NVP2040 Data Sheet

CCD Camera Image Signal Processor

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Interlaced CCD Image Signal Processor

NVP2040 is an image signal processor(ISP) which outputs CVBS or S-Video data format after receiving color filter array(CFA) patterns from color-interlaced CCD sensor(760H), which is processed through an internal encoder and DAC. NVP2040 provides high image quality than ever by supporting 600TV lines resolution. For providing stable color reproduction, NVP2040 has functions both AE which maintains the brightness and AWB which keeps in white regardless of its color temperature. Moreover, it provides OSD without external MCU to make camera contol more easily. Besides, NVP2040 supports RS-485 communication for remote control, parking line and H-mirror for rear-view camera application, lens shading correction and motion detection etc for superior camera functionality.

Features

-. Input : NTSC/PAL, 760H CCD format
-. Output : NTSC/PAL analog S-Video or CVBS
-. Programmable GAMMA processing(16 steps)
-. Supports horizontal resolution 600TV lines
-. De-moire
-. H/V aperture
-. Video adjustment (brightness, contrast, saturation and hue)
-. Horizontal MIRROR
-. Blemish compensation → AUTO(64 points)
-. Color rolling / Breathing suppress.
-. DWDR(Digital Wide Dynamic Range)
-. Motion detection (Motion size : 48 x 15)
-. Lens shading
-. Parking Line
-. OSD(English/Chinese(Simplified))
-. Communication : RS-485 (Pelco-D/P, NEXTCHIP)
-. Serial interface for AFE (AD9943/HD49343HNP)
-. I2C Interface
-. On-chip optical detector (AE/AWB)
-. On-chip CCD timing generator,
-. On-chip NTSC/PAL video encoder
-. On-chip 2CH DAC (S-video or CVBS and IRIS)
-. On-chip 1CH ADC (2CH MUX)
-. 5.0V / 3.3V operation (LDO include)

Ordering Information

Device	Package	Temperature Range
NVP2040	64-TQFP	-25℃ ~ 85℃

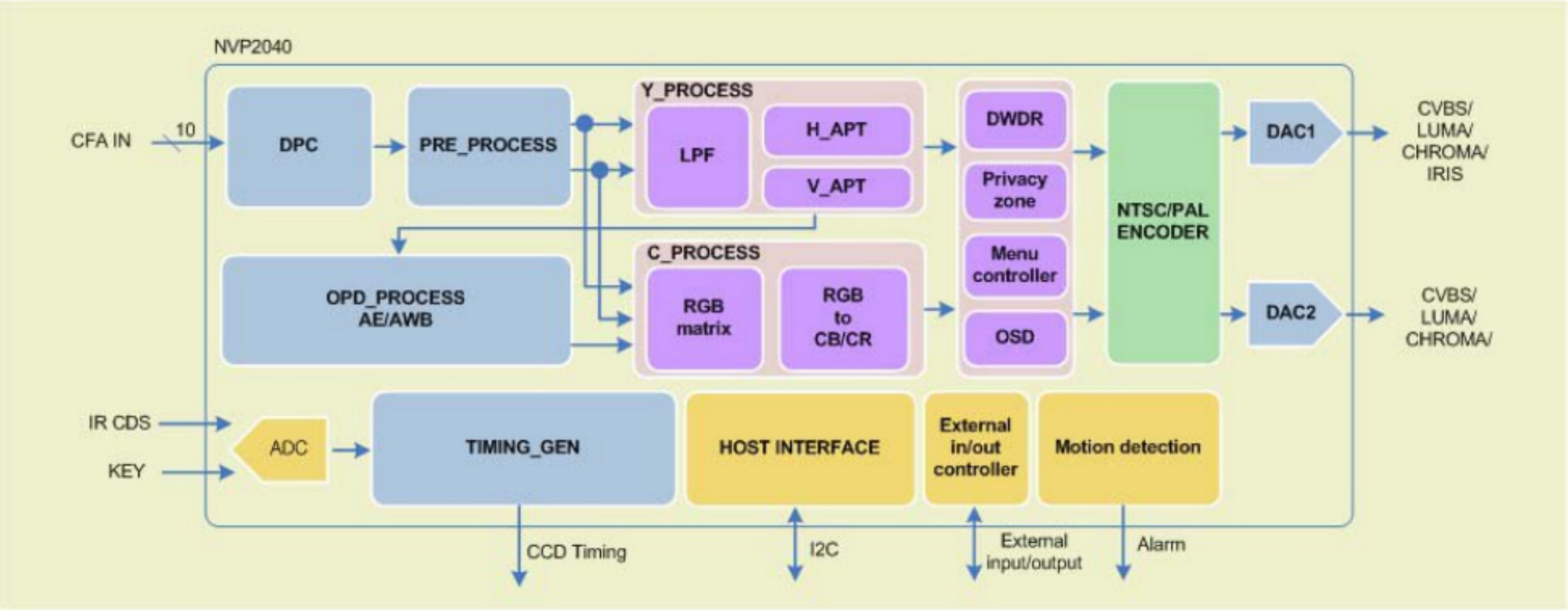
Applications

-. CCD camera
-. Door phone camera
-. Video phone camera
-. Rear-view monitoring camera

Related Products

-. CCD : SONY, SHARP CCD
-. AFE : AD9943/HD49343HNP
-. V-Driver : NVD2014A (NEXTCHIP)

