THOMSON-CSF
SEMICONDUCTEURS SPECIFIQUES

FingerChip™ Family

PRELIMINARY SPECIFICATION

FC2X17
500 dpi 0.08" x 0.69" fingerprint linear sensor

1. DESCRIPTION

FC2X17 is part of the FingerChip™ TCS monolithic fingerprint sensor family.

FC2X17 is a single chip, high performance, low cost sensor based on both pressure and temperature physical effects for fingerprint sensing.

Thanks to the combination of those two effects, FC2X17 gives to fingerprint recognition systems an efficient way to solve the "dead or alive" dilemma.

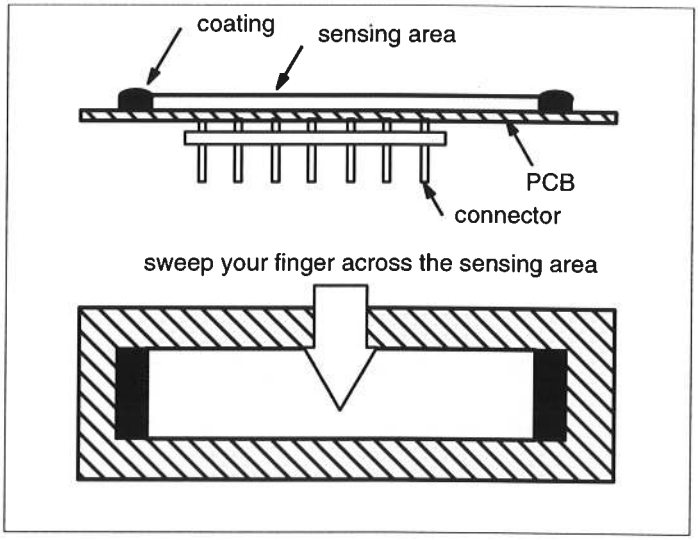
The sensitive layer is deposited over a CMOS image device, enabling output of an accurate fingerprint image.

The present product has a 350x40 pixel array, with a pixel pitch of 50 µm (500 dpi). Sensor area is 2 mm X 17.5 mm (0.08" X 0.69"), allowing the capture of a fingerprint image by sweeping the finger across the sensing area.

Its linear shape allows a low surface chip. After picturing several images, a specific software can redraw a long and wide image.

In nominal operation, the device delivers 57 images per second.

Demonstration board is available under reference FCDEMO2.



2. MAIN FEATURES

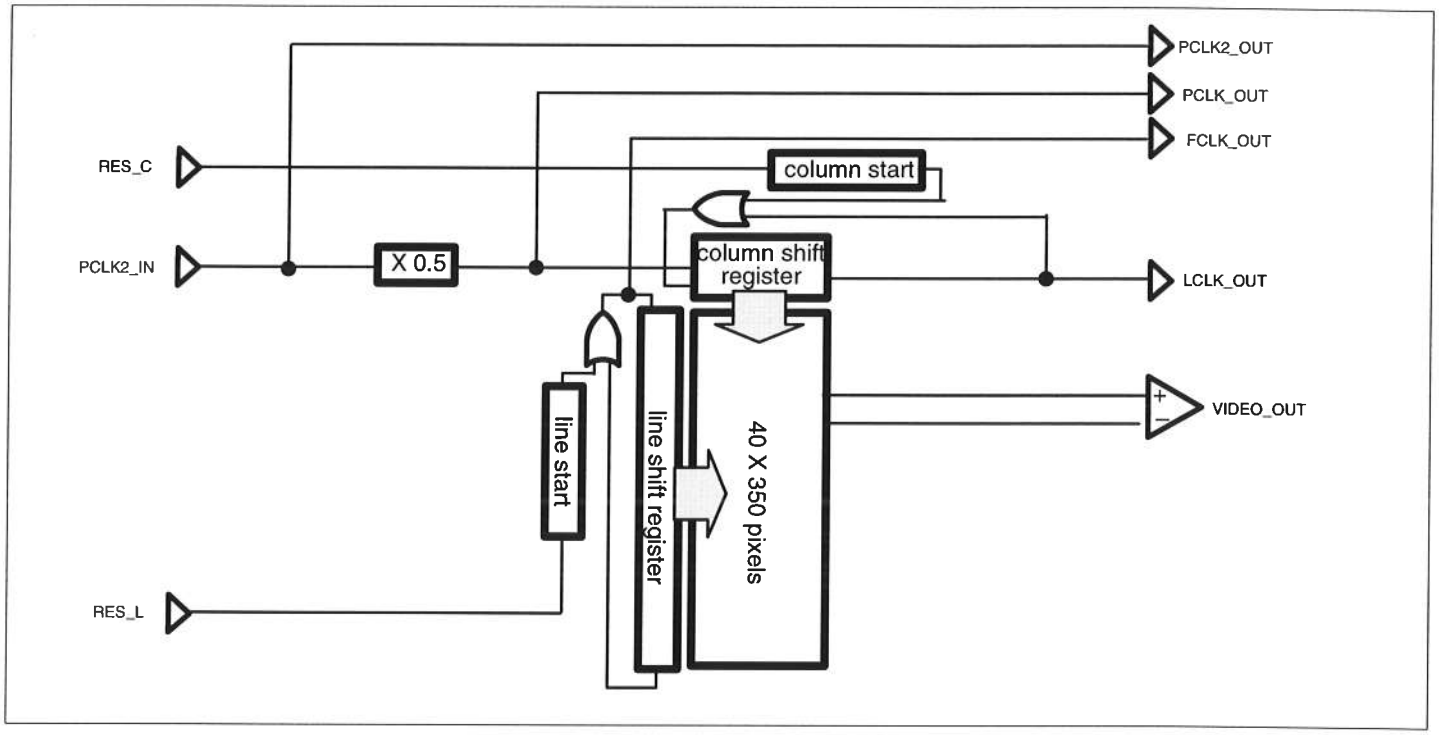
- MONOLITHIC low volume, low surface, flat sensor.
- Sensitive layer associated to a CMOS array insuring live fingerprint capture (1.2 µm CMOS technology Double Level Metal)
- Heat and pressure of the finger detected: living finger.
- No optics, no prism, no light required.
- Image zone : 2 x 17.5 mm = 0.08" X 0.69".
- Array: 40 x 350 pixels.
- Pixel pitch : 50 µm x 50 µm = 500 dpi.
- Power consumption : 140 mW @ 5v, pixel clk = 1MHz, 25°C.
- Sampling in Chip–On–Board package.
- External pixel clock : 1MHz
  Internal line clock : 2857 Hz
  Internal Frame clock : 57.1 Hz

