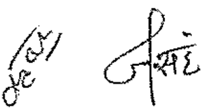
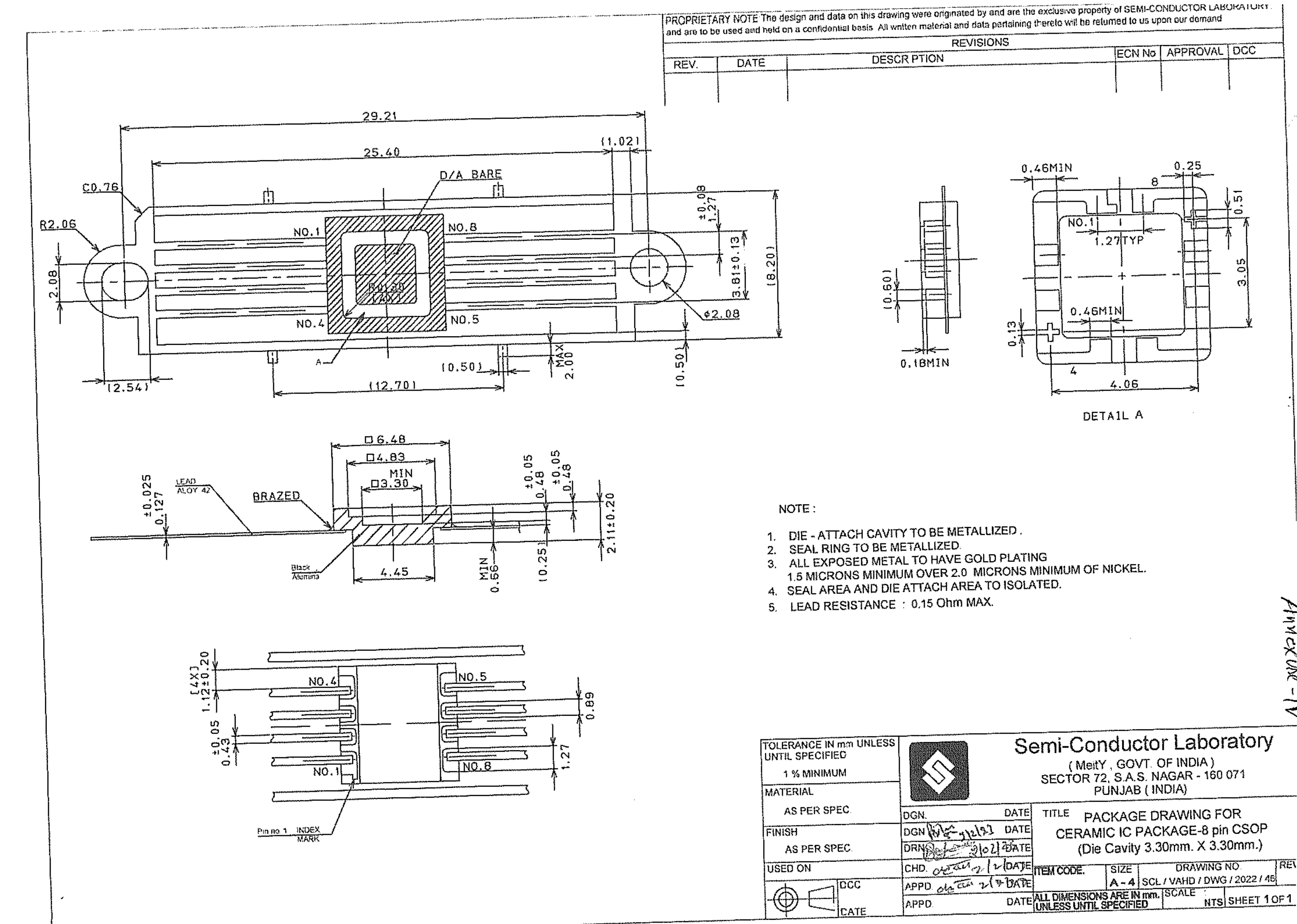
Material Specification of Multilayer HTCC packages

Item	Values
1. **Application:**	Packaging of Silicon die using Silver Glass die attach adhesive cured at ≥ 430°C, aluminium wire bonding using ultrasonic wire bonder and Kovar lid with Au-Sn solder for hermetic seal meeting MIL-STD-883 requirements.
2. **Technical Specifications:**	
A Material:	
a) Material of the base	: Ceramic: 90% minimum Alumina.
b) Metallization	: Tungsten or equivalent (refractory metal).
c) Lead material	: Kovar, Alloy-42 or equivalent with gold metallization.
d) Gold Plating	: 99.9% minimum Pure Gold per MIL-G-45204 over Ni plating on all exposed metallization area. Gold plating thickness shall be 60 micro inches minimum over a minimum thickness of 50 micro inches of Nickel plating.
B. Dimensions:	As Per Package drawing
C. Physical characteristics:	
a) Ceramic area (other than seal area):	
i. Cracks	: Not allowed
ii. Chip	maximum 0.030" x 0.030" x 0.060" ,. Chip should not remove or expose any metallization area.
iii. Flakes	: maximum 0.10" x 0.100" x 0.100"
iv. Bumps/ Excess	: On ceramic surface (bottom & top) should not exceed material 0.002" and 0.010" in height on any other surface.
v. Camber	: should be 0.004"/inch maximum not less than 0.002".
vi. Foreign Material/ discoloration/stains / Gold on Ceramic surface:	should not exceed 20 mils in size on the top or bottom of package and 50 mils in size on sides.
b) Die-attach area:	
i)Voids/peeling/blistering/Foreign material:	maximum 0.010" in diameter with not more than 3 defects 0.030" apart in critical die attach area.
ii) Flatness (excluding perimeter path of 0.015" from cavity wall)	:0.002" maximum (upto cavity size 0.5" sq) , 0.0035" (for cavity 0.501" to 0.75")
iii) Bumps/ excess material:	maximum 0.001" in height in critical die attach area.
iv)Near Shorts (Excess metallization that could cause a short):	Distance between die attach area and bond pad should not reduce more than 50% of ceramic wall height.
c) Seal Area:	
i) Seal area Flatness:	0.002" maximum for Seal ring area upto 0.5" sq, 0.003" maximum for area 0.501" sq to 0.750"sq; 0.004" maximum for area over 0.750" sq.
ii)Bumps/ excess material/ depressions/ pits:	0.001" Maximum
iii)Voids/Chips/peeling/blistering /foreign material:	On the seal area no larger than 0.010" or 25% of the width of the seal ring (whichever is smaller).
d) Wire bond finger area:	
i) Bumps/ excess material/ of depression:	Not allowed in critical bond area (square area 2/3 the bond pad width, starting at 5 mil from tip of bond pad). In non critical bond area 0.002" maximum.
ii) Voids/ Chips/peeling/bond blistering/foreign material/scratches:	Not allowed in critical bond area. In non critical area it should not be more than half of the bond pad width.
e) Lead/Pin Attachment:	
i) Pits/ Burrs/ Scratches/gouges/rough gold	a) Pits/ Gouges/scratches max. 2 mil in depth & burrs/Rough Gold not more than 2 mil in height. b) Pits,Gouges or Scratches expose the nickel underplate or base metal

Item	Values
ii) Lead/ Pad alignment (For CQFP)	: The leads should not overhang the braze pads by more than 25% of the lead width.
ii) Pin/ Pad alignment (For CPGA)	: The leads should not overhang the braze pads. Whole 100% of entire diameter of the pin to be on braze pad.
iii) Lead alignment (For CQFP)	: Opposite leads offset not greater than a total of 10 mils.
iv) Braze Fillet	: Braze fillet should be visible around at least 75% of the lead area brazed on metalized pad.
v)Braze Pad Near Shorts	: Space between braze pads should not reduce by 50% due to metallization smear.
f) Castellation Area (If present)	
i) Castellation Near Shorts	: Distance between any two castellation should not reduce by 50% of the space.
g) Gold Plating:	
i) Blister/ flaking/Discoloration	On bare package, it shall not be there when viewed under 10X magnification & no discoloration allowed visible to naked eye.
ii) Adhesion	: Gold plating shall withstand peel off test using scotch tape.
iii) Solderability	: Leads with gold plating shall withstand solderability test.
iv)Bake test	: Package bases after placing on a heater block at 450± 10°C in air for one minute. Gold plating shall not show discoloration after cooling, visible to the naked eye & blisters, peeling or flaking at 10X
h) Appearance:	
i)Visual	: At 10X magnification, package base shall present a clean appearance, free of loose foreign particles. Foreign particles which can be removed with the blow of Nitrogen gas or dry air (30psi) from a distance shorter than one inch may not be considered as foreign particles.
3. Shelf Life	: Package base should have not been manufactured more than five years before the date of dispatch. Vendor to provide manufacturer certificate of conformance to specifications along with manufacturer lot no. and date of manufacturer with the supplied material.
4. Packing requirement: a)	Package to be packed in trays and then in air-tight (vacuum sealed) aluminum foil packing.
b) The container containing these package bases	Should protect these against oxidation, dust, mechanical damage, spillage etc.
5. Safety/Handling	: Package bases should not be exposed to dust & should never be touched with bare hands.
6. Storage Condition	: Packages should be stored in manufacturer's original vacuum seal packing & these sealed packets should be stored in dry N2 ambient in dust free environment. Vendor to provide confirmation with respect to storage conditions.
7. Test Conditions:	
a) Conformance to specs :	Specified at serial no. 2
b) The package after die attach using silver glass epoxy & aluminum wire bonding using ultrasonic wire bonder	Should be able to withstand the following tests:
i. Die shear evaluation	– MIL-STD-883, Method 2019.
ii. Destructive bond pull	– MIL-STD-883, Method 2011.
c) The package after sealing with lid preform	Should be able to withstand the following tests:
i. Thermal Shock	- MIL-STD-883, Method 1011, Condition C, 15 Cycles.
ii) Thermal Cycling	-MIL-STD-883, Method 1010, Condition C, 100 Cycles
iii) Mechanical Shock	- MIL-STD-883, Method 2002, Condition B
iv) Vibration	-MIL-STD-883, Method 2007,Condition A, 20g.
v) Constant Acceleration	- MIL-STD-883, Method 2001, Condition D.
vi) Stabilization Bake	-MIL-STD-883, Method 1008, 150oC, 1000 hrs.
vii) Seal Test-	MIL-STD-883, Method 1014,Fine leak-Condition A; Gross leak -Condition C



Item	Values
viii) Metal Package Isolation (If applicable)	- MIL-STD-883, Method 1003, 600V DC, 100 nA max.
ix) Solderability-	MIL-STD-883, Method 2003,
x) Lead Integrity	- MIL-STD-883, Method 2004
8. Acceptance Criteria:	The Packages should meet all the above mentioned specifications and test conditions.



