



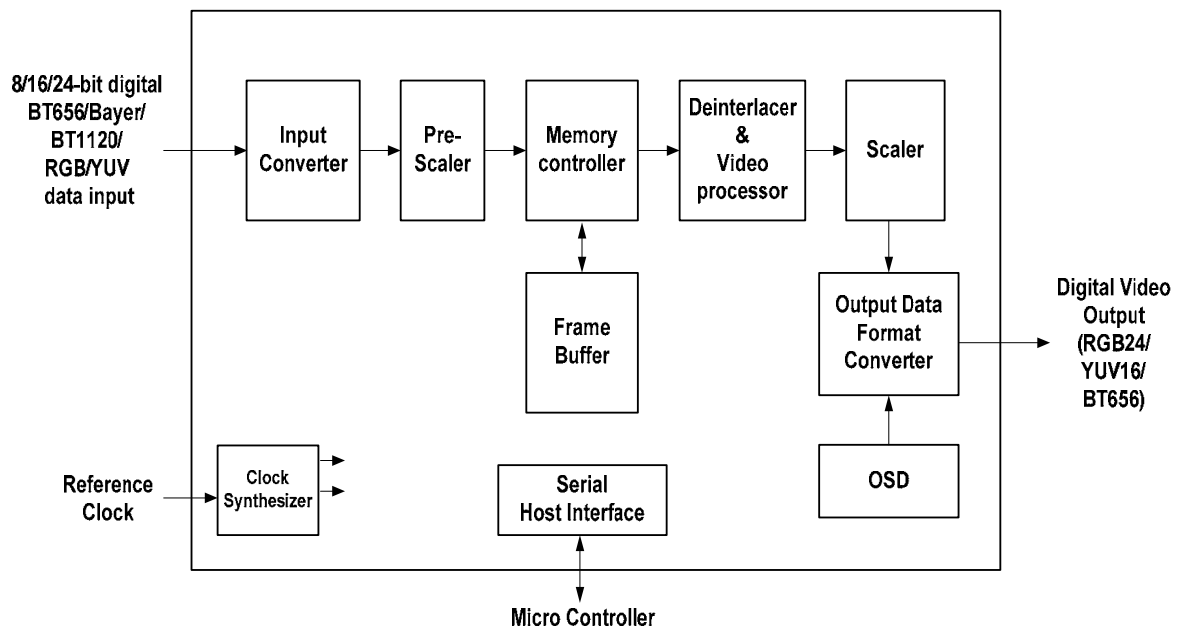
VS9988

HIGH DEFINITION
VIDEO PROCESSOR
AND
MULTI FORMAT CONVERTER

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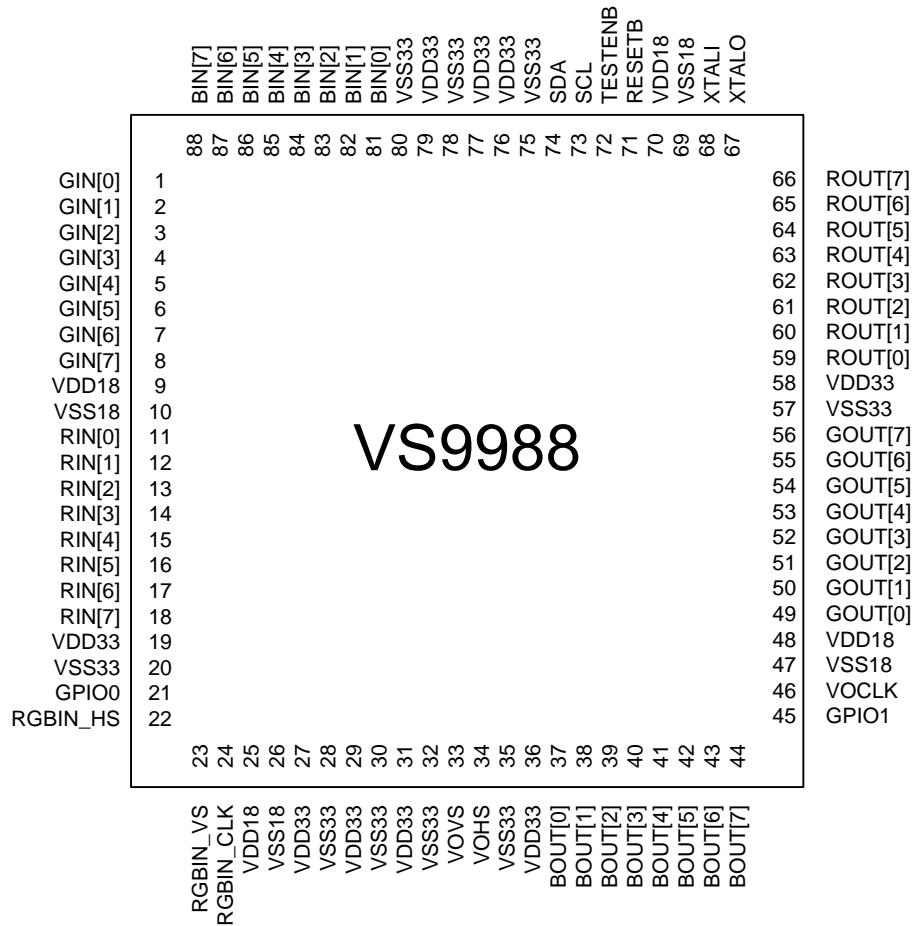
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1. BLOCK DIAGRAM


