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**GOODRAM Industrial**  
**DDR3 SODIMM 204pin**  
standard temperature, low voltage

**DATASHEET**

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## Unbuffered DDR3 SODIMM LV datasheet

### REVISION HISTORY

VERSION	CHANGES	DATE
1.0	Initial release	02.11.2020



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## PRODUCT OVERVIEW

Module Form Factor	204-pin, unbuffered small-outline dual in-line memory module (SODIMM)
Interface	DDR3, JEDEC compliant JESD79-3
Capacity	1GB – 8GB
Fast Data Transfer Rates	PC3-12800 @1600 MT/s
DRAM IC Type	128Mx8, 256Mx8, 512Mx8
Power Supply	VDD = 1.35V, VDDSPD = 3.0V - 3.6V
ECC Support	NO
Registered	NO
Thermal sensor	NO
Temperature range <sup>Note1</sup>	Operating: 0°C ~ +85°C; Storage: -40°C ~ +100°C
Fly-by topology	YES
Gold edge contacts	YES
RoHS compliant	YES

Notes:

1. According to IEC-60068-2-1/2/14 standards

## **PRODUCT DETAILS**

### **General Description**

DDR3 SDRAM modules are high-speed, CMOS dynamic random access memory modules that use internally configured 8-bank DDR3 SDRAM devices. DDR3 SDRAM modules use DDR architecture to achieve high-speed operation. DDR3 architecture is essentially an 8n-prefetch architecture with an interface designed to transfer two data words per clock cycle at the I/O pins. A single read or write access for the DDR3 SDRAM module effectively consists of a single bit 8n-bit-side, one-clock-cycle data transfer at the internal DRAM core and eight corresponding n-bit-wide, one-half-clock-cycle data transfers at the I/O pins.

### **Fly-By Topology**

DDR3 modules use faster clock speeds than earlier DDR technologies, making signal quality more important than ever. For improved signal quality, the clock, control, command and address buses have been routed in a fly-by topology, where each clock, control, command and address pin on each DRAM is connected to a single trace and terminated (rather than a tree structure, where the termination is off the module near the connector). Inherent to fly-by topology, the timing skew between the clock and DQS signals can be easily accounted for by using the write-leveling feature of DDR3.

### **Thermal Sensor Operations**

The temperature from the integrated thermal sensor is monitored and converts into a digital word via the I<sup>2</sup>C bus. System designers can use the user-programmable registers to create a custom temperature-sensing solution based on system requirements. Programming and configuration details comply with JEDEC standard 21-C page 4.7-1 "Definition of the TSE2002av. Serial Presence Detect with Temperature Sensor".

## PART NUMBERS AND TIMING PARAMETERS

PART NUMBER	MODULE DENSITY	CONFIGURATION	MODULE BANDWIDTH	MEMORY CLOCK / DATA RATE	CLOCK CYCLES (CL- <sup>T</sup> RCD- <sup>T</sup> RP)
GR3S1G160S8L	1GB	128Mx8 SR	12.8 GB/s	1.25ns/1600 MT/s	11-11-11
GR3S2G160D8L	2GB	128Mx8 DR	12.8 GB/s	1.25ns/1600 MT/s	11-11-11
GR3S2G160S8L	2GB	256Mx8 SR	12.8 GB/s	1.25ns/1600 MT/s	11-11-11
GR3S4G160D8L	4GB	256Mx8 DR	12.8 GB/s	1.25ns/1600 MT/s	11-11-11
GR3S4G160S8L	4GB	512Mx8 SR	12.8 GB/s	1.25ns/1600 MT/s	11-11-11
GR3S8G160D8L	8GB	512Mx8 DR	12.8 GB/s	1.25ns/1600 MT/s	11-11-11

