

# SpecTek NAND Flash Part Numbering System

Last Updated: 09/07/2017

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

FN N L5\*A HG K 3 B A A WP - AF  
 FN N L6\*A 51 K 3 B A B WP - 15 AF  
 FN N L0\*B256G1 K D B A B WP - 10 AL

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  
 4, L = Multiple-level cell  
 B = Triple-level cell

Process Node

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

Functional Density\*  
 Process Node [6/7/8/9]

Parent Density (2<sup>N</sup> in Gigabits)  
 1 = 2Gib 6 = 64Gib 0 = 1Gib  
 2 = 4Gib 7 = 128Gib A = 1024Gib  
 3 = 8Gib 8 = 256Gib B = 2048Gib  
 4 = 16Gib 9 = 512Gib N = no density  
 5 = 32Gib guaranteed

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

Functional Density\*  
 Process Node [100 and above] - 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)

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	Vcc	VccQ	VssQ
1 <sup>1</sup>	1.8V	not used	not used	F = 3.3V	1.2V	0V
2	2.7V	not used	not used	J = 3.3V	1.8V / 3.3V	0V
3 <sup>1</sup>	3.3V	not used	not used	L = 1.8V	1.8V	0V
4 <sup>1</sup>	5.0V	not used	not used	S = 3.3V	3.3V	0V
D	3.3V	1.8V	0V	T = 3.3V	1.8V / 1.2V	0V
E	3.3V	1.8V / 3.3V	0V			

Note: 1. It is recommended to connect Vcc to VccQ despite the term "not used".

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)  
 -HP = Single Plane, half capacity  
 -S5 = Partially tested, est yield of 50%  
 -S7 = Partially tested, est yield of 70%  
 -S8 = Partially tested, est yield of 80%  
 -S9 = Partially tested, est yield of 90%  
 -SG = Simple Test Passers/Extended Test Failures  
 -SS = Simple Test Failures  
 -ES = Engineering Sample

Speed Grade (max speed)  
 Blank = Asynchronous Timing Mode 5 (TM5)  
 15 = NV-DDR TM3 133MT/s  
 12 = NV-DDR TM4 166MT/s  
 10 = NV-DDR TM5 200MT/s  
 75 = NV-DDR2 TM5  
 6 = NV-DDR2 TM6 333MT/s  
 5 = NV-DDR2 TM7 400MT/s

Package Code

WP = 48-pin TSOP-1 Center Package Leads (CPL) PB free  
 WC = 48-pin TSOP-1 Off-center Package Leads (OCPL) PB free  
 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  
 G1 = 272-ball VFBGA, 14 x 18 x 1.0  
 G2 = 272-ball LFBGA, 14 x 18 x 1.3  
 G5 = 272-ball LFBGA, 14 x 18 x 1.4  
 G6 = 272-ball LFBGA, 14 x 18 x 1.5  
 G9 = 272-ball LFBGA, 12 x 18 x 1.4  
 HC = 63-ball VFBGA 10.5 x 13 x 1.0  
 H1 = 100-ball VBGA, 12 x 18 x 1.0  
 H2 = 100-ball TBGA, 12 x 18 x 1.2  
 H3 = 100-ball LBGA, 12 x 18 x 1.4  
 H4 = 63-ball VFBGA, 9 x 11 x 1.0  
 H5 = 56-ball VFBGA, 12.8 x 9.5 x 1.0  
 H6 = 152-ball VBGA 14 x 18 x 1.0  
 H7 = 152-ball TBGA 14 x 18 x 1.2  
 H8 = 152-ball LBGA 14 x 18 x 1.4  
 J1 = 132-ball VBGA, 12 x 18 x 1.0  
 J2 = 132-ball TBGA, 12 x 18 x 1.2  
 J3 = 132-ball LBGA 12 x 18 x 1.4  
 J4 = 132-ball VBGA 12 x 18 x 1.0  
 J5 = 132-ball LBGA 12 x 18 x 1.2  
 J6 = 132-ball TBGA 12 x 18 x 1.4  
 J7 = 152-ball LBGA 14 x 18 x 1.5  
 K3 = 100-ball VLGA 12 x 18 x 0.9  
 K4 = 100-ball TLGA, 12 x 18 x 1.1  
 K7 = 152-ball VLGA 14 x 18 x 0.9  
 K8 = 152-ball TLGA 14 x 18 x 1.1  
 MD = 130-ball VFBGA, 8 x 9 x 1.0  
 M4 = 132-ball TBGA, 12 x 18 x 1.3  
 M5 = 132-ball LBGA, 12 x 18 x 1.5  
 M8Z = 55-ball VFBGA, 8 x 10 x 1.2

