Hi3516A/Hi3516D V100 Power Consumption Test Report

Issue 01

Date 2014-12-20

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Change History

Date	Revision Version	CR ID	Section Number	Change Description	Author
2014-12-20	01	N/A	N/A	This issue is the first official release.	Yin Wei

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1 Power Consumption Test Conclusions of the Hi3516A

1.1 Test Environment

Test Object	Hi3516A socket board
Camera	IMX178 (5-megapixel@30 fps) or M34220 (1080p@60 fps)
Power Supply	HiPower power consumption test platform
Temperature Tester	Point thermometer
Heater	High- and low-temperature box. The ambient temperature is 25°C (77°F), and the chip surface temperature is 100°C (212°F).
Heat Dissipation Mode of the Main Chip	The main chip is placed in the temperature box, and the produced heat is dissipated through the surfaces of the printed circuit board (PCB) and chip.

1.2 Test Scenarios and Data

1.2.1 Scenario 1

5-megapixel@30 fps

The configurations are as follows:

- CPU: 600 MHz; two 16-bit DDR3 SDRAMs (4 Gbits); MIPI-VICAP-ISP 250 MHz
- VGS: 300 MHz; VPSS: 250 MHz; VEDU (H.265): 297 MHz; AVC (H.264): 297 MHz (disabled); SYS-AXI: 198 MHz; MDA1-AXI: 250 MHz, MDA0-AXI: 297 MHz
- CVBS automatic detection, audio single input and output, and USB and SDIO disabled

The typical services are as follows:

- MIPI -> VICAP (ISP) -> VPSS (one input and three outputs) -> DDR -> VEDU (5-megapixel and VGA streams)+JPEG (5-megapixel@2 fps) -> IVE perimeter (CIF 15 fps)
- Audio input -> AENC -> ADEC -> audio output+VOD of 1-channel large stream from the network at 12 Mbit/s
- Data streams are compressed and decompressed in all channels. The scenario is the motion scenario (motion-related videos are played on a large-screen television and are captured by the IP camera).

The maximum services are as follows:

- MIPI -> VICAP (ISP) -> DDR -> VGS (rotate) -> DDR -> VPSS (one input and three outputs) -> DDR -> VEDU (5-megapixel and VGA streams)+JPEG (5-megapixel@2 fps) -> IVE perimeter (CIF 15 fps)
- Audio input -> AENC -> ADEC -> audio output+VOD of 8-channel large stream from the network at 12 Mbit/s
- Data streams are compressed and decompressed in all channels. The scenario is the motion scenario (motion-related videos are played on a large-screen television and are captured by the IP camera).

1

5-megapixel@30 fps

The power consumption listed in this table is the typical value at various temperatures.

Ambient Temperature	Chip Surface Temperature	Core Power Consumption				1.5 V (mW)	MIPI (mW)	3.3 V (mW)	Total Power Consumption (mW)
		VDD (mW)	DDR (mW)	CPU (mW)	Media (mW)				
25ºC (77ºF)	33.4ºC (92.1ºF)	About 56	About 71	About 35	About 682	About 120	About 26	About 200	About 1190
92ºC (197.6ºF)	101.4ºC (214.52ºF)	About 75	About 76	About 56	About 724	About 120	About 26	About 200	About 1277

2

The power consumption listed in this table is the maximum value at various temperatures.

Ambient Temperature	Chip Surface Temperature	Core Power Consumption				1.5 V (mW)	MIPI (mW)	3.3 V (mW)	Total Power Consumption (mW)
		VDD (mW)	DDR (mW)	CPU (mW)	Media (mW)				
25ºC (77ºF)	35.6ºC (96.08ºF)	About 69	About 93	About 57	About 689	About 120	About 26	About 200	About 1254
91ºC (195.8ºF)	102.4ºC (216.32ºF)	About 107	About 103	About 119	About 808	About 120	About 26	About 200	About 1483

1.2.2 Scenario 2

1080p@60 fps

CPU: 600 MHz; MIPI-VICAP-ISP 150 MHz

VGS: 237 MHz; VPSS: 150 MHz; VEDU (H.265): 250 MHz; AVC (H.264): 250 MHz (disabled); SYS-AXI: 198 MHz; MDA1-AXI: 200 MHz, MDA0-AXI: 237 MHz

CVBS automatic detection, audio single input and output, and USB and SDIO disabled

The typical services are as follows:

One 16-bit DDR3 SDRAM (4 Gbits)

MIPI -> VICAP (ISP) -> VPSS (one input and three outputs) -> DDR -> VEDU (5-megapixel and VGA streams)+JPEG (2-megapixel@2 fps) -> IVE perimeter (CIF 15 fps)

Audio input -> AENC -> ADEC -> audio output+VOD of 1-channel large streams from the network at 12 Mbit/s

Data streams are compressed and decompressed in all channels. The scenario is the motion scenario (motion-related videos are played on a large-screen television and are captured by the IP camera).

The maximum services are as follows:

Two 32-bit DDR3 SDRAMs (4 Gbits)

MIPI -> VICAP (ISP) -> DDR -> VGS (rotate) -> DDR -> VPSS (one input and three outputs) -> DDR -> VEDU (5-megapixel and VGA streams)+JPEG (2-megapixel@2 fps) -> IVE perimeter (CIF 15 fps)

Audio input -> AENC -> ADEC -> audio output+VOD of 8-channel large streams from the network at 12 Mbit/s

Data streams are compressed and decompressed in all channels. The scenario is the motion scenario (motion-related videos are played on a large-screen television and are captured by the IP camera).

