

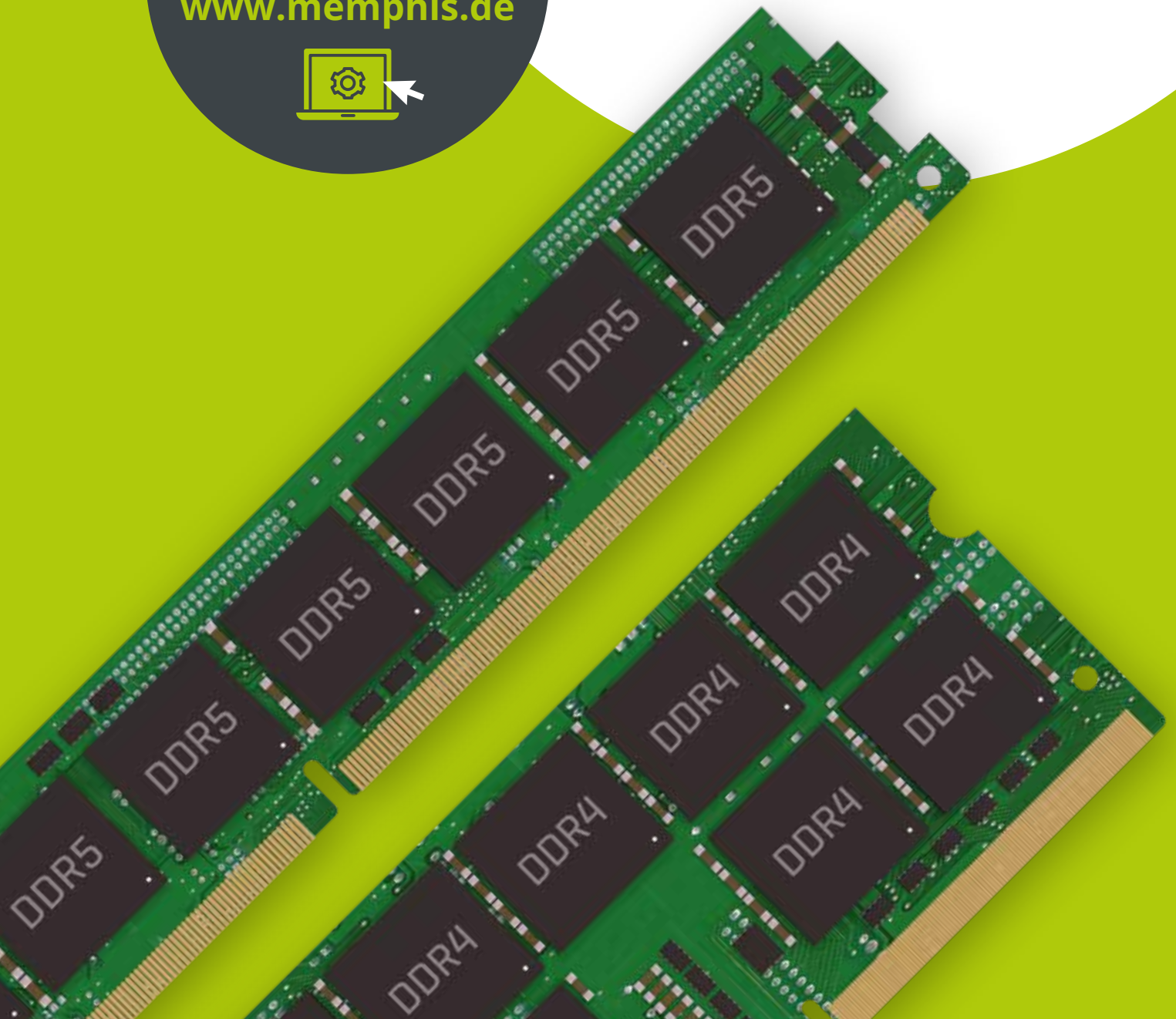
MEMPHIS

WE KNOW MEMORY

30  
YEARS

High quality configured  
**DRAM**  
**Modules**  
by MEMPHIS

Use  
our module  
configurator at  
[www.memphis.de](http://www.memphis.de)



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## HIGH QUALITY DRAM MODULES BY MEMPHIS

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For over 30 years MEMPHIS has configured industrial grade memory modules. Supporting extended product life cycles and guaranteeing supply-chain sustainability, MEMPHIS delivers the best memory solutions for high reliability applications demanding stable, consistent performance. From day one, we have insisted on developing our own PCB design capability which ensures our high standards are achieved.

With over 300 JEDEC standardized modules in our catalog and our extensive expertise designing custom solutions, MEMPHIS has the right module for your application.

