




FIGURE 1   

JEDEC
SOLID STATE
PRODUCT OUTLINE

THIS **REGISTERED OUTLINE** HAS BEEN PREPARED BY THE JEDEC JC-11 COMMITTEE
AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY;
CHANGES ARE LIKELY TO OCCUR.

THERMALLY ENHANCED PLASTIC
VERY THICK, QUAD FLAT
NO LEAD PACKAGE

PACKAGE DESIGNATOR
HP-VFQFP-N

ISSUE
B

DATE
FEB 04

ITEM #
MO-239

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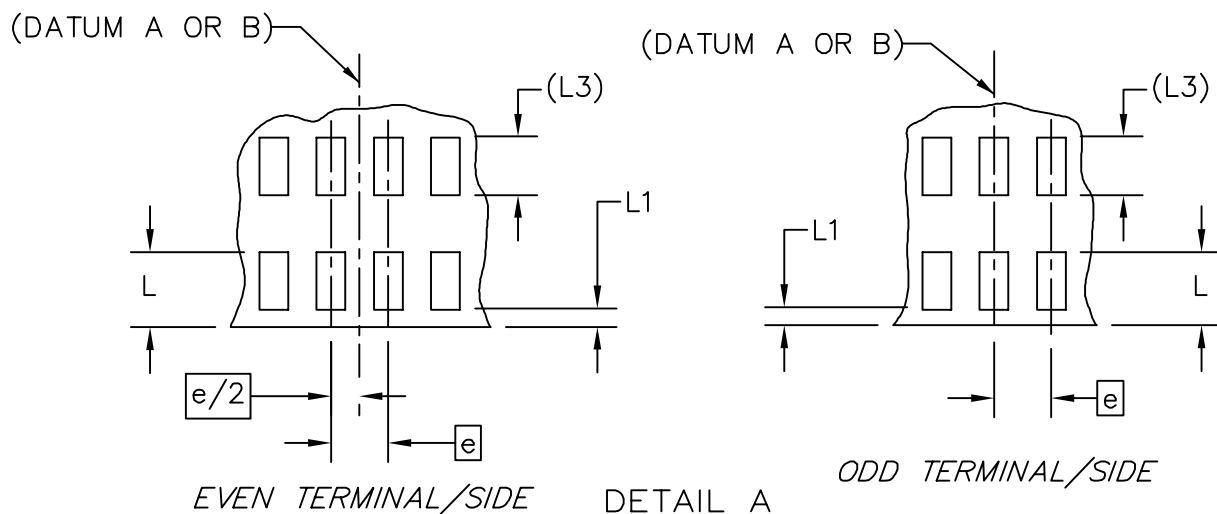
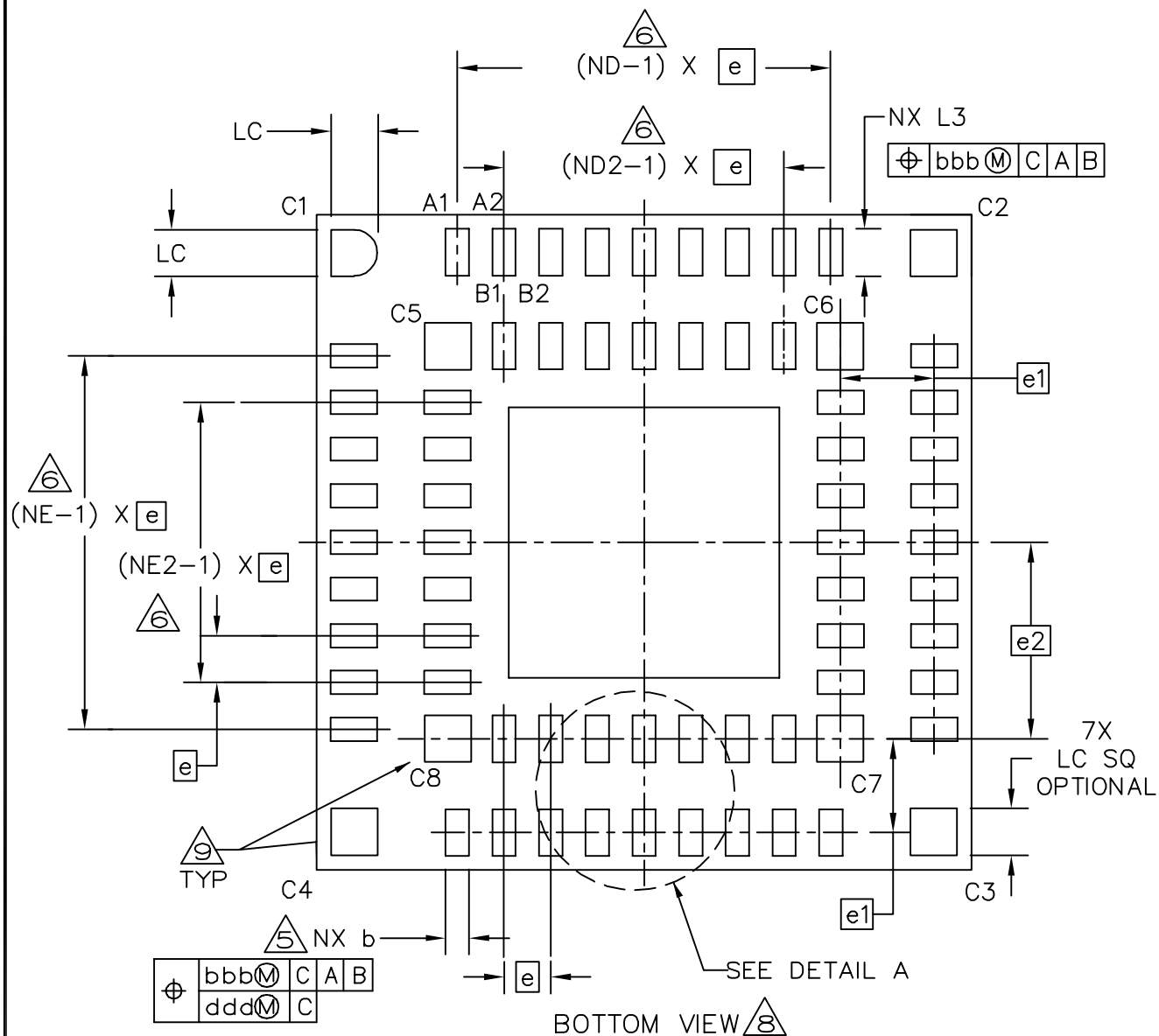


