

REV	ECO#	DESCRIPTION OF REVISION
03	0057081477	REV A CANDIDATE

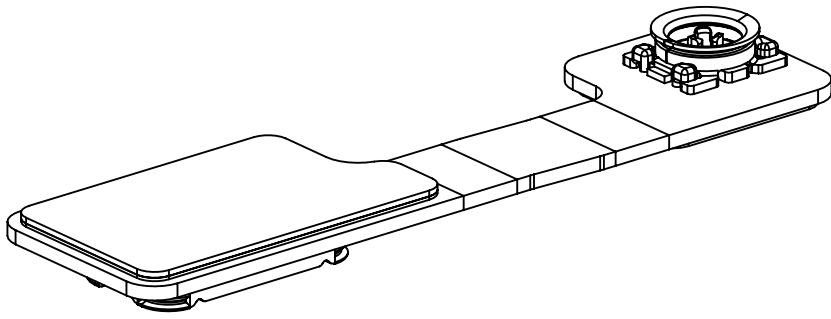
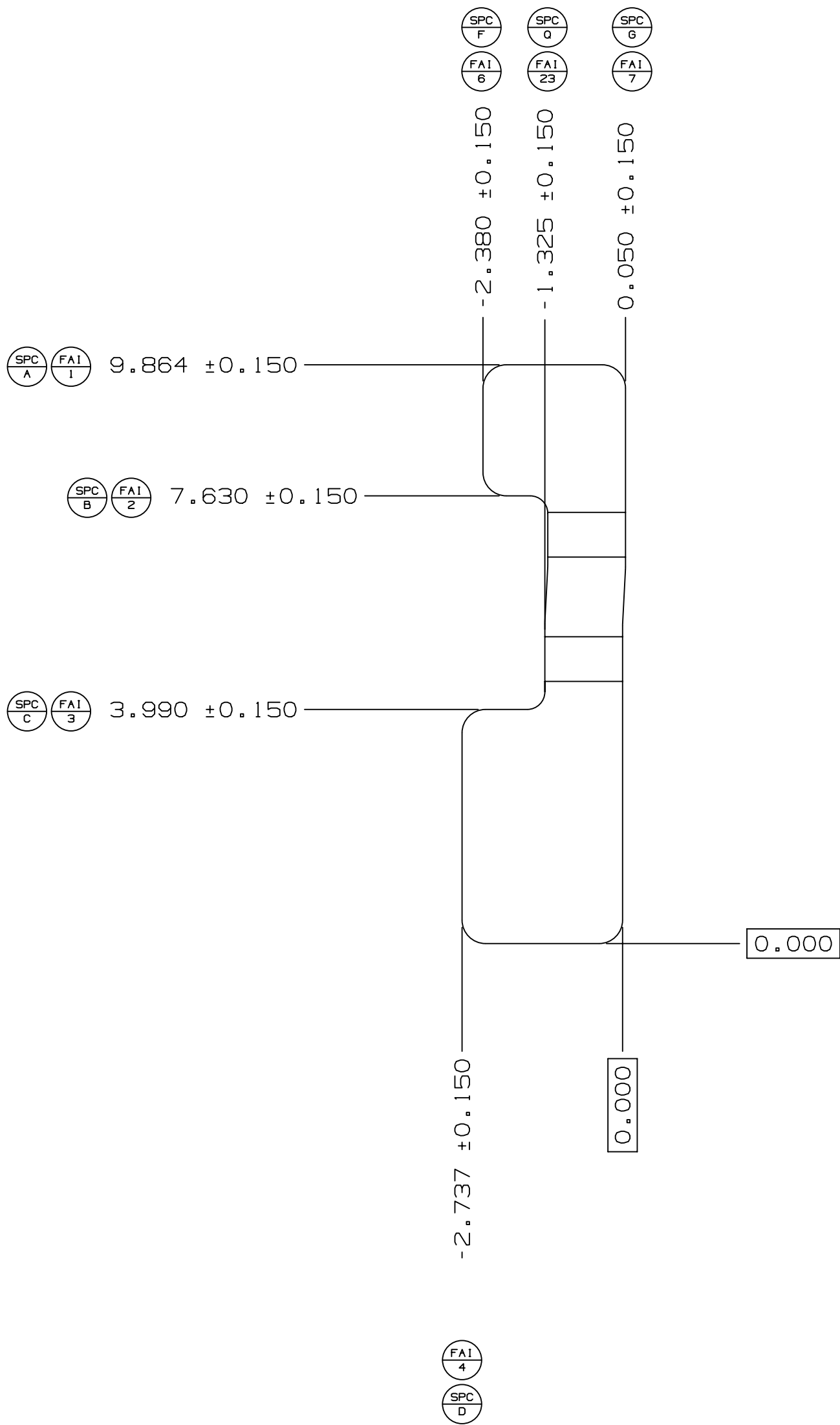
MBANH 07/23/24

