

Notes on Sony CCD and CMOS 2D imaging sensors

Information on Sony CCD sensors is often somewhat hard to find and we considered it useful to have most of their sensors listed in one place so that inter-comparisons would be relatively straightforward. The tables in this note were prepared from a variety of sources and are believed to be correct at the time of writing, November 2012.

Video rate, interlaced sensors are listed first. The list is restricted to devices designed for the European market, conforming to CCIR and PAL standards. This choice was made partially as we are located in the UK and partially to reduce searching time! This is followed by professional progressive scan CCD imagers and by CCD imagers intended for the consumer / camera / mobile phone market. A short selection of CMOS imaging systems is shown and finally a listing of CMOS (mostly colour) sensors completes the document.

It is noted that imaging sensor formats are expressed in the confusing and semi-standardized 'inch' system: this 'inch' measurement refers to approximately 1.5 times the diagonal length of the sensor. The reason for the adoption of this 'standard' is that early scanning electron beam imaging sensors (e.g. vidicons, orthicons etc.) operated in a vacuum; these typically used an image scanning area of 16 mm diagonal, the maximum possible in an 18 mm internal diameter glass tube, which had an outside diameter of 1" (25.4 mm). Therefore (!!!) a '1-inch' CCD has a diagonal of 16 mm and sensor dimensions of 12.8 x 9.6 mm. It is unfortunate, that this confusing nomenclature has persisted but it is a de-facto standard, applicable to both imaging chips and their associated video components.

It is noted that a given inch dimension of sensor can occupy different aspect ratios and thus different areas. All chips listed here provide a nominal 4:3 aspect ratio, but the higher resolution devices support 16:9 or similar formats through exclusion of several top/bottom rows pixels.

It is also noted that imager outputs (in mV) listed under the column 'sensitivity' are obtained with different illumination levels for monochrome and colour devices, and this should be taken into account when comparing monochrome and colour imagers.

Interlaced scan CCIR monochrome

Part number	Pixel size	Pixel number	Size	Total pixel number	Sensitivity (mV)	Readout frequency	Technology	Package
ICX423AL	11.6 x 11.2 µm	437664	½"	752 x 582	1000	14.1875 MHz	HAD	20 pin r. cerdip
ICX419ALB	8.6 x 8.3 µm	437664	½"	752 x 582	1,100	14.1875 MHz	HAD	16 pin cerdip
ICX419ALL	8.6 x 8.3 µm	437664	½"	752 x 582	1,100	14.1875 MHz	HAD	20 pin cerdip
ICX429ALB	8.6 x 8.3 µm	437664	½"	752 x 582	1,400	14.1875 MHz	EXview HAD CCD	16 pin r. cerdip
ICX429ALL	8.6 x 8.3 µm	437664	½"	752 x 582	1,400	14.1875 MHz	EXview HAD CCD	20 pin cerdip
ICX255AL	9.8 x 6.3 µm	291000	⅓"	500 x 582	1,600	9.4581 MHz	EXview HAD CCD	16 pin PDIP
ICX405AL	9.8 x 6.3 µm	291000	⅓"	500 x 582	1,350	9.4581 MHz	Super HAD CCD	16 pin PDIP
ICX259AL	6.50 x 6.25 µm	291000	⅓"	752 x 582	1,000	14.1875 MHz	EXview HAD CCD	16 pin PDIP
ICX409AL	6.50 x 6.25 µm	291000	⅓"	752 x 582	850	14.1875 MHz	Super HAD CCD	16 pin PDIP
ICX409ALB	6.50 x 6.25 µm	291000	⅓"	752 x 582	850	14.1875 MHz	Super HAD CCD	14 pin r. cerdip
ICX659ALA	6.50 x 6.25 µm	291000	⅓"	752 x 582	1,100	14.1875 MHz	EXview HAD CCD	16 pin PDIP
ICX207AL	7.3 x 4.7 µm	291000	¼"	500 x 582	880	9.4581 MHz	Super HAD CCD	14 pin PDIP
ICX227AL	7.3 x 4.7 µm	291000	¼"	500 x 582	880	9.4581 MHz	Super HAD CCD	14 pin PDIP
ICX229AL	4.85 x 4.65 µm	437664	¼"	752 x 582	440	14.1875 MHz	Super HAD CCD	14 pin PDIP
ICX279AL	4.85 x 4.65 µm	437664	¼"	752 x 582	800	14.1875 MHz	EXview HAD CCD	14 pin PDIP

