

ATSAMA5D27-WLSOM1 Power Consumption in Different Modes

AN5242

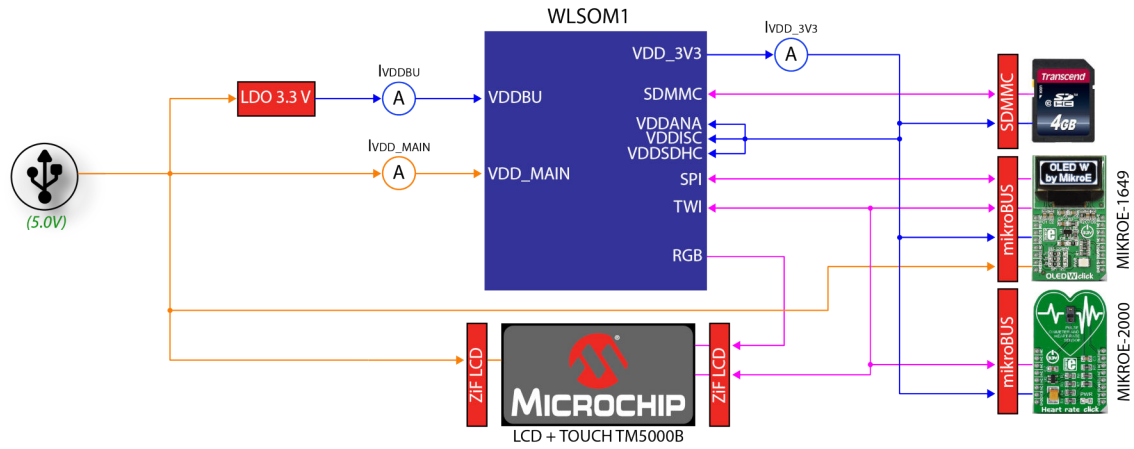


Scope

This application note describes the current consumption measurements made on the SAMA5D27 Wireless SOM1 (ATSAMA5D27-WLSOM1) module mounted on the ATSAMA5D27-WLSOM1-EK1 (DM320117), its evaluation kit.

1. Hardware Set-Up

The figure below illustrates the hardware architecture and the position of voltmeters for the measurements performed on the ATSAMA5D27-WLSOM1-EK1 board in revision "Rev3".



2. Software Set-Up and Commands

2.1 Software Set-Up

The Linux® image used for the tests, named "linux4sam-buildroot-sama5d27_wlsom1_ek-graphics-2020.04.img", is available on linux4sam.org at the following link: [linux4sam-buildroot-sama5d27_wlsom1_ek-graphics-2020.04.img.bz2](https://linux4sam.org/buildroot-sama5d27_wlsom1_ek-graphics-2020.04.img.bz2).

2.2 Software Commands

To activate various interfaces, the following commands are used:

- For Wi-Fi® activity:
 - modprobe wilc-sdio
 - wpa_supplicant -Dnl80211 -iwlan0 -c/etc/wpa_supplicant.conf &
 - wpa_cli -iwlan0 -p/var/run/wpa_supplicant add_network
 - wpa_cli -iwlan0 -p/var/run/wpa_supplicant set_network 2 ssid ""IPERF_TEST""
 - wpa_cli -iwlan0 -p/var/run/wpa_supplicant set_network 2 key_mgmt WPA-PSK
 - wpa_cli -iwlan0 -p/var/run/wpa_supplicant set_network 2 psk ""12345678""
 - wpa_cli -iwlan0 -p/var/run/wpa_supplicant select_network 2
 - udhcpc -iwlan0 &
 - iperf -s -i 1 -w 512k & (At WLSOM terminal)
 - iperf -c 192.168.1.3 -i 1 -t 300 -w 512k (At PC terminal)
- For Ethernet activity:
 - ping 192.168.1.2 &
- For SDCard Read/Write activity:
 - sh sdcardtest.sh &
- For USB Host Copy activity:
 - sh copy.sh &
- For OLED activity:
 - sh oledtest.sh &
- For Heart Beat activity:
 - python hr_click_board.py &
- For LCD activity:
 - sh lcdtest.sh &

3. Current Consumption Measurements

3.1 Current Consumption Measurements in Linux Environment

Table 3-1. Current Consumption in Linux Environment

Scenario		Scenario N°1	Scenario N°2	Scenario N°3	Scenario N°4	Scenario N°5	Scenario N°6
Set-up		BEFORE BOOT. MODULE OFF Not Started	AFTER LINUX BOOT	Wi-Fi ACTIVITY Channel 6	Wi-Fi + ETHERNET ACTIVITIES	Wi-Fi + SDCARD + LCD ACTIVITIES	Wi-Fi + ETHERNET + USB HOST + SDCARD + HEART BEAT + OLED + LCD ACTIVITIES
Current Consumption	IVDD_MAIN @ 5V	60.5 μ A	162 mA	207 mA	208 mA	244 mA	250 mA
	IVDDBU @ 3.3V	13.8 μ A	10.1 μ A	10.1 μ A	10.2 μ A	10.1 μ A	10.1 μ A
	IVDD_3V3 @ 3.3V	0 mA	1.21 mA	1.31 mA	1.48 mA	7.94 mA	7.95 mA
Power Consumption	PVDD_MAIN @ 5V	302.5 μ W	810 mW	1035 mW	1040 mW	1220 mW	1250 mW
	PVDDBU @ 3.3V	45.54 μ W	33.33 μ W	33.33 μ W	33.66 μ W	33.33 μ W	33.33 μ W
	PVDD_3V3 @ 3.3V	0 mW	3.993 mW	4.323 mW	4.884 mW	26.202 mW	26.325 μ W

3.2 Current Consumption Measurements In Backup Modes

Table 3-2. Current Consumption in Backup Modes

Scenario		Scenario N°7	Scenario N°8	Scenario N°9	Scenario N°10	Scenario N°11
Set-up		Backup Mode	Backup Mode w/ Self Refresh	ULP0 Mode	ULP1 Mode	Idle Mode
Current Consumption	IVDD_MAIN @ 5V	58.9 μ A	82.6 mA	59.8 mA	58.4 mA	58.7 mA
	IVDDBU @ 3.3V	13.6 μ A	9.6 μ A	13.7 μ A	6.2 μ A	6.3 μ A
	IVDD_3V3 @ 3.3V	44.5 μ A	5.34 mA	870 μ A	780 μ A	800 μ A
Power Consumption	PVDD_MAIN @ 5V	294.5 μ W	413 mW	299 mW	292 mW	293.5 mW
	PVDDBU @ 3.3V	44.88 μ W	31.68 μ W	45.21 μ W	20.46 μ W	20.79 μ W
	PVDD_3V3 @ 3.3V	146.84 μ W	17.62 μ W	2871 μ W	2574 μ W	2640 μ W

4. Revision History

Revision	Date	Changes
A	January 2024	Initial version

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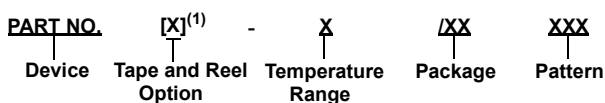
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Temperature Range:	I	= -40°C to +85°C (Industrial)
	E	= -40°C to +125°C (Extended)
Package: ⁽²⁾	JQ	= UQFN
	P	= PDIP
	ST	= TSSOP
	SL	= SOIC-14
	SN	= SOIC-8
	RF	= UDFN
Pattern:	QTP, SQTP, Code or Special Requirements (blank otherwise)	

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