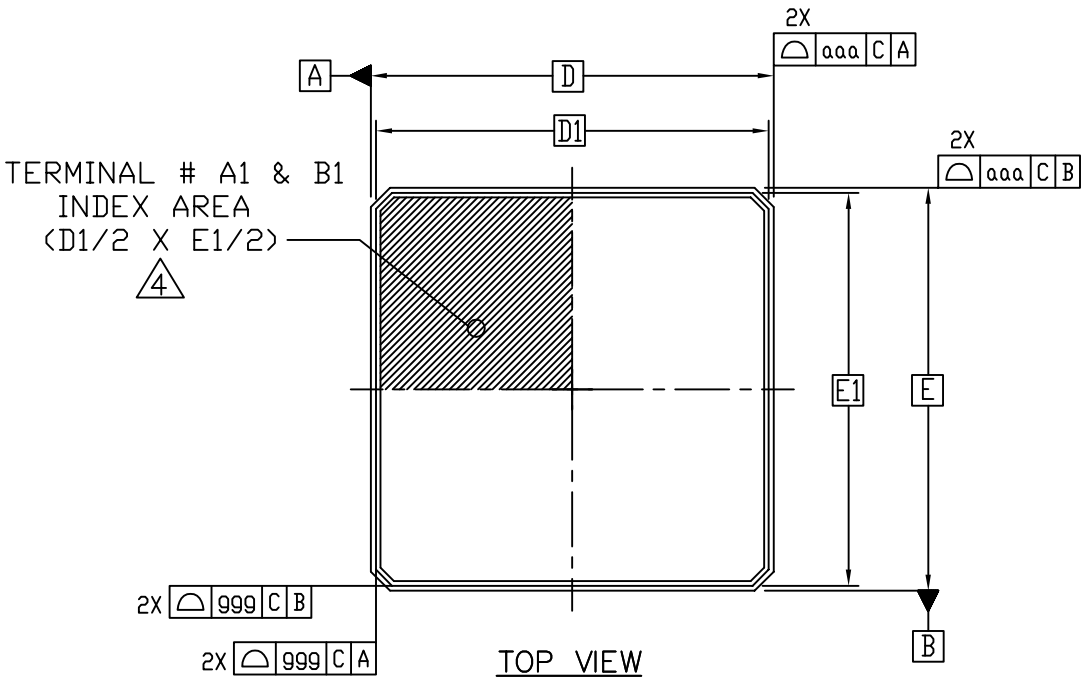
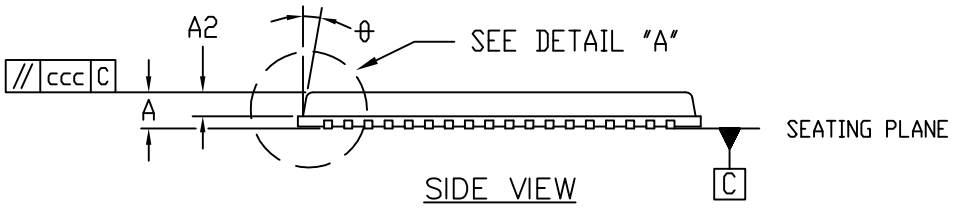
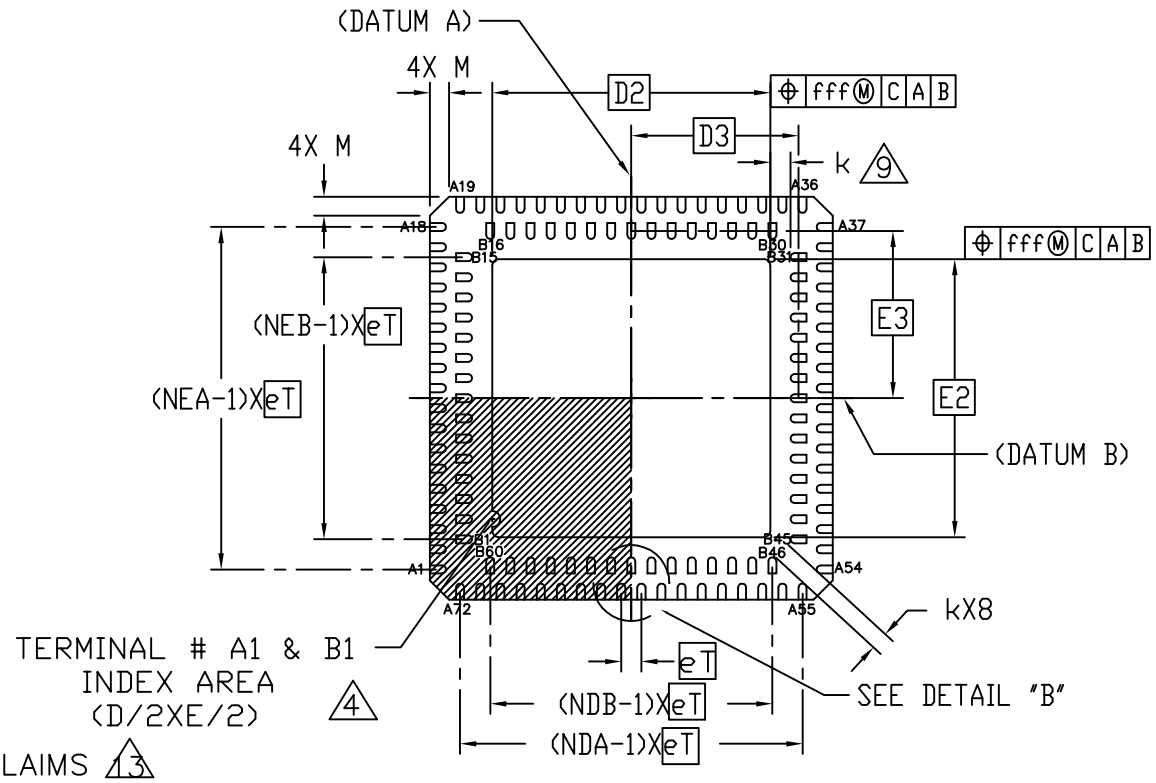


