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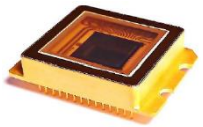
Data Sheet
Rev 02.0521

Short Wavelength Infrared 1.2-2.2um 640x512 InGaAs Focal Plane Array



FPA15M640SC

Overview

The Lasermate Imaging Sensors FPA15M640SC is a 640x512 pixel focal plane array (FPA) with 15um pixel pitch. With embedded thermoelectric cooler, the FPA covers the short wavelength infrared (SWIR) region with selectable number of outputs (2, 4 or 8) and windowing capability which may be read out at up to 18MHz pixel rate.

Features

- 640x512 pixel array format with 15um pixel pitch
- 1.2-2.2um spectral range
- 28-pin metal SDIP package
- Embedded thermoelectric cooler
- Typical pixel operability >98%
- Quantum efficiency >70% at 1.9um
- Built-in temperature sensor
- Snapshot ITR/IWR and IMRO readout modes
- 2, 4 or 8 outputs with up to 18MHz pixel rate
- Windowing capability

Applications

- Shortwave Infrared imaging
- Hyper-/Multi-spectral imaging
- Semiconductor inspection/Process monitoring
- Waste recycling
- Medical science and biology
- See through fog/smoke
- Ice/slush/moisture mapping
- Laser beam profiling
- High-speed industrial thermal imaging
- Mineral identification

General Description

Parameters	Value
Sensor technology	Planar InGaAs PIN
Spectral range	1.2-2.2um
Actual pixel array	640x512
Effective pixel array	636x508
Pixel pitch	15um
Image size	9.6mmx7.68mm
Package type	28-pin Metal SDIP package
Package size (LxWxT)	36.1mmx25.4mmx7.3mm (without pins)
Weight	19.5(+/-0.5)g

Absolute Maximum Ratings

Parameters	Min.	Max.	Unit
Operating temperature [1]	-40	+71	°C
Storage temperature [1]	-40	+80	°C
Power consumption [2]	-	200	mW

TEC Bias [3]	-	10	V
TEC Current [3]	-	2.1	A

[1] In non-condensing environment.

[2] Without powering on the thermoelectric cooler.

[3] Applied to Pin-1 for cooling operation. Operation above these maximum ratings causes excessive (local) heat accumulation and may result in permanent damage to the cooler.

Specifications (ITS=-40°C [4])

Parameters		Typ.	Unit	Conditions
Dark current [5]		≤500	fA (=6250 e^-/s)	Photopixel biased @ -0.1V Mean value
Quantum Efficiency * Fill Factor (QEFF) [5]		≥60	%	λ=1.4um-2.1um
Response nonuniformity [5]		≤10	%	At 50% well occupation
Response nonlinearity (Max. Peak-to-Peak Deviation) [5]		≤4	%	15%-85% well occupation range
Charge capacity [6]	@ High Gain, 46.2uV/e^-	0.041	Me^-	ROIC specifications
	@ Mid Gain, 16.2uV/e^-	0.118		
	@ Low Gain, 1.39uV/e^-	1.380		
Readout noise floor [6]		<35	e^-	In High gain mode
Noise-Equivalent Irradiance (NEI) [5]		≤$4.5x10^{10}$	ph#/cm^2-s	In High Gain Mode
Mean detectivity [5]		≤$1.7x10^{12}$	cm-√Hz/W	Integration Time = 3.33ms, λ=1.55um
Output swing		2.25	V	
Minimum integration period [5]		<1	us	
Pixel operability [5] [7]		≥98	%	Percentage of pixels with response output deviation within +/-30% of mean value
Maximum cooling capability (ΔT_{MAX})		≥60	°C	$T_{Heatsink}$ = 20°C

[4] Readings from integrated temperature sensor (ITS).

[5] These items are defined for central effective pixel array (636x508). Their values correspond to default operation conditions.

