



## DS3645

# 4KB Secure Memory with Tamper Protection for Network Server Applications

Single-Chip Solution Integrates Advanced Physical Security with On-Chip Encryption Key Memory



NDA Required. Request Full Data Sheet

### **Description**

The DS3645 is a secure supervisor with 4096 bytes of SRAM for applications requiring the secure storage of sensitive data and the physical tamper-sensing response functions required in cryptographic processors and data security equipment.

One of the DS3645's primary features is the on-chip encryption key memory, consisting of 32 128-byte banks incorporating a high-speed, direct-clearing function. The 4KB key memory is constantly complemented in the background to prevent memory imprinting. In the event of a qualified tamper event, the key memory is rapidly cleared and a negative bias is applied to clear SRAM external to the DS3645.

The device includes a real-time seconds counter, watchdog timer, CPU supervisor, nonvolatile (NV) SRAM controller, and on-chip temperature sensor. In the event of a primary power failure, an external battery source is automatically switched in to keep the key memory, seconds counter, and tamper-detection circuitry active. The DS3645 provides low-leakage tamper-detection inputs for interface to external sensors, interlocks, and antitamper meshes. The DS3645 also invokes a tamper event if the backup battery drops below a specified threshold or absolute temperature, if the temperature rate-of-change exceeds programmed limits, or if the crystal oscillator frequency falls outside a specified window. The tamper event is latched and timestamped for future debugging purposes.

Access to the seconds counter, tamper monitoring, key memory, and device configuration is conducted through an I<sup>2</sup>-C-compatible interface. The DS3645 is assembled in a CSBGA package, which enhances key security because the leads are not exposed to the outer edges of the package.

## Key Features

- 4096-Byte Nonimprinting Key Memory with High-Speed Erase
- Optional External SRAM Clear Upon Qualified Tamper Event
- 64-Byte General-Purpose RAM (Not Cleared)
- 32-Bit Seconds Counter
- Watchdog Timer
- CPU Supervisor
- Four General-Purpose Tamper-Detect Comparators
- Four Window Comparators with On-Chip Reference Voltages
- Two Tamper-Detect Logic Inputs
- On-Chip, Programmable Temperature Sensing with Proprietary Rate-of-Change Detector
- On-Chip Random-Number Generator (RNG)
- Latching and Timestamping of Tamper Events
- Crystal Oscillator Tamper Monitoring
- Low-Power Consumption
- Wide Temperature Range: -55°C to +95°C
- CSBGA Package (7mm x 7mm x 0.8mm) with No Horizontally Exposed Leads
- I<sup>2</sup>C-Compatible Interface

## Applications/Uses

- Alarm Systems
- Gaming
- IT Security
- Point-of-Sale Terminals
- Routers/Switches

| Part Number   | Analog Voltages Monitored | Digital Inputs Monitored | Internal Key Memory (Bytes) | Package/Pins | Oper. Temp. (°C) |
|---------------|---------------------------|--------------------------|-----------------------------|--------------|------------------|
| <b>DS3645</b> | 12                        | 4                        | 4096                        | CSBGA/49     | -55 to +95       |

| Part Number | Status | Carrier Type | Package                           |
|-------------|--------|--------------|-----------------------------------|
| DS3645B+    | Active | Tray         | CSBGA; 49Pin; 49mm <sup>2</sup> ; |
| DS3645B+TRL | Active | Reel         | CSBGA; 49Pin; 49mm <sup>2</sup> ; |
| DS3645K     | Active | Box          |                                   |
| DS3645B-TRL | NLA    | Reel         | CSBGA; 49Pin; 49mm <sup>2</sup> ; |
| DS3645B     | Active | Tray         | CSBGA; 49Pin; 49mm <sup>2</sup> ; |
| DS3645B-W+  | NLA    | Tray         | CSBGA; 49Pin; 49mm <sup>2</sup> ; |