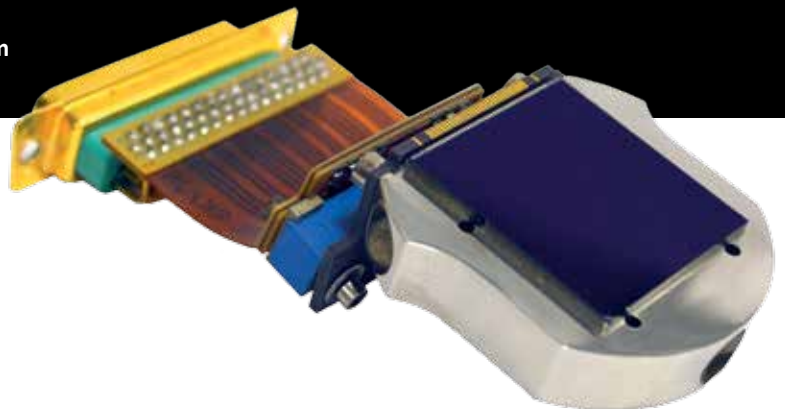


IMAGE SENSORS FOR SPACE AND ASTRONOMY



Image of Comet 67p captured by e2v CCD42-40 image sensor
on Rosetta Osiris – courtesy of ESA/Rosetta/MPS for OSIRIS Team
MPS/UPD/LAM/IAA/SSO/INTA/UPM/DASP/IDA



CMOS image sensors

Custom products also available

SPACE TRL	NUMBER OF PIXELS		COLOUR FILTER OPTION		PIXEL PITCH (µm)		IMAGE SIZE (mm)		SHUTTER TYPE	OUTPUT FORMAT	FRAME RATE (FPS)	MAXIMUM READOUT RATE (MHz)	DYNAMIC RANGE (dB)	PEAK SIGNAL (ke-)	PACKAGE TYPE	PACKAGE SIZE (mm)		HI-RES DEEP DEPLETION SILICON	BACK THINNED
	V	H	V	H	V	H	V	H								W	H		
Sapphire 1.3M – EV76C560	9	1024	1280	Mono, Bayer	5.3	5.3	5.43	6.78	Global (GS) + Rolling (ERS)	Parallel 10 bit	60 (>100 at VGA)	120	62	12	CLCC48	12.7	12.7	No	No
Ruby 1.3M – EV76C660	4	1024	1280	Mono, Bayer	5.3	5.3	5.43	6.78	Global (GS) + Rolling (ERS)	Parallel 10 bit	60 (>100 at VGA)	120	65	8.4	CLCC48	12.7	12.7	Yes	No
Ruby 1.3M – EV76C661	4	1024	1280	Mono, Bayer	5.3	5.3	5.43	6.78	Global (GS) + Rolling (ERS)	Parallel 10 bit	60 (>100 at VGA)	120	63	8.4	CLCC48	12.7	12.7	Yes	No
Onyx 1.3M – EV76C664	4	1025	1280	Mono, Sparse	10	10	10.4	12.8	GS/DDS/ERS	LVDS from 8b to 14b	100 (at 12b)	250	58/67/74	42	PGA 67	25	25	Yes	No
CANOPUS™ – CIS111*	5	5 channels of 4 pixels	224 or 448	Yes	46 or 23	2500	10.3	10.9	Global (GS)	1 x analog	2500	4	72	212-1900	Custom	Custom	No	No	
VEGA™ – CIS113*	4	4608	1920	No	16	16	73.7	30.7	Rolling (ERS) + Global (GS)	8 x analog	1.6	2 per channel	74	17	Metal buttable + PGA	82.34	31.7	Yes	Yes
SIRIUS™ – CIS115	6	2000	6	No	7	7	14	10.5	Rolling (ERS)	4 x analog	7.5	10	74	33	Custom 140 PGA	48.26	48.26	Yes	Yes
CIS119*	3	10 channels of 4 pixels	98	No	250	250	19	24.5	Global (GS)	5 x analog	4500	4	72	434-2600	Custom	Custom	No	No	
CIS120*	3	2048	3	No	10	10	20.5	20.5	Rolling (ERS) + Global (GS)	4 x 14bit digital	20 at 12 bits	21 per channel	77	50	TBC			Yes	Yes