2. FEATURES

- Support Various Digital Video Input Formats
 - 8-bit interlace BT.656 or progressive input
 - 8-bit ITU-R BT.601 + Horizontal Sync + Vertical Sync
 - 16-bit Y/UV with sync or BT1120 input
 - 24-bit RGB/YUV input
 - 8-bit CMOS Raw Bayer format data
- Resolutions of all input format are up to 1080i/1080P
- Support Various Digital Video Output Formats
 - 24/18/16-bit RGB + Horizontal Sync + Vertical Sync
 - 24-bit 4:4:4 YUV + Horizontal Sync + Vertical Sync
 - 24-bit 4:4:4 YPbPr + Horizontal Sync + Vertical Sync
 - 16-bit 4:2:2 YUV + Horizontal Sync + Vertical Sync
 - BT.1120 16 bit output
 - 8-bit Bayer format output + Horizontal Sync + Vertical Sync
 - BT.656 8-bit progressive / interlace output
- Resolutions of all output format are up to 1080P
- Support UHD 4K2K@30Hz input to 1080P@60Hz output transformation
- Frame rate up-conversion to 60 Hz or more
- Frame rate down to 1 Hz video output or less
- Motion-Adaptive 3D Deinterlace
- Edge-Preserving Pixel Interpolation
- Cross color suppression
- Embedded Scaling Engine (Relács), Supporting progressive Output Resolution from 320X240 to 1920X1200
- Programmable scaler
- Brightness, Contrast, Saturation, and Hue Adjustment
- Color Transient Improvement, Adaptive Black-Level Extension
- Video Noise Reduction
- Frequency Directive Picture Sharpening
- Image Signal Processing
 - Auto white balance
 - Auto focus
 - Auto exposure
- Adaptive 2D/3D noise reduction
- edge enhancement

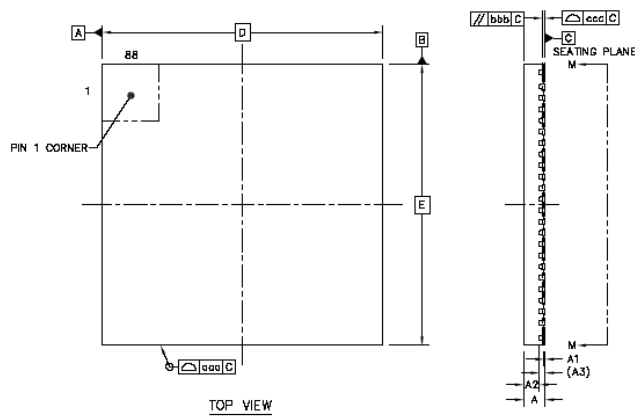
- Image flip, mirror, still
- 3-Channel 10-Bit Build-In Color gamma Look-Up Table for Video Fine-Tune
- Host Interface Compatible with Two-Wire IIC, Serial Interface
- OSD with 128 Build-in and 64 Programmable Font and Attribute Table, 16 Colors at same Time from 16,777,216-Color Template, Blinking, and Blending
- R/G/B output port swap & rotation control
- R/G/B input port swap & rotation control
- SDRAM emdedded
- One 27 MHz crystal
- 1.8V / 3.3V power supply
- 88pin TQFN

