SpecTek NAND Flash Part Numbering System

SPECTEK® Brilliant Memory Solutions

Last Updated: 04/26/2021

For the previous marketing part number, see the next page.

FB M B2*B 512G6 K L B A E J4 - 25 AS

SpecTek NAND Flash Memory
FN, FT, FB, FX = SpecTek
CB = Chip on Board

Product Marking
Internal code for Laser Marker. Not applicable for customers.

Cell Technology
3, M = Single-level cell (SLC)
4, L = Multiple-level cell (MLC)
B = Triple-level cell (TLC)
Q = Quad-level cell (QLC)

Process Node
For process node values of 6, 7, 8, 9, B, D, or E, see page 2

Functional Density*
Process Node [0, 1, 2, or 3] - potential density

64G = 64Gbit	Density Grade (% of Parent Density)
128G = 128Gbit	1 = 94–100%
256G = 256Gbit	9 = 90–100%
384G = 384Gbit	6 = 50–90%
512G = 512Gbit	5 = 40–60%
768G = 768Gbit	0 = BL or S* grade definitions
1T = 1024Gbit	
1T2 = 1152Gbit (1.125T)	
1HT = 1536Gbit (1.5T)	
2T = 2048Gbit (2T)	
3T = 3072Gbit (3T)	
4T = 4096Gbit (4T)	
6T = 6144Gbit (6T)	
8T = 8192Gbit (8T)	
16T = 16384Gbit (16T)	

Configuration

G = x8 ECC enabled	L = x16
H = x1	M = x8 (half page, size)
J = x4	P = x16 ECC enabled
K = x8 (normal page, size)	N = Not available

Voltage

	Vcc	VccQ	VssQ
1 =	1.8V	1.8V	not used
3 =	3.3V	3.3V	not used
D =	3.3V	1.8V	0V
E =	3.3V	1.8V / 3.3V	0V
F =	3.3V	1.2V	0V
J =	3.3V	1.8V / 3.3V	0V
L =	2.5V	1.2V	0V
S =	3.3V	3.3V	0V
T =	3.3V	1.8V / 1.2V	0V

Grade and Product Definition
-AS = Full Spec for SSD (100%)
-AL = Full Spec for USB/SD and low end SSD (100%)
-AF = Full Spec for low end USB/SD (100%)
-AR = Relaxed Spec (see Functional Density)
-ES = Engineering Sample
-MB = Mixed Bins (35%)
-PG = Partial Good Mixed Bins (50%)
-UT = Untested (80%)
-S7 = Partially tested, est yield of 75%
-S9 = Partially tested, est yield of 90%
-S5 = Partially tested, est yield of 50% (EOL 4/15/19)
-S8 = Partially tested, est yield of 85% (EOL 4/15/19)
-SG = Simple Test Passers/Extended Test Failures (EOL 4/15/19)
-SS = Simple Test Failures (EOL 4/15/19)

Speed Grade (max speed)

15 = NV-DDR TM3 133MT/s	37 = NV-DDR2 TM8 533MT/s
12 = NV-DDR TM4 166MT/s	3 = NV-DDR3 TM9 666MT/s
10 = NV-DDR TM5 200MT/s	25 = NV-DDR3 TM10 800MT/s
75 = NV-DDR2 TM5 266MT/s	18 = NV-DDR3 TM11 1066MT/s
6 = NV-DDR2 TM6 333MT/s	16 = NV-DDR3 TM12 1200MT/s
5 = NV-DDR2 TM7 400MT/s	