NOTES: (UNLESS OTHERWISE SPECIFIED)

- A DRAWING OF GEOMETRIC DATA FILES PROVIDED BY APPLE INC. SHALL BE USED FOR MASTER GEOMETRY DATA. A DRAWING OF EQUIVALENT FILENAME AND REVISION TO THE GEOMETRIC DATA SHALL BE USED TO DETERMINE GEOMETRIC CHARACTERISTICS AND TOLERANCES. DRAWING DIMENSIONS ARE SUBORDINATE TO GEOMETRIC DATA UNLESS SPECIFIED ON DRAWING TO BE MASTER, AS MAY BE THE CASE OF CABLE LENGTHS OR TABULATED VARIABLE DIMENSIONS. THE SUPPLIER MUST COMPLY WITH THE STANDARDS PERTAINING TO THE TOLERANCE METHOD APPLIED.
2. GD&T - GEOMETRIC TOLERANCE METHODS IN ACCORDANCE TO ASME Y14.5-2009. DATUM REFERENCE FRAMES RANK AS DATUM A PRIMARY, B SECONDARY AND C TERTIARY. FEATURE CONTROL FRAMES MAY RE-ORDER DATUMS PER THE FEATURES DATUM DEPENDENCE. DIMENSIONS THAT LOCATE GEOMETRIC TOLERANCE CHARACTERISTICS ARE BASIC (EXACT). NO TOLERANCES APPLY TO BASIC DIMENSIONS.
3. DIRECT TOLERANCE DIMENSIONING - INTERPRET DIMENSIONS THAT DO NOT LOCATE GD&T CHARACTERISTICS OR GD&T CONTROL FEATURES TO THE DIRECT TOLERANCE DIMENSION SYSTEM. THE LOCAL PLUS/MINUS, LOCAL LIMIT AND TITLE BLOCK TOLERANCES APPLY.
4. IN THE ABSENCE OF DRAWING DIMENSIONS AND DATUMS, THE GEOMETRIC DATA IS BASIC. THE PLANES OF THE ABSOLUTE COORDINATE SYSTEM DENOTE THE DATUM REFERENCE PLANES AS X-Y = DATUM A, Y-Z = B AND X-Z = C. ALL GEOMETRIC DATA SURFACES 0.2|A|B|C.
5. PERFECT ORIENTATION AND/OR PERFECT LOCATION AT MMC AS REQUIRED FOR THE INTERRELATIONSHIP OF ALL DATUM FEATURES OF SIZE.
6. ON PARTS SUBJECT TO FREE STATE VARIATION, ALL TOLERANCES APPLY WHEN THE PART IS STRAINED ACCORDING TO FUNCTIONAL MATING CONDITIONS AS DEFINED BY THE DATUM REFERENCE FEATURE RANK OR FEATURE CONTROL FRAME DATUM RANK PER THE FEATURE INSPECTED. CONSULT PROPER APPLE INC. MANUFACTURING QUALITY ENGINEER (MQE) FOR APPROVAL/CLARIFICATION ON INDIVIDUAL PARTS.
7. TOLERANCES DESIGNATED WITH THE SYMBOL SPC SHALL BE PRODUCED WITH STATISTICAL TOLERANCE PROCESS CONTROLS. IN ORDER TO USE THE TOLERANCE ON A FEATURE, THE STATISTICAL PROCESS (CP, CPK, ETC) OF THE PART MUST BE VALIDATED AND APPROVED BY AN APPLE INC. MQE.
8. ALL TOOLING, FIXTURING AND OTHER UNIQUE ITEMS THAT ARE USED TO CREATE THIS PART ARE THE PROPERTY OF APPLE INC. AND SHALL BE PERMANENTLY MARKED IN ACCORDANCE WITH DOCUMENT SRAS-2018.
9. THE DESIGN OF ALL TOOLING OR FIXTURING REQUIRED FOR THE MANUFACTURING OR VERIFICATION OF THE PART SHALL BE APPROVED BY THE APPROPRIATE APPLE INC. ENGINEER PRIOR TO TOOL OR FIXTURE FABRICATION.
10. ALL HOMOGENEOUS MATERIALS MUST COMPLY WITH THE FOLLOWING ENVIRONMENTAL SPECIFICATIONS:
• APPLE INC. REGULATED SUBSTANCES SPECIFICATION, 069-0135
ALL ADHESIVES, COATINGS AND PAINTS, PRINTING INKS, AND CLEANING AGENTS USED IN THE MANUFACTURING OF THIS PART MUST COMPLY WITH THE APPLE VOC SPECIFICATION, 099-22549
ALL MATERIALS WITH RECYCLED OR RENEWABLE CONTENT MUST COMPLY WITH THE APPLE RECYCLED & RENEWABLE MATERIAL SPECIFICATION, 099-15593
11. REFER TO THE PCB RELEASE PACKAGE PROVIDED BY APPLE INC. FOR MASTER GEOMETRY DATA. THIS DRAWING IS SUPPLEMENTAL TO THE MASTER DATA AND TO BE USED TO INDICATE CRITICAL MECHANICAL FEATURES AND TOLERANCES. TOLERANCES ON THIS DRAWING ARE ONLY INTENDED FOR DIMENSIONS ON THIS DRAWING AND NOT FOR ALL DATA IN THE RELEASE PACKAGE.
12. REFER TO APPLE INC. SPECIFICATION DOCUMENT 080-2265 FOR DESIGN REQUIREMENTS
