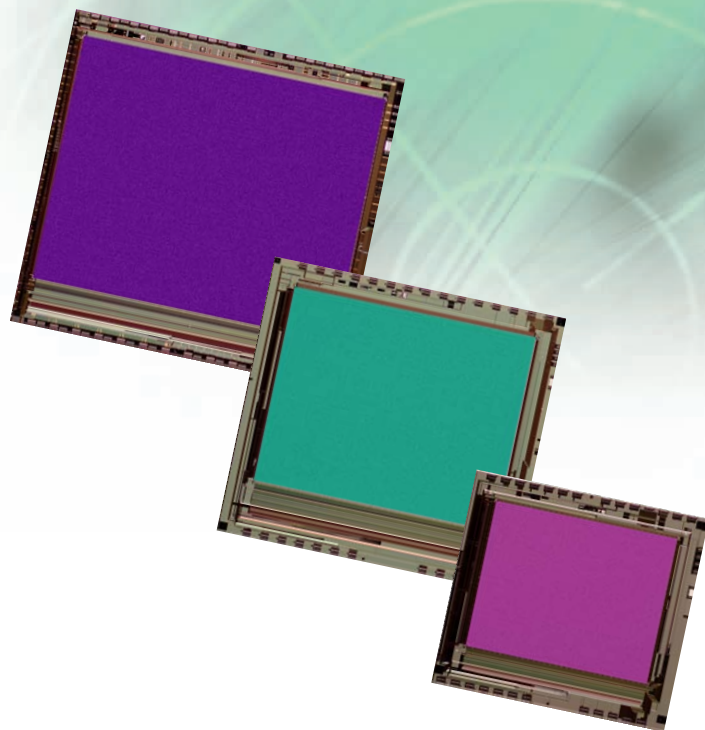


# Large-Format Readout Integrated Circuits

Standard Readout Integrated Circuits -  
at the heart of today's high-resolution IR systems







## Delivery

Standard ROIC devices are delivered in wafer form, probe tested and labeled according to pass/fail criteria. Test data is included on CD-ROM for each device. A User Guide is provided that describes all device electrical interfaces. A Mechanical Interface Database provides the layout information needed by customers to design their detector interface. If our standard ROIC products can't meet your requirements, we offer full custom design services, from trade study through design and fabrication of wafers.

If our Standard ROIC products do not meet your requirements, we offer full custom design services from trade study through fabrication of wafers.

## Standard Readout Functions

	ISC9803	ISC0002	ISC9901	ISC0402*	ISC0403	ISC0404*
<b>Array Size</b>	640 x 512	640 x 512	640 x 512	640 x 512	640 x 512	1024 x 1024
<b>Pixel Pitch</b>	25 $\mu$ m	25 $\mu$ m	20 $\mu$ m	20 $\mu$ m	15 $\mu$ m	18 $\mu$ m
<b>Input Circuit</b>	Direct Injection	CTIA	Direct Injection	Direct Injection	Direct Injection	Direct Injection
<b>Integration Type</b>	Snapshot mode	Snapshot mode	Snapshot mode	Snapshot mode	Snapshot mode	Snapshot mode
<b>Integration Time</b>	Adjustable integration time > 9.6 $\mu$ s	Adjustable integration time > 5.4 $\mu$ s	Adjustable integration time > 100 $\mu$ s	Adjustable integration time > 0.5 $\mu$ s	Adjustable integration time > 0.5 $\mu$ s	Adjustable integration time > 0.5 $\mu$ s
<b>Integration Modes</b>	Integrate-While-Read Integrate-Then-Read	Integrate-While-Read Integrate-Then-Read	Integrate-Then-Read	Integrate-While-Read Integrate-Then-Read Non-destructive Read	Integrate-While-Read Integrate-Then-Read	Integrate-While-Read Integrate-Then-Read Non-destructive Read
<b>Gain Adjustment</b>	2 bit (x1, x1.3, x2, x4)	1 bit (x1, x27)	2 bit (x1, x1.3, x2, x4)	N/A	N/A	N/A
<b>Operational Modes</b>	"Hands-off" default User configurable	"Hands-off" default User configurable	"Hands-off" default User configurable	"Hands-off" default User configurable	"Hands-off" default User configurable	"Hands-off" default User configurable
<b>Windowing</b>	Dynamic windowing Window size- position	Dynamic windowing Window size- position	Dynamic windowing Window size- position	Dynamic windowing Window size- position	Dynamic windowing Window size- position	Dynamic windowing Window size- position
<b>Readout Modes</b>	Invert [row] Revert [column] Inverse [row-column] Interlaced mode	Invert [row] Revert [column] Inverse [row-column] Interlaced mode	Invert [row] Revert [column] Inverse [row-column] Interlaced mode	Invert [row] Revert [column] Inverse [row-column]	Invert [row] Revert [column] Inverse [row-column]	Invert [row] Revert [column] Inverse [row-column]
<b>Number of Outputs</b>	Selectable 1, 2 or 4 Reference output	Selectable 1, 2 or 4 Reference output	Selectable 1, 2 or 4 Reference output	Selectable 1, 2 or 4 Reference output	Selectable 1, 2 or 4 Reference output	Selectable 4, 8 or 16 Reference output
<b>Detector Application</b>	p-on-n InSb or QWIP	p-on-n InGaAs or MCT	p-on-n InSb or QWIP	p-on-n InSb, InGaAs, MCT or QWIP	p-on-n InSb	p-on-n InSb