3. PIN OUT DIAGRAM


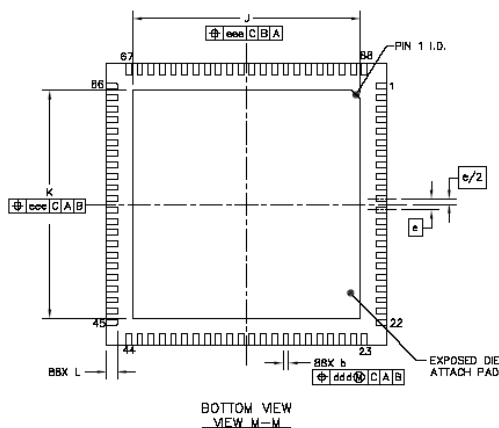
4 PIN DESCRIPTION

Video Input Pins			
Name	Type	Description	Notes
RIN7~0	I	Red input data	
GIN7~0	I	Green/BT656/Bayer input data	
BIN7~0	I	Blue input data	
RGBIN_VS	I	Input Vertical Synchronization	
RGBIN_HS	I	Input Horizontal Synchronization	
RGBIN_CLK	I	Input Data Clock	
Video Output Pins			
Name	Type	Description	Notes
ROUT [7:0]	O	R/V/Pr Digital Video Output	
GOUT [7:0]	O	G/Y/BT656 Digital Video Output	
BOUT [7:0]	O	B/U/Pb Digital Video Output	
VOHS / GPO1	O	Video Output Horizontal Synchronization / GPO1	
VOVS / GPO0	O	Video Output Vertical Synchronization / GPO0	
VOCLK	O	Video Output Clock / BT656 Output Clock	
GPIO0	I	Input Video Data Enable (DEI)	
	O	GPO0 output	
GPIO1	O	GPO1 output, Output Video Data Enable(DEO)	
Miscellaneous I/O Pins			
Name	Type	Description	Notes
RESETB	I _{PU}	Chip Reset (Active Low)	
XTAL_OUT	XO	Crystal Output	
XTAL_IN	XI	Crystal Input	
SDA	I _{PU} /O	Host Interface Serial Data / Address	
SCL	I _{PU}	Host Interface Serial Clock	
TEST_ENB	I _{PU}	Test Mode Enable (Active Low)	
Power Pins			
Name	Type	Description	Notes
VDD33	P ₃₃	Digital 3.3V power for I/O	Qty: 9
VSS33	G	Digital Ground For I/O	Qty: 9
VDD18	P ₁₈	Digital 1.8V Power for Core	Qty: 4
VSS18	G	Digital Ground for Core	Qty: 4
note :			
I		3.3V input	

O	3.3V output
I/O	3.3V input/output
I _{PU}	3.3V input with internal pull up
XI,XO	crystal input, output pin
P ₃₃	3.3V power pin
P ₁₈	1.8V power pin
G	Ground pin

5 PACKAGE
TQFN-88L


	SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS	A	0.7	0.75	0.8
STAND OFF	A1	0	0.035	0.05
MOLD THICKNESS	A2	---	0.55	0.57
L/F THICKNESS	A3		0.203 REF	
LEAD WIDTH	b	0.15	0.20	0.25
BODY SIZE	X	10 BSC		
	Y	10 BSC		
LEAD PITCH	e	0.4 BSC		
EP SIZE	X	J	8	8.1
	Y	K	8	8.1
LEAD LENGTH	L	0.35	0.4	0.45
PACKAGE EDGE TOLERANCE	aaa	0.1		
MOLD FLATNESS	bbb	0.1		
COPLANARITY	ccc	0.08		
LEAD OFFSET	ddd	0.1		
EXPOSED PAD OFFSET	eee	0.1		



NOTES
 1.0 COPLANARITY APPLIES TO LEADS, CORNER LEADS AND DIE ATTACH PAD.