FIGURE 1 $\triangle 8$ $\triangle 9$ $\triangle 12$

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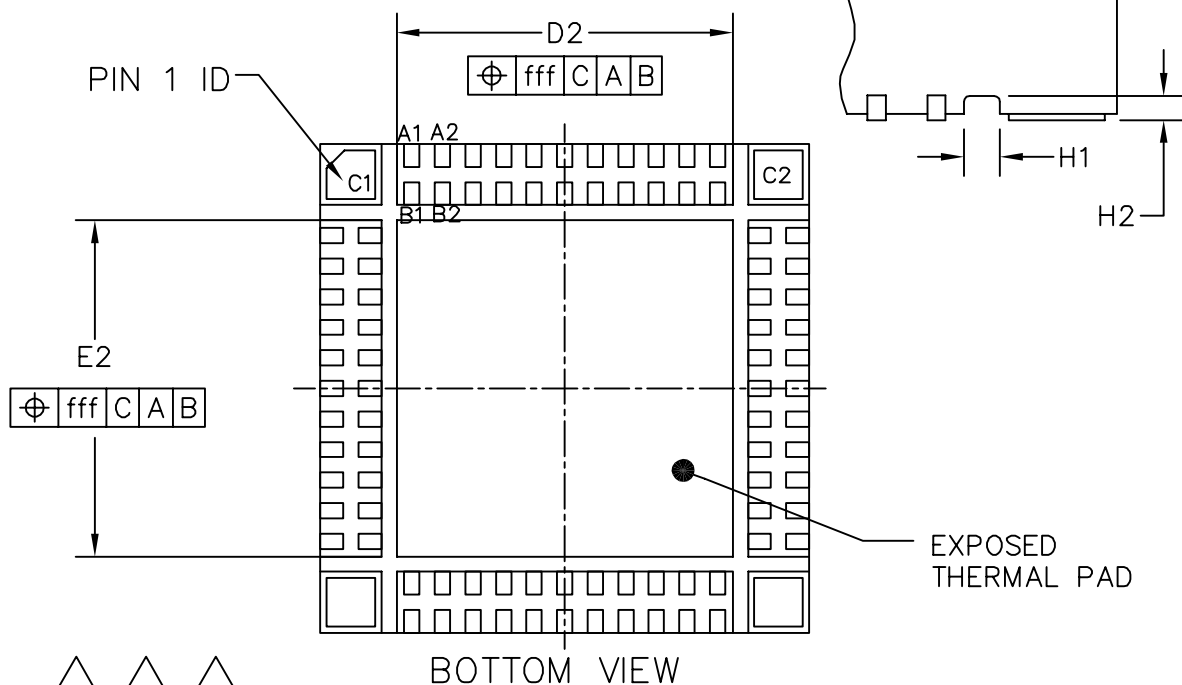
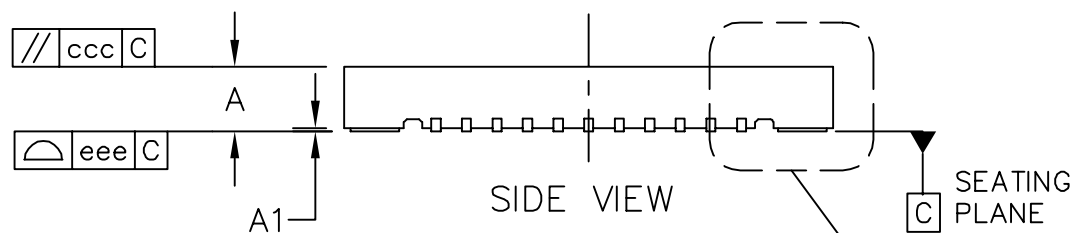
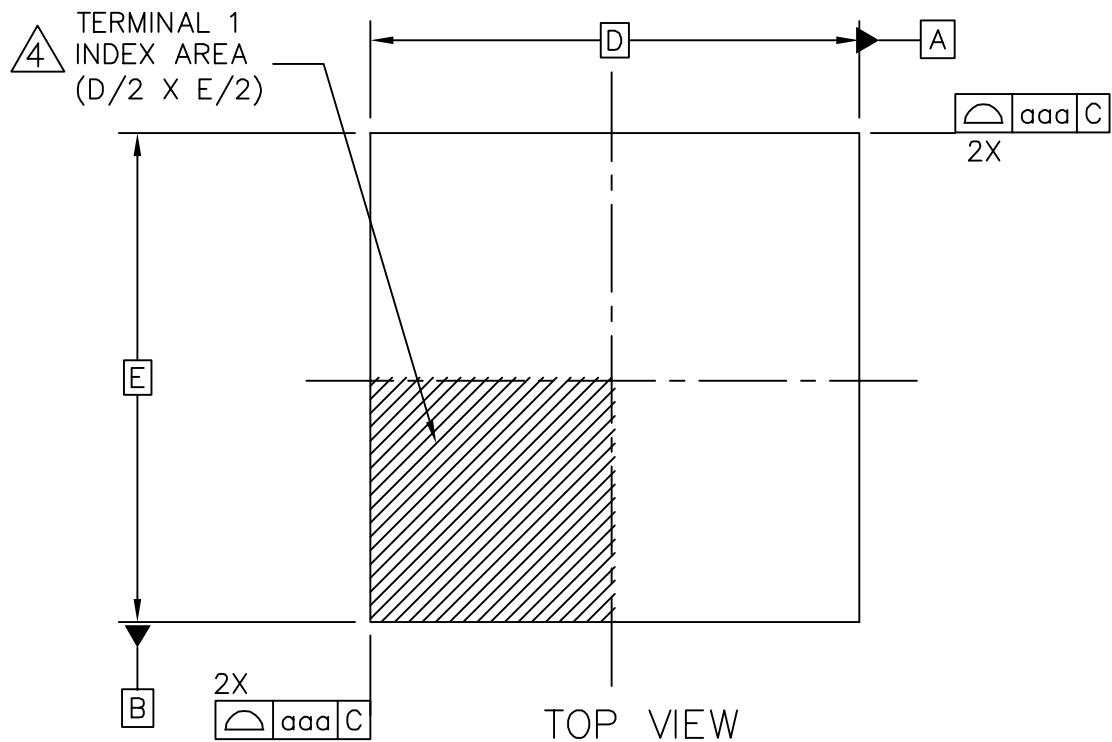