BLANK= See datasheet for specific speed

Note: 1. TM = Timing mode
2. MT/s = Millions of Transfers per second

Package Code with Pitch

WP = 48-pin TSOP-1 Center Package Leads (CPL) PB free, 12 x 20 x 1.2
WC = 48-pin TSOP-1 Off-center Package Leads (OCPL) PB free, 12 x 20 x 1.2
C3 = 52-pad ULGA, 12 x 17 x 0.65
C4 = 52-pad VLGA, 12 x 17 x 1.0
C5 = 52-pad VLGA, 14 x 18 x 1.0
C6 = 52-pad LLGA, 14 x 18 x 1.47
C7 = 48-pad LLGA, 12 x 20 x 1.47
C8 = 52-pad WLGA, 14 x 18 x 0.75
D1 = 52-pad VLGA, 11 x 14 x 0.9
D4 = 154/195 ball VFBGA, 13.5 x 11.5 x 1.0
D5 = 154/195 ball LFBGA, 13.5 x 11.5 x 1.3
D6 = 154/195 ball LFBGA, 13.5 x 11.5 x 1.5
G1 = 272/352 ball VFBGA, 14 x 18 x 1.0
G2 = 272/352 ball LFBGA, 14 x 18 x 1.3
G4 = 252/308 ball LFBGA, 12 x 18 x 1.5
G5 = 272/352 ball LFBGA, 14 x 18 x 1.4
G6 = 272/352 ball LFBGA, 14 x 18 x 1.5
G7 = 252/308 ball LFBGA, 12 x 18 x 1.0
G8 = 252/308 ball LFBGA, 12 x 18 x 1.3
G9 = 252/308 ball LFBGA, 12 x 18 x 1.4
HC = 63/120 ball VFBGA 10.5 x 13 x 1.0
H1 = 100/170 ball VBGA, 12 x 18 x 1.0
H2 = 100/170 ball TBGA, 12 x 18 x 1.2
H3 = 100/170 ball LBGA, 12 x 18 x 1.4
H4 = 63/120 ball VFBGA, 9 x 11 x 1.0
H5 = 56/256 ball VFBGA, 12.8 x 9.5 x 1.0
H6 = 152/221 ball VBGA 14 x 18 x 1.0
H7 = 152/221 ball TBGA 14 x 18 x 1.2
H8 = 152/221 ball LBGA 14 x 18 x 1.4
J1 = 132/187 ball VBGA, 12 x 18 x 1.0
J2 = 132/187 ball TBGA, 12 x 18 x 1.2
J3 = 132/187 ball LBGA 12 x 18 x 1.4
J4 = 132/187 ball VBGA 12 x 18 x 1.0
J5 = 132/187 ball LBGA 12 x 18 x 1.2
J6 = 132/187 ball TBGA 12 x 18 x 1.4
J7 = 152/221 ball LBGA 14 x 18 x 1.5
K3 = 100/170 ball VLGA 12 x 18 x 0.9
K4 = 100/170 ball TLGA, 12 x 18 x 1.1
K6 = 152/221 ball LBGA, 14 x 18 x 1.3
K7 = 152/221 ball VLGA 14 x 18 x 0.9
K8 = 152/221 ball TLGA 14 x 18 x 1.1
K9 = 132/187 ball VLGA, 12 x 18 x 1.0
M4 = 132/187 ball TBGA, 12 x 18 x 1.3
M5 = 132/187 ball LBGA, 12 x 18 x 1.5
MD = 130-ball VFBGA, 8 x 9 x 1.0
M8Z = 55-ball VFBGA, 8 x 10 x 1.2

Interface

Mark	Interface	Mark	Interface
A	Async only	F	Async/NVDDR2/NVDDR3
B	Async/Sync	G	Enterprise Sync
C	Sync only	H	NVDDR3/NVLPDDR4
D	SPI	M	SIM Flash
E	NVDDR3 only	N	ASYNC/NVDDR2

Package Functionality Partial Type
A = All CE(s) are valid and usable
B = CE1 Valid, CE2 not guaranteed
C = CE2 Valid, CE1 not guaranteed
D = SLC on the fly. Consult factory for more information

Package Configuration Type

Code	# Die	# CE Pins	Num I/O Channels
A	1	0	1
B	1	1	1
C	3	3	2
D	2	1	1
E	2	2	2
F	2	2	1
G	3	3	3
H	4	1	1