Functional Block Diagram



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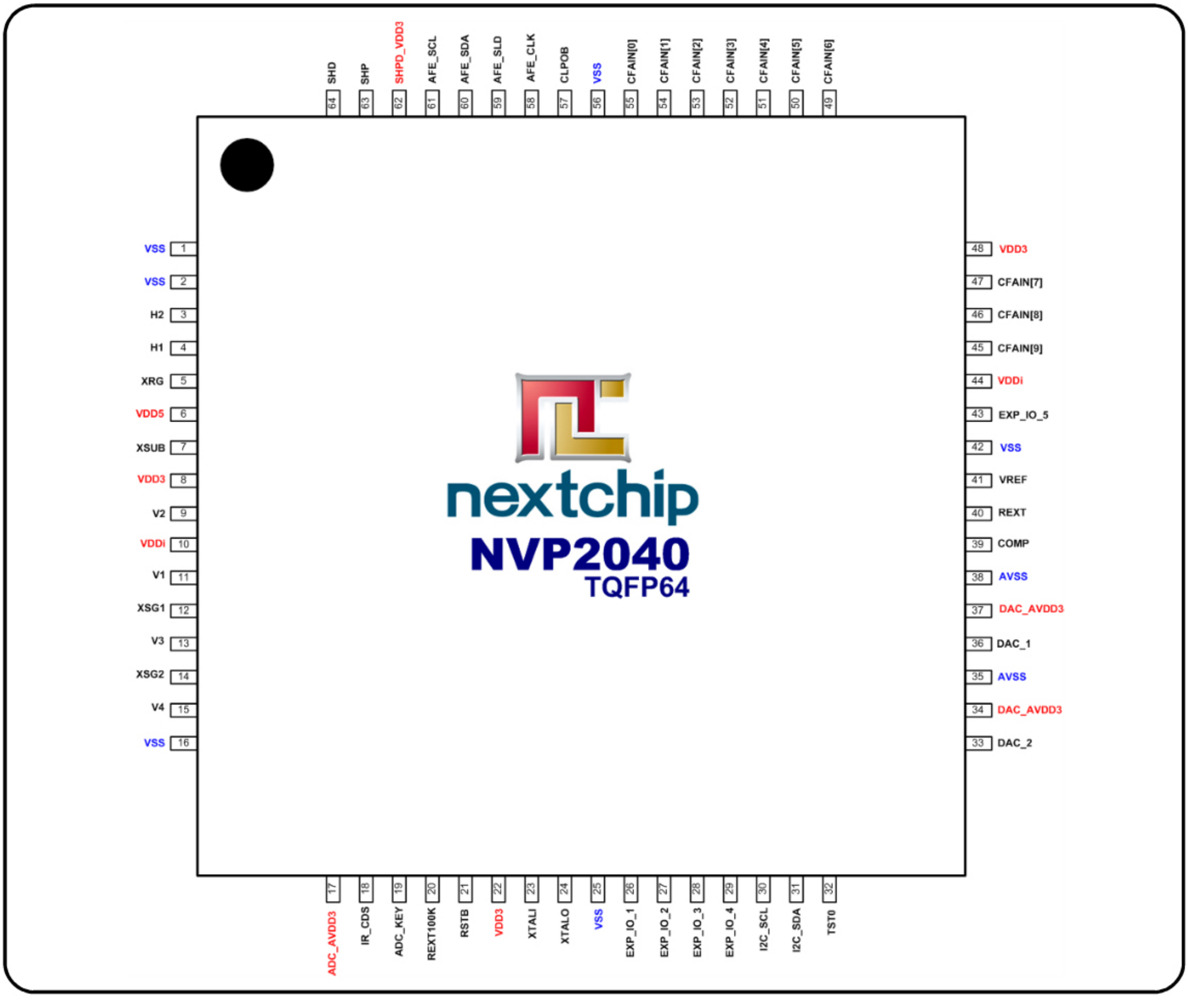
1. Pin Information

1.1 Pin Assignments



1.2 Pin Description

PIN NO.	SYMBOL	I/O	DESCRIPTION
1	VSS	G	Digital Ground (for SHP, SHD)
2	VSS	G	Digital Ground (for XRG, H1, H2 pulse)
3	H2	O	CCD Horizontal Driving pulse 2
4	H1	O	CCD Horizontal Driving pulse 1
5	XRG	O	CCD Reset gate pulse
6	VDD5	P	5V Digital Power (for XRG, H1, H2 pulse)
7	XSUB	O	CCD shutter speed control pulse
8	VDD3	P	3.3V Digital Power
9	V2	O	CCD vertical driving pulse phase-2
10	VDDi	P	1.8V Internal Core Power(Connect to VSS via external capacitor)
11	V1	O	CCD vertical driving pulse phase-1
12	XSG1	O	CCD Read out pulse 1
13	V3	O	CCD vertical driving pulse phase-3
14	XSG2	O	CCD Read out pulse 2
15	V4	O	CCD vertical driving pulse phase-4
16	VSS	G	Digital Ground
17	ADC_AVDD3	P	ADC 3.3V Analog Power
18	IR_CDS	I	ADC IR CDS INPUT
19	ADC_KEY	I	ADC KEY INPUT
20	REXT100K	-	100Kohm external resistor
21	RSTB	I	System Reset (active low)
22	VDD3	P	3.3V Digital Power
23	XTALI	I	X-tal input(NTSC:28.6363MHz : PAL:28.375MHz)
24	XTALO	O	X-tal output
25	VSS	G	Digital Ground
26	EXP_IO_1	I/O	External input / output Pin
27	EXP_IO_2	I/O	External input / output Pin
28	EXP_IO_3	I/O	External input / output Pin
29	EXP_IO_4	I/O	External input / output Pin
30	I2C_SCL	I/O	I2C Serial Clock (EEPROM/MCU interface)
31	I2C_SDA	I/O	I2C Serial Data (EEPROM/MCU interface)
32	TST0	I	Chip Test pin
33	DAC2	O	DAC Output (LUMA/CHROMA/CVBS Output)
34	DAC_AVDD3	P	3.3V DAC Analog Power
35	VSSA	G	DAC Analog Ground
36	DAC1	O	DAC Output (LUMA/CHROMA/CVBS/IRIS Output)
37	DAC_AVDD3	P	3.3V DAC Analog Power
38	VSSA	G	DAC Analog Ground
39	COMP	-	DAC comparator reference
40	REXT	-	DAC external resistor pin(REXT(ohm)=VREFIN(V)*7.02/IOFS(A))
41	VREF	-	DAC Voltage reference
42	VSS	G	Digital Ground
43	EXP_IO_5	I/O	External input/out Pin
44	VDDi	P	1.8V Internal Core Power(Connect to VSS via external capacitor)
45	CFAIN[9]	I	CCD CFA pattern input 9
46	CFAIN[8]	I	CCD CFA pattern input 8
47	CFAIN[7]	I	CCD CFA pattern input 7

PIN NO.	SYMBOL	I/O	DESCRIPTION
48	VDD3	P	3.3V Digital Power
49	CFAIN[6]	I	CCD CFA pattern input 6
50	CFAIN[5]	I	CCD CFA pattern input 5
51	CFAIN[4]	I	CCD CFA pattern input 4
52	CFAIN[3]	I	CCD CFA pattern input 3
53	CFAIN[2]	I	CCD CFA pattern input 2
54	CFAIN[1]	I	CCD CFA pattern input 1
55	CFAIN[0]	I	CCD CFA pattern input 0
56	VSS	G	Digital Ground
57	CLPOB	O	Optical blank clamping pulse
58	AFE_CLK	O	ADC sampling clock
59	AFE_SLD	O	3-wire Serial Enable output (for AFE control)
60	AFE_SDA	O	3-wire Serial data input/output (for AFE control)
61	AFE_SCL	O	3-wire Serial interface clock output (for AFE control)
62	SHPD_VDD3	P	3.3V Digital Power
63	SHP	O	CDS sample & hold pulse for pre-charge
64	SHD	O	CDS sample & hold pulse for data