\* two well size options available

Specifications subject to change without notice.

## Specifications

	ISC9803	ISC0002	ISC9901	ISC0402	ISC0403	ISC0404
Array Size	640 x 512	640 x 512	640 x 512	640 x 512	640 x 512	1024 x 1024
Pixel Pitch	25 $\mu\text{m}$	25 $\mu\text{m}$	20 $\mu\text{m}$	20 $\mu\text{m}$	15 $\mu\text{m}$	18 $\mu\text{m}$
Operating Temperatures	80K to 310K	80K to 310K	80K to 310K	80K	80K	80K
Detector Bias Range (I <sub>det</sub> = 1nA)	0 to 0.5V	0 to 2.5V	0 to 0.5V	0 to 0.5V	0 to 0.5V	0 to 0.5V
Detector Bias Resolution	5mV	External adjust.	5mV	5mV	6mV	5mV
RoAd Min.	$\geq 1 \times 10^3 \Omega \cdot \text{cm}^2$	$\geq 1 \times 10^7 \Omega \cdot \text{cm}^2$	$\geq 1 \times 10^3 \Omega \cdot \text{cm}^2$	$> 2 \times 10^4 \Omega \cdot \text{cm}^2$	$\geq 1 \times 10^4 \Omega \cdot \text{cm}^2$	$\geq 1 \times 10^4 \Omega \cdot \text{cm}^2$
Detector Capacitance Max	$\leq 0.5\text{pF}$	$\leq 0.05\text{pF}$	$\leq 0.5\text{pF}$	$\leq 0.04\text{pF}$	$\leq 0.1\text{pF}$	$\leq 0.1\text{pF}$
Well Capacity (Min - Max Gain)	11.2 x10 <sup>6</sup> 8.4 x10 <sup>6</sup> 5.6 x10 <sup>6</sup> 2.8 x10 <sup>6</sup>	2.5 x10 <sup>6</sup> 93 x10 <sup>3</sup>	7 x10 <sup>6</sup> 5.2 x10 <sup>6</sup> 3.5 x10 <sup>6</sup> 1.8 x10 <sup>6</sup>	11 x10 <sup>6</sup> Option 1 3.0 $\pm$ 0.5 x10 <sup>6</sup> Option 2	6.5 x10 <sup>6</sup>	12 x10 <sup>6</sup> Option 1 2.5 $\pm$ 0.5 x10 <sup>6</sup> Option 2
Input Current (Min, Nom, Max)	1pA 1nA 10nA	0.01pA 1pA 50nA	1pA 1nA 10nA	1pA 0.5nA 10nA	1pA 0.5nA 10nA	1pA 0.5nA 10nA
ROIC Noise (Min. Gain)	$\leq 550e^{\text{RMS}*}$	$\leq 360e^{\text{RMS}*}$	$\leq 350e^{\text{RMS}*}$	$\leq 1279e^{\text{RMS}*}$ Option 1	$\leq 760e^{\text{RMS}*}$	$\leq 1026e^{\text{RMS}*}$ Option 1
ROIC Noise (Max. Gain)	$\leq 350e^{\text{RMS}*}$	$\leq 70e^{\text{RMS}*}$	$\leq 200e^{\text{RMS}*}$	$\leq 368e^{\text{RMS}*}$ Option 2	N/A	$\leq 282e^{\text{RMS}*}$ Option 2
Output Range	2.5V	2.5V	2.5V	3V	2.0V	2.0V
