

JEDEC STANDARD

DDR4 NVDIMM-N Design Standard (Revision 1.0)

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(From JEDEC Board Ballot JCB-16-28, formulated under the cognizance of the JC-45.6 Subcommittee on Hybrid Modules.)

1 Scope

This standard defines the electrical and mechanical requirements for 288-pin, 1.2 Volt (VDD), Double Data Rate, Synchronous SDRAM Nonvolatile Dual In-Line Memory Modules with NAND Flash backup (DDR4 NVDIMM-N). A DDR4 NVDIMM-N is a Hybrid Memory Module with a DDR4 DIMM interface consisting of DRAM that is made nonvolatile through the use of NAND Flash. NVDIMM-N modules adhere to the Byte Addressable Energy Backed Interface Standard, JESD245, that provides detailed logical behavior, interface, and register definitions. These DDR4 NVDIMM-N modules are intended for use as main memory or storage when installed in PCs.

System interface constraints are included which provide an initial basis for DDR4 NVDIMM-N and LR NVDIMM-N designs. Modifications to these constraints may be required to meet all system timing, signal integrity and thermal requirements for PC4-1600, PC4-1866, PC4-2133, PC4-2400, PC4-2666 and PC4-3200 support. All DDR4 NVDIMM-N implementations must use simulations and lab verification to ensure proper timing requirements and signal integrity in the design.

An additional lower voltage of TBD is defined. PC4L is used to reference DIMMs capable of operation at this voltage level. The annex for each raw card will have specific entries to indicate DIMM operation at PC4 and PC4L voltage levels. This standard follows the JEDEC standard DDR4 component standard (refer to JEDEC standard JESD79-4, at www.jedec.org).

Table 1 — DDR4 Product Family Attributes

DIMM Organization	x72 ECC	Notes
DIMM Dimensions (nominal)	133.35 mm x 31.25 mm	Refer to MO-309
	133.35 mm x 18.75 mm	Refer to MO-309
Pin Count	288	
DDR4 SDRAMs Supported	4Gb, 8Gb, 16Gb	78/106-ball FBGA package for x4 and x8 devices. Refer to MO-207: variations DT-z, DW-z
Capacity	4GB, 8GB, 16GB, 32GB, 64GB, 128GB	
SDRAM width	x4, x8	
Serial Presence Detect, Thermal Sensor (SPD-TSE)	512 byte	TSE2004av specifications
Voltage Options	VDD: PC4 - 1.2 Volt $\pm 5\%$, PC4L - TBD	
	VPP: 2.5 Volt +10%, -5%	The VPP supply has VSS as its return path. VPP is a separate supply, VDDSPD.
	VDDSPD: 2.5 Volt $\pm 10\%$	The VDDSPD supply has VSS as its return path. VDDSPD is separate from the VPP power plane. VDDSPD is shared between the SPD-TSE and the RCD (register). The RCD only supports 2.5V.
	V ₁₂ : +12 Volt $\pm 15\%$	The +12 V supply has VSS as its return path. +12 V is required for NVDIMM-N operation.
Interface	1.2 V signaling	