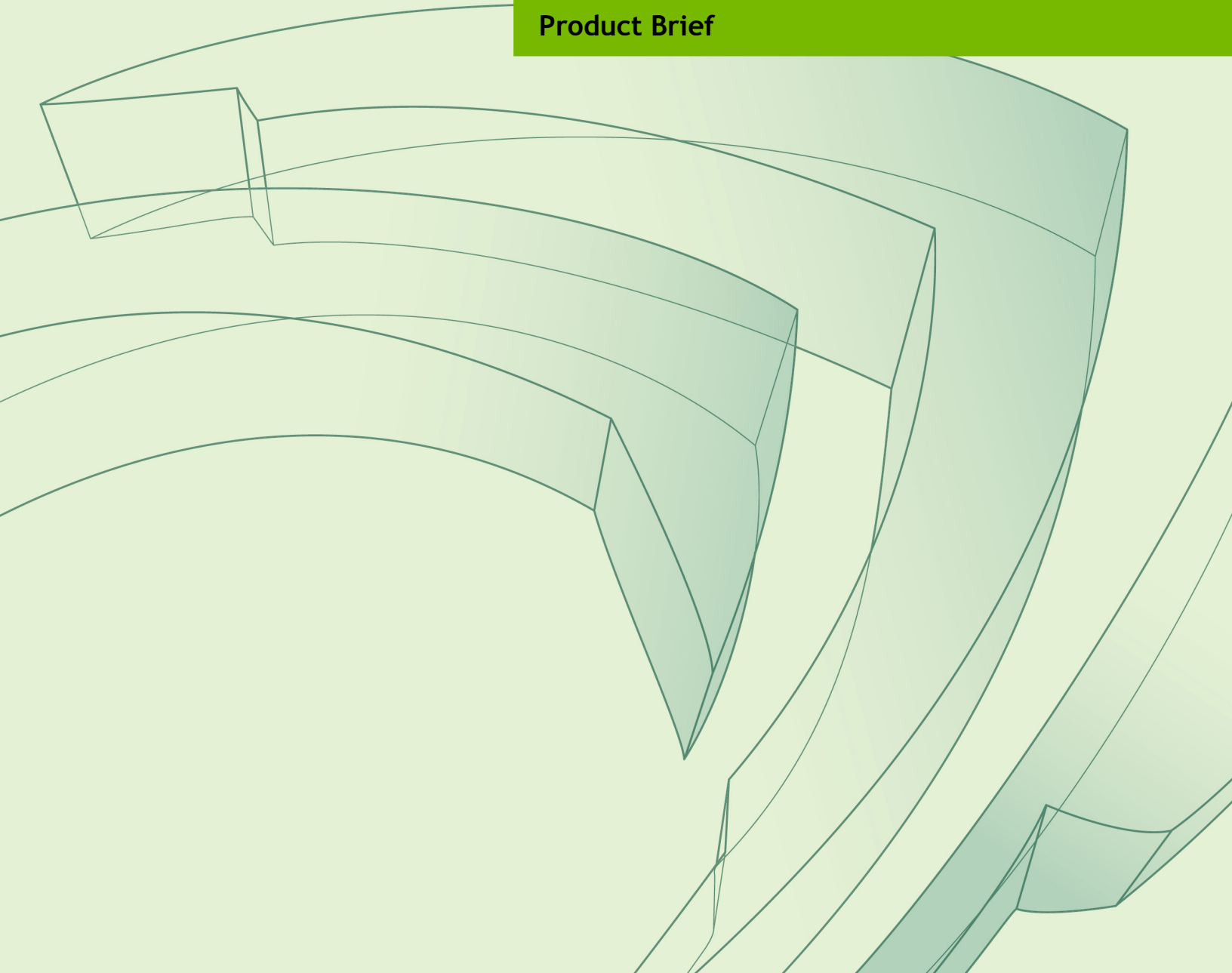




# TESLA M6

PB-07865-001\_v01 | November 2015

## Product Brief



# DOCUMENT CHANGE HISTORY

PB-07865-001\_v01

Version	Date	Authors	Description of Change
01	November 13, 2015	YI, SM	Initial Release

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# OVERVIEW

The NVIDIA® Tesla® M6 is an MXM 3.1 Type B card with a single NVIDIA Maxwell™ GM204 graphics processing unit (GPU). It has 8 GB GDDR5 on-board memory and a 100 W maximum power limit.

Tesla M6 is specifically designed to fit into constrained space available in blade servers. NVIDIA does not ship it with a cooling solution attached. However, it provides thermal specifications that OEMs can use to design their custom heat sinks.

