

ISC0208
Euro Format 25um ROIC
Specification and Requirements
FLIR #400-0208-09 - Version 200

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The World's **Sixth Sense**™

Revision History

- **Version 100 - April 16, 2003 Initial Release**
- **Version 200 - November 1, 2005 – updated noise values based on characterization measurements, page 7**

ISC0208 Specification and Requirements Review (1 of 7)

ROIC PARAMETER	SPECIFICATION REQUIREMENT	COMMENTS
Array Configuration	384x288	
Pixel Pitch in Columns (384)	25um	
Pixel Pitch in Rows (288)	25um	
Input Polarity	P-on-N (Current Flows into Inputs)	InSb, InGaAs, HCT, QWIP
Input Configuration	Direct Injection (DI)	
Core Multiplexing Configuration	Voltage Mode	
Detector Impedance	> 1.0E3 (Ohm-cm ²)	Used for Simulation

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ROIC PARAMETER	SPECIFICATION REQUIREMENTS	COMMENTS
Input Biases	VDETCOM 5.5V VPOS 5.5V VPOSOUT 5.5V VPD 5.5V VREF 1.6V VREFOUT 1.6V VNEG 0.0V VNEGOUT 0.0V VND 0.0V VOS 1.6V-5.5V	Detector Common Analog Positive Output Pos Supply Digital Positive Analog Reference Analog Output Reference Analog Negative Output Neg Supply Digital Negative Offset/Skim Supply req'd if OE=1 See Interface Definition

<p>Input Clocks</p>	<p><u>Name</u> <u>Vhigh to Vlow</u></p> <p>CLK VPD±0.5V to VND LSYNC VPD+0.5V to VND FSYNC VPD+0.5V to VND DATA VPD+0.5V to VND</p>	<p>Master Clock Line Sync Frame Sync (Integ. Control) Mode Control</p>
<p>Input Clock Rise and Fall</p>	<p>10% to 90% in 10nS</p>	
<p>Outputs</p>	<p>Selectable 1,2, or 4 with Reference Output</p>	
<p>Output Interface</p>	<p>> 100k Ohms ≤ 25 pF</p>	
<p>Output Voltage Swing</p>	<p>> 3.0 V T=300K Default mode</p>	<p>Expect 3.0 V @ T=80K (4.6V ± 0.2V to 1.6V ± 0.2V)</p>

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ROIC PARAMETER	SPECIFICATION REQUIREMENTS	COMMENTS
Power	< 75mW Single Output < 160mW 4 Output Mode at max frame rate	Power controllable using external bias or on-chip DAC
Control Register Functions	Programmable Test I/O Power Control Master Current Gain Select Skimming Enable Detector Bias Adj. Invert/Revert Windowing 1, 2, or 4 Outputs Integration Mode Reference Output Enable Global Reset	
Programmable Test	Unit Cell Test Injection VET Circuit Test Row Input	
Detector Bias Adjust	0 - 500mV reverse bias @ nominal current (1nA) ~ 5mV resolution	

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ROIC PARAMETER	SPECIFICATION REQUIREMENTS	COMMENTS																																																																								
Input Current Min Nominal Max	1 pA 1.0 nA 10 nA	Simulation Range																																																																								
Gain Control	Option-1 <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2"></th> <th colspan="2" style="text-align: center;">Rel.</th> <th colspan="2"></th> </tr> <tr> <th style="text-align: left;">G1</th> <th style="text-align: left;">G0</th> <th style="text-align: left;">uV/e-</th> <th style="text-align: left;">Gain</th> <th style="text-align: left;">Max</th> <th style="text-align: left;">e-</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0.16</td> <td>1.0*</td> <td>18.5M</td> <td>*</td> </tr> <tr> <td>0</td> <td>1</td> <td>0.21</td> <td>1.33</td> <td>13.9M</td> <td></td> </tr> <tr> <td>1</td> <td>0</td> <td>0.32</td> <td>2.0</td> <td>9.2M</td> <td></td> </tr> <tr> <td>1</td> <td>1</td> <td>0.65</td> <td>4.0</td> <td>4.6M</td> <td></td> </tr> </tbody> </table> *Typical, Default Gain Setting Option-2 <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2"></th> <th colspan="2" style="text-align: center;">Rel.</th> <th colspan="2"></th> </tr> <tr> <th style="text-align: left;">G1</th> <th style="text-align: left;">G0</th> <th style="text-align: left;">uV/e-</th> <th style="text-align: left;">Gain</th> <th style="text-align: left;">Max</th> <th style="text-align: left;">e-</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0.23</td> <td>1.0*</td> <td>13M</td> <td>*</td> </tr> <tr> <td>0</td> <td>1</td> <td>0.30</td> <td>1.33</td> <td>9.8M</td> <td></td> </tr> <tr> <td>1</td> <td>0</td> <td>0.46</td> <td>2.0</td> <td>6.5M</td> <td></td> </tr> <tr> <td>1</td> <td>1</td> <td>0.92</td> <td>4.0</td> <td>3.2M</td> <td></td> </tr> </tbody> </table> *Default Gain Setting			Rel.				G1	G0	uV/e-	Gain	Max	e-	0	0	0.16	1.0*	18.5M	*	0	1	0.21	1.33	13.9M		1	0	0.32	2.0	9.2M		1	1	0.65	4.0	4.6M				Rel.				G1	G0	uV/e-	Gain	Max	e-	0	0	0.23	1.0*	13M	*	0	1	0.30	1.33	9.8M		1	0	0.46	2.0	6.5M		1	1	0.92	4.0	3.2M		
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Input Charge Handling	Option 1: >18.5x10 ⁶ carriers Option 2: >13.0x10 ⁶ carriers																																																																									