Code	# Die	# CE Pins	Num I/O Channels
J	4	2	1
K	4	2	2
L	4	4	4
M	4	4	2
N	6	6	3
P	8	8	2
Q	8	4	4
R	8	2	2

Code	# Die	# CE Pins	Num I/O Channels
S	16	4	4
T	16	8	2
U	8	4	2
V	16	8	4
W	16	4	2
X	4	4	2
Y	11	7	4
1	16	2	1

Code	# Die	# CE Pins	Num I/O Channels
2	64	8	2
3	8	4 or 2	2
4	4	4	1

SDP (Single Die per Package), DDP (Dual Die per Package), QDP (Quad Die per Package), 8DP (Eight Die per Package), 16DP (Sixteen Die per Package)

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Old SpecTek NAND Flash Part Numbering System

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FNN L52*A H G K 3 WG - AF

FNN L63*A 5 1 K 3 WG - AF

F= SpecTek

Product Family
B, N, T= SpecTek NAND Flash

Product Marking
Internal code for Laser mark. Not applicable for customers.

Cell Technology
M= Single-level cell
L= Multiple-level cell

Design Generation
(Consult factory)

Functional Density
Process Node [B/D/E/2/3/4/5] *

1G= 1.0Gib	HG= 16.0Gib
18= 1.8Gib	31= 31.0Gib
2G= 2.0Gib	32= 32.0Gib
38= 3.8Gib	64= 64.0Gib
4G= 4.0Gib	
78= 7.8Gib	NX= 128Mb
8G= 8.0Gib	NY= 256Mb
F8= 15.8Gib	NZ= 512Mb

Process Node [6/7/8/9] *

Parent Density (2^N in Gigabits)

1= 2Gib	6= 64Gib	A= 1024Gib
2= 4Gib	7= 128Gib	B= 2048Gib
3= 8Gib	8= 256Gib	N= no density guaranteed
4= 16Gib	9= 512Gib	
5= 32Gib	0= 1Gib	

Density Grade
1= 94-100% of Parent Density
9= 90-100% of Parent Density
6= 50-90% of Parent Density
5= 40-60% of Parent Density
A= see, HP, BL, or S* grade definitions

Configuration
K= x8 L= x16 H= x1

Grade and Product Definition

-AL= Full Spec	-SS= Settle & Ship
-AF= Full Spec	-S3= 3rd Pass
-AR= Relaxed Spec	-S7= Untested Settle & Ship
-AT= One Time Programmable	-ES= Engineering Sample
-AC= No Cache Feature	-HP= Single Plane
-AW= No Write Protect Feature	-SJ= 1st Step Failure
-AA= No READ ID Feature	-SG= Guardband Failure

Package Functionality
G= Single Die Package, CE only
1= Dual Die Package, CE1 functional only
2= Dual Die Package, CE1 and CE2 functional
3= Dual Die Package, CE3 functional only
4= Quad Die Package, CE1 and CE2 functional
5= Quad Die Package, CE1 functional only
6= Quad Die Package, CE2 functional only
7= Octal Die Package, CE3 functional
8= Octal Die Package, CE2/CE3/CE4 functional
9= Octal Die Package, CE2/CE4 functional

Package Code
B= 100/170B BGA 12x18mm PB free
C= 52-pad ULGA 12x17mm PB free
D= 63/120B VFBGA 9x11mm PB free
G= 52-pad VLGA 12x17x1mm PB free
H= 63/120B VBGA 10.5x13mm PB free
J= 48/52-pad SOP/LLGA 12x20mm PB free
L= 52-pad LLGA 14x18mm PB free
P= 48ld TSOP-1 Off-center Package Leads (OCPL) PB free
T= 48ld TSOP-1 PB
V= 52-pad VLGA 14x18mm PB free
W= 48ld TSOP-1 Center Package Leads (CPL) PB free

Voltage

	Vcc	VccQ	VssQ
1=	1.8V	not used	not used
3=	3.3V	not used	not used
D=	3.3V	1.8V	0V
S=	3.3V	3.3V	0V

