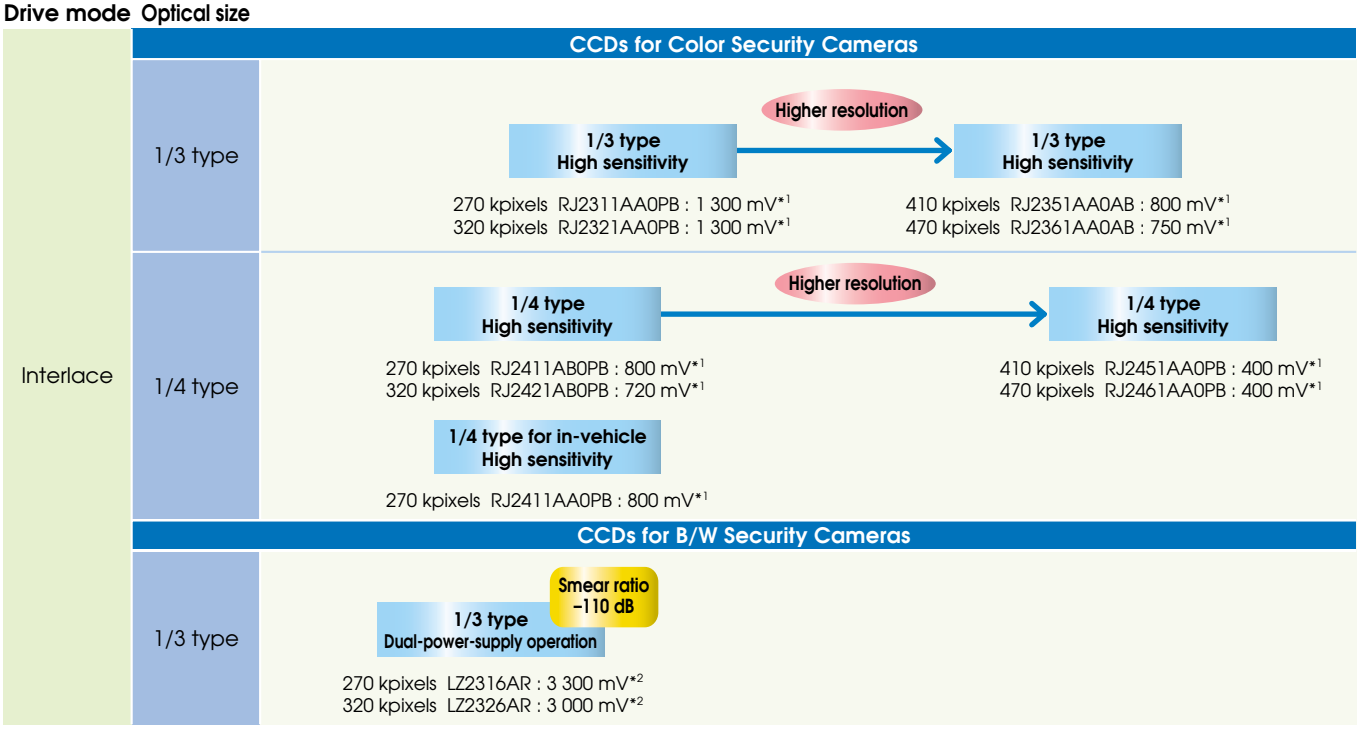
CCDs for Security Cameras

★ Under development

Road Map

Drive mode Optical size

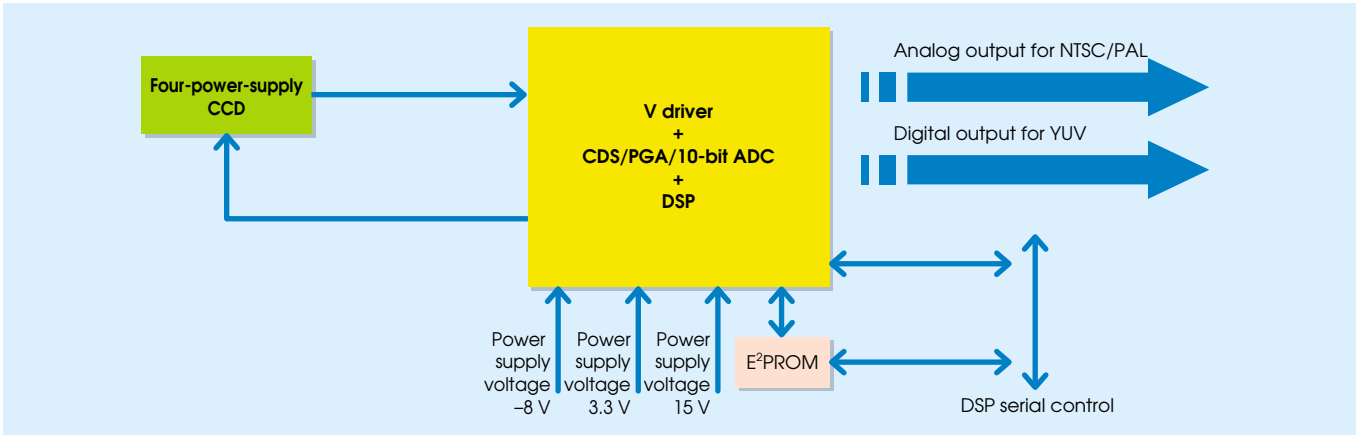


*1 Sensitivity *2 Sensitivity when IR cut-off filter is not used.

Color Security Camera System with Two-chip Configuration

Selling Points

- Analog output (NTSC/PAL) capability.
- Two-chip configuration helps reduce mounting surface area.
- Small optical size contributes to size reduction of camera products.



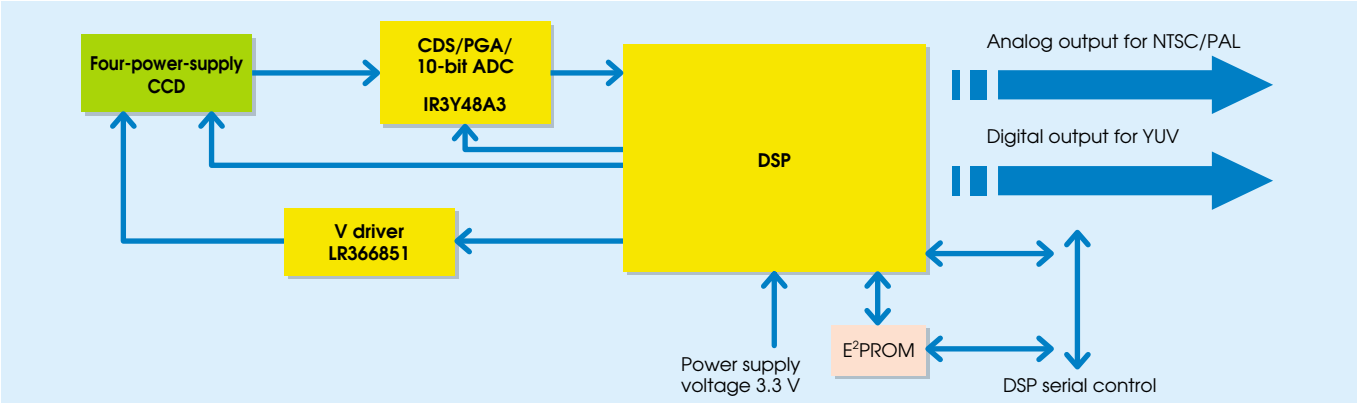
Four-power-supply CCDs and peripheral LSIs

CCD			V driver + CDS/PGA/ADC + DSP
1/3 type	270 kpixels	RJ2311AA0PB	LR386431/★LR38645
	320 kpixels	RJ2321AA0PB	
	410 kpixels	RJ2351AA0AB	
	470 kpixels	RJ2361AA0AB	
1/4 type	270 kpixels	RJ2411AA0PB	
		RJ2411AB0PB	
	320 kpixels	RJ2421AB0PB	
	410 kpixels	RJ2451AA0PB	
	470 kpixels	RJ2461AA0PB	

Color Security Camera System with Four-chip Configuration

Selling Points

- Analog output (NTSC/PAL) capability.
- Camera system with four-chip configuration.
- Small optical size contributes to size reduction of camera products.



