

SpecTek NAND Flash Part Numbering System

Brilliant Memory Solutions

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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^N 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 ¹ = 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 ¹ = 3.3V	not used	not used	L = 1.8V	1.8V	0V
4 ¹ = 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
 -AL = Full spec w/ tighter requirements -S8 = Visual defects, tinged leads
 -AF = Full Spec -SS = Settle&Ship
 -AR = Relaxed Spec -S7 = Untested Settle&Ship
 -BL = SpecTek Post Electrical Rejects (25%) -ES = Engineering Sample
 -CB = Chip on Board (70%) -SG = Guardband Failure
 -CBU = Chip on Board w/underfill (30%)
 -HP = Single Plane

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 VLGA, 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	Interface
A	Async only	E PPN (Perfect Page NAND)
B	Async or Sync	F Async/NV-DDR2/NV-DDR3
C	NV-DDR/NV-DDR2	G Enterprise Sync
D	SPI	M SIM Flash

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



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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)

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^N 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 rd 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 st 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



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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	3.3V												
WP	Wafer	3.3V	3.3V												
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												

Parent Device/Configuration 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	Cell Technology M = SLC L = MLC B = TLC	Device Generation & Parent Density x9x = 2Gb x5x = 128Gb x0x = 4Gb x6x = 256Gb x1x = 8Gb x7x = 512Gb x2x = 16Gb x3x = 32Gb x4x = 64Gb	Film Frame Type D = Disco G = Gel Pak K = K & S N = NA
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CU Bond Pad Type A = NI/PD D = ALM3 B = NI/AU E = ALM2 C = AL CAP F = NI/PD/AU	Pick Grade E0 = 100% E4 = 40% E9 = 90% E3 = 30% E8 = 80% E2 = 25% E7 = 70% E1 = 10% E6 = 60% EX = Carcass Die 2% E5 = 50%	Reticle Grade and Revision Nx = 300mm wafer Where "x" indicates the die's top reticle revision and can be any character between "A" (oldest) to "S" (newest).	Die Thickness 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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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)
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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