

Smart Card Reader

Application Overview

Problem/Solution

Called by various names—Integrated Circuit Cards, Smart Cards, Chip Cards—these wallet-size cards with an IC chip inside are used to deliver information, store data, and/or modify data content. The card is powered from the card reader's Vcc. Defective cards or foreign objects placed into the reader can cause a short-circuit and permanently damage the reader. Placing a PolySwitch device in the power source circuit can provide protection against such faults.

Typical Protection Requirements

The EMV '96 – Integrated Circuit Card Specification for Payment Systems (Version 3.1.1, May 31, 1998) states that terminals do require circuit protection; VPP is not used by the terminals, Vcc is covered by section 1.4.6 listing the following operating characteristics:

$$V_{OP} = 5V \pm 0.4V$$

$$I_{OP} \text{ max} = 55 \text{ mA}$$

$$T_{OP} = 0\text{-}50 \text{ C}$$

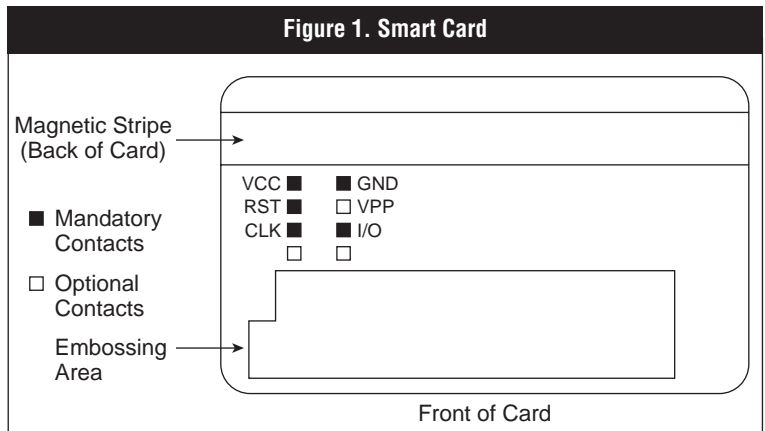
Resettable overcurrent protection is required per sections 1.4.6 and 1.4.8 of the EMV:

1.4.6 Supply Voltage (Vcc)

The spec states:

“The terminal shall generate a Vcc of $5V \pm 0.4VDC$ and shall be capable of delivering steady state output current in the range 0 to 55 mA while maintaining Vcc within these tolerances....

Figure 1. Smart Card



The terminal shall contain protection circuitry to prevent damage occurring to it in the event of fault conditions such as a short-circuit to GND or Vcc.”

1.4.8 Short-Circuit Resilience

The spec states:

“The terminal shall be capable of sustaining a short-circuit of any duration between any or all contacts without suffering damage or malfunction, for example, if a metal plate or an ICC with a metallic surface is inserted.”

Typical Agency Approval Requirements

ISO/IEC 7816-3 covers the requirements for these cards.

Type	Voltage (max.)	Current (max.)	Ambient Temp.
A	5.5V	60mA	0-50C
B	3.3V	50mA	0-50C

Device Selection

For Vcc protection, products typically used are from the nanoSMD and microSMD series.

Figure 2. Smart Card Reader Schematic