We offer the best solutions for industrial applications such as POS, kiosks, routers, robotics, embedded systems, medical equipment, telecommunications, servers and many other high reliability end applications. In many cases, a fully functional prototype or working sample can be delivered in as little as three weeks.

MEMPHIS modules are currently used in many high reliability solutions around the world. Thousands of customers rely on MEMPHIS' expertise in Memory for advice and support of their high reliability requirements.

**MEMPHIS – WE KNOW MEMORY!**

### Product Highlights

- Specified DRAM modules for industrial PC and embedded applications
- Support for all temperature grades (Commercial, Industrial, Automotive)
- Extensive memory component selection from MEMPHIS distribution portfolio and beyond
- JEDEC Standard & Custom Module Design
- State-of-the-Art & Legacy Products
- Best longevity and performance ratio
- Lifetime Warranty

### Additional Services

- Testing Scheme Creation
- Conformal Coating
- **Customized** Serial Presence Detect
- Warehousing
- Controlled BOM (Bill of Materials)
- Change Management
- Product Life Cycle Management
- Build-to-order
- Best price to performance ratio

### Support

- Fast response time from 15 offices worldwide
- Expert technical support and consultation
- Drop shipments
- Labeling
- Custom packaging

### Industry Affiliations

- Member of JEDEC
- Member of FBDi
- Member of ECIA

### Quality Management

- Compliant with RoHS & REACH Directives
- No use of conflict minerals
- ISO9001 and ISO14001 Certified

## DRAM MODULE STANDARD DESIGN OVERVIEW

MEMPHIS Electronic has a comprehensive portfolio of PCB and module designs in both standard and non-standard densities and configurations. All modules are available in a variety of capacities, speeds, form factors and configurations for different applications. Furthermore, many

modules are optionally available in industrial temperature range (-40 to 85°C tA/-40 to 95°C tC). If you do not see your required solution in the tables on the following pages, please **contact your local MEMPHIS Electronic Sales representative** for more information.

