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# Hibernate Mode in the AT73C238/AT73C239

## 1. Scope

This application note describes the hibernate mode for the AT73C238/AT73C239.

### 1.1 Reference Documents

[Table 1-1](#) gives the references of the documents and their denominations in this document.

**Table 1-1.** Reference Documents

Owner - Reference	Title
Atmel - 6201.pdf	AT73C239 Technical Datasheet



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**Power  
Management**

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**Application  
Note**

6240A-PMAAC-19-May-06



## 2. Operating Conditions

**Table 2-1.** AT73C238/AT73C239 Operating Conditions

Parameter/Function	Pads	Conditions	Min	Max	Unit
Operating Temperature	--		-40	85	°C
Main Input Voltage	VDD1, VDD2, VDD3		3.0	3.6	V
Backup Input Voltage	VBAT		2.5	3.6	V
LDO1 Trimming	vo1	Trimmed @ 2.75V	2.7	2.8	V
LDO2 Trimming	vo2	Trimmed @ 1.8V	1.75	1.85	V
LDO3 Trimming	vo3	Trimmed @ 1.5V	1.45	1.55	V
LDO4 Trimming	vo4	Trimmed @ 1.5V	1.4	1.6	V

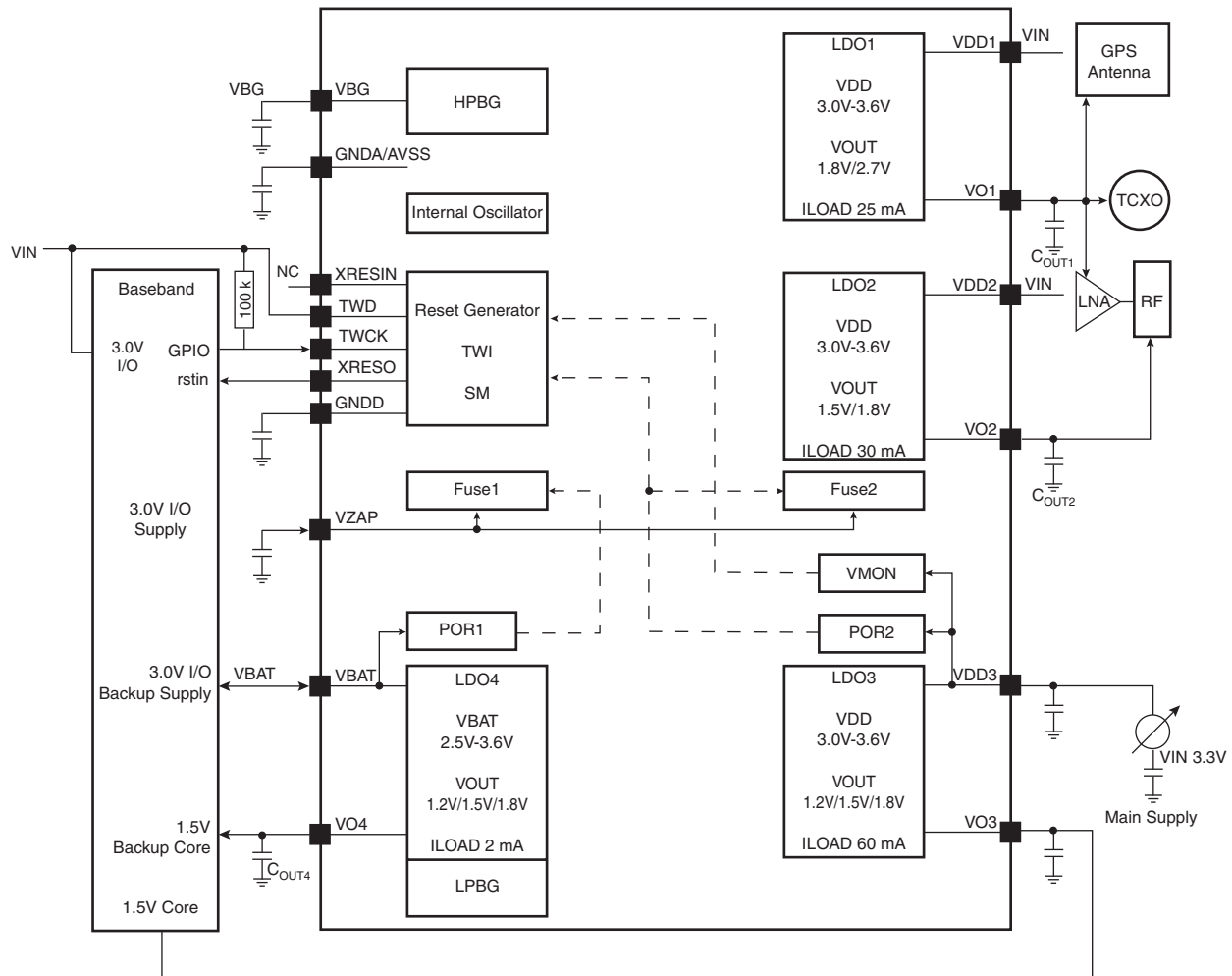
## 3. Glossary

**Hibernate Mode** -- When this mode is activated, the baseband enters very low consumption mode. In this mode, only the RTC block of the baseband is running, thus the main LDOs are switched off.