2. REGISTER INFORMATION

2.1 REGISTER MAP

BANK 0										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
-	0x00	0xAA								
-	0x01	0x55								
-	0x02	0xAA								
-	0x03	0x55								
0x00	0x04	H1_P	H2_P	H1_DELAY						
0x01	0x05	SHP_P	SHD_P	H2_DELAY						
0x02	0x06	RG_P	ADCLK_P	SHP_DELAY						
0x03	0x07	XSUB_P	PBLK_P	SHD_DELAY						
0x04	0x08	CLPOB_P	CLPDM_P	RG_DELAY						
0x05	0x09	NTSC	INIT_BLACK	AFE_CLK_DELAY						
0x06	0x0A	CCD_TYPE[1:0]		H1_WIDTH			H2_WIDTH			
0x07	0x0B	SHPD_TYPE	-	SHD_WIDTH			SHP_WIDTH			
0x08	0x0C	H1_HW	H2_HW	SHP_HW	SHD_HW	RG_HW	RG_WIDTH			
0x09	0x0D	SELO_DAY_MOTOR_H				SELO_DAY_MOTOR_L				
0x0A	0x0E	-								
0x0B	0x0F	DWDR_VSZ				-				
0x0C	0x10	ADC_PD	ADC_CLK_P	ADC_CLK_SPD		ADC_SEL_AUTO	ADC_EOC_FREE	ADC_RUN	ADC_SEL	
0x0D	0x11	SELO_CLPDM				SELO_PBLK				
0x0E	0x12	SELO_MD				SELO_PWID				
0x0F	0x13	AFE_00[7:0]								
0x10	0x14	AFE_00[15:8]								
0x11	0x15	AFE_01[7:0]								
0x12	0x16	AFE_01[15:8]								
0x13	0x17	AFE_02[7:0]								
0x14	0x18	AFE_02[15:8]								
0x15	0x19	AFE_03[7:0]								
0x16	0x1A	AFE_03[15:8]								
0x17	0x1B	AFE_04[7:0]								
0x18	0x1C	AFE_04[15:8]								
0x19	0x1D	AFE_05[7:0]								
0x1A	0x1E	AFE_05[15:8]								
0x1B	0x1F	AFE_06[7:0]								
0x1C	0x20	AFE_06[15:8]								
0x1D	0x21	AFE_07[7:0]								
0x1E	0x22	AFE_07[15:8]								
0x1F	0x23	AFE_08[7:0]								
0x20	0x24	AFE_08[15:8]								
0x21	0x25	AFE_09[7:0]								
0x22	0x26	AFE_09[15:8]								
0x23	0x27	AFE_0A[7:0]								
0x24	0x28	AFE_0A[15:8]								
0x25	0x29	AFE_0B[7:0]								
0x26	0x2A	AFE_0B[15:8]								
0x27	0x2B	AFE_0C[7:0]								
0x28	0x2C	AFE_0C[15:8]								
0x29	0x2D	AFE_0D[7:0]								
0x2A	0x2E	AFE_0D[15:8]								
0x2B	0x2F	AFE_0E[7:0]								
0x2C	0x30	AFE_0E[15:8]								
0x2D	0x31	AFE_0F[7:0]								
0x2E	0x32	AFE_0F[15:8]								

BANK 0										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0x2F	0x33	AFE_PGA_LENGTH			AFE_PGA_DUMMY		AFE_PGA_LOC			
0x30	0x34	MOTION_ICON	AFE_PCON	AFE_PGA_ADDR						
0x31	0x35	CLAMP_REG					LLDC_P	CLAMP_LEVEL		
0x32	0x36	AFE_SET	AFE_SEL			POWER_FRE		AFE_SPD		
0x33	0x37	-				AFE_REG_CNT				
0x34	0x38	CLPOB_SIZE				CLPOB_POS				
0x35	0x39	CLPDM_SIZE				CLPDM_POS				
0x36	0x3A	HBLK_OFFSET								
0x37	0x3B	V_OFFSET								
0x38	0x3C	HM_OFFSET								
0x39	0x3D	H_OFFSET_ENC								
0x3A	0x3E	V_SIZE				IRIS_ESS_MIN				
0x3B	0x3F	HE_SIZE				HS_SIZE				
0x3C	0x40	U_BURST[7:0]								
0x3D	0x41	GAMMA_SEL_LCD					-	U_BURST[9:8]		
0x3E	0x42	ENC_V_BURST[7:0]								
0x3F	0x43	VAPT_GAIN					MOTION_OUTLINE	ENC_V_BURST[9:8]		
0x40	0x44	SYNC_LPF_ON	-	BLACK_CTL_CRT						
0x41	0x45	ENCODER_RANGE								
0x42	0x46	DAC1_SL	DAC2_SL	BURST_DLY						
0x43	0x47	DAC12_CLKP	DPC_CLEAR	SYNC_SIZE						
0x44	0x48	DAC2_OUT				DAC1_OUT				
0x45	0x49	DAC_DATA								
0x46	0x4A	VER_ID_00								
0x47	0x4B	VER_ID_01								
0x48	0x4C	VER_ID_02								
0x49	0x4D	POS_BLT				POS_VER				
0x4A	0x4E	IRIS_ESS_SPD				POS_COM				
0x4B	0x4F	Y_PRE_GAIN								
0x4C	0x50	Y_GAIN								
0x4D	0x51	Y_OFFSET								
0x4E	0x52	Y_C_CLIP_ON	Y_CLIP							
0x4F	0x53	Y_GAMMA0								
0x50	0x54	Y_GAMMA1								
0x51	0x55	Y_GAMMA2								
0x52	0x56	Y_GAMMA3								
0x53	0x57	Y_GAMMA4								
0x54	0x58	Y_GAMMA5								
0x55	0x59	Y_GAMMA6								
0x56	0x5A	Y_GAMMA7								
0x57	0x5B	HAPT_LOW_SLICE				HAPT_HIGH_SLICE				
0x58	0x5C	LOGO_SIZE_UP	-	-	HAPT_LOW_GAIN					
0x59	0x5D	HAPT_HIGH_SEL		-	HAPT_HIGH_GAIN					
0x5A	0x5E	AWB_DIP_MODE	SUE_2DNR_ON	MOTION_VIEW_ON	HVAPT_GAIN					
0x5B	0x5F	-	MENU_LENS_SEL		HVAPT_CLIP					
0x5C	0x60	C_GAMMA0								
0x5D	0x61	C_GAMMA1								
0x5E	0x62	C_GAMMA2								
0x5F	0x63	C_GAMMA3								
0x60	0x64	C_GAMMA4								
0x61	0x65	C_GAMMA5								
0x62	0x66	C_GAMMA6								
0x63	0x67	C_GAMMA7								
0x64	0x68	GAIN_RS1								
0x65	0x69	GAIN_RS2								
0x66	0x6A	GAIN_BS1								