Tesla M6 can function in two modes:

- ▶ **Compute:** Compute mode has large memory BAR and ECC enabled, making it suitable for single precision compute applications. ECC protects the DRAM content by fixing any single-bit errors and detecting double-bit errors.
- ▶ **Graphics:** By using the `gpumodeswitch` utility, Tesla M6 can be switched to graphics mode. This mode allows it to be compatible with the NVIDIA GRID™ software to use in virtualized graphics environments.

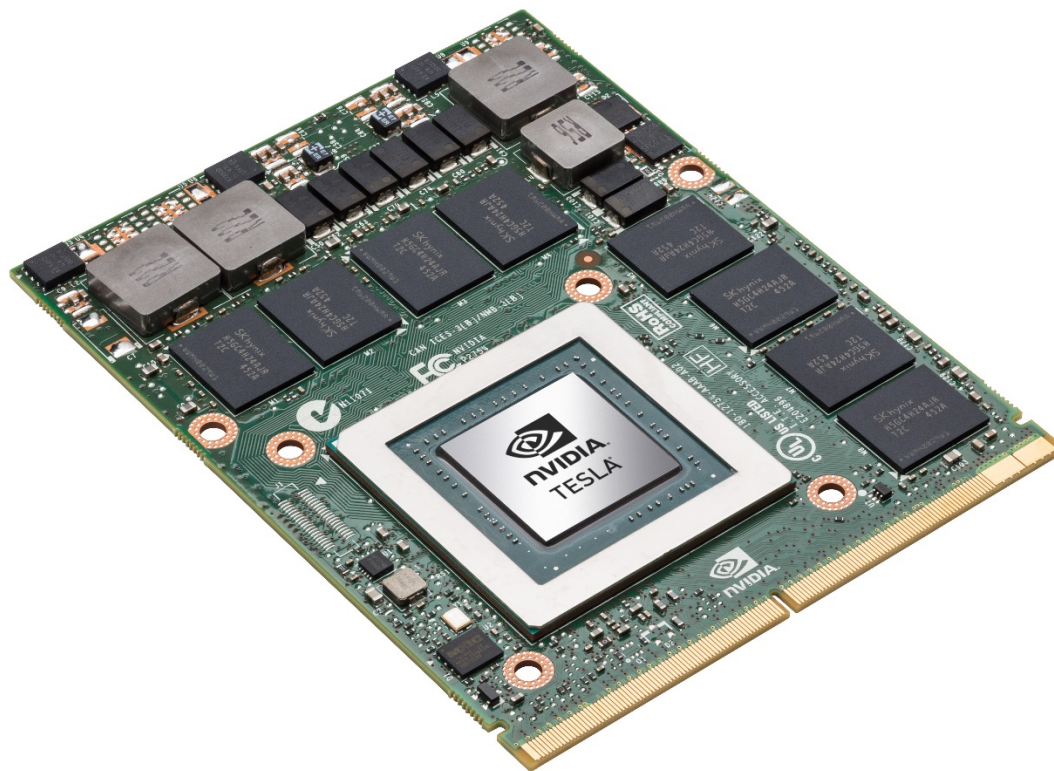


Figure 1. Tesla M6 Board

# SPECIFICATIONS

## PRODUCT SPECIFICATION

Table 1 provides the product specifications for the Tesla M6 board.

Table 1. Product Specifications

Specification		Description
Board SKU		P2754 SKU 200
Total board power		100 W (maximum)
GPU SKU		GM204-995
IDs		DEVID: 0x13F3 SSID: 0x1143
Form Factor		MXM 3.1 Type B
NVIDIA® CUDA® cores		1536
GPU clocks	Base	722 MHz (TGP: 75 W) 950 MHz (TGP: 100 W)
	Boost	886 MHz (TGP: 75 W) 1051 MHz (TGP: 100 W)
PCI Express interface		P0: Gen3 16 lanes, 8.0 Gbps P8: Gen1 16 lanes, 2.5 Gbps

Table 2 provides the memory specifications for the Tesla M6 graphics board.

**Table 2. Memory Specifications**

Specification	Description
Memory clock	2300 MHz
Memory size	8 GB
Memory I/O	256-bit
Memory configuration	16 pcs 256M × 16 GDDR5
Memory bandwidth	147.2 GB/s

Table 3 provides the software feature specifications.

**Table 3. Software Feature Specifications**

Specification	Description
EEPROM size	4 Mbit
PCI classcodes	PCI base class: 0x03 PCI sub-class: 0x02
ECC support	Supported
SMBPBI (SMBus Post Box Interface)	Supported

Table 4 provides the thermal specifications for the Tesla M6 graphics board.