Interlaced scan PAL colour

Part number	Pixel size	Pixel number	Size	Total pixel number	Sensitivity (mV)	Readout frequency	Technology	Package	Filter
ICX419AKB	8.6 x 8.3 µm	437664	½"	752 x 582	1300	14.1875 MHz	HAD	16 pin round	YCMG
ICX419AKL	8.6 x 8.3 µm	437664	½"	752 x 582	1300	14.1875 MHz	HAD	20 pin ceram	YCMG
ICX429AKL	8.6 x 8.3 µm	437664	½"	752 x 582	1600	14.1875 MHz	EXview HAD CCD	20 pin ceram	YCMG
ICX255AK	9.8 x 6.3 µm	291000	⅓"	500 x 582	2,000	9.4581 MHz	EXview HAD CCD	16 pin PDIP	YCMG
ICX405AK	9.8 x 6.3 µm	291000	⅓"	500 x 582	1,700	9.4581 MHz	Super HAD CCD	16 pin PDIP	YCMG
ICX633BKA	9.8 x 6.3 µm	291000	⅓"	500 x 582	3,800	9.4581 MHz	Super HAD CCD II	16 pin PDIP	YCMG
ICX259AK	6.5 x 6.25 µm	437664	⅓"	752 x 582	1,100	14.1875 MHz	EXview HAD CCD	16 pin PDIP	YCMG
ICX409AK	6.5 x 6.25 µm	437664	⅓"	752 x 582	950	14.1875 MHz	Super HAD CCD	16 pin PDIP	YCMG
ICX639BKA	6.5 x 6.25 µm	437664	⅓"	752 x 582	2,250	14.1875 MHz	Super HAD CCD II	16 pin PDIP	YCMG
ICX659AKA	6.5 x 6.25 µm	437664	⅓"	752 x 582	1,200	14.1875 MHz	EXview HAD CCD	16 pin PDIP	YCMG
ICX207AK	7.3 x 4.7 µm	291000	¼"	500 x 582	880	9.4581 MHz	Super HAD CCD	14 pin PDIP	YCMG
ICX207AKB	7.3 x 4.7 µm	291000	¼"	500 x 582	880	9.4581 MHz	Super HAD CCD	16 pin round	YCMG
ICX227AK	7.3 x 4.7 µm	291000	¼"	500 x 582	880	9.4581 MHz	Super HAD CCD	14 pin PDIP	YCMG
ICX227AZ	7.3 x 4.7 µm	291000	¼"	500 x 582	880	9.4581 MHz	Super HAD CCD	14 pin PDIP	YCMG
ICX643AKA	7.3 x 4.7 µm	291000	¼"	500 x 582	1,850	9.4581 MHz	Super HAD CCD II	14 pin PDIP	YCMG
ICX643BKA	7.3 x 4.7 µm	291000	¼"	500 x 582	1,850	9.4581 MHz	Super HAD CCD II	14 pin PDIP	YCMG
ICX229AK	4.85 x 4.65 µm	437664	¼"	752 x 582	440	14.1875 MHz	HAD	14 pin PDIP	YCMG
ICX229AZ	4.85 x 4.65 µm	437664	¼"	752 x 582	440	14.1875 MHz	HAD	14 pin PDIP	YCMG
ICX279AK	4.85 x 4.65 µm	437664	¼"	752 x 582	800	14.1875 MHz	EXview HAD CCD	14 pin PDIP	YCMG
ICX649AKA	4.85 x 4.65 µm	437664	¼"	752 x 582	1,050	14.1875 MHz		16 pin PDIP	YCMG
ICX649BKA	4.85 x 4.65 µm	437664	¼"	752 x 582	950	14.1875 MHz	Super HAD CCD II	14 pin PDIP	YCMG
ICX239AKE	3.275 x 3.15 µm	437664	1/6"	752 x 582	300	14.1875 MHz	--	12 pin SON	YCMG

Progressive scan monochrome

Part number	Pixel size	Pixel number	Size	Total pixel number	Sensitivity (mV)	Readout frequency	Technology	Package
ICX285AL	6.45 x 6.45 µm	1447680	½"	1,392 x 1,040	1300	28.64 MHz	EXview HAD CCD	20 pin cerDIP
ICX274AL	4.4 x 4.4 µm	2012208	1/1.8"	1,628 x 1,236	420	28.64 MHz	Super HAD CCD	20 pin PDIP
ICX414AL	9.9 x 9.9 µm	325546	½"	659 x 494	820	24.54 MHz	HAD	22 pin cerDIP
ICX415AL	8.3 x 8.3 µm	455124	½"	782 x 582	820	29.5 MHz	HAD	22 pin cerDIP
ICX205AL	4.65 x 4.65 µm	1447680	½"	1,392 x 1,040	450	14.318 MHz	HAD	20 pin cerDIP
ICX267AL	4.65 x 4.65 µm	1447680	½"	1,392 x 1,040	450	28.636 MHz	HAD	20 pin cerDIP
ICX424AL	7.4 x 7.4 µm	325546	½"	659 x 494	880	24.54 MHz	HAD	16 pin PDIP
ICX424ALB	7.4 x 7.4 µm	325546	½"	659 x 494	880	24.54 MHz	HAD	14 pin r. cerDIP
ICX204AL	4.65 x 4.65 µm	805486	½"	1,034 x 779	360	15-20 MHz	HAD	16 pin PDIP
ICX445ALA	3.75 x 3.75 µm	1251936	½"	1,296 x 966	380/1500	29-36 MHz	EXview HAD CCD	24 pin prec. PDIP
ICX098BL	5.6 x 5.6 µm	325546	½"	659 x 494	700	12.27 MHz	HAD	14 pin PDIP
ICX614ALA	5.6 x 5.6 µm	325546	½"	659 x 494	800	24.54 MHz	HAD	14 pin prec. PDIP
ICX0614ALA	5.6 x 5.6 µm	325546	½"	659 x 494	800	24.54 MHz	Super HAD CCD	--
ICX0618ALA	5.6 x 5.6 µm	325546	½"	659 x 494	1200/5500	24.54 MHz	EXview HAD CCD	14 pin prec. PDIP