BANK 0										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0x67	0x6B	GAIN_BS2								
0x68	0x6C	CCY_GAIN								
0x69	0x6D	CCR_GAIN								
0x6A	0x6E	CCB_GAIN								
0x6B	0x6F	HAPT_LOW_SEL		CLP_RS1						
0x6C	0x70	CCRB_ID	S1_ID	CLP_RS2						
0x6D	0x71	-	-	CLP_BS1						
0x6E	0x72	-	-	CLP_BS2						
0x6F	0x73	CCORR								
0x70	0x74	CCORG								
0x71	0x75	CCORB								
0x72	0x76	CCOGR								
0x73	0x77	CCOGG								
0x74	0x78	CCOGB								
0x75	0x79	CCOBR								
0x76	0x7A	CCOBG								
0x77	0x7B	CCOBB								
0x78	0x7C	RWB								
0x79	0x7D	GWB								
0x7A	0x7E	BWB								
0x7B	0x7F	RBLK								
0x7C	0x80	GBLK								
0x7D	0x81	BBLK								
0x7E	0x82	RGB_R								
0x7F	0x83	RGB_G								
0x80	0x84	HUE1								
0x81	0x85	HUE2								
0x82	0x86	HUE3								
0x83	0x87	HUE4								
0x84	0x88	HUE5								
0x85	0x89	HUE6								
0x86	0x8A	UV_GAIN1								
0x87	0x8B	UV_GAIN2								
0x88	0x8C	UV_GAIN3								
0x89	0x8D	UV_GAIN4								
0x8A	0x8E	UV_GAIN5								
0x8B	0x8F	UV_GAIN6								
0x8C	0x90	NEGATIVE_IMG	PZ_ON	HLC_VIEW	AWB_CMODE	DWDR_EN	IR_SAMRT_VIEW	H_MIRROR	DPC_START	
0x8D	0x91	SUE_AGC_LEVEL								
0x8E	0x92	SUC_EDGE_GAIN				SUE_AGC_2DNR				
0x8F	0x93	SUC_AGC_LEVEL								
0x90	0x94	SUC_HL_GAIN				SUC_HL_LLEVEL				
0x91	0x95	MOTION_BKT		SUC_AGC_GAIN						
0x92	0x96	SUC_HL_HLEVEL							-	
0x93	0x97	AE_LEVEL								
0x94	0x98	ME_ESS[7:0]								
0x95	0x99	BLC_ON	BLC_AREA_VIEW	IRIS_LENS		IRIS_P	AGC_FST	HLC_ON	ME_ESS[8]	
0x96	0x9A	ME_ESS_LOW[7:0]								
0x97	0x9B	GAMMA_SEL_CRT					AE_MODE[1]	ME_ESS_LOW[9:8]		
0x98	0x9C	SSM_DC				AE_MODE_DC	-	-	-	
0x99	0x9D	SSM_VIDEO				AE_MODE_V	-	-	-	
0x9A	0x9E	SSM_MANUAL				AE_MODE_M	-	-	-	
0x9B	0x9F	AGC_LEVEL_OFST								
0x9C	0xA0	AE_ESS_SPD				AGC_SPD				
0x9D	0xA1	AGC_MVALUE[7:0]								
0x9E	0xA2	-	-	VAPT_SLICE				AGC_MVALUE[9:8]		

BANK 0										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0x9F	0xA3	BLC_LEVEL_OFST								
0xA0	0xA4	BLC_AREA_V0				BLC_AREA_H0				
0xA1	0xA5	BLC_AREA_SZV0				BLC_AREA_SZH0				
0xA2	0xA6	BLC_GAIN								
0xA3	0xA7	SELO_DAY_IR_H				SELO_DAY_IR_L				
0xA4	0xA8	RS485_ID_ON	RS485_PROTOCOL		RS485_ID_POSY					
0xA5	0xA9	HSBLC_GAIN								
0xA6	0xAA	HLC_TH								
0xA7	0xAB	IRIS_VGAIN								
0xA8	0xAC	AE_OFFSET_MAX2								
0xA9	0xAD	AE_OFFSET_MAX3								
0xAA	0xAE	IRIS_BLC_GAIN								
0xAB	0xAF	TEST_PATTERN			IRIS_VIDEO_TYPE	IRIS_CDS_ON	DAY_CDS_TYPE	BLC_AREA_BLINK		
0xAC	0xB0	DAY_IR_HIGH	DIS_LCD		-	-	-	MENU_AWB_REM	BLC_AREA_STATE	
0xAD	0xB1	PZ_MIR_POS								
0xAE	0xB2	IRIS_VBLC_LVL								
0xAF	0xB3	AWB_MODE		AWB_DIP		HSBLC_NIGHT	MENU_AUTO_OFF		MENU_BK_ON	
0xB0	0xB4	AWB_OPD_LOW								
0xB1	0xB5	AWB_OPD_HIGH								
0xB2	0xB6	SELI_DAY				SELI_DWDR				
0xB3	0xB7	SELI_LSC				SELI_DPC				
0xB4	0xB8	AWB_SPD			-	AWB_STA_ZONE				
0XB5	0xB9	LSDPC_AUTO_TH								
0xB6	0xBA	RS485_USER_KEY2_1								
0xB7	0xBB	RS485_USER_KEY2_2								
0xB8	0xBC	RS485_USER_KEY2_3								
0xB9	0xBD	RS485_USER_KEY2_4								
0xBA	0xBE	AWB_R0								
0xBB	0xBF	AWB_R1								
0xBC	0xC0	AWB_R2								
0xBD	0xC1	AWB_R3								
0xBE	0xC2	USER_C_GAIN								
0xBF	0xC3	-	-	BLACK_CTL_USER						
0xC0	0xC4	Y_GAMMA8								
0xC1	0xC5	Y_GAMMA9								
0xC2	0xC6	AWB_B0								
0xC3	0xC7	AWB_B1								
0xC4	0xC8	AWB_B2								
0XC5	0xC9	AWB_B3								
0xC6	0xCA	AWB_R_OFFSET								
0xC7	0xCB	Y_GAMMA10								
0xC8	0xCC	AWB_B_OFFSET								
0xC9	0xCD	AWB_M_R								
0xCA	0xCE	Y_GAMMA11								
0xCB	0xCF	AWB_M_B								
0xCC	0xD0	ATW1_R_MAX								
0xCD	0xD1	ATW1_B_MAX								
0xCE	0xD2	ATW1_R_MIN								
0xCF	0xD3	ATW1_B_MIN								
0xD0	0xD4	PZ_STATE								
0xD1	0xD5	PZ_H0								
0xD2	0xD6	PZ_V0								
0xD3	0xD7	PZ_SZH0								
0xD4	0xD8	PZ_SZV0								
0xD5	0xD9	PZ_H1								
0xD6	0xDA	PZ_V1								

