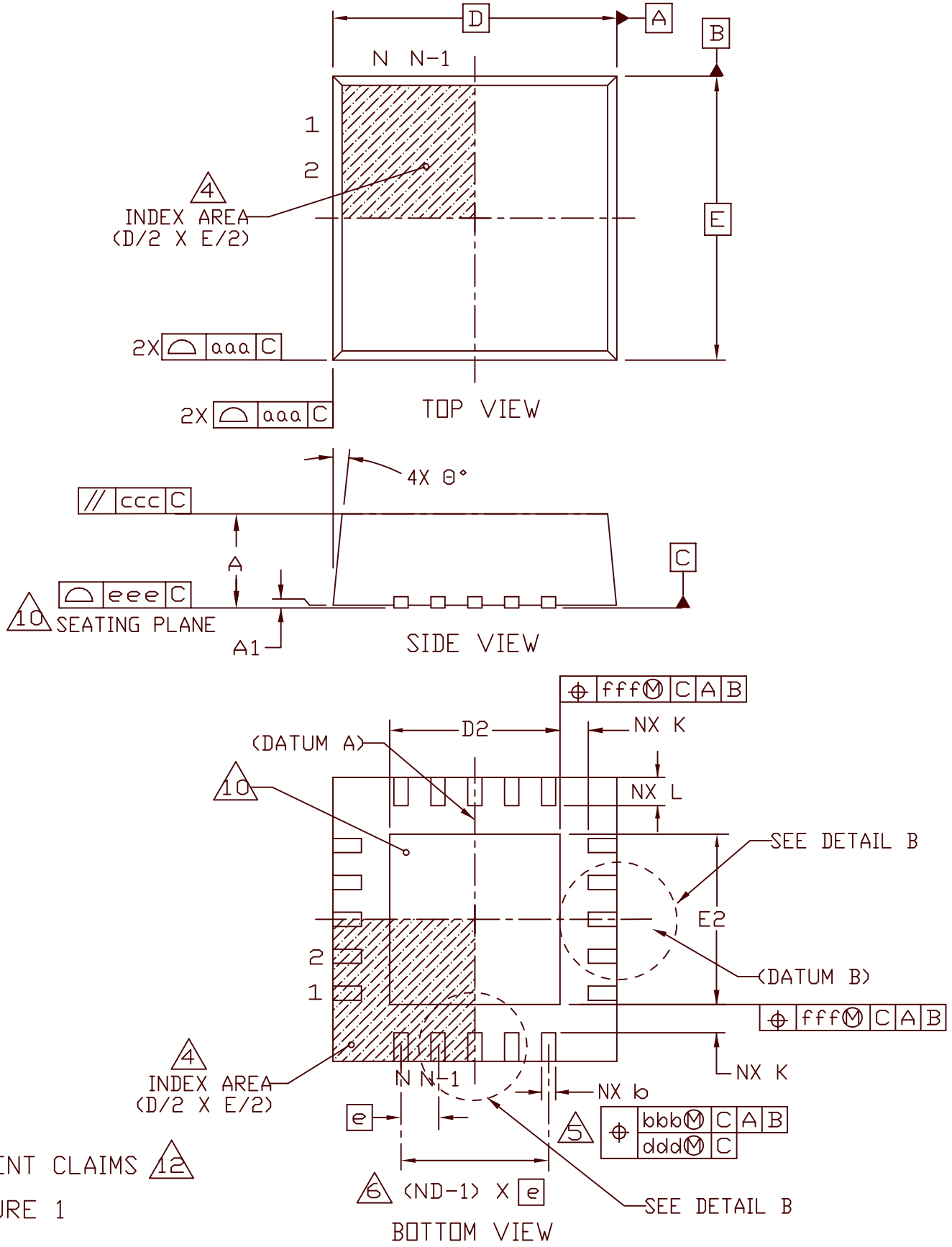

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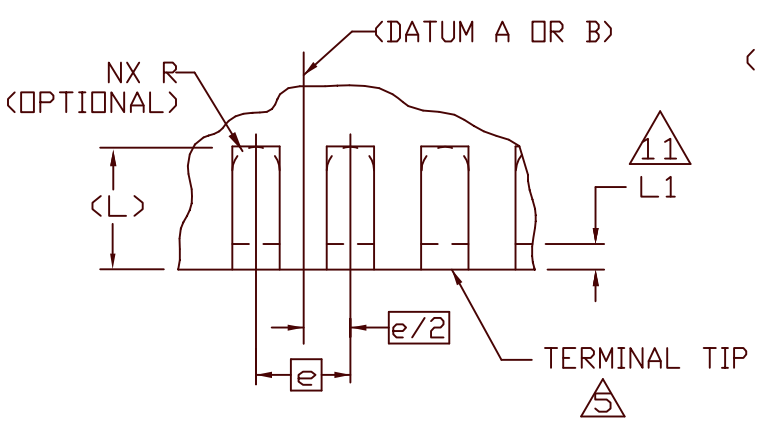
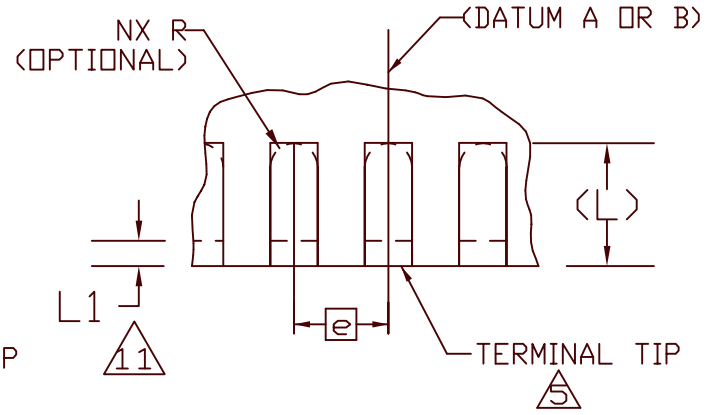
FIGURE 1

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 LOW AND THIN PROFILE FINE PITCH QUAD FLAT NO LEAD PACKAGE FAMILY	JESD-30 DESIGNATOR HLF-PQFPN & HTF-PQFPN	ISSUE A	DATE FEB 2004	MO-254	SHEET 1 OF 5

