# Near-Infrared ( 0.9 - 1.7 μm ) 640x512 InGaAs Focal Plane Array

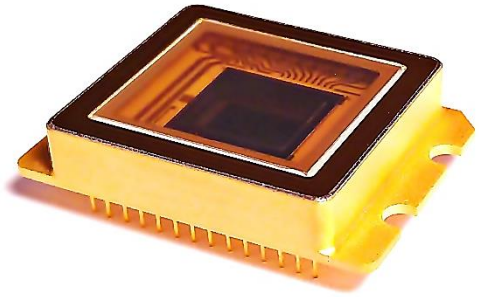
FPA0640P15F-17-T1 : with 1-Stage Thermoelectric Cooler
FPA0640P15F-17-T2: with 2-Stage Thermoelectric Cooler

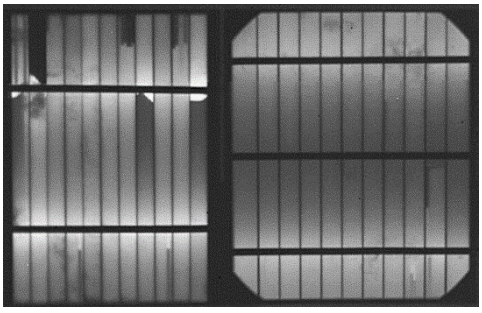
## FEATURES

- 640x512 Array Format
- 0.9μm-1.7μm Spectral Range
- 28-pin Metal SDIP Package
- Embedded Thermoelectric Cooler
- Typical Pixel Operability >99.5%
- Quantum Efficiency >65%
- 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
- Fiberoptic Telecommunication
- See through Fog/Smoke
- Ice/Slush/Moisture Mapping
- Industrial Thermal Imaging
- Astronomy and Scientific





## GENERAL DESCRIPTIONS

| PARAMETER | UNIT | VALUE |
|---|---|---|
| Sensor Technology | --- | Planar InGaAs PIN |
| Spectral Range | μm | 0.9 -1.7 |
| Actual Pixel Array | --- | 640 x 512 |
| Effective Pixel Array | --- | 636 x 508 |
| Pixel Pitch | μm | 15 |
| Image Size | mm | 9.6 x 7.68 |
| Package Type | --- | 28-pin Metal SDIP Package |
| Package Size L x W x T | mm | 36.1 x 25.4 x 7.3 (without pins) |
| Weight | g | 19.5 (±0.5) (for both package) |

## SPECIFICATIONS ( [1]ITS = 20°C )

| Parameter | | Unit | Typical Value | Conditions |
|---|---|---|---|---|
| [2,3]Dark Current | | fA | ≤ 20 | Photopixel Biased @ -0.5 V |
| [2,3]Quantum Efficiency * Fill Factor (QEFF) | | % | ≥ 70 | λ = 1.0 µm - 1.6 µm |
| [2,3]Response Nonuniformity | | % | ≤ 5 | At 50% Well Occupation |
| [2,3]Response Nonlinearity (Max. Peak-to-Peak Deviation) | | % | ≤ 2 | 15% - 85% Well Occupation Range |
| Charge Capacity | @ High Gain | $Me^-$ | 0.043 | ROIC Specifications |
| | @ Mid Gain | | 0.12 | |
| | @ Low Gain | | 1.44 | |
| Readout Noise | @ High Gain | $e^-$ | < 35 | ROIC Specifications |
| | @ Mid Gain | | < 60 | |
| | @ Low Gain | | < 500 | |
| Noise-Equivalent Irradiance (NEI) | | ph# / $cm^2$-s | ≤ 1.4 x $10^9$ | Mid Gain, Integration Time = 16.7 ms, λ = 1.55 µm |
| Mean Detectivity | | cm-√Hz / W | ≥ 2 x $10^{13}$ | |
| Output Swing | | V | 2.25 | |
| [3]Minimum Integration Period | | µs | <1 | |
| [2,3]Pixel Operability | | % | ≥ 99.5 | Percentage of Pixels with QEFF Deviation within ±20%*(QEFF Mean). |
| [4]Maximum Cooling Capability ($\Delta T_{MAX}$) | FPA0640P15F-17-T1 | °C | ≥ 35 | $T_{Heatsink}$ = 20°C |
| | FPA0640P15F-17-T2 | | ≥ 55 | |

