



LDA512P25X-1.7-T1

Near Infrared Linear Image Sensor (0.9 - 1.7 μ m) with 512 x 1 pixels

FEATURES	APPLICATIONS
<ul style="list-style-type: none">● 512 x 1 pixels (pixel size: M 25 x 250 μm², L 25 x 500 μm²)● 28-pin Metal DIP Package● Embedded Thermoelectric Cooler● Built-in Temperature Sensor● 0.9 μm - 1.7 μm Spectral Range● Minimum Pixel Operability > 99%● Quantum Efficiency > 70%● Snapshot ITR / IWR● One output with up to 22 MHz Pixel Rate	<ul style="list-style-type: none">● Shortwave-Infrared Imaging● Semiconductor Inspection / Process Monitoring● Sorting / Recycling● Near-Infrared Spectrophotometry



The LDA512-T1 series is a near-infrared linear image sensor consisting of a linear InGaAs detector array bonded to a p-on-n readout-IC. The series includes two part-numbers with different sensor pixel sizes, LDA512P25M-1.7-T1 and LDA512P25L-1.7-T1.

GENERAL DESCRIPTIONS

PARAMETER	UNIT	VALUE	
Sensor Technology	---	Planar InGaAs PIN	
Spectral Range	μ m	0.9 - 1.7	
Actual Pixel Array	--	512 x 1	
Pixel Pitch	μ m	25	
Pixel Size	μ m	Pixel Size	Dimension
		M	25 x 250
		L	25 x 500
Chip Size	mm	15.3 x 4.5	
Package Type	---	28-pin Metal DIP Package	
Package Size L x W x T	mm	50.00 x 25.40 x 11.67	
Weight	g	25.8	



SPECIFICATIONS (ITS¹ = 20 ± 1°C)

PARAMETER		UNIT	VALUE	CONDITIONS
Dark Current ^{2,3}		fA	M ≤ 600	Photo pixel biased @ -0.5 V
			L ≤ 1000	
Quantum Efficiency ² * Fill Factor (QEFF)		%	≥ 70	λ = 1550 nm
Response Nonuniformity ²		%	≤ 5	At 50% Full Well
Response Nonlinearity ²		%	≤ 2	15% - 85% Well Occupation Range
Charge Capacity	Cint = 6.4 fF	μV/e ⁻	25	16 settings from 6.4 fF to 2.1 pF
	Cint = 16 fF		10	
	Cint = 30 fF		5.3	
	Cint = 120 fF		1.3	
	Cint = 2.1 pF		0.076	
Readout Noise	Cint = 6.4 fF	mV	1.2	ROIC Specifications
	Cint = 16 fF		0.8	
	Cint = 30 fF		0.6	
	Cint = 120 fF		0.5	
	Cint = 2.1 pF		0.25	
Output Swing		V	≥ 2.0	Gain @ 120 fF
Minimum Integration Period		μs	5	ROIC Specifications
Maximum Pixel Rate		MHz	22	ROIC Specifications
Pixel Operability ²		%	≥ 99	Percentage of Pixels with QEFF Deviation within ± 20%* (QEFF Mean)

1. Readings from Integrated Temperature Sensor (ITS).
2. These items are defined for central effective pixel array (512x1). Their values correspond to default operation conditions.
3. Medium gain, charge capacity @120fF, integration time 5ms.

ABSOLUTE MAXIMUM RATINGS

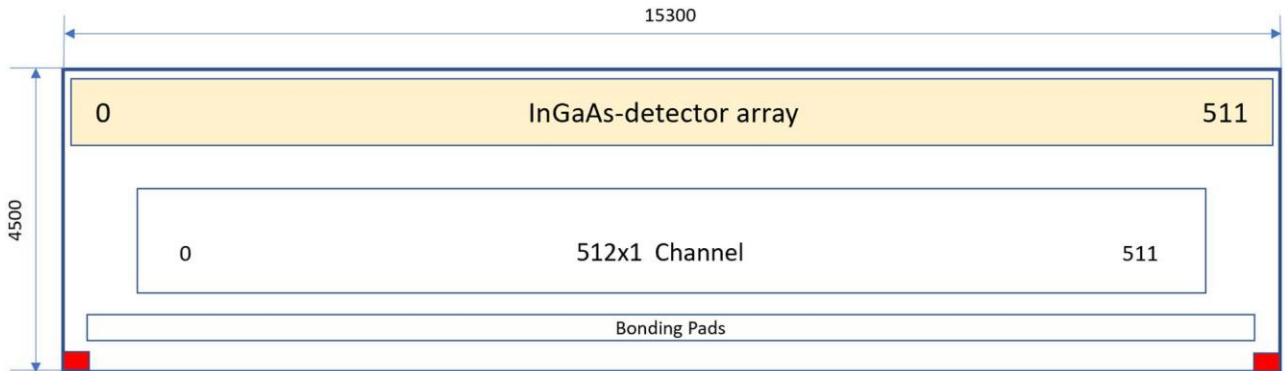
PARAMETER	UNIT	MIN.	MAX.
Operating Temperature ⁴	°C	-40	+70
Storage Temperature ⁴	°C	-40	+70
Power Consumption ⁵	mW	---	95

