

# DRAM Component Part Numbering System

The part numbering system is available at [www.micron.com/numbering](http://www.micron.com/numbering)

## DDR4/DDR3/DDR2/DDR/SDRAM, Mobile LPDDR4/LPDDR3/LPDDR2/LPDDR/LPSDR, RLD RAM® & GDDR6/GDDR5X/GDDR5 Memory

MT 42 A 128M16 D1 KL - 25 IT ES :A

### Micron Technology

#### Product Family

40 = DDR4 SDRAM  
 41 = DDR3 SDRAM  
 42 = Mobile LPDDR2  
 44 = RLD RAM 3  
 46 = DDR SDRAM/Mobile LPDDR  
 47 = DDR2 SDRAM  
 48 = SDRAM/Mobile LPSDR  
 49 = RLD RAM 2  
 51 = GDDR5  
 52 = Mobile LPDDR3  
 53 = Mobile LPDDR4 (2x16 ch/die)  
 58 = GDDR5X  
 61 = GDDR6  
 62 = Mobile LPDDR5

#### Voltage

A = 1.2V V<sub>DD</sub>  
 AX = 1.275V V<sub>DD</sub>  
 B = 1.1V V<sub>DD</sub>  
 C = 5.0V V<sub>CC</sub>  
 D = 1.1V V<sub>DD</sub>, 0.6V VDDQ (see datasheets for 200b Z11M VDDQ options)  
 E = 1.1V VDD, (1.1V VDDQ / 0.6V VDDQ (backward compatible))  
 F = 1.05V VDD, 0.5V VDDQ  
 G = 3.0V V<sub>DD</sub>  
 H = 1.8V V<sub>DD</sub>  
 HC = 1.8V V<sub>DD</sub>, 1.2V I/O  
 J = 1.5V V<sub>DD</sub>  
 K = 1.35V V<sub>DD</sub>  
 L = 1.2V V<sub>DD</sub>  
 LC = 3.3V V<sub>DD</sub>  
 M = 1.25V V<sub>DD</sub>  
 N = 1.0V V<sub>DD</sub>  
 R = 1.55V V<sub>DD</sub>  
 V = 2.5V V<sub>DD</sub>

#### Component Configuration

Depth, Width  
 Blank = Bits  
 K = Kilobits  
 M = Megabits  
 G = Gigabits

#### Device Versions

Alphanumeric character(s) specified by individual datasheet

#### Mobile devices

D1 = Single die (LPDDR2, LPDDR3, LPDDR4, LPDDR5)  
 LF = Single die (LPDDR)  
 LG = Single die, reduced page-size addressing (LPDDR)  
 D2 = 2-die stack (LPDDR2, LPDDR3, LPDDR4, LPDDR5)  
 L2 = 2-die stack (LPDDR)  
 D4 = 4-die stack (LPDDR2, LPDDR3, LPDDR4, LPDDR5)  
 L4 = 4-die stack (LPDDR)  
 D6 = 6-die stack (LPDDR3)  
 D8 = 8-die stack (LPDDR4, LPDDR5)  
 DA = 16-die stack (LPDDR4, LPDDR5)

#### RLDRAM only

Blank = Common I/O  
 C = Separate I/O

#### GDDR5X only

Blank = Initial version  
 1,2,3,etc. = Sequential number for product variations

#### DRAM Package Codes

Codes range from 1-3 characters depending on the product.  
 Please refer to the datasheet for package details.

### Die Revision Designator

#### Production Status

ES = Engineering sample  
 MS = Mechanical sample  
 Blank = Production

#### Operating Temperatures

Blank = Commercial temperature  
 IT\*\* = Industrial temperature  
 AT = Automotive temperature  
 WT = Wireless temperature  
 XT = Wide temperature  
 UT = Ultra temperature  
 ET = Extreme temperature  
 \*\*The number one (1) and the capital letter "I" utilize the same laser mark—"I"

#### Special Options

(Multiple processing codes are separated by a space and are listed in hierarchical order)  
 A = Automotive  
 G = Graphics  
 L = Low power  
 M = Reduced standby  
 N = Networking (Graphics)  
 X = Product Longevity Program (Automotive & Industrial only)  
 OS = Off Spec  
 RS = Relaxed Spec