Note: Sensitivity determined with 3200 K 706 Cd/m² illumination and f/8 lens and 1/30sec exposure

Progressive scan Colour

Part number	Pixel size	Pixel number	Size	Total pixel number	Sensitivity (mV)	Readout frequency	Technology	Package	Filter
ICX285AQ	6.45 x 6.45 µm	1447680	½"	1,392 x 1,040	1240	28.64 MHz	Wfine CCD, EXview HAD CCD	20 pin cerDIP	RGB
ICX274AQ	4.4 x 4.4 µm	2012208	1/1.8"	1,628 x 1,236	420	28.64 MHz	Wfine CCD, Super HAD CCD	20 pin PDIP	RGB
ICX414AQ	9.9 x 9.9 µm	325546	½"	659 x 494	840	24.54 MHz	Wfine CCD, HAD	22 pin cerDIP	RGB
ICX415AQ	8.3 x 8.3 µm	455124	½"	782 x 582	720	29.5 MHz	Wfine CCD, HAD	22 pin cerDIP	RGB
ICX205AK	4.65 x 4.65 µm	1447680	½"	1,392 x 1,040	400	14.318 MHz	Wfine CCD, HAD	20 pin cerDIP	RGB
ICX267AK	4.65 x 4.65 µm	1447680	½"	1,392 x 1,040	400	28.636 MHz	Wfine CCD, HAD	20 pin PDIP	RGB
ICX424AQ	7.4 x 7.4 µm	325546	½"	659 x 494	600	24.54 MHz	Wfine CCD	16 pin PDIP	RGB
ICX424AQB	7.4 x 7.4 µm	325546	½"	659 x 494	750	24.54 MHz	Wfine CCD	14 pin r. cerDIP	RGB
ICX204AK	4.65 x 4.65 µm	805486	½"	1,034 x 779	400	15-20 MHz	HAD	16 pin PDIP	RGB
ICX445AQA	3.75 x 3.75 µm	1251936	½"	1,296 x 966	380	36 MHz	Wfine CCD, EXview HAD CCD	24 pin PDIP	RGB
ICX445AKA	3.75 x 3.75 µm	1251936	½"	1,296 x 966	460	36 MHz	--	24 pin PDIP	YCMG
ICX693AQA	6 x 6 µm	500000	½"	868 x 626	1800	50 fps 36 MHz	Super HAD CCD II	16 pin PDIP	RGB
ICX692AQA	4.08 x 4.08 µm	1000000	½"	1348 x 746	800 mV	36 MHz	ExView HAD CCD II	16 pin PDIP	RGB
ICX692AKA	4.08 x 4.08 µm	1000000	½"	1348 x 746	1000 mV	36 MHz	ExView HAD CCD II	16 pin PDIP	YCMG
ICX098BQ	5.6 x 5.6 µm	325546	½"	659 x 494	580	12.27 MHz	Wfine CCD, HAD	14 pin PDIP	RGB
ICX0614AKA		325546	½"	659 x 494	1400		Super HAD CCD		YCMG
ICX0614AQA		325546	½"	659 x 494	750		Wfine CCD		RGB
ICX0618AKA		325546	½"	659 x 494	1400		EXview HAD CCD		YCMG
ICX0618AQA		325546	½"	659 x 494	750		Wfine CCD, EXview HAD CCD		RGB

Note: Sensitivity determined with 3200 K 706 Cd/m² illumination and f/5.6 lens and 1/30sec exposure

"Super HAD CCD" is a trademark of Sony Corporation. The Super HAD CCD is a version of Sony's high performance CCD HAD (Hole-Accumulation Diode) sensor with sharply improved sensitivity by the incorporation of a new semiconductor technology developed by Sony Corporation.

"EXview HAD CCD" is a trademark of Sony Corporation. EXview HAD CCD is a CCD that drastically improves light efficiency by including near infrared light region as a basic structure of HAD (Hole-Accumulation Diode) sensor.

"Wfine CCD" is a trademark of Sony Corporation and represents a CCD adopting progressive scan, primary colour filter, and square pixel.

Progressive scan consumer style monochrome CCDs

Part number	Pixel size	Package	Size	Resolution	Effective pixels	Chip area	Pixel number	Frame rate	Sensitivity
ICX274AL	4.4 µm x 4.4 µm	20 pin DIP	1/1.8"	1688 x 1248	1628 x 1236		2.11 M/2.01 M	20 fps@28.634 MHz	420 mV
ICX687ALA	3.69 µm x 3.69 µm	28 pin DIP	1/1.8"	2020 x 1476	1940 x 1460		2.98 M/2.83 M	20 fps@54 MHz	660 mV
ICX674ALG	4.54 µm x 4.54 µm	68 pin cer PGA	2/3"	2020 x 1476	1940 x 1460	--	2.98 M/2.83 M	20 fps@54 MHz	950 mV
ICX694ALG	4.54 µm x 4.54 µm	68 pin cer PGA	1"	2838 x 2224	2758 x 2208		6.31 M/6.09 M	20 fps@54 MHz	1000 mV

