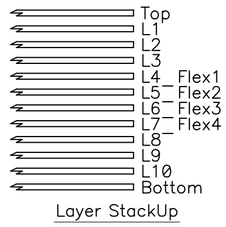
Drill Table			
Hole Dia (inch)	Symbol	Quantity	Plated
0.015	+	296	Yes
0.038	X	36	Yes
0.070	Y	2	Yes
0.079	⊤	6	No
0.100	⧖	14	Yes

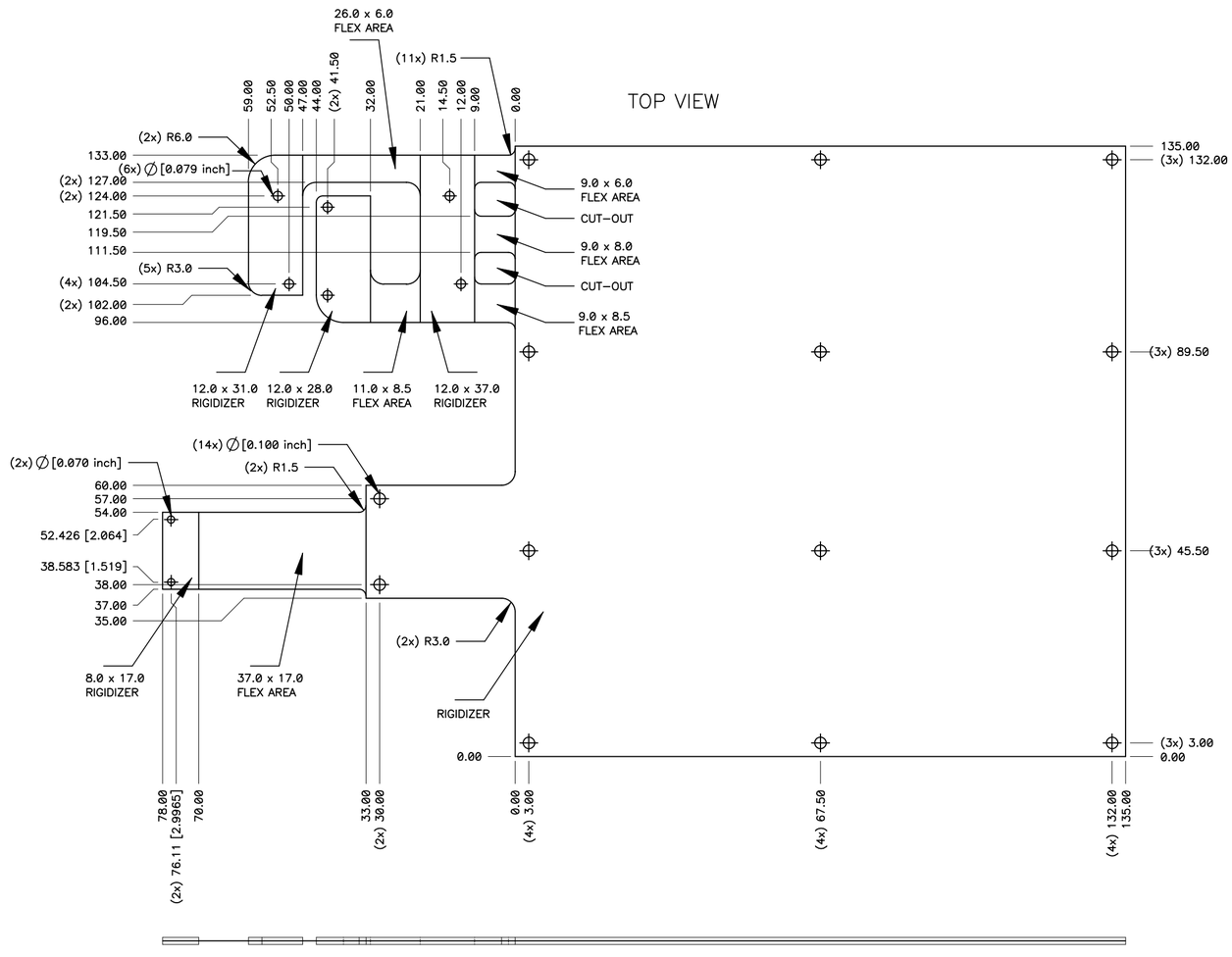
(See also the Drill files for the blind vias)