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ROIC PARAMETER	SPECIFICATION REQUIREMENTS	COMMENTS																																				
Transimpedance Non-Linearity	< $\pm 0.5\%$ from least squares line fit	Output Voltage vs. Tint Typical $\pm 0.1\%$, Max Dev. from least squares fit over 10% to 80% of full range																																				
Noise	<p>Option-1 (Cint=1pF) at 80K Without Detector or System Noise</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Output</th> <th>Input</th> </tr> <tr> <th><u>G1</u></th> <th><u>G0</u></th> <th><u>Noise</u></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>165uV</td> </tr> <tr> <td>0</td> <td>1</td> <td>210uV</td> </tr> <tr> <td>1</td> <td>0</td> <td>300uV</td> </tr> <tr> <td>1</td> <td>1</td> <td>555uV</td> </tr> </tbody> </table> <p>Option-2 (Cint=0.695pf) at 80K Without Detector or System Noise</p> <table style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Output</th> <th>Input</th> </tr> <tr> <th><u>G1</u></th> <th><u>G0</u></th> <th><u>Noise</u></th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>175uV</td> </tr> <tr> <td>0</td> <td>1</td> <td>230uV</td> </tr> <tr> <td>1</td> <td>0</td> <td>330uV</td> </tr> <tr> <td>1</td> <td>1</td> <td>605uV</td> </tr> </tbody> </table>		Output	Input	<u>G1</u>	<u>G0</u>	<u>Noise</u>	0	0	165uV	0	1	210uV	1	0	300uV	1	1	555uV		Output	Input	<u>G1</u>	<u>G0</u>	<u>Noise</u>	0	0	175uV	0	1	230uV	1	0	330uV	1	1	605uV	
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Column Output Order Output A Output B Output C Output D	Column 0,4,...,380 Column 1,5,...,381 Column 2,6,...,382 Column 3,7,...,383	Four Output Mode Normal Readout Direction																																				

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ROIC PARAMETER	SPECIFICATION REQUIREMENTS	COMMENTS
Column Output Order Output A Output B	Column 0,2,4,6,...,382 Column 1,3,5,7,...,383	Two Output Mode Normal Readout Direction
Column Output Order Output A	0,1,2,3,4,...,383	Single Output Mode Normal Readout Direction
Invert / Revert	Reverse Order of Rows and/or Columns	Select using Control Register
Temperature Sensor	0.7V +/- 0.05V @ 300K 1.070V +/- 0.05V at 78K	Test/Temp Pad
Full Frame Rate Pixel Rate 10MHZ	4 Output - 260 FPS 2 Output - 150 FPS 1 Output - 80 FPS	384 x 288 IWR @ 80K, Maximum Power
Data Valid / Settling Time	Settle to 0.1% @ T=80K in ≤ 70 ns Settle to 0.39% @ T=300K in ≤ 70 ns	60ns Typical, Single output
Adjacent Pixel Crosstalk	< 0.1% @ T=80K <0.39% @ T=300K	

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ROIC PARAMETER	SPECIFICATION REQUIREMENTS	COMMENTS
Non-Adjacent Pixel Crosstalk	$< 0.05\%$ @ T=80K $< 0.2\%$ @ T=300K	
Minimum Window Size (Max Frame Rate)	≥ 32 columns X 2 Rows ≥ 64 columns X 2 Rows ≥ 128 columns X 2 Rows	1 Output Mode (31.0KFPS) 2 Output Mode (31.0KFPS) 4 Output Mode (31.0KFPS) IWR, 10MHz Output Rate @ 80K, Maximum Power