Note: Sensitivity determined with 3200 K 706 Cd/m² illumination and f/8 lens and 1/30sec exposure

Progressive scan consumer style complementary colour filter CCDs

Part number	Pixel size	Package	Size	Resolution	Effective pixels	Chip area	Pixel number	Frame rate	Sensitivity
ICX224AK	3.9 µm x 3.9 µm	20 pin DIP	½"	1668 x 1248	1636 x 1236	7.6 x 5.2 mm	2.11 M/2.02 M	7.5-30 fps@18 MHz	350 mV (Y)
ICX224AKF	3.9 µm x 3.9 µm	20 pin SOP	½"	1668 x 1248	1636 x 1236	7.6 x 5.2 mm	2.11M/2.02 M	7.5-30 fps@18 MHz	350 mV (Y)
ICX232AK	3.125 x 3.125 µm	16 pin DIP	1/3.6"	1343 x 972	1290 x 966	4.94 x 4.2 mm	1.3 M/1.25 M	7.5-30 fps@12.7 MHz	220 mV (Y)
ICX252AK	3.45 µm x 3.45 µm	20 pin DIP	1/1.8"	2140 x 1560	2088 x 1550	8.1 x 6.64 mm	3.34 M/3.24M	4.3-30 fps@18 MHz	320 mV (Y)
ICX252AKF	3.45 µm x 3.45 µm	20 pin SOP	1/1.8"	2140 x 1560	2088 x 1550	8.1 x 6.64 mm	3.34 M/3.24 M	4.3-30 fps@18 MHz	320 mV (Y)
ICX284AK	3.275 x 3.275 µm	16 pin DIP	1/2.7"	1668 x 1248	1636 x 1236	6.17 x 5.17 mm	2.11 M/2.02 M	7.5-30 fps@18 MHz	260 mV (Y)
ICX282AK	3.4 µm x 3.4 µm	24 pin DIP	2/3"	2658 x 1970	2588 x 1960	--	5.24 M/5.07 M	3.75-29.97@22.5 MHz	320 mV (Y)
ICX282AKF	3.4 µm x 3.4 µm	24 pin SOP	2/3"	2658 x 1970	2588 x 1960	--	5.24 M/5.07 M	3.75-29.97@22.5 MHz	320 mV (Y)

Note: Sensitivity determined with 3200 K 706 Cd/m² illumination and f/5.6 lens and 1/30 sec exposure