Annexure - IV
PROPRIETARY NOTE The design and data on this drawing were originated by and are the exclusive property of SEMI-CONDUCTOR LABORATORY and are to be used and held on a confidential basis. All written material and data pertaining thereto will be returned to us upon our demand
REVISIONS
REV.
DATE
DESCRIPTION
ECN No
APPROVAL
DCC
29.21
25.40
(1.02)
D/A BARE
C0.76
R2.06
NO.1
NO.8
NO.4
NO.5
2.08
3.81±0.13
(8.20)
ϕ2.08
(0.50)
MAX 2.00
(12.70)
(2.54)
A
DETAIL A
0.46MIN
0.25
8
NO.1
1.27 TYP
0.51
3.05
0.13
4
4.06
(0.60)
0.18MIN
□6.48
□4.83
MIN □3.30
LEAD ALOY 42
BRAZED
Black Alumina
4.45
MIN 0.56
(0.25)
2.11±0.20
[4X] 1.12±0.20
0.43 ±0.05
0.89
1.27
Pin no 1 INDEX MARK
NOTE :
1. DIE - ATTACH CAVITY TO BE METALLIZED .
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING
1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.
5. LEAD RESISTANCE : 0.15 Ohm MAX.
TOLERANCE IN mm UNLESS UNTIL SPECIFIED
1 % MINIMUM
MATERIAL
AS PER SPEC.
FINISH
AS PER SPEC.
USED ON
DCC
DATE
Semi-Conductor Laboratory
(MeitY , GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
DGN. DATE
DGN DATE
DRN DATE
CHD. DATE
APPD. DATE
APPD. DATE
TITLE PACKAGE DRAWING FOR
CERAMIC IC PACKAGE-8 pin CSOP
(Die Cavity 3.30mm. X 3.30mm.)
ITEM CODE.
SIZE A - 4
DRAWING NO. SCL / VAHD / DWG / 2022 / 46
REV
ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED
SCALE NTS
SHEET 1 OF 1

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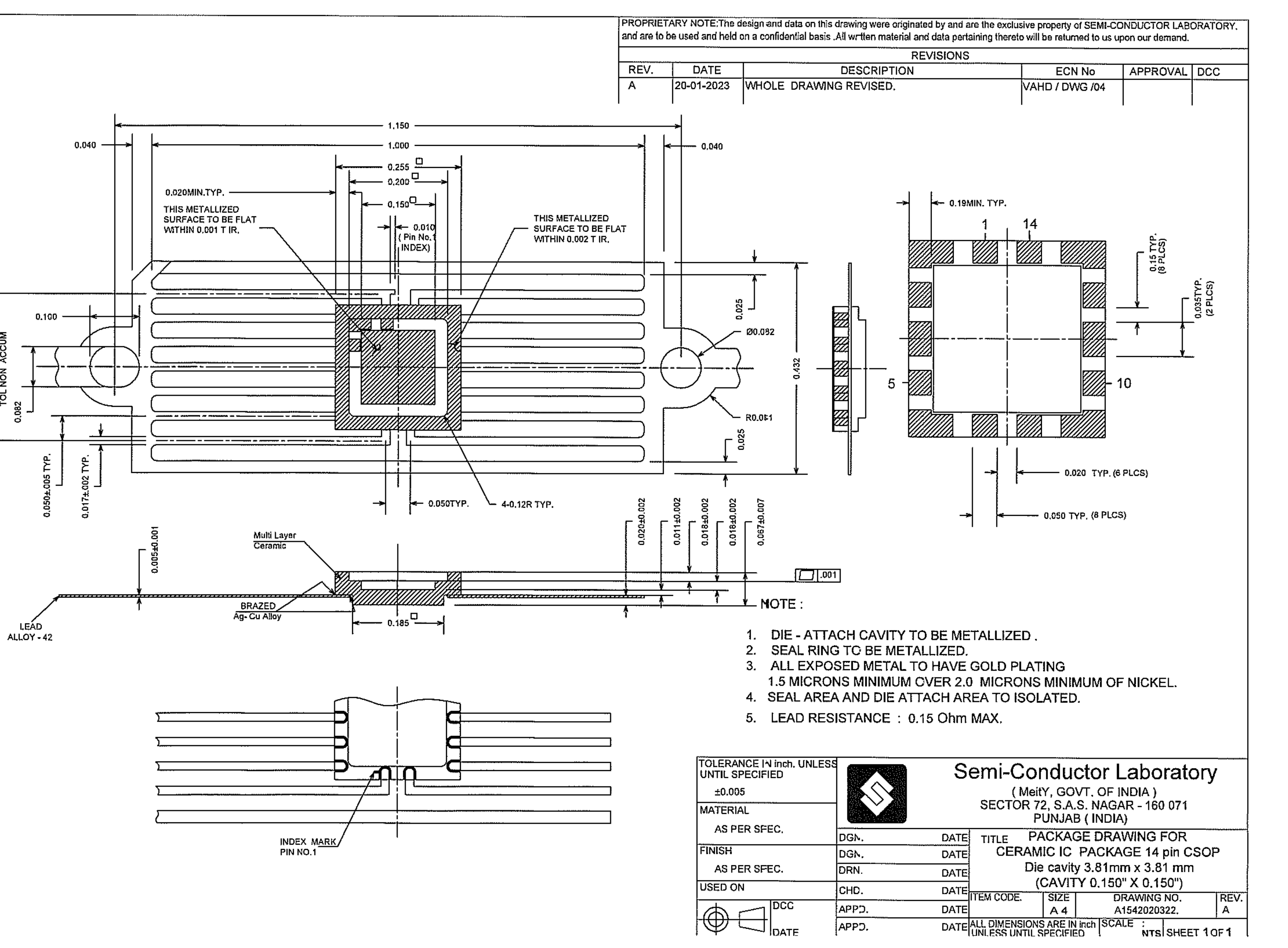
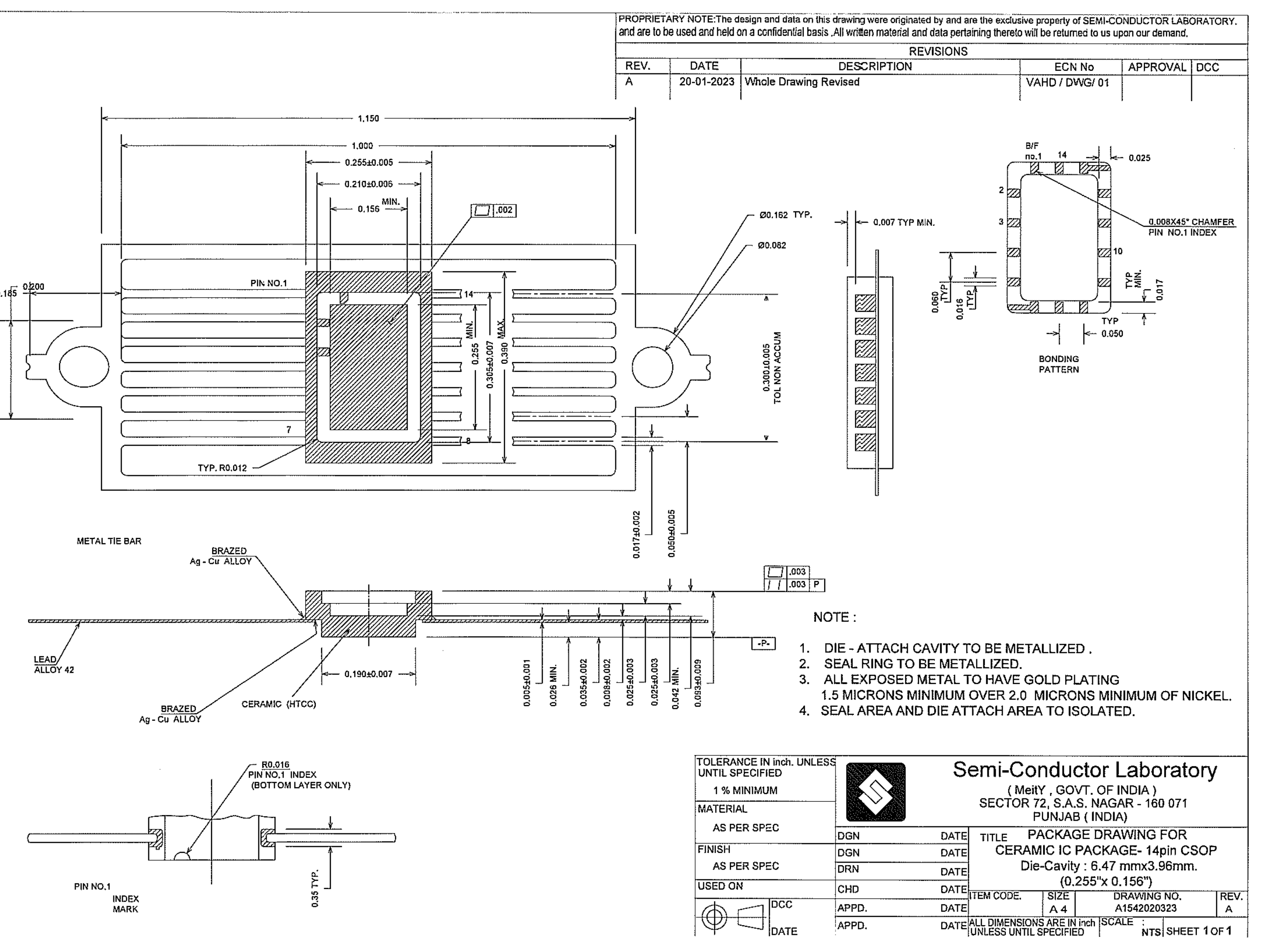
REVISIONS					
REV.	DATE	DESCRIPTION	ECN No	APPROVAL	DCC
A	20-01-2023	WHOLE DRAWING REVISED.	VAHD / DWG /04		



NOTE :

1. DIE - ATTACH CAVITY TO BE METALLIZED .
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.
5. LEAD RESISTANCE : 0.15 Ohm MAX.

TOLERANCE IN inch. UNLESS UNTIL SPECIFIED ±0.005		Semi-Conductor Laboratory (MeitY, GOVT. OF INDIA) SECTOR 72, S.A.S. NAGAR - 160 071 PUNJAB (INDIA)
MATERIAL AS PER SPEC.	DGN. DATE	TITLE PACKAGE DRAWING FOR CERAMIC IC PACKAGE 14 pin CSOP Die cavity 3.81mm x 3.81 mm (CAVITY 0.150" X 0.150")
FINISH AS PER SPEC.	DGN. DATE	
	DRN. DATE	
USED ON	CHD. DATE	ITEM CODE. / SIZE A 4 / DRAWING NO. A1542020322. / REV. A
DCC	APPD. DATE	
DATE	APPD. DATE	ALL DIMENSIONS ARE IN inch UNLESS UNTIL SPECIFIED / SCALE : NTS / SHEET 1 OF 1



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REVISIONS
REV. | DATE | DESCRIPTION | ECN No | APPROVAL | DCC
A | 20-01-2023 | Whole Drawing Revised | VAHD / DWG/ 01
1.150
1.000
0.255±0.005
0.210±0.006
0.156 MIN.
.002
PIN NO.1
14
7
8
TYP. R0.012
0.255 MIN.
0.305±0.007
0.390 MAX.
Ø0.162 TYP.
Ø0.082
0.300±0.005 TOL NON ACCUM
0.185
0.200
0.017±0.002
0.050±0.005
0.007 TYP MIN.
B/F no.1
14
2
3
10
0.025
0.008X45° CHAMFER PIN NO.1 INDEX
0.060 TYP
0.016 TYP
TYP MIN. 0.017
TYP 0.050
BONDING PATTERN
METAL TIE BAR
BRAZED Ag - Cu ALLOY
LEAD ALLOY 42
BRAZED Ag - Cu ALLOY
CERAMIC (HTCC)
0.190±0.007
.003
.003 P
-P-
0.005±0.001
0.026 MIN.
0.035±0.002
0.008±0.002
0.025±0.003
0.025±0.003
0.042 MIN.
0.093±0.009
NOTE :
1. DIE - ATTACH CAVITY TO BE METALLIZED .
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.
R0.016 PIN NO.1 INDEX (BOTTOM LAYER ONLY)
0.35 TYP.
PIN NO.1 INDEX MARK
TOLERANCE IN inch. UNLESS UNTIL SPECIFIED
1 % MINIMUM
MATERIAL
AS PER SPEC
FINISH
AS PER SPEC
USED ON
DCC
DATE
Semi-Conductor Laboratory
(MeitY , GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
DGN DATE
DGN DATE
DRN DATE
CHD DATE
APPD. DATE
APPD. DATE
TITLE PACKAGE DRAWING FOR CERAMIC IC PACKAGE- 14pin CSOP
Die-Cavity : 6.47 mmx3.96mm.
(0.255"x 0.156")
ITEM CODE.
SIZE A 4
DRAWING NO. A1542020323
REV. A
ALL DIMENSIONS ARE IN inch UNLESS UNTIL SPECIFIED
SCALE : NTS
SHEET 1 OF 1

