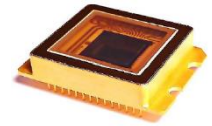




Near Infrared 0.9-1.7um 640x512 InGaAs Focal Plane Array



FPA15M640Nx

Overview

The Lasermate Imaging Sensors FPA15M640Nx is a 640x512 pixel focal plane array (FPA) with 15um pixel pitch. With embedded thermoelectric cooler, the FPA covers the near infrared (NIR) 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
- 0.9um-1.7um spectral range
- 28-pin metal SDIP package
- Embedded thermoelectric cooler
- Typical pixel operability >99.9%
- Quantum efficiency >70%
- 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

- Near Infrared imaging
- Covert surveillance
- Semiconductor/Solar panel inspection
- Medical science and biology
- Fiber optic assembly and testing
- See through fog/smoke
- Ice/slush/moisture mapping
- Industrial thermal imaging
- Astronomy and scientific

Product Overview

Part Number	Feature
FPA15M640NA	With 1-stage high-voltage thermoelectric cooler
FPA15M640NB	With 1-stage high-current thermoelectric cooler
FPA15M640NC	With 2-stage thermoelectric cooler

General Description

Parameters	Value
Sensor technology	Planar InGaAs PIN
Spectral range	0.9-1.7um
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⁾	FPA15M640NA	-	12	V
	FPA15M640NB	-	6	
	FPA15M640NC	-	10	
TEC Current ⁽³⁾	FPA15M640NA	-	1.4	A
	FPA15M640NB	-	2.6	
	FPA15M640NC	-	2.1	

⁽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=20°C ⁽⁴⁾)

Parameters		Typ.	Unit	Conditions
Dark current ⁽⁵⁾		≤20	fA (=6250 e ⁻ /s)	Photopixel biased @ -0.5V Mean value
Quantum Efficiency * Fill Factor (QE_{EFF}) ⁽⁵⁾		≥70	%	λ=1.0um-1.6um
Response nonuniformity ⁽⁵⁾		≤5	%	At 50% well occupation
Response nonlinearity (Max. Peak-to-Peak Deviation) ⁽⁵⁾		≤2	%	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⁾		≤1.8x10 ¹⁰	ph#/cm ² -s	In High Gain Mode
Mean detectivity ⁽⁵⁾		≤3.5x10 ¹²	cm-VHz/W	Integration Time = 3.33ms, λ=1.55um
Output swing		2.25	V	
Minimum integration period ⁽⁵⁾		<1	us	
Pixel operability ^{(5) (7)}		≥99.9	%	Percentage of pixels with QE _{EFF} deviation with +/-20%*(QE _{EFF} Mean)
Maximum cooling capability (ΔT_{MAX})	FPA15M640NA/B	≥40	°C	T _{Heatsink} = 20°C
	FPA15M640NC	≥60		

⁽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.

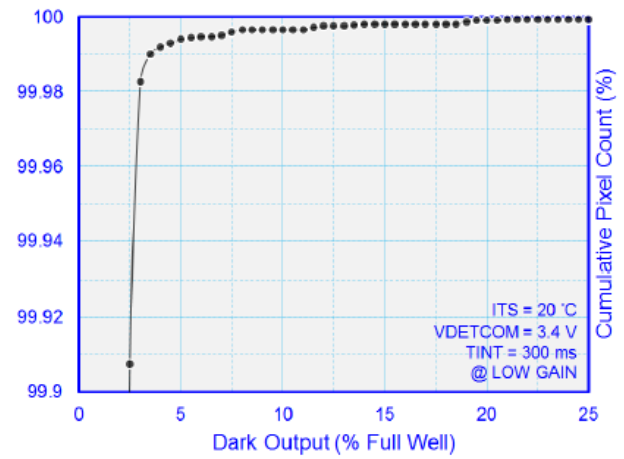
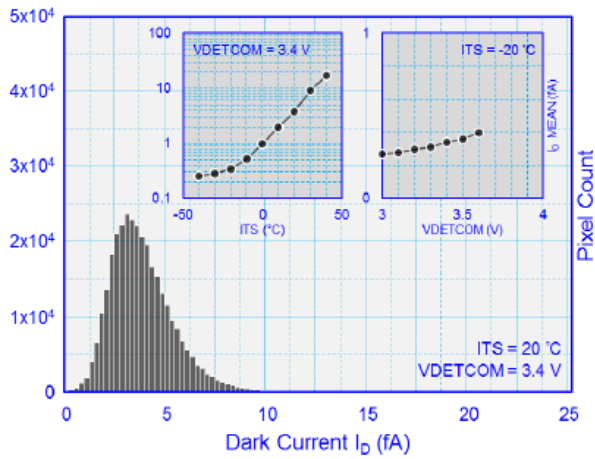
⁽⁶⁾ These values are ROIC-version dependent.