Detail for Drill Table						
Drill files	Layer	Hole Dia (inch)				
		0.015	0.038	0.070	0.079	0.100
701002_A.TH	From TOP to BOT (thru all)	165	36	2	6	14
701002_A.TL3	From TOP to L3	66				
701002_A.L8B	From L8 to BOT	65				
TOTAL		296	36	2	6	14



Layer StackUp

(See 701002_REV_A3_Stackup for more detail)



BOARD THICKNESS
1.50 +/- 0.15 mm
[0.058 +/- 0.006] INCH

FLEX THICKNESS :
0.3 to 0.355 mm MAX
[0.012 to 0.014 INCH MAX]

PRINTED DATE	Fri May 09, 2014	DWG NO.	701002	SH	OF	REV	A3

REVISIONS

REV	DESCRIPTION	DATE	APPROVED

Note Table

1 ALL SECTIONS AND SUBSECTIONS REFERRED TO IN THIS DOCUMENT ARE PER JPL SPECIFICATION D-8208 Rev. K
2 THIS DOCUMENT AND RELATED ARTWORK ARE COMPUTER GENERATED
CHANGES ARE TO BE PERFORMED ON THE ORIGINAL DATABASE ON FILE AT CALTECH
3 FABRICATE PRINTED WIRING BOARD PER JPL SPECIFICATION D-8208 SECTION 3.6 AND IAW IPC-6012, CLASS 3
FABRICATE RIGID-FLEX PER IPC-6013, CLASS 2
4 BOARD DETAILS:
FAB DRAWING NAME : 701002_A3_FAB_DWG
NUMBER OF LAYERS : 12 LAYERS
LAYER CONTRUCTION DRAWING NAME : See 701002_REV_A3_Stackup
X-DIMENSION : 213 mm [8.386 inch]
Y-DIMENSION : 135 mm [5.315 inch]
BOARD THICKNESS : 1.50 +/- 0.15 mm [0.058 +/- 0.006 INCH]
FLEX THICKNESS : 0.3 to 0.355 mm MAX [0.012 to 0.014 INCH MAX]
8 MIL TRACE AND 8 MIL SPACE MINIMUM ON ALL LAYERS
5 MATERIALS:
MATERIALS USED SHALL BE TRACEABLE TO THE MANUFACTURER'S LOT.
CERTIFICATION SHALL BE SUPPLIED WITH ALL TEST DATA
LAMINATE AND PRE-PREGS: POLYIMIDE IAW IPC-4101 and IPC-4204 for FLEXIBLE LAMINATE
COPPER WEIGHT: EXTERNAL 1 OZ.
INTERNAL RIGID 1 OZ. / INTERNAL FLEX 0.5 OZ
6 SEPARATION
BETWEEN ADJACENT CONDUCTOR LAYERS SHALL BE A MINIMUM OF 0.0035 INCHES AND CONSIST OF A MINIMUM TWO PLIES OF PRE-PREG
7 BOW AND TWIST SHALL NOT EXCEED 0.50%
8 ETCHBACK:
NEGATIVE ETCHBACK SHALL BE PROHIBITTED
POSITIVE ETCHBACK SHALL BE 0.0002-0.002 INCH; 0.0005 INCH IS PREFERRED
PLASMA DESMEAR/ETCHBACK IS THE PREFERRED METHOD
9 ANNULAR RING:
EXTERNAL ANNULAR RING SHALL BE AT LEAST 0.002 INCH
INTERNAL ANNULAR RING SHALL BE AT LEAST 0.001 INCH
10 HOLES:
HOLE SIZES AND PLATING SHALL BE PER DRILL TABLE
HOLE SIZES APPLY AFTER PLATING AND FINAL CONDUCTOR FINISH
HOLE SIZE TOLERANCE +/- 0.003 INCH
COPPER PLATING IN HOLES SHALL BE 0.0015 INCH NOMINAL THICKNESS WITH NO READING LESS THAN 0.001 INCH
11 HOLE FILLING:
COMPONENT MOUNTING THROUGH HOLES SHALL NOT BE FILLED
PLATED VIA HOLES LESS THAN 0.012 INCH CAN BE SOLDER FILLED UNLESS OTHERWISE SPECIFIED
12 OUTER METALIZATION FINISH:
HOT AIR SOLDER LEVEL (HASL) IAW IPC-6012, CLASS 3. UNLESS OTHERWISE SPECIFIED
13 IONIC CONTAMINATION :
SHALL BE MEASURED ON ONE BOARD PER LOT AND SHALL NOT EXCEED 10 MICROGRAMS PER SQUARE INCH. TEST DOCUMENTATION SHALL BE DELIVERED WITH THE BOARD. THE BOARD USED FOR IONIC CONTAMINATION TESTING SHALL BE BAKED AT 125F FOR 20 MINUTES PRIOR TO APPLICATION OF SOLDERMASK
14 SOLDER MASK:
LPI (GREEN) PER IPC-SM-840 TYPE H
LAYERS: TOP AND BOTTOM LAYERS OVER BARE COPPER
UNLESS OTHERWISE SPECIFIED
COMPONENT PADS TO BE FREE FROM BLEEDING OR MISREGISTRATION
LPI SOLDERMASK SHALL BE UV BUMPED PRIOR TO FINAL CURE
DO NOT TENT VIAS
15 SILKSCREEN:
MARKINGS ON BOTH SIDES SHALL BE MADE USING NON-CONDUCTIVE WHITE EPOXY INK
16 TEST COUPONS:
REPRESENTATIVE TEST COUPONS SHALL BE MADE PER IPC-2221 AND IPC-6012 AND SHALL BE DELIVERED WITH THE FINISHED PWB
AND SHALL BE DELIVERED WITH THE FINISHED PWB
17 ELECTRICAL TESTING:
CONTINUITY AND SHORTS TESTING SHALL BE PERFORMED ON EACH PWB AT 100%
SHORTS TESTING SHALL BE AT A MINIMUM OF 200V DC
TESTING DOCUMENTATION SHALL BE DELIVERED WITH THE FINISHED PWB
18 FLEX-CIRCUIT:
FILLET AT FLEX TO RIGID TRANSITIONS WITH URALANE 5753
FILLET SHOULD NOT EXTEND ONTO FLEX IN EXCESS OF 90 MIL

