# Low-Cost Smart Card Interface IC

## General Purpose Smart Card Electrical Interface with High Performance


The 73S8024R is a single smart card interface IC, compliant to the electrical requirements of ISO-7816-3. It is available either in a standard SO28 package, or in a 32-pin QFN package (5mmx5mmx0.8mm), making it the smallest solution available today in the market. It can be used in any micro-controller-based design, to implement a generic smart card reader (terminal) and is suitable for designs that need to comply with EMV 4.0 (EMV2000) or NDS The 73S8024R enables a micro-controller to communicate with the smart card by using a dedicated digital control bus, compatible with the industry standard devices TDA8004 & TDA8024.

A significant advantage of the 73S8024R over existing IC solutions is the use of a Low Drop-Out (LDO) voltage regulator to generate the card power supply ($V_{CC}$) from a nominal power supply source ($V_{PC}$) of 5V. Digital circuitry is separately powered by a digital power supply ($V_{DD}$) typically 3.3V, which is independent from the 5V supply of the LDO regulator. The LDO exhibits improved noise performance when compared to typical step-up converter based ICs, which generate a lot of undesired noise and ripple causing problems when trying to comply with applicable standards. The LDO architecture also allows the 73S8024R to be the highest card current capable smart card interface IC available today in the market, with up to 90mA minimum provided to the card. Finally, the LDO regulator IC solution, with fewer external components, makes the 73S8024R a more cost effective solution for high-volume smart card readers in consumer electronics applications such as set-top-boxes, digital TVs, or personal video recorders.

The 73S8024R includes an ISO-7816 sequencer that controls the card activation/deactivation. The card itself is also better protected, compared with existing ICs, since the emergency card deactivation is initiated upon 5 possible hardware faults. These faults are card extraction, card over-current, $V_{DD}$ fault, $V_{PC}$ fault (LDO regulator power supply), $V_{CC}$ fault (card power supply, output of the LDO regulator) or a die over-heating fault.

The $V_{DD}$ fault detection has a threshold voltage that can be adjusted with an external resistor or resistor network, allowing automated card deactivation at a customized $V_{DD}$ voltage threshold. This allows, for instance, customizing the automated card deactivation to match the operating voltage range of the host microcontroller.

The 73S8024R is the ideal solution for integration of a smart card reader in payment systems, identification and conditional access terminals, where performance, small size and low cost are required.

### Key Applications

- *Set-Top-Boxes, Digital TVs and PVRs:*
  - *Conditional Access Slot (NDS Approved)*
  - *Payment Slot (EMV pre-Certified)*
- *Point of Sales & Transaction Terminals*
- *Control Access & Identification*

### Key Advantages

- *NDS-approved*
- *Traditional step-up converter is replaced by a LDO regulator:*
  - *Better noise performance (typical factor 10:1 with existing converter based ICs)*
  - *Highest card current interface in the market: With 90mA for the ICC, it is suitable for high-performance smart cards and Secure Access Modules*
  - *More cost-effective*
- *Pin-to-pin compatible with industry-standards TDA8004 and TDA8024*
- *Requires fewer external components than typical ICC interface ICs*
- *Card clock STOP (high and low) mode*
- *32QFN (5x5x.08mm) package option: The smallest card interface IC of the industry!*