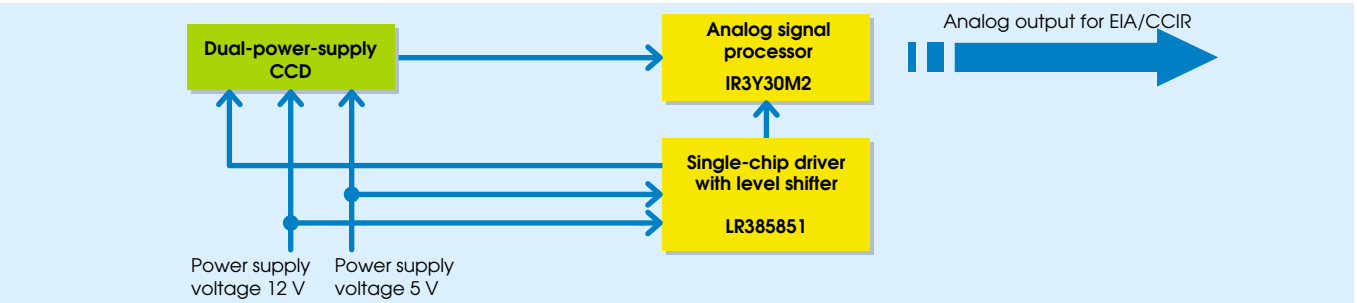
Four-power-supply CCDs and peripheral IC/LSIs

CCD			V driver	CDS/PGA/ADC	DSP
1/3 type	270 kpixels	RJ2311AA0PB	LR366851	IR3Y48A3	LR386032/★LR38607
	320 kpixels	RJ2321AA0PB			
	410 kpixels	RJ2351AA0AB			
	470 kpixels	RJ2361AA0AB			
1/4 type	270 kpixels	RJ2411AB0PB			
	320 kpixels	RJ2421AB0PB			
	410 kpixels	RJ2451AA0PB			
	470 kpixels	RJ2461AA0PB			

B/W Security Camera System

Selling Points

- Analog output (EIA/CCIR) capability.
- Camera system with three-chip configuration.
- High-sensitivity dual-power-supply CCDs make possible size reduction, lower cost and lower power consumption.



Dual-power-supply CCDs and peripheral IC/LSI for analog interface

CCD			Single-chip driver (Timing generator + Synchronous signal generator)	Signal processor
1/3 type	270 kpixels	LZ2316AR	LR385851	IR3Y30M2
	320 kpixels	LZ2326AR		

Features

LR386032

- Signal processor for 270 k/320 k/410 k/470 k-pixel CCDs
- Built-in 9-bit DAC
- Built-in synchronous signal generation circuit
- Built-in CCD drive timing generator
- Built-in processing circuit for AWB/AE control
- Built-in 2-Kbit E^2PROM drive circuit
- Mirror image function
- Digital output for YUV
- Analog output for NTSC/PAL
- Supports monitoring output of IR3Y48A3
- Package : 80 LQFP (pin pitch : 0.5 mm)

CCDs and Peripheral ICs/LSIs

★ Under development

CCDs

■ Higher-resolution CCDs

Optical size	Total pixels	Color filter	Model No.	30 fps VGA movie	Resolution Image pixels (H x V)	Pixel size H x V (μm²)	Sensitivity (mV) TYP.	Smear ratio (dB) TYP.	Package
1/1.8 type	5 180 000	Primary color mosaic filers	RJ21S3AA0PT	–	2 592 x 1 944	2.8 x 2.8	155	–90	P-DIP020-0500
	6 360 000		RJ21T3AA0PT		2 872 x 2 160	2.5 x 2.5	105	–88	
	8 500 000		★RJ21V3BA0ET	○	3 320 x 2 496	2.2 x 2.2	90		P-SOP032-0525
			★RJ21V3CA0ET	–					
1/2.5 type	4 180 000	Primary color mosaic filers	★RJ23R3EA0ET	○	2 332 x 1 740	2.5 x 2.5	105	–88	P-SOP028-0400
	4 190 000		RJ23R3BA0ET						
			RJ23R3CA0ET	–					
	5 190 000		RJ23S3BA0ET	○	2 600 x 1 944	2.2 x 2.2	90		
			RJ23S3CA0ET	–					
1/3.2 type	3 370 000	Primary color mosaic filers	RJ24P3BA0ET	○	2 096 x 1 560	2.2 x 2.2	90	–88	P-SOP028-0400
			RJ24P3CA0ET	–					