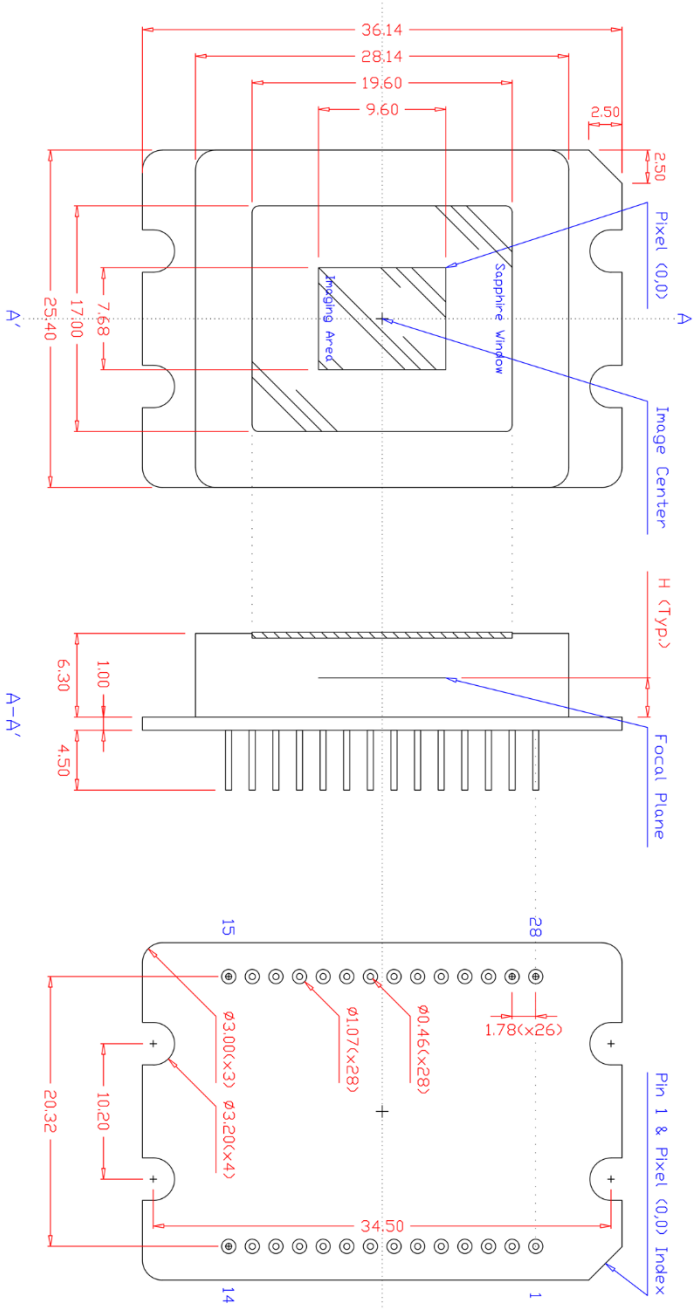
1. Readings from integrated temperature sensor (ITS).
2. These items are defined for central effective pixel array (636x508). Their values correspond to default operation conditions.
3. Contact us for further information.
4. Adequate heatsink and thermal interface material are the prerequisites for stable operation.

## ABSOLUTE MAXIMUM RATINGS

| Parameter | Unit | Min. | Max. |
|---|---|---|---|
| [5]Operation Temperature | °C | -40 | +70 |
| [5]Storage Temperature | °C | -40 | +70 |
| [6]Power Consumption | mW | --- | 200 |