REFER TO APPLE INC. SPECIFICATION DOCUMENT 080-3942 FOR CONNECTOR INSPECTION REQUIREMENTS
REFER TO APPLE INC. SPECIFICATION DOCUMENT 062-9728 FOR SAFETY REQUIREMENTS
13. FLEX 3 LAYERS: SEE SHEET 3 FOR THICKNESS & LAYER TRANSITION DETAILS
FLEX COPPER SHOULD BE 100ZRC HA/ED/HTE COPPER FOIL AND 100ZRC COPPER SALT BUTION PLATED.
•COPPER THEORETICAL VOLUME: 0.560 mm³
THIS MATERIAL MUST SATISFY THE CERTIFICATION REQUIREMENTS FOR MINIMUM (100%) RECYCLED ALLOY BY WEIGHT PER ISO 14021:2016 SECTION 7.8. AS ADDITIONALLY DESCRIBED IN 099-15593.
14. STIFFENER MATERIAL: SUS 316L MIN (80ZRC) PER 088-06576.
STIFFENER THICKNESS: 0.070 ± 0.010 mm FAI 21
STIFFENER HARDNESS: 200-350 HV. MEASURE AT LOCATION INDICATED. FAI 22
STIFFENER FINISH: 1 µm - 5 µm SEMI-BRIGHT NICKEL, PRE-PLATING.
B2B STIFFENER
• VOLUME: 0.665 mm³
• MASS: 0.0053 ± 0.0015 g FAI 18
COAX STIFFENER
• VOLUME: 0.311 mm³
• MASS: 0.0025 ± 0.0015 g FAI 20
THIS MATERIAL MUST SATISFY THE CERTIFICATION REQUIREMENTS FOR MINIMUM (80%) RECYCLED ALLOY BY WEIGHT. PER ISO 14021:2016 SECTION 7.8. AS ADDITIONALLY DESCRIBED IN 099-15593.
NO VISIBLE GRAIN DIRECTION. BURR DIRECTION TO FACE AWAY FROM FLEX.
STIFFENERS MUST BE INSPECTED AT SUS STIFFENER OQC AND FLEX IOQC ON A LOT BASIS AND APPROVED BY APPLE MQE. COUPON LEVEL TESTING ACCEPTED.
B2B STIFFENER MUST BE ELECTRICALLY CONNECTED TO GND
ADHESIVE MATERIAL: CONDUCTIVE ADHESIVE, TOYO TSC600-60D FAI 24
UNCOMPRESSED ADHESIVE THICKNESS: 0.060 ± 0.010 mm
15. NO UNDERFILL
16. NO ENCAPSULANT
17. PANEL TABS OPTIONAL. TO BE MAX 0.200MM PROUD TO 0.000MM SUBFLUSH. MAX WIDTH OF 0.900MM. ALLOWED ONLY IN LOCATIONS INDICATED.
LOCATION TO BE APPROVED BY APPLE PD AND DFM.
18. PANEL TABS OPTIONAL. TO BE MAX 0.050MM PROUD TO 0.050MM SUBFLUSH. MAX WIDTH OF 0.900MM. ALLOWED ONLY IN LOCATIONS INDICATED.
LOCATION TO BE APPROVED BY APPLE PD AND DFM.
19. LASER ETCH BAR CODE ON SUS IN AREA INDICATED.
USE APPLE FLEX DFM APPROVED CODE.
20. PRE-BEND IN LOCATIONS SHOWN. PRE-BEND AT CM ONLY.
21. BEND TEST PER APPLE SPEC 069-5890 AT EACH LOCATION WITH CONDITIONS INDICATED.
REPORT BEFORE AND AFTER BEND TEST RESISTANCE VALUES FOR EACH TRACE THROUGH BEND REGION.
USE BEND RATE OF 1 BEND PER 2 SECONDS.
BEND TO TEST IS FOR DATA COLLECTION ONLY. NO FLEX LAYER DELAMINATION.
HOLD PARTS USED FOR BEND TEST FOR 60 DAYS. DO NOT SHIP DOWNSTREAM.
22. ALL MATERIALS MUST COMPLY WITH APPLE INC. SPECIFICATION 062-9728, BE UL RECOGNIZED AND MEET THE FOLLOWING REQUIREMENTS:
• FLEX & STIFFENER MATERIALS MUST HAVE A MINIMUM FLAMMABILITY RATING OF V-2, VTM-2, VW-1 OR BETTER.
• PCB & FLEX PCB WITH COMPONENTS MUST HAVE MINIMUM FLAMMABILITY RATING OF V-1 OR BETTER.
23. PERFORM B2B MATE/UN-MATE CYCLE TEST, COLLECT 32PCS DATA, REPORT WITH FAI REPORT.
MATE / UN-MATE CONNECTOR 25X TIMES. CHECK SOLDER AND ELECTRICAL CONNECTION AFTER EACH CYCLE.
RECORD CYCLE NUMBER AND FAILURE MODE IF FAILURES OCCUR BEFORE 25 CYCLES.
TEST TO TEST IS FOR DATA COLLECTION ONLY. RESULTS SHOULD NOT GATE SHIPMENT.
HOLD PARTS USED FOR MATE/UN-MATE TEST FOR 60 DAYS. DO NOT SHIP DOWNSTREAM.
24. ALL COVERLAY TO BE MATTE BLACK, LESS THAN 35 GU.
25. PARTS MUST SURVIVE 8 HOURS SALT SPRAY TEST PER ASTM B117 WITH NO SIGN OF CORROSION.
26. PACKAGING/SHIPPING REQUIREMENTS: TO BE PROPOSED BY VENDOR. MUST BE APPROVED BY APPLE PD/DFM.

