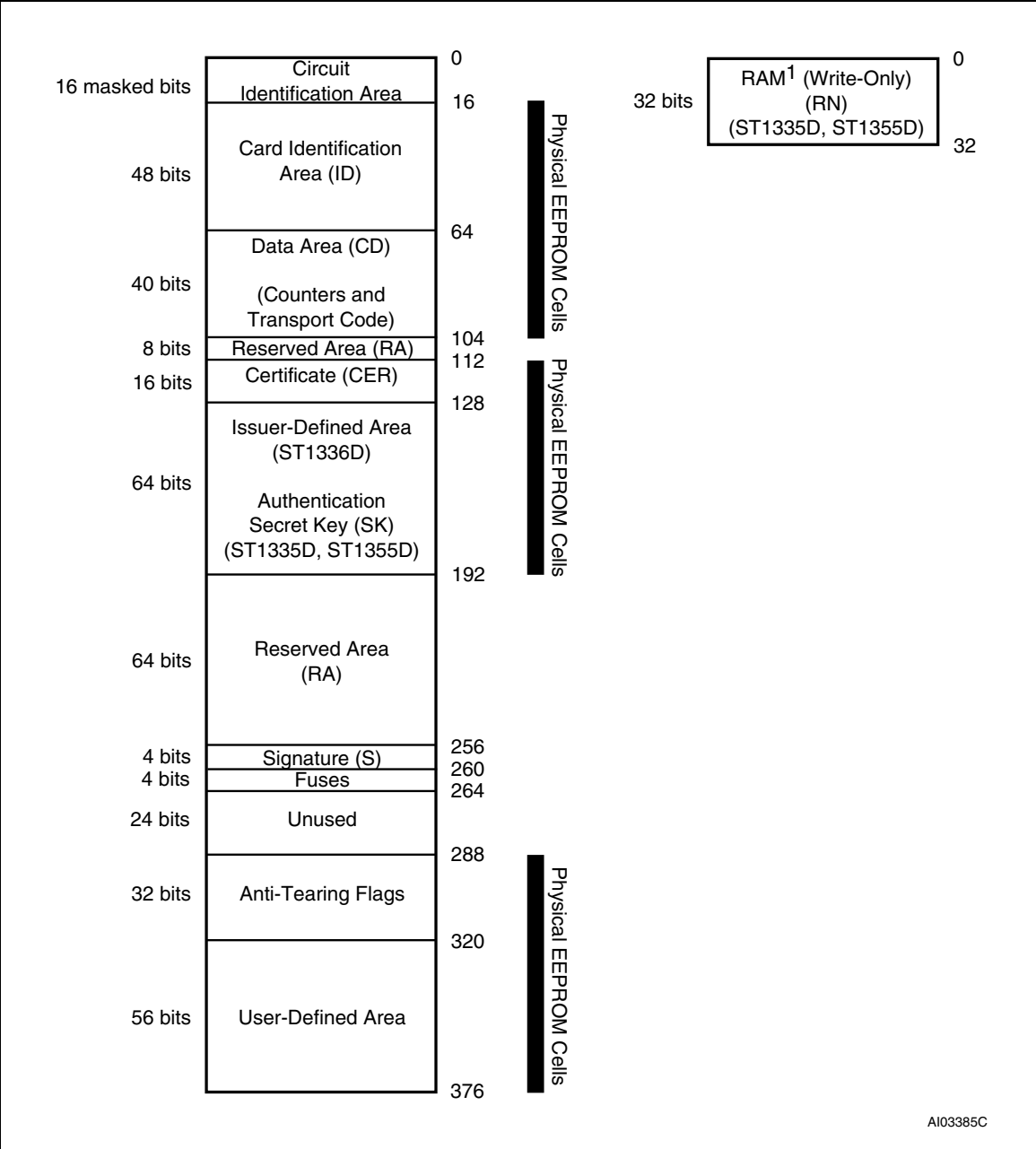
ORDERING INFORMATION

The notation used for the device number is as shown in Table 2. For a list of available options (speed, package, etc.) or for further information on any aspect of this device, please contact your nearest ST Sales Office.

Table 2. Ordering Information Scheme

Example: ST1335   D   W4   /   XX   YY

Product		
35	Active Authentication Function	
36	Issuer Area	
55	Cipher Block Chaining Authentication Function	

Transport Code
Given by ST

Customer Code
Given by the Issuer

Revision	
D	5 V supply voltage, fuse blow and Inlock system

Delivery Form	
D15	Micromodule on reel
W4	Wafer (180 μm thickness)

Note: 1. Please contact your nearest ST Sales Office to check on availability

Figure 3. Memory Map

16 masked bits	Circuit Identification Area	0
		16
48 bits	Card Identification Area (ID)	
		64
40 bits	Data Area (CD) (Counters and Transport Code)	
		104
8 bits	Reserved Area (RA)	112
16 bits	Certificate (CER)	128
64 bits	Issuer-Defined Area (ST1336D) Authentication Secret Key (SK) (ST1335D, ST1355D)	
		192
64 bits	Reserved Area (RA)	
4 bits	Signature (S)	256
4 bits	Fuses	260 / 264
24 bits	Unused	
		288
32 bits	Anti-Tearing Flags	
		320
56 bits	User-Defined Area	
		376

Physical EEPROM Cells

32 bits	RAM[1] (Write-Only) (RN) (ST1335D, ST1355D)	0
		32

AI03385C

Note: 1. The write-only RAM area (RN) is applicable only for the User Mode.

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