CCD image sensors

Custom products also available

SPACE TRL	NUMBER OF ACTIVE PIXELS		STORE SECTION TOTAL PIXELS		PIXEL PITCH (µm)		IMAGE SIZE (mm)		OUTPUT AMPLIFIER TYPE	MAXIMUM READOUT RATE (MHz)	READOUT NOISE (e-)	PRIMARY PACKAGE TYPE	ALTERNATIVE PACKAGE TYPES	BACK-THINNED	OPERATION MODE	ANTI-BLOOMING	HI-RES DEEP DEPLETION SILICON
	V	H	V	H	V	H	V	H									
CCD30-11	9	256	1024		26	26	6.7	26.7	LS	5	4 (RNB)	20-pin DIL ceramic		(N)/(A)		■	
CCD42-10	9	512	2048		13.5	13.5	6.9	27.6	2 x VLN	3	2 (RNB)	20-pin DIL ceramic		(N)/(A)	□	□	
CCD42-40	9	2048	2048		13.5	13.5	27.6	27.6	2 x VLN	3	2 (RNB)	24-pin DIL ceramic		(N)/(A)	□	■	
CCD42-80**	9	4096	2048		13.5	13.5	55.3	27.6	2 x VLN	3	2 (RNB)	3-side metal buttable		(N)	□		
CCD42-90	7	4608	2048		13.5	13.5	62.2	27.6	2 x VLN	3	2 (RNB)	Invar 3-side buttable + PGA		(N)	□	□	
CCD44-82**	4	4096	2048		15	15	61.4	30.7	2 x VLN	3	2 (RNB)	Invar 3-side buttable + PGA		(N)		□	
CCD55-20	9	1152	770		22.5	22.5	25.9	17.3	1 VLN + 1 LS	7	3 (RNB)	44-pin PGA ceramic		(A)	□	□	
CCD55-30	9	1152	1252		22.5	22.5	25.9	27.9	1 VLN + 1 LS	7	3 (RNB)	44-pin PGA ceramic		(A)	□	□	
CCD203-82	9	4136	4096		12	12	49.2	49.2	4 x VLN	3	4.5 (RNB)	Metal buttable flex cable		(N)		■	
CCD230-42	5	2064	2048		15	15	30.7	30.7	4 x VLN	5	3 (RNB)	78-pin PGA ceramic		(I)			
CCD230-84	4	4112	4096		15	15	61.4	61.4	4 x VLN	5	3 (RNB)	80-pin PGA ceramic		(I)			
CCD231-42	4	2064	2048		15	15	30.7	30.7	4 x VLN	3	2 (RNB)	78-pin PGA ceramic		(N)			
CCD231-84	4	4112	4096		15	15	61.4	61.4	4 x VLN	3	2 (RNB)	SiC buttable + 2 flex cable	80-pin PGA ceramic	(N)		■	
CCD231-C6	4	6160	6144		15	15	92.4	92.2	4 x VLN	3	2 (RNB)	SiC buttable + 2 flex cable		(N)		■	
CCD261-84	4	4140	2048		15	15	61.6	61.6	2 x VLN	1	2.5 (RNB)	Invar 3-side buttable + PGA		(N)		■ fully depleted, thick silicon	
CCD290-99	4	9232	9216		10	10	92.4	92.2	16 x VLN	3	2 (RNB)	SiC buttable + 2 flex cable		(N)		■	