4. In non-condensing environment.
5. Without powering on the thermoelectric cooler.



CHIP PROFILE

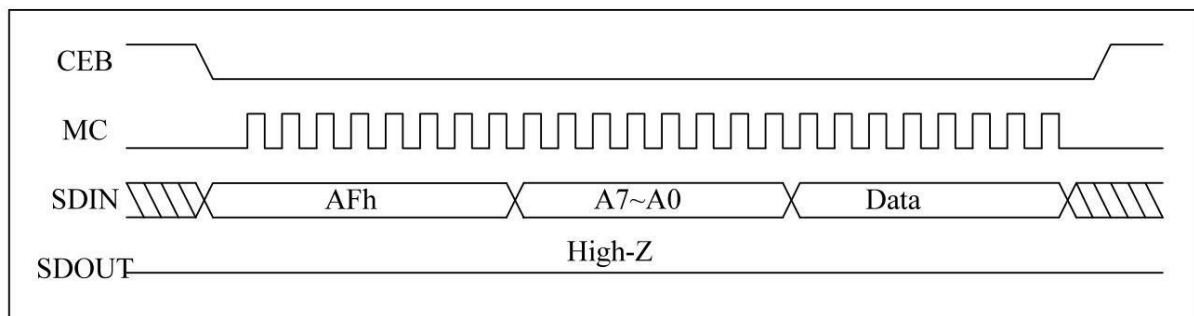
Layout



Chip size: 15.3 mm x 4.5 mm

SPI Interface

LDA512 supports SPI protocol to set the command registers. There are functions of the gain mode, power consumption control and the sequence of pixel output.



SPI Protocol Schematic



OPERATING CONDITIONS

Bias Input

Pin #	Bias	Voltage	Current	Remark
01	VDD	1.8 V	> 30 mA	Positive logic supply
11	VDDA	3.6 V	> 60 mA	Positive analog supply
12	VR2	0.3 V	> 30 mA	External Input Bias
13	VR1	2.3 V	> 5 mA	External Input Bias
14	VDETCOM	> VR1	--	Detector common voltage Detector bias ⁶ = VDETCOM - VR1
15	GND	0 V	--	Ground
03	TEC+	0 V ~ 5.3 V	< 2.2 A	Positive TEC supply
26	TEC-	0 V	--	TEC ground
02	RESET	1.8 V	--	Chip reset
17	VOFFSET	0.3 ~ 2.3 V	> 30 mA	Offset Input Bias

6. VDETCOM lower than 2.3V will forward bias the sensor, the exact zero bias voltage is device and temperature dependent.

Digital Pattern Input

Pin #	Clocks	Levels	Rise/Fall	Remark
04	INT	1.8 V / 0 V	< 50 ns	Integration time
05	MC	1.8 V / 0 V	< 5 ns	Master clock, Max. Freq. = 22 MHz
06	CEB	1.8 V / 0 V	< 10 ns	Chip enable ⁷
07	SDIN	1.8 V / 0 V	< 5 ns	Data code input