1 **1080p@60 fps:**

The power consumption listed in this table is the typical value at various temperatures.

Ambient Temperature	**Chip Surface Temperature**	**Core Power Consumption**				**1.5 V (mW)**	**MIPI (mW)**	**3.3 V (mW)**	**Total Power Consumption (mW)**
		VDD (mW)	**DDR (mW)**	**CPU (mW)**	**MEDIA (mW)**				
25ºC (77ºF)	33ºC (91.4ºF)	About 53	About 70	About 36	About 509	About 80	About 26	About 200	About 974
92ºC (197.6ºF)	100.9ºC (213.62º F)	About 72	About 73	About 60	About 572	About 80	About 26	About 200	About 1083

2 The power consumption listed in this table is the maximum value at various temperatures.

Ambient Temperature	**Chip Surface Temperature**	**Core Power Consumption**				**1.5 V (mW)**	**MIPI (mW)**	**3.3 V (mW)**	**Total Power Consumption (mW)**
		VDD (mW)	**DDR (mW)**	**CPU (mW)**	**MEDIA (mW)**				
25ºC (77ºF)	37.9ºC (100.22º F)	About 67	About 90	About 55	About 518	About 120	About 26	About 200	About 1076

	89ºC (192.2ºF)	101.5ºC (214.7ºF)	About 107	About 101	About 108	About 593	About 120	About 26	About 200	About 1255

1.3 Power Consumption of Each Module

Module	Core Power Consumption				Power Consumption Under Various Power Supplies			Total Power Consumption (mW)
	VDD (mW)	DDR (mW)	CPU (mW)	Media (mW)	1.5 V (mW)	1.8 V (mW)	3.3 V (mW)	
USB	About 27.5	About 0.55	0	0	0	0	About 16.5	About 44.55
CVBS	0	0	0	0	0	0	About 135.3	About 135.3
Audio CODEC	0	0	0	0	0	0	About 19.8	About 19.8
SDIO0	0	About 0.66	0	About 17.6	0	About 9	About 16.5	About 43.76
SDIO1	0	About 1.1	0	About 19.25	0	About 9	About 16.5	About 45.85
MIPI	0	0	0	0	0	About 26	0	About 26

2 Power Consumption Test Conclusions of the Hi3516D

3-megapixel@30 fps

CPU: 600 MHz; two 16-bit DDR3 SDRAM (4 Gbits), MIPI-VICAP-ISP 150 MHz

VGS: 200 MHz; VPSS: 150 MHz; VEDU (H.265): 198 MHz; AVC (H.264): 198 MHz (disabled); SYS-AXI: 198 MHz; MDA1-AXI: 200 MHz, MDA0-AXI: 198 MHz

CVBS automatic detection, audio single input and output, and USB and SDIO disabled

The typical services are as follows:

MIPI -> VICAP (ISP) -> VPSS (one input and three outputs) -> DDR -> VEDU (3-megapixel and VGA streams)+JPEG (3-megapixel@2 fps) -> IVE perimeter (CIF 15 fps)

Audio input -> AENC -> ADEC -> audio output+VOD of 1-channel large streams from the network at 10 Mbit/s

Data streams are compressed and decompressed in all channels. The scenario is the motion scenario (motion-related videos are played on a large-screen television and are captured by the IP camera).

The maximum services are as follows:

MIPI -> VICAP (ISP) -> DDR -> VGS (rotate) -> DDR -> VPSS (one input and three outputs) -> DDR -> VEDU (3-megapixel and VGA streams)+JPEG (3-megapixel@2 fps) -> IVE perimeter (CIF 15 fps)

Audio input -> AENC -> ADEC -> audio output+VOD of 3-channel large streams from the network at 10 Mbit/s

Data streams are compressed and decompressed in all channels. The scenario is the motion scenario (motion-related videos are played on a large-screen television and are captured by the IP camera).

3-megapixel@30 fps

The power consumption listed in this table is the typical value at various temperatures.

Ambient Temperature	Chip Surface Temperature	Core Power Consumption				1.5 V (mW)	MIPI (mW)	3.3 V (mW)	Total Power Consumption (mW)
		VDD (mW)	DDR (mW)	CPU (mW)	Media (mW)				
25ºC (77ºF)	35.5ºC (95.9ºF)	About 58	About 61	About 30	About 369	About 80	About 26	About 200	About 824
90ºC (194ºF)	101.4ºC (214.52ºF)	About 70	About 65	About 55	About 419.5	About 80	About 26	About 200	About 915.5

The power consumption listed in this table is the maximum value at various temperatures.

Ambient Temperature	Chip Surface Temperature	Core Power Consumption				1.5 V (mW)	MIPI (mW)	3.3 V (mW)	Total Power Consumption (mW)
		VDD (mW)	DDR (mW)	CPU (mW)	Media (mW)				
25ºC (77ºF)	34.9ºC (94.82ºF)	About 60	About 85	About 42	About 420	About 80	About 26	About 200	About 913
89ºC (192.2ºF)	100.6ºC (213.08ºF)	About 102	About 100	About 82	About 576	About 80	About 26	About 200	About 1166

2.1 Power Consumption of Each Module

The power consumption of the Hi3516A is the same as that for the Hi3516D.