

# DDR3 SDRAM SO-DIMM (PC3-14900 4GB ECC) FN14N004GE-M414DC0

Rev. 1.00

## Features

- JEDEC Standard 204-pin Dual In-Line Memory Module
- Intend for PC3-14900 applications
- Inputs and Outputs are SSTL-15 compatible
- VDD=VDDQ= 1.5 Volt ± 0.075
- Bi-directional Differential Data Strobe
- DLL aligns DQ and DQS transition with CK transition
- SDRAMs have 8 internal banks for concurrent operation
- Normal and Dynamic On-Die Termination support
- SDRAMs are 78-ball BGA Package
- Golden Connector (Au:30u")
- 8 bit pre-fetch
- Support ECC Function
- Two different termination values (Rtt\_Nom & Rtt\_WR)
- Auto & self refresh 7.8μs (TA ≤ +85°C)
- 14/10/1 Addressing (row/column/rank)-1GB
- SDRAM operating temperature range 0°C ≤ TA ≤ +85°C
- Programmable Device Operation:
  - Burst Type: Sequential or Interleave
  - Device CAS# Latency: 7,9,11
  - Burst Length: switch on-the-fly: BL=8 or BC 4
- RoHS Compliant

Part Number	FN14N004GE-M414DC0
Density	4GB
Module speed	PC3-14900 (DDR3-1866)
Function	ECC
Operating Temp	0 to +85°C
Organization	512Mx72
Component Composition	512Mx8 Micron *9
Number of Rank	1
Height	30mm
Golden Connector	Au: 30u"

## Key Parameter

Industry Nomenclature	Data Rate MT/s			tRCD (min) (ns)	tRP (min) (ns)	tRC (min) (ns)
	CL=9	CL=11	CL=13			
PC3-14900	1333	1600	1866	13.91	13.91	47.91

## Environmental Req.

Symbol	Parameter	Rating	Units	Notes
TOPR	Operating Temperature (ambient)	0 to +85	°C	1,2
		+85 to +95	°C	1,2
TSTG	Storage Temperature	-50 to +100	°C	-
HOPR	Operating Humidity (relative)	10 to 90	%	-
HSTG	Storage Humidity (without condensation)	5 to 95	%	-

1. The component maximum case temperature (Tcase) shall not exceed the value specified in the DDR DRAM component specification.
2. Average Refresh Period 7.8us at lower then TCASE 85°C, 3.9us at 85°C < TCASE ≤ 95°C

# Absolute Max DC Rating

Symbol	Parameter	Rating	Units	Notes
V <sub>IN</sub> , V <sub>OUT</sub>	Voltage on any pins relative to V <sub>SS</sub>	-0.4 to +1.8	V	1
V <sub>DD</sub>	Voltage on V <sub>DD</sub> supply relative to V <sub>SS</sub>	-0.4 to +1.8	V	1,2
V <sub>DDQ</sub>	Voltage on V <sub>DDQ</sub> supply relative to V <sub>SS</sub>	-0.4 to +1.8	V	1,2

1. Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is stress rating only, and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
2. V<sub>DD</sub> and V<sub>DDQ</sub> must be within 300 mV of each other at all times; and V<sub>REF</sub> must be not greater than 0.6 x V<sub>DDQ</sub>, When V<sub>DD</sub> and V<sub>DDQ</sub> are less than 500 mV; V<sub>REF</sub> may be equal to or less than 300 mV

# Operating Conditions

## - Recommended DC Operating Conditions - DDR3L (1.35V) operation

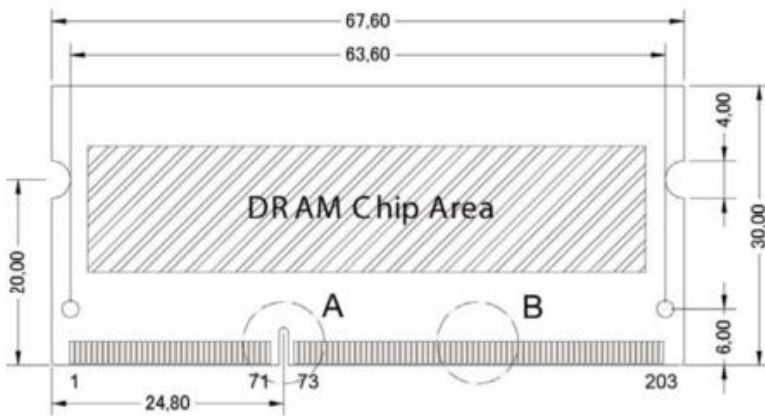
Voltage referenced to V<sub>SS</sub> = 0V, V<sub>DD</sub>&V<sub>DDQ</sub>=1.35 V +0.100/- 0.067V , T<sub>c</sub> = 0 to 85°C

Symbol	Parameter	Min	MAX	Units	Notes
V <sub>DD</sub>	Supply Voltage	1.283	1.45	V	1,2
V <sub>DDSPD</sub>		3	3.6	V	
V <sub>DDQ</sub>	Supply Voltage for Output	1.283	1.45	V	1,2
V <sub>REFCA</sub> , (DC)	I/O Reference Voltage(CMD/ADD)	0.49 x V <sub>DDQ</sub>	0.51 x V <sub>DDQ</sub>	V	3,4
V <sub>REFDQ</sub> , (DC)	I/O Reference Voltage(DQ)	0.49 x V <sub>DDQ</sub>	0.51 x V <sub>DDQ</sub>	V	3,4

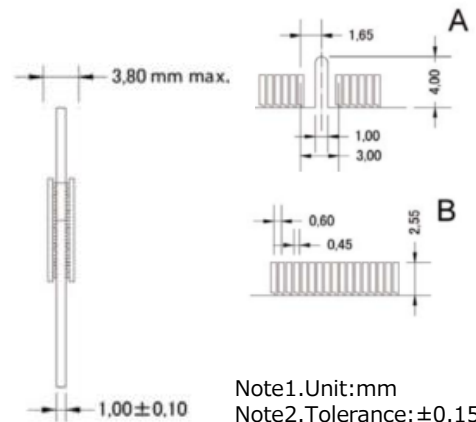
1. Under all conditions V<sub>DDQ</sub> must be less than or equal to V<sub>DD</sub>.
2. V<sub>DDQ</sub> tracks with V<sub>DD</sub>. AC parameters are measured with V<sub>DD</sub> and V<sub>DDQ</sub> tied together.
3. The AC peak noise on V<sub>REF</sub> may not allow V<sub>REF</sub> to deviate from V<sub>REF</sub>(DC) by more than anent d (for reference: approx. ±13.5mV)
4. For reference: approx. V<sub>DD</sub>/2 ±13.5mV

# Dimensions

Front



Side



Note1.Unit:mm  
Note2.Tolerance:±0.15mm

**HAGIWARA Solutions** ハギワラ ソリューションズ 株式会社

本社 〒460-0003 愛知県名古屋市中区錦2-5-12 パシフィックスクエア名古屋 8F  
Head Office 8th floor, Pacific Square Nagoya Nishiki, 2-5-12 Nishiki, Nakaku, Nagoya City, Aichi 460-0003, Japan  
Mail Address hsol.support@hagisol.co.jp

Please visit our website for the latest information such as support information, etc... <https://www.hagisol.co.jp>

■ Company name, product name described in this specification is either a registered trademark or trademark.  
■ The descriptions in this specification are subject to change without advance notice due to developmental status, etc...  
■ Although the descriptions in this document cause damage to you, Hagiwara solutions shall bear no responsibility for such damage.

文書番号 : HSXS22062-A01