⁽⁷⁾ FPA with pixel operability lower than 99.9% (<99.9% is categorized as a test-grade device, which, if available in stock, can be provided on request.

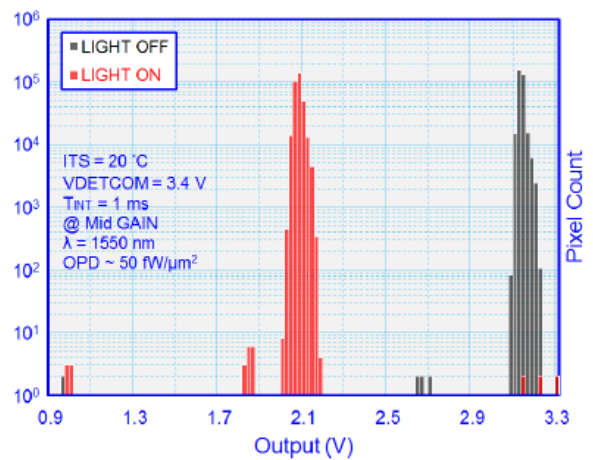
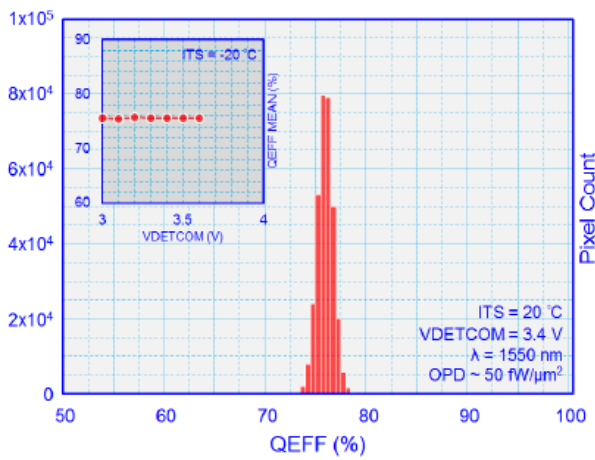
⁽⁸⁾ Adequate heatsink and thermal interface material are the prerequisites for stable operation.

