



**Please note that Cypress is an Infineon Technologies Company.**

The document following this cover page is marked as “Cypress” document as this is the company that originally developed the product. Please note that Infineon will continue to offer the product to new and existing customers as part of the Infineon product portfolio.

**Continuity of document content**

The fact that Infineon offers the following product as part of the Infineon product portfolio does not lead to any changes to this document. Future revisions will occur when appropriate, and any changes will be set out on the document history page.

**Continuity of ordering part numbers**

Infineon continues to support existing part numbers. Please continue to use the ordering part numbers listed in the datasheet for ordering.

## Features

### ■ Fingerprint Sensor

- BGA package consisting of die mounted on a polymer substrate sensor
- 8.0 mm × 8.0 mm active imaging area fingerprint sensor
- 340 DPI 107 × 107 pixel array at 8-bits per pixel resolution
- Great image quality with polymer, plastic, and ceramic coatings < 100µ in overall thickness
- 32-bit Arm® Cortex®-M0 CPU
- Noise-suppression technologies for the battery chargers, displays, and radios in the device
- Self-calibration and self-testing
- Factory tuned with on-chip baseline storage, no field tuning required
- Secure firmware upgrades via bootloader

### ■ System Performance

- Live Finger Complete Acquisition Time (Get\_Image): ~160ms)
- 14 Finger Identify Match Time: ~500ms (average)
- <1.5% FRR at FAR >1:100K using CY-supplied matching SW
- 360 degree finger placement

### ■ Embedded Environment

- Embedded Framework (CYFPEF) provided for porting into host processor
- Recommended MCU Features: Cortex M4, 256KB of flash, and 96KB of RAM
- Ability to import and export templates securely
- Configurable security levels (1:10K to 1:1000K)
- Simple secure external communication protocol over MCU UART Interface

### ■ Sensor Communication Interface

- SPI slave bit rates up to 7.8 Mbps
- Strong 256-bit AES encryption secures the system interface from sensor to the host processor

### ■ Power (configuration-dependent)

- Operation of single 3.3-V supply
- 1.71 V to 1.95 V direct digital supply or 2.0 V to 5.5 V via LDO
- 2.65 V to 5.5 V analog supply
- <80-mW active power (average power while sensing)
- 8-µW typical deep-sleep power
- 400-µW Finger detection power @ 10 detects per second

### ■ Operating Temperature Range

- -40 °C to +85 °C

### ■ Package Options

- BGA package, 8.87 × 9.26 mm rectangular sensor

## Optional Features

- False finger rejection limiting host processor interruptions
- Fake finger rejection (anti-spoofing)
- Programmable finger detection timing (Wake-on-Finger)
- Navigation