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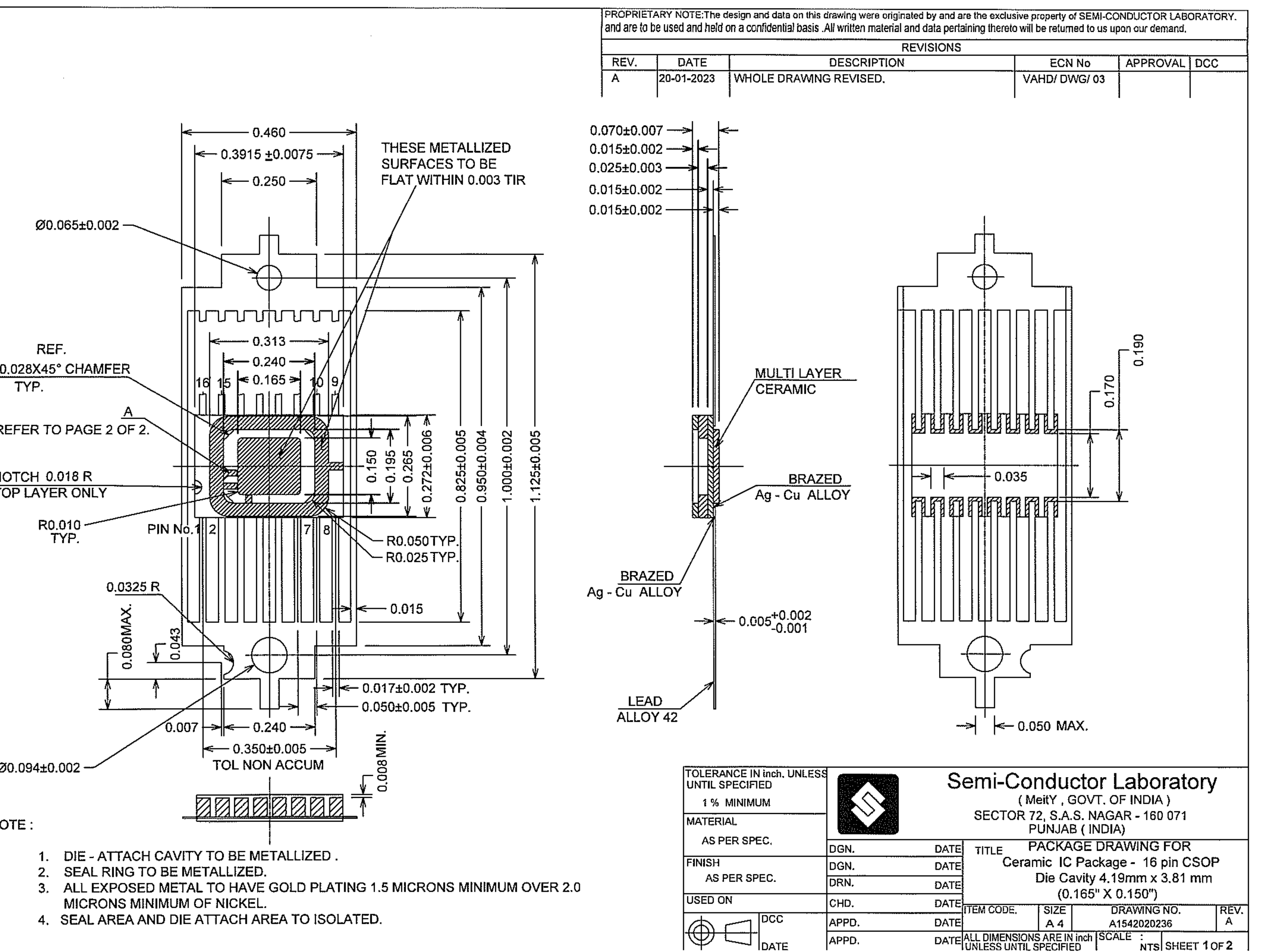
REVISIONS

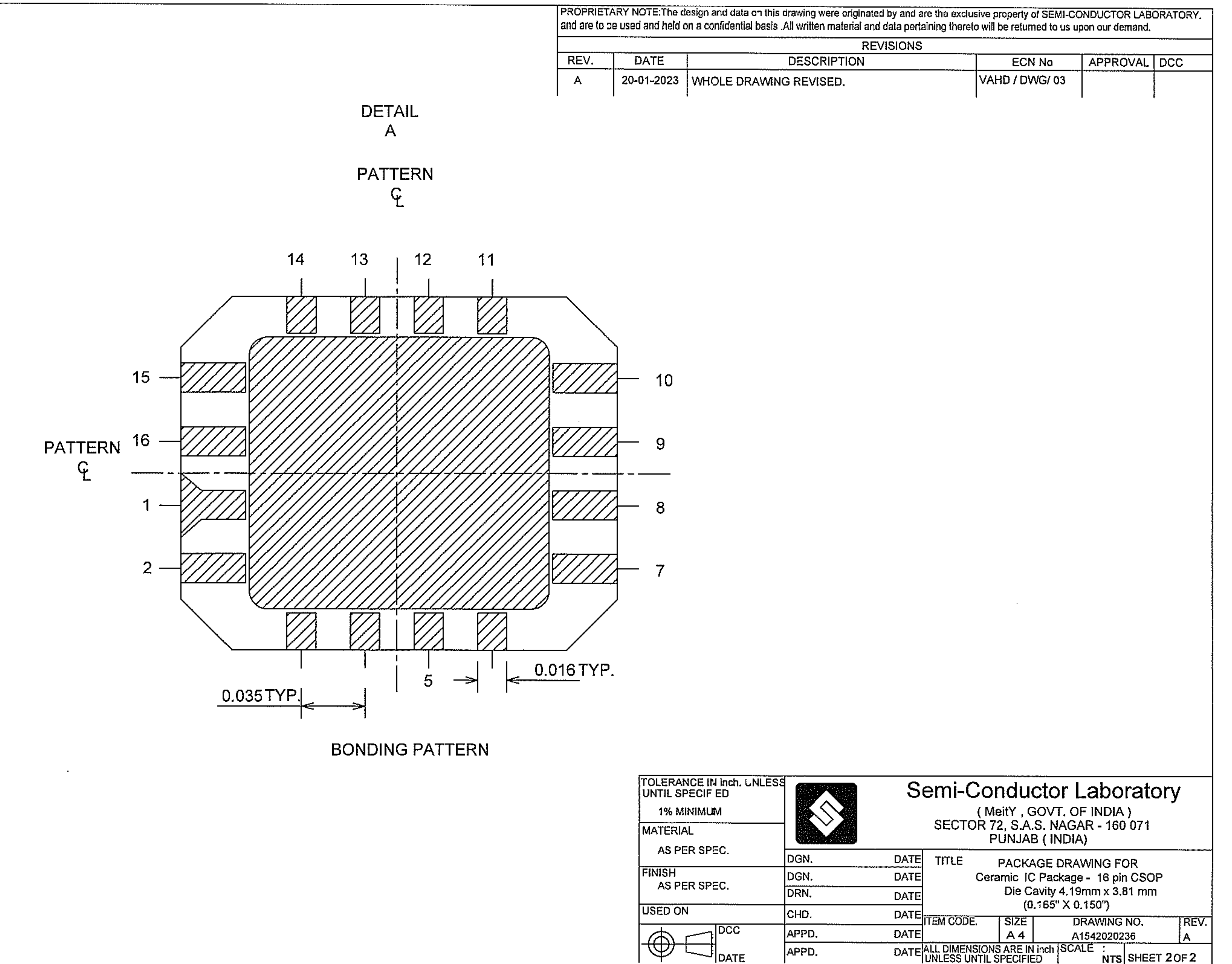
REV.	DATE	DESCRIPTION	ECN No	APPROVAL	DCC
A	20-01-2023	WHOLE DRAWING REVISED.	VAHD/ DWG/ 03		



NOTE :