Progressive scan consumer style primary colour filter CCD

Part number	Pixel size	Package	Size	Resolution	Effective pixels	Chip area	Pixel number	Frame rate	Sensitivity
ICX232AQ	3.125 x 3.125 µm	16 pin DIP	1/3.6"	1343 x 972	1290 x 966	4.94 x 4.2 mm	1.3 M/1.25 M	7.5-30 fps@12.7 MHz	200 mV (G)
ICX688SQG	1.34 µm x 1.34 µm	42 pin cer QFN	1/2.93"	3729 x 2744	3684 x 2760		10.34 M/10.17 M	2.62 fps@38 MHz	704 levels
ICX284AQ	3.275 x 3.275 µm	16 pin DIP	1/2.7"	1668 x 1248	1636 x 1236	6.17 x 5.17 mm	2.11 M/2.02 M	7.5-30 fps@18 MHz	220 mV (G)
ICX454DQ	3.275 x 3.275 µm	16 pin DIP	1/2.7"	1690 x 1250	1648 x 1240	6.38 x 5.26 mm	2.11M/2.02 M	8.56 fps@22.5 MHz	330 mV (G)
ICX454DDQ	3.275 x 3.275 µm	16 pin SOP	1/2.7"	1690 x 1250	1648 x 1240	6.38 x 5.26 mm	2.11M/2.02 M	8.56 fps@22.5 MHz	330 mV (G)
ICX488DQ	2.35 µm x 2.35 µm	24 pin DIP	1/2.7"	2396 x 1766	2344 x 1752	--	4.23 M/4.11 M	4.28 fps@27 MHz	160 mV (G)
ICX488DQF	2.35 µm x 2.35 µm	24 pin SOP	1/2.7"	2396 x 1766	2344 x 1752	--	4.23 M/4.11 M	4.28 fps@27 MHz	160 mV (G)
ICX498BQA	2.5 µm x 2.5 µm	20 pin DIP	1/2.5"	2396 x 1766	2344 x 1752	--	4.23 M/4.11 M	4.28-30 fps@27MHz	210 mV (G)
ICX498BQF	2.5 µm x 2.5 µm	20 pin SOP	1/2.5"	2396 x 1766	2344 x 1752	--	4.23 M/4.11 M	4.28-30 fps@27MHz	210 mV (G)
ICX498NQV	2.5 µm x 2.5 µm	20 pin cer SON	1/2.5"	2396 x 1766	2344 x 1752	--	4.23 M/4.11 M	4.28-30 fps@27MHz	210 mV (G)
ICX495AQN	2.2 µm x 2.2 µm	28 pin SOP	1/2.5"	2668 x 1970	2616 x 1960	--	5.25 M/5.13 M	4.28 fps@27MHz	150 mV (G)
ICX624AQN	2.03 µm x 2.03 µm	28 pin SOP	1/2.5"	2892 x 2138	2840 x 2128	--	6.18 M/6.14 M	4.28 fps@33.75MHz	170 mV (G)
ICX624CQV	2.03 µm x 2.03 µm	28 pin cer SON	1/2.5"	2892 x 2138	2840 x 2128	--	6.18 M/6.14 M	4.28 fps@33.75MHz	170 mV (G)
ICX624CQZ	2.03 µm x 2.03 µm	27 pin cer QFN	1/2.5"	2892 x 2138	2840 x 2128	--	6.18 M/6.14 M	4.28 fps@33.75MHz	170 mV (G)
ICX629AQN	1.86 µm x 1.86 µm	28 pin SOP	1/2.5"	3164 x 2342	3112 x 2328	--	7.41 M/7.24 M	3.33 fps@33.75 MHz	170 mV (G)
ICX629CQV	1.86 µm x 1.86 µm	28 pin cer SON	1/2.5"	3164 x 2342	3112 x 2328	--	7.41 M/7.24 M	3.33 fps@33.75 MHz	170 mV (G)
ICX629CQZ	1.86 µm x 1.86 µm	27 pin cer QFN	1/2.5"	3164 x 2342	3112 x 2328	--	7.41 M/7.24 M	3.33 fps@33.75 MHz	170 mV (G)
ICX636EQZ	1.75 µm x 1.75 µm	34 pin cer QFN	1/2.5"	3336 x 2484	3298 x 2472	--	8.29 M/8.15 M	2.5 fps @ 36 MHz	165 mV (G)
ICX636EQP	1.75 µm x 1.75 µm	32 pin cer QFN	1/2.5"	3336 x 2484	3298 x 2472	--	8.29 M/8.15 M	2.5 fps @ 36 MHz	165 mV (G)
ICX646CQZ	1.75 µm x 1.75 µm	34 pin cer QFN	1/2.5"	3336 x 2484	3298 x 2472	--	8.29 M/8.15 M	2.5 fps @ 36 MHz	160 mV (G)
ICX646CQP	1.75 µm x 1.75 µm	32 pin cer QFN	1/2.5"	3336 x 2484	3298 x 2472	--	8.29 M/8.15 M	2.5 fps @ 36 MHz	160 mV (G)
ICX637CQZ	1.66 µm x 1.66 µm	34 pin cer QFN	1/2.5"	3537 x 2628	3492x2616	--	9.3 M/9.14M	2.38 fps@38 MHz	155 mV (G)
ICX667SQW	1.55 µm x 1.55 µm	38 pin cer QFN	1/2.3"	4077 x 3039	4032 x 3024	--	12.39 M/12.19 M	2.038 fps@38 MHz	180 mV (G)
ICX667SQP	1.55 µm x 1.55 µm	40 pin cer QFN	1/2.3"	4077 x 3039	4032 x 3024	--	12.39 M/12.19 M	2.038 fps@38 MHz	180 mV (G)
ICX677SQW	1.55 µm x 1.55 µm	38 pin cer QFN	1/2.3"	4077 x 3039	4032 x 3024	--	12.39 M/12.19 M	2.038 fps@38 MHz	180 mV (G)
ICX665SQW	1.68 µm x 1.68 µm	38 pin cer QFN	1/2.3"	3729 x 2774	3684x2760	--	10.34 M/10.17M	1.96 fps@38 MHz	160 mV (G)
ICX665SQP	1.68 µm x 1.68 µm	40 pin cer QFN	1/2.3"	3729 x 2774	3684x2760	--	10.34 M/10.17M	1.96 fps@38 MHz	160 mV (G)
