

Glass-to-Metal Seals

A glass-to-metal seal is characterized by superior hermeticity and electrical characteristics. It is used widely in areas such as laser diodes , sensors and optical communication where reliability is an important factor.

Korea Shinko offers not only the industry standard but also various structure stems and caps depending on the needs of customers having cooperation with Shinko (Japan).

As we react flexibly to diversifying customer needs, we are able to carry out all the integrated production processes (product design, mold design, stamping, and plating).

■ Feature

- High hermeticity (1×10^{-9} Pa m³/sec Max.)
- Low dielectric constant glass feed through
- Various feed through structure (Matched type)
- Design for high frequency

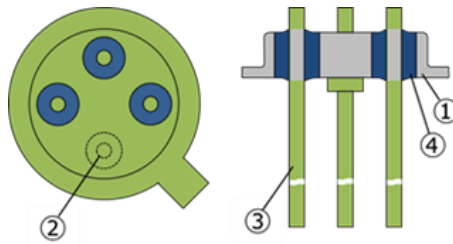
■ Application

- Transistors, Op-Amps, ICs, etc.
- Optoelectronics (LEDs, PDs, Lasers, etc.)
- Optical communication devices (TOSA, ROSA, PD with TIA, etc.)
- RF terminals designed characteristic impedance
- Sensors
- Others



■ Structure (Material set)

• Header



- Matched type

	① Eyelet	②③ Lead	④ Glass
Material	Kovar	Kovar	Hard glass

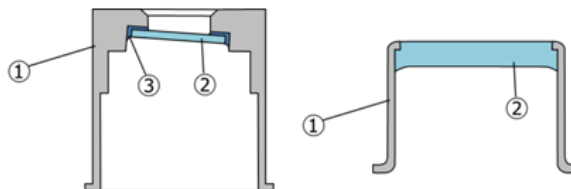
Since the heat expansion coefficients of the metal and glass are matched, there are minimal constraints on the shape of the design. Generally, it's used for high reliability.

- Compression type

	① Eyelet	②③ Lead	④ Glass
Material	Steel	50%Ni-Fe	Soft glass

Inexpensive materials and a simple manufacturing process result in a highly economical product. And the heat dissipation is greater than matched type. However, some design constraints are needed to ensure compression balance and strength.

• Cap



No.	Parts	Material	
1	Eyelet	50%Ni-Fe, SUS	Kovar
2	Window	Hard glass	Hard glass
3	Adhesion	Low temperature glass (Pb Free)	-

■ Plating

The following platings are available now and plating thickness depends on customer's specifications.

(1) Electrolytic gold plating (MIL - G - 45204 TYPE III GRADE A)

Example: $1.27\mu(50\mu'')$ MIN

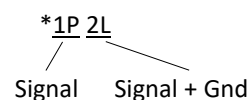
(2) Electroless nickel plating.

Example : $2 \sim 4\mu(80 \sim 160\mu'')$ MIN

(3) Electrolytic nickel under plating (MIL - M - 38510)