1. DIE - ATTACH CAVITY TO BE METALLIZED .
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.

TOLERANCE IN inch. UNLESS UNTIL SPECIFIED 1 % MINIMUM	Semi-Conductor Laboratory (MeitY , GOVT. OF INDIA) SECTOR 72, S.A.S. NAGAR - 160 071 PUNJAB (INDIA)			
MATERIAL AS PER SPEC.	DGN. DATE	TITLE PACKAGE DRAWING FOR Ceramic IC Package - 16 pin CSOP Die Cavity 4.19mm x 3.81 mm (0.165" X 0.150")		
FINISH AS PER SPEC.	DGN. DATE			
	DRN. DATE			
USED ON	CHD. DATE	ITEM CODE.	SIZE A 4	DRAWING NO. A1542020236	REV. A
DCC	APPD. DATE			
DATE	APPD. DATE	ALL DIMENSIONS ARE IN inch UNLESS UNTIL SPECIFIED	SCALE : NTS	SHEET 1 OF 2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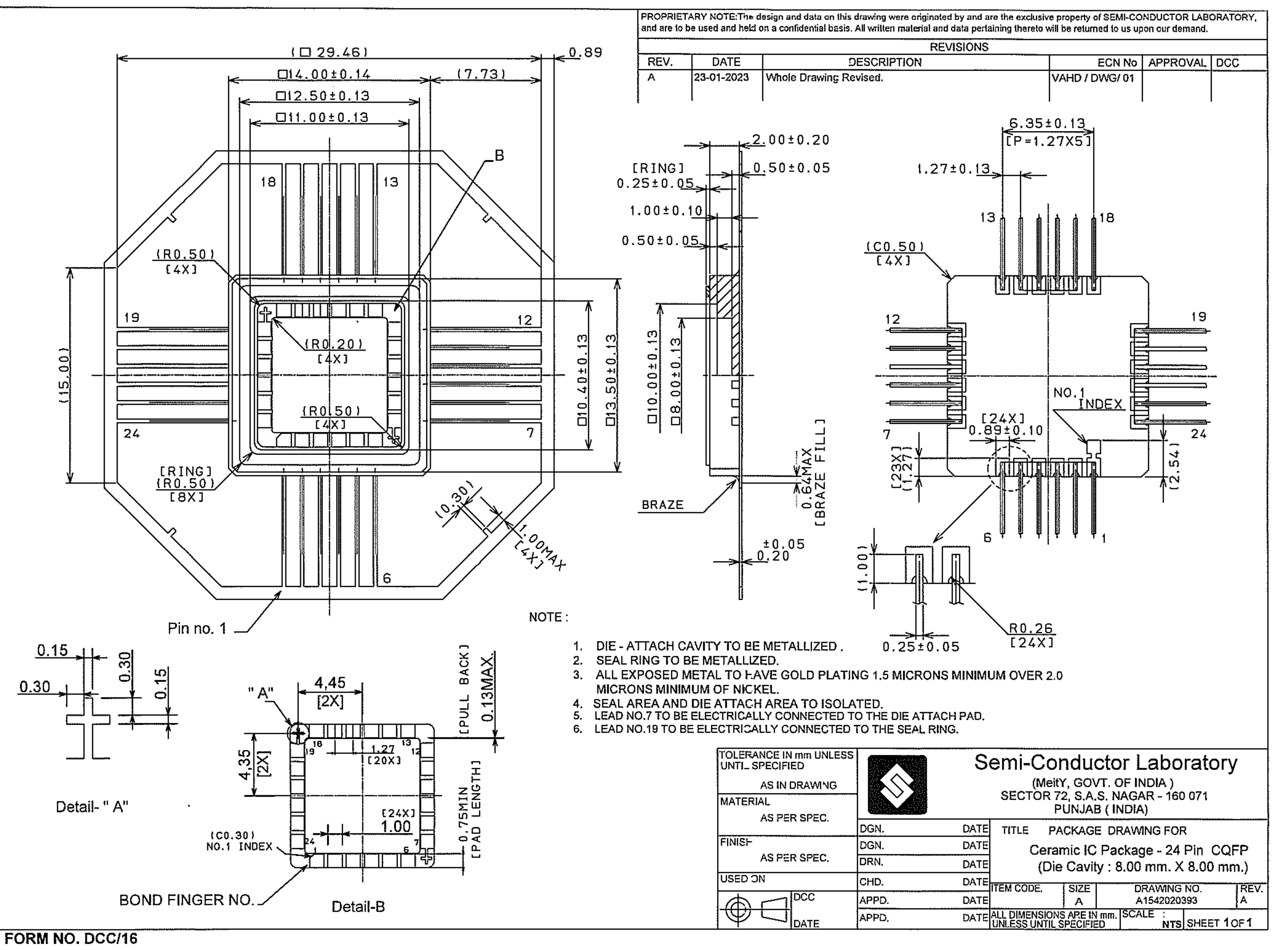
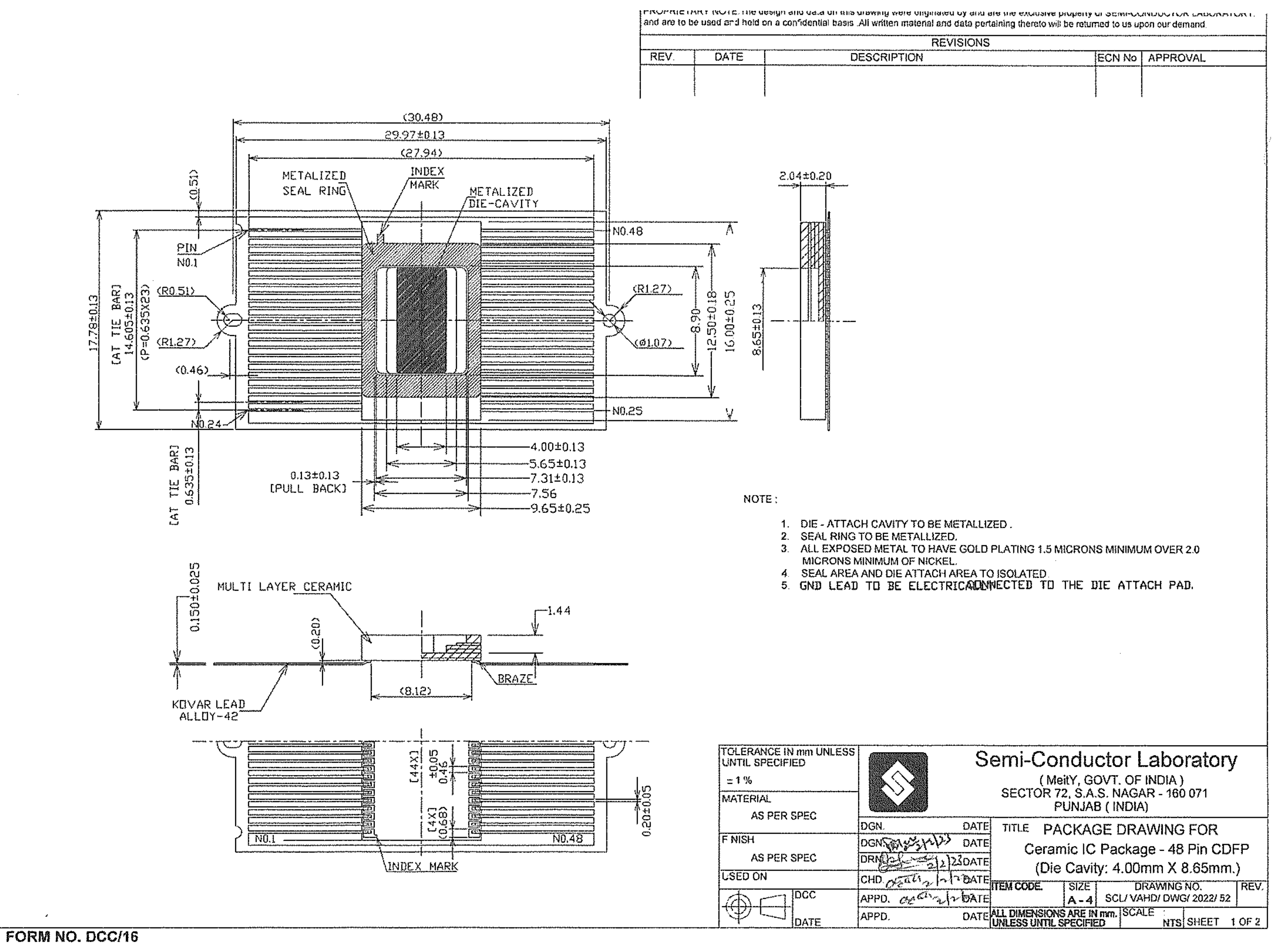
REVISIONS
REV.
DATE
DESCRIPTION
ECN No
APPROVAL
DCC
A
20-01-2023
WHOLE DRAWING REVISED.
VAHD / DWG/ 03
DETAIL A
PATTERN ℄
14
13
12
11
15
16
1
2
10
9
8
7
5
PATTERN ℄
0.035 TYP.
0.016 TYP.
BONDING PATTERN
TOLERANCE IN inch. UNLESS UNTIL SPECIFIED
1% MINIMUM
MATERIAL
AS PER SPEC.
FINISH
AS PER SPEC.
USED ON
DCC
DATE
Semi-Conductor Laboratory
(MeitY , GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
DGN. DATE
DGN. DATE
DRN. DATE
CHD. DATE
APPD. DATE
APPD. DATE
TITLE
PACKAGE DRAWING FOR
Ceramic IC Package - 16 pin CSOP
Die Cavity 4.19mm x 3.81 mm
(0.165" X 0.150")
ITEM CODE.
SIZE
A 4
DRAWING NO.
A1542020236
REV.
A
ALL DIMENSIONS ARE IN inch UNLESS UNTIL SPECIFIED
SCALE : NTS
SHEET 2 OF 2


PROPRIETARY NOTE:The design and data on this drawing were originated by and are the exclusive property of SEMI-CONDUCTOR LABORATORY, and are to be used and held on a confidential basis. All written material and data pertaining thereto will be returned to us upon our demand.
REVISIONS
REV. | DATE | DESCRIPTION | ECN No | APPROVAL | DCC
A | 23-01-2023 | Whole Drawing Revised. | VAHD / DWG/ 01
(□ 29.46)
0.89
□14.00±0.14
(7.73)
□12.50±0.13
□11.00±0.13
B
18
13
19
12
24
7
6
(R0.50)
[4X]
(R0.20)
[4X]
(R0.50)
[4X]
[RING]
(R0.50)
[8X]
(15.00)
□10.40±0.13
□13.50±0.13
(0.30)
1.00MAX
[4X]
Pin no. 1
2.00±0.20
[RING]
0.25±0.05
0.50±0.05
1.00±0.10
0.50±0.05
□10.00±0.13
□8.00±0.13
0.64MAX
[BRAZE FILL]
BRAZE
±0.05
0.20
6.35±0.13
[P=1.27X5]
1.27±0.13
(C0.50)
[4X]
NO.1
INDEX
[24X]
0.89±0.10
[23X]
(1.27)
(2.54)
(1.00)
R0.26
[24X]
0.25±0.05
1
NOTE :
1. DIE - ATTACH CAVITY TO BE METALLIZED .
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.
5. LEAD NO.7 TO BE ELECTRICALLY CONNECTED TO THE DIE ATTACH PAD.
6. LEAD NO.19 TO BE ELECTRICALLY CONNECTED TO THE SEAL RING.
0.15
0.30
0.30
0.15
Detail- " A"
"A"
4,45
[2X]
4,35
[2X]
1.27
[20X]
[24X]
1.00
(C0.30)
NO.1 INDEX
BOND FINGER NO.
Detail-B
[PULL BACK]
0.13MAX.
0.75MIN
[PAD LENGTH]
TOLERANCE IN mm UNLESS UNTIL SPECIFIED
AS IN DRAWING
MATERIAL
AS PER SPEC.
FINISH
AS PER SPEC.
USED ON
DCC
DATE
DGN. DATE
DGN. DATE
DRN. DATE
CHD. DATE
APPD. DATE
APPD. DATE
Semi-Conductor Laboratory
(MeitY, GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
TITLE PACKAGE DRAWING FOR
Ceramic IC Package - 24 Pin CQFP
(Die Cavity : 8.00 mm. X 8.00 mm.)
ITEM CODE.
SIZE A
DRAWING NO. A1542020393
REV. A
ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED
SCALE : NTS
SHEET 1 OF 1
FORM NO. DCC/16



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REVISIONS
REV. | DATE | DESCRIPTION | ECN No | APPROVAL
(30.48)
29.97±0.13
(27.94)
METALIZED SEAL RING
INDEX MARK
METALIZED DIE-CAVITY
(0.51)
PIN N0.1
N0.48
N0.25
N0.24
(R0.51)
(R1.27)
(Ø1.07)
(0.46)
17.78±0.13
[AT TIE BAR] 14.605±0.13
(P=0.635X23)
8.90
12.50±0.18
16.00±0.25
2.04±0.20
8.65±0.13
4.00±0.13
5.65±0.13
7.31±0.13
7.56
9.65±0.25
0.13±0.13 [PULL BACK]
[AT TIE BAR] 0.635±0.13
0.150±0.025
MULTI LAYER CERAMIC
(0.20)
1.44
BRAZE
(8.12)
KOVAR LEAD ALLOY-42
[44X] 0.46 ±0.05
[4X] (0.68)
0.20±0.05
N0.1
N0.48
INDEX MARK
NOTE :
1. DIE - ATTACH CAVITY TO BE METALLIZED .
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.
5. GND LEAD TO BE ELECTRICALLY CONNECTED TO THE DIE ATTACH PAD.
TOLERANCE IN mm UNLESS UNTIL SPECIFIED
= 1 %
MATERIAL
AS PER SPEC
F NISH
AS PER SPEC
USED ON
DCC
DATE
Semi-Conductor Laboratory
(MeitY, GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
DGN. DATE
DGN. DATE
DRN. DATE
CHD. DATE
APPD. DATE
APPD. DATE
TITLE PACKAGE DRAWING FOR
Ceramic IC Package - 48 Pin CDFP
(Die Cavity: 4.00mm X 8.65mm.)
ITEM CODE.
SIZE A-4
DRAWING NO. SCL/ VAHD/ DWG/ 2022/ 52
REV.
ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED
SCALE : NTS
SHEET 1 OF 2
FORM NO. DCC/16

