

# STANDARD CMOS IMAGE SENSORS GUIDE



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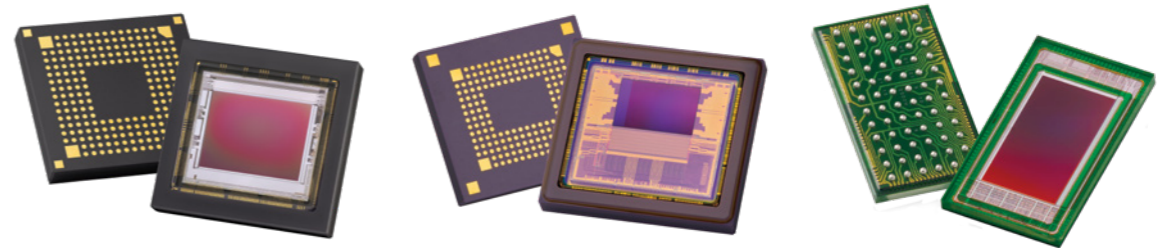
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## INDUSTRY LEADING CMOS IMAGE SENSORS

The vision market is constantly looking for highly specialised, cost effective solutions where performance is not compromised. Teledyne e2v has over 40 years of heritage in imaging, with a background in the design and manufacture of CCD and CMOS image sensors.

Teledyne e2v's CMOS image sensors deliver high performance across many applications including machine vision and automation, medical and life sciences, logistics and robotics and the environment, food and recycling. Capabilities include ultra-high speed and ultra-low noise and our unique approach involves listening to the market and application challenges of customers and partnering with them to provide innovative standard, semi-custom or fully custom imaging solutions.



# STANDARD CMOS IMAGE SENSORS GUIDE Custom products also available

	Resolution (pixels)	Format (H x V)	Pixel Pitch (µm)	Optical Format	Shutter Type
<b>EMERALD GEN2 FAMILY</b>					
Emerald Gen2 8.9M - standard speed	8.9M	4,096 x 2,160	2.8	2/3'	Global
Emerald Gen2 8.9M - high speed	8.9M	4,096 x 2,160	2.8	2/3'	Global
Emerald Gen2 12M - standard speed	12M	4,096 x 3,072	2.8	1'	Global
Emerald Gen2 12M - high speed	12M	4,096 x 3,072	2.8	1'	Global
<b>EMERALD FAMILY</b>					
Emerald 5M - CLGA	5M	2,560 x 1,936	2.8	1/1.8'	Global
Emerald 8.9 - high speed	8.9M	4,096 x 2,160	2.8	2/3'	Global
Emerald 8.9 - standard speed	8.9M	4,096 x 2,160	2.8	2/3'	Global
Emerald 10M - high speed	10M	4,096 x 2,460	2.8	1'	Global
Emerald 10M - standard speed	10M	4,096 x 2,460	2.8	1'	Global
Emerald 36M - high speed	37.7M	6,144 x 6,144	2.5	4/3'	Global
Emerald 36M - ultra-high speed	37.7M	6,144 x 6,144	2.5	4/3'	Global
Emerald 67M - high speed	67M	8,192 x 8,192	2.5	APS-C	Global
Emerald 67M - ultra-high speed	67M	8,192 x 8,192	2.5	APS-C	Global
<b>FLASH FAMILY</b>					
Flash 2K	2M	2,048 x 1,080	6	C-Mount	Global
Flash 4K	4M	4,096 x 1,080	6	APS-C	Global
<b>LINCE FAMILY</b>					
Lince 1M3	1.3M	1,280 x 1,024	10	1'	Global
Lince5M - high speed	5.2M	2,560 x 2,048	5	1'	Global
Lince5M - standard speed	5.2M	2,560 x 2,048	5	1'	Global
Lince6M5	6.5M	2,560 x 2,560	5	1'	Global + Rolling
Lince11M	11M	4,480 x 2,496	6	31 mm	Global
<b>RUBY FAMILY</b>					
Ruby 1.3M - rolling shutter	1.3M	1,280 x 1,024	5.3	1/1.8'	Rolling
Ruby 1.3M - global shutter	1.3M	1,280 x 1,024	5.3	1/1.8'	Global
<b>SAPPHIRE FAMILY</b>					
Sapphire 1.3M	1.3M	1,280 x 1,024	5.3	1/1.8'	Global + Rolling
Sapphire 2M	2M	1,600 x 1,200	4.5	1/1.8'	Global + Rolling