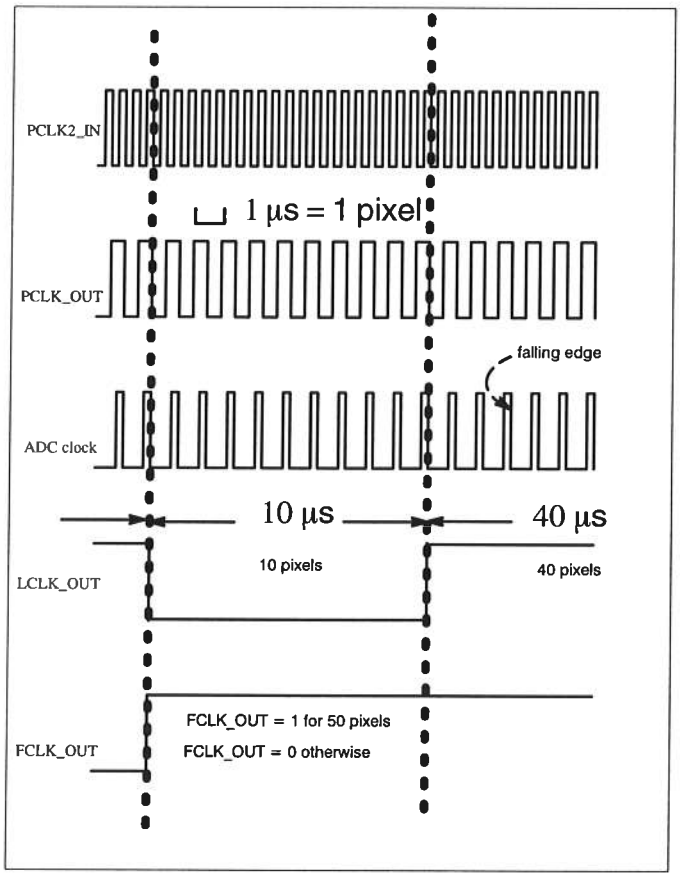
3. APPLICATIONS

All devices that require authentic acceptance, especially portable devices.

- Terminal Access (Multimedia PCs, access to networks, etc...)
- Electronic payment associated with smart card (Automated Teller Machine–, Portable Point Of Sale–, etc...)
- Building access
- Electronic keys (cars, home, ...)
- Cellular phones (usable only by registered users)
- Weapons (usable only by registered users)
- Portable fingerprint recorders for law enforcement
- ...

