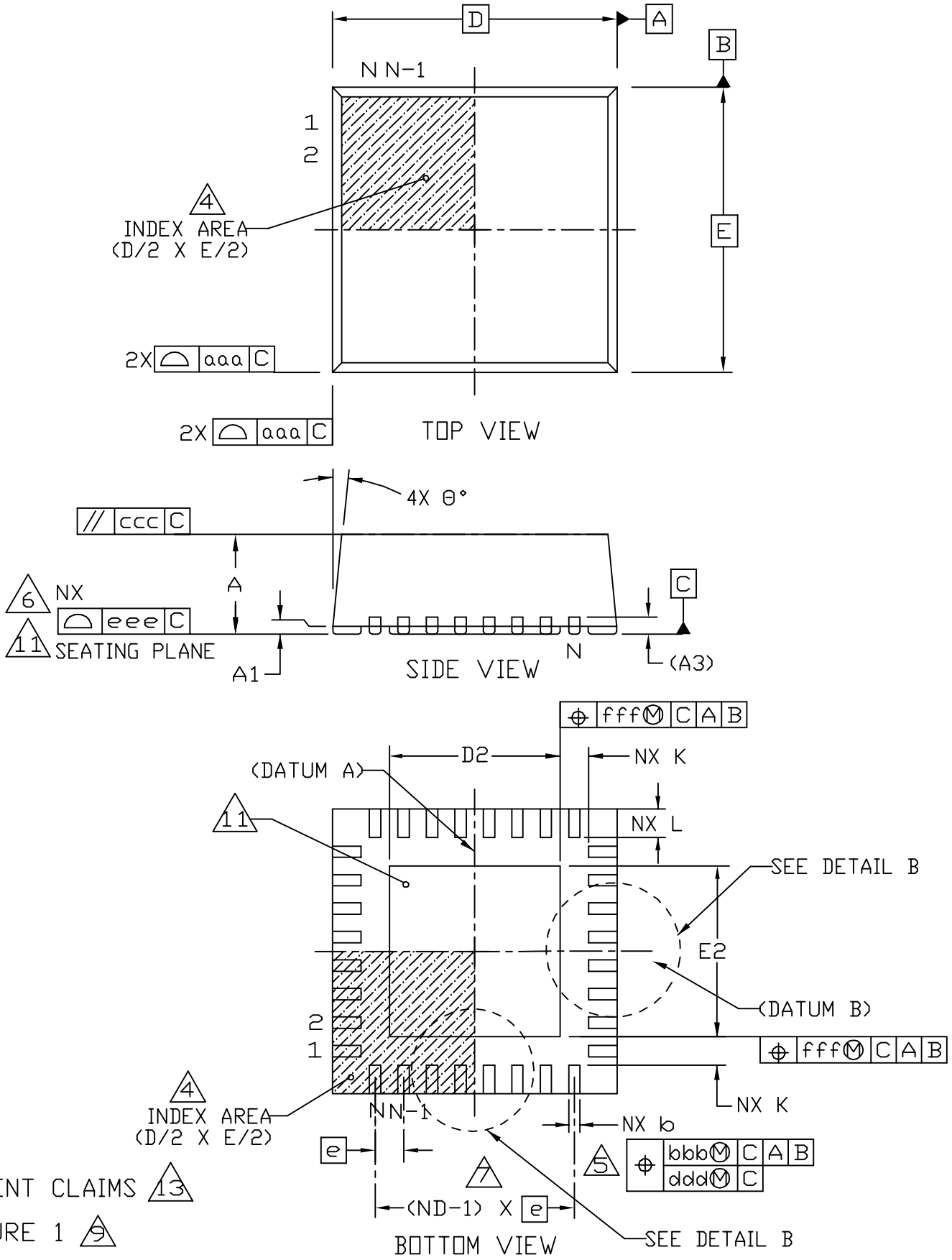
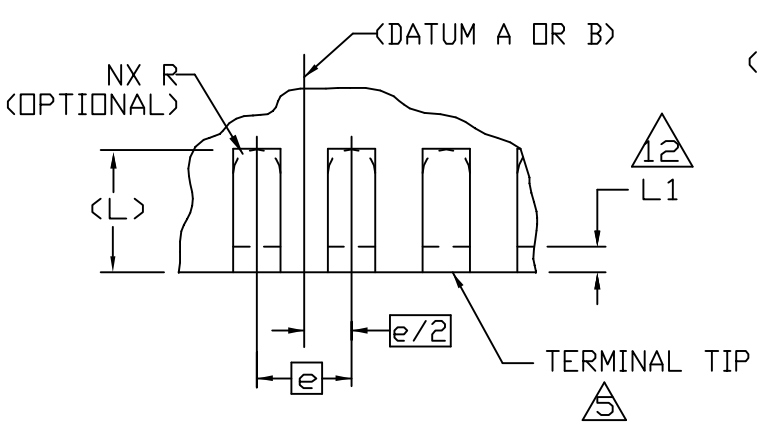
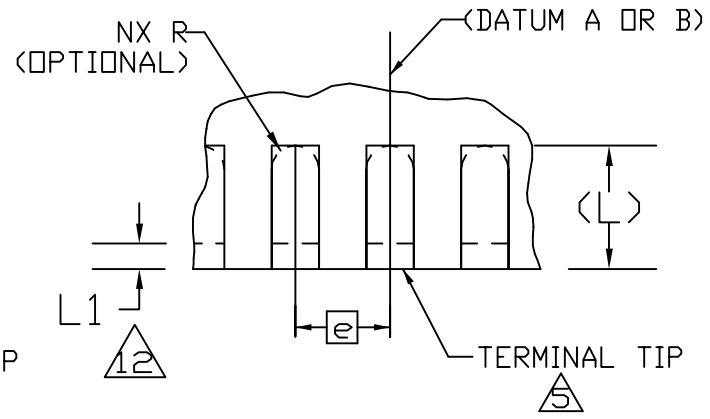