Example : $1.27 \sim 8.89\mu(50 \sim 350\mu'')$ MIN

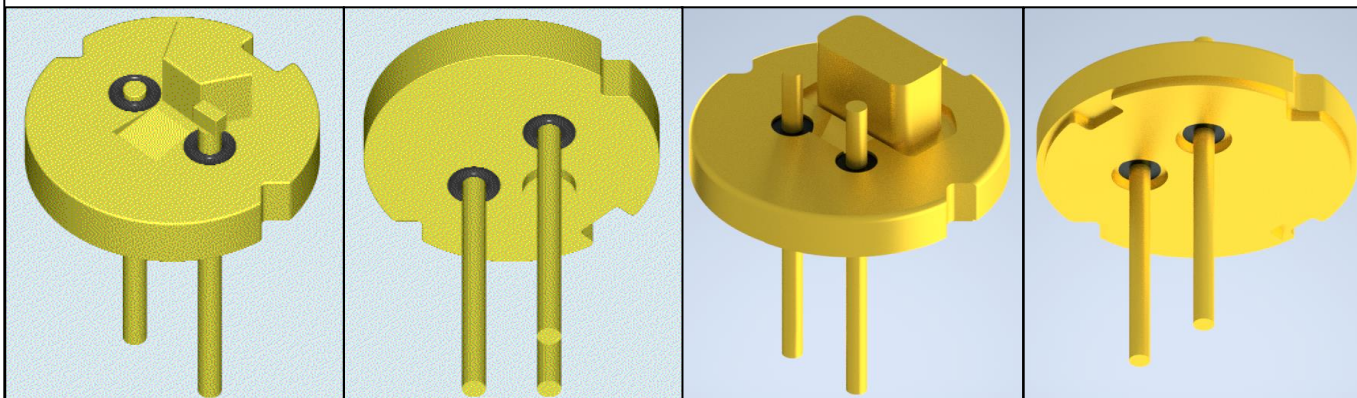
■ Open tool



Package type	Outer diameter	Pin Count*	RF pin count	Base material	Note / Application
LD Header (TO-33/38/56/ø6/ø9)					
LD (TO-33)	ø 3.3	2P3L	-	Steel	For LD
LD (TO-38)	ø 3.8	3P4L	-	Steel	For LD
LD (TO-56)	ø 5.6	2P3L, 3P4L	-	Steel	For LD
LD (ø6)	ø 6	8P8L	2	Kovar	For cooled DML ($Z_0:25\Omega$)
LD (ø9)	ø 9	2P2L	-	Steel	High heat dissipation type
LD Header with Substrate (TO-38/56)					
LD (TO-38)	ø 3.8	3P4L	2	Steel	For DML ($Z_0:25\Omega$)
LD (TO-56)	ø 5.6	4P5L	2	Steel	For DML ($Z_0:25\Omega$)
LD (TO-56)	ø 5.6	6P7L	2	Steel	For cooled DML ($Z_0:25\Omega$)
LD (TO-56)	ø 5.6	6P7L	1	Steel	For cooled EML ($Z_0:50\Omega$)
LD (TO-56)	ø 5.6	6P8L	1	Steel	For cooled EML ($Z_0:50\Omega$)
TO Header					
TO-46	ø 5.4	1P2L, 2P3L 3P4L, 4P5L 5P6L	-	Kovar Steel	
TO-46	ø 5.4	4P5L, 5P6L 4P6L, 5P7L	2	Kovar	For PD with TIA, VCSEL ($Z_0:50\Omega$)
TO-18	ø 5.4	1P2L, 2P3L 4P4L, 6P6L	-	Kovar	
TO-39	ø 9.1~ø 9.15	3P4L, 4P4L	-	Kovar Steel	
TO-5	ø 9.1~ø 9.2	1P2L, 2P3L 6P6L, 7P8L 8P8L, 9P10L 10P10L	-	Kovar	
Other	ø 13.85	2P2L	-	Steel	
Other	ø 15.24	12P12L	-	Kovar	
Cap					
Lensed	ø 5.35~ø 5.4	-	-	Kovar	
Flat	ø 5.33~ø 5.4	-	-	Kovar	
Tilted	ø 5.45	-	-	SUS	

LD Header (TO-33/38/56/60/9)