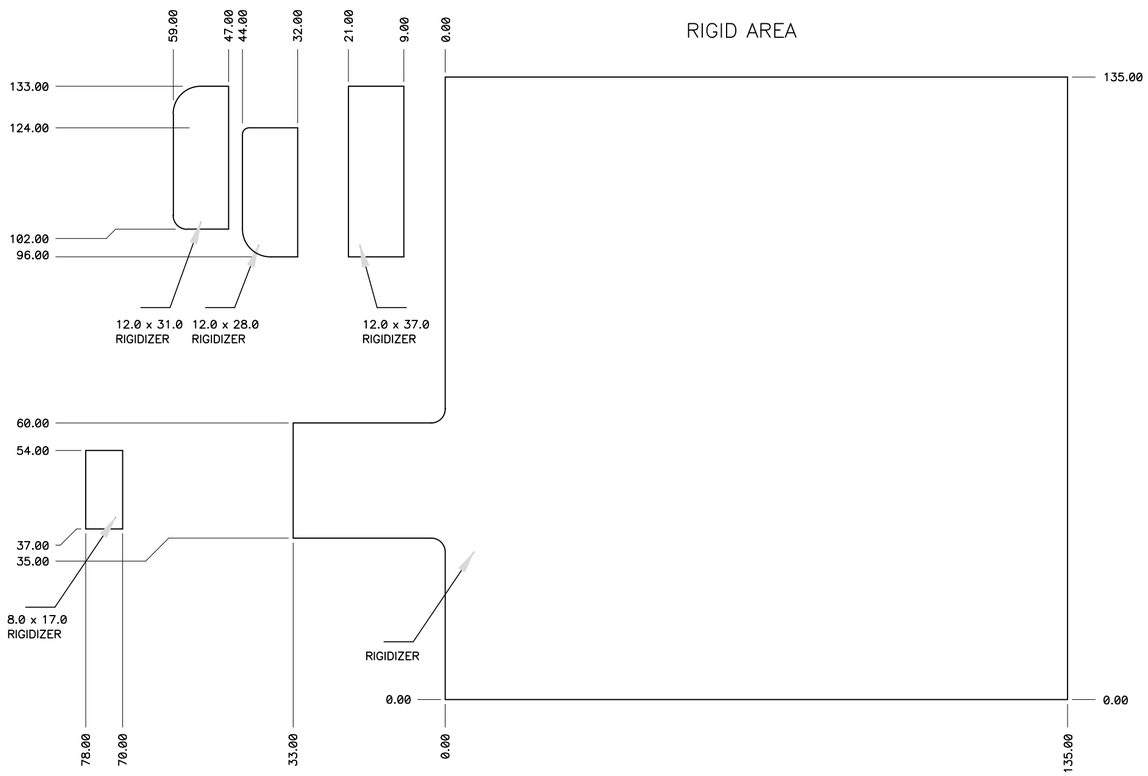
DIMENSION : mm [inch]