Sensor Shown With Coating



Back of the Sensor



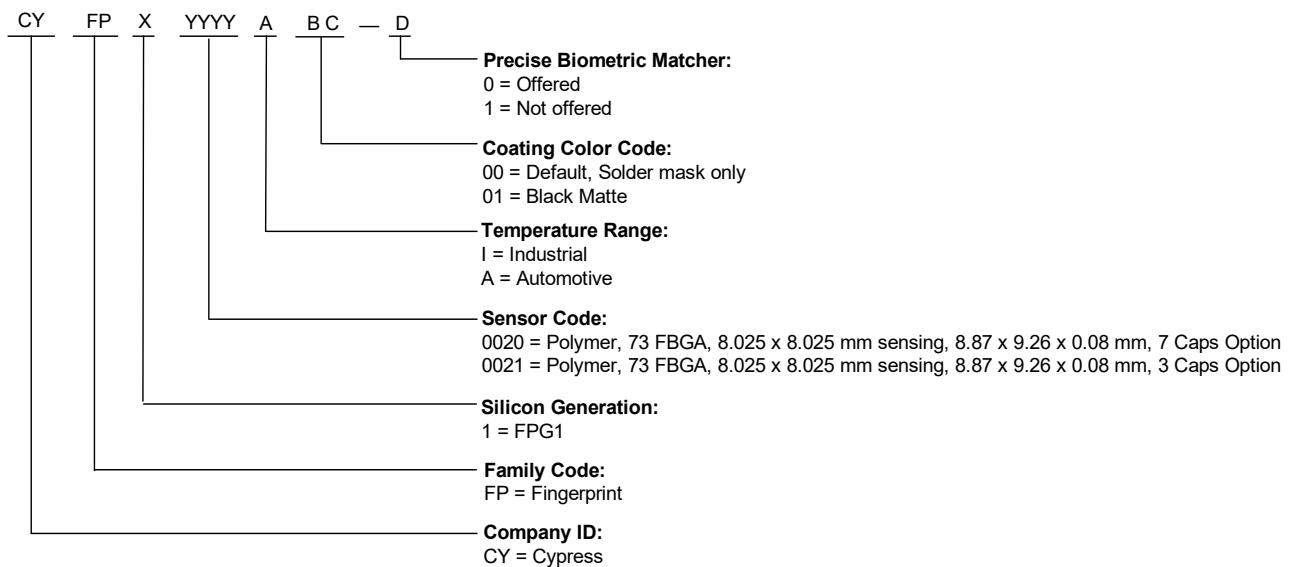
Front of the Sensor

**Ordering Information**

**Table 1. CYFP1 Device Key Features and Ordering Information**

Silicon Type	Package Type	Package Size	Operating Temperature
CYFP10020I00	73-Ball BGA	8.87 × 9.26 × 0.80 mm	Industrial
CYFP10020I01			
CYFP10020I01-1			
CYFP10021I00		12.20 × 12.20 × 0.80 mm	
CYFP10021I01		8.87 × 9.26 × 0.80 mm	
CYFP10021I01-1			

**Part Ordering Code Definitions**



All devices in the CYFP1 family comply to RoHS-6 specifications, demonstrating the commitment by Cypress to Pb-free products. Lead (Pb) is an alloying element in solders that has resulted in environmental concerns due to potential toxicity. Cypress uses the nickel-palladium-gold (NiPdAu) technology for a majority of the lead frame-based packages.

A high-level review of the Cypress Pb-free position is available on our website. Specific package information is also available. Package Material Declaration Datasheets (PMDDs) identify all substances contained within Cypress packages. PMDDs also confirm the absence of many banned substances. The information in the PMDDs will help Cypress customers plan for recycling or other “end of life” requirements.

**Document History Page**

Document Title: CYFP1002XXXX, CYFP1-8080 Datasheet Document Number: 002-11237				
Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	5142470	HFO	02/18/2016	New datasheet.
*A	5363615	HFO	08/19/2016	Updated <a href="#">Features</a> and added board image.
*B	6283450	HFO	09/19/2018	Updated template. Updated <a href="#">Features</a> and <a href="#">Ordering Information</a> .

## Sales, Solutions, and Legal Information

### Worldwide Sales and Design Support

Cypress maintains a worldwide network of offices, solution centers, manufacturer's representatives, and distributors. To find the office closest to you, visit us at [Cypress Locations](#).

#### Products

Arm <sup>®</sup> Cortex <sup>®</sup> Microcontrollers	<a href="http://cypress.com/arm">cypress.com/arm</a>
Automotive	<a href="http://cypress.com/automotive">cypress.com/automotive</a>
Clocks & Buffers	<a href="http://cypress.com/clocks">cypress.com/clocks</a>
Interface	<a href="http://cypress.com/interface">cypress.com/interface</a>
Internet of Things	<a href="http://cypress.com/iot">cypress.com/iot</a>
Memory	<a href="http://cypress.com/memory">cypress.com/memory</a>
Microcontrollers	<a href="http://cypress.com/mcu">cypress.com/mcu</a>
PSoC	<a href="http://cypress.com/psoc">cypress.com/psoc</a>
Power Management ICs	<a href="http://cypress.com/pmic">cypress.com/pmic</a>
Touch Sensing	<a href="http://cypress.com/touch">cypress.com/touch</a>
USB Controllers	<a href="http://cypress.com/usb">cypress.com/usb</a>
Wireless Connectivity	<a href="http://cypress.com/wireless">cypress.com/wireless</a>