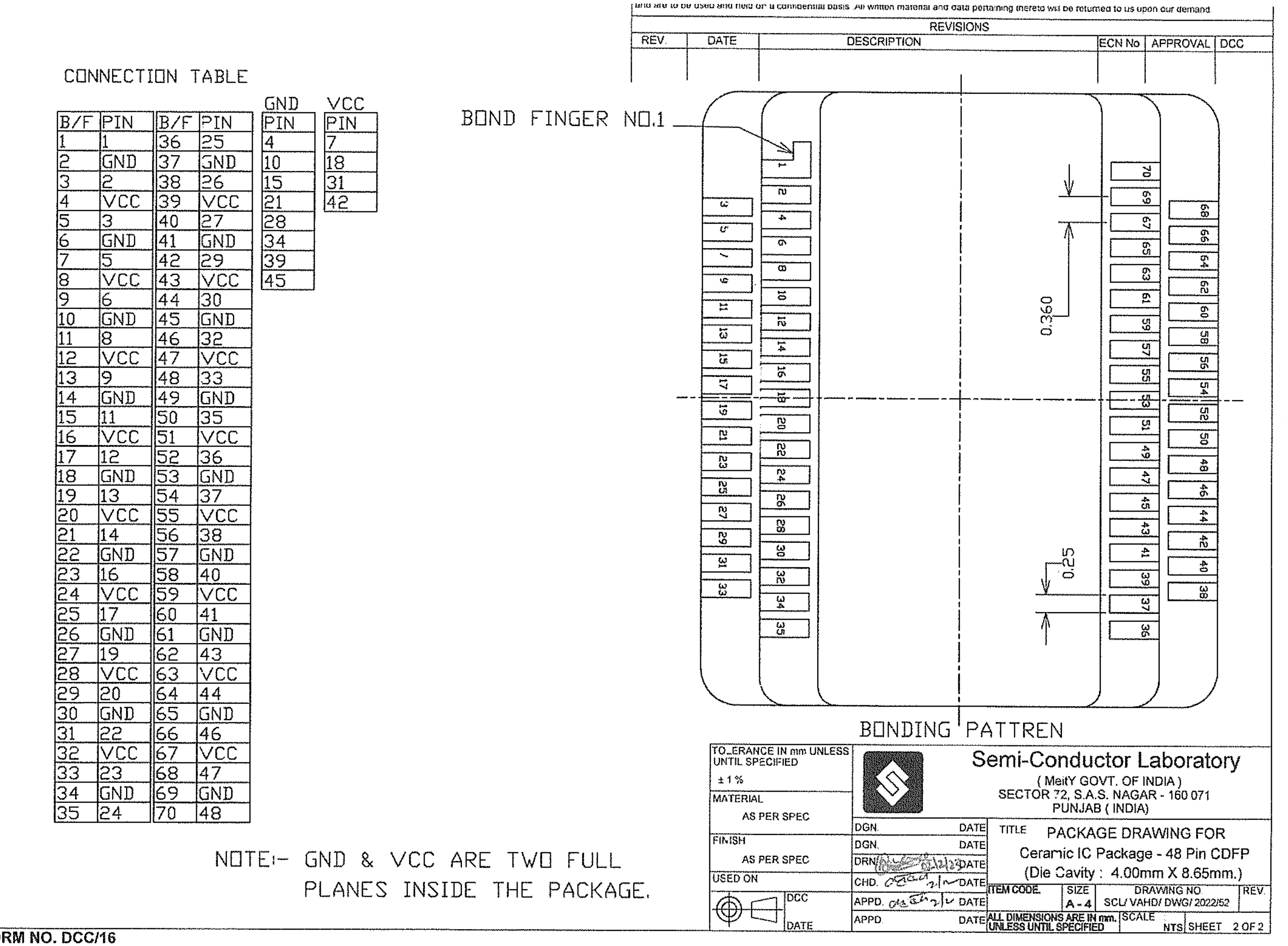
and are to be used and held on a confidential basis. All written material and data pertaining thereto wil be returned to us upon our demand.

REVISIONS					
REV.	DATE	DESCRIPTION	ECN No	APPROVAL	DCC

CONNECTION TABLE

B/F	PIN	B/F	PIN
1	1	36	25
2	GND	37	GND
3	2	38	26
4	VCC	39	VCC
5	3	40	27
6	GND	41	GND
7	5	42	29
8	VCC	43	VCC
9	6	44	30
10	GND	45	GND
11	8	46	32
12	VCC	47	VCC
13	9	48	33
14	GND	49	GND
15	11	50	35
16	VCC	51	VCC
17	12	52	36
18	GND	53	GND
19	13	54	37
20	VCC	55	VCC
21	14	56	38
22	GND	57	GND
23	16	58	40
24	VCC	59	VCC
25	17	60	41
26	GND	61	GND
27	19	62	43
28	VCC	63	VCC
29	20	64	44
30	GND	65	GND
31	22	66	46
32	VCC	67	VCC
33	23	68	47
34	GND	69	GND
35	24	70	48

GND PIN	VCC PIN
4	7
10	18
15	31
21	42
28	
34	
39	
45	

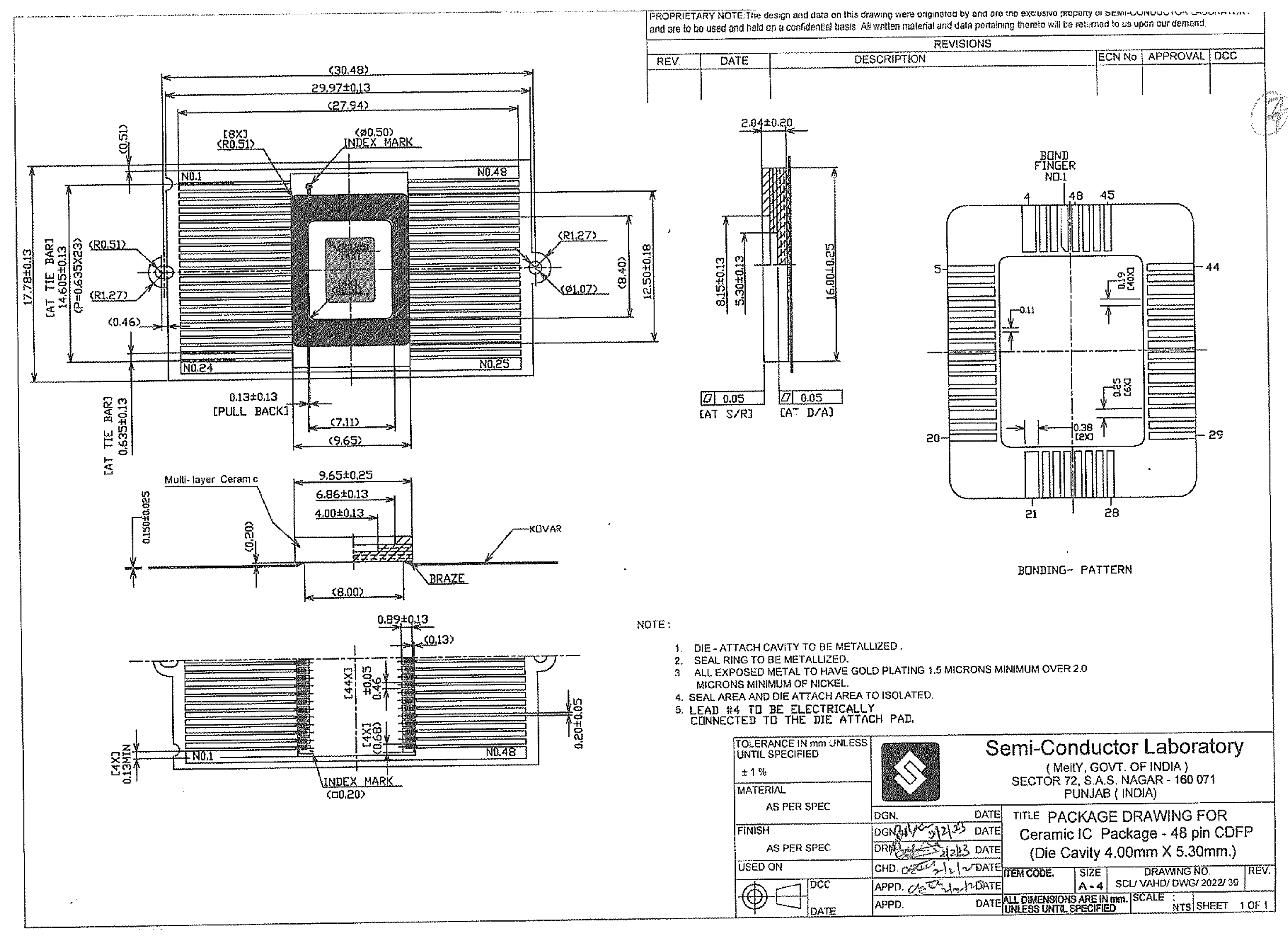


BONDING PATTREN

NOTE:- GND & VCC ARE TWO FULL PLANES INSIDE THE PACKAGE.

TOLERANCE IN mm UNLESS UNTIL SPECIFIED ± 1 %	Semi-Conductor Laboratory (MeitY GOVT. OF INDIA) SECTOR 72, S.A.S. NAGAR - 160 071 PUNJAB (INDIA)	
MATERIAL AS PER SPEC	DGN. DATE	TITLE PACKAGE DRAWING FOR Ceramic IC Package - 48 Pin CDFP (Die Cavity : 4.00mm X 8.65mm.)
FINISH AS PER SPEC	DGN. DATE	
	DRN. DATE	
USED ON	CHD. DATE	
DCC DATE	APPD. DATE	ITEM CODE. SIZE A - 4 DRAWING NO. SCL/ VAHD/ DWG/ 2022/52 REV.
	APPD. DATE	ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED SCALE NTS SHEET 2 OF 2