Output Format	Frame Rate (at 10 bits)	Dynamic Range (dB)	Package Type	Package Size (MM - H x V)	Color Filter Option	NIR Enhanced
MIPI CSI-2 & LVDS	65	67.5	CLGA	21 x 20	Mono, Bayer	No
MIPI CSI-2 & LVDS	100	67.5	CLGA	21 x 20	Mono, Bayer	No
MIPI CSI-2 & LVDS	33	67.5	CLGA	21 x 20	Mono, Bayer	No
MIPI CSI-2 & LVDS	70	67.5	CLGA	21 x 20	Mono, Bayer	No
MIPI CSI-2 8b to 12b	54	66	CLGA112	15 x 16	Mono, Bayer	No
LVDS from 8b to 12b	91	67.5	CLGA224	20 x 21	Mono, Bayer	No
LVDS from 8b to 12b	47	67.5	CLGA224	20 x 21	Mono, Bayer	No
LVDS from 8b to 12b	80	67.5	CLGA224	20 x 21	Mono, Bayer	No
LVDS from 8b to 12b	42	67.5	CLGA224	20 x 21	Mono, Bayer	No
LVDS from 8b to 12b	43	67	µPGA	37 x 42	Mono, Bayer	No
LVDS from 8b to 12b	87	67	µPGA	37 x 42	Mono, Bayer	No
LVDS from 8b to 12b	32	67	µPGA	37 x 42	Mono, Bayer	No
LVDS from 8b to 12b	65	67	µPGA	37 x 42	Mono, Bayer	No
LVDS 8b and 10b	1500 (at 8 bits)	>50 Up to 100 HDR	µPGA 228	27 x 27	Mono	No
LVDS 8b and 10b	1800 (at 8 bits)	>50 Up to 100 HDR	µPGA 380	49 x 37	Mono	No
LVDS from 8b to 12b	980 @ 12 bit	58	µPGA181	28 x 28	Mono	No
LVDS from 8b to 12b	250 @ 12 bit	58	µPGA181	28 x 28	Mono, Bayer	Optional
LVDS from 8b to 12b	69 @ 12 bit 105 @ 8 bit	58	CLCC84	23 x 23	Mono, Bayer	No
LVDS from 8b to 12b	170 @ 12 bit	58 Global 62 Rolling	µPGA179	28.7 x 28.7	Mono, Bayer	No
LVDS 10b	609	61.3	µPGA415	50 x 46	Mono	No
Parallel 8 to 10 bit	60 (>100 at VGA)	>65	CLCC48	12.7 x 12.7	Mono, Bayer	Yes
Parallel 8 to 10 bit	60 (>100 at VGA)	>63	CLCC48	12.7 x 12.7	Mono, Bayer	Yes
Parallel 8 to 10 bit	60	>62	CLCC48	12.7 x 12.7	Mono, Bayer	No
Parallel 8 to 10 bit	50 to 60	66	CLCC48	12.7 x 12.7	Mono, Bayer	No

Non-exhaustive list, limited to standard version of Teledyne e2v sensors. Other sensors are potentially available under restricted conditions.

Note: Whilst Teledyne 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.

Teledyne 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 the information contained herein. Not all combinations of variants are available for a single device. Users are advised to contact Teledyne e2v to confirm if their particular requirements are available with a standard device before designing their system.