JEDEC SOLID STATE PRODUCT OUTLINE	*THIS REGISTERED OUTLINE HAS BEEN PREPARED BY THE JEDEC JC-II COMMITEE AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY; CHANGES ARE LIKELY TO OCCUR*				
THERMALLY ENHANCED PLASTIC VERY THIN AND VERY VERY THIN FINE PITCH BUMPED QUAD FLAT NO LEAD PACKAGE	JESD-30 DESIGNATOR HP-VFQFP-NB & HP-WFQFP-NB	ISSUE A	DATE AUG03	MO-243	SHEET 1 OF 5



EVEN TERMINAL/SIDE



ODD TERMINAL/SIDE

DETAIL B

TABLE 1

VARIATION DESIGNATORS							
FIRST DIGIT CODE		SECOND DIGIT CODE		THIRD DIGIT CODE		FOURTH DIGIT CODE	
OVERALL HEIGHT		*BODY LENGTH*		*BODY WIDTH*		*TERMINAL PITCH*	
A	LETTER CODE	D	LETTER CODE	E	LETTER CODE	e	LETTER CODE
1.00 MAX	V	1.0	A	1.0	A	1.00	A
0.80 MAX	W	1.5	B	1.5	B	0.80	B
–	–	2.0	C	2.0	C	0.65	C
–	–	2.5	D	2.5	D	0.50	D
–	–	3.0	E	3.0	E	0.40	E
–	–	3.5	F	3.5	F	–	–
–	–	4.0	G	4.0	G	–	–
–	–	5.0	H	5.0	H	–	–
–	–	6.0	J	6.0	J	–	–
–	–	7.0	K	7.0	K	–	–
–	–	8.0	L	8.0	L	–	–
–	–	9.0	M	9.0	M	–	–
–	–	10.0	N	10.0	N	–	–
–	–	11.0	P	11.0	P	–	–
–	–	12.0	R	12.0	R	–	–
–	–	4.5	S	4.5	S	–	–
–	–	5.5	T	5.5	T	–	–
–	–	6.5	U	6.5	U	–	–