FIGURE 2 9 11 15

SEE SHEET 4 FOR DETAIL

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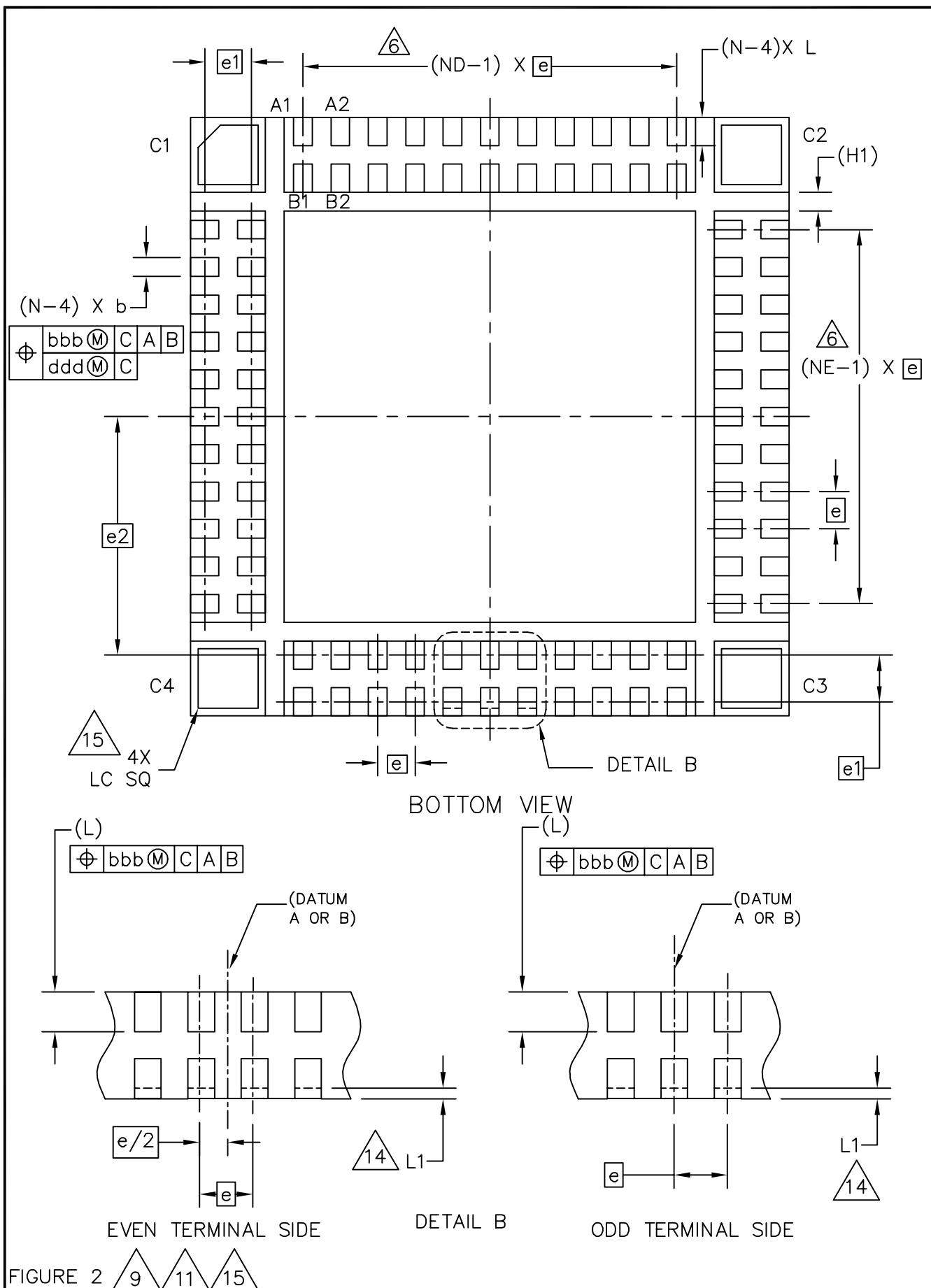


FIGURE 2 $\triangle 9$ $\triangle 11$ $\triangle 15$

VARIATION DESIGNATORS					
FIRST DIGIT CODE		SECOND DIGIT CODE		THIRD DIGIT CODE	
BODY LENGTH		BODY WIDTH		TERMINAL PITCH	
D	CODE	E	CODE	e	CODE
7.00	A	7.00	A	0.80	A
8.00	B	8.00	B	0.65	B
9.00	C	9.00	C	0.50	C
10.00	D	10.00	D	----	----
11.00	E	11.00	E	----	----
12.00	F	12.00	F	----	----
13.00	G	13.00	G	----	----
14.00	H	14.00	H	----	----
15.00	J	15.00	J	----	----