■ 1/3-type CCDs

Total pixels	Standard		Model No.	Electronic shutter (s)	Resolution Horizontal TV lines	Resolution Image pixels (H x V)	Pixel size H x V (μm²)	Sensitivity (mV) TYP.	Smear ratio (dB) TYP.	Package
270 000	Color	NTSC	RJ2311AA0PB	1/60 to 1/10 000	330	512 x 492	9.6 x 7.5	1 300	–120	P-DIP016-0500C
320 000		PAL	RJ2321AA0PB	1/50 to 1/10 000		512 x 582	9.6 x 6.3			
410 000		NTSC	RJ2351AA0AB	1/60 to 1/10 000	480	768 x 494	6.4 x 7.5	800	–105	N-DIP016-0450
470 000		PAL	RJ2361AA0AB	1/50 to 1/10 000		752 x 582	6.5 x 6.3	750		

■ 1/4-type CCDs

Total pixels	Standard		Model No.	Electronic shutter (s)	Resolution Horizontal TV lines	Resolution Image pixels (H x V)	Pixel size H x V (μm²)	Sensitivity (mV) TYP.	Smear ratio (dB) TYP.	Package
270 000	Color	NTSC	RJ2411AA0PB*	1/60 to 1/10 000	330	512 x 492	7.2 x 5.6	800	–105	P-DIP014-0400A
			RJ2411AB0PB							
320 000		PAL	RJ2421AB0PB	1/50 to 1/10 000		512 x 582	7.2 x 4.7	720		
410 000		NTSC	RJ2451AA0PB	1/60 to 1/10 000	480	768 x 494	4.9 x 5.6	400	–90	
470 000		PAL	RJ2461AA0PB	1/50 to 1/10 000		752 x 582	5.0 x 4.7			

* For in-vehicle use

■ Dual-power-supply (5 V/12 V) Operation 1/3-type CCDs*1

Total pixels	Standard		Model No.	Electronic shutter (s)	Resolution Horizontal TV lines	Resolution Image pixels (H x V)	Pixel size H x V (μm²)	Sensitivity (mV) TYP.	Smear ratio (dB) TYP.	Package
270 000	B/W	EIA	LZ2316AR	1/60 to 1/10 000	380	512 x 492	9.6 x 7.5	3 300*2	–110	N-DIP016-0500C
320 000		CCIR	LZ2326AR	1/50 to 1/10 000		512 x 582	9.6 x 6.3	3 000*2		

*1 With mirror image function
*2 When IR cut-off filter is not used.