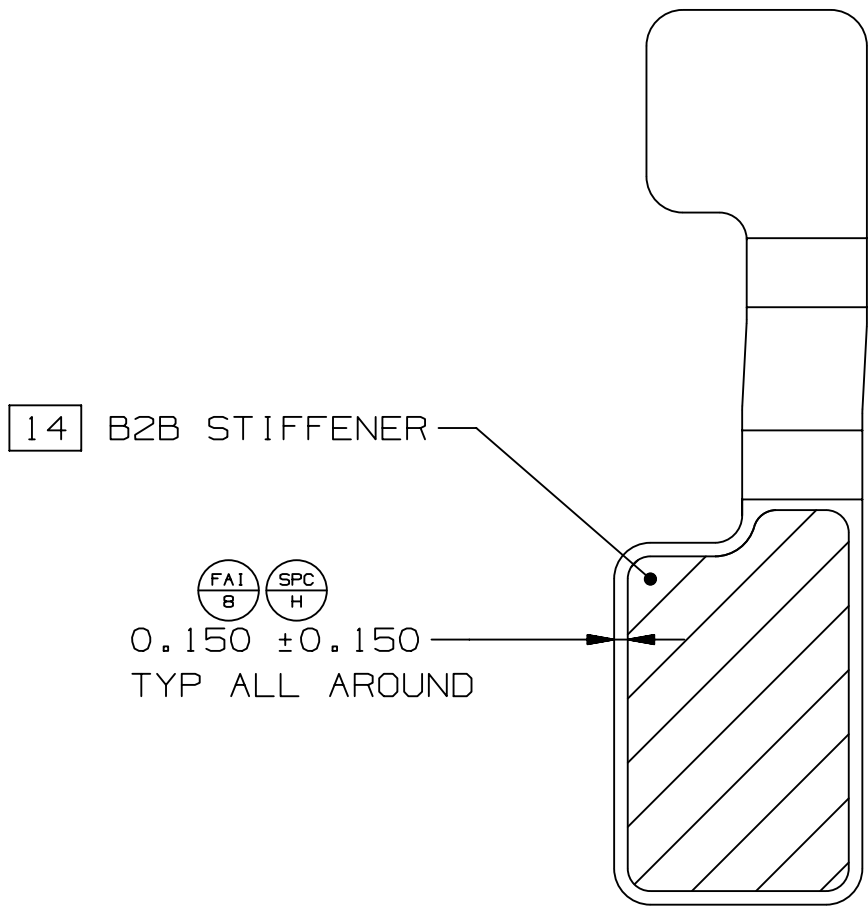
FLEX OUTLINE

(AS VIEWED THROUGH TOP)



