Application Note
AM263Px Power Estimation Tool

TEXAS INSTRUMENTS

ABSTRACT

The power estimation spreadsheet provides power consumption estimates based on measured and simulated data; they are provided "as is" and are not ensured 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 tool is meant for estimating power consumption during realistic operating modes; it is not intended for power supply sizing. This power estimation spreadsheet is preliminary and subject to change. This spreadsheet can be downloaded from the web at: SPRM851.

> **Note**
>
> This is a preliminary tool and TI is continuing to characterize more devices; therefore, data is updated and the Power Estimation Tool (PET) revised along with new findings.

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1 Introduction

The power estimation tool consists of a spreadsheet that helps calculate the estimated power based on the inputs of the application use-case a user provides. The usage of the spreadsheet is explained further in the document. By default, the spreadsheet has the most commonly used use-case settings as its' inputs.

2 Using the Power Estimation Tool

The input part of the spreadsheet consists of following 3 sections: Processing Elements, Interfaces and Power Report.

To use the input part the spreadsheet, users must modify the fields with their appropriate usage parameters. Cells designed for user input are in yellow. Fields that cannot be modified are gray. Fields in blue are the output calculated power. Configure the yellow cells to a value most closely aligned with the intended scenario.

The purpose of each of these sections is:

*   Processing Elements:
    *   Configure frequency of operation for R5F Dual Core 0, R5F Dual Core 1, HSM M4, ICSSM and CPSW
    *   Mode of operation for R5F and HSM (Hardware Security Module)
    *   User estimated percent utilization of each core
*   Interfaces
    *   Subset of commonly used major Interfaces with selectable mode
    *   Subset of commonly used major Interfaces with percent utilization
*   Other Inputs
    *   Junction Temperature (Tj) in degree Celsius
    *   Package type: SIP or non-SIP
    *   In case of SIP, Flash operation mode: RWW or Octal Read
*   Power Report:
    *   Selectable VDD, VDD_SRAM, VDDA
    *   Power estimation output by rail
    *   Power rails are aligned with AM263Px controlCARD™ design

3 Processing Elements

This section allows you to set the operating frequency, mode and load each compute core with utilization between 0%-100% (inclusive). Utilization here refers to the amount of time the core is utilized/active (expressed in-terms of percentage) within a fixed time frame. Table 3-1 lists the selectable options.

Table 3-1. Selectable Options for Frequency, Mode and Utilization

Processing Element	Frequency	Mode	Utilization
HSM (Hardware Security Module)	N/A	Secure Boot, Run Time Services	0% – 100%
R5F Dual Core 0	400MHz, 200MHz	Dual, Lockstep	0% – 100%
R5F Dual Core 1	400MHz, 200MHz, 0 (Disabled)	Dual, Lockstep	0% – 100%
ICSSM	200MHz	N/A	0% – 100%
CPSW	200MHz	N/A	0% – 100%

4 Interfaces

This section lets you select both modes and utilization of subset of the commonly used interfaces on AM263Px including CMPSS, DAC, ADC, OSPI, PWM, Ethernet, MCAN, MCSPI, Resolver. Utilization here refers to the amount of time the corresponding interface is utilized/active (expressed in-terms of percentage) within a fixed time frame.

Table 4-1 lists the selectable options.

Table 4-1. Selectable Options of Mode and Utilization

Interface	Mode	Utilization
CMPSS	on_3p3v, off	0%-100%
ADC	on_3p3v, off	0%-100%
DAC	on_3p3v, off	0%-100%
Ethernet_0 & Ethernet_1	RGMII, RMII, MII, 10, 100, 3.3V, Off	0%-100%
OSPI	Controller (Master), Peripheral (Slave), 133MHz, 100MHz, 80MHz, 67MHz, 60MHz, 40MHz	0%-100%
Resolver	on_3p3v, off	0%-100%
ECAP	Capture, PWM Out , 3v3	0%-100%
EPWM	on_3p3v, off	0%-100%
MCAN	250kbps, 1,5,8mbps, 3.3V, Off	0%-100%
MCSPI	Controller (Master), Peripheral (Slave), 1.563, 2.083, 3.125, 6.25, 12.5, 25, 40mbps, 3.3V, Off	0%-100%

5 Other inputs

- There is a selectable field for the junction temperature configuration:
  - Temperature (T_j °C): -40, 0, 25, 85, 105, 125, 140, 150.

Note

In Case of SIP package, the maximum T_j is 125°C and the tool only supports 25°C and 125°C configurations.

- There is a selectable field for the package type configuration:
  - Select SIP if SIP package is being used
  - Non-SIP if Non-SIP package is being used.
- There is a selectable field for the Flash operation configuration:
  - RWW (Read While Write - OSPI 8D Mode 133MHz)
  - Octal Read (OSPI 8D Mode 133MHz)

6 Power Report

The power estimation tool generates a power analysis report in this section. The report lists power supply name, voltage in Volts (V), and power consumption in Watts (W) per power rail groups. Power rail groups match the AM263Px CC design.

The table below shows the selectable fields for the following power rails options.

Table 6-1. Selectable options for the power rails

Voltage Rail	Selectable Options (V)
VDD	1.15, 1.175, 1.20,1.23, 1.25
VDD_SRAM	1.15, 1.175, 1.20,1.23, 1.25
VDDA	3.135, 3.3, 3.465

7 Revision History

DATE	REVISION	NOTES
May 2024	*	Initial release.

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
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