FORM NO. DCC/16



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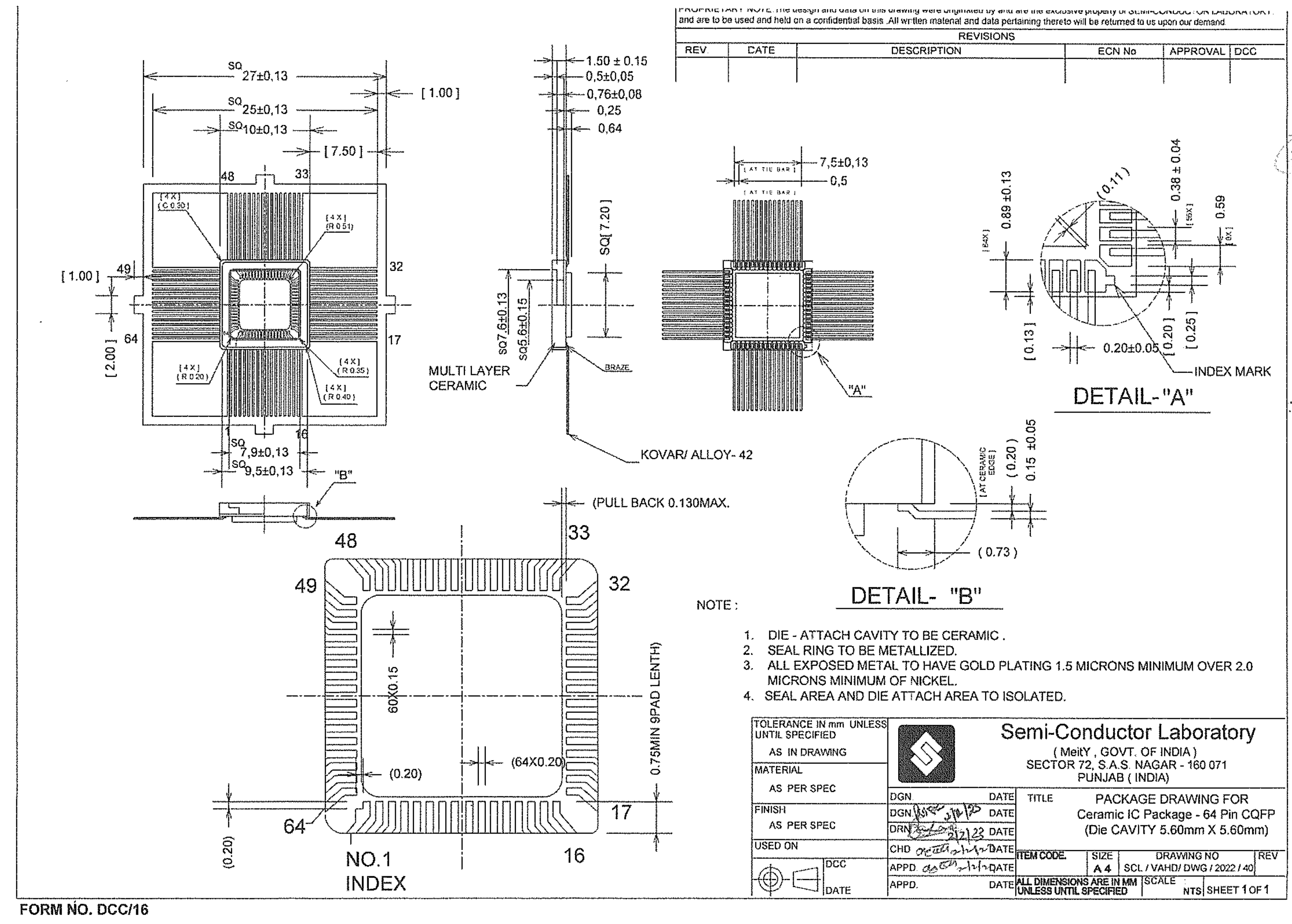
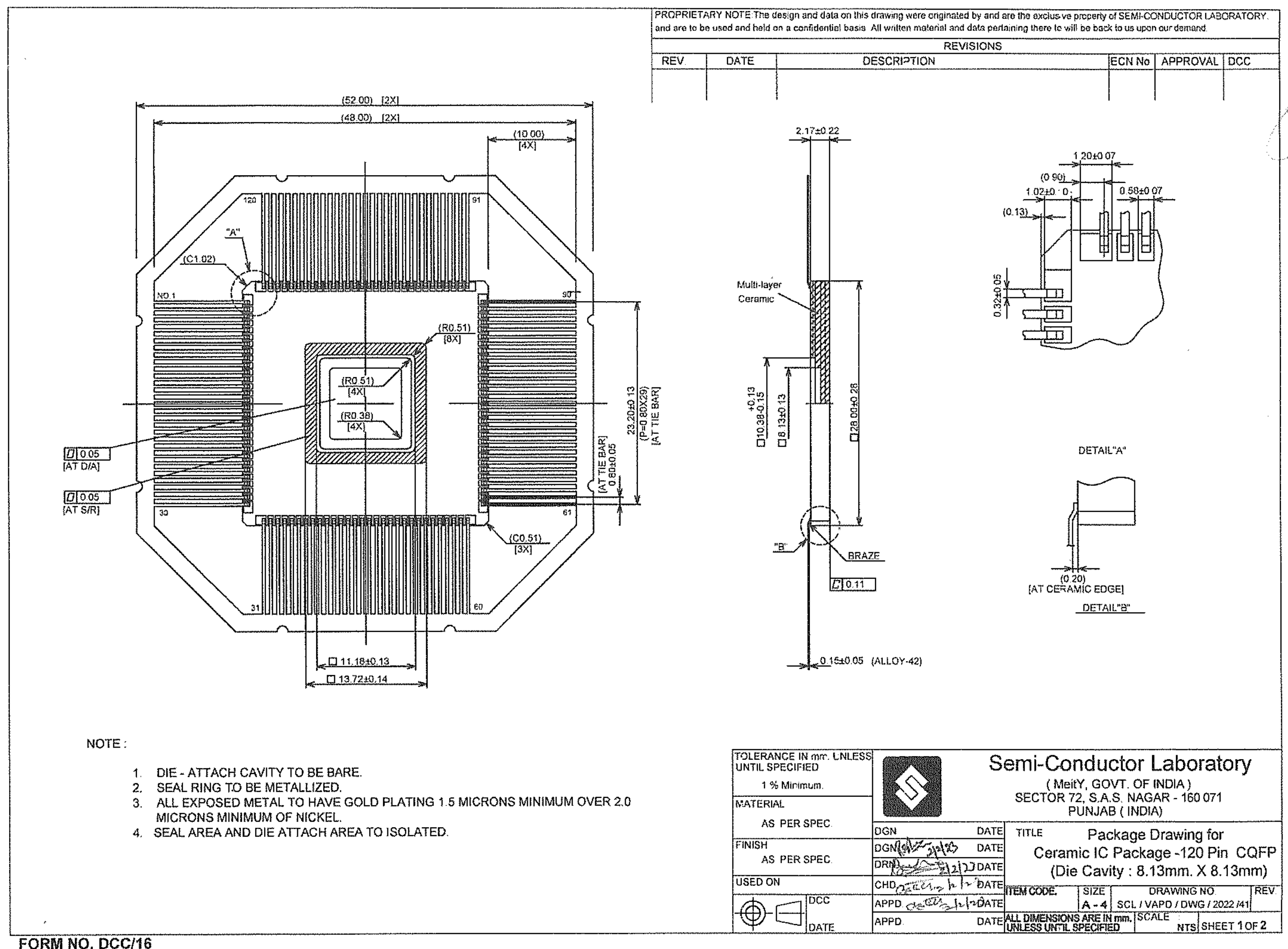
REVISIONS
REV. | DATE | DESCRIPTION | ECN No | APPROVAL | DCC
(30.48)
29.97±0.13
(27.94)
[8X] (R0.51)
(⌀0.50) INDEX MARK
N0.1
N0.48
N0.24
N0.25
(0.51)
(R0.51)
(R1.27)
(0.46)
17.78±0.13
[AT TIE BAR] 14.605±0.13
(P=0.635X23)
(R1.27)
(⌀1.07)
(8.40)
12.50±0.18
[AT TIE BAR] 0.635±0.13
0.13±0.13 [PULL BACK]
(7.11)
(9.65)
2.04±0.20
8.15±0.13
5.30±0.13
16.00±0.25
0.05 [AT S/R]
0.05 [AT D/A]
BOND FINGER NO.1
4
48
45
5
44
20
29
21
28
0.19 [40X]
0.11
0.25 [6X]
0.38 [2X]
BONDING- PATTERN
Multi-layer Ceramic
9.65±0.25
6.86±0.13
4.00±0.13
0.150±0.025
(0.20)
KOVAR
BRAZE
(8.00)
0.89±0.13
(0.13)
[44X]
0.46 ±0.05
[4X] (0.68)
0.20±0.05
[4X] 0.13MIN
N0.1
N0.48
INDEX MARK (□0.20)
NOTE:
1. DIE - ATTACH CAVITY TO BE METALLIZED.
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.
5. LEAD #4 TO BE ELECTRICALLY CONNECTED TO THE DIE ATTACH PAD.
TOLERANCE IN mm UNLESS UNTIL SPECIFIED
± 1 %
MATERIAL
AS PER SPEC
FINISH
AS PER SPEC
USED ON
DCC
DATE
Semi-Conductor Laboratory
(MeitY, GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
DGN. DATE
DGN. DATE
DRN. DATE
CHD. DATE
APPD. DATE
APPD. DATE
TITLE PACKAGE DRAWING FOR
Ceramic IC Package - 48 pin CDFP
(Die Cavity 4.00mm X 5.30mm.)
ITEM CODE.
SIZE A-4
DRAWING NO. SCL/ VAHD/ DWG/ 2022/ 39
REV.
ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED
SCALE : NTS
SHEET 1 OF 1



NOTE :

1. DIE - ATTACH CAVITY TO BE CERAMIC .
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.

TOLERANCE IN mm UNLESS UNTIL SPECIFIED	Semi-Conductor Laboratory (MeitY , GOVT. OF INDIA) SECTOR 72, S.A.S. NAGAR - 160 071 PUNJAB (INDIA)
AS IN DRAWING	
MATERIAL: AS PER SPEC	TITLE: PACKAGE DRAWING FOR Ceramic IC Package - 64 Pin CQFP (Die CAVITY 5.60mm X 5.60mm)
FINISH: AS PER SPEC	DGN. DATE / DGN. DATE / DRN. 2/2/23 DATE / CHD DATE / APPD. DATE / APPD. DATE
USED ON	ITEM CODE. / SIZE A4 / DRAWING NO SCL / VAHD/ DWG / 2022 / 40 / REV
DCC / DATE	ALL DIMENSIONS ARE IN MM UNLESS UNTIL SPECIFIED / SCALE NTS / SHEET 1 OF 1



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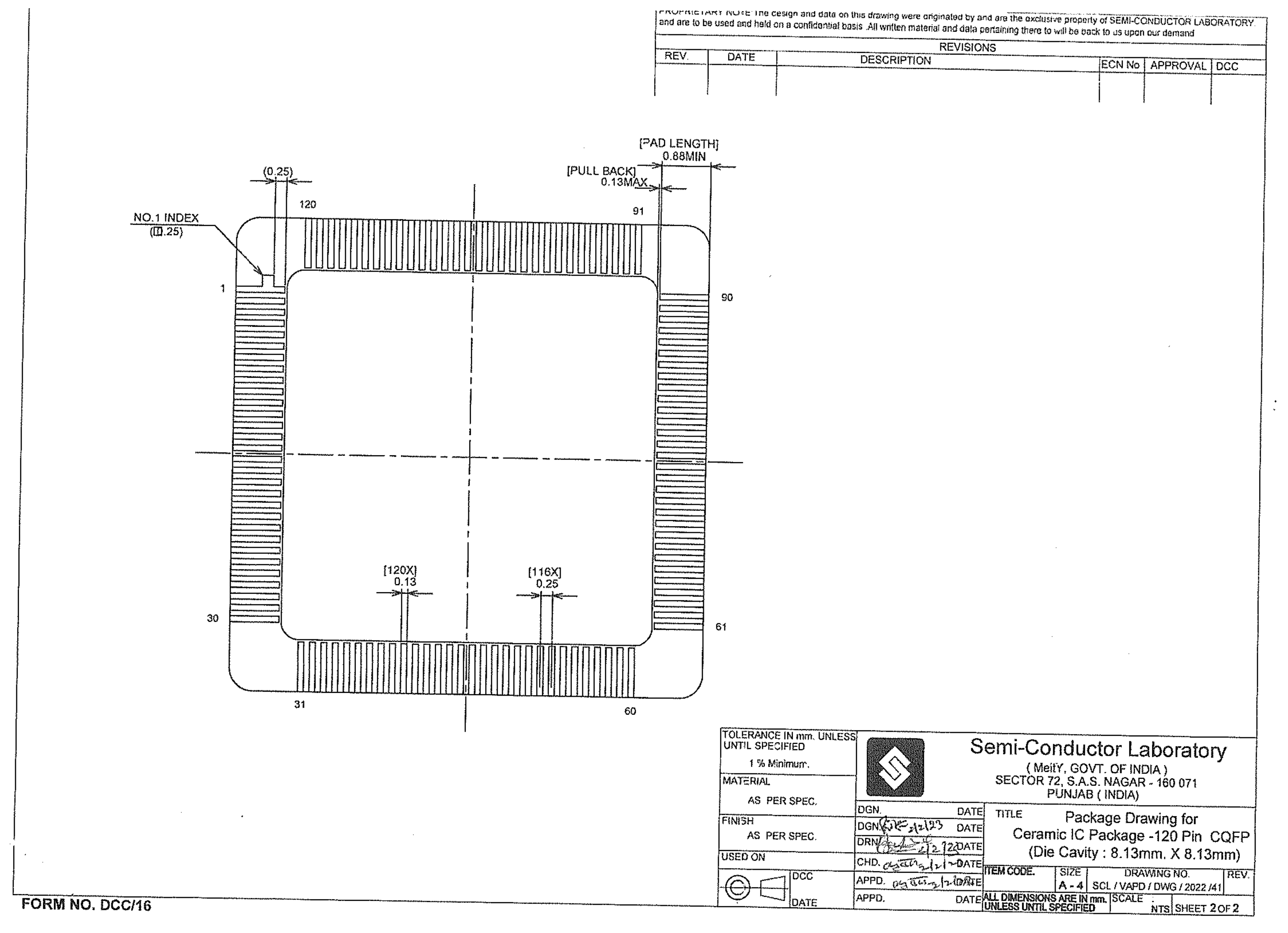
REVISIONS
REV.
DATE
DESCRIPTION
ECN No
APPROVAL
DCC
(52.00) [2X]
(48.00) [2X]
(10.00) [4X]
"A"
(C1.02)
NO.1
120
91
90
(R0.51) [8X]
(R0.51) [4X]
(R0.38) [4X]
0.05 [AT D/A]
0.05 [AT S/R]
23.20±0.13 (P=0.80X29) [AT TIE BAR]
[AT TIE BAR] 0.80±0.05
30
61
31
60
(C0.51) [3X]
11.18±0.13
13.72±0.14
2.17±0.22
Multi-layer Ceramic
10.38 +0.13 -0.15
8.13±0.13
28.00±0.28
"B"
BRAZE
0.11
0.15±0.05 (ALLOY-42)
1.20±0.07
(0.90)
1.02±0.0
0.58±0.07
(0.13)
0.32±0.05
DETAIL"A"
(0.20) [AT CERAMIC EDGE]
DETAIL"B"
NOTE :
1. DIE - ATTACH CAVITY TO BE BARE.
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.
TOLERANCE IN mm. UNLESS UNTIL SPECIFIED
1 % Minimum.
MATERIAL
AS PER SPEC.
FINISH
AS PER SPEC.
USED ON
DCC
DATE
Semi-Conductor Laboratory
(MeitY, GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
DGN DATE
DGN DATE
DRN DATE
CHD DATE
APPD DATE
APPD DATE
TITLE
Package Drawing for
Ceramic IC Package -120 Pin CQFP
(Die Cavity : 8.13mm. X 8.13mm)
ITEM CODE.
SIZE A - 4
DRAWING NO. SCL / VAPD / DWG / 2022 /41
REV.
ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED
SCALE NTS
SHEET 1 OF 2
FORM NO. DCC/16