Frame transfer sensors

CCD275-42	8	1024	1024	1024	1026	26	26	26.6	26.6	4 x VLN switching	5	40 (RNA)	Custom		(N)		■
CCD39-01	8	80	80	80	80	24	24	1.9	1.9	4 x VLN	3	3 (RNB)	24-pin DIL ceramic	Peltier Package + window	(N)		
CCD39-02	8	80	80	80	80	24	24	1.9	1.9	1 x VLN	3	3 (RNB)	24-pin DIL ceramic	Peltier Package + window	(N)		
CCD47-20	9	1024	1024	1033	1056	13	13	13.3	13.3	2 x VLN	5	2 (RNB)	32-pin DIL ceramic	Peltier Package + window	(N)/(A)	■ (N)	■
CCD55-20	9	576	770	576	804	22.5	22.5	13	17.3	VLN + LS	7	3 (RNB)	44-pin PGA ceramic		(A)	□	□

EMCCD image sensors – L3Vision™

CCD60	4	128	128	130	130	24	24	3	3	1 x VLN	18	< 1 (RNA)	24-pin DIL ceramic	Peltier Package + window	(I)		
CCD97	4	512	512	528	536	16	16	8.2	8.2	1 VLN + 1 LS	13	< 1 (RNA)	30-pin DIL ceramic	32-pin Peltier Package + window	(I)		
CCD201	6	1024	1024	1037	1056	13	13	13.3	13.3	1 VLN + 1 LS	15	< 1 (RNA)	36-pin ceramic package	Peltier Package + window	(I)		
CCD220-00	4	240	240	240	244	24	24	5.8	5.8	8 x VLN	14	< 1 (RNA)	64-pin Peltier package + window		(I)		■
CCD 351	4	1024	1024	1043	1056	10	10	10	10	1 x LS	37	< 1 (RNA)	30-pin ceramic DIL		(I)		

Linear image sensors

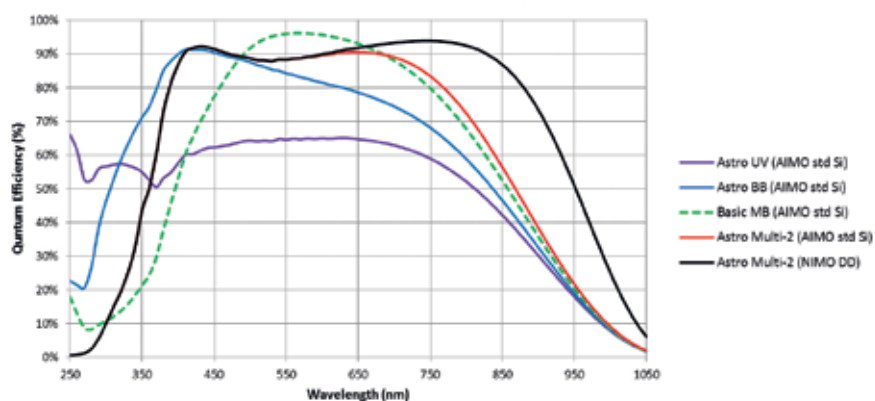
TH7834	9	1	12000	1	12000	6.5µm	6.5µm	0.0065	78.0	4x LN	5	54	Ceramic				■
AT71547	9	4x1	6000	4x1	6000	13µm	13µm	4 x 0.013	78.0	4x LN	6	67	Ceramic				■
AT71544	9	3x2	12000	4x2	6000	6.5µm	6.5µm	3 x 0.0065	78.0	3x4 LN	8	40	Ceramic				■
EV71569	9	1	2048	1	2048	14µm	14µm	0.014	28.7	2x LN	10	52	Ceramic				■

Key
 ■ Available
 □ Subject to tooling and/or order quantity
 (A) Advanced IMO
 (N) Non-IMO only
 (I) IMO Inverted Mode Operation
 VLN Very Low Noise scientific amplifier
 LS Large Signal scientific amplifier
 HSA High Speed Output Amplifier
 DIL Dual In Line
 PGA Pin Grid Array
 V Vertical
 H Horizontal
 RNA At maximum readout rate, FI device
 RNB At 20kHz readout rate, FI device
 *Under development
 **Also available as frame transfer
 TRL Technology Readiness Level, with 9 meaning: Actual system "flight proven" through successful mission operations