BANK 0										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0xD7	0xDB	PZ_SZH1								
0xD8	0xDC	PZ_SZV1								
0xD9	0xDD	PZ_H2								
0xDA	0xDE	PZ_V2								
0xDB	0xDF	PZ_SZH2								
0xDC	0xE0	PZ_SZV2								
0xDD	0xE1	PZ_H3								
0xDE	0xE2	PZ_V3								
0xDF	0xE3	PZ_SZH3								
0xE0	0xE4	PZ_SZV3								
0xE1	0xE5	PZ_H4								
0xE2	0xE6	PZ_V4								
0xE3	0xE7	PZ_SZH4								
0xE4	0xE8	PZ_SZV4								
0xE5	0xE9	PZ_H5								
0xE6	0xEA	PZ_V5								
0xE7	0xEB	PZ_SZH5								
0xE8	0xEC	PZ_SZV5								
0xE9	0xED	PZ_H6								
0xEA	0xEE	PZ_V6								
0xEB	0xEF	PZ_SZH6								
0xEC	0xF0	PZ_SZV6								
0xED	0xF1	PZ_H7								
0xEE	0xF2	PZ_V7								
0xEF	0xF3	PZ_SZH7								
0xF0	0xF4	PZ_SZV7								
0xF1	0xF5	PZ_COLOR1				PZ_COLOR0				
0xF2	0xF6	PZ_COLOR3				PZ_COLOR2				
0xF3	0xF7	PZ_COLOR4				PZ_COLOR4				
0xF4	0xF8	PZ_COLOR7				PZ_COLOR6				
0xF5	0xF9	PZ_BKT3		PZ_BKT2		PZ_BKT1		PZ_BKT0		
0xF6	0xFA	PZ_BKT7		PZ_BKT6		PZ_BKT5		PZ_BKT4		
0xF7	0xFB	-								
0xF8	0xFC	-								
0xF9	0xFD	-	-	-	-	SLAVE_ADDR				
0xFA	0xFE	BANK								

BANK 1										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0x00	0x00	-								
0x01	0x01	LLDC_TH								
0x02	0x02	LSC_H_CENTER[7:0]								
0x03	0x03	CFA_GRAY	LLDC_ON	-	-	-	-	LSC_H_CENTER[9:8]		
0x04	0x04	LSC_V_CENTER[7:0]								
0x05	0x05	-	-	-	-	-	-	LSC_V_CENTER[9:8]		
0x06	0x06	LSC_GAIN								
0x07	0x07	DAY_START								
0x08	0x08	DAY_END								
0x09	0x09	DAY_STOP_MODE	DAY_CDS_P	DAY_BC_DLY			DAY_CB_DLY			
0x0A	0x0A	DAY_IR_GAIN								
0x0B	0x0B	-	DAY_IR_GAIN_P	DAY_BURST_ON	DAY_ON		DAY_IR_PULSE_M			
0x0C	0x0C	LSDPC_COMPEN_ST								
0x0D	0x0D	PL_LN_WIDTH				LSC_EN	PL_EN	-	IR_SMART_ON	
0x0E	0x0E	PL_HL_TOP								
0x0F	0x0F	PL_HL_BTM								
0x10	0x10	PL_HR_TOP								
0x11	0x11	PL_HR_BTM								
0x12	0x12	PL_V_TOP								
0x13	0x13	PL_V_BTM								
0x14	0x14	PL_H_LENGTH				PL_LN_SPACE				
0x15	0x15	OSD_HPOS								
0x16	0x16	OSD_VPOS						OSD_ON	OSD_CLEAR	
0x17	0x17	OSD_DATA								
0x18	0x18	OSD_POS[7:0]								
0x19	0x19	OSD_TRANS	OSD_BLK_TIME		OSD_WR	OSD_BLINK		OSD_COLOR_SEL	OSD_POS[8]	
0x1A	0x1A	OSD_COLOR_01				OSD_COLOR_00				
0x1B	0x1B	BTN_LT_LEVEL								
0x1C	0x1C	BTN_RT_LEVEL								
0x1D	0x1D	BTN_TP_LEVEL								
0x1E	0x1E	BTN_BT_LEVEL								
0x1F	0x1F	BTN_ET_LEVEL								
0x20	0x20	BTN_TYPE	BTN_REPT_ON	BTN_ZONE						
0x21	0x21	BTN_DLY				BTN_MENU_DLY				
0x22	0x22	RS485_USER_KEY_ON		BTN_REG_KEY						
0x23	0x23	MOTION_BLINK				MOTION_EN	MOTION_AREA_VIEW	-	-	
0x24	0x24	MOTION_COLOR				MOTION_STATE				
0x25	0x25	MOTION_AGC				MOTION_HIGH				
0x26	0x26	MOTION_THL								
0x27	0x27	MOTION_CNT								
0x28	0x28	MOTION_TH0								
0x29	0x29	MOTION_TH1								
0x2A	0x2A	MOTION_V0				MOTION_H0				
0x2B	0x2B	MOTION_SZV0				MOTION_SZH0				
0x2C	0x2C	MOTION_V1				MOTION_H1				
0x2D	0x2D	MOTION_SZV1				MOTION_SZH1				
0x2E	0x2E	LSDPC_HS				LSDPC_HE	-	-	-	
0x2F	0x2F	LSDPC_VS				LSDPC_VE	-	-	-	
0x30	0x30	LSDPC_H[7:0]								
0x31	0x31	LSDPC_DIFF						LSDPC_H[9:8]		
0x32	0x32	LSDPC_V[7:0]								
0x33	0x33	LSDPC_MANUAL	LSDPC_WR	LSDPC_MCU	ID_POS_EDIT_ON	LSDPC_ON	LSDPC_VIEW	LSDPC_V[9:8]		
0x34	0x34	LSDPC_ADDR								
0x35	0x35	LSDPC_CNT		LSDPC_LSVALUE						
0x36	0x36	LSDPC_BH0[7:0]								
0x37	0x37	LSDPC_BV0[5:0]						LSDPC_BH0[9:8]		
0x38	0x38	-	-	-	-	LSDPC_BV0[9:6]				