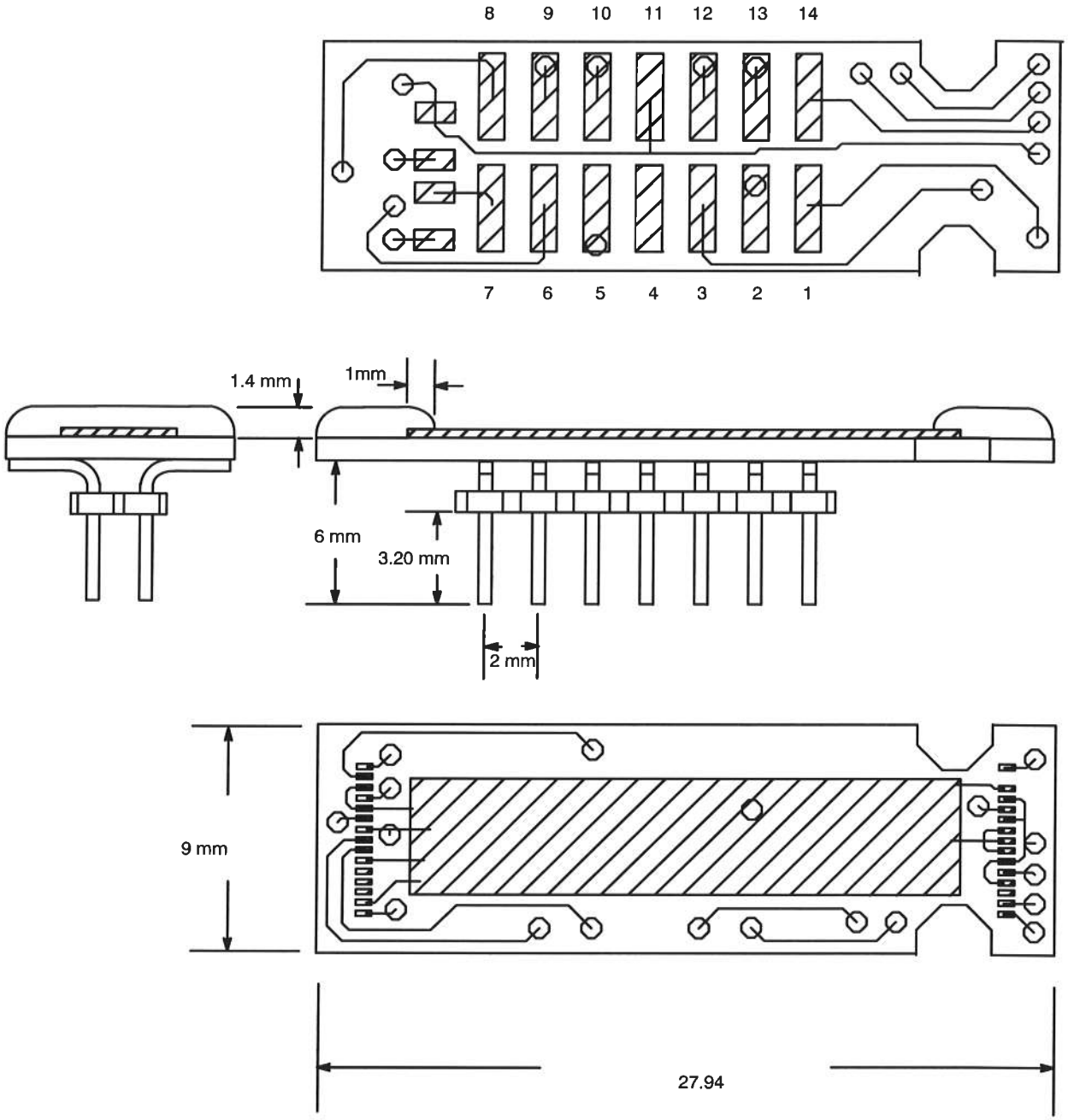
4. BLOCK DIAGRAM and CHRONOGRAM





- PCLK2_IN is the external clock at a rate of 2 MHz.
- PCLK2_OUT is the output of the external clock at a rate of 2 MHz.
- PCLK_OUT is the pixel clock output at a rate of 1 MHz. A pixel is read during 1 µs.
- An ADC can be added to digitize the VIDEO_OUT signal at a rate of 1 MHz. The output amplifier can drive an impedance of 3 kΩ, 5 pF. The ADC sample clock is obtained with an operation on the PCLK_OUT and PCLK2_OUT signals. The falling edge is used to trigger the ADC. The dynamic range of the ADC should be set between 1 and 3 volts.
- RES_C is the column shift register reset, which is active on high level. When released, the first column is selected.
- RES_L is the line shift register reset, which is active on high level. When released, the first line is selected.
- LCLK_OUT is the line clock output. It is set to low level during 10 µs. This time is the interval between two lines. The same interval is used between the last and the first line. When a line is selected for reading and reseting, LCLK_OUT is set to high level, during 40 µs.
- FLCK_OUT is the frame clock output. This output is set to high level during 50 µs when the first line is selected.

5. CHIP–ON–BOARD PACKAGING



6. PIN IDENTIFICATION

FPL	1	front plane	0v
GND	2	ground	0v
VCC	11	power supply	5v
RES_C	3	column shift register reset	TTL active high
FCLK_OUT	14	frame clock output	TTL 36.76 Hz
VIDEO_OUT	12	video output	1v – 3v
REF_IN	13	reference voltage of amplifier	1.2 – 1.8 v **mandatory**
PCLK_OUT	10	pixel clock output	TTL 1 MHz
PCLK2_OUT	9	double pixel clock output	TTL 2 MHz
PCLK2_IN	8	double pixel clock input	TTL 2 MHz
RES_L	6	line shift register reset	TTL active high
LCLK_OUT	5	line clock output	TTL 5,882 kHz
VDR	7	pixel reset voltage	1.13 v **internal value**
	4		not used 0v

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