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SpecTek NAND Flash Wafer/Die Marketing

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WB S M 49A D C BX NL - 0x E2 A

Prefix	Product	Supply Voltage (VCC)	I/O Supply Voltage (VCCQ)
WB	Die on frame	3.3V	3.3V or 1.8V
WT	Die on frame	3.3V	3.3V or 1.8V
WC	Wafer	3.3V	3.3V or 1.8V
WS	Wafer	3.3V	3.3V or 1.8V
WD	Die on frame	1.8V	1.8V
WF	Die on frame	1.8V	1.8V
WG	Wafer	1.8V	1.8V
WH	Wafer	1.8V	1.8V
WM	Die stacked	3.3V	3.3V or 1.8V
WN	Die stacked	3.3V	3.3V or 1.8V
WJ	Die stacked	1.8V	1.8V
WK	Die stacked	1.8V	1.8V
WL	Die on frame	3.3V	1.8V
WP	Wafer	3.3V	1.8V
WQ	Die on frame	3.3V	1.2V
WR	Wafer	3.3V	1.2V
WV	Die on frame	3.3V	1.8/1.2V
WW	Wafer	3.3V	1.8/1.2V
WX	Die on frame	2.5V	1.2V
WY	Wafer	2.5V	1.2V

XX = SPTK PROJECTION MPN W1 = Single DS Recon

CU Bond Pad Type

A = NI/PD
B = NI/AU
C = AL CAP
D = ALM3
E = ALM2
F = NI/PD/AU
U = Unavailable

Manufacture Yield

E0 = 100%
E9 = 90%
E8 = 80%
E7 = 70%
E6 = 60%
E5 = 50%
E4 = 40%
E3 = 30%
E2 = 25%
E1 = 10%
EX = Carcass Die 2%

Reticle Grade and Revision

0x = 300mm wafer
Nx = 300mm wafer
Where "x" indicates the die's top reticle revision and can be any character between "A" (oldest) to "S" (newest).

Parent Device/Configuration

1 = 32Gx8
2 = 48Gx8
3 = 64Gx8
4 = 128Mx8
5 = 8Mx16
6 = 768Mx16
7 = 16Mx8
8 = 5330Mx8
A = 512Mx16
U = Unavailable
C = 32Mx8
D = 16Mx16
E = 1Gx8
F = 2Gx8
G = 4Gx8
H = 8Gx8
J = 64Mx8
K= 16Gx8
L = 32Mx16
M = 128Mx8
Q = 64Mx16
S = 256Mx8
T = 2Mx16
V = 512Mx8
Y = 128Mx16
Z = 256Mx16

Die Thickness

AA = 790µm
AB = 725µm
AC = 285µm
AD = 280µm
AE = 55µm
AF = 30µm
NA = 100µm
NB = 508µm
NC = 200µm
ND = 375µm
NE = 305µm
NZ = Unknown Die Thickness
NF = 400µm
NG = 675µm
NH = 500µm
NI = 40µm
NJ = 750µm
NK = 350µm
NL = 80µm
NM = 175µm
NN = 250µm
NP = 125µm
NQ = 225µm
NR = 150µm
NS = 510µm
NT = 65µm
NU = 325µm
NV = 90µm
NW = 120µm
NX = 600µm
NY = 265µm
N2 = 340µm
N3 = 230µm
N4 = 75µm
N5 = 135µm
N6 = 275µm
N7 = 70µm
N8 = 60µm
N9 = 50µm

Cell Technology

B = TLC
L = MLC
M = SLC
Q = QLC

Device Generation & Parent Density

x9x = 2Gb
x0x = 4Gb
x1x = 8Gb
x2x = 16Gb
x3x = 32Gb
x4x = 64Gb
x5x = 128Gb
x6x = 256Gb
x7x = 512Gb

Backside Adhesive (See Next Page)