10
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TABLE 2

COMMON DIMENSIONS							
	V: VERY THIN			W: VERY VERY THIN			
SYMBOL	*MIN*	*NOM*	*MAX*	*MIN*	*NOM*	*MAX*	
A	0.80	0.90	1.00	0.60	0.70	0.80	
A1	0.03	0.07	0.11	0.03	0.07	0.11	
*A3	–	0.25 REF	–	–	0.25 REF	–	
L1	0.00	–	0.15	0.00	–	0.15	12.
θ	0°	–	14°	0°	–	14°	
K	0.20	–	–	0.20	–	–	
R	b MIN/2	–	–	b MIN/2	–	–	
NOTES	1,2						
REF	11.11-661						
ISSUE	A						

* DIMENSION A2 IS NOT PRESENT ON SAW SINGULATED CONFIGURATIONS

TABLE 3

LEAD WIDTH			
b			
PITCH	*MIN*	*NOM*	*MAX*
1.00	0.30	0.40	0.45
0.80	0.25	0.30	0.35
0.65	0.25	0.30	0.35
0.50	0.18	0.25	0.30
0.40	0.15	0.20	0.25
NOTES	5, 14		
REF	11.11-661		
ISSUE	A		

TABLE 4

TOLERANCE OF FORM & POSITION	
aaa	0.15
bbb	0.10
ccc	0.10
ddd	0.05
eee	0.08
fff	0.10
NOTES	1,2
REF	11.11-661
ISSUE	A

EXAMPLE: A 32 TERMINAL HP-VFQFP-NB WHICH IS 5.00 mm LONG BY 5.00 mm WIDE AND HAS A 0.50 mm PITCH WILL BE VARIATION VHHD.

TABLE 5

SUMMARY TABLE				
BODY SIZE	LEAD PITCH	LEAD COUNT	VERY THIN FQFP-NB	VERY VERY THIN FQFP-NB
3.00 X 3.00	0.50	16	VEED	WEED
4.00 X 4.00	0.50	24	VGGD	WGGD
5.00 X 5.00	0.50	32	VHHD	WHHD
6.00 X 6.00	0.50	40	VJJD	WJJD
7.00 X 7.00	0.50	48	VKKD	WKKD
8.00 X 8.00	0.50	56	VLLD	WLLD
9.00 X 9.00	0.50	64	VMMD	WMMD
10.00 X 10.00	0.50	72	VNND	WNND

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TABLE 6

e=0.50 PITCH										
VARIATION / SYMBOL		VEED	VGGD	VHHD	VJJD	VKKD	VLLD	VMMD	VNND	NOTE
		WEED	WGGD	WHHD	WJJD	WKKD	WLLD	WMMD	WNND	
D BSC		3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	
E BSC		3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	
D2	MIN	1.05	1.05	1.05	1.05	1.25	2.25	3.25	4.25	
	NOM	–	–	–	–	–	–	–	–	
	MAX	1.45	2.45	3.45	4.45	5.45	6.45	7.45	8.45	
E2	MIN	1.05	1.05	1.05	1.05	1.25	2.25	3.25	4.25	
	NOM	–	–	–	–	–	–	–	–	
	MAX	1.45	2.45	3.45	4.45	5.45	6.45	7.45	8.45	
L	MIN	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	
	NOM	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
	MAX	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	
N		16	24	32	40	48	56	64	72	8,3
ND		4	6	8	10	12	14	16	18	7
NE		4	6	8	10	12	14	16	18	7
NOTES		1,2,10	1,2,10	1,2,10	1,2,10	1,2,10	1,2,10	1,2,10	1,2,10	
REF		11.11-661	11.11-661	11.11-661	11.11-661	11.11-661	11.11-661	11.11-661	11.11-661	
ISSUE		A	A	A	A	A	A	A	A	