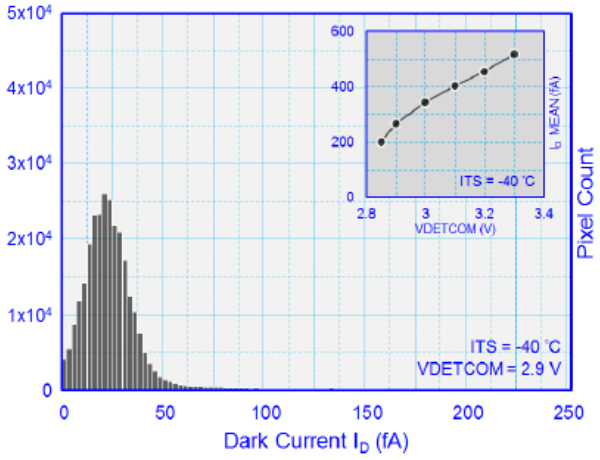
[6] These values are ROIC-version dependent.

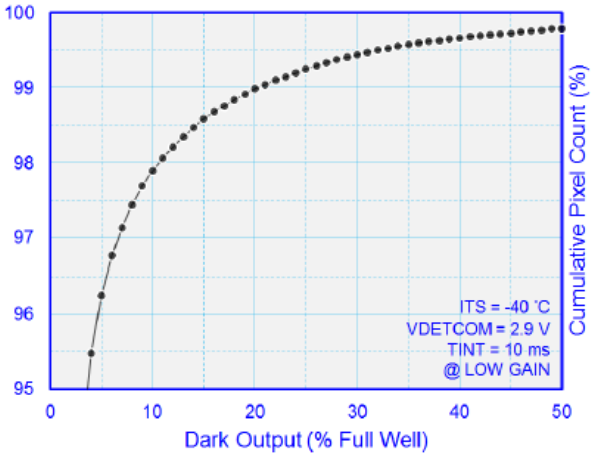
[7] FPA with pixel operability lower than 98% (<98%) is categorized as a test-grade device, which, if available in stock, can be provided on request.

[8] Adequate heatsink and thermal interface material are the prerequisites for stable operation.