Interface

Mark	Interface	Mark	Interface
A	Async only	E	PPN (Perfect Page NAND)
B	Async or Sync	F	Async/NV-DDR2/NV-DDR3
C	Sync only	G	Enterprise Sync
D	SPI	M	SIM Flash
		N	ASYN/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	Code	# Die	# CE Pins	Num I/O Channels
A	1	0	1	N	6	6	3
B	1	1	1	P	8	8	2
C	3	3	2	Q	8	4	4
D	2	1	1	R	8	2	2
E	2	2	2	T	16	8	2
F	2	2	1	U	8	4	2
G	3	3	3	V	16	8	4
H	4	1	1	W	16	4	2
J	4	2	1	X	4	4	2
K	4	2	2	Y	11	7	3
L	4	4	4	4	4	4	1
M	4	4	2				

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

# Old SpecTek NAND Flash Part Numbering System



Last Updated: 04/01/11

**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)

Density

For 20, 40, 50 series: Functional Density\*

1G= 1.0 Gib	8G= 8.0 Gib
18= 1.8 Gib	F8= 15.8 Gib
2G= 2.0 Gib	HG= 16.0 Gib
38= 3.8 Gib	31= 31.0 Gib
4G= 4.0 Gib	32= 32.0 Gib
78= 7.8 Gib	64= 64.0 Gib

For 60 -70 series\*

Parent Density (2<sup>N</sup> in Gigabits)

1= 2 Gib	5= 32 Gib
2= 4 Gib	6= 64 Gib
3= 8 Gib	7= 128 Gib
4= 16 Gib	8= 256 Gib

NA= Unavailable

Density Grade

1= 100% of Parent Density  
9= 90% of Parent Density  
6= 60% of Parent Density  
5= 50% of Parent Density

Configuration

K= x8 L= x16 H= x1

Grade and Product Definition

-AL= Full Spec	-SS= Settle & Ship
-AF= Full Spec	-S3= 3 <sup>rd</sup> 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= 1 <sup>st</sup> 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

# SpecTek NAND Flash Wafer/Die Marketing



Last Updated: 11/01/2017

Prefix	Product	Supply Voltage (VCC)	I/O Supply Voltage (VCCQ)	WB	S	M	50A	D	B	CX	NL	-	NA	E2	A
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												

  

<b>Parent Device/Configuration</b> 1 = 32Gx8      C = 32Mx8      L = 32Mx16 2 = 48Gx8      D = 16Mx16     M = 128Mx8 3 = 1Mx16      E = 1Gx8        Q = 64Mx16 4 = 8Mx8        F = 2Gx8        S = 256Mx8 6 = 4Mx16      G = 4Gx8        T = 2Mx16 7 = 16Mx8      H = 8Gx8        V = 512Mx8 8 = 5330Mx8    J = 64Mx8        Y = 128Mx16 A = 512Mx16    K = 16Gx8        Z = 256Mx16 U = Unavailable	<b>Cell Technology</b> M = SLC L = MLC B = TLC	<b>Device Generation &amp; Parent Density</b> x9x = 2Gb    x5x = 128Gb x0x = 4Gb    x6x = 256Gb x1x = 8Gb    x7x = 512Gb x2x = 16Gb x3x = 32Gb x4x = 64Gb	<b>Film Frame Type</b> D = Disco G = Gel Pak K = K & S N = NA
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<b>CU Bond Pad Type</b> A = NI/PD      D = ALM3 B = NI/AU      E = ALM2 C = AL CAP     F = NI/PD/AU	<b>Pick Grade</b> E0 = 100%      E4 = 40% E9 = 90%        E3 = 30% E8 = 80%        E2 = 25% E7 = 70%        E1 = 10% E6 = 60%        EX = Carcass Die 2% E5 = 50%	<b>Reticle Grade and Revision</b> Nx = 300mm wafer Where "x" indicates the die's top reticle revision and can be any character between "A" (oldest) to "S" (newest).	<b>Die Thickness</b> AA = 790µm    NF = 400µm    NP = 125µm    NY = 265µm AB = 725µm    NG = 675µm    NQ = 225µm    N2 = 340µm AC = 285µm    NH = 500µm    NR = 150µm    N3 = 230µm AD = 280µm    NI = 40µm     NS = 510µm    N4 = 75µm AE = 55µm     NJ = 750µm    NT = 65µm     N5 = 135µm AF = 30µm     NK = 350µm    NU = 325µm    N6 = 275µm NA = 100µm    NL = 80µm     NV = 90µm     N7 = 70µm NB = 508µm    NM = 175µm    NW = 120µm    N8 = 60µm NC = 200µm    NN = 250µm    NX = 600µm    N9 = 50µm ND = 375µm NE = 305µm NZ = Unknown Die Thickness
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<b>Backside Adhesive (See Next Page)</b>	<b>Wafer Tape Type</b> 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)
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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 = 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  
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