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5M-1994.
2. ALL DIMENSIONS ARE IN MILLIMETERS AND ALL ANGLES ARE IN DEGREES.
3. N IS THE TOTAL NUMBER OF TERMINALS.
4. THE TERMINAL #1 IDENTIFIER AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JEDEC PUBLICATION 95 SPP-002. DETAILS OF TERMINAL #1 IDENTIFIER ARE OPTIONAL, BUT MUST BE LOCATED WITHIN THE ZONE INDICATED. THE TERMINAL #1 IDENTIFIER MAY BE EITHER A MOLD OR MARKED FEATURE.
5. DIMENSION b APPLIES TO BUMPED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.35 mm FROM THE TERMINAL END. IF THE TERMINAL HAS THE OPTIONAL RADIUS ON THE OTHER END , DIMENSION b SHOULD NOT BE MEASURED IN THAT RADIUS AREA.
6. THE PRIMARY DATUM C AND THE SEATING PLANE ARE DEFINED BY THE DOMED CROWNS OF THE TERMINALS.
7. ND AND NE REFER TO THE NUMBER OF TERMINALS ON EACH D AND E SIDE RESPECTIVELY.
8. DEPOPULATION IS POSSIBLE IN A SYMMETRICAL FASHION.
9. VARIATION VHHD IS SHOWN FOR ILLUSTRATION ONLY.
10. FOR A COMPLETE SET OF DIMENSIONS FOR EACH VARIATION, SEE THE INDIVIDUAL VARIATION AND THE COMMON DIMENSIONS AND TOLERANCE ON PAGE 3.
11. BILATERAL COPLANARITY ZONE APPLIES TO THE BUMPED EXPOSED HEAT SINK SLUG AS WELL AS THE BUMPED TERMINALS.
12. DEPENDING ON THE METHOD OF LEAD TERMINATION AT THE EDGE OF THE PACKAGE, PULL BACK (L1) MAYBE PRESENT. L MINUS L1 TO BE EQUAL TO OR GREATER THAN 0.30 mm.
13. VARIOUS COMPANIES HAVE ISSUED PATENTS AND RELATED PATENT APPLICATIONS THAT MAY APPLY TO THIS REGISTRATION. IF THE CURRENT ISSUE PATENTS OR LATER PATENTS RESULTING FROM RELATED APPLICATIONS DO APPLY, THESE COMPANIES INTEND TO COMPLY WITH THE JEDEC PATENT POLICY AND LICENSE UNDER REASONABLE TERMS AND CONDITIONS THAT ARE DEMONSTRABLY FREE OF ANY UNFAIR DISCRIMINATION. REFERENCED PATENTS ARE AS FOLLOWS.

AMKOR TECHNOLOGY	U.S. PATENT - No. 6,143,981, 5,866,939, 6,281,568, 6,331,451, 6,433,277, 6,448,633, 6,455,356, 6,469,369, 6,475,827 & 6,476,478
ASAT	U.S. PATENTS - No. 6,229,200B1, 6,242,281B1 & 6,294,100B1
NATIONAL SEMICONDUCTOR	U.S. PATENT No. 6,130,473

14. WHEN MORE THAN ONE VARIATION (OPTION) EXIST FOR THE SAME PROFILE HEIGHT, BODY SIZE (DxE), AND PITCH, THEN THOSE VARIATIONS WILL BE DENOTED BY AN ADDITIONAL DASH NUMBER (i.e.-1,2, etc.) DESIGNATOR TO IDENTIFY THEM. THE NEW VARIATIONS WOULD BE CREATED FROM ALL OR ANY OF THE FOLLOWING REASONS LEAD COUNTS, TERMINAL LENGTHS, ADD OR THERMAL PAD SIZES.