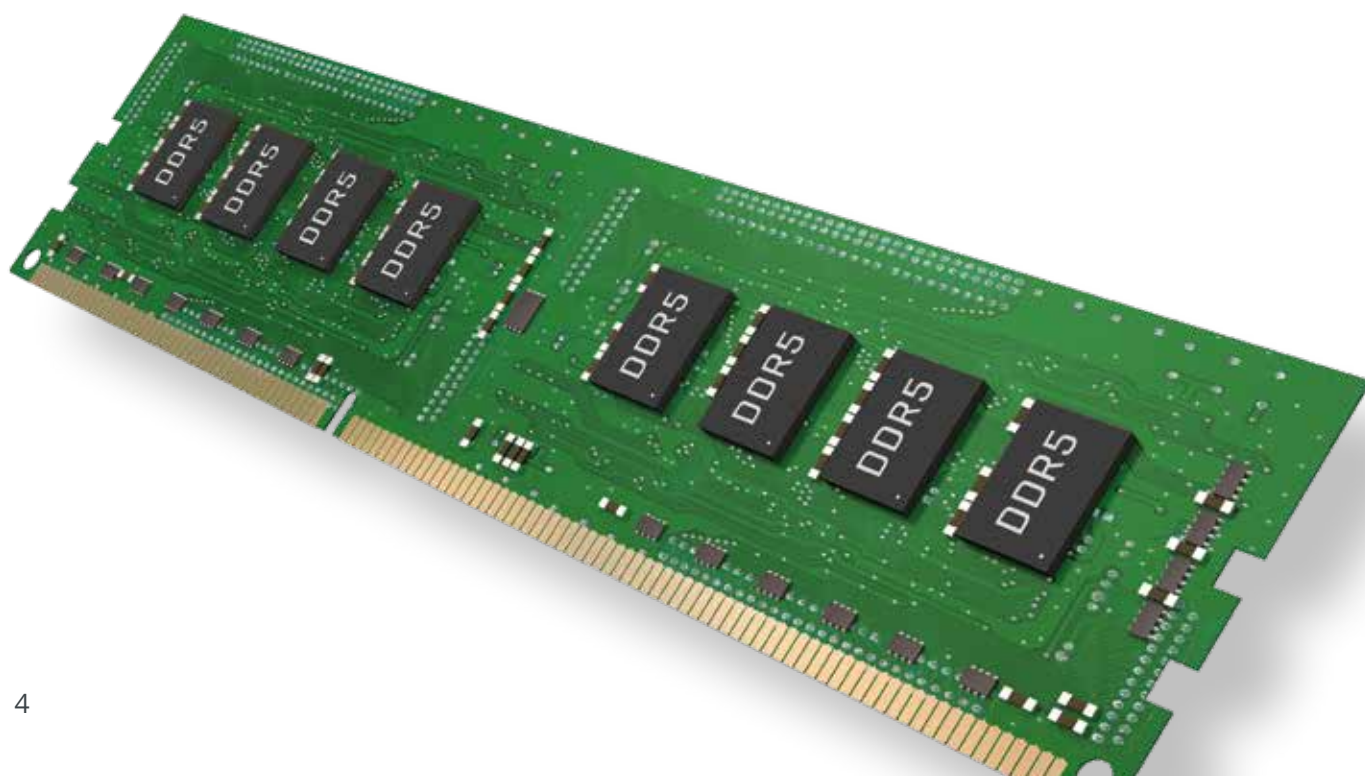
Form Factor	Height-Options	Bit-Width	DDR5	DDR4	DDR3	DDR2	DDR1	SDRAM
SO-DIMM	Standard VLP ULP	x64	8-32GB	2-32GB	up to 16GB	up to 4GB	up to 2GB	up to 1GB
ECC SO-DIMM	Standard VLP ULP	x80	16-32GB	4-32GB	up to 16GB	up to 4GB	up to 2GB	up to 1GB
UDIMM	Standard VLP ULP	x64	8-32GB	2-32GB	up to 16GB	up to 4GB	up to 2GB	up to 1GB
ECC UDIMM	Standard VLP ULP	x80	16-32GB	4-32GB	up to 16GB	up to 4GB	up to 2GB	up to 1GB
FBDIMM	Standard	x72	X	X	X	up to 8GB	X	X
RDIMM	Standard VLP ULP	x80	16-256GB	4-64GB	up to 32GB	up to 8GB	up to 4GB	up to 2GB
LRDIMM	Standard VLP ULP	x72	X	up to 64GB	up to 32GB	X	X	X
Mini-UDIMM	Standard VLP ULP	x72	X	2-32GB	up to 8GB	up to 4GB	X	X
Mini-RDIMM	Standard VLP ULP	x72	X	4-16GB	up to 16GB	up to 2GB	X	X
SO-RDIMM	Standard VLP ULP	x72	X	X	up to 16GB	X	X	X
Micro-UDIMM	Standard VLP ULP	x72	X	X	up to 2GB	X	X	X
100p UDIMM	Standard LP	x32	X	X	X	X	up to 512MB	up to 512MB
Micro DIMM	Standard	x64	X	X	X	X	up to 1GB	up to 256MB
SO-CDIMM	Standard	x72	X	X	X	X	up to 2GB	up to 1GB

## DDR5 OVERVIEW

DDR5 is the latest DRAM memory technology. Compared to previous generations, DDR5 DRAM server modules boast twice the speed with 4800Mbps and - with 512GB - up to four times the capacity. This next-generation high-performance memory allows networks to handle the soaring amounts of data generated by

cloud computing, IIoT, AI and autonomous driving systems. Memory hungry applications like these will drive the need for high-speed, high-capacity memory in industrial applications beyond datacenters where the reduced energy consumption in computing and cooling is also a key consideration.

Form Factor	Bit-Width	PinCount	Hight Options	CompOrg	RANKS	Capacity
SO-DIMM	x64	262	Standard	x8, x16	1, 2	8-32GB
ECC SO-DIMM	x80	262	Standard	x8	1, 2	16-32GB
UDIMM	x64	288	Standard	x8, x16	1, 2	8-32GB
ECC UDIMM	x80	288	Standard	x8	1, 2	16-32GB
RDIMM	x80	288	Standard	x4, x8	1, 2, 4, 8	16-512GB

