

MANUFACTURING DESCRIPTION

Module Manufacturer:	G.Skill
Module Part Number:	F4-3333C16-8GTZ
DRAM Manufacturer:	Samsung
DRAM Components:	K4A4G085WE-BCPB
Module Manufacturing Date:	Undefined
Module Manufacturing Location:	Taipei, Taiwan
Module Serial Number:	00000000h
Module PCB Revision:	01h
DRAM Stepping:	01h
DRAM Process Technology:	20 nm

PHYSICAL & LOGICAL ATTRIBUTES

Fundamental Memory Class:	DDR4 SDRAM
Module Speed Grade:	DDR4-2133P downbin
Base Module Type:	UDIMM (133.35 mm)
Module Capacity:	8192 MB
Reference Raw Card:	B0 (8 layers)
Initial Raw Card Designer:	Micron Technology
Module Nominal Height:	31 < H <= 32 mm
Module Thickness Maximum, Front:	1 < T <= 2 mm
Module Thickness Maximum, Back:	1 < T <= 2 mm
Number of DIMM Ranks:	2
Address Mapping from Edge Connector to DRAM:	Mirrored
DRAM Device Package:	Standard Monolithic
DRAM Device Package Type:	78-ball FBGA
DRAM Device Die Count:	Single die
Signal Loading:	Not specified
Number of Column Addresses:	10 bits
Number of Row Addresses:	15 bits
Number of Bank Addresses:	2 bits (4 banks)
Bank Group Addressing:	2 bits (4 groups)
DRAM Device Width:	8 bits
Programmed DRAM Density:	4 Gb
Calculated DRAM Density:	4 Gb
Number of DRAM components:	16
DRAM Page Size:	1 KB
Primary Memory Bus Width:	64 bits
Memory Bus Width Extension:	0 bits
DRAM Post Package Repair:	Not supported
Soft Post Package Repair:	Not supported

DRAM TIMING PARAMETERS

Fine Timebase:	0.001 ns
Medium Timebase:	0.125 ns
CAS Latencies Supported:	9T, 11T, 12T, 13T, 14T, 15T, 16T, 18T, 19T
DRAM Minimum Cycle Time:	0.938 ns
DRAM Maximum Cycle Time:	1.500 ns
Nominal DRAM Clock Frequency:	1066.10 MHz

Minimum DRAM Clock Frequency:	666.67 MHz
CAS# Latency Time (tAA min):	13.500 ns
RAS# to CAS# Delay Time (tRCD min):	13.500 ns
Row Precharge Delay Time (tRP min):	13.500 ns
Active to Precharge Delay Time (tRAS min):	32.000 ns
Act to Act/Refresh Delay Time (tRC min):	46.500 ns
Normal Refresh Recovery Delay Time (tRFC1 min):	260.000 ns
2x mode Refresh Recovery Delay Time (tRFC2 min):	160.000 ns
4x mode Refresh Recovery Delay Time (tRFC4 min):	110.000 ns
Short Row Active to Row Active Delay (tRRD_S min):	3.700 ns
Long Row Active to Row Active Delay (tRRD_L min):	5.300 ns
Long CAS to CAS Delay Time (tCCD_L min):	5.355 ns
Four Active Windows Delay (tFAW min):	21.000 ns
Maximum Active Window (tMAW):	8192*tREFI
Maximum Activate Count (MAC):	Unlimited MAC
DRAM VDD 1.20 V operable/endurant:	Yes/Yes

THERMAL PARAMETERS

Module Thermal Sensor:	Not Incorporated
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INTEGRATED TEMPERATURE SENSOR

Manufacturer:	Giantec
Model:	GT34TS04
Revision:	01h
Temperature Monitor Status:	Active
Current Ambient Temperature:	40.500°C
Sensor Resolution:	0.2500°C
Accuracy at 75°C to 95°C:	±1°C
Accuracy at 40°C to 125°C:	±2°C
Open-drain Event Output:	Disabled
10V of VHV on A0 pin:	Supported
Negative Temperature Measurements:	Supported
Interrupt capabilities:	Supported

SPD PROTOCOL

SPD Revision:	1.0
SPD Bytes Total:	512
SPD Bytes Used:	384
SPD Checksum (Bytes 00h-7Dh):	CDFAh (OK)
SPD Checksum (Bytes 80h-FDh):	27DEh (OK)

PART NUMBER DETAILS

JEDEC DIMM Label:	8GB 2Rx8 PC4-2133P-UB0-10
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FREQUENCY	CAS	RCD	RP	RAS	RC	RRDS	RRDL	CCDL	FAW
1067 MHz	19	15	15	35	50	4	6	6	23
1067 MHz	18	15	15	35	50	4	6	6	23
1067 MHz	16	15	15	35	50	4	6	6	23
1067 MHz	15	15	15	35	50	4	6	6	23
933 MHz	14	13	13	30	44	4	5	5	20
933 MHz	13	13	13	30	44	4	5	5	20
800 MHz	12	11	11	26	38	3	5	5	17
800 MHz	11	11	11	26	38	3	5	5	17

667 MHz	9	9	9	22	31	3	4	4	14
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INTEL EXTREME MEMORY PROFILES

Profiles Revision: 2.0

Profile 1 (Certified) Enables: Yes

Profile 2 (Extreme) Enables: No

Profile 1 Channel Config: 2 DIMM/channel

XMP PARAMETER**PROFILE 1****PROFILE 2**

Speed Grade:	DDR4-3334	N/A
RAM Clock Frequency:	1667 MHz	N/A
Module VDD Voltage Level:	1.35 V	N/A
Minimum DRAM Cycle Time (tCK):	0.600 ns	N/A
CAS Latencies Supported:	16T	N/A
CAS Latency Time (tAA):	16T	N/A
RAS# to CAS# Delay Time (tRCD):	16T	N/A
Row Precharge Delay Time (tRP):	16T	N/A
Active to Precharge Delay Time (tRAS):	36T	N/A
Active to Active/Refresh Delay Time (tRC):	52T	N/A
Four Activate Window Delay Time (tFAW):	40T	N/A
Short Activate to Activate Delay Time (tRRD_S):	6T	N/A
Long Activate to Activate Delay Time (tRRD_L):	9T	N/A
Normal Refresh Recovery Delay Time (tRFC1):	434T	N/A
2x mode Refresh Recovery Delay Time (tRFC2):	267T	N/A
4x mode Refresh Recovery Delay Time (tRFC4):	184T	N/A

Show delays in nanoseconds