# DAVICOM Semiconductor, Inc.

# DM2192

## 192x192 Pixels Fingerprint Sensor IC



***Preliminary***

***Version: DM2192-11-MCO-DS-P01***

***July 15, 2018***

# Table of Contents

# 1. Introduction

The DM2192 fingerprint sensor is a high-performance touch type fingerprint sensor. Due to its large sensing area, the traditional minutia-based fingerprint authentication algorithm can work well on this sensor, it is the ideal choice for usage in the lock, remote control, access control…etc. standalone fingerprint authentication applications.

# 2. Features

| Item | Feature |
|---|---|
| Image Gray Level | ● 256 gray levels/sensor pixel, 8-bits ADC |
| Image Resolution | ● 508 DPI |
| Image Size | ● 192 x 192 pixels |
| Sensor Scan Area | ● 9.6mm x 9.6mm |
| Interface | ● SPI Slave @SPI Mode 0/3, SPI Clock Frequency up to 10MHz<br>● Level High Triggered Interrupt<br>● Active Low Reset |
| IO Operating Voltage | ● 1.8V/2.8V/3.3V |
| IC Operating Voltage | ● 1.8V/2.8V/3.3V |
| Working Mode and Power Consumption | ● Fingerprint Image Getting Mode < 5.0 mA<br>● Finger-On Detection Mode < 100 uA<br>● Sleep Mode < 1 uA |
| Environment Specifications | ● Robust ESD IEC 61000-4-2 level 4 (+/- 15KV)<br>● Green compliant<br>● Withstands over 20 million touches<br>● Operating temperature: -20℃~+85℃<br>● Humidity: 0%~90% RH under 60℃ |

