Validity
VFS101
Reliable 2D Swipe Sensor™
Fingerprint Imaging on Flexible Tape

This revolutionary **2D Swipe Sensor™** provides higher reliability and superior imaging performance

Companion rate sensor provides quality of 2D sensor combined with the cost effectiveness of a swipe sensor.

- ✓ Our sensing elements are decoupled from the active electronics
- ✓ A built-in companion sensor ensures accurate images are captured
- ✓ Robust and flexible Chip-on-Film design provides for custom packaging
- ✓ Integration simplification by conforming to current standards; USB, Windows, BioAPI and 500dpi

Validity, Inc
1300 Massachusetts Ave
Suite 200
Boxborough, MA 01719

Phone: 978 635-3400
Fax: 978 635-3492
www.validityinc.com

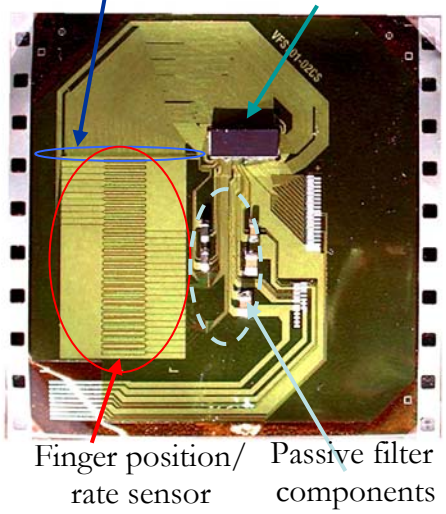
Robust and Flexible

The VFS101 fingerprint sensor by Validity uses a unique method of acquiring a fingerprint image that does not require the user's finger to touch silicon or a lens. Giving it distinct advantages over direct contact methods, without increasing cost.

- Sensor elements are mechanically decoupled from the electronics
- The silicon that drives the sensor is unexposed and never touched during a scan
- Percussion and ESD events (Tap and Zap) do not affect this sensor
- Flexible packaging allows easier product customization
- Ultra-thin plastic sensor allows unique product placement
- Proven, world-class manufacturing process

No Latent Fingerprint Images

The swiping action required to acquire an image on the **2D Swipe Sensor™** leaves no fingerprint image behind.



VFS101 - The worlds first flexible fingerprint sensor with decoupled electronics

Integrated Companion Sensor

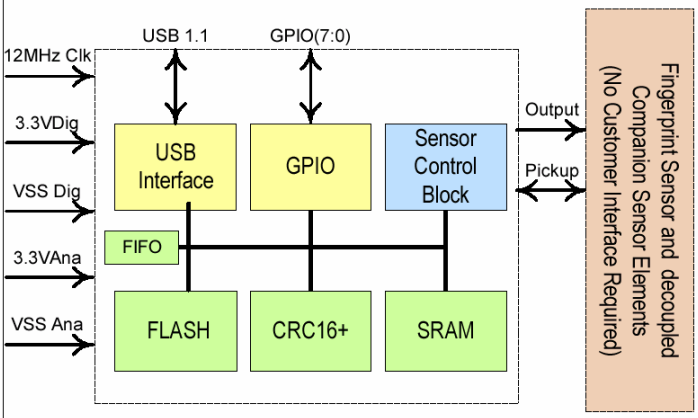
Unique feature giving real-time feedback to the user, training the user and delivering higher quality images:

- Rate, Position, Speed and Finger Contact metrics are measured
- Quality controls the image scanning, giving less false rejects

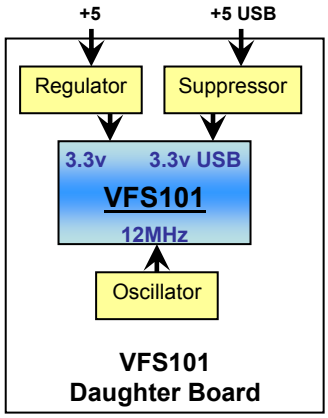
Integration Ease

- USB Interface on board
- 500dpi image acquisition
- BioAPI compliant
- Software modules for match, enrol and security applications

VFS101 Block Diagram



VFS101 Daughter Board



Internal signals for VFS101 include 3.3v Power and USB signals. A daughter board is available for development adding external USB signals +5v as well as a 12MHz Oscillator.

