

3.11.5 SDRAM & SGRAM Architectural and Operational Features

The following standards describe features or characteristics that are applicable to one or more of the SDRAM devices described in section 3.11 of Std. 21-C. This section is being reorganized in Release 9 to accommodate several new categories of devices being covered. The original Standards included in this section covered only Single Data Rate (SDR) SDRAMs (these devices were initially just referred to as SDRAM). This coverage has expanded to include Double Data Rate (DDR) SDRAMs, Enhanced SDRAMs (ESDRAM), and Virtual Channel SDRAM (VCSDRAM). The new organization of Section 3.11.5 brings together into one sub-section all standards specifically applicable to one class of device. All standards in the following section that are defined for SDRAM, are also applicable to SGRAM, (even though SGRAM is not mentioned), unless SGRAM is specifically excluded.

A complete Table of Contents of all SDRAM & SGRAM Features follows.

3.11.5.1 - General SDRAM Functions

3.11.5.1.1 - SDRAM FUNCTION TRUTH TABLE

3.11.5.1.2 - SDRAM FUNCTION TRUTH TABLE FOR CKE

3.11.5.1.3 - SDRAM MODE REGISTER ARCHITECTURE

3.11.5.1.4 - POWER ON SEQUENCE (RECOMMENDED)

3.11.5.1.5 - AUTO PRECHARGE

3.11.5.1.6 - PRECHARGE ALL BANKS

3.11.5.1.7 - MODE REGISTER WRITE TIMING

3.11.5.1.8 - AUTO REFRESH

3.11.5.1.9 - WRITE LATENCY

3.11.5.1.10 - DQM LATENCY FOR READS AND WRITES

3.11.5.1.11 - PRECHARGE TIMING FOR READS

3.11.5.1.12 - COLUMN ADDRESS TO COLUMN ADDRESS DELAY

3.11.5.1.13 - CKE TIMING FOR POWER DOWN

3.11.5.1.14 - CKE TIMING FOR CLOCK SUSPEND

3.11.5.1.15 - SELF REFRESH ENTRY AND EXIT

3.11.5.1.16 - Burst Stop/Burst Terminate Command for SDRAMs/SGRAMs

3.11.5.1.17 - Full Page Burst Mode for SDRAM/SGRAM

3.11.5.1.18 - Deep Power Down Mode

3.11.5.2 - DDR Specific SDRAM Functions

3.11.5.2.1 - Bi-Directional DQS for DDR SDRAM

3.11.5.2.2 - Differential Clock for DDR SDRAMs & SGRAMs

3.11.5.2.3 - Read Interrupting a Write Operation for DDR SDRAMs/SGRAMs

3.11.5.2.4 - Write Interrupting a Read Operation for DDR SDRAMs/SGRAMs

3.11.5.2.5 - Precharge Timing for Reads for DDR SDRAMs/SGRAMs

3.11.5.2.6 - Precharge Timing for Writes for DDR SDRAMs/SGRAMs

- 3.11.5.2.7 - Burst Stop Command for DDR SDRAMs/SGRAMs**
- 3.11.5.2.8 - DDR SDRAM/SGRAM Full Sequential Burst Ordering**
- 3.11.5.2.9 - DDR SDRAM QS Coincident with Data**
- 3.11.5.2.10 - Extended Mode Register Set for DDR SDRAM / SGRAM.**
- 3.11.5.2.11 - DLL Enable/Disable Mode for DDR SDRAM/SGRAM with EMRS**
- 3.11.5.2.12 - Refresh Requirements**
- 3.11.5.2.13 - MRS/EMRS for Low Power DDR SDRAM**

3.11.5.3 - ESDRAM Specific SDRAM Functions

- 3.11.5.3.1 - Read-AutoPrecharge Operation for SDR ESDRAM**
- 3.11.5.3.2 - Read-AutoPrecharge Operation for DDR ESDRAM**
- 3.11.5.3.3 - Cache Load Operation for SDR ESDRAM**
- 3.11.5.3.4 - Cache Load Operation for DDR ESDRAM**
- 3.11.5.3.5 - No Write Transfer, Mode of Operation for SDR ESDRAM**
- 3.11.5.3.6 - No Write Transfer, Mode of Operation for DDR ESDRAM**

3.11.5.4 - VCSDRAM Specific SDRAM Functions

- 3.11.5.4.1 - Command Table for Virtual Channel SDR SDRAM**
- 3.11.5.4.2 - Command Table for Virtual Channel DDR SDRAM**
- 3.11.5.4.3 - Virtual Channel SDR SDRAM Mode Register Architecture**
- 3.11.5.4.4 - Virtual Channel DDR SDRAM Mode Register Architecture**

3.11.5.5 - DDR2 Specific SDRAM Functions

3.11.5.6 - GDDR2 Specific SGRAM Functions

3.11.5.7 - GDDR3 Specific SGRAM Functions

3.11.5.8 - GDDR4 Specific SGRAM Functions