# 3. Architecture

## 3.1. Block Diagram

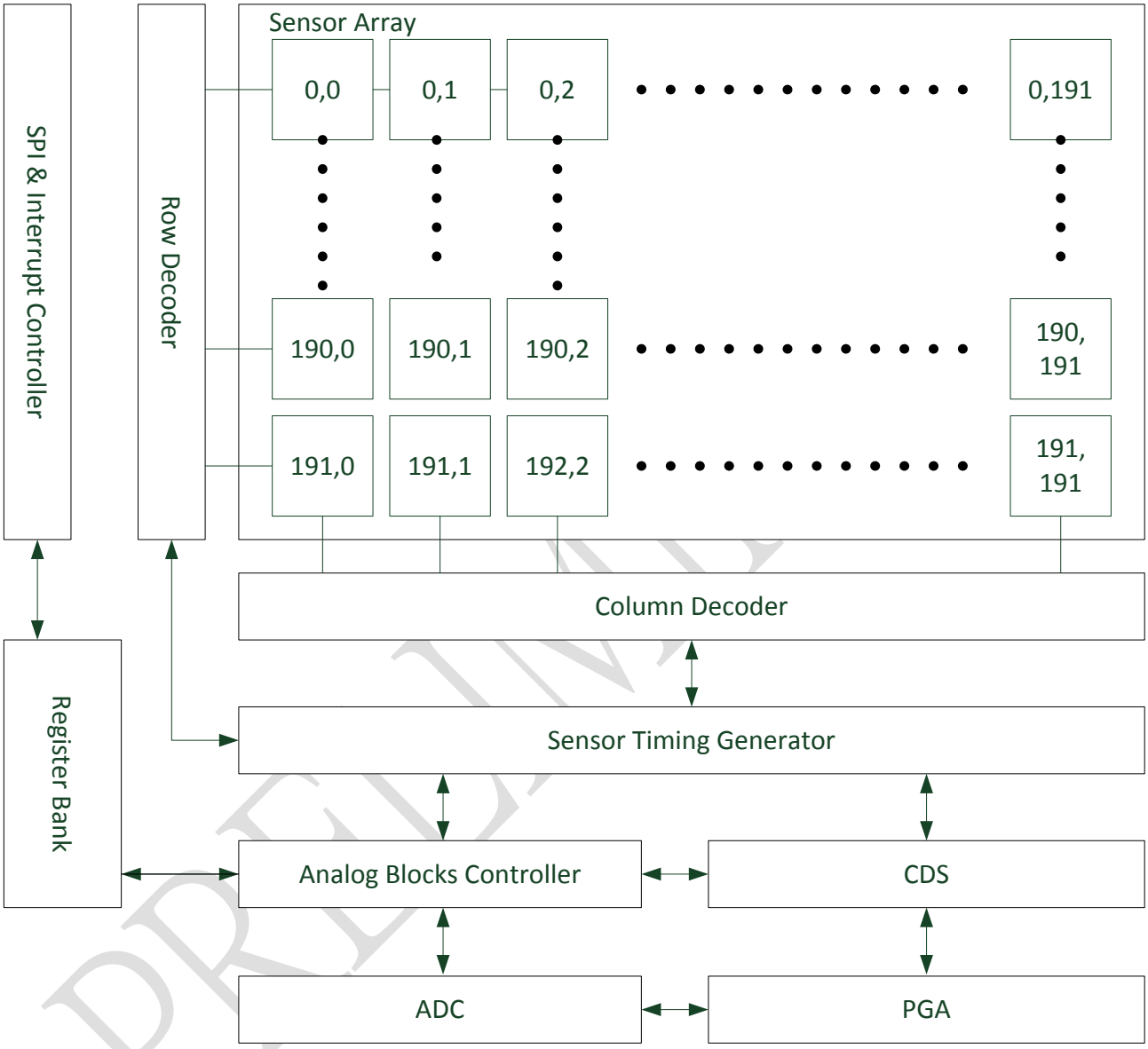
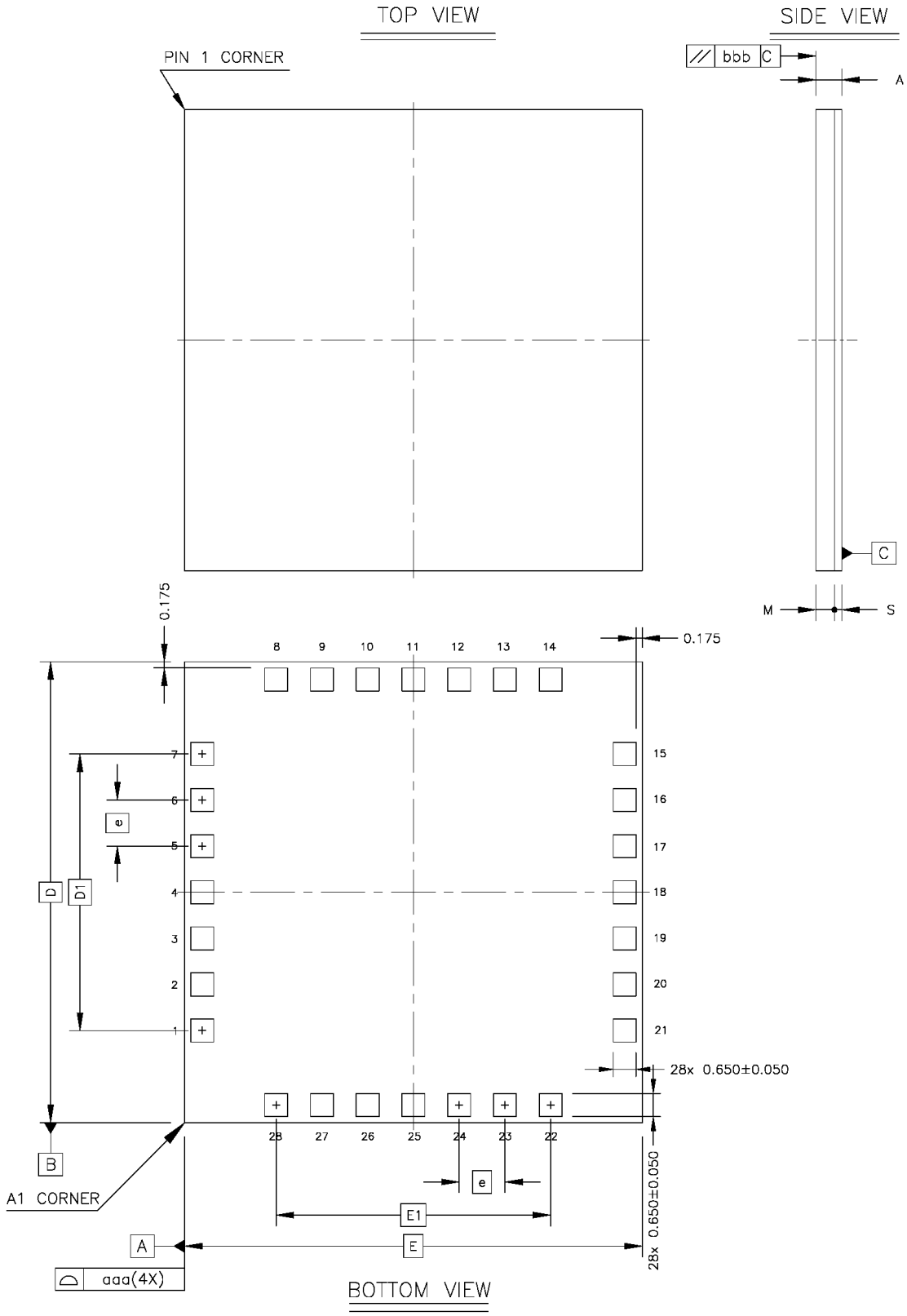