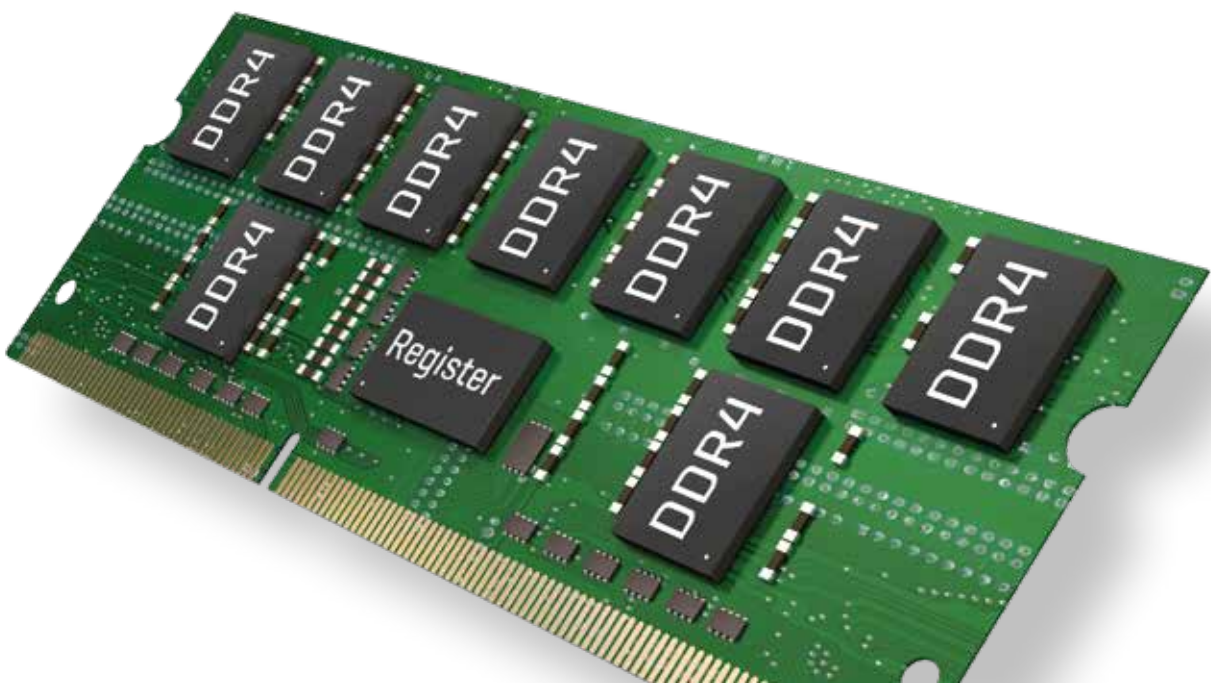


## DDR4 OVERVIEW

DDR4 has become the standard for high performance memory module solutions. It is designed to reliably run at much higher speeds that more than offset the increased latency. With data rates up to 3200Mb/s, DDR4 increases

performance up to 50% over DDR3 while also adding new reliability features. DDR4 also delivers a 20% reduction in voltage over DDR3 while simultaneously increasing clock frequency by 800 to 1600 MHz.

Form Factor	Bit-Width	PinCount	Hight Options	CompOrg	RANKS	Capacity
SO-DIMM	x64	260	Standard	x8, x16	1, 2	2-32GB
ECC SO-DIMM	x72	260	Standard ULP	x8, x16	1, 2	4-32GB
UDIMM	x64	288	Standard	x8, x16	1, 2	2-32GB
ECC UDIMM	x72	288	Standard VLP	x8	1, 2	4-16GB
RDIMM	x72	288	Standard VLP	x4, x8	1, 2, 4	64GB
LRDIMM	x72	288	Standard	x4, x8	2, 4	64GB
Mini-UDIMM	x72	288	Standard VLP	x8	1, 2	32GB
Mini-RDIMM	x72	288	Standard VLP	x8	1, 2	32GB