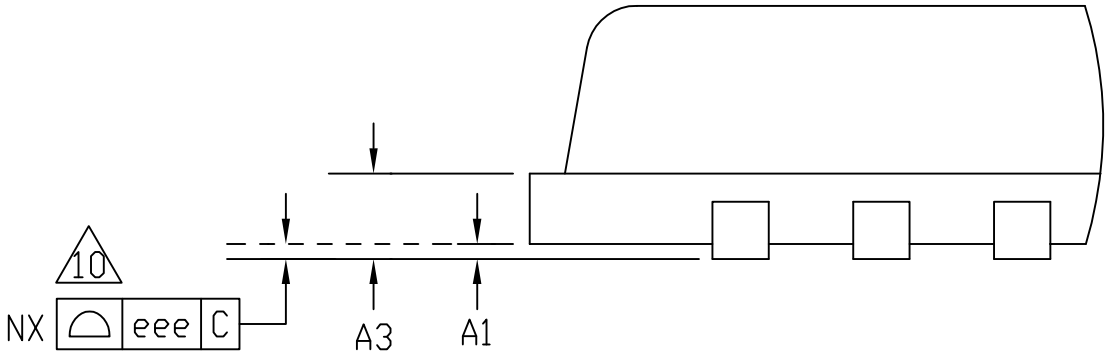




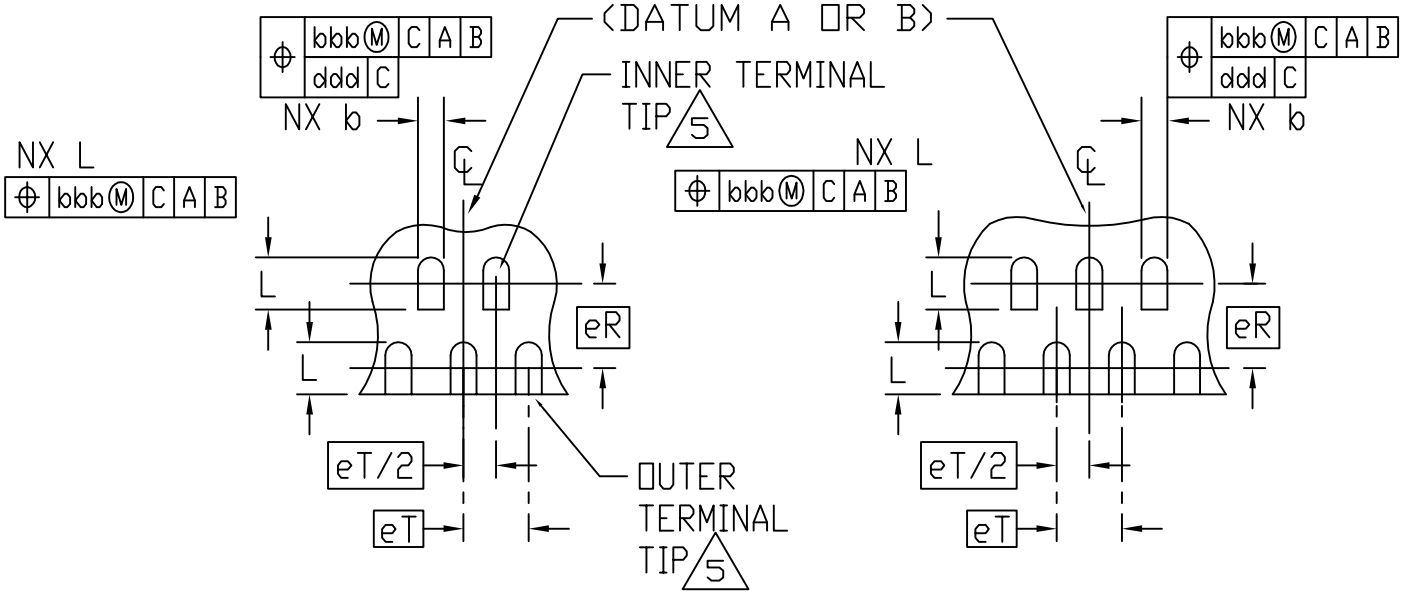
PATENT CLAIMS 13

FIGURE 1 8 9

JEDEC SOLID STATE PRODUCT OUTLINE	*THIS REGISTERED OUTLINE HAS BEEN PREPARED BY THE JEDEC JC-II COMMITT AND REFLECTS A PRODUCT WITH ANTICIPATED USAGE IN THE ELECTRONICS INDUSTRY, CHANGES ARE LIKELY TO OCCUR*				
THERMALLY ENHANCED PLASTIC VERY THIN FINE PITCH QUAD FLAT NO LEAD PACKAGE	JESD-30 DESIGNATOR HVF-PQFN	ISSUE B	DATE MAR 2006	MO-267	PAGE 1 OF 8



DETAIL "A"



FOR ODD OUTER TERMINAL/SIDE

FOR EVEN OUTER TERMINAL/SIDE

DETAIL "B"

JEDEC SOLID STATE PRODUCT OUTLINE	TITLE: THERMALLY ENHANCED PLASTIC VERY THIN FINE PITCH QUAD FLAT NO LEAD PACKAGE	ISSUE B	DATE MAR 2006	MO-267	PAGE 2 OF 8

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	eT	LETTER CODE