COMMON DIMENSIONS				
SYMBOL	MIN	NOM	MAX	NOTE
A	-----	-----	1.00	
A1	0.00	-----	0.05	12
b	0.20	0.25	0.30	5
H1	0.20	-----	0.30	12
H2	0.10	-----	0.25	12
K	0.20	-----	-----	
L1	-----	-----	0.15	14
L2	SEE NOTE BELOW			
Ø	0*	-----	8*	
NOTES	1,2			
REF	11-680			
ISSUE	B			

TOLERANCE OF FORM & POSITION	
SYMBOL	TOL
aaa	0.10
bbb	0.10
ccc	0.10
ddd	0.05
eee	0.08
fff	0.10
NOTES	1,2
REF	11-680
ISSUE	B

L2 IS NOT PRESENT IN THE REGISTRATION SINCE NEITHER FIGURE 1 OR 2 ARE BUILT WITH LEADS PROTRUDING FROM THE PERIPHERAL EDGE OF PACKAGE.

SUMMARY TABLE					
BODY SIZE	TERMINAL PITCH	TERMINAL COUNT	VARIATION CODE	NOTE	CONFIGURATION OPTION
7.00 X 7.00	0.50	64	AAC		FIGURE 1
7.00 X 7.00	0.50	76	AAC-1	13, 15	FIGURE 2
8.00 X 8.00	0.50	80	BBC		FIGURE 1
8.00 X 8.00	0.50	92	BBC-1	13, 15	FIGURE 2
9.00 X 9.00	0.50	96	CCC		FIGURE 1
9.00 X 9.00	0.50	108	CCC-1	13, 15	FIGURE 2
10.00 X 10.00	0.50	112	DDC		FIGURE 1
10.00 X 10.00	0.50	124	DDC-1	13, 15	FIGURE 2
11.00 X 11.00	0.50	128	EEC		FIGURE 1
12.00 X 12.00	0.50	144	FFC		FIGURE 1
12.00 X 12.00	0.50	156	FFC-1	13, 15	FIGURE 2
13.00 X 13.00	0.50	160	GGC		FIGURE 1
14.00 X 14.00	0.50	176	HHC		FIGURE 1
15.00 X 15.00	0.50	192	JJC		FIGURE 1

EXAMPLE: A 128 TERMINAL HP-VFQFP-N WHICH IS 11 mm LONG (DIMENSION D) BY 11 mm WIDE (DIMENSION E) AND A 0.50 mm PITCH WILL BE VARIATION EEC.

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VARIATIONS										
SYMBOL		AAC	AAC-1	BBC	BBC-1	CCC	CCC-1	DDC	DDC-1	NOTE
D BSC		7.00	7.00	8.00	8.00	9.00	9.00	10.00	10.00	
D2	MIN	NOTE 10	4.00	NOTE 10	5.00	NOTE 10	6.00	NOTE 10	7.00	
	NOM		4.50		5.50		6.50		7.50	
	MAX		5.00		6.00		7.00		8.00	
E BSC		7.00	7.00	8.00	8.00	9.00	9.00	10.00	10.00	
E2	MIN	NOTE 10	4.00	NOTE 10	5.00	NOTE 10	6.00	NOTE 10	7.00	
	NOM		4.50		5.50		6.50		7.50	
	MAX		5.00		6.00		7.00		8.00	
e BSC		0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	
e1 BSC		1.00	0.63	1.00	0.63	1.00	0.63	1.00	0.63	
e2 BSC		2.10	2.69	2.60	3.19	3.10	3.69	3.60	4.19	
L	MIN	---	0.30	---	0.30	---	0.30	---	0.30	
	NOM	---	---	---	---	---	---	---	---	
	MAX	0.75	0.50	0.75	0.50	0.75	0.50	0.75	0.50	
L3	MIN	0.40	---	0.40	---	0.40	---	0.40	---	
	NOM	0.50	---	0.50	---	0.50	---	0.50	---	
	MAX	0.60	---	0.60	---	0.60	---	0.60	---	
LC	MIN	0.40	0.70	0.40	0.70	0.40	0.70	0.40	0.70	
	NOM	0.50	0.80	0.50	0.80	0.50	0.80	0.50	0.80	
	MAX	0.60	0.90	0.60	0.90	0.60	0.90	0.60	0.90	
N		64	76	80	92	96	108	112	124	3
ND		9	9	11	11	13	13	15	15	6
ND2		7	9	9	11	11	13	13	15	6
NE		9	9	11	11	13	13	15	15	6
NE2		7	9	9	11	11	13	13	15	6
NOTES		1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	
REF		11-680	11-680	11-680	11-680	11-680	11-680	11-680	11-680	
ISSUE		B	B	B	B	B	B	B	B	