CONTRACT NO:	TOLERANCES: METRIC .X ± .25 .XX ± .13 INCH .XX ± .01 .XXX ± .005 ANGLE ± 0°30'	SPACE INSTRUMENTS SI 19 Hammond, Suite 508, Irvine, CA 92618 – 1636 Phone : (949) 472-4785 * FAX : (949) 588-5887 www.spaceinstruments.com			
APPROVALS		DATE	DWG NAME	FABRICATION DRAWING, HVPS / EPI-Hi_CALTECH	
DRAWN BY:		05-09-14			
CHECKED:					
ENGINEERING:	DEAN D. AALAMI		SIZE	FSCM(CAGE CODE)	DWG NO.	REV
PROJECT MGR:			C	1TY89	701002	A3
QA:			SCALE: 1:1	RELEASED	SHEET 1 OF 3	
Filename :						

PRINTED DATE	Fri May 09, 2014	DWG NO.	701002	SH	OF	REV	A3

REVISIONS

REV	DESCRIPTION	DATE	APPROVED



DIMENSION : mm [inch]

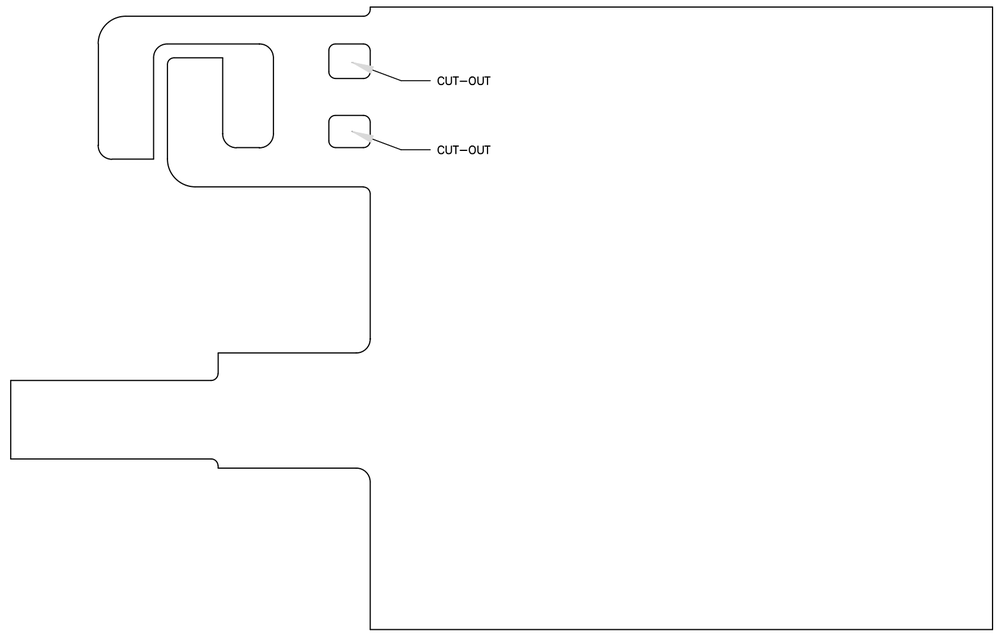
CONTRACT NO:	TOLERANCES: METRIC .X ± .25 .XX ± .13 INCH .XX ± .01 .XXX ± .005 ANGLE ± 0°30′	SPACE INSTRUMENTS SI 19 Hammond, Suite 508, Irvine, CA 92618 – 1636 Phone : (949) 472–4785 * FAX : (949) 588–5887 www.spaceinstruments.com				
APPROVALS		DATE	DWG NAME	FABRICATION DRAWING, HVPS / EPI–Hi_ CALTECH		
DRAWN BY:		05–09–14				
CHECKED:						
ENGINEERING:	DEAN D. AALAMI		SIZE	FSCM(CAGE CODE)	DWG NO.	REV
PROJECT MGR:			C	1TY89	701002	A3
QA:			SCALE: 1:1	RELEASED		SHEET 2 OF 3
Filename :						