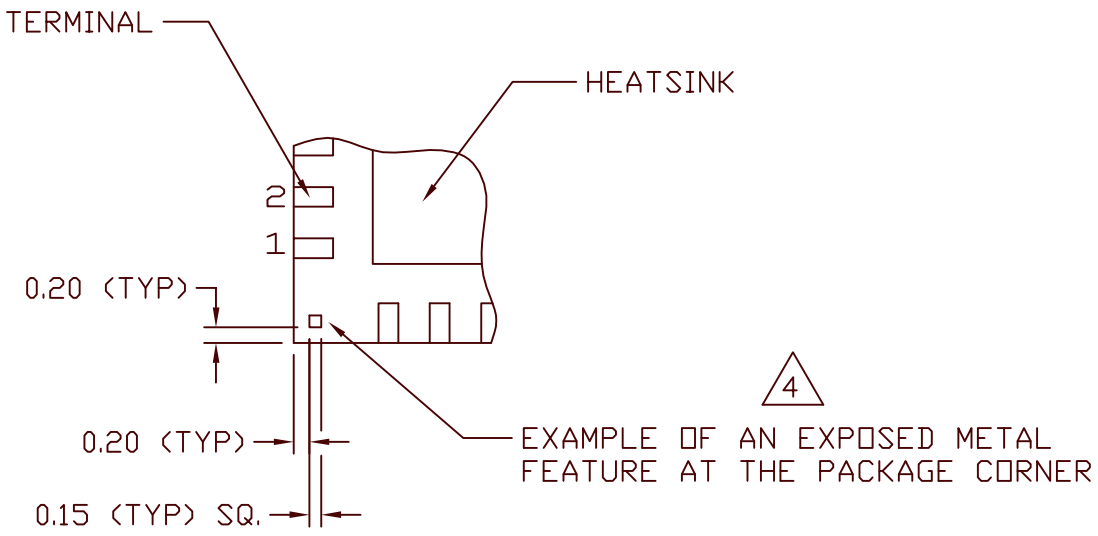


EVEN TERMINAL/SIDE



ODD TERMINAL/SIDE

DETAIL B



PIN 1 ID BOTTOM EXAMPLE

JEDEC SOLID STATE PRODUCT OUTLINE	THERMALLY ENHANCED PLASTIC LOW AND THIN PROFILE FINE PITCH QUAD FLAT NO LEAD PACKAGE FAMILY	ISSUE A	DATE FEB 2004	MO-254	SHEET 2 OF 5