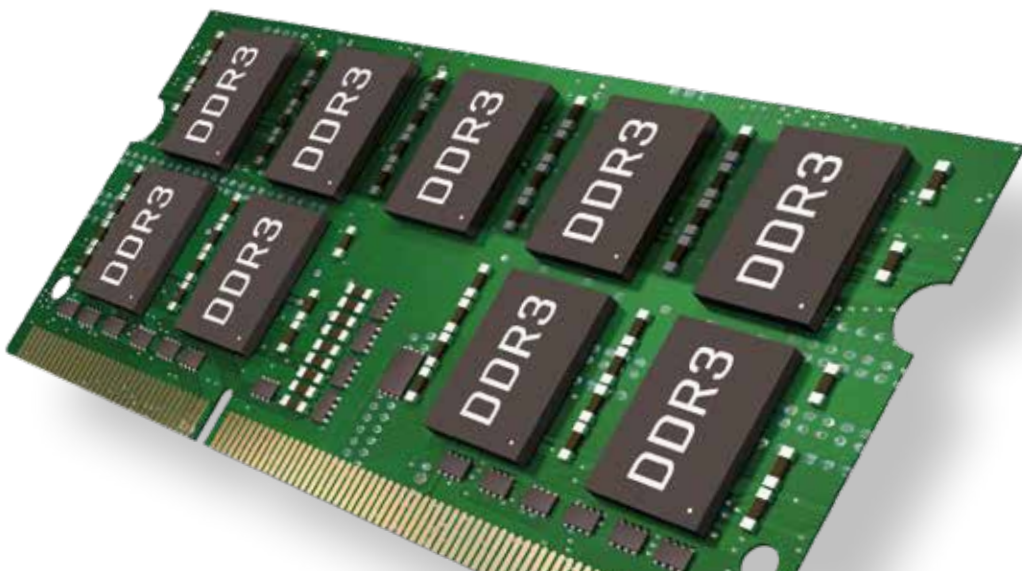


## DDR3 OVERVIEW

DDR3 is the higher speed successor to DDR2, bringing along technical advantages for increased demands. DDR3 supports data rates of 800 to 2133 Mb/s with clock frequencies of 400 to 1066 MHz effectively doubling the

speeds of DDR2. DDR3 standard 1.5V and 1.35V operating voltages reduce power consumption by up to 30% compared to DDR2.

Form Factor	Bit-Width	PinCount	Hight Options	CompOrg	RANKS	Capacity
SO-DIMM	x64	204	Standard ULP	x8, x16	1, 2	16GB
ECC SO-DIMM	x72	204	Standard ULP	x8, x16	1, 2	16GB
UDIMM	x64	240	Standard	x8, x16	1, 2	16GB
ECC UDIMM	x72	240	Standard VLP	x8	1, 2	16GB
RDIMM	x72	240	Standard VLP ULP	x4, x8	1, 2, 4	32GB
LRDIMM	x72	240	Standard	x4, x8	2, 4	32GB
Mini UDIMM	x72	244	Standard ULP	x8	1, 2	8GB
Mini RDIMM	x72	244	Standard VLP	x8	1, 2	16GB
SO-RDIMM	x72	204	Standard	x8	1, 2	16GB
Micro-UDIMM	x72	214	Standard	x16	1	2GB

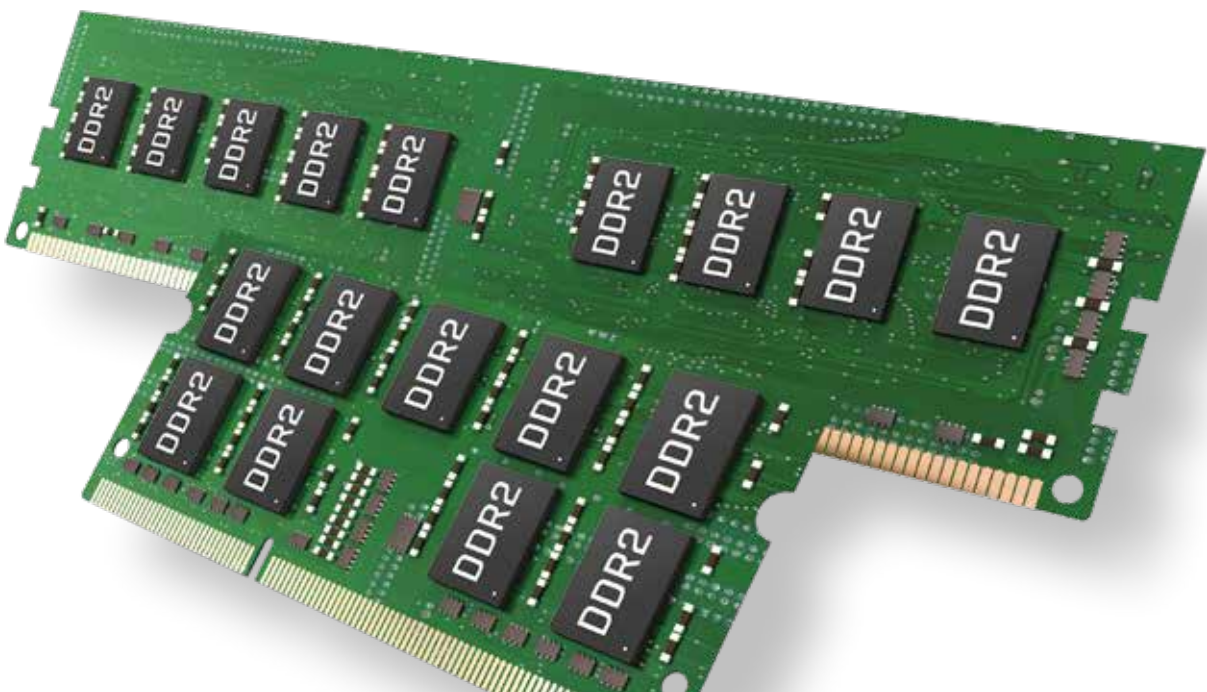


## DDR2 OVERVIEW

DDR2 is the technology following DDR with many advantages over its predecessor. DDR2 operates at data rates from 400-1066 Mb/s and a clock frequency of 200 to

533 MHz. The lower operational voltage enables a 50% reduction in power and an improved thermal performance and signal integrity over DDR1.