#### PSoC<sup>®</sup> Solutions

[PSoC 1](#) | [PSoC 3](#) | [PSoC 4](#) | [PSoC 5LP](#) | [PSoC 6 MCU](#)

#### Cypress Developer Community

[Community](#) | [Projects](#) | [Video](#) | [Blogs](#) | [Training](#) | [Components](#)

#### Technical Support

[cypress.com/support](http://cypress.com/support)

---

© Cypress Semiconductor Corporation, 2016-2018. This document is the property of Cypress Semiconductor Corporation and its subsidiaries, including Spansion LLC ("Cypress"). This document, including any software or firmware included or referenced in this document ("Software"), is owned by Cypress under the intellectual property laws and treaties of the United States and other countries worldwide. Cypress reserves all rights under such laws and treaties and does not, except as specifically stated in this paragraph, grant any license under its patents, copyrights, trademarks, or other intellectual property rights. If the Software is not accompanied by a license agreement and you do not otherwise have a written agreement with Cypress governing the use of the Software, then Cypress hereby grants you a personal, non-exclusive, nontransferable license (without the right to sublicense) (1) under its copyright rights in the Software (a) for Software provided in source code form, to modify and reproduce the Software solely for use with Cypress hardware products, only internally within your organization, and (b) to distribute the Software in binary code form externally to end users (either directly or indirectly through resellers and distributors), solely for use on Cypress hardware product units, and (2) under those claims of Cypress's patents that are infringed by the Software (as provided by Cypress, unmodified) to make, use, distribute, and import the Software solely for use with Cypress hardware products. Any other use, reproduction, modification, translation, or compilation of the Software is prohibited.

TO THE EXTENT PERMITTED BY APPLICABLE LAW, CYPRESS MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS DOCUMENT OR ANY SOFTWARE OR ACCOMPANYING HARDWARE, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No computing device can be absolutely secure. Therefore, despite security measures implemented in Cypress hardware or software products, Cypress does not assume any liability arising out of any security breach, such as unauthorized access to or use of a Cypress product. In addition, the products described in these materials may contain design defects or errors known as errata which may cause the product to deviate from published specifications. To the extent permitted by applicable law, Cypress reserves the right to make changes to this document without further notice. Cypress does not assume any liability arising out of the application or use of any product or circuit described in this document. Any information provided in this document, including any sample design information or programming code, is provided only for reference purposes. It is the responsibility of the user of this document to properly design, program, and test the functionality and safety of any application made of this information and any resulting product. Cypress products are not designed, intended, or authorized for use as critical components in systems designed or intended for the operation of weapons, weapons systems, nuclear installations, life-support devices or systems, other medical devices or systems (including resuscitation equipment and surgical implants), pollution control or hazardous substances management, or other uses where the failure of the device or system could cause personal injury, death, or property damage ("Unintended Uses"). A critical component is any component of a device or system whose failure to perform can be reasonably expected to cause the failure of the device or system, or to affect its safety or effectiveness. Cypress is not liable, in whole or in part, and you shall and hereby do release Cypress from any claim, damage, or other liability arising from or related to all Unintended Uses of Cypress products. You shall indemnify and hold Cypress harmless from and against all claims, costs, damages, and other liabilities, including claims for personal injury or death, arising from or related to any Unintended Uses of Cypress products.

Cypress, the Cypress logo, Spansion, the Spansion logo, and combinations thereof, WICED, PSoC, CapSense, EZ-USB, F-RAM, and Traveo are trademarks or registered trademarks of Cypress in the United States and other countries. For a more complete list of Cypress trademarks, visit [cypress.com](http://cypress.com). Other names and brands may be claimed as property of their respective owners.