1.00 MAX	V	3.0	A	3.0	A	0.65	A
--	--	4.0	B	4.0	B	0.50	B
--	--	5.0	C	5.0	C	--	--
--	--	6.0	D	6.0	D	--	--
--	--	7.0	E	7.0	E	--	--
--	--	8.0	F	8.0	F	--	--
--	--	9.0	G	9.0	G	--	--
--	--	10.0	H	10.0	H	--	--
--	--	11.0	J	11.0	J	--	--
--	--	12.0	K	12.0	K	--	--

TABLE 2

TERMINAL PITCH eT							
SYMBOL	0.65 BSC			0.50 BSC			NOTE
	MIN	*NOM*	*MAX*	*MIN*	*NOM*	*MAX*	
b	0.18	0.22	0.30	0.18	0.22	0.30	
L	0.30	0.40	0.50	0.30	0.40	0.50	
eR	0.75 BSC			0.65 BSC			
NOTES	1,2,11						
REF	11.11-745						
ISSUE	B						

TABLE 3

COMMON DIMENSIONS				
SYMBOL	V: VERY THIN			NOTE
	MIN	*NOM*	*MAX*	
A	0.80	0.85	1.00	
A1	0.00	0.01	0.05	
A2	0.55	0.60	0.70	
A3	-	-	0.30	
~~θ~~	5°	-	15°	
M	-	-	0.60	
k	0.20	-	-	
R	b MIN/2	-	-	
NOTES	1,2,11			
REF	11.11-745			
ISSUE	B			