Figure 3.1 DM2192 Block Diagram

# 4. Package Size & Pad Location

## 4.1. Package Size& Pad Location



| | | Symbol | Common Dimensions | | |
|---|---|---|---|---|---|
| | | | MIN. | NOM. | MAX. |
| Package : | | | WLGA | | |
| Body Size: | X | E | 13.000 | | |
| | Y | D | 13.000 | | |
| Lead Pitch : | | e | 1.300 | | |
| Total Thickness : | | A | – | – | 0.800 |
| Mold Thickness : | | M | 0.530 Ref. | | |
| Substrate Thickness : | | S | 0.210 Ref. | | |
| Lead Size: | | | 0.650x0.650 | | |
| Stand Off : | | A1 | – | – | – |
| Ball Width : | | b | – | – | – |
| Package Edge Tolerance : | | aaa | 0.150 | | |
| Mold Parallelism : | | bbb | 0.100 | | |
| Coplanarity: | | ddd | – | | |
| Ball Offset (Package) : | | eee | – | | |
| Ball Offset (Ball) : | | fff | – | | |
| Lead Count : | | | 28 | | |
| Edge Lead Center to Center : | X | E1 | 7.800 | | |
| | Y | D1 | 7.800 | | |

Figure 4.1.Package Size

## 4.2. Pins Definition

| PIN | NAME | IO | DESCRIPTION |
|---|---|---|---|
| 1 | VDD33CP | PWR_O | Charge Pump Regulator Output, 3.6V |
| 2 | VDD33LDO | PWR_O | LDO2 Output to Analog PWR, 2.85V/3.0V/3.15V/3.3V/VDD33/Floating |
| 3 | VDD | PWR | Connected to VDD33LDO |
| 4 | VSSD | GND | Digital ground |
| 5 | VSSD | GND | Digital ground |
| 6 | VSSD | GND | Digital ground |
| 7 | VSSD | GND | Digital ground |
| 8 | ANAOUT | O | Analog Signal Output in Test Mode and Electric Filed Pulse in Working Mode |
| 9 | VDD33D | PWR | Connected to VDD33LDO |
| 10 | VDDIO | PWR | IOPAD PWR, Connected to 1.8V/2.8V/3.3V to Configure the IOPAD to 1.8V/2.8V/3.3V |
| 11 | SPI_MOSI | I | SPI Master Out Slave In |
| 12 | SPI_MISO | O | SPI Master In Slave Out |
| 13 | SPI_CLK | I | SPI Clock |
| 14 | INT | O | Interrupt output pin, Active High |
| 15 | SPI_CSB | I | SPI Chip Select Bar, Active Low |
| 16 | SENSOR_RESET_N | I | Hardware RESET, Active Low |
| 17 | VDD33D | PWR | Connected to VDD33LDO |
| 18 | VDD33IO_F | PWR | Connected to VDD33LDO |
| 19 | N.A. | N.A. | N.A. |
| 20 | N.A. | N.A. | N.A. |
| 21 | N.A. | N.A. | N.A. |
| 22 | N.A. | N.A. | N.A. |
| 23 | VSSD | GND | Digital ground |
| 24 | CH | I/O | Fly Capacitor, 0.1uF ~ 10uF |

| | | | |
|---|---|---|---|
| 25 | CL | I/O | Fly Capacitor, 0.1uF ~ 10uF |
| 26 | VDD_OUT | PWR_O | LDO1 Power Ouput:1.8V~3.3V |
| 27 | VDD_IN | PWR_I | LDO1 Power Input:1.8V~3.3V |
| 28 | VSSA | GND | Analog GND |