PROPRIETARY NOTE The design and data on this drawing were originated by and are the exclusive property of SEMI-CONDUCTOR LABORATORY and are to be used and held on a confidential basis. All written material and data pertaining there to will be back to us upon our demand

REVISIONS					
REV.	DATE	DESCRIPTION	ECN No	APPROVAL	DCC

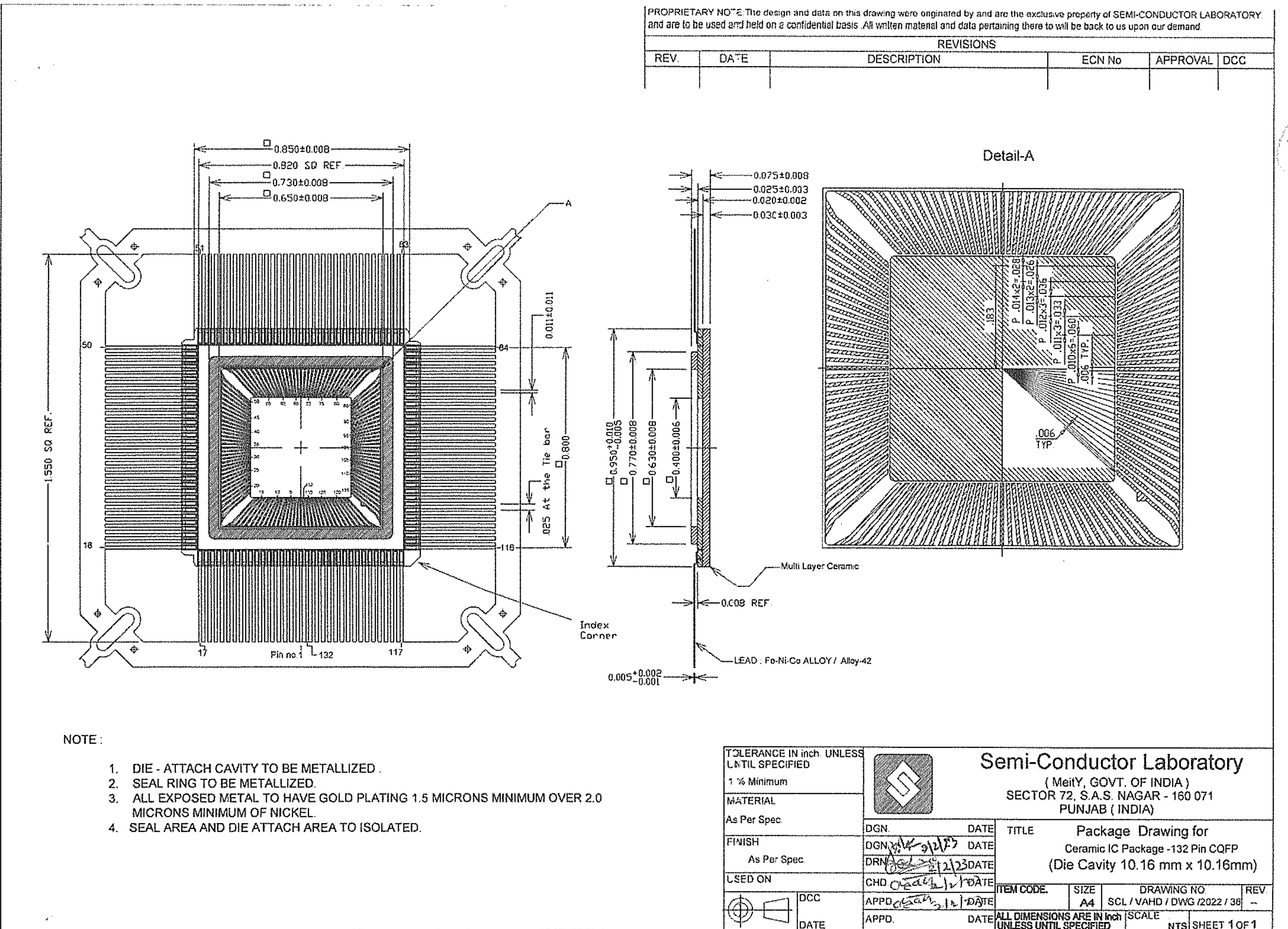


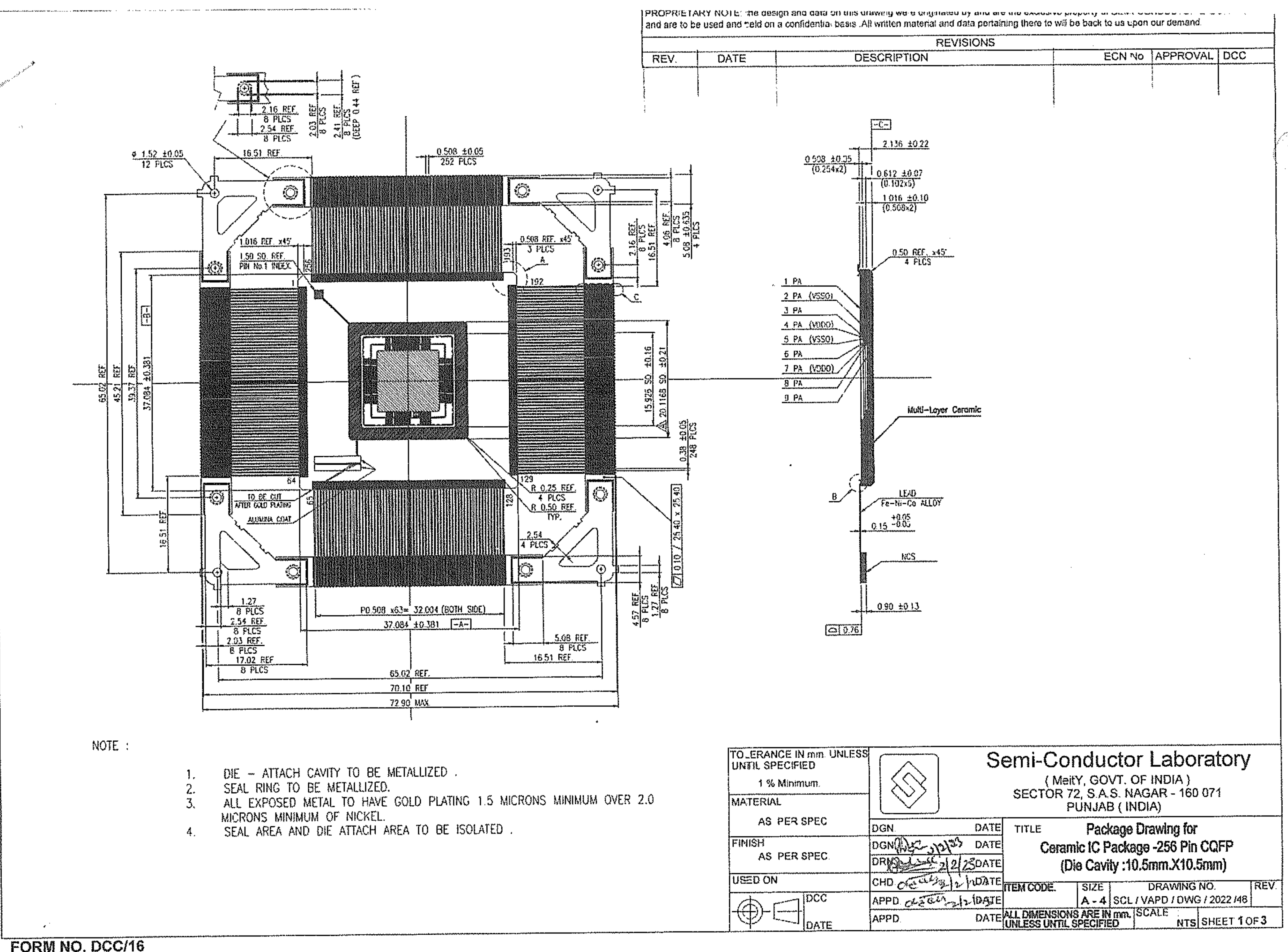
TOLERANCE IN mm. UNLESS UNTIL SPECIFIED			
1 % Minimum.			
MATERIAL AS PER SPEC.			
FINISH AS PER SPEC.	DGN. DATE		
USED ON	DGN. DATE		
DCC	DRN. DATE		
DATE	CHD. DATE		
	APPD. DATE		
	APPD. DATE		

Semi-Conductor Laboratory
(MeitY, GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)

TITLE: Package Drawing for Ceramic IC Package -120 Pin CQFP (Die Cavity : 8.13mm. X 8.13mm)

ITEM CODE.	SIZE	DRAWING NO.	REV.
	A - 4	SCL / VAPD / DWG / 2022 /41	
ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED	SCALE NTS	SHEET 2 OF 2	


PROPRIETARY NOTE: The design and data on this drawing were originated by and are the exclusive property of SEMI-CONDUCTOR LABORATORY and are to be used and held on a confidential basis. All written material and data pertaining there to will be back to us upon our demand.
REVISIONS
REV.
DATE
DESCRIPTION
ECN No
APPROVAL
DCC
0.850±0.008
0.820 SQ REF.
0.730±0.008
0.650±0.008
A
1.550 SQ REF.
0.011±0.011
.025 At the Tie bar
0.800
Index Corner
Pin no.1
132
17
117
18
116
50
84
51
83
Detail-A
0.075±0.008
0.025±0.003
0.020±0.002
0.030±0.003
0.950+0.010 -0.005
0.770±0.008
0.630±0.008
0.400±0.006
Multi Layer Ceramic
0.008 REF.
LEAD : Fe-Ni-Co ALLOY / Alloy-42
0.005+0.002 -0.001
.183
P .014x2=.028
P .013x2=.026
P .012x3=.036
P .011x3=.033
P .010x6=.060
.006 TYP.
.006 TYP.
NOTE :
1. DIE - ATTACH CAVITY TO BE METALLIZED.
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO ISOLATED.
TOLERANCE IN inch. UNLESS UNTIL SPECIFIED
1 % Minimum
MATERIAL
As Per Spec.
FINISH
As Per Spec.
USED ON
DCC
DATE
Semi-Conductor Laboratory
(MeitY, GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
DGN. DATE
DGN. DATE
DRN. DATE
CHD. DATE
APPD. DATE
APPD. DATE
TITLE
Package Drawing for
Ceramic IC Package -132 Pin CQFP
(Die Cavity 10.16 mm x 10.16mm)
ITEM CODE.
SIZE
A4
DRAWING NO.
SCL / VAHD / DWG /2022 / 38
REV.
--
ALL DIMENSIONS ARE IN inch UNLESS UNTIL SPECIFIED
SCALE
NTS
SHEET 1 OF 1
FORM NO. DCC/16