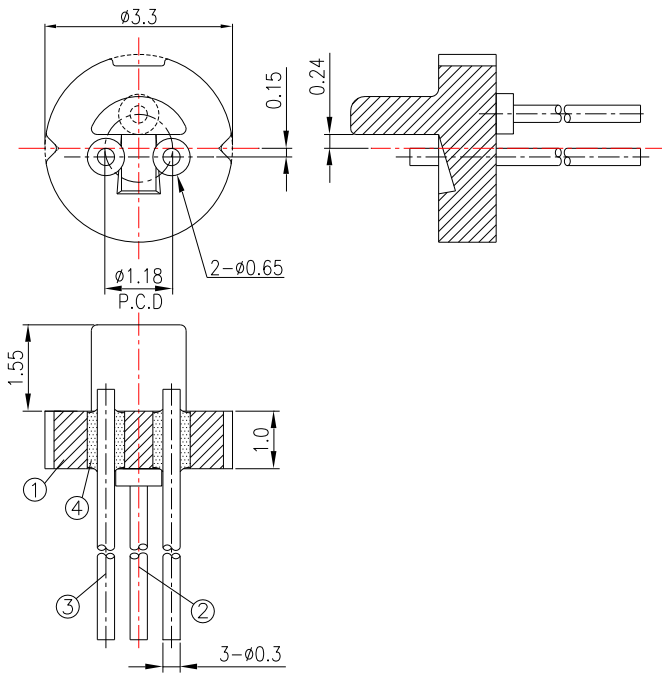
#3D Modeling



#Photograph

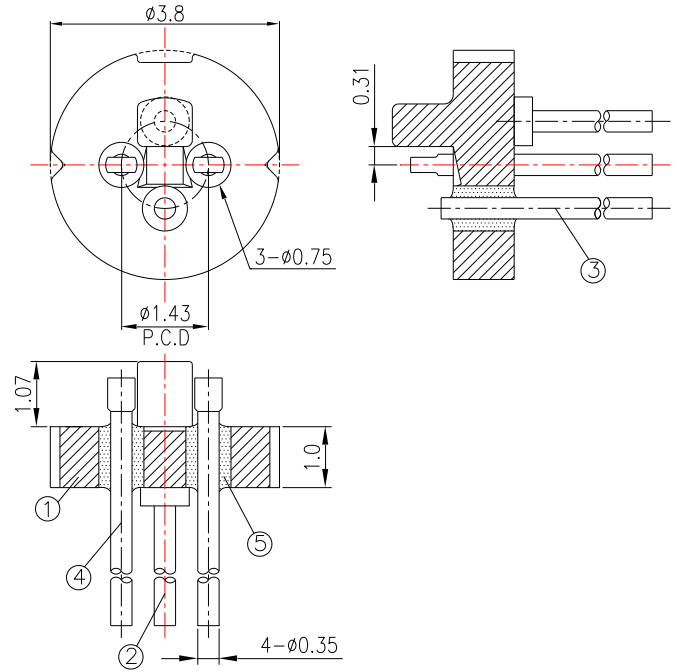


TO-3301, TO-33 2P3L



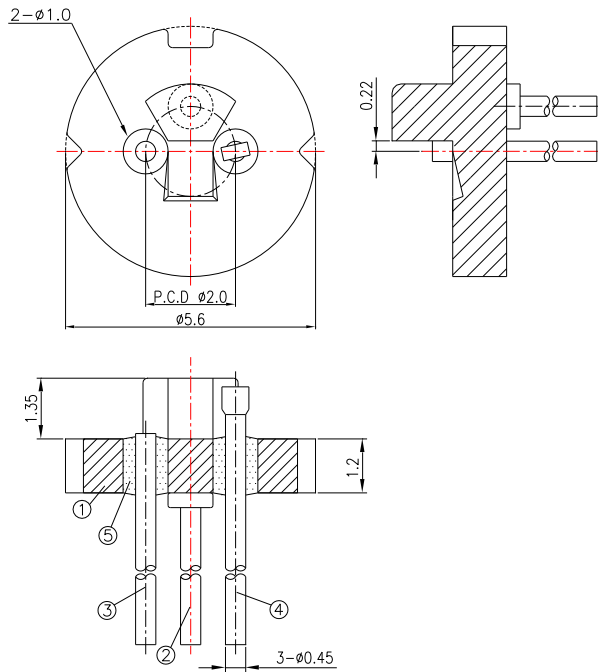
- ① Eyelet : Steel
- ②③ Leads : 50%Ni-Fe or Kovar
- ④ Glass : Soft Glass

TO-3801, TO-38 3P4L



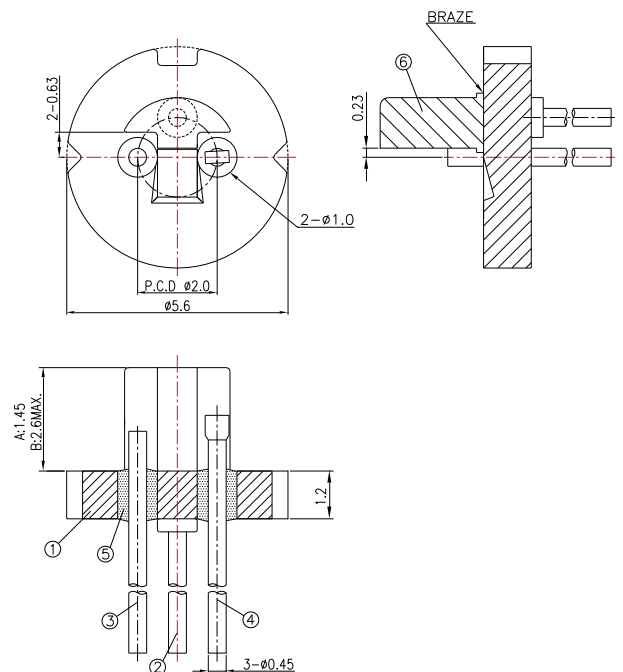
- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe
- ⑤ Glass : Soft Glass