Physical Characteristics

Kapton Flex Circuit	
Length:	42mm
Width:	27.6mm
Sensor Length:	29mm
Sensor Width:	12mm
Thickness (min - max):	0.1 - 1.6mm
Silicon - die size	21mm^2

Kapton Materials Properties	
Flammability	94V-0
Dielectric Strength	170KV/mm
Bend Radius	< 1mm
ESD (Package, air discharge)	>12kV
Percussive resistance (Pen drop)	Height *n*cm
Abrasion Resistance	Superior to Mylar
Chemical Resistance	Resistant to typical foods, solvents and acids

Operational Characteristics

Operating Voltage	3.3	± 0.3V
Operating Temperature	0 to50˚C	
Storage Temperature	-40 to 85˚ C	

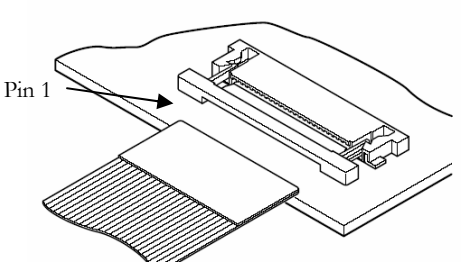
Current	**Typical**	**Max**
During Swipe	50 mA	<90mA
USB Sleep Mode (0s wake)	<200 uA	<500uA
Suspend Mode (200ms wake)	<10uA	<50uA

Operational Characteristics	
Scan lines	288
Receiver	Hi-Q differential
oscillator	12MHz
sensor width	12mm
resolution	500 DPI
Finger Skew	+/- 15 ˚
Finger stretch	+/- 15%

Module Specifications	
Connector	14pin (JST)
Cable type	USB 5-pin mini-B
Communications interface	USB 1.1

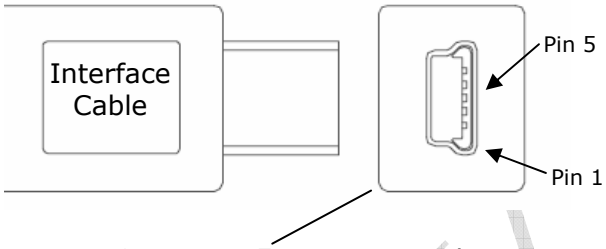
Preliminary

VFS101 Pin out



14-pin ribbon cable connector located on the VFS101 Module and VFS101 Daughter Board. (Connector: JST 14FLH-RSM1-TB)

VFS101-D1 Pin Out



USB Mini-B 5-Pin Receptacle on Validity Daughter Board (Cable: Belkin F3U138-06)

VFS101 Module

Signal	D1 Pin	48M Pin	Description
AGnd	14	1	Analog Section Ground
AVcc	13	2	Analog Power, 3.3 V
DGnd	12	3	Digital Ground
DM	11	4	USB D-
DP	10	5	USB D+
DVcc	9	6	Digital Power, 3.3 V (includes USB power)
CLKIN	8	7	12 MHz Clock
DGnd	7	8	Extra Ground to shield Clock
GPIO1	6	9	Oscillator Enable
GPIO2	5	10	Self/Bus Powered
GPIO4	4	11	General Purpose IO 4 (uncommitted) NC in 48mm Prototypes
GPIO5	3	12	General Purpose IO 5 (uncommitted) NC in 48mm Prototypes
GPIO6	2	13	General Purpose IO 6 (uncommitted) NC in 48mm Prototypes
GPIO7	1	14	General Purpose IO 7 (uncommitted) NC in 48mm Prototypes

USB 5-Pin Mini-B

Signal	Pin#	Description
VBUS	1	Power +5v
D-	2	Data -
D+	3	Data +
ID	4	N/C
Gnd	5	Ground

Interface Methods: VFS101 Module

The VFS101 ships standard with a 3.3v USB 1.1 interface which can be connected through a thin flexible cable. The interface runs at USB High-Speed. The VFS101 Module is a circuit board that can be used for rapid development of a fingerprint sensor solution. As most designs have 3.3V and a 12MHz clock available, we do not duplicate resources by including these functions. If these resources are not available we will provide a daughter board and a reference design to allow these functions to be added efficiently.