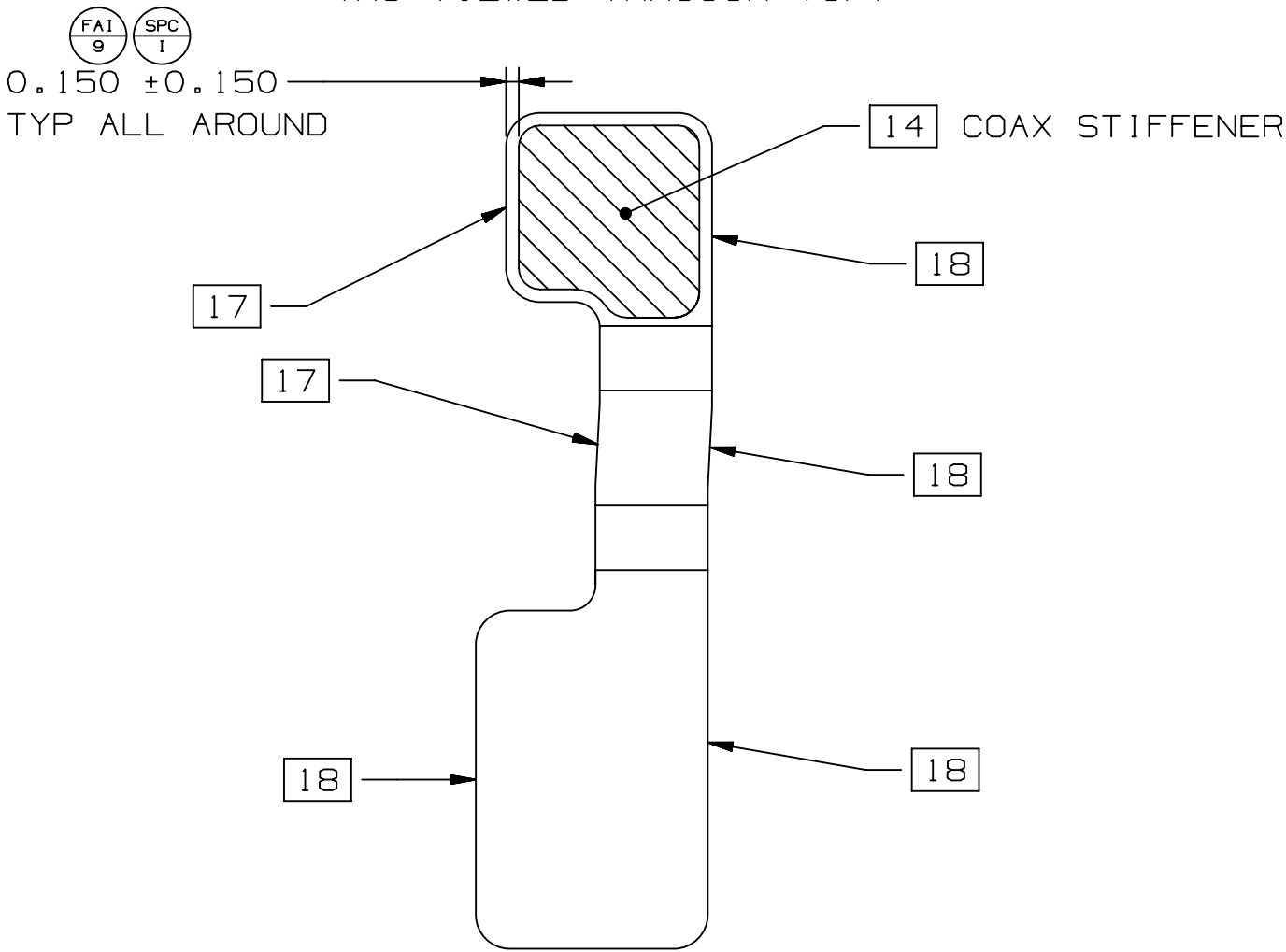
TOP STIFFENERS


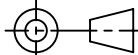

(AS VIEWED THROUGH TOP)