★ Under development

CCD Peripheral ICs/LSIs

Description	Model No.	Features		Package
Single-chip driver (Timing generator + Synchronous signal generator)	**LR385851**	For 270-k/320-kpixel CCDs with dual-power-supply operation (5 V/12 V)	Electronic shutter, electronic exposure, mirror image function, for B/W CCDs, level shifter, smooth shutter, line lock	P-QFP048-0707
V driver	**LR366851**	Vertical pulse driver for CCDs, 2-level output x 2, 3-level output x 4, 2-level output circuit for electronic shutter		P-SSOP024-0275
	LR36687U/Y	Vertical pulse driver for CCDs, 2-level output x 10, 3-level output x 10, 2-level output circuit for electronic shutter		P-VQFN064-0808/ TFBGA068-0606
	LR36688U	Vertical pulse driver for CCDs, 2-level output x 4, 3-level output x 8, 2-level output circuit for electronic shutter		P-VQFN052-0707
Signal processor	**IR3Y30M2**	Available for signal processing from CCD output to 75 Ω video output, for B/W CCDs, comparator for electronic exposure, high-speed S/H circuit, H aperture, LPF, AGC		P-QFP048-0707
CDS/PGA/ADC	**IR3Y48A3**	Low power consumption [80 mW (TYP.)], high-speed S/H circuit, high-gain PGA circuit, 10-bit ADC (18 MHz)		P-QFP048-0707
	IR3Y50U6	Low power consumption [75 mW (TYP.)], high-speed S/H circuit, high-gain PGA circuit, 12-bit ADC (25 MHz)		P-VQFN036-0606
	IR3Y51U	Low power consumption [84 mW (TYP.) at 40 MHz, 63 mW (TYP.) at 27 MHz], high-speed S/H circuit, high-gain PGA circuit, 10-bit ADC (40 MHz)		P-VQFN052-0707
Timing generator + V driver + CDS/PGA/ADC	**LR38647**	For 1/1.8 type 5.18-Mpixel CCD	Timing generator : Monitoring mode/still mode V driver : Vertical pulse driver for CCDs, 2-level output x 2, 3-level output x 4, 2-level output circuit for electronic shutter CDS/PGA/ADC : 40 MHz, high-speed S/H circuit, high-gain PGA circuit, 10-bit ADC	LFBGA160-1010
	LR38649	For 1/1.8 type 6.36-Mpixel CCD, For 1/2.5 type 4.19-Mpixel, 1/3.2 type 3.37-Mpixel CCDs with/without movie function	Timing generator : Monitoring mode/still mode V driver : Vertical pulse driver for CCDs, 2-level output x 2, 3-level output x 4, 2-level output circuit for electronic shutter CDS/PGA/ADC : 25 MHz (LR38649)/ 30 MHz (LR38667/★LR386XX)/ 36 MHz (★LR38674), high-speed S/H circuit, high-gain PGA circuit, 12-bit ADC	LFBGA192-1010
	★LR386XX	For 1/2.5 type 4.18-Mpixel CCD with movie function employing 9-pixel mixing technology		
	LR38667	For 1/2.5 type 5.19-Mpixel CCDs with/without movie function		
	★LR38674	For 1/1.8 type 8.5-Mpixel CCDs with/without movie function		
V driver + CDS/PGA/ADC + DSP	**LR386431**	For 270-k/320-k/410-k/ 470-kpixel CCDs	V driver : Vertical pulse driver for CCDs, 2-level output x 2, 3-level output x 4, 2-level output circuit for electronic shutter CDS/PGA/ADC : 18 MHz, high-speed S/H circuit, high-gain PGA circuit, 10-bit ADC DSP : YUV digital output, NTSC/PAL analog output, mirror image function, 9-bit DAC, synchronous signal generation circuit, CCD drive timing generator, processing circuit for AWB/AE control, supports monitoring output of IR3Y48A3	LFBGA168-1212
	★LR38645		V driver : Vertical pulse driver for CCDs, 2-level output x 2, 3-level output x 4, 2-level output circuit for electronic shutter CDS/PGA/ADC : 18 MHz, high-speed S/H circuit, high-gain PGA circuit, 10-bit ADC DSP : YUV digital output, NTSC/PAL analog output, mirror image function, 9-bit DAC, synchronous signal generation circuit, CCD drive timing generator, processing circuit for AWB/AE control, Y/C separation analog output, line lock function, supports monitoring output of IR3Y48A3	LFBGA180-1212
DSP	**LR386032**	For 270-k/320-k/410-k/ 470-kpixel CCDs	YUV digital output, NTSC/PAL analog output, mirror image function, 9-bit DAC, synchronous signal generation circuit, CCD drive timing generator, processing circuit for AWB/AE control, supports monitoring output of IR3Y48A3	P-LQFP080-1212
	★LR38607		YUV digital output, NTSC/PAL analog output, mirror image function, 9-bit DAC, synchronous signal generation circuit, CCD drive timing generator, processing circuit for AWB/AE control, Y/C separation analog output, line lock function, supports monitoring output of IR3Y48A3	P-LQFP100-1414
	LR38669Y	For 1.3-M to 10-Mpixel CCDs	CCD signal processing circuit, ARM core, JPEG (hardware), memory controller, video encoder (NTSC/PAL), USB line driver, supports CompactFlash™/SmartMedia™/ SD memory card interfaces, 4-bit SD bus mode, supports several types of LCD digital interfaces, support for CCDs with movie function	TFBGA260-1313