5. Non-condensing environment.
6. Without powering on the thermoelectric cooler.

# PACKAGE OUTLINE (Unit: mm)




BOTTOM VIEW

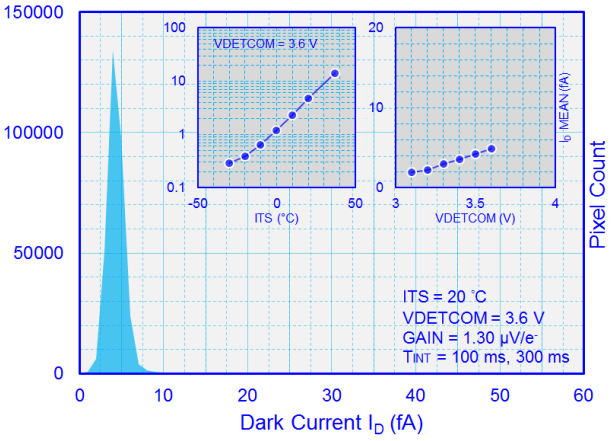
SIDE VIEW

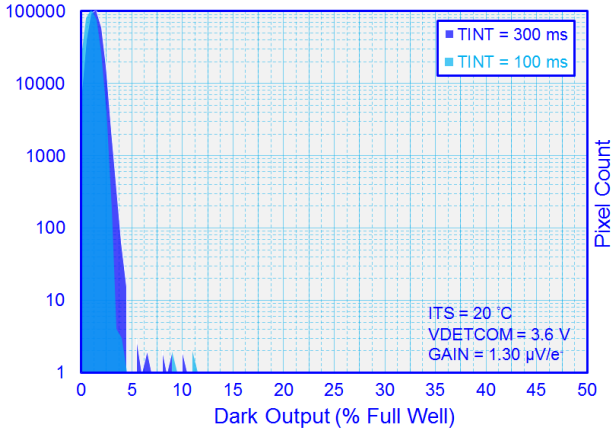
| Model | H |
|---|---|
| FPA0640P15F-17-T1 | 2.95 |
| FPA0640P15F-17-T2 | 4.55 |

TOP VIEW

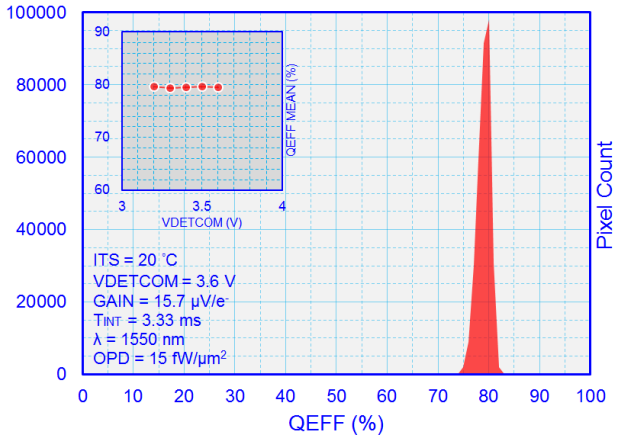
# EXAMPLE CURVES

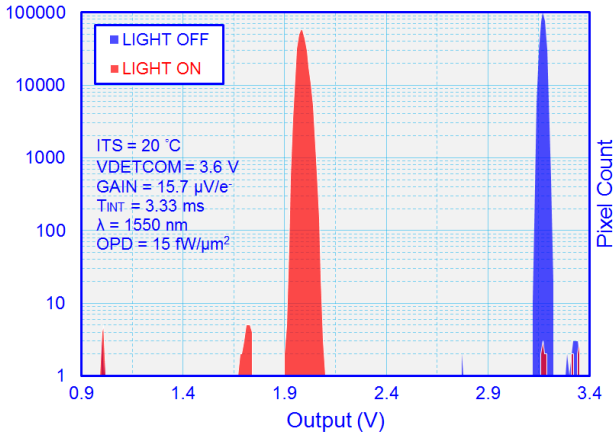
## Histograms of Dark Condition



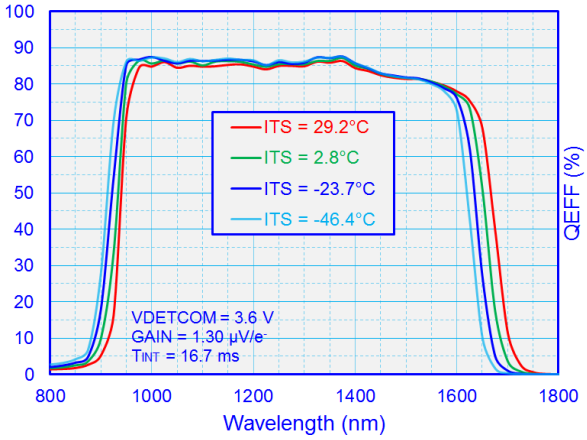




## Histograms of Illumination Condition




## QEFF Spectrum




## Output Linearity