BANK 1										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0x39	0x39	LSDPC_BH1[7:0]								
0x3A	0x3A	LSDPC_BV1[5:0]						LSDPC_BH1[9:8]		
0x3B	0x3B	TIM_H_OPD_OFST				LSDPC_BV1[9:6]				
0x3C	0x3C	LSDPC_BH2[7:0]								
0x3D	0x3D	LSDPC_BV2[5:0]						LSDPC_BH2[9:8]		
0x3E	0x3E	-	-	TOSD_VIEW		LSDPC_BV2[9:6]				
0x3F	0x3F	LSDPC_BH3[7:0]								
0x40	0x40	LSDPC_BV3[5:0]						LSDPC_BH3[9:8]		
0x41	0x41	V_START				LSDPC_BV3[9:6]				
0x42	0x42	-								
0x43	0x43	IRIS_ESS_OFST			-					
0x44	0x44	LSDPC_HS[6:4]			-					
0x45	0x45	LSDPC_HE[6:4]			-					
0x46	0x46	LSDPC_VS[6:4]			-					
0x47	0x47	LSDPC_VE[6:4]			-					
0x48	0x48	PZ_MIR_SZ			-					
0x49	0x49	C_DELAY			-					
0x4A	0x4A	-	VACT_P	LSDPC_SIZE	-					
0x4B	0x4B	-								
0x4C	0x4C	CLAMP_AUTO	-							
0x4D	0x4D	-			-					
0x4E	0x4E	-	DWDR_AUTO_LVL	DWDR_HI_LEVEL						
0x4F	0x4F	-	-	DWDR_LI_LEVEL						
0x50	0x50	LSDPC_MSEL		DWDR_COLOR_LEVEL		DWDR_CONTRAST_LEVEL				
0x51	0x51	BTN_GPIO_P	LOGO_SIZE_96	DWDR_AGC_LEVEL		-	1	1		
0x52	0x52	MENU_H0								
0x53	0x53	MENU_BK_SEL			MENU_V0					
0x54	0x54	MENU_SZH0								
0x55	0x55	MENU_BKT1	PELCO_P_ADR	MENU_SZV0						
0x56	0x56	MENU_H1								
0x57	0x57	MENU_V1								
0x58	0x58	MENU_SZH1								
0x59	0x59	MENU_SZH2								
0x5A	0x5A	MENU_COLOR1				MENU_COLOR0				
0x5B	0x5B	MENU_VF0					MENU_BTN3_ON	MENU_BKT0		
0x5C	0x5C	AGC_MAX3								
0x5D	0x5D	RS485_ID								
0x5E	0x5E	RS485_RATE			RS485_ID_POSX					
0x5F	0x5F	DAY_START_CDS_SEL		DAY_IR_PULSE_L			DAY_STOP_1_P	-	DAY_IR_HIGH_P	
0x60	0x60	-								
0x61	0x61	IRIS_SPD				FLD_P	IRIS_OSEL_P	IRIS_REF[1:0]		
0x62	0x62	IRIS_REF[9:2]								
0x63	0x63	IRIS_SCALE_L								
0x64	0x64	IRIS_SCALE_H								
0x65	0x65	IRIS_REGION_TH								
0x66	0x66	IRIS_REF_OFST								
0x67	0x67	IRIS_OFFSET								
0x68	0x68	IRIS_BLC_OFST								
0x69	0x69	LOGO_ON	LOGO_OUTLINE	LOGO_TRANS			LOGO_COLOR			
0x6A	0x6A	LOGO_HPOS								
0x6B	0x6B	LOGO_VPOS								
0x6C	0x6C	DAY_STOP_TIME								
0x6D	0x6D	MENU_COL_CUR		MENU_COL_S_S		MENU_TITLE_MID	MENU_MID_POS		HACT_P	
0x6E	0x6E	IR_SMART_GAIN								
0x6F	0x6F	IR_SMART_OFST								
0x70	0x70	CAM_TITLE_12[1:0]		CAM_TITLE_00						
0x71	0x71	CAM_TITLE_12[3:2]		CAM_TITLE_01						

BANK 1										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0x72	0x72	CAM_TITLE_12[5:4]		CAM_TITLE_02						
0x73	0x73	CAM_TITLE_13[1:0]		CAM_TITLE_03						
0x74	0x74	CAM_TITLE_13[3:2]		CAM_TITLE_04						
0x75	0x75	CAM_TITLE_13[5:4]		CAM_TITLE_05						
0x76	0x76	CAM_TITLE_14[1:0]		CAM_TITLE_06						
0x77	0x77	CAM_TITLE_14[3:2]		CAM_TITLE_07						
0x78	0x78	CAM_TITLE_14[5:4]		CAM_TITLE_08						
0x79	0x79	CAM_TITLE_Y[1:0]		CAM_TITLE_09						
0x7A	0x7A	CAM_TITLE_Y[3:2]		CAM_TITLE_10						
0x7B	0x7B	CAM_TITLE_X[1:0]		CAM_TITLE_11						
0x7C	0x7C	MENU_LANG	CAM_TITLE_ON	-	-	CAM_TITLE_Y[4]	CAM_TITLE_X[4:2]			
0x7D	0x7D	POS_EXP				POS_LEN				
0x7E	0x7E	POS_DAY				POS_AWB				
0x7F	0x7F	POS_ADJ				POS_SPC				
0x80	0x80	POS_CAM				POS_RST				
0x81	0x81	AGC_MAX1								
0x82	0x82	POS_MOT				MOTION_DELAY				
0x83	0x83	POS_LGG				POS_PRI				
0x84	0x84	POS_DPC				POS_PKL				
0x85	0x85	POS_CAM	POS_RST	POS_ADJ	POS_SPC	POS_DAY	POS_AWB	POS_EXP	POS_LEN	
0x86	0x86	POS_DPC	POS_PKL	POS_LGG	POS_PRI	POS_MOT	-	-	-	
0x87	0x87	MENU_H2								
0x88	0x88	MENU_V2								
0x89	0x89	MENU_SZH2								
0x8A	0x8A	MENU_SZV2								
0x8B	0x8B	MENU_LOGO_ON	MENU_BAR_ON	MENU_BKT2		MENU_COLOR2				
0x8C	0x8C	LLDC_STRENGTH								
0x8D	0x8D	-								
0x8E	0x8E	-								
0x8F	0x8F	-								
0x90	0x90	IR_SMART_H				IR_SMART_V				
0x91	0x91	IR_SMART_SZH				IR_SMART_SZV				
0x92	0x92	-								
0x93	0x93	-								
0x94	0x94	-								
0x95	0x95	-								
0x96	0x96	-								
0x97	0x97	-								
0x98	0x98	-								
0x99	0x99	-								
0x9A	0x9A	TIM_ACCE_HBLK								
0x9B	0x9B	-		EEPROM_WR_TIME						
0x9C	0x9C	MENU_DAY_SEL		MOTION_ID_POSX						
0x9D	0x9D	MOTION_ID_ON	SUE_AGC_GAIN	MOTION_ID_POSY						
0x9E	0x9E	RS485_USER_KEY_1								
0x9F	0x9F	RS485_USER_KEY_2								
0xA0	0xA0	RS485_USER_KEY_3								
0xA1	0xA1	RS485_USER_KEY_4								
0xA2	0xA2	-				SELO_EFLD				
0xA3	0xA3	SELO_IRIS				-				
0xA4	0xA4	SELI_BTN_RT				SELI_BTN_ET				
0xA5	0xA5	SELI_BTN_UP				SELI_BTN_LT				
0xA6	0xA6	SELI_MIRROR				SELI_BTN_DN				
0xA7	0xA7	SELI_BLC				SELI_HLC				
0xA8	0xA8	SELI_AGC				SELI_AE_FLK				
0xA9	0xA9	SELI_AE_SSM1				SELI_AE_SSM0				
0xAA	0xAA	SELI_AE_SSM3				SELI_AE_SSM2				