TO-5601, TO-56 2P3L



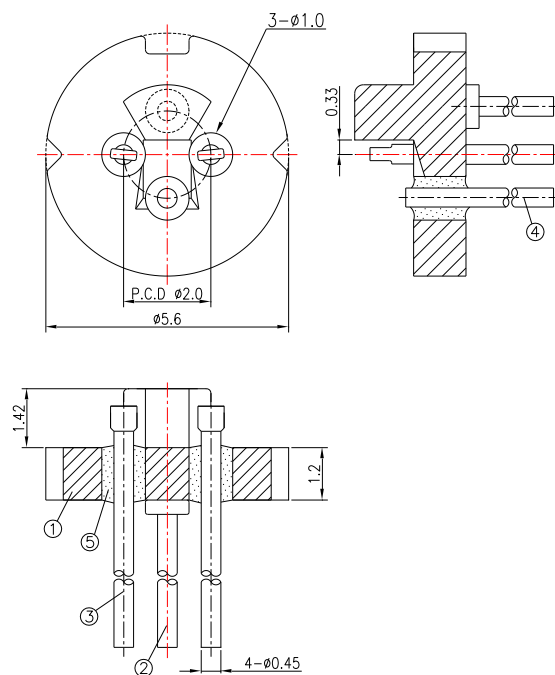
- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe or Kovar
- ⑤ Glass : Soft Glass

TO-5602, TO-56 2P3L (Cu Block)



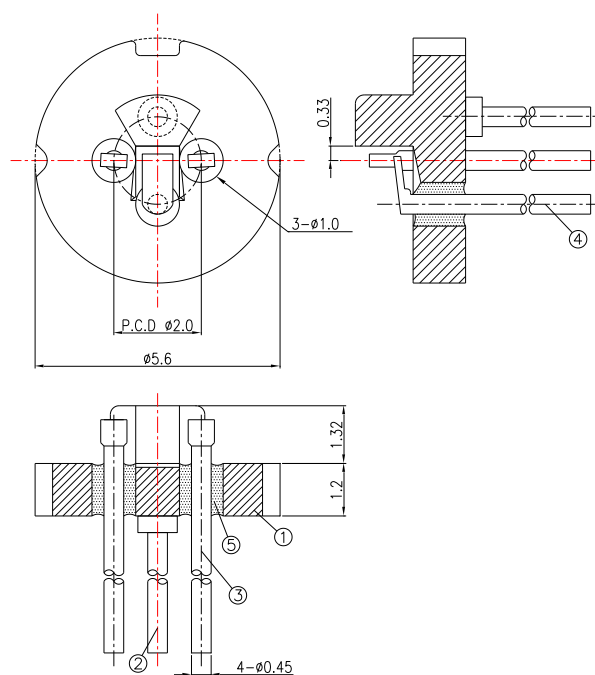
- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe or Kovar
- ⑤ Glass : Soft Glass
- ⑥ Heat Sink : Copper

TO-5603, TO-56 3P4L



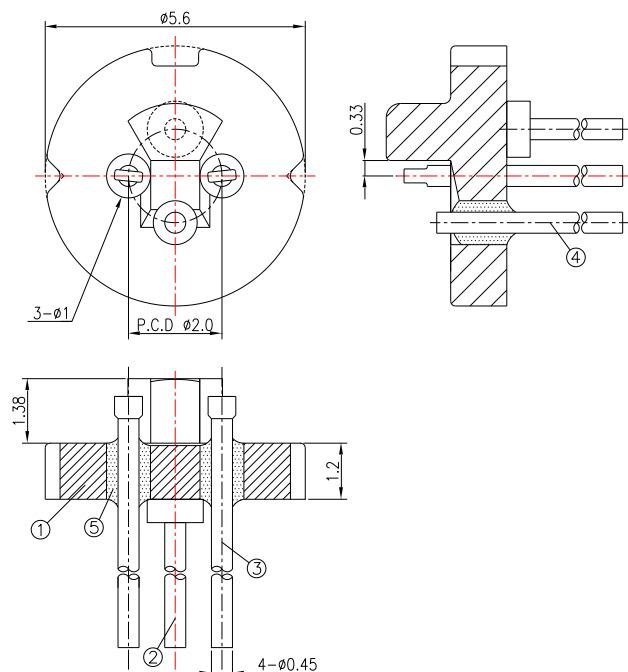
- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe or Kovar
- ⑤ Glass : Soft Glass

