

Product Roadmap

2023. Q3



Product Solutions

DRAM

- LPDDR4x SDRAM
- LPDDR2 SDRAM
- LPDDR SDRAM
- LPSDRAM
- DDR3 SDRAM

NAND

- SLC NAND FLASH
- SPI NAND FLASH
- eMMC NAND FLASH

NOR

- SPI NOR FLASH

MCP

- NAND+LPDDR4x SDRAM
- NAND+LPDDR2 SDRAM
- NAND+LPDDR SDRAM
- NAND+LPSDRAM
- eMMC+LPDDR4x SDRAM

LPSDRAM

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
128Mb	<ul style="list-style-type: none"> ◆ x16/x32 ◆ 3.3V/1.8V ◆ 200MHz ◆ KGD, FBGA 54B/90B 												
256Mb													
512Mb													

LPDDR SDRAM

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
128Mb	<ul style="list-style-type: none"> ◆ x16/x32 ◆ 3.3V/1.8V ◆ 200MHz ◆ KGD, FBGA 60B/90B 												
256Mb													
512Mb													
1Gb	<ul style="list-style-type: none"> ◆ x16/x32 ◆ 1.8V ◆ 200MHz ◆ KGD, FBGA 60B/90B 												
2Gb	<ul style="list-style-type: none"> ◆ X32 ◆ 1.8V ◆ 200Mhz ◆ DDP, FBGA 90B 												

ES CS MP



LPDDR2 SDRAM

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
512Mb	<ul style="list-style-type: none"> ◆ x16 / x32 ◆ 1.2V ◆ 400MHz / 533MHz ◆ KGD, FBGA 121B/134B 	[Blue bar]											
1Gb		[Blue bar]											
2Gb		[Blue bar]											
4Gb		[Blue bar]				[Light Green bar]		[Dark Green bar]					
		[Blue bar]				[Light Green bar]		[Dark Green bar]					

LPDDR4x SDRAM

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1Gb	<ul style="list-style-type: none"> ◆ 1600MHz (1Gb/2Gb x32) / 2133MHz (2Gb x16, 4Gb) ◆ X16 (1Gb, 2Gb, 4Gb, 8Gb) / x32 (2Gb, 4Gb, 8Gb) (per channel) ◆ (KGD), FBGA 200B 	[Blue bar]				[Light Green bar]		[Dark Green bar]					
2Gb		[Blue bar]				[Light Green bar]		[Dark Green bar]					
4Gb		[Blue bar]											
8Gb		[Blue bar]											
16Gb		[Blue bar]				[Light Blue bar]		[Dark Blue bar]					

ES	CS	MP
ES	CS	MP

DDR3 / DDR3L

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1Gb	<ul style="list-style-type: none"> ◆ X4 / x8 / x16 ◆ DDR3(1.5V) / DDR3L(1.35V) ◆ 800MHz ◆ KGD, FBGA 78B/96B 												
2Gb	<ul style="list-style-type: none"> ◆ X4 / x8 / x16 ◆ DDR3(1.5V) / DDR3L(1.35V) ◆ 800MHz / 933MHz ◆ KGD, FBGA 78B/96B 												
4Gb	<ul style="list-style-type: none"> ◆ X4 / x8 / x16 ◆ DDR3(1.5V) / DDR3L(1.35V) ◆ 800MHz / 933MHz ◆ KGD, FBGA 78B/96B 												

ES CS MP



SLC NAND Flash

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1Gb	<ul style="list-style-type: none"> ◆ Parallel interface ◆ 3.3V / 1.8V ◆ x8 / x16, 4bit ECC ◆ KGD, FBGA 48B/63B/67B, TSOP 48 	[Solid Blue Bar]											
2Gb		[Solid Blue Bar]											
4Gb		[Solid Blue Bar]											
8Gb		[Solid Blue Bar]											
16Gb		[Dashed Blue Bar] TBD											
512Mb	<p>SPI NAND</p> <ul style="list-style-type: none"> ◆ Serial peripheral interface ◆ 3.3V / 1.8V ◆ x1 / x2 / x4, Internal ECC ◆ KGD, WSON, SOP 					[Light Green Bar]		[Solid Green Bar]					
1Gb		[Solid Green Bar] B-Die											
2Gb		[Solid Green Bar] B-Die											
4Gb						[Light Green Bar]		[Solid Green Bar] B-Die(DDP)					
						[Light Orange Bar]		[Solid Orange Bar] C-Die					