BANK 1										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0xAB	0xAB	SELI_AWB_MODE1				SELI_AWB_MODE0				
0xAC	0xAC	SELI_AWB_DIP1				SELI_AWB_DIP0				
0xAD	0xAD	SELI_PARK_LINE				SELI_MOTION				
0xAE	0xAE	SELI_485RX				SELI_DAY_CDS				
0xAF	0xAF	SELO_VBLK				SELO_HBLK				
0xB0	0xB0	-								
0xB1	0xB1	-								
0xB2	0xB2	-								
0xB3	0xB3	-								
0xB4	0xB4	-								
0xB5	0xB5	-								
0xB6	0xB6	-								
0xB7	0xB7	-								
0xB8	0xB8	-								
0xB9	0xB9	-								
0xBA	0xBA	-								
0xBB	0xBB	-								
0xBC	0xBC	-								
0xBD	0xBD	-								
0xBE	0xBE	-								
0xBF	0xBF	-								
0xC0	0xC0	AGC_OFFSET								
0xC1	0xC1	CR1_GAIN								
0xC2	0xC2	CB1_GAIN								
0xC3	0xC3	CR2_GAIN								
0xC4	0xC4	CB2_GAIN								
0xC5	0xC5	PZ_BLINK								
0xC6	0xC6	AGC_START_VALUE								
0xC7	0xC7	AGC_MIN_VALUE								
0xC8	0xC8	-	-	-	-	ATW_CNT_LMT				
0xC9	0xC9	ATW1_POS_X1								
0xCA	0xCA	ATW1_POS_Y1								
0xCB	0xCB	ATW1_POS_X2								
0xCC	0xCC	ATW1_POS_Y2								
0xCD	0xCD	ATW1_DOWN								
0xCE	0xCE	ATW1_UP								
0xCF	0xCF	BLC_AREA_V1				BLC_AREA_H1				
0xD0	0xD0	BLC_AREA_SZV1				BLC_AREA_SZH1				
0xD1	0xD1	MOTION_V2				MOTION_H2				
0xD2	0xD2	MOTION_SZV2				MOTION_SZH2				
0xD3	0xD3	MOTION_V3				MOTION_H3				
0xD4	0xD4	MOTION_SZV3				MOTION_SZH3				
0xD5	0xD5	MOTION_TH2								
0xD6	0xD6	MOTION_TH3								
0xD7	0xD7	LSC_AGC_THD								
0xD8	0xD8	LSC_AGC_STP								
0xD9	0xD9	C_GAMMA_SEL						POS_COM	POS_VER	
0xDA	0xDA	CRT_C_GAIN								
0xDB	0xDB	LCD_C_GAIN								
0xDC	0xDC	-	-	BLACK_CTL_LCD						
0xDD	0xDD	DAY_END_CDS_SEL		ACCE_LI_LMAX						
0xDE	0xDE	HSBLC_IR_ON	DAY_STOP_2_P	ACCE_LI_LMIN						
0xDF	0xDF	Y_GAMMA12								
0xE0	0xE0	Y_GAMMA13								
0xE1	0xE1	Y_GAMMA14								
0xE2	0xE2	Y_GAMMA15								
0xE3	0xE3	RGB_B								

BANK 1										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0xE4	0xE4	RGB_1								
0xE5	0xE5	RGB_2								
0xE6	0xE6	RGB_3								
0xE7	0xE7	SUC_HL_GAIN_MAX				-				
0xE8	0xE8	SEL_IO_P[7:0]								
0xE9	0xE9	COLOR_OFF	SEL_IO_P[14:8]							
0xEA	0xEA	AGC_MAX_SEL		-	GAMMA_SEL_USER					
0xEB	0xEB									
0xEC	0xEC									
0xED	0xED	-								
0xEE	0xEE	TIM_V_OPD_OFST			-					
0xEF	0xEF	-								
0xF0	0xF0	-								
0xF1	0xF1	-								
0xF2	0xF2	-								
0xF3	0xF3	AE_OFFSET_START								
0xF4	0xF4	AE_OFFSET_MAX1								
0xF5	0xF5	DAY_GAP								
0xF6	0xF6	-								
0xF7	0xF7	LLDC_HLEDGE_TH								
0xF8	0xF8	ATW1_RIGHT								
0xF9	0xF9	ATW1_LEFT								
0xFA	0xFA	-								
0xFB	0xFB	AWB_STA_IN				AWB_STA_OUT				
0xFC	0xFC	SELI_LENS1				SELI_LENS0				
0xFD	0xFD	AGC_MIDDLE								
0xFE	0xFE	AGC_ZONE				AGC_ZONE2				

BANK 2										
ADDR		RESISTER								DEF.
ISP	EEPROM	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
0xB0	0xB0	ATW2_R_MAX								
0xB1	0xB1	ATW2_B_MAX								
0xB2	0xB2	ATW2_R_MIN								
0xB3	0xB3	ATW2_B_MIN								
0xB4	0xB4	ATW2_POS_X1								
0xB5	0xB5	ATW2_POS_Y1								
0xB6	0xB6	ATW2_POS_X2								
0xB7	0xB7	ATW2_POS_Y2								
0xB8	0xB8	ATW2_DOWN								
0xB9	0xB9	ATW2_UP								
0xBA	0xBA	ATW2_RIGHT								
0xBB	0xBB	ATW2_LEFT								

2.2 READ ONLY REGISTER

BANK 0x71									
ADDR	RESISTER								DEF.
ISP	[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]	
AE/AWB									
0x00	BLC_AREA[7:0]								-
0x01	NBLC_AREA[5:0]						BLC_AREA[9:8]		-
0x02	-	-	-	-	NBLC_AREA[9:6]				-
0x06	AGC								-
0x4C	ACC_R[7:0]								-
0x4D	-	-	-	-	-	-	ACC_R[9:8]		-
0x4F	ACC_G[7:0]								-
0x4F	-	-	-	-	-	-	ACC_G[9:8]		-
0x50	ACC_B[7:0]								-
0x51	-	-	-	-	-	-	ACC_B[9:8]		-
MOTION DETECTION									
0x30	-	-	-	-	-	-	-	MDET	-
0x31	M_DET_AREA[7:0]								-
0x32	M_DET_AREA[15:8]								-
ADC DATA									
0xA2	ADC1 DATA								-
0xA3	ADC2 DATA								-
DPC									
0xE0	LSDPC_READ0[7:0]								-
0xE1	LSDPC_READ0[15:8]								-
0xE2	-	-	-	-	LSDPC_READ0[19:16]				-
0xE3	LSDPC_READ1[7:0]								-
0xE4	LSDPC_READ1[15:8]								-
0xE5	-	-	-	-	LSDPC_READ1[19:16]				-
0xE6	LSDPC_READ2[7:0]								-
0xE7	LSDPC_READ2[15:8]								-
0xE8	-	-	-	-	LSDPC_READ2[19:16]				-
0xE9	LSDPC_READ3[7:0]								-
0xEA	LSDPC_READ3[15:8]								-
0xEB	-	-	-	-	LSDPC_READ3[19:16]				-
0xEC	LSDPC_READ4[7:0]								-
0xED	LSDPC_READ4[15:8]								-
0xEE	-	-	-	-	LSDPC_READ4[19:16]				-

