

MAGNESIUM® MIL RP0092

High Dynamic Range Dual-Band Digital Pixel 12 μm Pitch, 1280 x 720 DPROIC

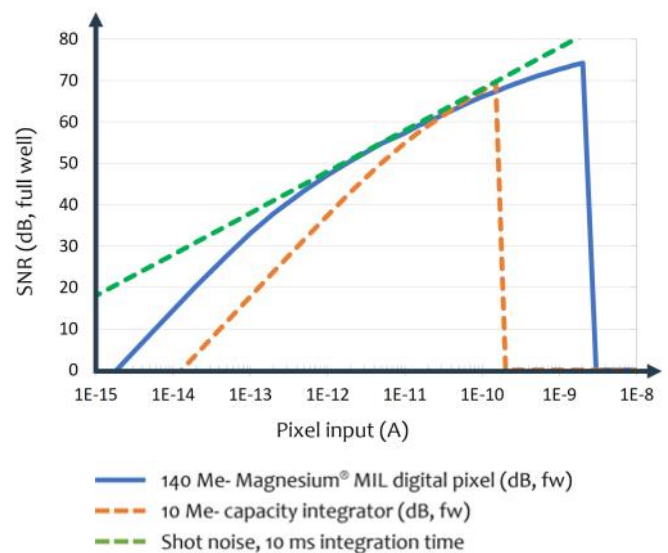
The Magnesium® MIL RP0092 is an advanced digital pixel readout integrated circuit (DPROIC) with a large well capacity and wide dynamic range. It is designed for use with any industry-standard single or dual-band direct-injection compatible detector technology.

Features

- ◆ 12 μm pitch, 1280 x 720, digital pixel readout IC
- ◆ Low power direct injection bias
- ◆ Dual-band (2-color) or single-band operation
- ◆ Dual-polarity (RP0092-D12x version),
- ◆ Single-polarity (RP0092-P12x version) N-on-P polarity
- ◆ Global shutter (snapshot), integrate-then-read (ITR)
- ◆ Programmable capacity from 8 Me- to over 140 Me-
- ◆ Programmable conversion gain as high as 1 LSB/160 e-
- ◆ Full-frame operation up to 120 fps
- ◆ Fast windows down to 32×6 at 4.7 kfps (at $t_{\text{int}}=100 \mu\text{s}$)
- ◆ Over 110 dB in-pixel dynamic range possible
- ◆ Selectable 2, 4, or 8 hot-swappable LVDS output ports
- ◆ 22-bits of internal selectable range
- ◆ SPI control interface (SenSPI®) and DDR master clock

Benefits of the Magnesium® MIL DPROIC

The Magnesium MIL RP0092 enables a new level of performance in infrared imaging systems. Digital pixel sensors disconnect well capacity from noise floor, enabling reduced noise and increased sensitivity for extremely high well capacities. The RP0092 has been built to bridge conventional 12 μm pitch analog dual-band pixel performance by boosting the sensitivity for low signals and greatly increasing the maximum well capacity for large signals with long integration times, as shown in the graph below. It is now possible to capture distant ice-cold objects in the same frame in which hot targets are resolved in unprecedented detail.



Electronics

Like all Senseker digital readout ICs, the Magnesium MIL is supported by CoaxSTACK™ electronics. The CoaxSTACK interfaces directly to Senseker sensor test units (STUs) that accommodate and cool the Magnesium MIL based focal plane array. The CoaxSTACK also connects to a host PC via a CoaXPress interface. The host PC runs CamIRa imaging software and controls the Magnesium MIL.



Enabled by Senseker Innovation

The RP0092 is a cutting-edge design composed of built-for-purpose IP and proprietary readout IP blocks that were developed by Senseker.

Two Dynamic Resistance Element (DRE) circuits (US Patent 9,628,105) are used for optimized dual-band operation. The DRE is an efficient way to implement a charge transfer mechanism into the delta sigma modulation (DSM) ADC and is advantageous in supporting a wide range of direct-injection compatible detector technologies. The DRE greatly reduces the power consumption requirements of the in-pixel DSM and enables very high speed clocking.

Availability and Contact Information

Part number: RP0092-D12x-WSP (Dual-polarity version)
Part number: RP0092-P12x-WSP (Single-polarity version)
Available unit: full wafer
Available to order now
Contact sales for pricing information:
products@senseker.com

Recon, Surveillance and Target Acquisition

The large well capacity digital pixels of the RP0092 address the requirement for wide dynamic range and high sensitivity that are critical in recon, surveillance and target acquisition systems.

Programmable windows can be used to observe targets at much higher frame rates. Sizing can be adjusted for accurate multi-target tracking at the highest possible speed. The digital pixel architecture allows a much higher maximum current to be imaged within windows, providing additional hot object detail. The RP0092 wide dynamic range enables the observation of thermally subtle targets in the presence of high flux events that occur in the same scene. This ensures that the widest range of contrast in targets can be resolved under the most challenging conditions.

Dual-Band Applications

The Magnesium MIL is capable of detecting infrared radiation in two distinct wavelength bands sequentially, in conjunction with a dual-band detector. The key advantage of dual-band infrared detection lies in its ability to provide complementary information from the two different wavelength bands. By contrasting the data from these bands, the system can better discriminate between objects, materials, and temperature variations, leading to more accurate and reliable results in a wide range of applications.

Industry Standard Pitch/Format Detector

The industry-standard 12 μm pitch and 1280 x 720 format enables RP0092 compatibility with many existing detectors. The digital pixel capability is uniquely suited to optimizing sensor performance when using high background detector types.

Restrictions

This 'MIL' solution was designed for U.S. Military applications. It is available off-the-shelf from Senseker, with product sales restricted to customers who have approval from the U.S. Government.