**Trimming** -- Action on internal fuse to adjust the output voltage value to the targeted value.

## 4. Block Diagram With Hibernate Mode

Figure 4-1. Standard Application Diagram with Hibernate Mode



## 5. Hibernate Mode

### 5.1 Scope

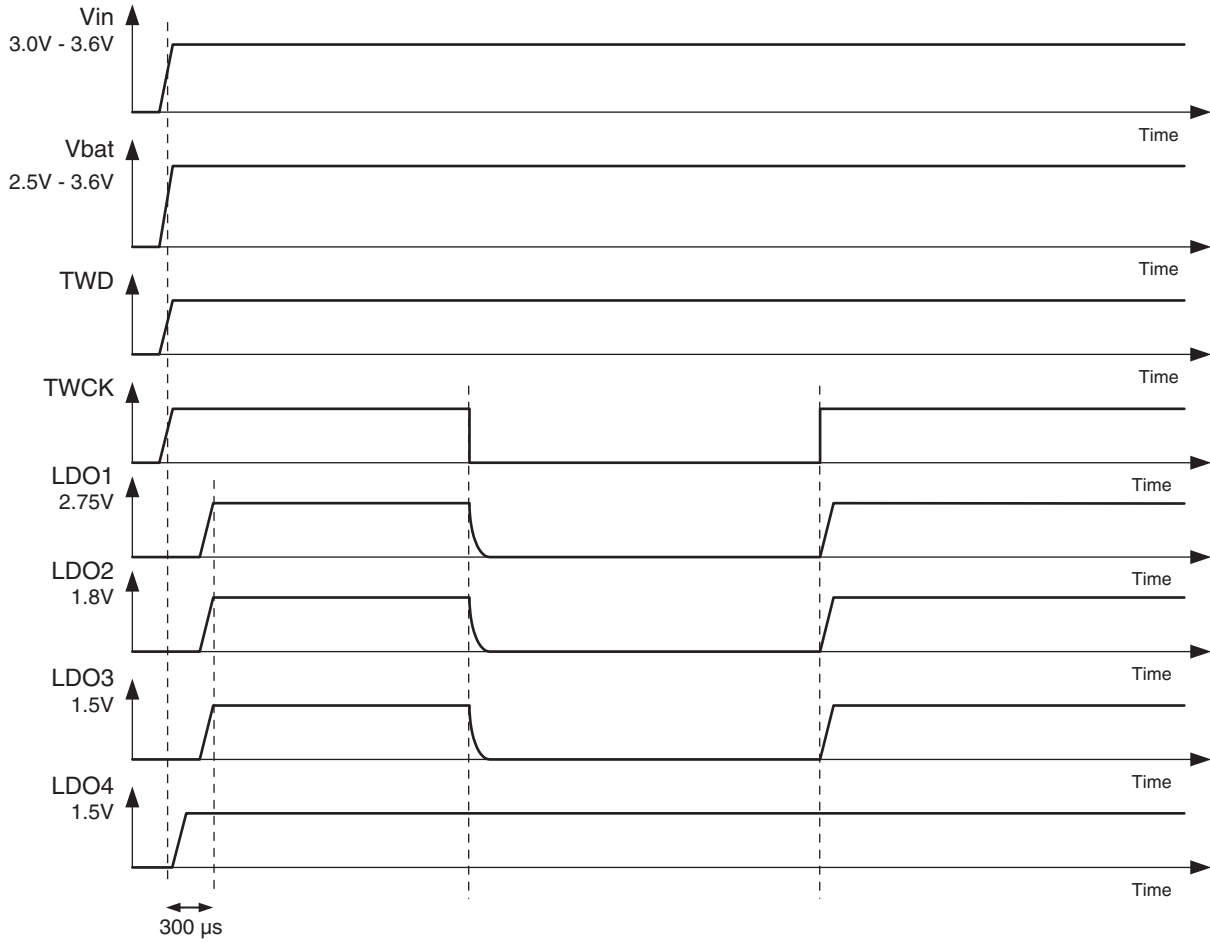
Hibernate mode puts the application in very low consumption mode. During this phase, the consumption is less than 2mA. In order to achieve this, all the main LDOs are switched off (LDO1, LDO2 and LDO3) by activating the “twck” pin to low level. Only LDO4 remains active so that the baseband RTC block may continue working.

To wake up the device (equivalent to quitting Hibernate Mode), a high level should be applied on the “twck” pin. This switches on the main LDOs.

## 5.2 Timing Diagram

Figure 5-1 shows the timing diagram of the behavior of each LDO output voltage for Hibernate Mode.