3. Electrical characteristics

3.1. Absolute Maximum Ratings

Parameter	Min	Max	Unit
Power supply voltage	-0.5	6	V
Voltage on any 3.3V input pin	3.0	3.6	V
Voltage on any 5V input pin	4.5	5.5	V
Storage temperature	-40	125	℃

3.2. Recommended Operating Condition

Parameter	Symbol	Min	Typ	Max	Unit
3.3V Digital power supply voltage	VDD3 SHPD_VDD3	3.0	3.3	3.6	V
3.3V Analog power supply voltage	ADC_AVDD3 DAC_AVDD3	3.0	3.3	3.6	V
5.0V Digital power supply voltage	VDD5	4.5	5.0	5.5	V
Industrial temperature range	T_A	-25	-	85	℃

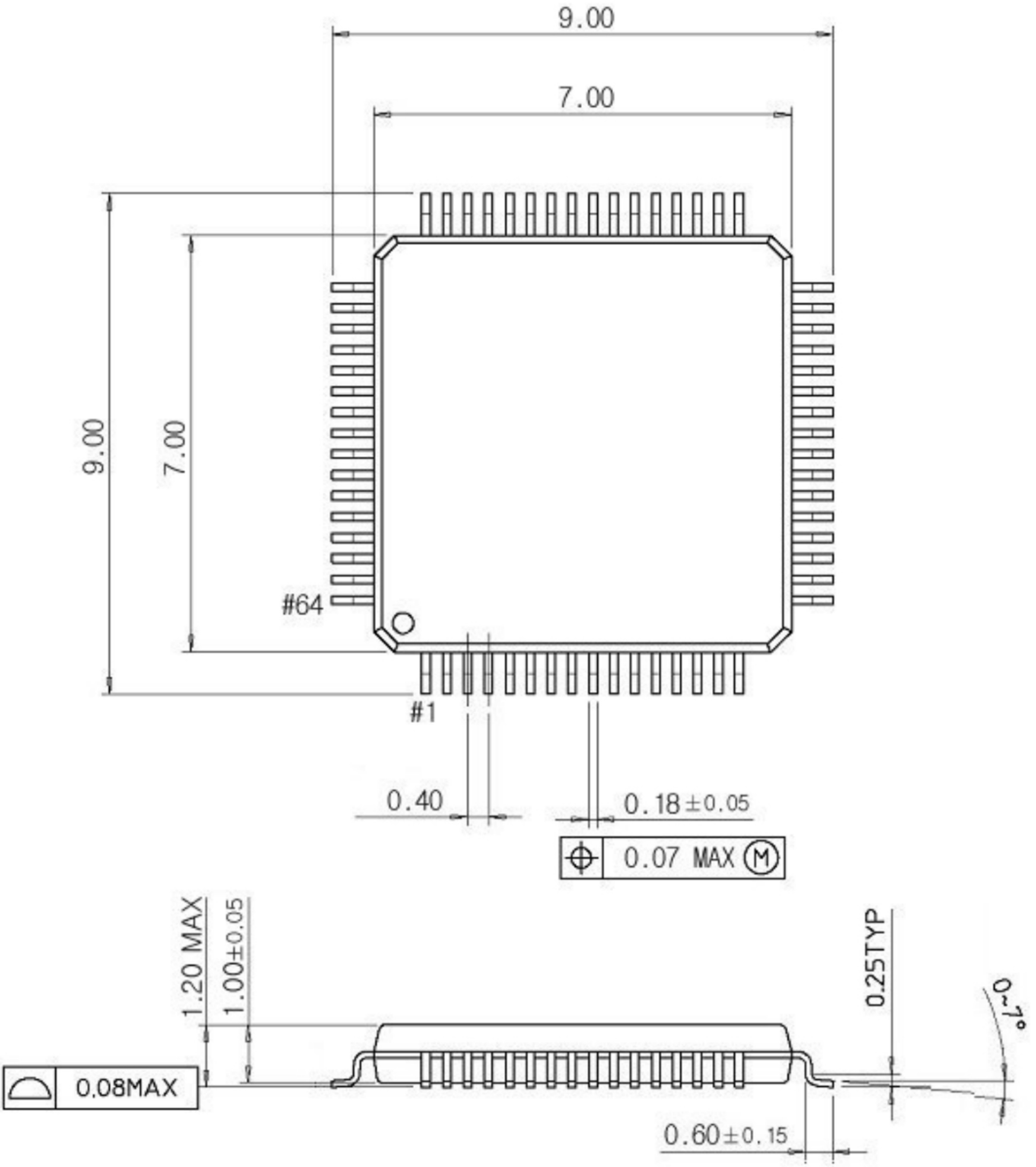
3.3 DC Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
3.3V IO *Note1					
Input low voltage	V_{IL3}	-0.3	-	0.8	V
Input high voltage	V_{IH3}	2.0	-	5.5	V
Input Leakage current	I_{IL3}	-	-	±10	uA
Threshold point	V_{T3}	1.35	1.47	1.60	V
Schmitt trig Low to High threshold point	V_{T3+}	1.40	1.50	1.59	V
Schmitt trig. High to Low threshold point	V_{T3-}	0.88	0.94	1.00	V
Output low voltage	V_{OL3}	-	-	0.4	V
Output high voltage	V_{OH3}	2.4	-	-	V
5.0V IO *Note2					
Input low voltage	V_{IL5}	-0.3	-	0.8	V
Input high voltage	V_{IH5}	2.0	-	5.5	V
Input Leakage current	I_{IL5}	-	-	±10	uA
Threshold point	V_{T5}	1.33	1.44	1.48	V
Schmitt trig Low to High threshold point	V_{T5+}	1.82	1.96	2.04	V
Schmitt trig. High to Low threshold point	V_{T5-}	1.12	1.22	1.28	V
Output low voltage	V_{OL5}	-	-	0.4	V
Output high voltage	V_{OH5}	2.4	-	-	V

*Note1 : 3.3V data pins(expect 5V data pins)

*Note2 : 5V data pins(XRG, H1, H2 pins)

4. Package Information



Package	Type	Pin pitch	Size(WxD)
	64 - TQFP	0.40mm	7x7mm

5. Revision History

REVISION	DATE	DESCRIPTION
rev 0.1	2010.07.12	· Generated