Form Factor	Bit-Width	PinCount	Hight Options	CompOrg	RANKS	Capacity
SO-DIMM	x64	200	Standard	x8, x16	1, 2	4GB
ECC SO-DIMM	x72	200	Standard ULP	x8, x16	1, 2	4GB
UDIMM	x64	240	Standard VLP	x8, x16	1, 2	4GB
ECC UDIMM	x72	240	Standard VLP	x8	1, 2	4GB
FBDIMM	x72	240	Standard	x4	1, 2	8GB
RDIMM	x72	240	Standard VLP	x4, x8	1, 2, 4	8GB
Mini UDIMM	x72	244	Standard	x8	1, 2	4GB
Mini RDIMM	x72	244	Standard	x8	1	2GB

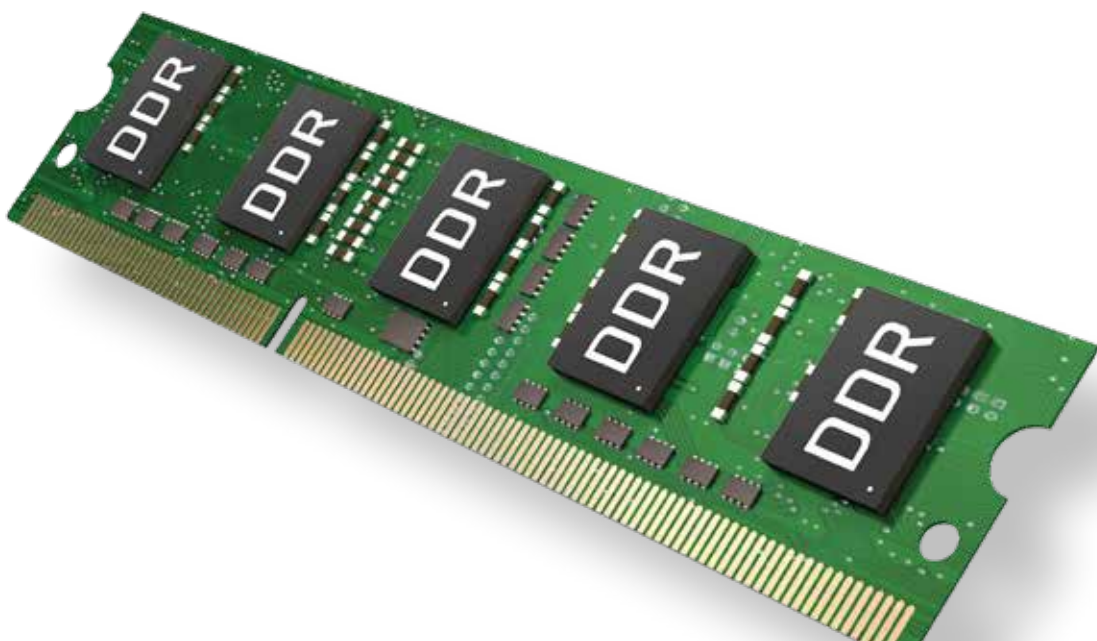


## DDR OVERVIEW

DDR (Double Data Rate) SDRAM captures data at twice the clock frequency as SDR, creating high-speed, higher density and lower power memory modules. DDR operates at data rates from 200-400 Mb/s with a clock frequency of 100-200 MHz and operating voltages of 2,5/2,6V.

Standard speeds for DDR include PC-2100, PC-2700 and PC-3200. MEMPHIS DDR SDRAM Memory Modules are available in a variety of capacities, speeds, form factors and configurations for embedded systems and industrial applications.

Form Factor	Bit-Width	PinCount	Hight Options	CompOrg	RANKS	Capacity
SO-DIMM	x64	200	Standard LP	x8, x16	1, 2	2GB
ECC SO-DIMM	x72	200	Standard	x8, x16	1, 2	2GB
UDIMM	x64	184	Standard, LP VLP	x8, x16	1, 2	2GB
ECC UDIMM	x72	184	Standard LP	x8, x16	1, 2	2GB
RDIMM	x72	184	Standard, LP VLP	x4, x8	1, 2, 4	4GB
100p UDIMM	x32	100	Standard LP	x8, x16	1, 2	512MB
Micro DIMM	x64	172	Standard	x8, x16	1, 2	1GB
SO-CDIMM	x72	200	Standard	x8, x16	1, 2	2GB