**Table 4. Thermal Specifications**

Action	$T_j$ (°C)
GPU shutdown temperature	91
GPU slowdown temperature	88
GPU maximum operating temperature	86
GPU hardware slowdown amount	50%



# DESIGN DISCUSSION

## FORM FACTOR

Tesla M6 follows the MXM 3.1 Type B mechanical specifications. For more details on the mechanical specifications, refer to the *MXM Electromechanical Specification Version 3.1*.

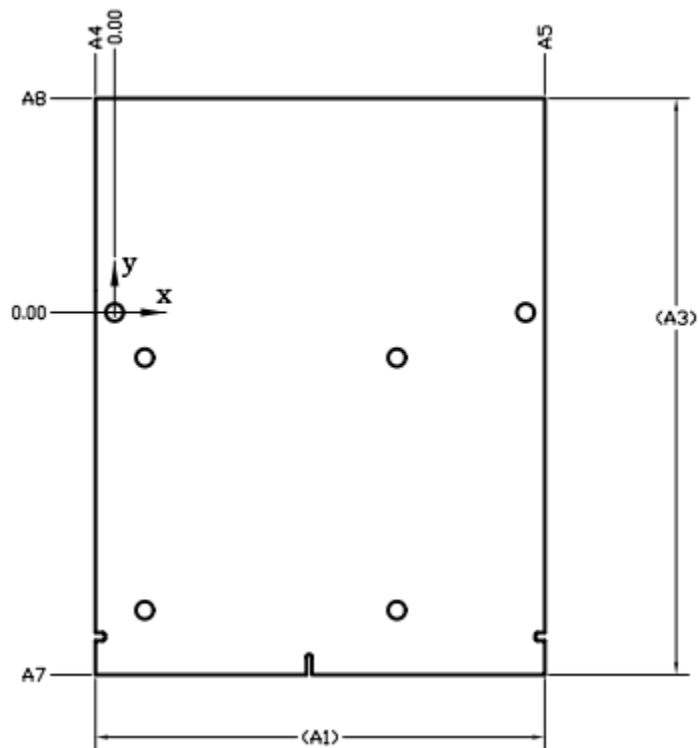


Figure 2. Tesla M6 Board Outline

Table 5. Tesla M6 Board Outline Specifications

Symbol	mm			inches		
	Minimum	Nominal	Maximum	Minimum	Nominal	Maximum
A1		82.00			3.228	
A2		70.00			2.756	
A3		105.00			4.134	
A4	3.37	3.50	3.63	0.133	0.138	0.143
A5	78.37	78.50	78.63	3.085	3.091	3.096
A6	3.87	4.00	4.13	0.152	0.157	0.163
A7	65.87	66.00	66.13	2.593	2.598	2.604
A8	38.87	39.00	39.13	1.530	1.535	1.541

## MXM PCB MOUNTING HOLES

The module has 6 holes. Two are used to secure the board to the system and the other four to fasten the thermal solution to the module.