Wafer Tape Type

B = D-175 (200mm)
C = R-3000/R-3100
D = LE-Z01
F = P-2110G (200mm)
G = D-175-12P (300mm)
H = P-4110G-12P (300mm)
N = NA (uncut wafers)
U = Unavailable

Film Frame Type

D = Disco
G = Gel Pak
K = K & S
N = NA

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Backside Adhesive

BC = Hitachi FH9411ST 40µm
BD = Lintec LE4431 30µm
BF = Nitto EM500-M3VJ-60 60µm
BG = Hitachi FH-900NT-25-E 25µm
BJ = Hitachi FH- 9211ST 20µm
BL = Lintec 4738 P12AW
BM = Nitto EM700J-P 25 25µm
BN = Nitto EM310VJ-P 60µm
BP = Lintec LE4411 10µm
BQ = Nitto EM500-M2 A 30µm
BR = Henkel ATB-120-12 30µm
BZ = Lintec LE4738 30µm
CD = Henkel ATB-130-12 30µm
CF = Hitachi FH-9011T-25 25µm
CG = Henkel ATB-S120-12 20µm
CH = Lintec LE4423H 25µm
CJ = Cheil DF-725NT 25µm
CK = Nitto EM-550H-P-12-20 20µm
CL = Hitachi FH-9011P-20 20µm
CM = Hitachi FH-9011P-40 40µm
CN = Nitto EM-310J-P-12-25 25µm
CQ = Hitachi FH9111ST 10µm
CR = Lintec LE4764 60µm
CS = Hitachi FH-9011T-40 40µm
CT = Nitto EM500-M2A-10 10µm
CV = Henkel ATB-120A-12 20µm
CY = Henkel ATB-130A-12 30µm
CZ = Lintec LE4424H 25µm
DB = Cheil DF-730GT 30µm
DC = Nitto 310WAJ-P-12-60 60µm
DD = Lintec LE-5000-12-20 20µm
DF = Hitachi FH-8011T-20 20µm
DH = Henkel ATB-120US1-12 20µm
DK = Lintec LE-4767-12-60 60µm
DL = Nippon NEX-130E4X(01)-12-60 60µm
DM = Hitachi HR-9070GT-20 20µm
DN = Nitto EM-550H1-P-12-20 20µm
DP = Lintec LE-4777H-8-75 75µm
DQ = Henkel ATB-125-8 25µm
DR = Nitto EM-710J-P-12-20 20µm
DS = LG Chem LDA-520-ST-12 20µm
DT = Nitto EM-500M2AG-P-J-12-20 20µm
DV = Nitto EM 710J-P-12-25 25µm
DW = Lintec LE4424 P12AW 20µm
DY = Nitto EM-700J-P-12-25 25µm
DZ = KCC WA-340H-12-20 20µm
EB = Cheil DF-557-D02-12-25 25µm
EC = Nitto EM-700J-P-12-20 20µm
ED = Nitto EM-500M2AG-P-J-12-40 40µm
EE = Hitachi HR-9070GT-10 10µm
EF = Nitto EM-310JT-P-12-60 60µm
EG = Nitto EM-550H1-P-12-40 40µm
EJ = Hitachi HR-900T-10-N20 10µm
EK = Nitto EM-710J1-P-12-20 20µm
EL = KCC WA-5000-12-30 30µm
EM = Nitto EM-310J-P-12-40 40µm
EN = Nitto EM-710C-P-12-40 40µm
EP = KCC WA-5000-12-50 50µm
EQ = Hitachi HR-900T-20-N20 20µm
ER = Henkel ATB-100A-12 10µm
ES = Henkel ATB-150-12 50µm
ET = KCC WA-5000-80T (80/110) 80µm
EV = Nitto EM-710J1-P-12-15 15µm
EX = Nitto EM500-M3-60 60µm
GW = Henkel HR-900T-7-N20
GX = Hitachi FH-9011 20µm
JX = Hitachi FH-9011T 20µm
VX = Nitto EM-310J-P-12-60 60µm
ZX = Nitto EM-310J-P-8-60 60µm

NX = NA

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