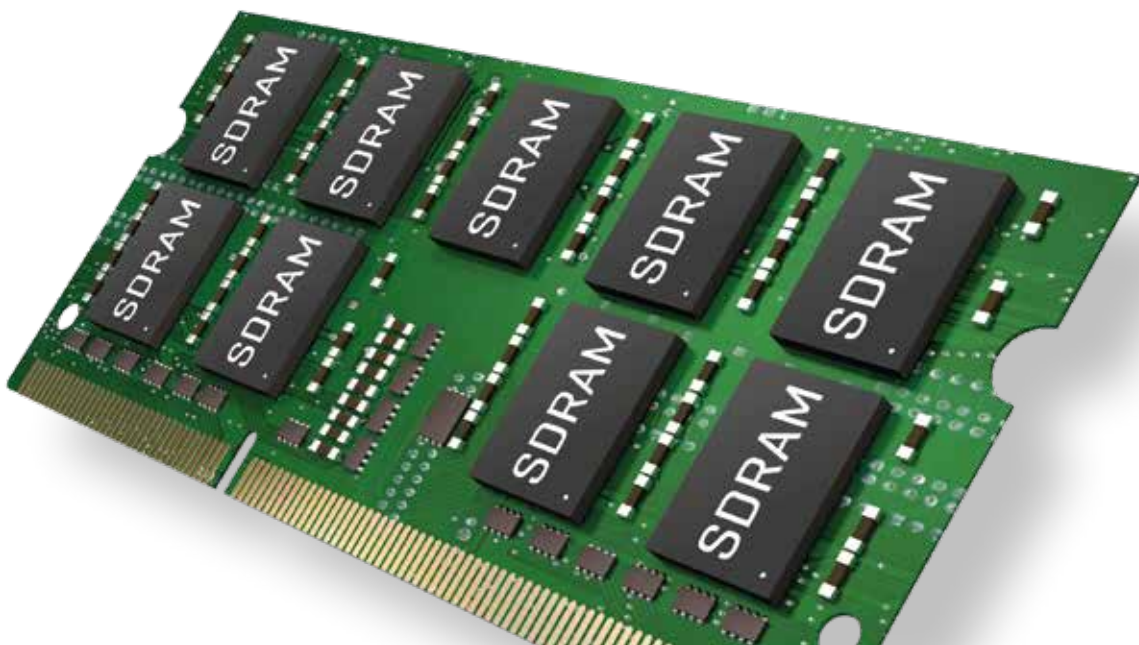


## SDRAM (SDR) OVERVIEW

SDRAM (Synchronous DRAM, SDR) operates with a synchronous interface at 3.3V. The common speeds are PC66, PC100 and PC133. All MEMPHIS SDR Memory Module products conform to JEDEC standards, are RoHS-compliant,

and are available in a variety of capacities, speeds, form factors and configurations for embedded systems and industrial applications.

Form Factor	Bit-Width	PinCount	Hight Options	CompOrg	RANKS	Capacity
SO-DIMM	x64	144	Standard LP	x8, x16	1, 2	1GB
ECC SO-DIMM	x72	144	Standard	x8, x16	1, 2	1GB
UDIMM	x64	168	Standard, LP VLP	x8, x16	1, 2	1GB
ECC UDIMM	x72	168	Standard LP	x8, x16	1, 2	1GB
RDIMM	x72	168	Standard LP	x4, x8	1, 2, 4	2GB
100p UDIMM	x32	100	Standard LP	x8, x16	1, 2	512MB
Micro DIMM	x64	144	Standard	x16	1	256MB
SO-CDIMM	x72	144	Standard	x8	2	1GB



## DRAM MODULE CUSTOMIZED DESIGN SERVICE

With more than two decades focused on DRAM module design and manufacturing, we have achieved numerous successful designs ranging from the classic 30-pin DRAM module to bespoke mission-critical server memory modules in DDR4. Our vast industry experience combined with

the unique and specialized engineering creativity of our passionate employees delivers a truly differentiated value. Advanced CAD technology and simulation tools allow us to provide quick and complete support to your projects accelerating your design cycles, saving you time and money.