SR – Single Rank  
DR – Double Rank

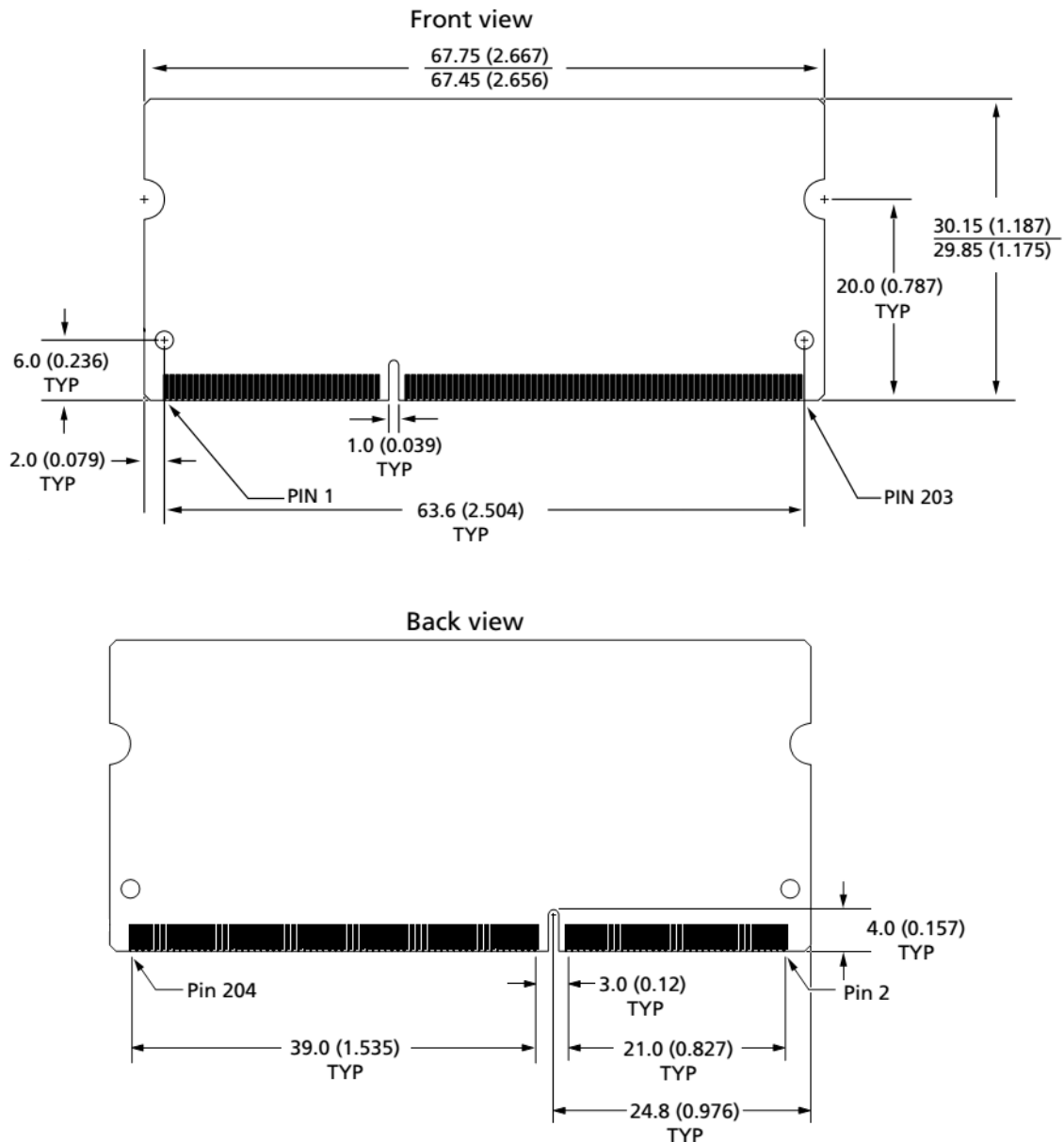
L – standard temperature, low voltage

## ADDRESSING

PARAMETER	1GB SR	2GB DR	2GB SR	4GB DR	4GB SR	8GB DR
Refresh count	8K	8K	8K	8K	8K	8K
Row address	16K A[13:0]	16K A[13:0]	32K A[14:0]	32K A[14:0]	64K A[15:0]	64K A[15:0]
Device bank address	8 BA[2:0]	8 BA[2:0]	8 BA[2:0]	8 BA[2:0]	8 BA[2:0]	8 BA[2:0]
Device configuration	1Gb (128Mx8)	2Gb (128Mx8)	2Gb (256Mx8)	4Gb (256Mx8)	4Gb (512Mx8)	8Gb (512Mx8)
Column address	1K A[9:0]	1K A[9:0]	1K A[9:0]	1K A[9:0]	1K A[9:0]	1K A[9:0]
Module rank address	1 S0#	2S#[1:0]	1 S0#	2S#[1:0]	1 S0#	2S#[1:0]

## PHYSICAL DIMENSION

Dimensions: 67.6mm (L) \* 30mm (W)



Note:

1. All dimensions are in millimeters (inches). MAX/MIN or typical (TYP) where noted.
2. The dimensional diagram is for reference only. Refer to JEDEC document for additional design dimensions.





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## STANDARDS & REFERENCES

The following table is to list out the standards that have been adopted for designing the product.

STANDARD USED	ACRONYM/SOURCE
RoHS	Restriction of Hazardous Substances Directive
CE	Consumer electronics certification; please contact us for further information.

## SAFETY PRECAUTIONS

Do not bend, crush, drop or place heavy objects on top of the Product. Do not use tweezers, pliers or similar items that could damage the Product. Take particular care when inserting or removing the Product. Stop using the Product when the Product does not work properly. Failure to follow these instructions could result in fire, damage to the Product and/or other property, and/or personal injury including burns and electric shock.

Keep out of reach of small children. Accidental swallowing may cause suffocation or injury. Contact a doctor immediately if you suspect a child has swallowed the Product.

Do not directly touch the interface pins, put them in contact with metal, strike them with hard objects or cause them to short. Do not expose to static electricity.

Do not disassemble or modify the Product. This may cause electric shock, damage to the Product or fire.

## NOTES ON USAGE

The Product contains nonvolatile semiconductor memory. Do not use the Product in accordance with a method of usage other than that written in the manual. This may cause the destruction or loss of data.

To protect against accidental data loss, you should back up your data frequently on more than one type of storage media. Wilk Elektronik S.A. assumes no liability for destruction or loss of data recorded on the Card for any reason.

When used over a long period of time or repeatedly, the reading, writing and deleting capabilities of the Product will eventually fail, and the performance speed of the Product may decrease below the original speed specific to the Product's applicable class.

If the Product is to be transferred or destroyed, note that the data it contained may still be recoverable unless it is permanently deleted by third-party deletion software or similar means beforehand.

Product is intended for use in general electronics applications and selected industrial applications and any other specific applications as expressly stated in this document. Product is neither intended nor warranted for use in equipment or systems where failure may cause loss of human life, bodily injury, serious property damage or serious public impact ("Unintended Use"). Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, medical equipment or equipment used to control combustions or explosions. Do not use Product for Unintended Use unless specifically permitted in this document.

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