TABLE 4

TOLERANCE OF FORM & POSITION	
aaa	0.10
bbb	0.10
ccc	0.10
ddd	0.05
eee	0.08
fff	0.10
999	0.20
NOTES	1,2,11
REF	11.11-735
ISSUE	A

TABLE 5

SUMMARY TABLE			
BODY SIZE	LEAD PITCH	LEAD COUNT	VERY THIN PROFILE
9.0 X 9.0	0.50	116	VGGB
	0.50	108	VGGB-1
10.0 X 10.0	0.50	132	VHHB
	0.50	124	VHHB-1
12.0 X 12.0	0.50	164	VKKB
	0.50	156	VKKB-1

TABLE 6

Ⓔ =0.50 PITCH									
VARIATION / SYMBOL		VGGB	VGGB-1	VHHB	VHHB-1	VKKB	VKKB-1			NOTE
D BSC		9.00	9.00	10.00	10.00	12.00	12.00			
E BSC		9.00	9.00	10.00	10.00	12.00	12.00			
D1 BSC		8.75	8.75	9.75	9.75	11.75	11.75			
E1 BSC		8.75	8.75	9.75	9.75	11.75	11.75			
D2	MIN	5.80	5.80	6.80	6.80	8.80	8.80			
	NOM	5.90	5.90	6.90	6.90	8.90	8.90			
	MAX	6.00	6.00	7.00	7.00	9.00	9.00			
E2	MIN	5.80	5.80	6.80	6.80	8.80	8.80			
	NOM	5.90	5.90	6.90	6.90	8.90	8.90			
	MAX	6.00	6.00	7.00	7.00	9.00	9.00			
D3 BSC		3.65	3.65	4.15	4.15	5.15	5.15			
E3 BSC		3.65	3.65	4.15	4.15	5.15	5.15			
N		116	108	132	124	164	156			3
NDA		16	14	18	16	22	20			6
NDB		13	13	15	15	19	19			6
NEA		16	14	18	16	22	20			6
NEB		13	13	15	15	19	19			6
FOOTPRINT FIGURE		-	2	-	2	-	2			
NOTES		1,2,7,11,12								
REF		11.11-735								
ISSUE		A								

NOTES :

1. DIMENSIONING AND TOLERANCE IS IN CONFORMANCE TO ASME Y14.5M-1994. THIS REGISTRATION IS IN COMPLIANCE WITH PUB 95, DESIGN GUIDE 4.23, ISSUE A, PUNCH-SINGULATED, FINE PITCH, SQUARE, VERY THIN, LEADFRAME-BASED QUAD AND DUAL INLINE, SQUARE AND RECTANGULAR, NO LEAD PACKAGES (WITH OPTIONAL THERMAL ENHANCEMENTS). QFP-N.

2. ALL DIMENSIONS ARE IN MILLIMETERS, ± IN DEGREES

3. N IS THE TOTAL NUMBER OF TERMINALS.

4. THE TERMINAL # A1 & B1 IDENTIFIERS AND TERMINAL NUMBERING CONVENTION SHALL CONFORM TO JEDEC PUBLICATION 95, 4.23, ISSUE A. DETAILS OF THE TERMINAL # A1 & B1 IDENTIFIERS ARE OPTIONAL, BUT MUST BE LOCATED WITH THE ZONE INDICATED. THE TERMINAL # A1 & B1 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 FROM THE TERMINAL TIP (BOTH ROWS). IF THE TERMINAL HAS OPTIONAL RADIUS ON THE OTHER END OF THE TERMINAL, THE DIMESNION b SHOULD NOT BE MEASURED IN THAT RADIUS AREA.

6. NDA AND NEA REFER TO THE NUMBER OF TERMINALS ON THE FIRST ROW OF EACH D AND E. NDB AND NEB REFER TO THE NUMBER OF TERMINALS ON THE SECOND ROW OF EACH D AND E.

7. DEPOPULATION IS POSSIBLE IN A SYMMETRICAL FASHION. IF NON-SYMMETRIC DEPOPULATION VARIATIONS SHOULD BE NEEDED. THEY MUST BE BROKEN OUT AS SEPARATE MECHANICAL OUTLINE VARIATIONS, INCLUDING DEPOPULATION GRAPHICS.

