



# VERSATILITY + PERFORMANCE

## LPDRAM for mobile and embedded

### Micron® LPDRAM

Consumers want more features and functionality from their ultrathin computing devices, mobile phones and automotive infotainment systems — and you're expected to design it in with less power, less time and less space. We understand these design challenges and offer a wide range of low-power DRAM (LPDRAM) devices to address them.

### What You Get With Micron's LPDRAM Portfolio

Micron offers one of the industry's broadest LPDRAM portfolios, featuring our industry-leading LPDDR4 and cutting-edge LPDDR5. Our wide array of options helps you choose the best balance of features for your design. You'll get the right mix of low-power, high-performance devices coupled with world-class technical support that features simulation models, in-house qualifications and lab analysis.

### Ideal Applications

- **Mobile** – Handsets and tablets
- **Consumer** – DTV, digital cameras, wearables, PMP/MP3 players, portable games, personal navigation devices
- **Networking** – Machine-to-machine (M2M) devices, USB dongles
- **Security** – Fingerprint detectors, digital surveillance
- **Automotive** – Infotainment, ADAS, communications, clusters
- **Industrial/Medical** – Patient monitors, defibrillators, portable ultrasound machines
- **Client** – Notebooks, ultrathins, convertibles and detachables
- **Graphics** – Portable games

See our entire line of LPDRAM devices and get specific part detail information at [micron.com/lpdram](http://micron.com/lpdram).

### Advantages of Designing-in Micron LPDRAM

#### 1. Low Power

Extend battery life with ultra-low power supply voltages and standby currents.

#### 2. High Performance

Deliver data transfer rates of 4266 GT/s with the industry's fastest mobile LPDDR4 and up to 6400 GT/s with our latest LPDDR5.

#### 3. Temperature Ranges

Maintain high performance in extreme environments with extended temperatures.

#### 4. Product Portfolio Breadth

Enhance design flexibility and provide a migration path with a wide range of densities and packages.

#### 5. Testing and Reliability

Provide greater reliability with parts that undergo stringent quality and reliability testing — including Micron's automotive product lines that meet the stringent requirements of ISO9001 and TS16949.

#### 6. Regional Technical Support

Receive assistance with your unique design challenges from our expert design engineers and local FAEs.



# Micron® LPDRAM

Features		Benefits
Densities	512Mb (LPDDR) 512Mb to 2Gb (LPDDR) 512Mb to 16Gb (LPDDR2) 4Gb to 32Gb (LPDDR3) 4Gb to 96Gb (LPDDR4) 16Gb to 128Gb (LPDDR5)	Provides flexibility for a variety of application designs
Configurations	x16, x32 (LPDDR, LPDDR) x16, x32, x64 (LPDDR2) x32, x64, x128 (LPDDR3) x32, (2 channels, x16), x64 (4 channels, x16) (LPDDR4, LPDDR5)	Enables the use of fewer components to support wide bus architectures
Core Voltages	1.8V (LPDDR, LPDDR) 1.2V (LPDDR2, LPDDR3) 0.6V, 1.1V (LPDDR4) 0.5V (LPDDR5)	Helps reduce power consumption—a key advantage over standard DRAM
Clock Frequencies	Up to 166 MHz (LPDDR) Up to 208 MHz (LPDDR) Up to 533 MHz (LPDDR2) Up to 933 MHz (LPDDR3) Up to 2133 MHz (LPDDR4) Up to 3200 MHz (LPDDR5)	Provides high performance, high bandwidth, and low power consumption
Power Consumption	Refer to specific data sheet	Delivers low power consumption in standby and active modes, plus special mobile features to reduce power for a more efficient design
Special Features	Temperature-compensated self refresh (TCSR)	Adjusts refresh timing to minimize power consumption at lower, ambient temperatures
	Partial-array self refresh (PASR)	Reduces power by refreshing only critical data
	Deep power-down (DPD) <sup>1</sup>	Provides an ultra-low power state when data retention is not required
	Programmable drive strength (DS)	Enables adjustment for operation in point-to-point and point-to-2-point applications
	Programmable $V_{OH}$ signal level (LPDDR4 only)	Enables adjustment for operation in point-to-point and point-to-2-point applications
Temperature Ranges	-30°C to +85°C (WT LPDDR2/3/4/5) -30°C to +105°C (XT LPDDR3/4) -40°C to +85°C (IT) -40°C to +95°C (IT LPDDR4, LPDDR5) -40°C to +105°C (AT LPDDR, LPDDR, LPDDR2/4/5) -40°C to +125°C (Ultra <sup>2</sup> LPDDR2/4/5)	Enables high performance in extreme environments
Packages	PoP	Saves board space by enabling a Mobile LPDRAM to be stacked on top of a processor so that the two components require only one footprint on the board
	Known good die (KGD)	Supports bare die with edge bond pads for easy stacking in SIP and MCP solutions
	FBGA	Supports JEDEC-standard FBGA ballout

1. LPDDR4 does not support DPD.

2. Only available for select automotive products.

[micron.com](http://micron.com)

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