DRAM Technology	Speed Grade Mark	MAX Clock Frequency	PC Targets CL-nRCD-nRP
Mobile LPDDR5	-031	3200 MHz	
	-036	2750 MHz	
Mobile LPDDR4	-046	2133 MHz	
	-053	1866 MHz	
	-062	1600 MHz	
	-075	1333 MHz	
	-093	1066 MHz	
	-125	800 MHz	
	-125	800 MHz	
	-18	533 MHz	
Mobile LPDDR3	-375	266 MHz	
	-15	667 MHz	
Mobile LPDDR2	-125	800 MHz	
	-18	533 MHz	
Mobile LPDDR	-25	400 MHz	
	-3	333 MHz	
	-37	266 MHz	
	-5	200 MHz	
Mobile LPSDR	-48	208 MHz	
	-8	125 MHz	
	-75	133 MHz	
RLDRAM 1 & 2	-6	167 MHz	
	-54	185 MHz	
	-5	200 MHz	
	-48	208 MHz	
RLDRAM 3	-6	167 MHz	
	-5	200 MHz	
	-33	300 MHz	
	-25	400 MHz with 'RC 20ns	
	-25E	400 MHz with 'RC 15ns	
GDDR5	-18	533 MHz	
	-125	800 MHz with 'RC (MIN) 12ns	
	-125E	800 MHz with 'RC (MIN) 10ns	
	-107	933 MHz with 'RC (MIN) 10ns	
	-107E	933 MHz with 'RC (MIN) 8ns	
GDDR5X	-093	1067 MHz with 'RC (MIN) 10ns	
	-093E	1067 MHz with 'RC (MIN) 8ns	
	-50	1.25 GHz	Data Rate
	-60	1.5 GHz	5 Gb/s
GDDR6	-70	1.75 GHz	6 Gb/s
	-80	2.0 GHz	7 Gb/s
	-80	2.0 GHz	8 Gb/s
	-100	1.25 GHz	Data Rate
GDDR6	-110	1.375 GHz	10 Gb/s
	-120	1.5 GHz	11 Gb/s
	-120	1.5 GHz	12 Gb/s
	-140	1.75 GHz	14 Gb/s
GDDR6	-10	1.25 GHz	Data Rate
	-12	1.5 GHz	10 Gb/s
	-13	1.625 GHz	11 Gb/s
	-14	1.75 GHz	12 Gb/s
	-14C	1.75 GHz	13 Gb/s
	-14	1.75 GHz	14 Gb/s
	-15	1.875 GHz	14 Gb/s
	-16	2.0 GHz	15 Gb/s
	-18	2.25 GHz	16 Gb/s
	-20	2.5 GHz	18 Gb/s
	-20	2.5 GHz	20 Gb/s
	-22	2.75 GHz	22 Gb/s

DRAM Technology	Speed Grade Mark	MAX Clock Frequency	PC Targets CL-nRCD-nRP
DDR4 SDRAM	-093E	1067 MHz	15-15-15
	-093H	1067 MHz	18-15-15
	-083	1200 MHz	17-17-17
	-083E	1200 MHz	16-16-16
	-083H	1200 MHz	20-18-18
	-083J	1200 MHz	19-17-17
	-075	1333 MHz	19-19-19
	-075E	1333 MHz	18-18-18
	-075H	1333 MHz	22-19-19
	-068	1467 MHz	21-21-21
	-068E	1467 MHz	20-20-20
	-068H	1467 MHz	24-21-21
	-062E	1600 MHz	22-22-22
	-062H	1600 MHz	26-22-22
DDR3 SDRAM	-15E	667 MHz	9-9-9
	-125	800 MHz	11-11-11
	-125E	800 MHz	10-10-10
	-107	933 MHz	13-13-13
DDR2 SDRAM	-093	1067 MHz	14-14-14
	-3	333 MHz	5-5-5
	-25	400 MHz	6-6-6
	-25E	400 MHz	5-5-5
DDR SDRAM	-187E	533 MHz	7-7-7
	-75	133 MHz	2.5-3-3
	-6T	167 MHz	2.5-3-3
SDRAM	-5B	200 MHz	3-3-3
	-75	133 MHz	3-3-3
	-7E	133 MHz	2-2-2
	-6A	167 MHz	3-3-3
-5	200 MHz	3-3-3	



**DDR3 SDRAM PART NUMBERING**

**H 5 I Q XX X X X X - XX X**  
 1 2 3 4 5 6 7 8 9 10 11 12 13 14

**SK Hynix MEMORY**

**PRODUCT FAMILY**

5 : DRAM

**PRODUCT MODE**

T : DDR3 SDRAM

**POWER SUPPLY**

Q : VDD=1.5V & VDDQ=1.5V  
 C : VDD=1.35V & VDDQ=1.35V

**DENSITY & REFRESH**

51 : 512Mb, 8K/64ms Refresh  
 1G : 1Gb, 8K/64ms Refresh  
 2G : 2Gb, 8K/64ms Refresh  
 4G : 4Gb, 8K/64ms Refresh  
 8G : 8Gb, 8K/64ms Refresh