Table 4.1 Pin Definition

## 4.3. Module Schematic & BOM

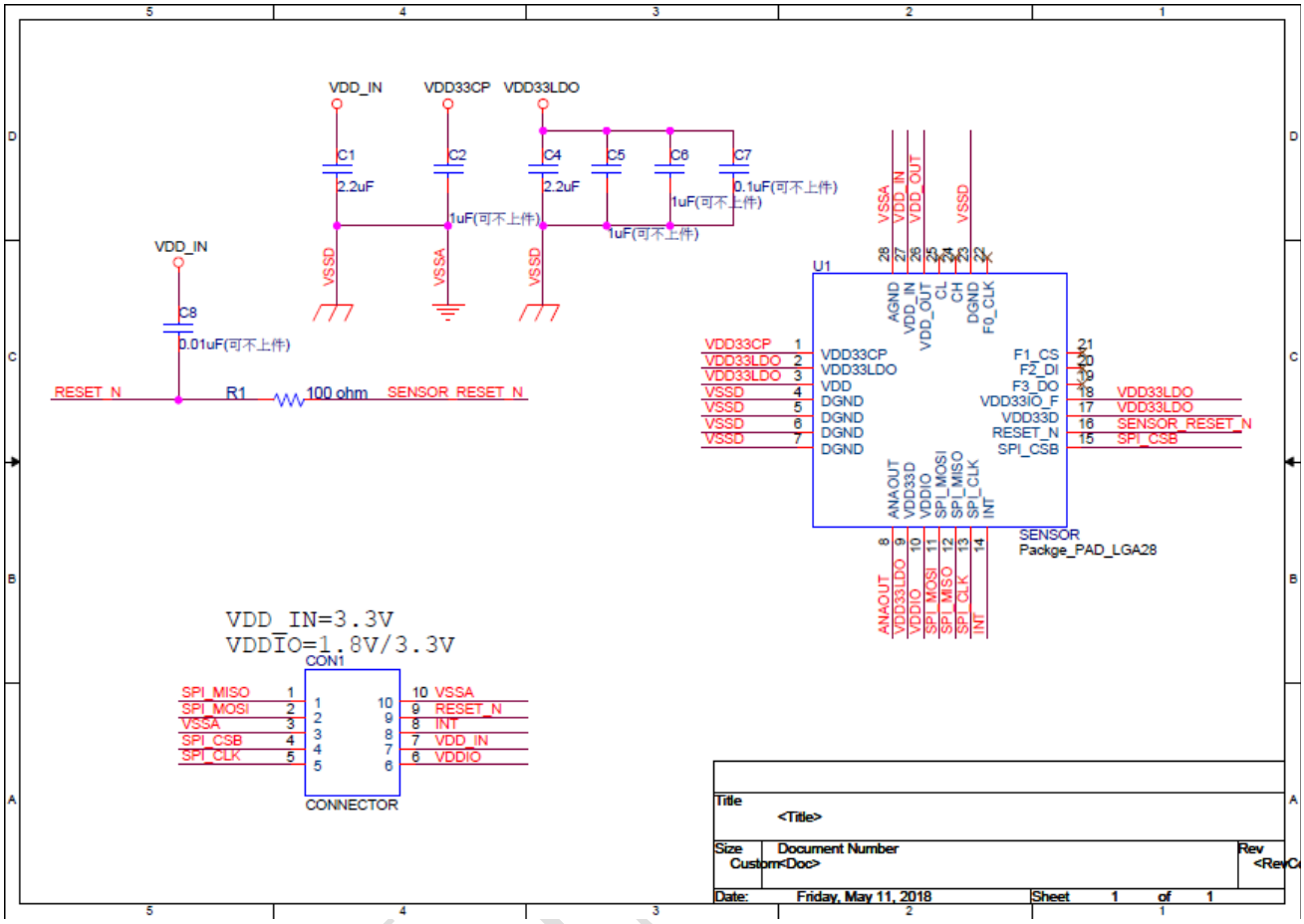



Figure 4.2 Module Schematic

| Item | Quantity | Reference | Part | Package |
|---|---|---|---|---|
| 1 | 2 | C1, C4 | 2.2uF | C0603 |
| 2 | 3(optional) | C2(optional), C5(optional), C6(optional) | 1uF | C0603 |
| 3 | 1(optional) | C7(optional) | 0.1uF | C0603 |
| 4 | 1(optional) | C8(optional) | 0.01uF | C0603 |
| 5 | 1(optional) | R1(optional) | 100 ohm | R0603 |
| 6 | 1 | U1 | Fingerprint Sensor | LGA_28 |
| 7 | 1 | CON1 | Connector | |

Table 4.2 BOM of Module

# 5. DC Characteristics

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| VDD_IN | VCC voltage level | VDD_IN=3.3V | 2.97 | 3.3 | 3.63 | V |
| VDDIO | IO Power Supply | VDDIO=1.8V<br>For 1.8V IO Operation | 1.62 | 1.8 | 1.98 | V |
| VDDIO | IO Power Supply | VDDIO=3.3V<br>For 3.3V IO Operation | 2.97 | 3.3 | 3.63 | V |
| VIH | High-level Input Voltage | | 2.0 | | | V |
| VIL | Low-level Input Voltage | | | 0.8 | | V |
| VOH | High-level Output Voltage | VDDIO=3.3V<br>IOH=2mA | 2.0 | | | V |
| VOL | Low-level Output Voltage | VDDIO=3.3V<br>IOH=2mA | | 0.8 | | V |

# 6. Ordering Information

| Part Number | Pin Count | Package |
|---|---|---|
| DM2192L | 28 | LGA |
| DM2192M1L | - | FPC module |

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