BOT STIFFENERS

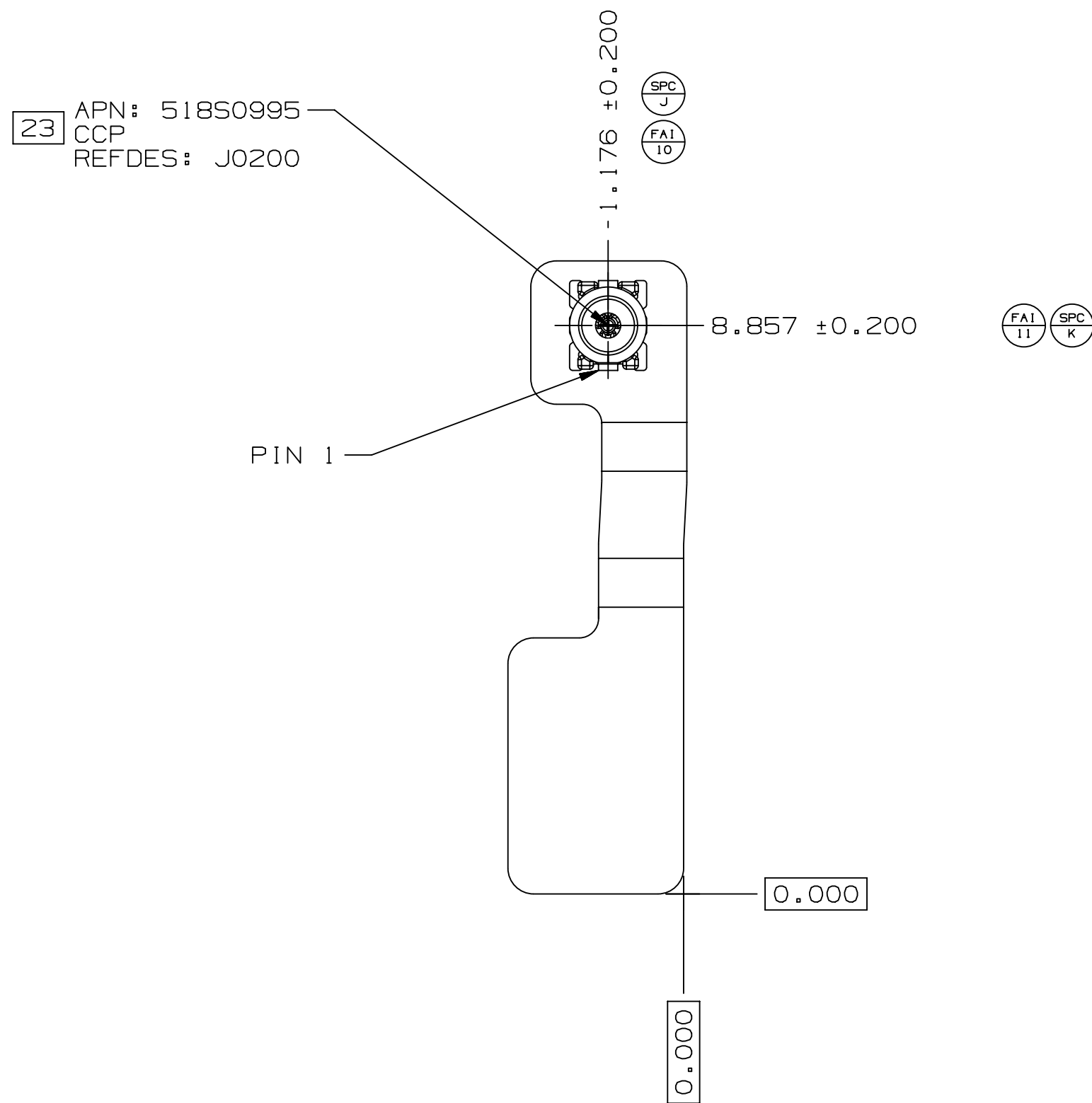
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<h1>METRIC</h1>			
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DIMENSIONS ARE IN MILLIMETERS TOLERANCES		TITLE	
X.X	±0.2	MCO , FLEX , STEP ,	
X.XX	±0.10	N217AN , NO SPLIT ,	
X.XXX	±0.050	SM	
ANGLES	±0.5°		
DO NOT SCALE DRAWINGS		DRAWING NUMBER	REV.
		056-19211	03
 THIRD ANGLE PROJECTION	SIZE 	SCALE	SHT 1 OF 2
		NONE	