Capacity	Height	Device Type	Speed	# Devices	Support Ranks
<b>EDO/FPM 168p Unbuffered x72 ECC</b>					
Up to 64MB	2.5"	x8	-50ns, -60ns, -70ns, -80ns	9, 18, 36	1, 2, 4, 8
<b>SDRAM 144p Registered SODIMM x72 ECC</b>					
Up to 256MB	1.25"	x16	Up to PC133	5	1
<b>DDR 184p Registered DIMM x72 ECC</b>					
Up to 4GB	1.2"	x8	Up to PC-3200	9, 18, 36	1, 2, 4
<b>DDR 200p Unbuffered SO-CDIMM x64 Non-ECC</b>					
Up to 2GB	1.25"	x8	Up to PC-3200	8, 16	1, 2
<b>DDR2 200p Registered SO-CDIMM x72 ECC</b>					
Up to 4GB	1.18"	x8	Up to PC2-6400	9	1, 2
<b>DDR3 244p ULP Unbuffered Mini-DIMM x72 ECC</b>					
Up to 8GB	0.7"	x8	Up to PC3-12800	9, 18	1, 2



## ABOUT MEMPHIS

MEMPHIS Electronic was founded in 1991 in Germany and is a specialized global distributor of memory ICs as well as a manufacturer of memory modules and NAND flash solutions. With a 100% focus on memory products, a portfolio of over 20 manufacturers representing technologies ranging from state-of-the-art to legacy, MEMPHIS Electronic offers a wide range of memory solutions for demanding embedded applications.

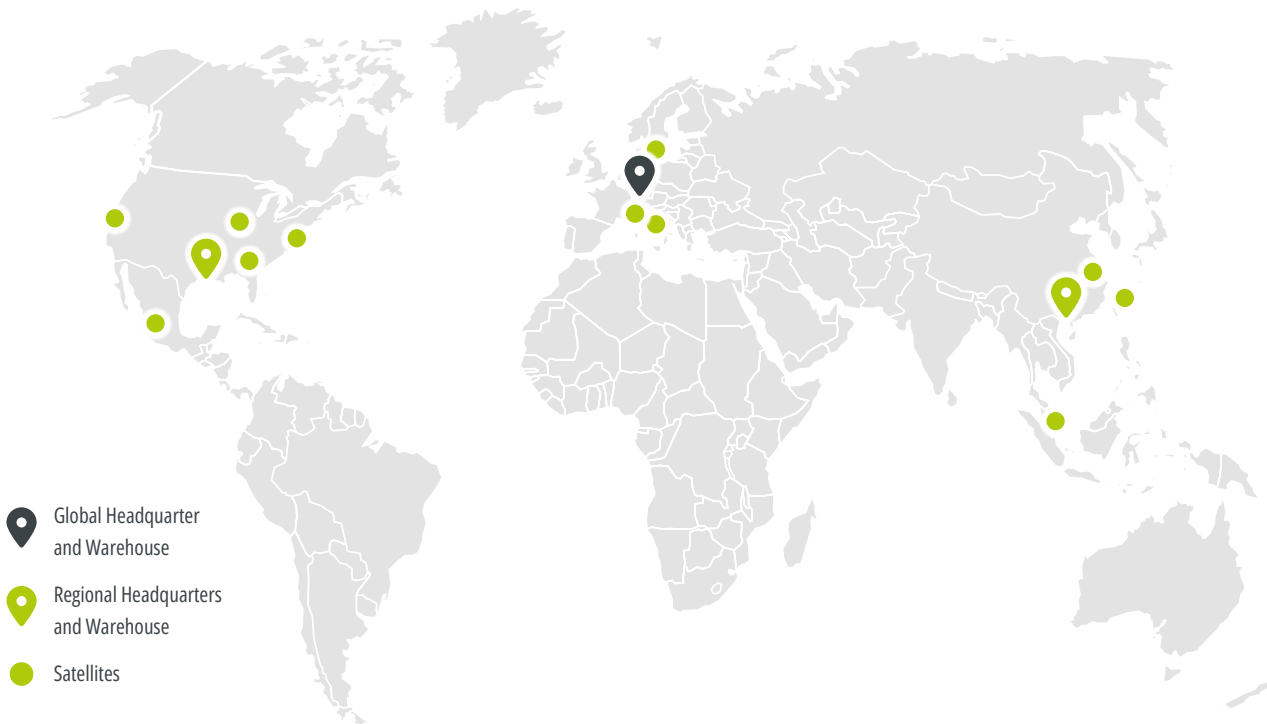
MEMPHIS serves a variety of target markets, including Industrial, IOT, Automotive, Medical, Telecommunications and many more.

Memory experts at more than 15 offices worldwide provide regional support and manufacturer recommendations to ensure the best technology and supply chain solution for their clients' projects.

**FULL-RANGE  
PROVIDER**  
for volatile,  
non-volatile and  
emerging memory.



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MEMPHIS complies with all major ISO and environmental regulations:



**ISO 14001**  
Certified Environmental  
Management System



**ISO 9001**  
Certified Quality  
Management System