ICX675CQW	1.68 µm x 1.68 µm	38 pin cer QFN	1/2.3"	3729 x 2774	3684x2760	--	10.34 M/10.17M	1.96 fps@38 MHz	160 mV (G)
ICX675CQP	1.68 µm x 1.68 µm	40 pin cer QFN	1/2.3"	3729 x 2774	3684x2760	--	10.34 M/10.17M	1.96 fps@38 MHz	160 mV (G)
ICX681SQW	1.43 µm x 1.43 µm	38 pin cer QFN	1/2.3"	4421 x 3282	4352 x 3264	--	14.48 M/14.2 M	1.616 fps@38 MHz	165 mV (G)
ICX682SQW	1.34 µm x 1.34 µm	38 pin cer QFN	1/2.3"	4700 x 3498	4640 x 3480	--	16.44 M/16.15 M	1.509 fps@40.5 MHz	160 mV (G)
ICX224AQ	3.9 µm x 3.9 µm	20 pin DIP	1/2"	1668 x 1248	1636 x 1236	7.6 x 5.2 mm	2.11M/2.02 M	7.5 fps@18 MHz	270 mV (G)
ICX224AQF	3.9 µm x 3.9 µm	20 pin SOP	1/2"	1668 x 1248	1636 x 1236	7.6 x 5.2 mm	2.11M/2.02 M	7.5 fps@18 MHz	270 mV (G)
ICX252AQ	3.45 µm x 3.45 µm	20 pin DIP	1/1.8"	2140 x 1560	2088 x 1550	8.1 x 6.64 mm	3.34 M/3.24M	4.3 fps@18 MHz	270 mV (G)
ICX252AQF	3.45 µm x 3.45 µm	20 pin SOP	1/1.8"	2140 x 1560	2088 x 1550	8.1 x 6.64 mm	3.34 M/3.24M	4.3 fps@18 MHz	270 mV (G)
ICX406AQ	3.125 x 3.125 µm	20 pin DIP	1/1.8"	2384 x 1734	2312 x 1720	--	4.13 M/3.98 M	3.33 fps@18 MHz	220 mV (G)
ICX406AQF	3.125 x 3.125 µm	20 pin SOP	1/1.8"	2384 x 1734	2312 x 1720	--	4.13 M/3.98 M	3.33 fps @ 18 MHz	220 mV (G)
ICX452AQ	2.275 x 2.275 µm	20 pin DIP	1/1.8"	2668 x 11970	2616 x 1960	8.23 x 6.68 mm	5.25 M/5.13 M	3.75 fps@24.3 MHz	235 mV (G)
ICX452AQF	2.275 x 2.275 µm	20 pin SOP	1/1.8"	2668 x 11970	2616 x 1960	8.23 x 6.68 mm	5.25 M/5.13 M	3.75 fps@24.3 MHz	235 mV (G)
ICX489AQF	2.35 µm x 2.35 µm	28 pin SOP	1/1.8"	3164 x 2342	3112 x 2328	--	7.41 M/7.24 M	3.33 fps@33.75 MHz	168 mV (G)
ICX476AQF	2.22 µm x 2.22 µm	28 pin SOP	1/1.8"	3340 x 2486	3288 x 2472	--	8.3 M/8.13 M	3.33 fps@36 MHz	170 mV (G)
ICX476CQV	2.22 µm x 2.22 µm	28 pin cer SON	1/1.8"	3340 x 2486	3288 x 2472	--	8.3 M/8.13 M	3.33 fps@36 MHz	170 mV (G)
ICX476CQZ	2.22 µm x 2.22 µm	32 pin cer SON	1/1.8"	3340 x 2486	3288 x 2472	--	8.3 M/8.13 M	3.33 fps@36 MHz	170 mV (G)
ICX687AQA	3.69 µm x 3.69 µm	28 pin DIP	1/1.8"	2020 x 1476	1940 x 1460	--	2.98 M/2.83 M	20 fps@54 MHz	580 mV (G)
ICX274AQ	4.4 µm x 4.4 µm	20 pin DIP	1/1.8"	1688 x 1248	1628 x 1236	--	2.11 M/2.01 M	20 fps@28.634 MHz	420 mV (G)
ICX612CQZ	1.85 µm x 1.85 µm	40 pin cer QFN	1/1.7"	4078 x 3038	4032 x 3024	--	12.39 M/12.19 M	2.34 fps@38 MHz	180 mV (G)
ICX652CQZ	1.75 µm x 1.75 µm	40 pin cer QFN	1/1.7"	4328 x 3218	4272 x 3204	--	13.93 M/ 13.69 M	1.7 fps@38 MHz	160 mV (G)
ICX685CQZ	2.03 µm x 2.03 µm	50 pin cer QFN	1/1.7"	3744 x 2778	3684 x 2760	--	10.4 M/10.17 M	2.052 fps@38 MHz	330 mV (G)
ICX282AQ	3.4 µm x 3.4 µm	24 pin DIP	2/3"	2658 x 1970	2588 x 1960	--	5.24 M/5.07 M	3.75 fps@22.5 MHz	270 mV (G)
ICX282AQF	3.4 µm x 3.4 µm	24 pin SOP	2/3"	2658 x 1970	2588 x 1960	--	5.24 M/5.07 M	3.75 fps@22.5 MHz	220 mV (G)
ICX456AQ	2.7 µm x 2.7 µm	28 pin DIP	2/3"	3350 x 2482	3288 x 2472	--	8.31 M/8.13 M	3.33 fps@33.75 MHz	200 mV (G)
ICX456AQF	2.7 µm x 2.7 µm	28 pin SOP	2/3"	3350 x 2482	3288 x 2472	--	8.31 M/8.13 M	3.33 fps@33.75 MHz	200 mV (G)
ICX674AQQ	4.54 µm x 4.54 µm	68 pin cer PGA	2/3"	2020 x 1476	1940 x 1460	--	2.98 M/2.83 M	20 fps@54 MHz	850 mV (G)
ICX689AQQ	4.54 µm x 4.54 µm	68 pin cer PGA	1"	2838 x 2224	2758 x 2208	--	6.31 M/6.09 M	20 fps@54 MHz	880 mV (G)
ICX413AQ	7.8 µm x 7.8 µm	34 pin DIP	1.8"	3110 x 2030	3040 x 2024	--	6.31 M/6.15 M	3.08 fps@25 MHz	1060 mV (G)