Typical Characteristics

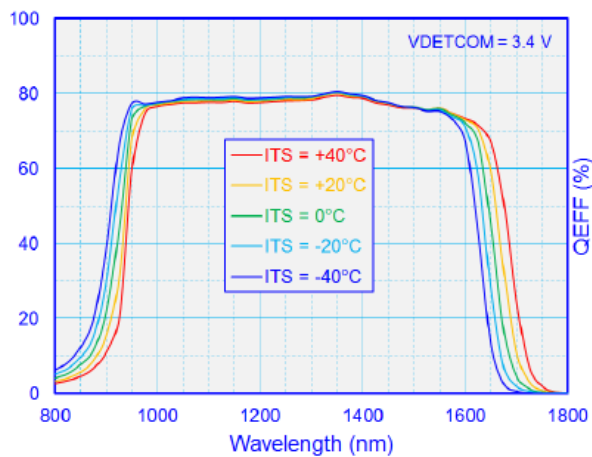
Histograms of Dark Condition



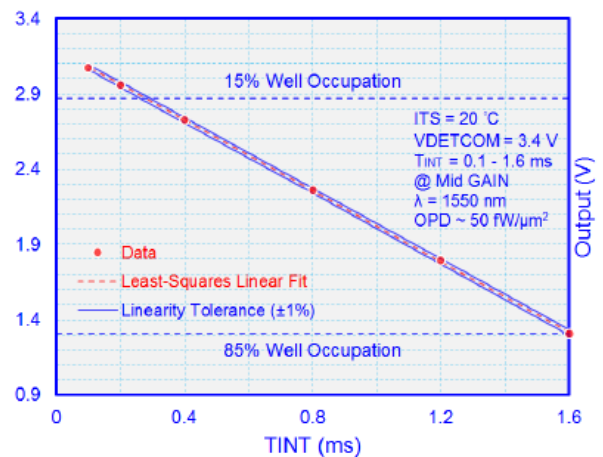
Histograms of Illuminated Condition



QEFF Spectrum

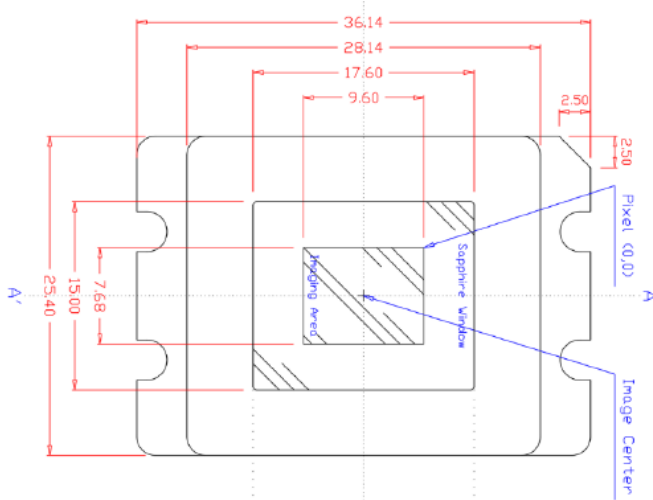


Output Linearity

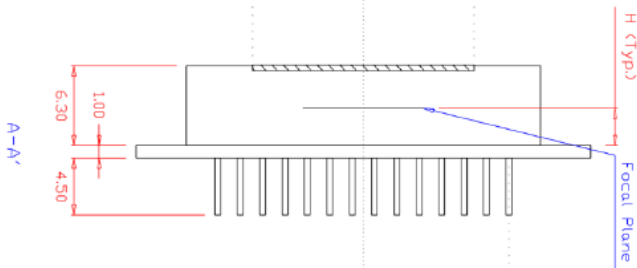


Package Outline Dimensions (unit: mm)

TOP VIEW

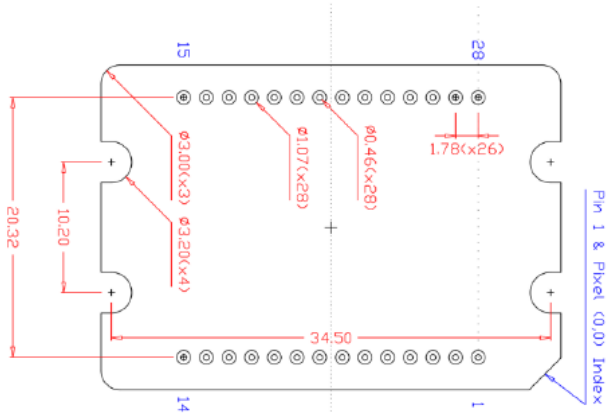


SIDE VIEW



Part Number	H
FPA15M640NA	2.95
FPA15M640NB	2.95
FPA15M640NC	4.05

BOTTOM VIEW



Note: Specifications are subject to change without notice.



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