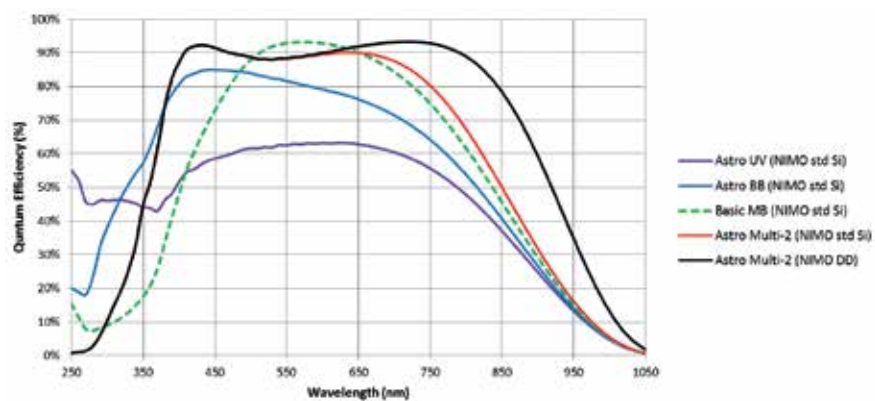
Non-exhaustive list, limited to standard version of e2v sensors. Other sensors are potentially available under restricted conditions. Note: Whilst e2v has taken care to ensure the accuracy of the information contained herein, it accepts no responsibility for the consequences of any use thereof and also reserves the right to change specification of goods without notice. e2v accepts no liability beyond that set out in its standard conditions of sale in respect of infringement of third party patents arising from the use of devices in accordance with information contained herein. Not all combinations of variants are available for a single device. Users are advised to contact e2v to confirm if their particular requirements are available with a standard device before designing their system.

Quantum Efficiency (QE) curves

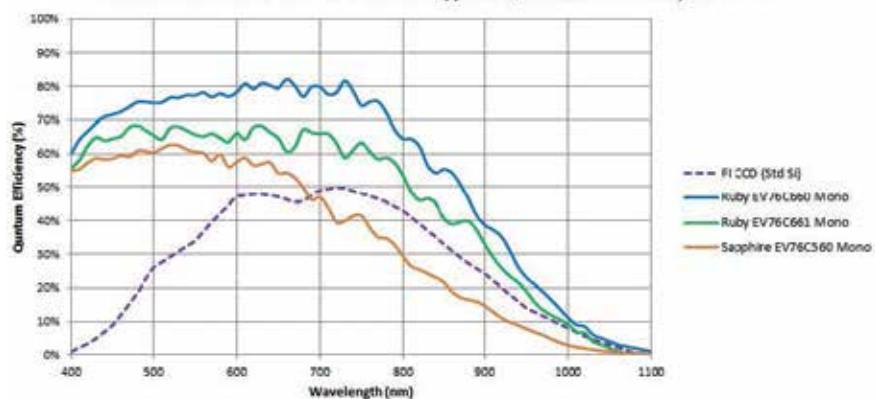
BACK-ILLUMINATED CCD AND EMCCD: TYPICAL QUANTUM EFFICIENCY AT -20°C



BACK-ILLUMINATED CCD AND EMCCD: TYPICAL QUANTUM EFFICIENCY AT -100°C



FRONT-ILLUMINATED CCD AND CMOS: TYPICAL QUANTUM EFFICIENCY AT +25°C



ASTRO UV = astronomy process, UV AR coating
ASTRO BB = astronomy process, broadband AR coating
BASIC MB = basic process, midband AR coating
ASTRO MULTI-2 = astronomy process, multi-2 AR coating (NIMO STANDARD = standard thickness silicon)
ASTRO MULTI-2 (NIMO DD = deep depletion silicon)
Other process and coating options available on request.

Contact us online at:

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