1. **Purpose** : Side brazed package with non-metallized or metallized ceramic die pad area for hermetic seal packaging using silver epoxy or silver-glass as die attach adhesive.

2. **Specifications**:

Technical data:

(I) **Material:**

i) Material of the base: Chip free ceramic (minimum 90% Al_2O_3 black)

ii) Lead material: KOVAR with gold metallization.

iii) Braze material: Ag-Cu Eutectic with melting point equal to or greater than 750 degree centigrade which will provide sufficient bond strength of the lead to the ceramic.

iv) Gold plating: 99.99% minimum purity gold.

(II) **Dimensions:**

i) Lead count & die attach cavity size: As specified in table-1

ii) Other dimensions: As specified in the corresponding drawing (drawing no. is mentioned in table-1)

(III) **Product design:**

i) Die-attach cavity: Bare ceramic or metallized as specified in table-1

ii) Gold plating: On all metallized areas the gold plating thickness shall be minimum of 2 micron over a minimum thickness of 2 micron of nickel plating.

iii) Lead one identification: The lead 'one' identification should be a geometric symbol. All the pins should be floating with respect to die attach surface or as specified in the drawing.

(IV) Physical characteristics:

a) <u>Ceramic area</u>:(other than seal area)

i) Cracks: Not allowed.

ii) Chip: Corner – maximum 0.030” x 0.030” x 0.060”
Edge – maximum 0.100” x 0.030” x 0.030”
Chips should not encroach or expose any metallized area.

iii) Bumps & projections: On ceramic surface should not exceed 0.004” maximum.

iv) Camber: Should be 0.004”/ inch maximum

b) **<u>Die – attach area:</u>**

i) Void: Maximum 0.010” diameter by a distance greater than 0.030” with no more than 3 voids.

ii) Flatness: 0.0025” over the entire cavity.

c) <u>Seal Area</u>:

i) Chips:
- 0.030” x 0.010” x 0.010” max for .300” package base
- 0.050” x 0.015” x 0.015” max for .600” package base
- 0.060” x 0.020” x 0.020” max for .900” package base.
- Chip can not reduce the seal width of more than 1/3 of the design width.

ii) Flatness:
- 0.002” TIR maximum (at center of package base) for .300” package base.
- 0.0025” TIR maximum (at center of package base) for .600” package base.
- 0.003” TIR maximum (at center of package base) for .900” package base.

iii) Bump & Projections: 0.001” Maximum above seal area.

iv) Void: On the seal area maximum of 3 voids no larger than 0.005” in diameter is allowed. Also the distance between any two voids should be at least 0.030”.

v) Seal plan run down: Internal Cavity – not to exceed 25% of the cavity layer thickness. External cavity – not to come within 0.005" (.127mm) of any side way metallization (braze pad)

d) Wire bond finger area:

i) Bumps & Projections: 0.001" Maximum above metallization.

ii) Voids: 0.010" x 0.010" void free area within the specified wire bond finger area as given in the drawing.

iii) Wire bond finger pull back: Bonding finger pullback should be maximum of 0.003" (0.076mm) for bonding fingers which are shorter than 0.025" (0.635mm) in length and a maximum of 0.005" (0.127mm) pull back for bonding fingers which are 0.025" (0.635mm) or greater in length.

iv) Wire bond finger rundown: Not to exceed 25% of the ceramic layer thickness or 0.005" (whichever is smaller).

e) Lead Attachment:

i) Voids in gold plated leads: 75% of the braze filler will be void free.

ii) Misalignment: The leads should not overhang the braze pads by more than 25% of the measured paddle width to reduce the clearance between adjustment pad or lead to less than 50% of the clearance between adjacent metallization.

iii) Offset: Lead center line must be aligned to within 0.015" relative to the position of the leads on the opposite side of the package base.

iv Lead to Lead alignment: 0.010" measured at the base of the ceramic on same side.

v) Co planarity: $\pm$ 2 mils.

f) Gold Plating:

i) Blister, flaking Discoloration: Shall not be there when viewed under 10X magnification & no discoloration allowed.

ii) Bake test: Package bases after placed on a heater block at 450± 5 degree in air for two minutes (after cooling) shall not show discoloration, visible to the naked eye & peeling or blistering at 10X magnification.

iii) Gold flash: For plated package bases gold flash on external leads above stand off on brazed pad & on the bar is acceptable.

g) Appearance:

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 (30 psi) from a distance shorter than one inch may not be considered as foreign particles.

3. Shelf Life: Package should not have 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 manufacture with the supplied material.

4. Packing requirement:

a) Bases to be packed in plastic trays and then in air-tight (vacuum sealed) aluminium foil packing during transportation.

b) The container containing these bases should protect these against oxidation, dust, mechanical damage, spillage etc.

c) Vendor shall provide the test methods followed and test results of qualification tests conducted at the manufacture's end.

5. Safety/Handling: Package bases should not be exposed to dust & should never be touched with bare hands.

6. Storage Condition: Packages should have been stored in manufacturer's original vacuum seal packing & these sealed packets should be stored in dry N_2 ambient in dust free environment. Vendor to provide confirmation wrt storage conditions.

7. Test Conditions:

a) Conformance to specs specified at serial no. 2

b) The package after die attach using silver glass epoxy & aluminium 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:

	Test		Method
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 E.
vi)	Stabilization Bake	-	MIL-STD-883, Method 1008, 150°C, 1000 hrs.
vii)	Seal Test	-	MIL-STD-883, Method 1004,
	Fine		Condition A
	Gross		Condition C
viii)	Metal Package Isolation	-	MIL-STD-883, Method 1003, 600V DC, 100 nA max.
ix)	Solderability	-	MIL-STD-883, Method 2003, $245\underline{+}5^{o}$C
x)	Lead Integrity	-	MIL-STD-883, Method 2028

Table-1

S. No.	Lead Count	Die Attach Cavity size(mils)	Mat. Code No.	Drawing No.	Remarks
1.	14 Pin	180 x 150	230216070	A1542020218	
2.	16 Pin	180 x150	230216055	A1542020187	
3.	16 Pin	350x180	230216041	031202087	
4.	16 Pin	200x170	230216072	031202068	
5.	16 Pin	240x174	230216073	031202056	
6.	18 Pin	320x175	230216043	031202090	
7.	20 Pin	215 x 160	230216071	A1542020217	
8.	22 Pin	250x220	230216074	031202053	
9.	24 Pin	250x250	230216030	031202017	
10.	24 Pin	310x310	230216035	031202086	
11.	28 Pin	220x220	230216045	A1542020411	
12.	28 Pin	310x310	230216047	031202081	
13.	40 Pin	310x310	230216075	031202088	
14.	40 Pin	400x400	230216048	031202089	
15.	48 Pin	310x310	230216037	031202067	
16.	48 Pin	400x400	230216050	031202083	
17.	64 Pin	310x310	230216038	031202069	
18.	64 Pin	400x400	230216076	031202080	
19.	28 Pin	1263x142	230216077	0312020140	