Interface Methods: VFS101 Daughter Board

For development a daughter board is available to team with the VFS101 module in order to directly connect using standard 5-pin Mini-B USB connector. This includes a regulator to input 5v and produce 3.3v out, a suppressor to convert the 5v USB signals to 3.3v, and a crystal oscillator to provide a 12MHz clock. A reference design is available allowing production designs to be developed without adding complexity or cost.

Preliminary

Product Options

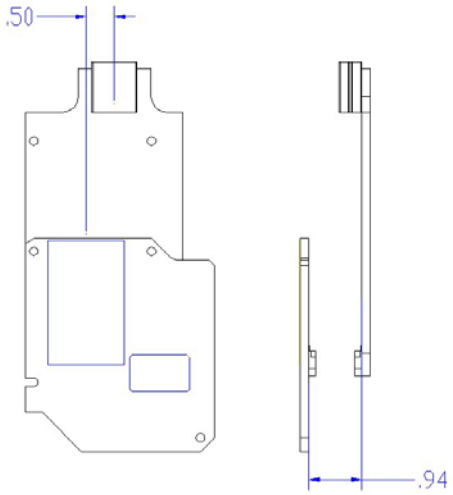
Validity offers product code combinations to provide flexibility enabling the right products to be purchased to meet specific requirements.

Evaluation of Validity Technology is easily accomplished by ordering one product code: VFS101-48M-USB which includes all the necessary software, hardware and USB cable to capture images with this revolutionary technology.

By ordering the VFS101-48M-COFSMT, VFS101-D1 and VFS101-TEK evaluation can take place on a bench without the enclosed case.

Once a design is complete, the VFS101-35M-PCBSMT is best for volume designs.

The following diagram displays the VFS101-48M-COFSMT module with the VFS101-D1 daughter board combination.



VFS101 Module, daughter board and TEK software combination provides a complete evaluation solution enabling fingerprints to be gathered on a standard PC running Windows.

Development Products

VFS101 Prototype Modules

48mm Flex-circuit laminated to a PCB Module for prototype development, not intended for high volume designs. 14 pin interface connector requires 3.3v for power and USB, as well as a 12MHz clock

VFS101 Pre-Production Modules

35mm Flex-circuit laminated to a PCB Module intended for pre-production designs. 14 pin interface connector requires 3.3v for power and USB, as well as a 12MHz clock.

VFS101 Daughter Board

Hardware to connect a prototype or pre-production module to standard USB interface (5-pin Mini-B connector) including 3.3v to 5v conversion for both power and USB signals as well as providing a 12MHz clock.

VFS101 Production (Flex on Reels)

35mm Chip-on-Film delivered in reels for high volume manufacturing process. All surface mount components removed for cost reduction.

VFS101 PC Peripheral Reference Design

A complete development kit which includes the VFS101 Module and Daughter Board integrated into a USB peripheral. VFS101-TEK Evaluation software also included allows fingerprint images to be captured and matched on a standard PC running Windows XP.

VFS101 TEK

Technical Evaluation Kit consist of application software which allows fingerprint images to be captured and matched on a standard PC running Windows XP.

VFS101 SDK

Software Development Kit includes libraries and drivers needed to develop custom solutions for the VFS101 products.

Sales
(877) 733-8833
Validity, Inc.
15210 South 50th Street
Suite 110
Phoenix, AZ 85044
sales@validityinc.com

Engineering
(877) 733-8833
Validity, Inc.
1300 Massachussetts Avenue
Suite 200
Boxborough, MA 01719
info@validityinc.com