Figure 5-1. Hibernate Mode Timing Diagram

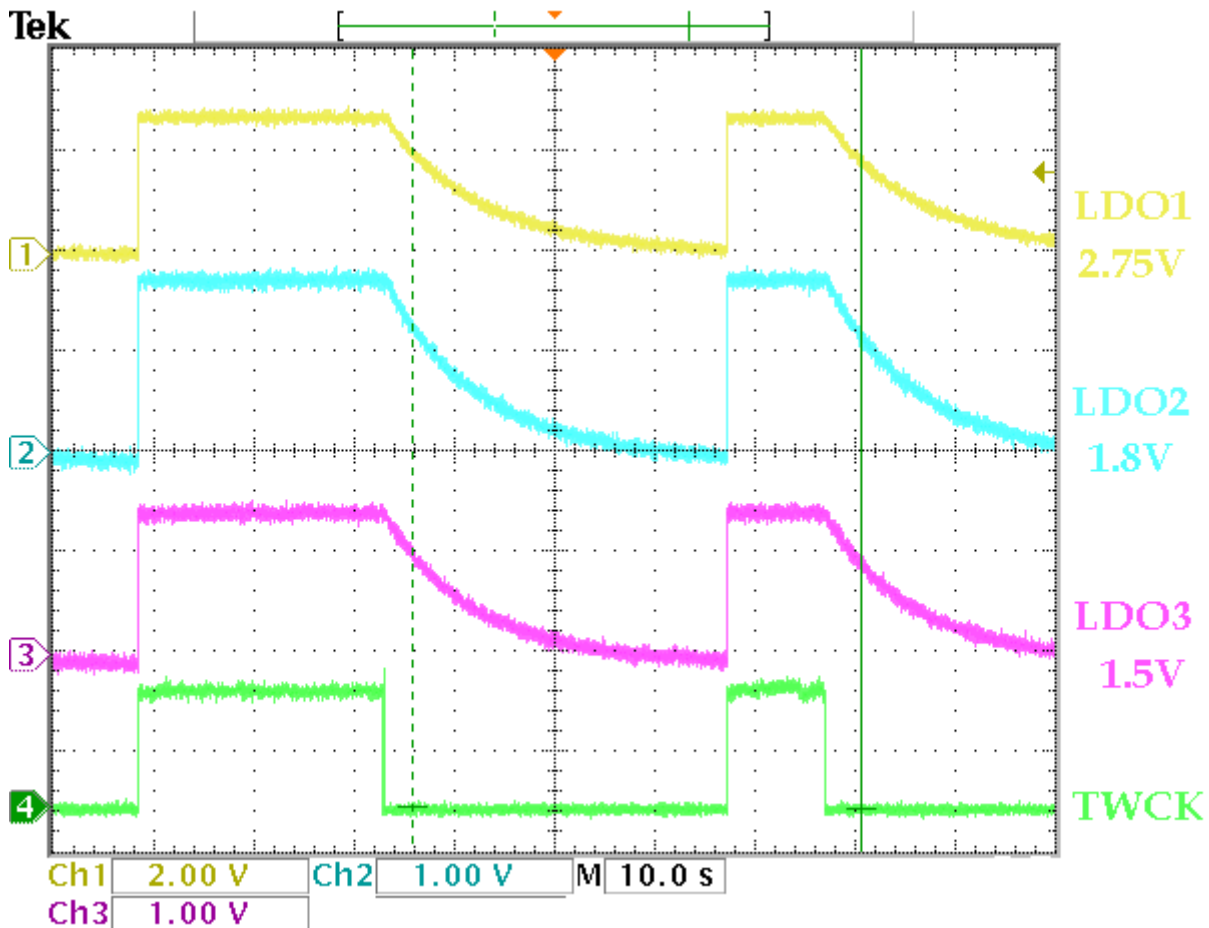


## 5.3 Output Voltage Values and Behavior on Silicon

Table 5-1. AT73C238/AT73C239 Product Output Voltages

Parameter/Function	Pads	Conditions		Unit
LDO1 Output Voltage	vo1	VBAT = VIN = 3.3V, in Normal Mode	2.75	V
		VBAT = VIN = 3.3V, in Hibernate Mode	0	V
LDO2 Output Voltage	vo2	VBAT = VIN = 3.3V, in Normal Mode	1.8	V
		VBAT = VIN = 3.3V, in Hibernate Mode	0	V
LDO3 Output Voltage	vo3	VBAT = VIN = 3.3V, in Normal Mode	1.5	V
		VBAT = VIN = 3.3V, in Hibernate Mode	0	V
LDO4 Output Voltage	vo4	VBAT = VIN = 3.3V, in Normal Mode	1.5	V
		VBAT = VIN = 3.3V, in Hibernate Mode	1.5	V

Figure 5-2. Hibernate Mode Timing Diagram on Silicon



Note: These measurements were done without any output loads.



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