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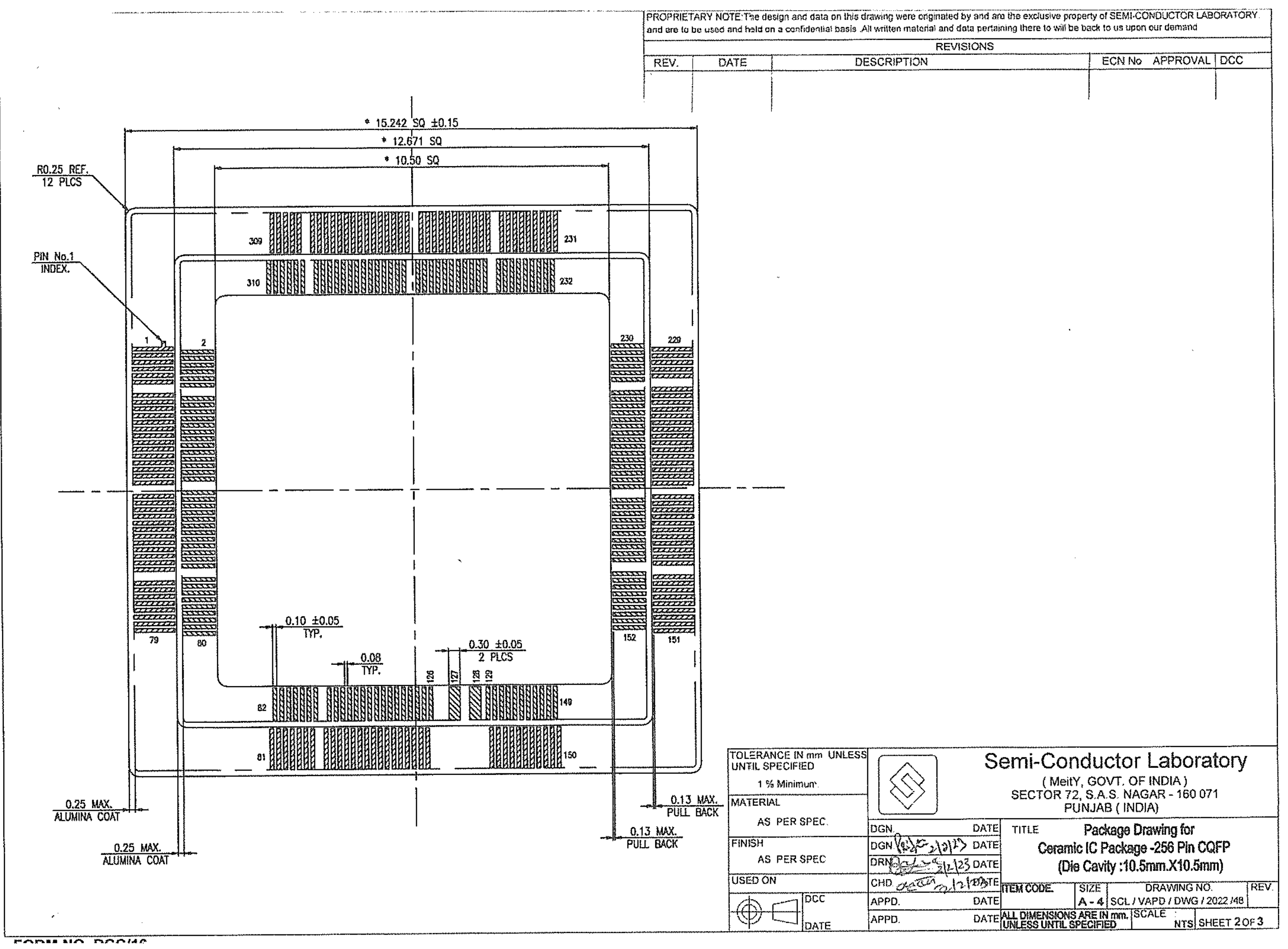
and are to be used and held on a confidential basis. All written material and data pertaining there to will be back to us upon our demand.
REVISIONS
REV.
DATE
DESCRIPTION
ECN No
APPROVAL
DCC
2.16 REF.
8 PLCS
2.54 REF.
8 PLCS
2.03 REF
8 PLCS
2.41 REF.
8 PLCS
(DEEP 0.44 REF)
φ 1.52 ±0.05
12 PLCS
16.51 REF
0.508 ±0.05
252 PLCS
1.016 REF. x45°
1.50 SQ. REF.
PIN No.1 INDEX
256
193
192
1
0.508 REF. x45°
3 PLCS
A
C
2.16 REF.
8 PLCS
16.51 REF
4.06 REF.
8 PLCS
5.08 ±0.635
4 PLCS
65.02 REF
45.21 REF
39.37 REF
37.084 ±0.381
-B-
15.925 SQ ±0.16
20.1168 SQ ±0.21
0.38 ±0.05
248 PLCS
64
65
128
129
TO BE CUT AFTER GOLD PLATING
ALUMINA COAT
R 0.25 REF.
4 PLCS
R 0.50 REF.
TYP.
2.54
4 PLCS
16.51 REF
0.10 / 25.40 x 25.40
1.27
8 PLCS
2.54 REF
8 PLCS
2.03 REF.
8 PLCS
17.02 REF
8 PLCS
P0.508 x63= 32.004 (BOTH SIDE)
37.084 ±0.381
-A-
4.57 REF
8 PLCS
1.27 REF
8 PLCS
5.08 REF.
8 PLCS
16.51 REF.
65.02 REF.
70.10 REF
72.90 MAX
-C-
2.136 ±0.22
0.508 ±0.05
(0.254x2)
0.612 ±0.07
(0.102x6)
1.016 ±0.10
(0.508x2)
0.50 REF. x45°
4 PLCS
1 PA
2 PA (VSSO)
3 PA
4 PA (VDDO)
5 PA (VSSO)
6 PA
7 PA (VDDO)
8 PA
9 PA
Multi-Layer Ceramic
B
LEAD
Fe-Ni-Co ALLOY
0.15 +0.05 -0.00
NCS
0.90 ±0.13
0.76
NOTE :
1. DIE - ATTACH CAVITY TO BE METALLIZED .
2. SEAL RING TO BE METALLIZED.
3. ALL EXPOSED METAL TO HAVE GOLD PLATING 1.5 MICRONS MINIMUM OVER 2.0 MICRONS MINIMUM OF NICKEL.
4. SEAL AREA AND DIE ATTACH AREA TO BE ISOLATED .
TOLERANCE IN mm. UNLESS UNTIL SPECIFIED
1 % Minimum.
MATERIAL
AS PER SPEC
FINISH
AS PER SPEC.
USED ON
DCC
DATE
Semi-Conductor Laboratory
(MeitY, GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
DGN.
DATE
DGN
DATE
DRN
DATE
CHD
DATE
APPD.
DATE
APPD.
DATE
TITLE
Package Drawing for
Ceramic IC Package -256 Pin CQFP
(Die Cavity :10.5mm.X10.5mm)
ITEM CODE.
SIZE
A - 4
DRAWING NO.
SCL / VAPD / DWG / 2022 /46
REV.
ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED
SCALE
NTS
SHEET 1 OF 3
FORM NO. DCC/16



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REVISIONS
REV.
DATE
DESCRIPTION
ECN No
APPROVAL
DCC
* 15.242 SQ ±0.15
* 12.671 SQ
* 10.50 SQ
R0.25 REF.
12 PLCS
PIN No.1
INDEX.
1
2
309
310
231
232
230
229
79
80
152
151
82
149
81
150
126
127
128
129
0.10 ±0.05
TYP.
0.08
TYP.
0.30 ±0.05
2 PLCS
0.25 MAX.
ALUMINA COAT
0.25 MAX.
ALUMINA COAT
0.13 MAX.
PULL BACK
0.13 MAX.
PULL BACK
TOLERANCE IN mm UNLESS UNTIL SPECIFIED
1 % Minimum
MATERIAL
AS PER SPEC.
FINISH
AS PER SPEC
USED ON
DCC
DATE
Semi-Conductor Laboratory
(MeitY, GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)
DGN.
DATE
DGN
DATE
DRN
DATE
CHD.
DATE
APPD.
DATE
APPD.
DATE
TITLE
Package Drawing for
Ceramic IC Package -256 Pin CQFP
(Die Cavity :10.5mm.X10.5mm)
ITEM CODE.
SIZE
A - 4
DRAWING NO.
SCL / VAPD / DWG / 2022 /48
REV.
ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED
SCALE
NTS
SHEET 2 OF 3

PROPRIETARY NOTE The design and data on this drawing were originated by and are the exclusive property of SEMI-CONDUCTOR LABORATORY and are to be used and held on a confidential basis. All written material and data pertaining there to will be back to us upon our demand.

REVISIONS

REV.	DATE	DESCRIPTION	ECN No	APPROVAL	DCC

CONNECTION TABLE

B/F No.	LEAD No.
3	3
4	4
5	5
6	6
9	7
10	8
11	9
12	10
13	11
14	12
15	13
16	14
19	15
20	16
21	17
22	18
25	19
26	20
27	21
29	23
30	24
31	25
32	26
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37	29
38	30
39	31
40	32
41	33
42	34
43	35
44	36
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48	38
49	39
50	40
51	41
54	44
55	45
56	46
57	47
60	48
61	49
62	50
63	51

B/F No.	LEAD No.
64	52
65	53
66	54
67	55
70	56
71	57
72	58
73	59
76	60
77	61
78	62
83	67
84	68
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103	83
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114	94
115	95
116	96
118	97
119	98
120	99
121	100
122	101
123	102
124	103

B/F No.	LEAD No.
125	104
126	105
127	106
128	107
129	108
130	109
131	110
132	111
133	112
134	113
135	114
136	115
138	116
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147	125
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155	133
156	134
159	135
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161	137
162	138
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168	142
169	143
170	144
171	145
172	146
175	147
176	148
177	149
180	152
181	153
182	154
183	155

B/F No.	LEAD No.
186	156
187	157
188	158
189	159
190	160
191	161
192	162
193	163
194	164
197	165
198	166
199	167
200	168
201	169
203	171
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212	178
213	179
216	180
217	181
218	182
219	183
220	184
221	185
222	186
223	187
226	188
227	189
228	190
233	195
234	196
235	197
236	198
239	199
240	200
241	201
242	202
245	203
246	204
247	205
248	206

B/F No.	LEAD No.
249	207
250	208
251	209
252	210
255	211
256	212
257	213
260	216
261	217
262	218
263	219
266	220
267	221
268	222
269	223
270	224
271	225
272	226
273	227
274	228
275	229
278	230
279	231
280	232
281	233
283	235
284	236
285	237
286	238
287	239
290	240
291	241
292	242
293	243
296	244
297	245
298	246
299	247
300	248
301	249
302	250
303	251
306	252
307	253
308	254

VDDO

B/F No.	LEAD No.
1	1
7	22
17	42
23	63
28	65
34	86
45	127
52	129
58	150
68	170
74	191
79	193
81	214
88	234
100	255
106	
117	
149	
151	
157	
163	
173	
178	
184	
195	
202	
208	
214	
224	
229	
231	
237	
243	
253	
258	
264	
276	
282	
288	
294	
304	
309	

VSSO

B/F No.	LEAD No.
2	2
8	43
18	64
24	66
35	87
46	128
53	130
59	151
69	192
75	194
80	215
82	256
89	
101	
107	
137	
150	
152	
158	
164	
174	
179	
185	
196	
209	
215	
225	
230	
232	
238	
244	
254	
259	
265	
277	
289	
295	
305	
310	

NC

OTHER
D/A
S/R

TOLERANCE IN mm. UNLESS UNTIL SPECIFIED
1 % Minimum

MATERIAL
AS PER SPEC.

FINISH
AS PER SPEC

USED ON

DCC
DATE

Semi-Conductor Laboratory
(MeitY, GOVT. OF INDIA)
SECTOR 72, S.A.S. NAGAR - 160 071
PUNJAB (INDIA)

DGN. DATE
DGN 2/2/23 DATE
DRN 2/2/23 DATE
CHD. 2/2/23 DATE
APPD 2/2/23 DATE
APPD. DATE

TITLE **Package Drawing for Ceramic IC Package -256 Pin CQFP (Die Cavity :10.5mm.X10.5mm)**

ITEM CODE.	SIZE	DRAWING NO.	REV.
	A - 4	SCL / VAPD / DWG / 2022 /48	

ALL DIMENSIONS ARE IN mm. UNLESS UNTIL SPECIFIED | SCALE : NTS | SHEET 3 OF 3

FORM NO. DCC/16