Note: Sensitivity determined with 3200 K 706 Cd/m² illumination and f/5.6 lens and 1/30sec exposure

CMOS imaging systems

Part number	Pixel size	Package	Size	Resolution	Effective pixels	PGA	Pixel number	Chip size	Frame rate	Sensitivity
ISX005	1.4 µm x 1.4 µm?	--	1/5"	2064 x 1544	2048 x 1536	AE/AF/AWB	5.11 M x 5.04 M	--	108 MHz	JPG/YCbCr
ISX006	1.4 µm x 1.4 µm?	--	1/4"	2608 x 1960	2592 x 1944	AE/AF/AWB		--	108 MHz	JPG/YCbCr

CMOS sensors

Part number	Pixel size	Package	Size	Resolution	Effective pixels	PGA	Pixel number	Chip size	Frame rate	Sensitivity
IMX021	5.49 µm x 5.49 µm	--	1.8"	4428 x 2948	4320 x 2888	24 dB	13.05 M/12.47 M	--	10.39 fps@54 MHz	500 mV (G)
IMX144CQJ	1.85 µm x 1.85 µm	--	1/1.7"	4168 x 3062	4072 x 3046	27 dB	35 fps/72.4 M	--	@72 MHz	1202 levels (G)
IMX017CQE	2.5 µm x 2.5 µm	--	1/1.8"	2984 x 2212	2928 x 2184	--	6.6 M / 6.39 M	--	15 fps(12 bit)@54 MHz	4200e ⁻ (G)
IMX118CQT	1.26 µm x 1.26 µm	--	1/2.3"	5064 x 3734	4968 x 3718	24 dB	18.91 M/18.47 M	--	24 fps@72 MHz	1054 levels (G)
IMX074PQ	1.4 µm x 1.4 µm	--	1/2.45"	4216 x 3160	4216 x 3128	18 dB(A) / 24 dB(D)	13.32 M/13.19 M	--	15 fps	--
IMX043	1.75 µm x 1.75 µm	--	1/2.5"	3320 x 2500	3228 x 2468	4.17 dB	8.4 M/8.12 M	--	10bit LVDS ser.	90 mV (G)
IMX060PQ	1.4 µm x 1.4 µm	--	1/2.5"	4088 x 3064	4040 x 3032	18 dB(A) / 24 dB(D)	12.53 M/12.25 M	7.60 x 5.80	10 fps	90 mV
IMX078CQK	1.55 µm x 1.55 µm	--	1/2.3"	4168 x 3060	4072 x 3044	24 dB	12.75 M/12.4 M	--	20 fps@72 MHz	1437 levels (G)
IMX032CQR	1.75 µm x 1.75 µm	--	1/2.3"	3632 x 2832	3528 x 2632	+18 dB	10.2 M/9.29 M	--	---	1140 =2300 e ⁻
IMX050CQK	1.65 µm x 1.65 µm	--	1/2.3"	3816 x 2784	3720 x 2780	18 dB(A) / 24 dB(D)	10.62 M/10.34 M	12.8 x 11.6	19.98 fps@60/72 MHz	1262 levels
IMX018	2.5 µm x 2.5 µm	--	1/2.8"	2072 x 1568	2072 x 1552	23.7 dB max	3.25 M/3.22 M	7.093 x 6.844	10 fps@42 MHz	127 mV (G)
IMX020	2.0 µm x 2.0 µm	--	1/2.8"	2664 x 1992	2616 x 1968	30 dB	5.31 M x 5.15	--	15 fps@24 MHz	57 mV (G)
IMX036LQR	2.5 µm x 2.5 µm	152 pin LGA	1/2.8"	2144 x 1588	2096 x 1561	--	3.4 M/3.27 M	--	60 fps@54 MHz, 216 Mb/s	200 mV
IMX036LLR	2.5 µm x 2.5 µm	--	1/2.8"	2144 x 1588	2096 x 1561	--	3.4 M/3.27 M	--	60 fps@54 MHz, 216 Mb/s	200 mV
IMX136LQJ	2.8 µm x 2.8 µm	94 pin LGA	1/2.8"	--	1944 x 1224	--	2.38 M	--	54 fps@74.25 MHz	425 mV
IMX122LQJ	2.8 µm x 2.8 µm	96 pin LGA	1/2.8"	2000 x 1241	1984 x 1225	--	2.48 M /2.43M	--	20 fps@54 MHz	425 mV
IMX136LQJ	2.8 µm x 2.8 µm	94 pin LGA	1/2.8"	--	1924 x 1244	--	2.43 M/2.38 M	--	54 fps@74.25 MHz	425 mV
IMX136LLJ	2.8 µm x 2.8 µm	94 pin LGA	1/2.8"	--	1924 x 1244	--	2.43 M/2.38 M	--	54 fps@74.25 MHz	612 mV
IMX081PQ	1.12 µm x 1.12 µm	--	1/2.8"	4672x 3552	4656 x 3496	41.7 dB	16.59 M/16.28 M	--	60 fps@60 MHz	--
IMX140LQJ	2.8 µm x 2.8 µm	94 pin LGA	1/2.8"	--	1944 x 1224	--	--/2.38 M	--	60 fps@74.25 MHz	425 mV
IMX104LQJ	3.75 µm x 3.75 µm	96 pin LGA	1/3"	--	1305 x 1049	--	1.37 M	7.8 x 7.5	30/60 fps@27/54 MHz	960 mV
IMX011FQ	2.925 µm x 2.925 µm	--	1/3"	1664 x 1281	1656 x 1249	23.7 dB max	2.13 M/ 2.07 M	--	15 fps@39 MHz	230 mV (G)
IMX139LQJ	3.75 µm x 3.75 µm	94 pin LGA	1/3"	--	1305 x 1049	--	--/1.37 M	--	120 fps@74.25 MHz	960 mV