Output Interface (R <sub>out</sub> , C <sub>out</sub> )	$> 100 \text{ k}\Omega$ $\leq 25\text{pF}$	$> 100 \text{ k}\Omega$ $\leq 25\text{pF}$	$> 100 \text{ k}\Omega$ $\leq 25\text{pF}$	$> 100 \text{ k}\Omega$ $\leq 18\text{pF}$	$> 100 \text{ k}\Omega$ $\leq 15\text{pF}$	$> 100 \text{ k}\Omega$ $\leq 18\text{pF}$
Pixel Rate	10MHz	10MHz	10MHz	12.5MHz	12MHz	12.5MHz
Full Frame Rate (1 output)	30Hz	30Hz	30Hz	$> 30\text{Hz}$	$> 30\text{Hz}$	$> 30\text{Hz}$ 4-output
Full Frame Rate (2 outputs)	58Hz	58Hz	55Hz	$> 60\text{Hz}$	$> 60\text{Hz}$	$> 60\text{Hz}$ 8-output
Full Frame Rate (4 outputs)	107Hz	107Hz	97Hz	$> 120\text{Hz}$	$> 120\text{Hz}$	$> 120\text{Hz}$ 16-output
Power (1 output)	$\leq 90\text{mW}$	$\leq 225\text{mW}$	$\leq 90\text{mW}$	$\leq 50\text{mW}$	$\leq 50\text{mW}$	$\leq 72\text{mW}$ 4 output
Power (4 outputs)	$\leq 180\text{mW}$	$\leq 325\text{mW}$	$\leq 180\text{mW}$	$\leq 89\text{mW}$	$\leq 77\text{mW}$	$\leq 130\text{mW}$ 16 output
	*T <sub>int</sub> =3msec, T=80K C <sub>det</sub> = 0.3pF R <sub>oA</sub> $\geq 5 \times 10^4 \Omega \cdot \text{cm}^2$	*T <sub>int</sub> =6msec, T=250K Det Bias = -0.5V C <sub>det</sub> = 50fF R <sub>oA</sub> = $1 \times 10^7 \Omega \cdot \text{cm}^2$	*T <sub>int</sub> =2.49msec, T=80K C <sub>det</sub> = 0.3pF R <sub>oA</sub> $\geq 5 \times 10^4 \Omega \cdot \text{cm}^2$	*T <sub>int</sub> =3msec, T=80K C <sub>det</sub> = 50fF R <sub>oA</sub> = $2 \times 10^4 \Omega \cdot \text{cm}^2$	*T <sub>int</sub> =3msec, T=80K C <sub>det</sub> = 0.1pF R <sub>oA</sub> = $1 \times 10^4 \Omega \cdot \text{cm}^2$	*T <sub>int</sub> =3msec, T=80K C <sub>det</sub> = 100fF R <sub>oA</sub> = $1 \times 10^4 \Omega \cdot \text{cm}^2$



**SANTA BARBARA**  
CVS World Headquarters  
FLIR Systems, Inc.  
70 Castilian Drive.  
Goleta, CA 93117  
USA  
PH: +1 805.964.9797  
FX: +1 805.685.2711

**PORTLAND**  
Corporate Headquarters  
FLIR Systems, Inc.  
27700 SW Parkway Avenue  
Wilsonville, OR 97070  
USA  
PH: +1 877.773.3547  
FX: +1 503.498.3153

**EUROPE**  
CVS Eurasian Headquarters  
FLIR Systems CVS BV  
Charles Petitweg 21  
4847 NW Teteringen - Breda  
The Netherlands  
PH: +31 (0) 765 79 41 94  
FX: +31 (0) 765 79 41 99

www.flir.com  
www.corebyindigo.com