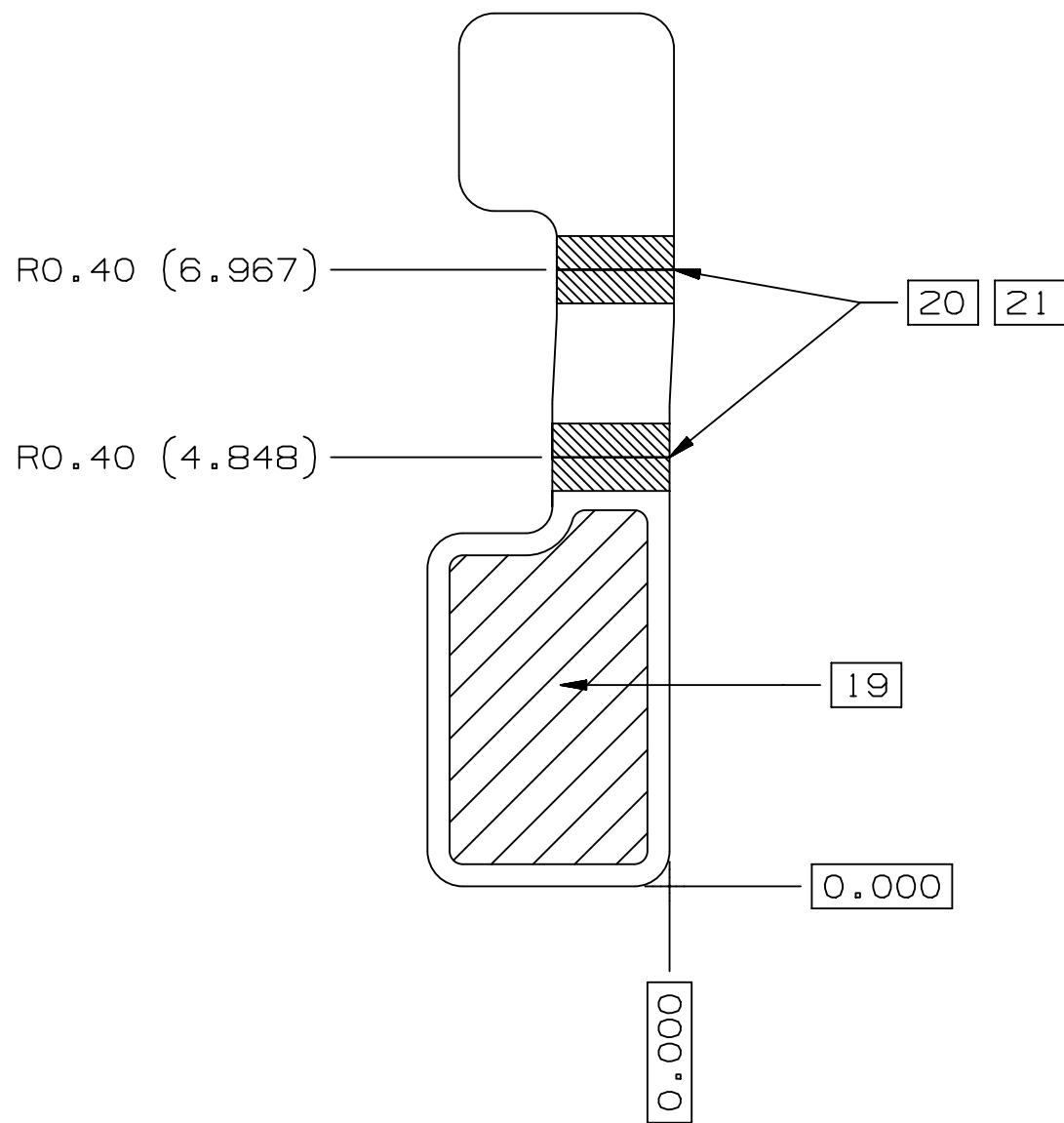
TOP COMPONENTS

(AS VIEWED THROUGH TOP)



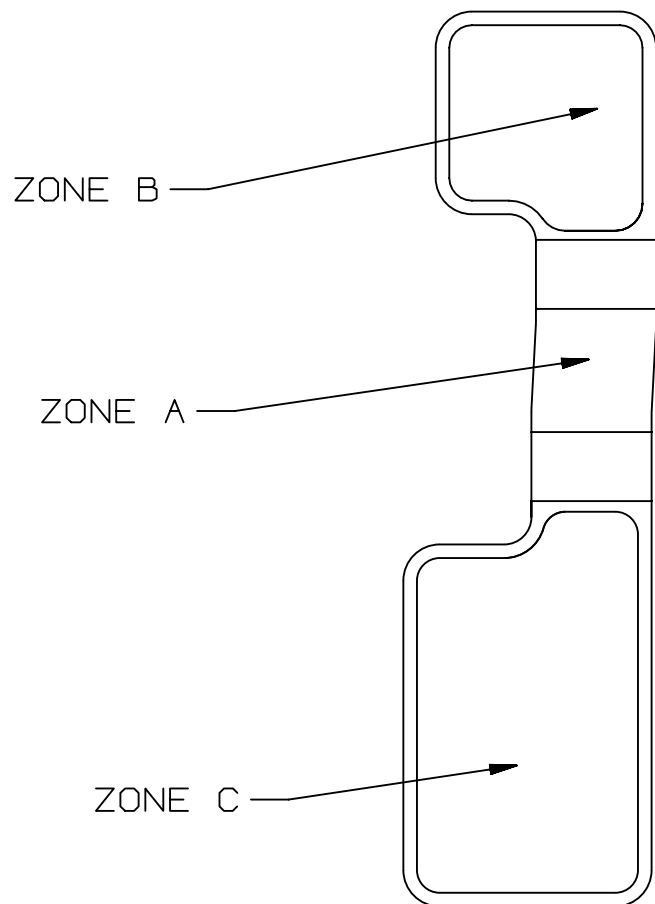
BENDING AND BARCODE REGIONS

(AS VIEWED THROUGH TOP)



FLEX STACK-UP

(AS VIEWED THROUGH TOP)