TO-5604, TO-56 3P4L



- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe or Kovar
- ⑤ Glass : Soft Glass

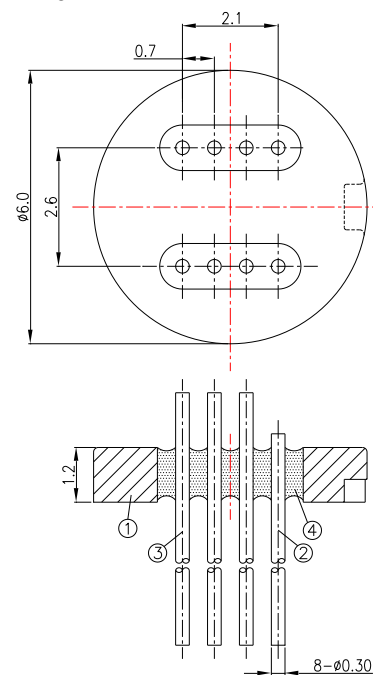
TO-5605, TO-56 3P4L



- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe or Kovar
- ⑤ Glass : Soft Glass

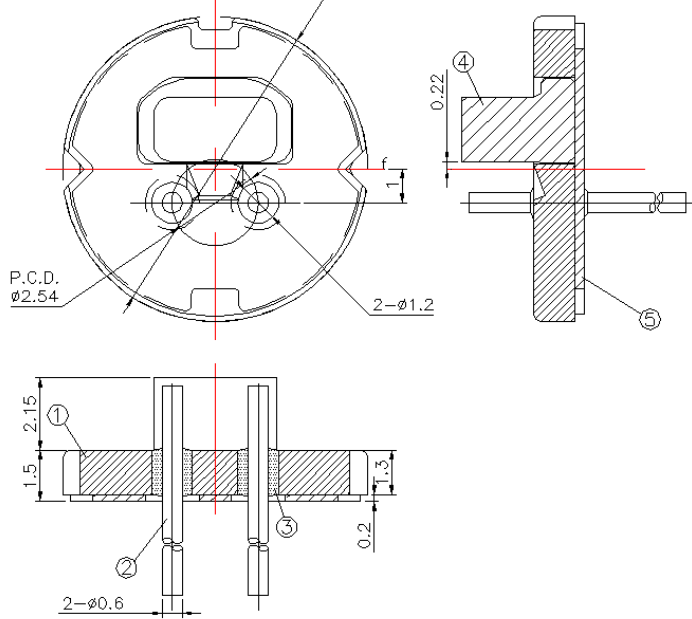
TO-6001, TO-60 8P8L

Cooled DML, $Z_0:25\Omega$



- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

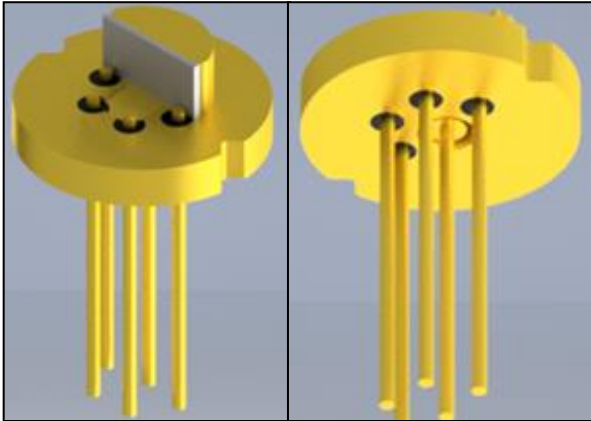
TO-901, TO-9 2P2L
High heat dissipation type