8. A 132 TERMINAL 0.50 mm PITCH 10.00 X 10.00 mm PACKAGE IS SHOWN FOR ILLUSTRATION ONLY.

9. THE INNER EDGE OF THE CORNER TERMINALS MAYBE CHAMFERED OR ROUNDED IN ORDER TO ACHIEVE THE MINIMUM GAP "k".

10. UNILATERAL COPLANARITY ZONE "eee" APPLIES TO THE EXPOSED HEATSINK SLUG AS WELL AS THE TERMINALS.

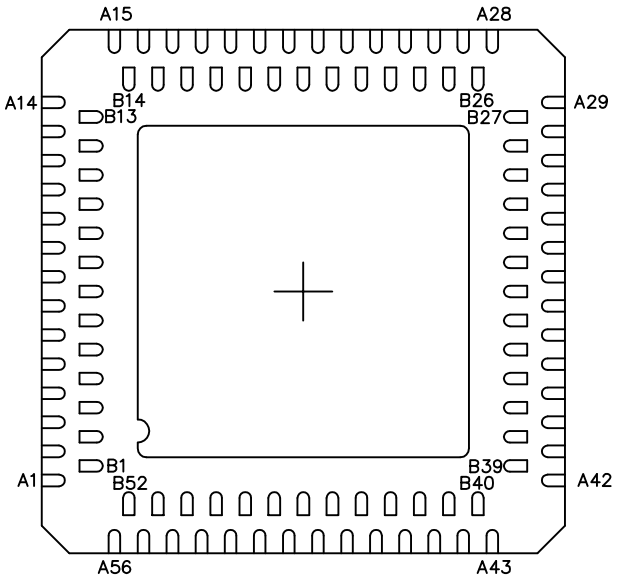
11. FOR A COMPLETE SET OF DIMENSIONS FOR EACH VARIATION, SEE THE INDIVIDUAL VARIATION TABLES AND THE COMMON DIMENSIONS (TABLE 2 & 3) AND TOLERANCE OF FORM AND POSITION (TABLE 4).

12. WHEN MORE THAN ONE VARIATION (OPTION) EXISTS FOR THE SAME PROFILE HEIGHT, BODY SIZE (D x E), AND PITCH, THEN THOSE VARIATIONS WILL BE DENOTED BY AN ADDITIONAL DASH NUMBER (ie:-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, AND OR THERMAL PAD SIZES.

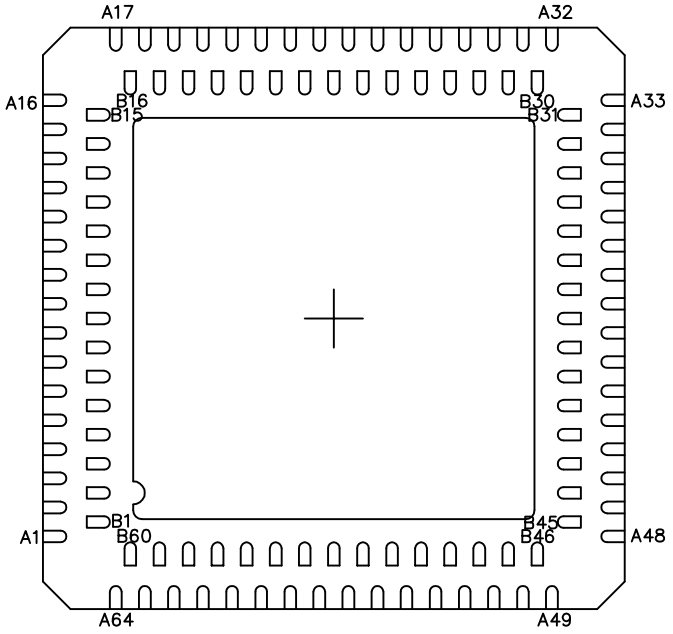
NOTES :

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 LICENCE UNDER REASONABLE TERMS AND CONDITIONS THAT ARE DEMONSTRABLY FREE OF ANY UNFAIR DISCRIMINATION. REFERENCED PATENTS ARE AS FOLLOWS.