7. The input and output of all commands start after the falling edge of CEB.

Digital Pattern Output

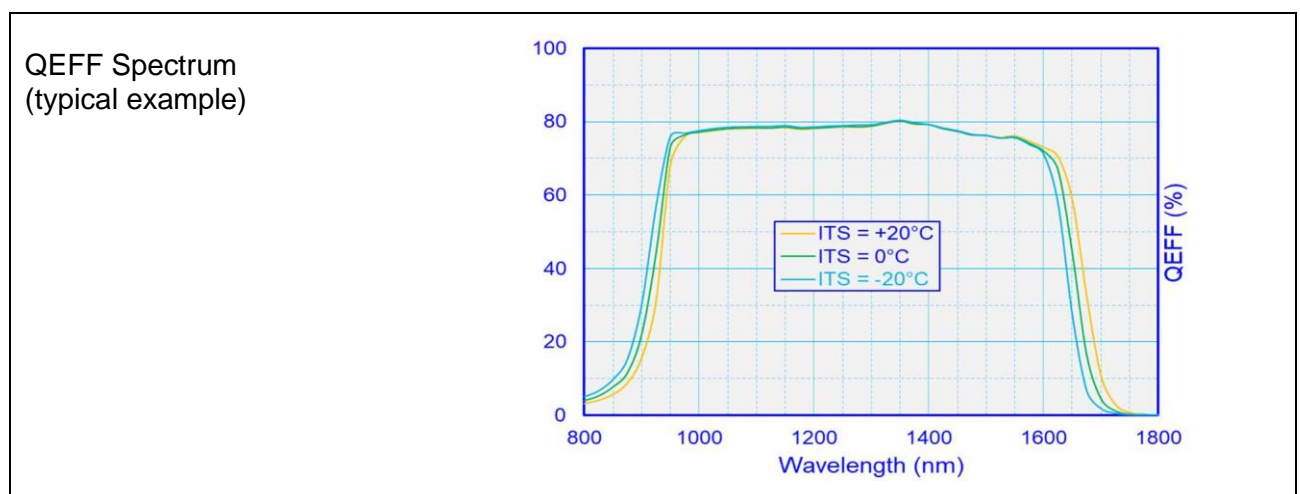
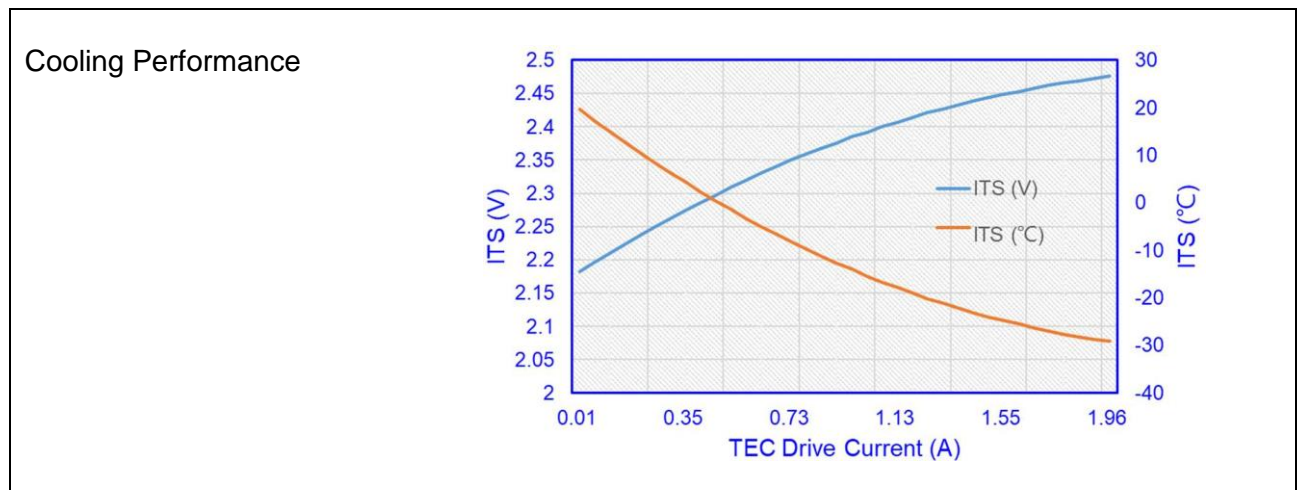
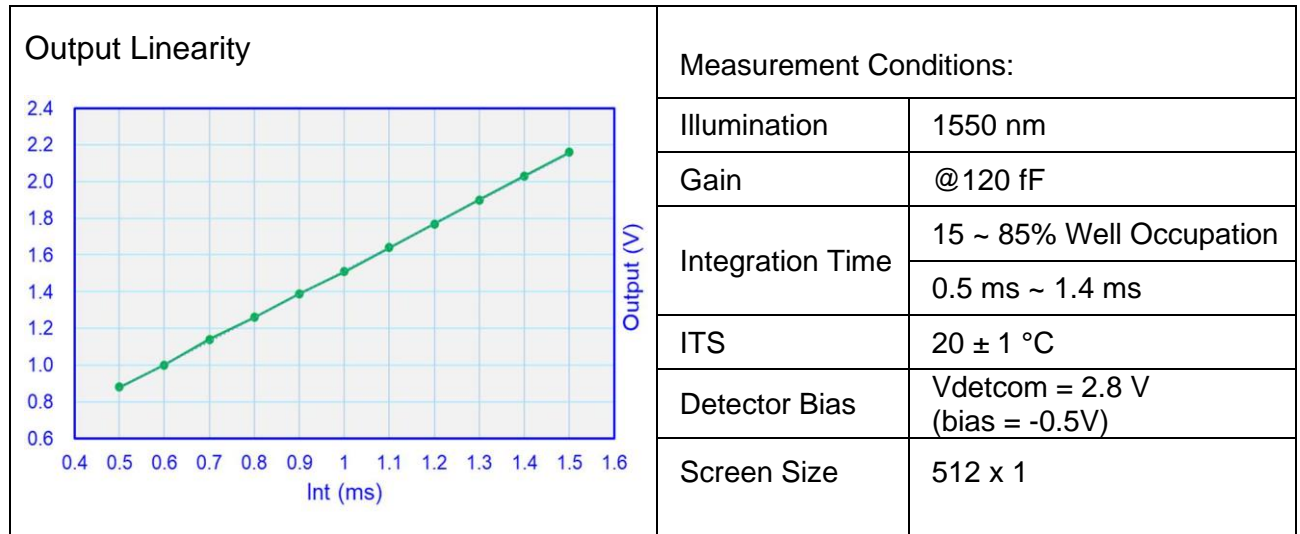
Pin #	Clocks	Levels	Rise/Fall	Remark
08	SDOUT	1.8 V / 0 V	--	Data code output
09	DATVALID	1.8 V / 0 V	--	Valid data output flag signal

Analog Output

Pin #	Outputs	Levels	Value	Remark
10	VOUT	0.2 ~ 2.4 V	--	Video output
18	VTEMP	2.138 V	27 °C	Integrated Temperature Sensor (-0.6 mV/°C)



EXAMPLE CURVES



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