**ORGANIZATION**

4 : x4  
 8 : x8  
 6 : x16

**NUMBER OF BANKS**

3 : 8 Banks  
 4 : 16 Banks

**DIE GENERATION**

M : 1st            D : 5th  
 A : 2nd           E : 6th  
 B : 3rd           F : 7th  
 C : 4th           G : 8th

**OPERATING TEMPERATURE & POWER CONSUMPTION**

C : Commercial Temp<sup>1)</sup> & Normal Power  
 L : Commercial Temp<sup>1)</sup> & Low Power  
 I : Industrial Temp<sup>2)</sup> & Normal Power  
 K : Automotive Temp<sup>3)</sup> & Normal Power  
 A : Commercial Temp<sup>1)</sup> & 1.35 VDD  
 J : Industrial Temp<sup>2)</sup> & Low Power

**SPEED(tCL-tRCD-tRP)**

TE : DDR3-2133 14-14-14  
 RD : DDR3-1866 13-13-13  
 PB : DDR3-1600 11-11-11  
 H9 : DDR3-1333 9-9-9  
 G7 : DDR3-1066 7-7-7

**PACKAGE MATERIAL**

P : Lead Free (ROHS<sup>4)</sup> compliant)  
 R : Lead Free & Halogen Free  
 (ROHS<sup>4)</sup> compliant)

**PACKAGE TYPE**

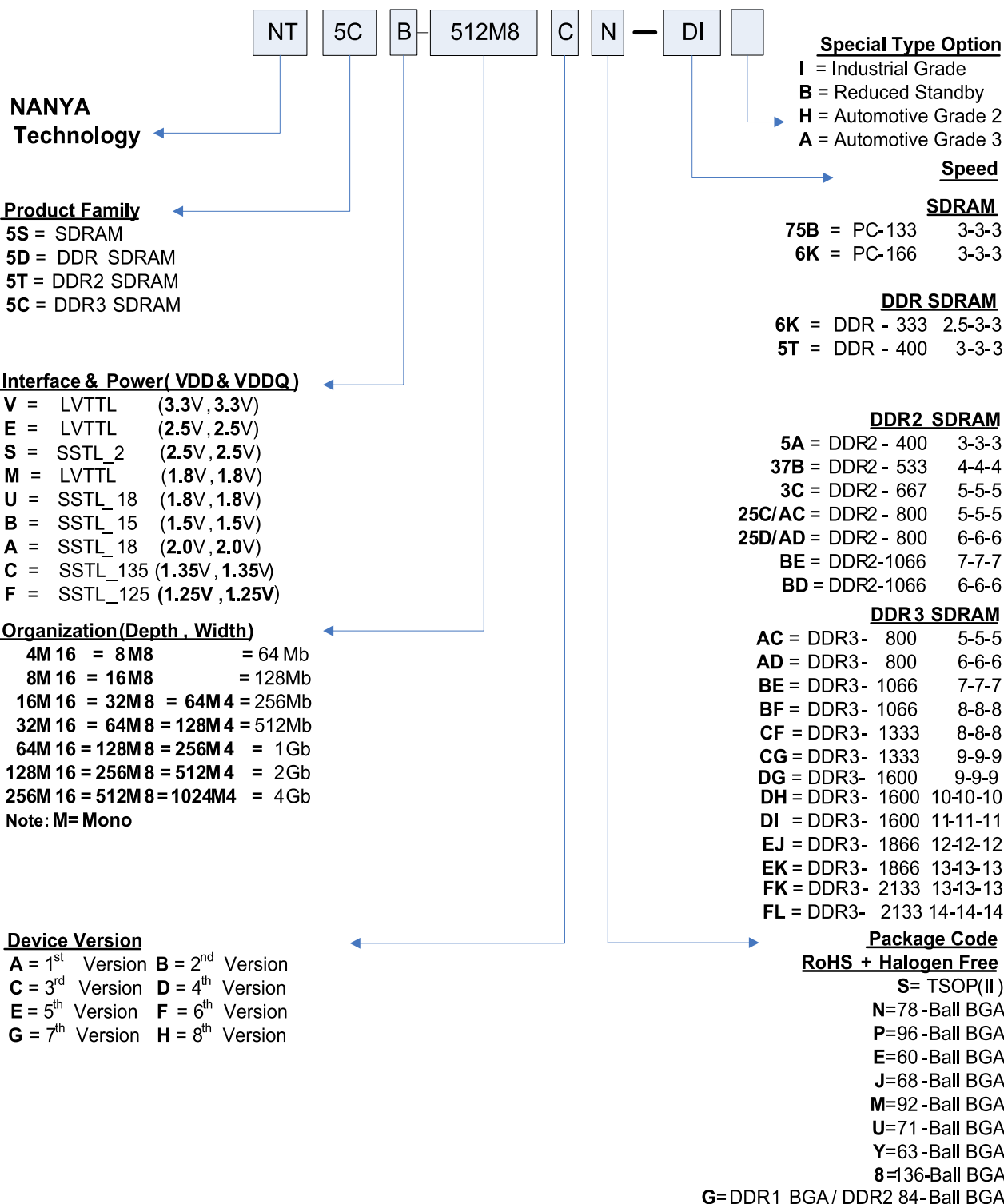
F : FBGA SDP  
 (Single Die Package)