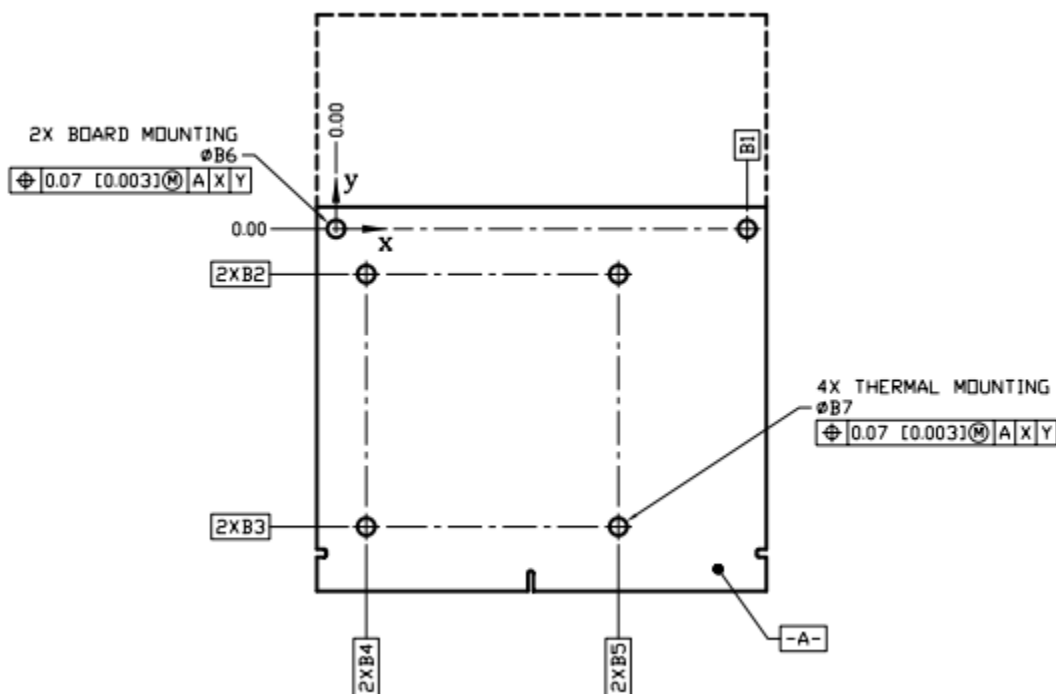


Figure 3. Mounting Holes

Table 6. Mounting Holes Specifications

Symbol	mm			inches		
	Minimum	Nominal	Maximum	Minimum	Nominal	Maximum
B1		75.00			2.953	
B2		8.25			0.325	
B3		54.25			2.136	
B4		5.50			0.217	
B5		51.50			2.028	
B6	3.07	3.20	3.33	0.121	0.126	0.131
B7	3.07	3.20	3.33	0.121	0.126	0.131

# COMPUTE AND GRAPHICS MODES

Tesla M6 can be configured into compute or graphics mode.

## COMPUTE MODE

Compute mode is optimized for high-performance compute (HPC) applications. Table 7 provides details of the compute mode settings.

Table 7. Compute Mode Settings

Setting	Value	Notes
Classcode	3D Controller	This classcode indicates to operating systems (OS) that the GPU is not intended for use as a primary display device.
Memory BAR	8 gigabytes	Tesla GPUs expose a large memory base address register (BAR) for direct access to the frame buffer from the CPU, and other PCI Express devices.
I/O base BAR	Disabled	The GPU need not consume any legacy I/O resources when used as a non-display device.
ECC protection	Enabled	Error Correcting Code (ECC) is enabled on the GPU frame buffer to protect against single- and multi-bit memory errors.

## GRAPHICS MODE

While compute mode is optimal for HPC usage, it can cause compatibility problems with OS and hypervisors when the GPU is used primarily as a graphics device:

- ▶ Some OS require that the GPU advertise a VGA display controller classcode in order for the GPU to be used as a primary graphics device.
- ▶ Some hypervisors cannot support pass through of GPUs with large memory BARs to guest virtual machines.

To address these problems, Tesla M6 supports graphics mode for compatibility with NVIDIA GRID software. Table 8 provides details of the graphics mode settings.

**Table 8. Graphics Mode Settings**

Setting	Value	Notes
Classcode	VGA Controller	This classcode indicates to OS that the GPU can function as a primary display device.
Memory BAR	256 megabytes	The GPUs a smaller memory BAR for direct access to the frame buffer.
I/O base BAR	Enabled	The GPU exposes an I/O BAR to claim the resources required to operate as a VGA controller.
ECC protection	Disabled	ECC protection is disabled by default, though it can still be enabled by use of the <code>nvidia-smi</code> management tool

The mode of the GPU is established directly at power-on, from settings stored in the GPU’s non-volatile memory. `gpumodeswitch` is used to program the mode of the GPU by updating the GPU’s non-volatile memory settings.

# SUPPORT INFORMATION

## CERTIFICATES AND AGENCIES

### Certifications

- ▶ Windows Hardware Quality Lab (WHQL):
  - Certified Windows 7 and Windows 8
- ▶ Ergonomic requirements for office work W/VDTs (ISO 9241)
- ▶ EU Reduction of Hazardous Substances (EU RoHS)
- ▶ Joint Industry guide (J-STD) / Registration, Evaluation, Authorization, and Restriction of Chemical Substance (EU) – (JIG / REACH)
- ▶ Halogen Free (HF)
- ▶ EU Waste Electrical and Electronic Equipment (WEEE)

### Agencies

- ▶ Australian Communications Authority and Radio Spectrum Management Group of New Zealand (C-Tick)
- ▶ Bureau of Standards, Metrology, and Inspection (BSMI)
- ▶ Conformité Européenne (CE)
- ▶ Federal Communications Commission (FCC)
- ▶ Industry Canada - Interference-Causing Equipment Standard (ICES)
- ▶ Korean Communications Commission (KCC)
- ▶ Underwriters Laboratories (cUL, UL)
- ▶ Voluntary Control Council for Interference (VCCI)

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