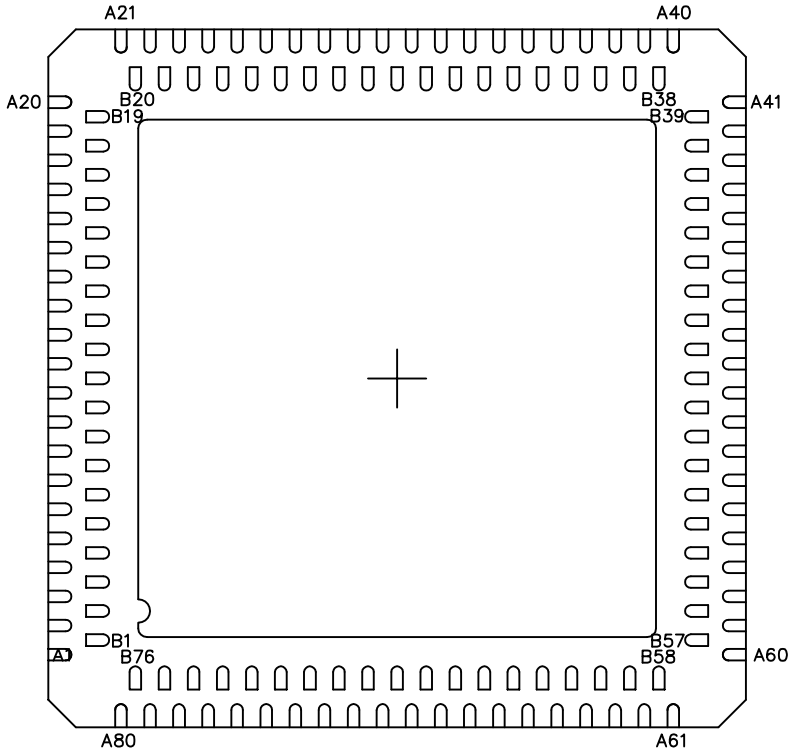
AMKOR TECHNOLOGY	U.S. PATENT #s: 5,866,939; 6,143,981; 6,281,568; 6,331,451;
	6,433,277; 6,448,633; 6,455,356; 6,469,369; 6,475,827;
	6,476,478; 6,501,161; 6,521,987; 6,525,406; 6,545,345;
	6,555,899; 6,580,159; 6,597,059; 6,605,865; 6,605,866;
	6,608,366; 6,611,047; 6,616,436; 6,627,976; 6,630,728;
	6,639,308; 6,646,339; 6,677,662; 6,677,663; 6,684,496
	6,696,747; 6,798,047; 6,825,062; 6,700,178; 6,713,322;
	6,730,544; 6,750,545; 6,753,597; 6,756,658; 6,759,737;
	6,770,961; 6,777,789; 6,803,645; 6,833,609; 6,841,414;
	6,847,099; 6,847,103; 6,853,059; 6,858,919; 6,867,071;
	6,873,032; 6,885,086; 6,893,900;
ASAT	U.S. PATENT #'S: 6,229,200B1; 6,242,281B1; 6,294,100B1;
	6,545,347B2; 6,585,905B1
NATIONAL SEMICONDUCTOR	U.S. PATENT No. 6,130,473; 6,589,814; 6,483,180; 6,452,255;
	6,399,415; 6,372,539; 6,551,048; 6,576,989; 6,488,107;
	6,564,447; 6,629,880;



VGGB–1



VHHB–1



VKKB–1

TERMINAL FOOTPRINTS

FIGURE 2

JEDEC SOLID STATE PRODUCT OUTLINE	TITLE: PLASTIC VERY THIN AND VERY VERY THIN FINE PITCH QUAD FLAT NO LEAD PACKAGE	ISSUE B	DATE MAR 2006	MO-267	PAGE 7 OF 8

Change of Record

If the change involves any words added or deleted (excluding deletion of accidentally repeated words), the change is included. Punctuation changes may not be included.

Initial Issue:	Date:	Item:
A	December 2005	11.11-735

Revision History

Issue: B	Date Published: March 2006	Item #: 11.11-745
Location	Changed from:	Changed to:
Page 2		ADD SIDE VIEW DETAIL
Page 3, Table 2	b NOM ---; L NOM --- and MAX 0.45	b NOM 0.22; L NOM 0.40 and MAX 0.50
Page 3, Table 3	A NOM 0.90; A2 MIN 0.60 and NOM 0.65	A NOM 0.85; A2 MIN 0.55 and NOM 0.60
Page 5, Note 10	BILATERAL	UNILATERAL