PRINTED DATE	Fri May 09, 2014	DWG NO.	701002	SH	OF	REV	A3

REVISIONS

REV	DESCRIPTION	DATE	APPROVED

TOTAL 4 FLEX LAYERS :
L4_FLEX1; L5_FLEX2
L6_FLEX3; L7_FLEX4



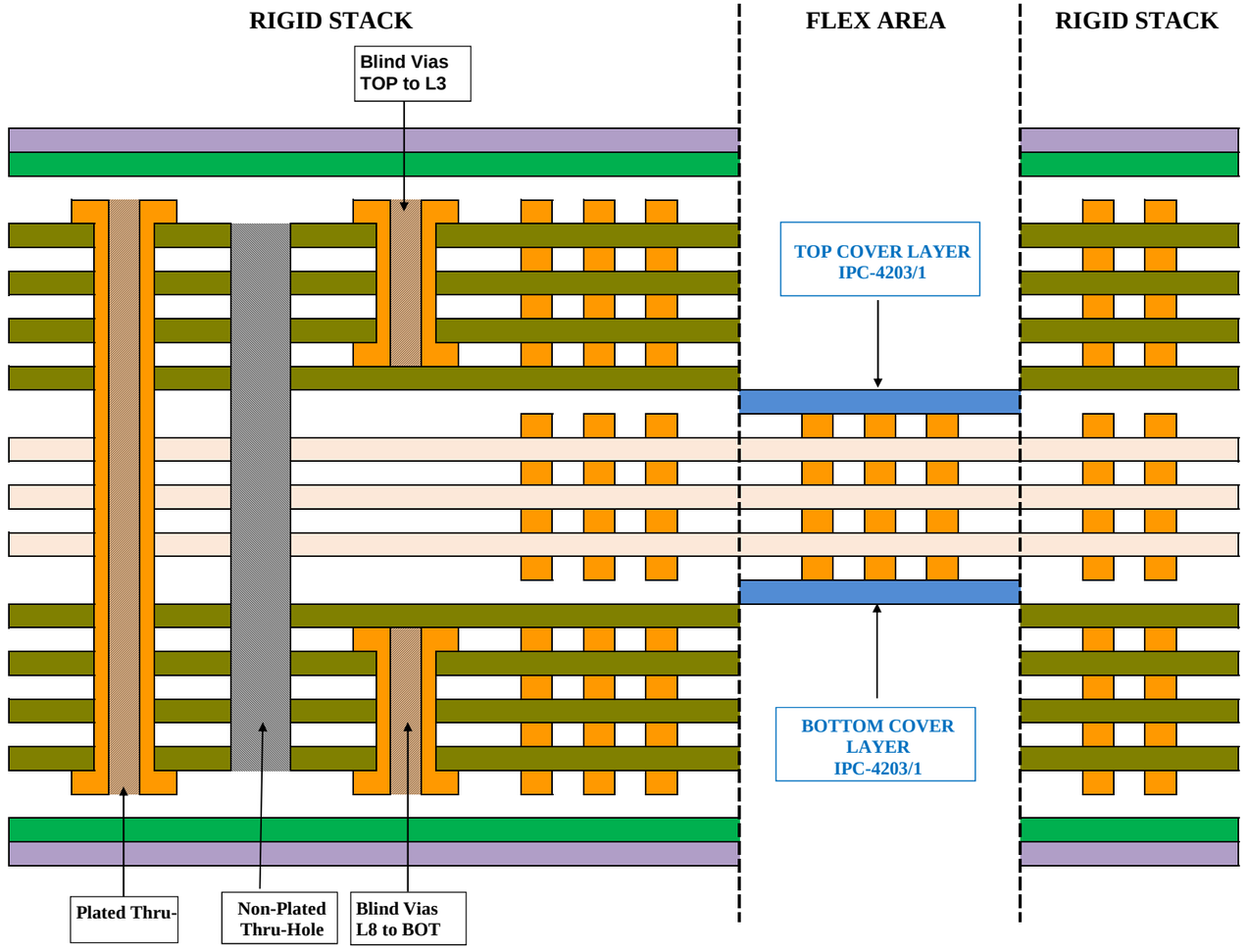
DIMENSION : mm [inch]