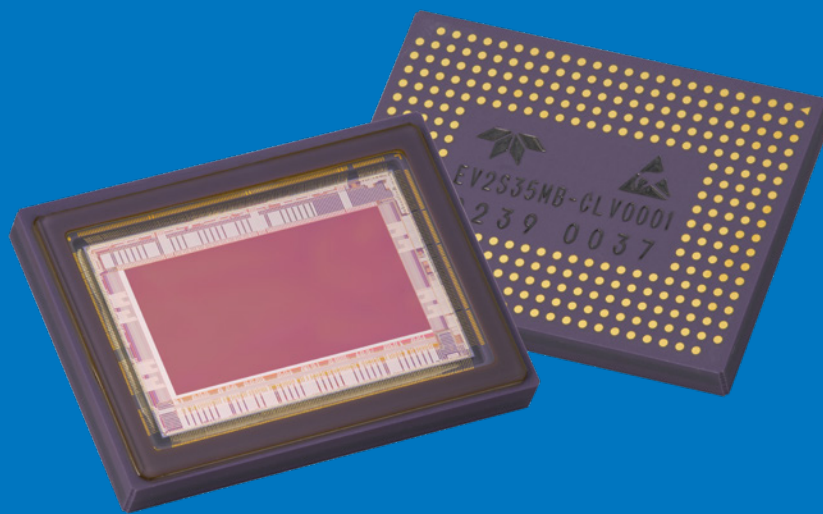
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	Resolution (pixels)	Format (H x V)	Pixel Pitch (µm)	Optical Format	Shutter Type
<b>SNAPPY WIDE FAMILY</b>					
Snappy Wide 16M	16M	8,192 x 2,000	2.5	21.1 mm	Global
Snappy Wide 28M	28M	8,192 x 3,500	2.5	22.3 mm	Global
Snappy Wide 35M	35M	8,192 x 4,320	2.5	23.2 mm	Global
<b>SNAPPY FAMILY</b>					
Snappy 5M - CLGA	5M	2,560 x 1,936	2.8	1/1.8'	Global
<b>TETRA FAMILY</b>					
Tetra 2k multispectral	2k	2,048 x 4	14	28.672 mm	Synchronized
Tetra 2k color & mono	2k	2,048x4	14	28.672 mm	Synchronized
Tetra 2k mono	2k	2,048 x 4	14	28.672 mm	Synchronized
Tetra 4k multispectral	4k	4,096 x 4	7	28.672 mm	Synchronized
Tetra 4k color & mono	4k	4,096 x 4	7	28.672 mm	Synchronized
Tetra 4k mono	4k	4,096 x 4	7	28.672 mm	Synchronized
<b>TIME-OF-FLIGHT SENSORS</b>					
Hydra3D+	0.5M	832 x 600	10	2/3'	Gated global
<b>TOPAZ FAMILY</b>					
Topaz 1.5M	1.5M	1,920 x 800	2.5	1/3.2"	Global
Topaz 2M	2M	1,920 x 1,080	2.5	1/3.2"	Global
Topaz5D (2D image + 3D depth map)	2M	1,920 x 1,080	2.5	1/3.2"	Global
<b>OTHER SENSORS</b>					
ELITE4k2k	4k/2k	2,048 x 8	7.5	15.36 mm	Global + Rolling
		4,096 x 8	5.78 x 3.75		
Jade 0.5M	0.5M	860 x 640	5.8	1/2.9'	Global
LS4K	4k/2k	2,048 x 1	14	28.672 mm	Rolling
		4,096 x 1	7		
OnyxMax	1.3M	1,280 x 1,024	10	1'	Global + Rolling + Range Gating

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Output Format	Frame Rate (at 10 bits)	Dynamic Range (dB)	Package Type	Package Size (MM - H x V)	Color Filter Option	NIR Enhanced
LVDS	>130	66	CLGA 326 pins	33 x 24.5	Mono, Bayer	No
LVDS	>75	66	CLGA 326 pins	33 x 24.5	Mono, Bayer	No
LVDS	>65	66	CLGA 326 pins	33 x 24.5	Mono, Bayer	No
MIPI CSI-2 8b to 12b	54	67.9	CLGA112	15 x 16	Mono, Bayer	No
LVDS 12 bit	25 kHz x 4	71	LCC	37.6 x 8.3 x 3.3	RGB & NIR	No
LVDS 12 bit	25 kHz x 4	71	LCC	37.6 x 8.3 x 3.3	RGB & Mono	No
LVDS 12 bit	100 kHz	71	LCC	37.6 x 8.3 x 3.3	Mono	No
LVDS 12 bit	128 kHz	71	Ceramic LCC	37.4 x 9.1 x 3.2	RGB & NIR	No
LVDS 12 bit	128 kHz	71	Ceramic LCC	37.4 x 9.1 x 3.2	RGB & Mono	No
LVDS 12 bit	128 kHz	71	Ceramic LCC	37.4 x 9.1 x 3.2	Mono	No
LVDS 12b	416 (12bits)	64	CLGA	24 x 22	Mono	Yes
MIPI CSI-2	130 @ 8 bits, 85 @ 10 bits	64	CSP	7.65 x 4.45 mm	Mono, Bayer	No
MIPI CSI-2	100 @ 8 bits, 65 @ 10 bits	64	CSP	7.65 x 4.45 mm	Mono, Bayer	No
MIPI CSI-2	65	60.5	CSP	7.65 x 4.45 mm	Mono, Bayer	No
LVDS 12b	200klps 100klps	54 Global 68 Rolling	Chip on Board 60	39 x 33	Mono, True RGB & Bayer	No
Parallel 8 bit	>52 linear >100 line/log	>40	CLCC48	10 x 10	Mono, Bayer, Sparse	No
LVDS 12b	18 klps to 80 klps	65	Dual in-line 40	44 x 15.5	Mono	No
LVDS from 8b to 14b	120	75	PGA 67	25 x 25	Mono	Yes



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