ES	CS	MP
ES	CS	MP
ES	CS	MP



eMMC

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
4GB	<ul style="list-style-type: none"> ◆ eMMC5.1 ◆ 153B ◆ 4GB & 8GB : MLC, 16GB/32GB/64GB: MLC&TLC 												
8GB													
16GB													
32GB													
64GB													

ES CS MP



SPI NOR Flash-1.8

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
2Mb		[Solid Blue Bar]											
4Mb		[Solid Blue Bar]											
32Mb		A-Die											
64Mb		A-Die											
128Mb	<ul style="list-style-type: none"> ◆ KGD ◆ PKG : SOP, WSON, WLCSP ◆ 104MHz / 133MHz ◆ Voltage : 1.65V ~ 1.95V 	A-Die											
256Mb		A-Die (DDP)											
		B-Die (SDP)											
512Mb		B-Die											
1Gb		B-Die (DDP)											
2Gb		B-Die (QDP)											

ES	CS	MP
ES	CS	MP



SPI NOR Flash-3.3

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
64Mb 128Mb 256Mb	<ul style="list-style-type: none"> ◆ KGD ◆ PKG : SOP, WSON ◆ 104MHz / 133MHz ◆ Voltage : 2.7V ~ 3.6V 	A-Die											
										TBD		B-Die	
										TBD		B-Die	
								TBD		B-Die			

ES	CS	MP
ES	CS	MP

SLC NAND MCP (NAND + LPDDR SDRAM)

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1Gb + 256Mb	<ul style="list-style-type: none"> ◆ MCP : 107B / 130B / 137B ◆ NAND 1.8V, x8 / x16 4bit ECC / Page=2KB+64B ◆ LPDDR/SDR, x16 / x32 												
1Gb + 512Mb	<ul style="list-style-type: none"> ◆ MCP : 107B / 130B / 137B ◆ NAND 1.8V, x8 / x16 4bit ECC / Page=2KB+64B ◆ LPDDR/SDR, x16 / x32 												
2Gb + 1Gb	<ul style="list-style-type: none"> ◆ MCP : 130B / 137B ◆ NAND 1.8V, x8 / x16 4bit ECC / Page=2KB+64B/128B ◆ LPDDR/SDR, x16 / x32 												
4Gb + 2Gb	<ul style="list-style-type: none"> ◆ MCP : 130B / 137B ◆ NAND 1.8V, x8 / x16 4bit ECC / Page=2KB+64B/128B ◆ LPDDR/SDR, x32 												

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SLC NAND MCP (NAND + LPDDR2 SDRAM)

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1Gb + 512Mb	<ul style="list-style-type: none"> ◆ MCP : 162B ◆ NAND 1.8V, x8 / x16 ◆ LPDDR2, x16 / x32 	[Blue bar spanning all quarters]											
1Gb + 1Gb	<ul style="list-style-type: none"> ◆ MCP : 162B ◆ NAND 1.8V, x8 / x16 ◆ LPDDR2, x16 / x32 	[Blue bar spanning all quarters]											
2Gb + 1Gb	<ul style="list-style-type: none"> ◆ MCP : 162B ◆ NAND 1.8V, x8 / x16 ◆ LPDDR2, x16 / x32 	[Blue bar spanning all quarters]											
2Gb + 2Gb	<ul style="list-style-type: none"> ◆ MCP : 162B ◆ NAND 1.8V, x8 / x16 ◆ LPDDR2, x16 / x32 	[Blue bar spanning all quarters] [Light green bar from Q4 2023 to Q4 2025]											
4Gb + 2Gb	<ul style="list-style-type: none"> ◆ MCP : 162B ◆ NAND 1.8V, x8 / x16 ◆ LPDDR2, x16 / x32 	[Blue bar spanning all quarters] [Light green bar from Q4 2023 to Q4 2025]											
4Gb + 4Gb	<ul style="list-style-type: none"> ◆ MCP : 162B ◆ NAND 1.8V, x8 / x16 ◆ LPDDR2, x16 / x32 	[Blue bar spanning all quarters] [Light green bar from Q4 2023 to Q4 2025]											