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
1.70 MAX	L	1.0	A	1.0	A	1.00	A
1.20 MAX	T	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	–	–
–	–	4.5	H	4.5	H	–	–
–	–	5.0	J	5.0	J	–	–
–	–	5.5	K	5.5	K	–	–
–	–	6.0	L	6.0	L	–	–
–	–	6.5	M	6.5	M	–	–
–	–	7.0	N	7.0	N	–	–
–	–	8.0	P	8.0	P	–	–
–	–	9.0	R	9.0	R	–	–
–	–	10.0	S	10.0	S	–	–
–	–	11.0	T	11.0	T	–	–
–	–	12.0	U	12.0	U	–	–

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TABLE 2

COMMON DIMENSIONS						
	L: LOW PROFILE			T: THIN PROFILE		
SYMBOL	*MIN*	*NOM*	*MAX*	*MIN*	*NOM*	*MAX*
A	>1.20	–	1.70	>1.00	–	1.20
A1	0.00	–	0.05	0.00	–	0.05
L1	0.00	–	0.15	0.00	–	0.15
θ	0°	–	14°	0°	–	14°
K	0.20	–	–	0.20	–	–
R	b MIN/2	–	–	b MIN/2	–	–
NOTES	1,2					
REF	11.11-686					
ISSUE	A					

11.

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, 13		
REF	11.11-686		
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	11.11-686
ISSUE	A

TABLE 5

e=0.65 PITCH					
VARIATION / *SYMBOL*		LGGC	LJJC		*NOTE*
D BSC		4.00	5.00		
E BSC		4.00	5.00		
D2	MIN	2.30	3.30		
	NOM	2.40	3.40		
	MAX	2.50	3.50		
E2	MIN	2.30	3.30		
	NOM	2.40	3.40		
	MAX	2.50	3.50		
L	MIN	0.45	0.45		
	NOM	0.50	0.50		
	MAX	0.55	0.55		
N		16	20		7,3
ND		4	5		6
NE		4	5		6
NOTES		1,2,9	1,2,9		
REF		11.11-686	11.11-686		
ISSUE		A	A		

EXAMPLE: A 20 TERMINAL HLF-PQFPN WHICH IS 5.00 mm LONG BY 5.00 mm WIDE AND HAS A 0.65 mm PITCH WILL BE VARIATION LJJC.

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 METALLIZED TERMINAL AND IS MEASURED BETWEEN 0.15mm AND 0.30mm FROM THE TERMINAL TIP. IF THE TERMINAL HAS THE OPTIONAL RADIUS ON THE OTHER END OF THE TERMINAL, THE DIMENSION b SHOULD NOT BE MEASURED IN THAT RADIUS AREA.

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

7. DEPOPULATION IS POSSIBLE IN A SYMMETRICAL FASHION.

8. VARIATION LJJC IS SHOWN FOR ILLUSTRATION ONLY.

9. FOR A COMPLETE SET OF DIMENSIONS FOR EACH VARIATION, SEE THE INDIVIDUAL VARIATION AND THE COMMON DIMENSIONS AND TOLERANCE ON PAGE 3 AND 4.

10. BILATERAL COPLANARITY ZONE APPLIES TO THE EXPOSED HEAT SINK SLUG AS WELL AS THE TERMINALS.

11. 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.

12. 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. 5,866,939; 6,143,981; 6,281,568; 6,331,451;
	6,433,277;6,448,633;6,455,356; 6,469,369; 6,475,827;
	6,476,478; 6,501,161; 6,521,987; 6,525,406; 6,545,345;
	6,555,899; 6,580,159; 6,597,059; 6,605,865; 6,605,866;
	6,608,366; 6,611,047; 6,616,436; 6,627,976; 6,630,728;
	6,639,308;6,646,339;6,677,662; 6,667,663; 6,684,496;
ASAT	U.S. PATENTS - No. 6,229,200B1; 6,242,281B1; 6,294,100B1;
	6,545,347B2; 6,585,905B1
NATIONAL SEMICONDUCTOR	U.S. PATENT No. 6,130,473

13. 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.