Application Report
SPRAC99–July 2017

AM571x Power Estimation Tool

Catalog Processors

ABSTRACT

The power estimation spreadsheet provides power consumption estimates based on measured and simulated data; they are provided “as is” and are not guaranteed within a specified precision. Power consumption depends on electrical parameters, silicon process variations, environmental conditions, and use cases running on the processor during operation. Actual power consumption should be verified in the real system. This power estimation spreadsheet is preliminary and subject to change.

The power estimation tool spreadsheets mentioned in this document can be downloaded from the following URL: http://www.ti.com/lit/zip/sprac99.

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Trademarks

1 Using the Power Estimation Tool

The input part of the spreadsheet consists of four sections: General, DDR Configuration, Operating Performance Point, and Use Case Input. To use the input part of the spreadsheet, modify the input fields with the appropriate usage parameters. Cells that are designed for user input are light blue in color. Simply configure the light blue cells to a value most closely aligned with your intended scenario. Briefly, the purpose of each of the sections is:

- General: configure the high-level system configuration such as junction temperature, power estimation mode and AVS options.
- DDR Configuration: configure DDR type, frequency, bit width and ECC options.
- Operating Performance Point: configure MPU, DSP, IVA and GPU OPP. The CORE is fixed to OPP_NOM.
- IO Voltage: Select IO voltage of each voltage domains.

1.1 Macro Buttons

The spreadsheet includes macros.

The input part of the spreadsheet has command buttons to run macros.

"Reset" - Set all input fields to default values.

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1.2 General

This section allows you to set a junction temperature (not ambient temperature) between 0°C and 105°C, power estimation mode and AVS option.

- Junction Temperature (°C) : 0 to approximately 105 (negative values are not supported in the tool)
- Power Estimation Mode : Max, Typ ('Max' accounts for the worst-case silicon process variation)
- AVS Class : None or Class 0. AVS is required for all operating performance points. Disabling AVS in this option is just to estimate power reduction by the AVS.

1.3 DDR Configuration

This section allows you to set DDR configuration parameters.

- Type: DDR3 or DDR3L
- Frequency: DDR clock frequency. 303, 400, 532, 600 or 666 MHz
- Width: DDR data width. 16 or 32 bits
- ECC Enabled: Hardware ECC option: Yes or No.

1.4 Operating Performance Point

This section allows you to set an operating performance point (OPP) for MPU, DSP, IVA, and GPU. The CORE voltage domain should always be at OPP_NOM.

- VDD_MPU: select from OPP_NOM, OPP_OD or OPP_HIGH
- VDD_DSP: select from OPP_NOM, OPP_OD or OPP_HIGH
- VDD_IVA: select from OPP_NOM, OPP_OD or OPP_HIGH (Not supported for AM5716xxD)
- VDD_GPU: select from OPP_NOM, OPP_OD or OPP_HIGH (Not supported for AM5716xxD)
- VDD_CORE: OPP_NOM only

1.5 I/O Voltage

This section allows you to select 1.8 V or 3.3 V for each dual voltage IO domains (VDDSHV1-11).

1.6 Use Case Input

- Power Domain: Power domain information for each modules.
- Module: Name of processing cores or peripheral modules.
- Frequency (MHz): The module operating frequency specified by the OPP configuration.
- State: Specifies whether a peripheral is Enabled and configured for use, or Disabled and unconfigured.
- Processing
  - Profile: Selects the peripheral-specific configuration mode.
  - Utilization (%): Specifies the utilization as a percentage of processing load relative to a full load condition.
- Transfer (DDR or I/O)
  - Read (MB/s): Specifies the data transfer rate the module is receiving versus transmitting.
  - Write (MB/s): Specifies the data transfer rate the module is transmitting versus receiving.
  - I/O Frequency: Specifies the I/O frequency of the module.
  - I/O Pins: Specifies the number of data I/O pins used in the use case scenario.
  - I/O Group: Specifies the dual voltage I/O power supply bank of the I/O pins used by the module.

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1.7 AM571x Power Consumption

The power estimation tool generates a power consumption table (AM571x Power Consumption) in the power estimation tool spreadsheet. This table lists the power supply names , voltage in V, current in mA and power consumption in mW per power rail groups. The total power consumption in mW is listed in the end of this table.

2 Important Notes and Limitations

The following notes and limitations apply to the AM571x Power Estimation Tool:

It is up to you to input reasonable utilization numbers for the MPU subsystem for the purposes of maximum power analysis. 90-100% loading on the subsystem is not realistic for most application scenarios.

3 References

1. Change macro security settings in Excel (Office 2010)
2. Change macro security settings in Excel (Office 2007)

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