CONTRACT NO:	TOLERANCES: METRIC .X ± .25 .XX ± .13 INCH .XX ± .01 .XXX ± .005 ANGLE ± 0°30′	SPACE INSTRUMENTS SI 19 Hammond, Suite 508, Irvine, CA 92618 – 1636 Phone : (949) 472-4785 * FAX : (949) 588-5887 www.spaceinstruments.com				
APPROVALS		DATE	DWG NAME	FABRICATION DRAWING, HVPS / EPI-Hi_CALTECH		
DRAWN BY:		05-09-14				
CHECKED:						
ENGINEERING:	DEAN D. AALAMI		SIZE	FSCM(CAGE CODE)	DWG NO.	REV
PROJECT MGR:			C	1TY89	701002	A3
QA:			SCALE: 1:1	RELEASED		SHEET 3 OF 3
Filename :						

DATE: 05/09/2014

SPACE INSTRUMENTS
19 Hammond, Suite 508
Irvine, CA 92618-1636
Phone (949) 472-4785 Fax (949) 588-5887
Website : www.spaceinstruments.com
Email : dean@spaceinstruments.com

701002_Rev_A3_HVPS
EPI-Hi _ CALTECH
Layer Stack Proposed Construction



		LAYER		THICKNESS ESTIMATE
		TOP_SILK	Silkscreen	
		TOP_MASK	Solder mask	
Layer 1 - Top Layer	TOP	TOP	1 oz copper	0.0031 " (Incl. Plating & Mask)
Layer 2 - MidLayer1	L1	Rigid laminate	(GI) Polyimide IPC 4101	0.0040 "
Layer 3 - MidLayer2	L2	L1	1 oz copper	0.0012 "
Layer 4 - MidLayer3	L3	Rigid Prepreg	(GI) Polyimide IPC 4101B	0.0040 "
Layer 5 - MidLayer4	L4 - Flex1	L2	1 oz copper	0.0012 "
Layer 6 - MidLayer5	L5 - Flex2	Rigid laminate	(GI) Polyimide IPC 4101	0.0040 "
Layer 7 - MidLayer6	L6 - Flex3	L3	1 oz copper	0.0012 "
Layer 8 - MidLayer7	L7 - Flex4	Rigid Prepreg	(GI) Polyimide IPC 4101B	0.0040 "
		Flex cover layer	*IPC-4203/1*	*0.0020* "
Layer 9 - MidLayer8	L8	*L4 - Flex1*	0.5 oz copper	0.0006 "
Layer 10 - MidLayer9	L9	*Flexible laminate*	*(Polyimide) IPC 4204/11*	0.0020 "
Layer 11- MidLayer10	L10	*L5 - Flex2*	0.5 oz copper	0.0006 "
Layer 12 - Bottom Layer	BOT	*Flexible Prepreg*	*(Polyimide) IPC 4204/11*	0.0020 "
		L6 - Flex3	0.5 oz copper	0.0006 "
		Flexible laminate	*(Polyimide) IPC 4204/11*	0.0020 "
		L7 - Flex4	0.5 oz copper	0.0006 "
		Flex cover layer	*IPC-4203/1*	*0.0020* "
		Rigid Prepreg	(GI) Polyimide IPC 4101B	0.0040
		L8	1 oz copper	0.0012 "
		Rigid laminate	(GI) Polyimide IPC 4101	0.0040 "
		L9	1 oz copper	0.0012 "
		Rigid Prepreg	(GI) Polyimide IPC 4101B	0.0040 "
		L10	1 oz copper	0.0012 "
		Rigid laminate	(GI) Polyimide IPC 4101	0.0040 "
		BOT	1 oz copper	0.0031 " (Incl. Plating & Mask)
		BOT_MASK	Solder mask	
		BOT_SILK	Silkscreen	

Estimated FLEX thickness : 0.0124 " **(MAX = 0.014")**

Estimated total thickness : 0.0580 " +/- 006"