ES	CS	MP
ES	CS	MP



SLC NAND MCP (NAND + LPDDR4x)

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
4Gb + 2Gb	<ul style="list-style-type: none"> ◆ PKG : 149B ◆ NAND 1.8V, x8 ◆ LPDDR4x, x16 ◆ -40°C ~ 105°C 									TBD			
4Gb + 4Gb	<ul style="list-style-type: none"> ◆ PKG : 149B ◆ NAND 1.8V, x8 ◆ LPDDR4x, x16 ◆ -40°C ~ 105°C ◆ AEC-Q100 Grade 2/3 	[Solid Blue Bar]											
4Gb + 8Gb	<ul style="list-style-type: none"> ◆ PKG : 149B ◆ NAND 1.8V, x8 ◆ LPDDR4x, x16 ◆ -40°C ~ 105°C 									TBD			
8Gb + 4Gb	<ul style="list-style-type: none"> ◆ PKG : 149B ◆ NAND 1.8V, x8 ◆ LPDDR4x, x16 ◆ -40°C ~ 105°C 	[Solid Blue Bar]											
8Gb + 8Gb	<ul style="list-style-type: none"> ◆ PKG : 149B, 254B ◆ NAND 1.8V, x8 ◆ LPDDR4x, x16, x32 ◆ -40°C ~ 105°C ◆ AEC-Q100 Grade 2/3 	<div style="display: flex; justify-content: space-between;"> <div style="width: 20%; background-color: #c8e6c9;"></div> <div style="width: 80%; background-color: #42a5f5; color: white; padding: 2px;">LPDDR4x DDP</div> </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <div style="width: 20%; background-color: #c8e6c9;"></div> <div style="width: 80%; background-color: #42a5f5; color: white; padding: 2px;">LPDDR4x SDP</div> </div>											
16Gb + 16Gb	<ul style="list-style-type: none"> ◆ PKG : 149B ◆ NAND 1.8V, x8 ◆ LPDDR4x, x16 ◆ -40°C ~ 105°C ◆ AEC-Q100 Grade 2/3 									LPDDR4x DDP			

ES	CS	MP
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eMCP (eMMC + LPDDR4x)

Density	Specification	2023				2024				2025			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
4GB + 8Gb	<ul style="list-style-type: none"> ◆ eMMC 5.1, PKG : 149B ◆ NAND: MLC ◆ LPDDR4x: x16 							TBD					
8GB + 8Gb	<ul style="list-style-type: none"> ◆ eMMC 5.1, PKG : 254B ◆ NAND: MLC ◆ LPDDR4x: x32 							TBD					
16GB + 16Gb	<ul style="list-style-type: none"> ◆ eMMC 5.1, PKG : 254B ◆ NAND: MLC/TLC ◆ LPDDR4x: x32 							TBD					
32GB + 32Gb	<ul style="list-style-type: none"> ◆ eMMC 5.1, PKG : 254B ◆ NAND: MLC/TLC ◆ LPDDR4x: x32 							TBD					
64GB + 32Gb	<ul style="list-style-type: none"> ◆ eMMC 5.1, PKG : 254B ◆ NAND: MLC/TLC ◆ LPDDR4x: x32 							TBD					

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Thank You

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