



## 13.56MHz Crypto Analogue Front End Circuit For High Secure RFID communication

### General Description

The EM4294 is an analogue front end for high secure 13.56MHz RFID reader systems. The reader integrates the crypto algorithm of the EM4035 transponder IC associated with 4 secret keys. Each secret key is 96 bit length and it gives access to the EM4035 tag protected memory after a true mutual authentication process between the tag and the reader. The secret key can not be read by an external device and their integrity is protected by a 32 bit password. The reader IC incorporates also 40k Bytes of user free memory accessible through an ISO7816-3 serial line. The EM4294 RF blocks are similar to the EM4094 one and have the same parameters and performances. The EM4294 reader chip can be used in different systems having sub carrier frequencies from 212kHz to 848kHz, hence covering ISO14443 and ISO15693 and Sony Felica™ protocols. The EM4294 offers several options for the RF communication which options can be adapted using a 3 wire serial interface. The push-pull transmitter generates 200mW output RF power into a 50Ω load. The RF output stage drivers are capable of OOK or ASK modulation from 7% up to 30% of AM modulation. The EM4294 operating voltage is comprised between 3.3V and 5V.

### Applications

- ❑ Electronic metering (gas, water, etc...)
- ❑ Vending machines, e-payments
- ❑ Public transportation
- ❑ Secure access control (fitness, swimming pools, etc)
- ❑ Low cost desktop reader / terminal (hotels, etc...)

### Features

- ❑ ISO15693 & ISO14443 Type A and B compatible
- ❑ HF EPC compliant
- ❑ Supports Sony Felica™ protocol
- ❑ 8 Bytes serial unique ID number containing a customer code
- ❑ Integrates EM4035 Crypto algorithm
- ❑ 4 secret keys of 96 bit length (write mode only)
- ❑ 32 bit password to change secret key contents
- ❑ Ratification number to prevent against attacks
- ❑ Random generator flips 140-2 compliant
- ❑ 40k Bytes of user free memory
- ❑ 3.3V or 5V Power Supply (analogue and digital)
- ❑ Antenna driver using OOK or ASK modulation
- ❑ ASK modulation index adjustable from 7% - 30%
- ❑ Single or double antenna driver configuration
- ❑ High output RF power of 200mW from 5V supply
- ❑ Antenna short circuit protection
- ❑ 2 receiver inputs for AM and PM demodulation
- ❑ 848KHz BPSK internal decoder (ISO14443 type B)
- ❑ Reception chain compliant with 212kHz, 424kHz, 484kHz and 848kHz sub-carriers
- ❑ Reception chain compliant with Manchester, Miller, and BPSK data encodings
- ❑ Built-in receive low-pass filter which cut-off frequencies are selectable between 400kHz and 1MHz
- ❑ Built-in receive high-pass filter cut-off frequency selectable between 100kHz, 200kHz and 300kHz
- ❑ Selectable receive gain from 0dB up to 40dB
- ❑ Serial 3 pins interface for option selection
- ❑ Power down mode controlled by the 3 wires SPI
- ❑ Operation temperature range -40°C to +85°C
- ❑ SO24 Package

### Typical Application