Note:

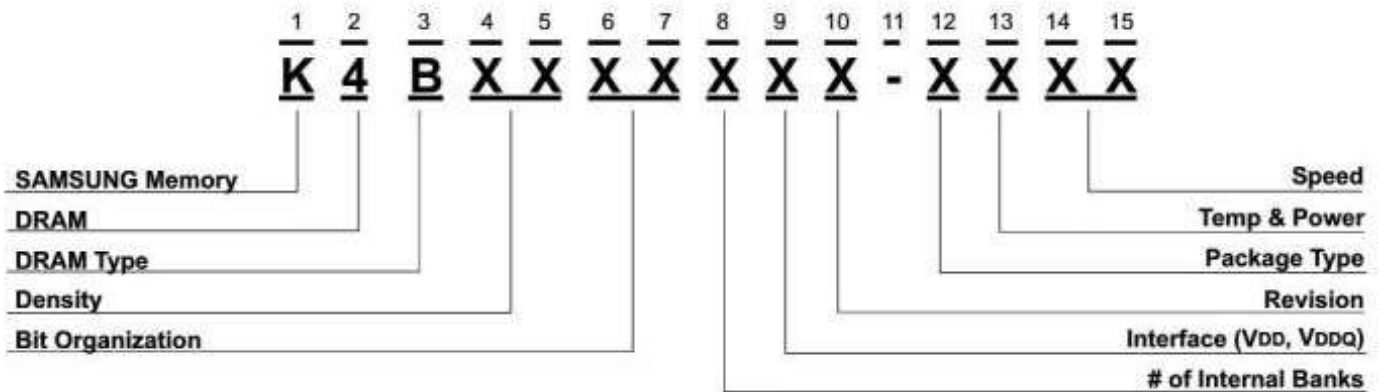
- 1) Commercial Temperature: 0°C ~ 85°C
- 2) Industrial Temperature: -40°C ~ 95°C
- 3) Automotive Temperature: -40°C ~ 105°C
- 4) ROHS : Restriction Of Hazardous Substances



## NANYA Component Part Numbering Guide



# 1. DDR3 SDRAM MEMORY ORDERING INFORMATION



## 1. SAMSUNG Memory : K

## 2. DRAM : 4

## 3. DRAM Type

B : DDR3 SDRAM

## 4~5. Density

51 : 512Mb  
 1G : 1Gb  
 2G : 2Gb  
 4G : 4Gb  
 8G : 8Gb  
 AG : 16Gb

## 6~7. Bit Organization

04 : x 4  
 08 : x 8  
 16 : x16  
 33 : x32

## 8. # of Internal Banks

3 : 4 Banks  
 4 : 8 Banks  
 5 : 16 Banks

## 9. Interface ( VDD, VDDQ)

6 : SSTL (1.5V, 1.5V)

## 10. Revision

M : 1st Gen.  
 A : 2nd Gen.  
 B : 3rd Gen.  
 C : 4th Gen.  
 D : 5th Gen.  
 E : 6th Gen.  
 F : 7th Gen.  
 G : 8th Gen.  
 H : 9th Gen.

## 11. "-"

## 12. Package Type

H : FBGA (Halogen-free & Lead-free)  
 M : FBGA (Halogen-free & Lead-free, DDP)  
 B : FBGA (Halogen-free & Lead-free, Flip Chip)  
 E : FBGA(Lead-free & Halogen-free, QDP)  
 O : FBGA(Lead-free & Halogen-free, QDP for 64GB LRDIMM)

## 13. Temp & Power

C : Commercial Temp.( 0°C ~ 85°C ) & Normal Power(1.5V)  
 Y : Commercial Temp.( 0°C ~ 85°C ) & Low VDD(1.35V)  
 K : Commercial Temp.( 0°C ~ 85°C ) & Low VDD(1.35V) & RS( Reduced Standby )

## 14~15. Speed

F7 : DDR3-800 (400MHz @ CL=6, tRCD=6, tRP=6)  
 F8 : DDR3-1066 (533MHz @ CL=7, tRCD=7, tRP=7)  
 H9 : DDR3-1333 (667MHz @ CL=9, tRCD=9, tRP=9)  
 K0 : DDR3-1600 (800MHz @ CL=11, tRCD=11, tRP=11)  
 MA : DDR3-1866 (933MHz @ CL=13, tRCD=13, tRP=13)