IMX035LQR	3.63 µm x 3.63 µm	152 pin LGA	1/3"	1384 x 1076	1329 x 1049	--	1.49 M/1.39 M	--	---	460 mV
IMX035CQ	3.63 µm x 3.63 µm	152 pin LGA	1/3"	1384 x 1076	1329 x 1049	---	1.49 M/1.39 M	--	---	460 mV
ICX445AQ	3.75 µm x 3.75 µm	24 pin DIP	1/3"	1348 x 976	1295 x 966	---	1.32 M/ 1.25 M	--	Interlaced	460 mV
IMX091PQ	1.12 µm x 1.12 µm	--	1/3.06"	4224 x 3176	4208 x 3120	41.7 dB	13.24 M/13.13 M	--	60 fps@60 MHz	--
IMX073PQ	1.4 µm x 1.4 µm	--	1/3.2"	3320 x 2500	3288 x 2468	18 dB(A) / 24 dB(D)	8.3 M/8.12 M	--	15 fps	--
IMX046PQ	1.4 µm x 1.4 µm	--	1/3.2"	3320 x 2500	3288 x 2468	18 dB(A) / 24 dB(D)	8.3 M/8.11 M	6.50 x 5.10	15 fps	90 mV
IMX006FQ	3.45 µm x 3.45 µm	--	1/3.2"	1304 x 1017	1296 x 960	35.7 dB max	1.33 M /1.28M	--	15 fps@24 MHz	370 mV (G)
IMX011CQ	2.925 µm x 2.925µm	--	1/3.2"	1664 x 1281	1656 x 1249	23.7 dB max	2.13 M/ 2.17 M	7.7 x 7.5	15 fps@39 MHz	230 mV (G)
IMX034	1.75 µm x 1.75 µm	--	1/3.2"	2664 x 2000	2616 x 1968	4.17 dB	5.33 M/5.15 M	--	10bit LVDS ser.	90 mV (G)
IMX019	2.5 µm x 2.5 µm	--	1/3.5"	1656 x 1268	1656 x 1249	23.7 dB max	2.1 M/ 2.07 M	6.053 x 6.392	15 fps@39 MHz	127 mV (G)
IMX012CQ	2.925 µm x 2.925µm	44 pin QFN	1/3.8"	1304 x 1017	1296 x 960	23.7 dB max	1.33 M /1.28M	--	15 fps@24 MHz	290 mV (G)
IMX058	1.75 µm x 1.75 µm	--	1/4"	2120 x 1584	2072 x 1552	4.17 dB	3.36 M/3.22 M	--	10bit par.	90 mV (G)
IMX072PQ	1.4 µm x 1.4 µm	--	1/4"	2664 x 2000	2616 x 1968	18 dB(A) / 24 dB(D)	5.33 M/5.15 M	--	22.5 fps	--
IMX137LQK	2.8 µm x 2.8 µm	74 pin LGA	1/4"	--	1368 x 1049	--	--/1.43 M	--	60 fps@54 MHz	425 mV
IMX111PQ	1.12 µm x 1.12 µm	--	1/4"	3296 x 2512	3280 x 2464	41.7 dB	8.28 M/8.08 M	--	60 fps@60 MHz	--
IMX076CQZ	2.8 µm x 2.8 µm	50 pin cer LCC	1/4"	1392 x 1076	1368 x 1049	--	1.5 M /1.43 M	--	60/30 fps 54 MHz / 27 MHz	425 mV
IMX045PQ	1.4 µm x 1.4 µm	--	1/4"	2664 x 2000	2616 x 1968	18 dB(A) / 24 dB(D)	5.33M/5.15 M	5.85 x 4.30	22.5 fps	90 mV
IMX076LQZ	2.8 µm x 2.8 µm	50 pin LCC	1/4"	1392 x 1076	1368 x 1049	--	1.5 M /1.43 M	--	60/30 fps 54 MHz / 27 MHz	425 mV
IMX029	1.75 µm x 1.75 µm	--	1/4"	2120 x 1584	2072 x 1592	4.17 dB	3.36 M/3.22 M	--	10bit LVDS ser.	90 mV (G)
IMX136LLJ	2.8 µm x 2.8 µm	--	1/2.8"	--	1944 x 1224	! Monochrome !	2.38 M	--	54 fps@74.25 MHz	425 mV

- Notes:** (a) IMX136LLJ is monochrome
(b) Sensitivity determined with 3200 K 706 Cd/m² illumination and f/5.6 lens and 1/30sec exposure

Note that sensitivity is determined in a different fashion for colour and monochrome sensors. The difference is the f-stop associated with bringing light into the camera. For the same 'mV' level, colour cameras are 50% less sensitive, as f/5.6 is used to define colour sensors and f/8 is used to define monochrome sensors

This note was prepared in December 2012 by B. Vojnovic, with help from D Volpi. Please note that information presented here is not guaranteed to be correct, although every effort has been made to ensure accuracy of compiling information from numerous sources. If you do find errors, please let me know at boris.vojnovic@oncology.ox.ac.uk.

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