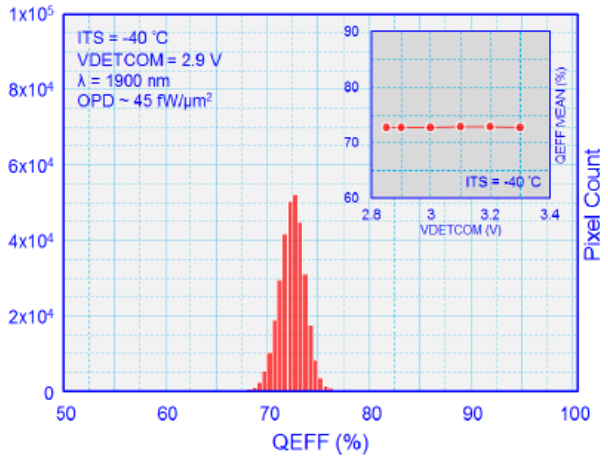
Typical Characteristics

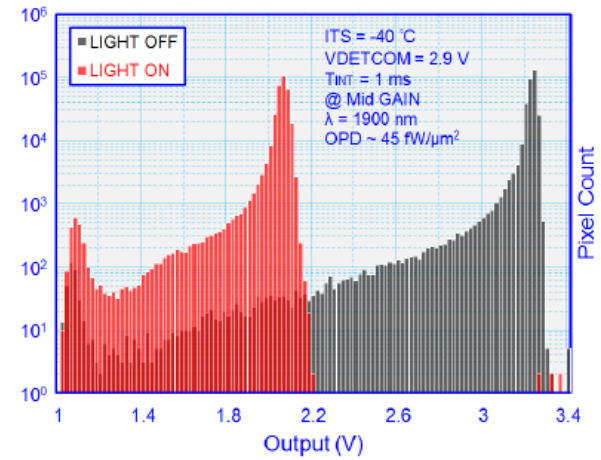
Histograms of Dark Condition



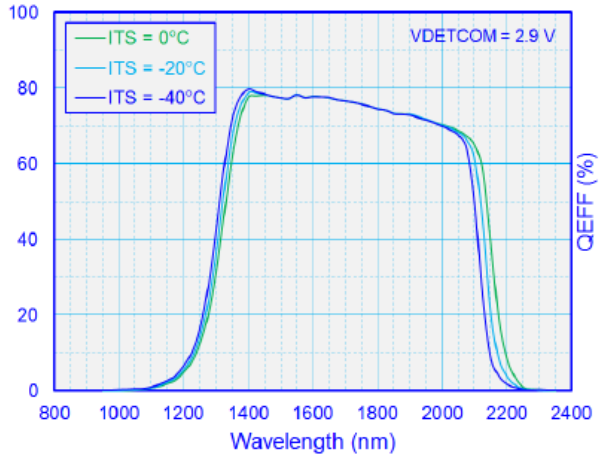


Histograms of Illuminated Condition

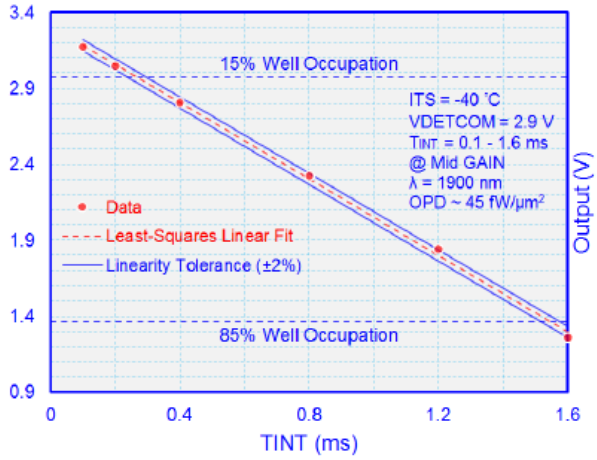




QEFF Spectrum

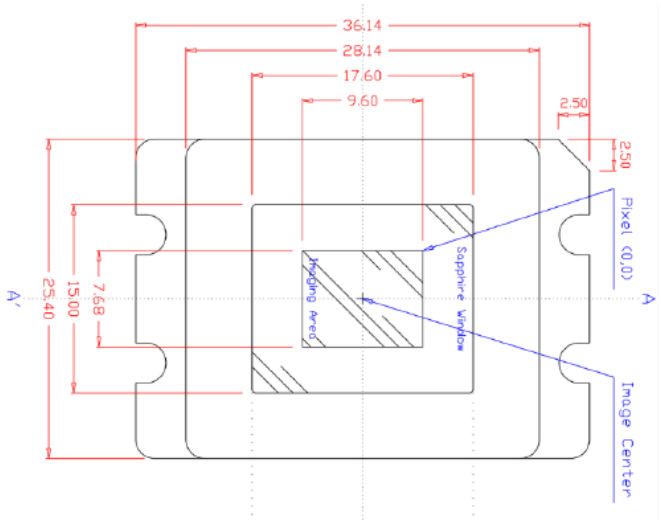


Output Linearity

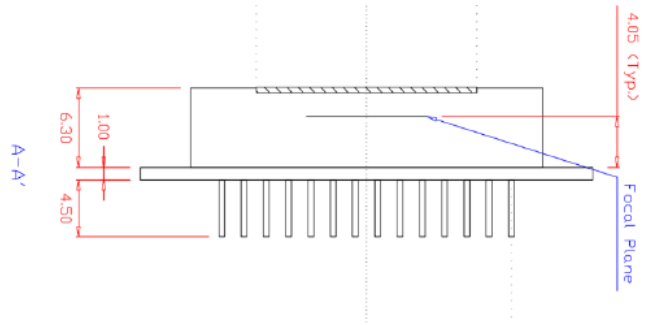


Package Outline Dimensions (unit: mm)

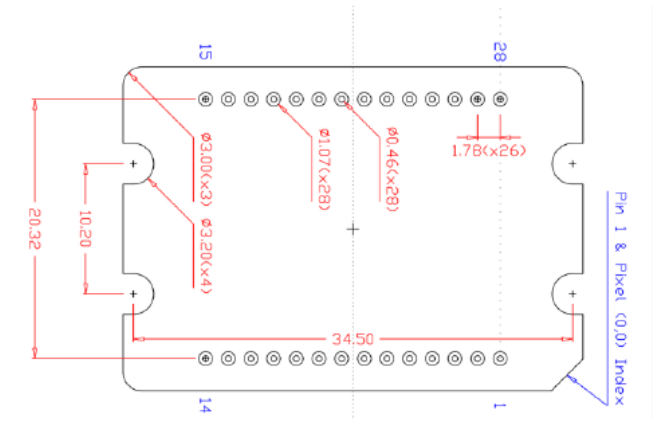
TOP VIEW



SIDE VIEW



BOTTOM VIEW



Note: Specifications are subject to change without notice.

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