LAYER	ZONE A	ZONE B	ZONE C
SUS STIFFENER	-	-	70
ADHESIVE	-	-	60
LPI	-	20	-
COVERLAY	12	-	12
ADHESIVE	15	-	15
ENIG	-	-	-
SELECTIVE PLATING	-	-	-
TOP COPPER	11	11	11
LCP CORE	25	25	25
LCP BONDPLY	25	25	25
COPPER	11	11	11
LCP CORE	50	50	50
BOTTOM COPPER	11	11	11
SELECTIVE PLATING	-	-	-
ENIG	-	-	-
ADHESIVE	15	15	-
COVERLAY	12	12	-
LPI	-	-	20
ADHESIVE	-	60	-
PI STIFFENER	-	-	-
SUS STIFFENER	-	70	-
LAMINATED THICKNESS	175±20	287±25	283±25

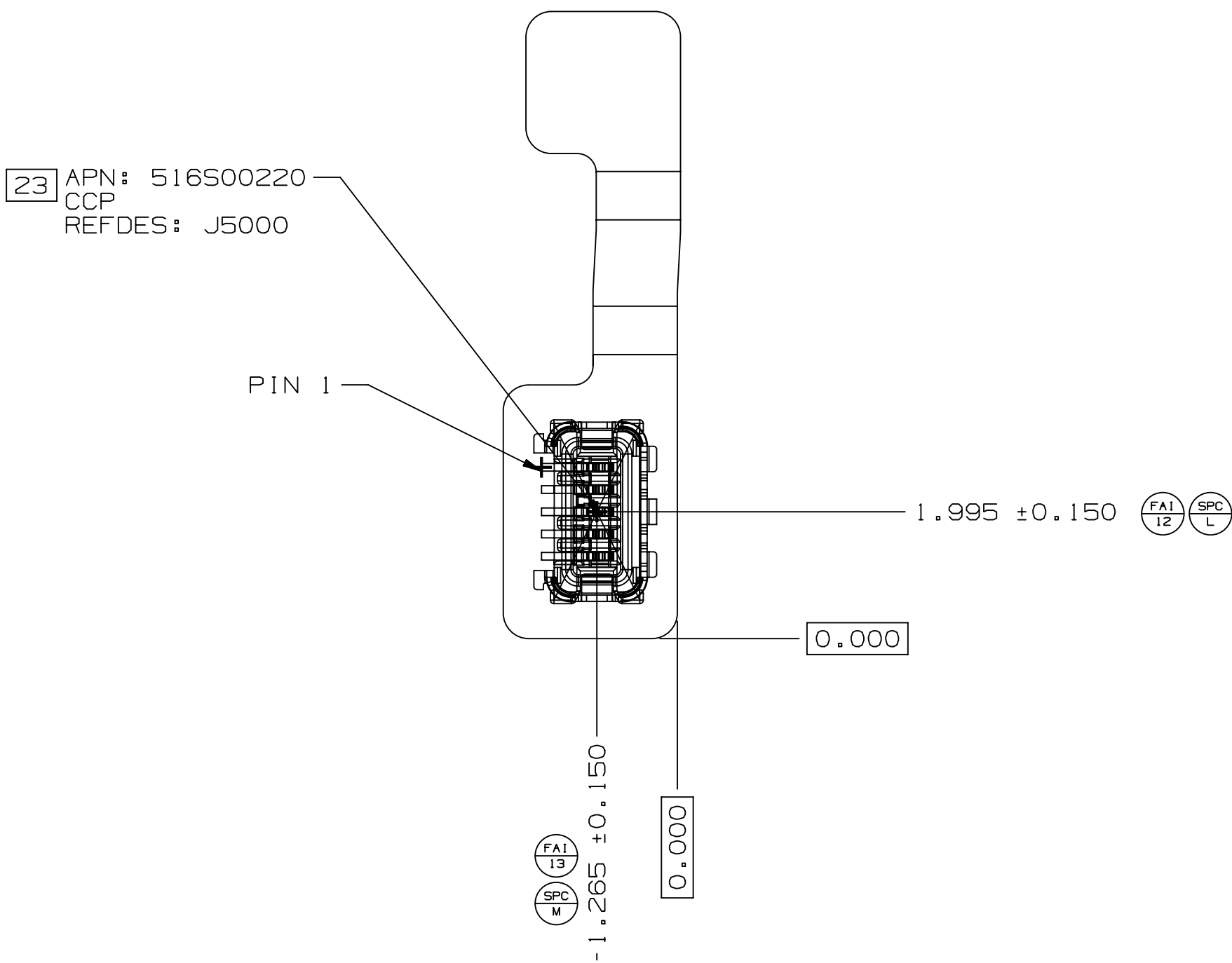
FAI 17
SPC F

FAI 15
SPC N

FAI 16
SPC O

BOT COMPONENTS

(AS VIEWED THROUGH TOP)



Apple Inc.

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SIZE DRAWING NUMBER REV.
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SCALE: NONE SHT 2 OF 2