EMVCo

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## Features

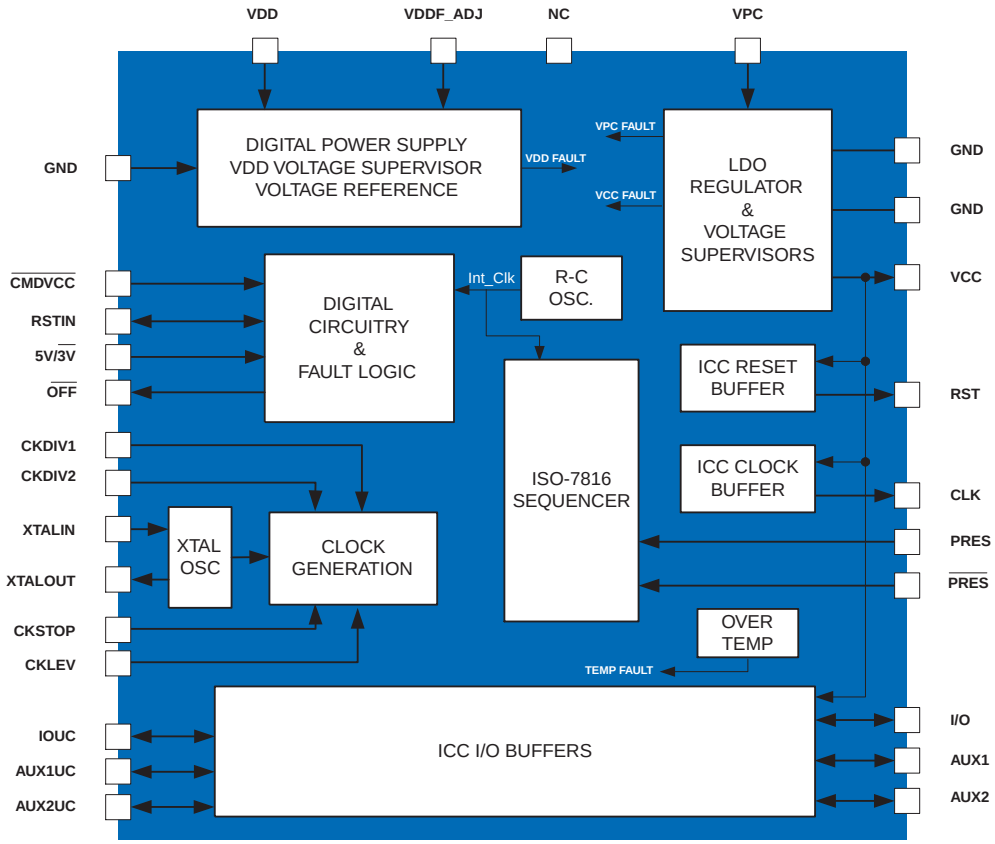
### Card Interface

- Complies with ISO-7816-3, EMV 4.0 and NDS Specifications
- Provides at least 90mA to the card
- LDO voltage regulator provides 3V / 5V to the card from an external power supply input
- ISO-7816-3 Activation / Deactivation sequencer with emergency automated deactivation on card removal or fault detected by the protection circuitry
- Protection includes 3 voltage supervisors that detect voltage drops on $V_{CC}$ (card), $V_{DD}$ (digital), and $V_{PC}$ (regulator) power supplies
- The $V_{DD}$ voltage supervisor threshold value can be externally adjusted with 2 resistors
- Over-current detection 150mA max.
- Card clock stop (high or low)
- 2 card detection inputs, 1 for each possible user polarity
- Auxiliary I/O lines, for C4 / C8 contact signals
- Card clock frequency up to 13.5MHz (NDS) and 20MHz (ISO7816 and EMV)

### System Controller Interface

- 3 Digital inputs control the card activation / deactivation, card reset and card voltage
- 4 Digital inputs control the card clock (division rate and card clock stop modes)
- 1 Digital output (interrupt) to the system controller, allows the system controller to monitor the card presence and faults

## 73S8024R Block Diagram




### Power Supply

- LDO Regulator ($V_{PC}$)
  - 4.75V to 5.5V (ISO7816/EMV 4.0)
  - 4.85V to 5.5V
- Digital Interfacing ($V_{DD}$):
  - 2.7V to 5.5V
  - 3.0V to 3.6V (NDS)

### 6KV ESD Protection on the card interface

**Package:** SO28 or QFN32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For immediate technical information and the name of a local representative or distributor, visit **www.tdksemiconductor.com,** send an e-mail to **support@tdksemiconductor.com** or call (714) 508-8800.