- ① Eyelet : Steel
- ② Lead : Kovar
- ③ Glass : Soft Glass
- ④ Heat Sink : OFCu
- ⑤ Cu Base : OFCu

LD Header with Submount (TO-38/56)

#3D Modeling

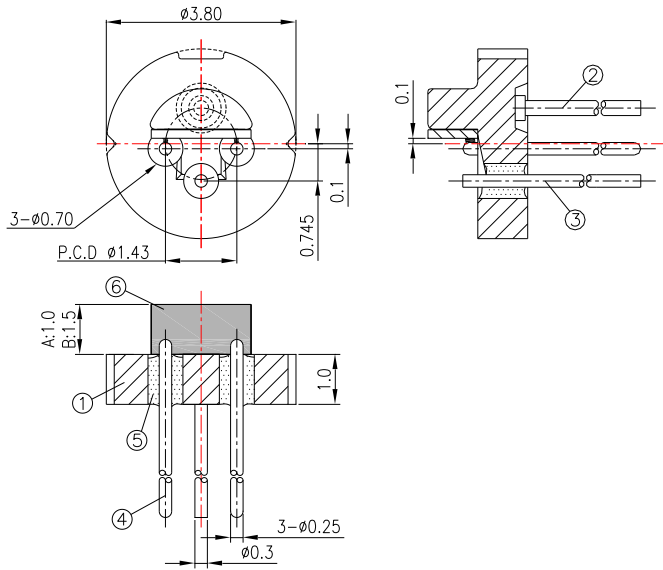


#Photograph



TO-3851, TO-38 3P4L

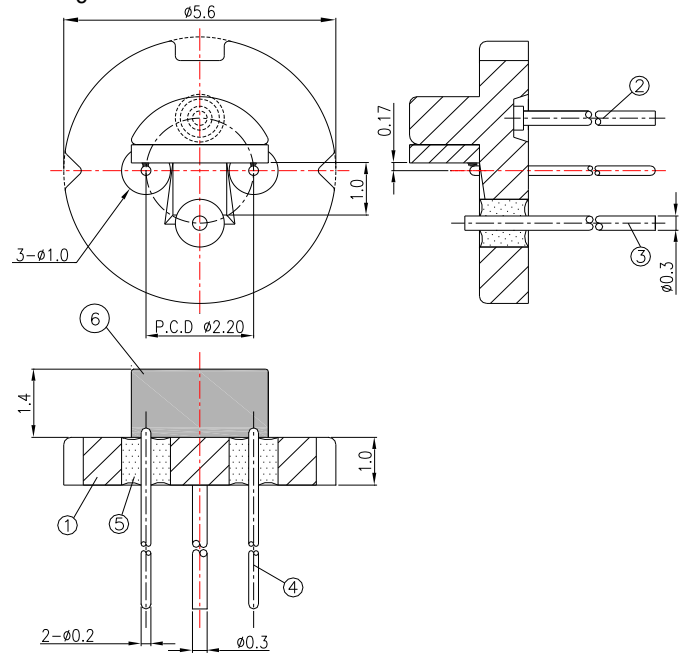
DML, Z₀:25Ω



- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe
- ⑤ Glass : Soft Glass
- ⑥ Submount : AlN

TO-5651, TO-56 3P4L

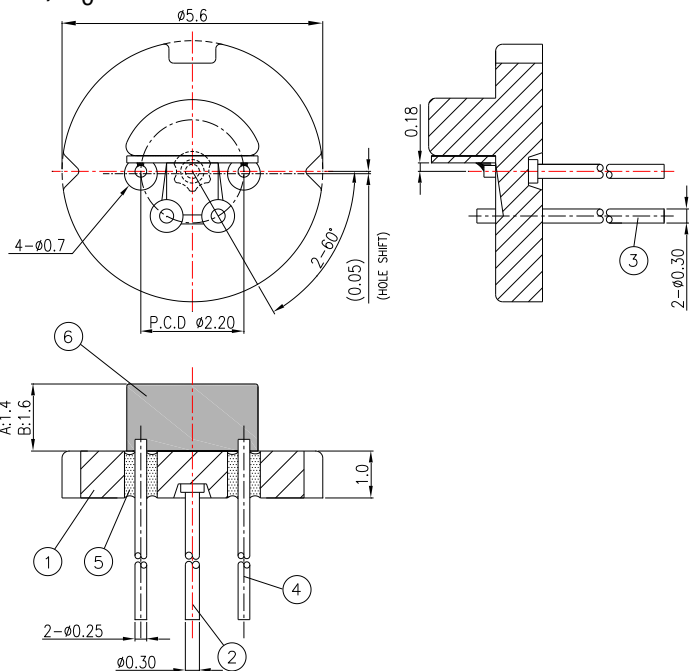
DML, Z₀:50Ω



- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe
- ⑤ Glass : Soft Glass(AE)
- ⑥ Submount : AlN

