

SpecTek NAND Flash Part Numbering System Brilliant Memory Solutions

Last Updated: 03/28/2016

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 B = 2048Gib
 3 = 8Gib 8 = 256Gib N = no density
 4 = 16Gib 9 = 512Gib guaranteed
 5 = 32Gib

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
 128G = 128Gbit (% of Parent Density)
 256G = 256Gbit 1 = 94-100%
 384G = 384Gbit 9 = 90-100%
 512G = 512Gbit 6 = 50-90%
 768G = 768Gbit 5 = 40-60%
 1T = 1024Gbit 0 = BL or S* grade definitions
 1T2 = 1152Gbit
 1HT = 1536Gbit
 2T = 2048Gbit
 3T = 3072Gbit
 4T = 4096Gbit

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
 1¹ = 1.8V not used not used
 2.7 = 2.7V
 3¹ = 3.3V not used not used
 4¹ = 5.0V not used not used
 D = 3.3V 1.8V / 3.3V 0V
 E = 3.3V 1.8V / 3.3V 0V
 F = 3.3V 1.2V 0V
 J = 3.3V 1.8V / 3.3V 0V
 L = 1.8V 1.8V 0V
 S = 3.3V 3.3V 0V
 T = 3.3V 1.8V / 1.2V 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 -S2 = Untested 1st Pass
 -AR = Relaxed Spec -S3 = 3rd Pass
 -AT = One Time Programmable -S5 = Settle&Ship
 -AA = No READ ID feature -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 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
 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/NVDDR2
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



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^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



Last Updated: 02/18/2016

WB S M 50A D B CX NL - NA E2 A

WB, WP, or WT = Die- 3.3 Volt
 WC, WQ, or WS = Unground Wafer- 3.3 Volt
 WD, WF, or WV = Die- 1.8 Volt
 WG, WH, or WW = Unground Wafer- 1.8 Volt
 WM, WN, or WR = Stacked die, no ring
 WJ, WK, or WL = Stacked die- 1.8 Volt

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

Device Generation & Parent Density

x9x = 2Gb x2x = 16Gb
 x0x = 4Gb x3x = 32Gb
 x1x = 8Gb x4x = 64Gb

Film Frame Type

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

Wafer Tape Type

B = D-175
 C = R-3000/R-3100
 D = LE-Z01
 F = P-2110G
 N = NA (uncut wafers)

Backside Adhesive (See Next Page)

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%
 E9 = 90%
 E8 = 80%
 E7 = 70%
 E6 = 60%
 E5 = 50%
 E4 = 40%
 E3 = 30%
 E2 = 20%
 E1 = 10%
 EX = Carcass Die 2%

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			

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