VARIATIONS								
SYMBOL		EEC	FFC	FFC-1	GGC	HHC	JJC	NOTE
D BSC		11.00	12.00	12.00	13.00	14.00	15.00	
D2	MIN	NOTE 10	NOTE 10	9.00	NOTE 10	NOTE 10	NOTE 10	
	NOM			9.50				
	MAX			10.00				
E BSC		11.00	12.00	12.00	13.00	14.00	15.00	
E2	MIN	NOTE 10	NOTE 10	9.00	NOTE 10	NOTE 10	NOTE 10	
	NOM			9.50				
	MAX			10.00				
e BSC		0.50	0.50	0.50	0.50	0.50	0.50	
e1 BSC		1.00	1.00	0.63	1.00	1.00	1.00	
e2 BSC		4.10	4.60	5.19	5.10	5.60	6.10	
L	MIN	---	---	0.30	---	---	---	
	NOM	---	---	---	---	---	---	
	MAX	0.75	0.75	0.50	0.75	0.75	0.75	
L3	MIN	0.40	0.40	---	0.40	0.40	0.40	
	NOM	0.50	0.50	---	0.50	0.50	0.50	
	MAX	0.60	0.60	---	0.60	0.60	0.60	
LC	MIN	0.40	0.40	0.70	0.40	0.40	0.40	
	NOM	0.50	0.50	0.80	0.50	0.50	0.50	
	MAX	0.60	0.60	0.90	0.60	0.60	0.60	
N		128	144	156	160	176	192	3
ND		17	19	19	21	23	25	6
ND2		15	17	19	19	21	23	6
NE		17	19	19	21	23	25	6
NE2		15	17	19	19	21	23	6
NOTES		1,2	1,2	1,2	1,2	1,2	1,2	
REF		11-680	11-680	11-680	11-680	11-680	11-680	
ISSUE		B	B	B	B	B	B	

NOTES:

1. DIMENSIONING AND TOLERANCING CONFORM TO ASME Y14.5M-1994.

2. ALL DIMENSIONS ARE IN MILLIMETERS, \ominus IS 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 METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15 MM AND 0.30 MM FOR THE TERMINAL TIP.

6. ND, ND2, NE AND NE2 REFER TO THE MAXIMUM NUMBER OF TERMINALS ON EACH D AND E SIDE RESPECTIVELY.

7. DEPOPULATION IS POSSIBLE IN A SYMMETRICAL FASHION.

8. VARIATIONS AAC IS SHOWN FOR ILLUSTRATION ONLY.

9. OPTIONAL PADS IN FIGURE 1 ARE NOT ACTIVE PINS AND CAN BE USED AS DUMMY SOLDER PADS TO IMPROVE PACKAGE SOLDER JOINT RELIABILITY.

10. D2 AND E2 ARE MAXIMUM EXPOSED PAD CALCULATED AS FOLLOWED:
 $D2\text{ MAX} = D\text{ MIN} - 2(L3\text{ MAX} + L1\text{ MAX} + e1 + K)$
 $E2\text{ MAX} = E\text{ MIN} - 2(L3\text{ MAX} + L1\text{ MAX} + e1 + K)$

11. VARIATIONS BBC-1 IS SHOWN FOR ILLUSTRATION ONLY.

12. ALL VARIATIONS MAY BE CONSTRUCTED PER FIGURE 1. VARIATIONS MAY ALTERNATIVELY BE CONSTRUCTED PER FIGURE 2 IF H1 & H2 ARE SPECIFIED IN THE DIMENSION TABLES. IN ALL CASES, THE MINIMUM "K" VALUE OF 0.20 MM APPLIES.

13. FOR VARIATIONS WITH MORE THAN ONE LEAD COUNT FOR A GIVEN BODY SIZE AND TERMINAL PITCH, EACH LEAD COUNT FOR THAT VARIATION IS DENOTED BY A DASH NUMBER (i.e. -1).

14. DEPENDING ON THE METHOD OF LEAD TERMINATION AT THE EDGE OF THE PACKAGE, PULL BACK (L1) MAY BE PRESENT. L MINUS L1 TO BE EQUAL TO OR GREATER THAN 0.3MM.

15. CORNER PADS IN FIGURE 2 ARE ACTIVE PINS AND INCLUDED IN TOTAL NUMBER OF TERMINALS.

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