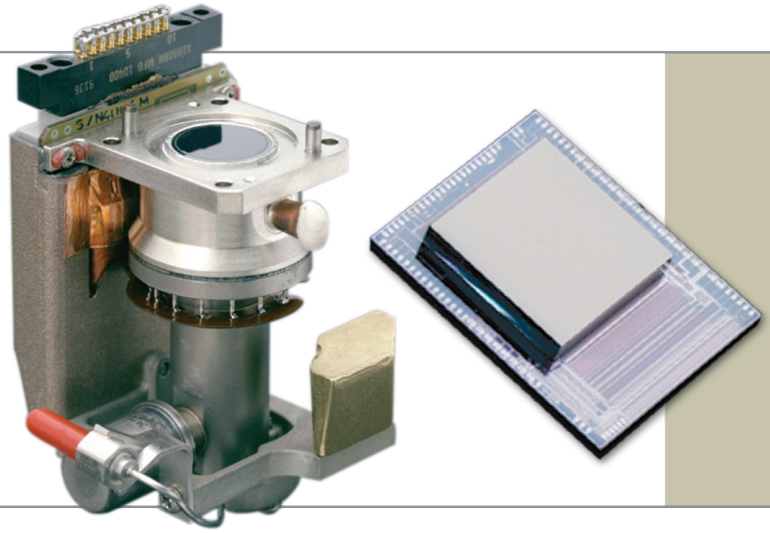
Raytheon

64 × 64 LWIR Focal Plane Assembly (FPA)

Highly Linear, Rapid Operation Staring Array



The 64 × 64 LWIR FPA Assembly is a high-performance LWIR staring array used on the Javelin Missile seeker

Benefits

- 64 × 64 active pixels
- Very uniform responsivity
- Highly linear response with incident flux
- Very mature product – high rate production

64 × 64 LWIR Staring Detective Assembly

Raytheon's longwave infrared (LWIR) HgCdTe 64 × 64 staring integrated Dewar assembly (IDA) is an established product supporting over 30,000 delivered Javelin missiles. These systems have a proven track record in the field with historic combat success making them the anti-tank weapon of choice, both domestically and internationally.

The heart of the Javelin IDA is a focal plane array (FPA) designed for low noise and uniform response, packaged in a Dewar that provides rapid cooldown and quick time to operation(within 9 seconds.) This IDA and FPA are also designed to meet the high stress thermal cycle requirements resulting from the rapid cooldown by the cryostat and have been demonstrated to exhibit cooldown lives of over 80 cycles.

The electronics driving the bias and timing are designed for low noise, high sensitivity performance. The circuit layout is on one compact video bias and timing (VB&T) circuit card to minimize overall package size. The readout electronics are designed for longer integration time and on-chip clocks and biases. The readout integrated circuit (ROIC) is designed to be operated with only nine bias and timing signals. Therefore, only nine signals are required through the hermetically sealed Dewar assembly feedthru, ensuring long vacuum life of the Dewar (>10yrs).

The Javelin seeker FPA is an excellent choice for system designers requiring rapid operation and high sensitivity in a compact, highly reliable package.

64 × 64 LWIR Focal Plane Assembly

Key Product Features

- 61 × 61 µm unit cell size
- High pixel operability (99%)
- In band response 3.2e-24 amps/Ph/cm^2 sec
- Crosstalk ≤0.4%
- Low noise (100 µV RMS)
- Highly linear response ≤0.35%, LMS Line
- Frame rate 180 Hz
- Single video output (-4.6V ± 0.5 V average)
- Data stable ≥800 ns
- Power dissipation 75 mW
- Operating temperature 77K to 87K
- Designed for rapid cooldown (~9 sec)
- Vacuum life ≥10 years
- Rugged design

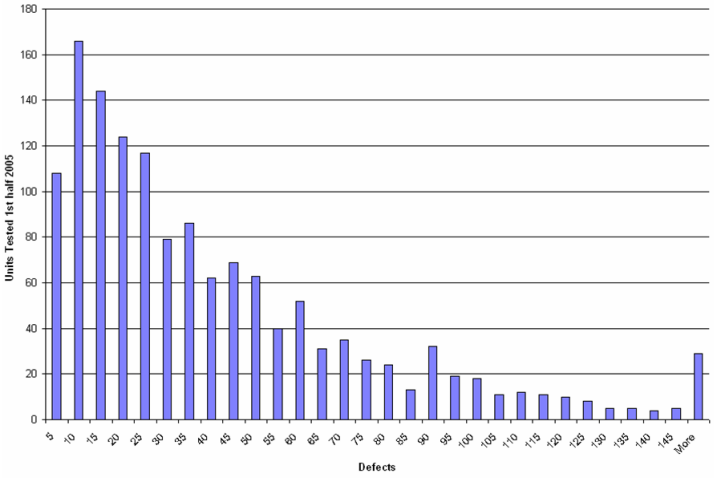
Specifications

Spectral response (cutoff wavelength)	λ_{co} >9.9 µm
Responsivity	1.5e7 ≥R ≥1e8 V/Watt
Response uniformity (2pt correction)	1%
Response stability (over temp Range)	ΔR ≤2%/°K
Output dynamic range	Max Flux (340K)
Nominal flux density	1.2 e 16 ph/cm^{2}sec
Operability (typical)	99%
Fixed pattern noise (typical)	<0.4 V
Crosstalk (typical)	≤0.4%
Frame rate	180 Hz
Integration time	165 µs
Format	64 × 64 active pixels
Pixel pitch	61 × 61 µm
Number of outputs	1
Power dissipation (typical)	≤75 mW

Electrical Interface Requirements

FPA Electrical I/O

- 1 – +15V DC supply
- 1 – -15V DC supply
- 2 – TTL compatible input timing signals
  Master clock (3.2256 MHz), frame sync (310 ns pulse)
- 1 – Current source
  Temperature sensor (1mA forward current)



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