TO-5652, TO-56 4P5L

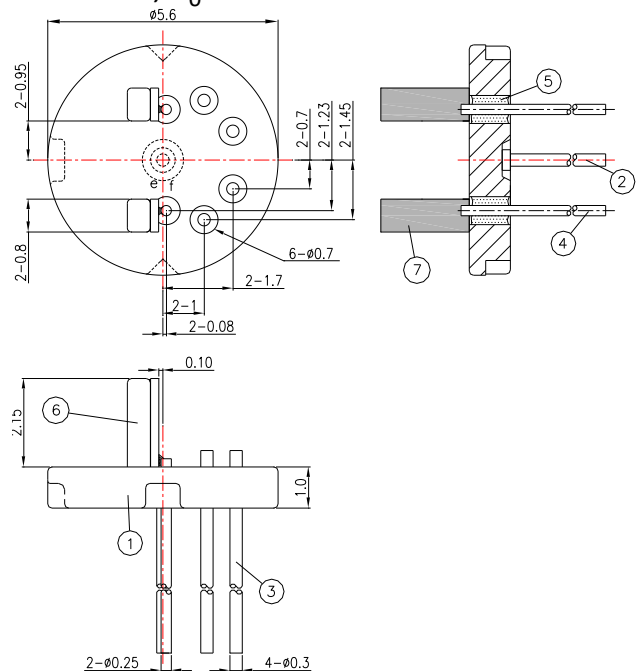
DML, Z₀:25Ω



- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe
- ⑤ Glass : Soft Glass
- ⑥ Submount : AlN

TO-5653, TO-56 6P7L (2 Blocks)

Cooled DML, Z₀:25Ω

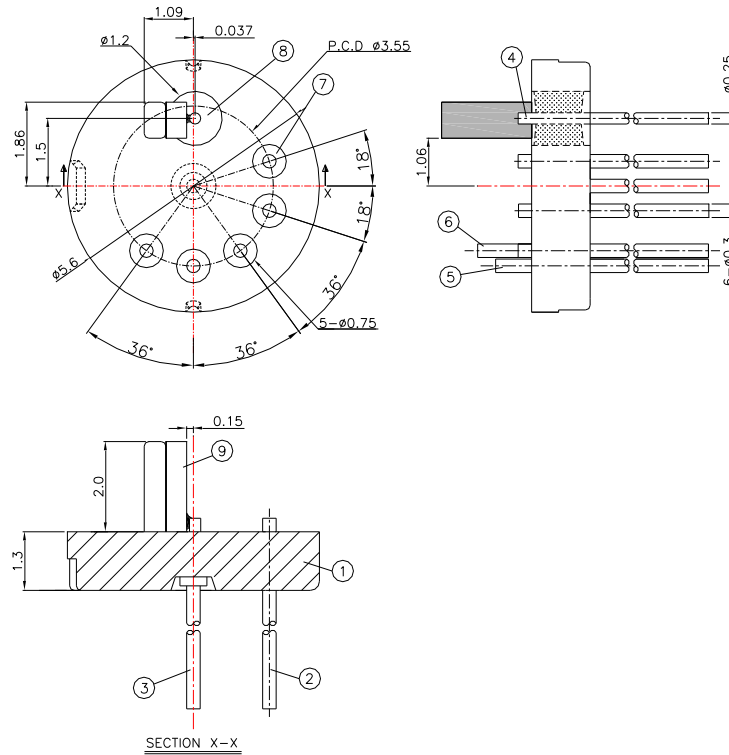


- ① Eyelet : Steel
- ②~④ Leads : 50%Ni-Fe
- ⑤ Glass : Soft Glass
- ⑥ Submount : AlN

*With or without submount. Please contact us about submount Design.

TO-5655, TO-56 6P7L

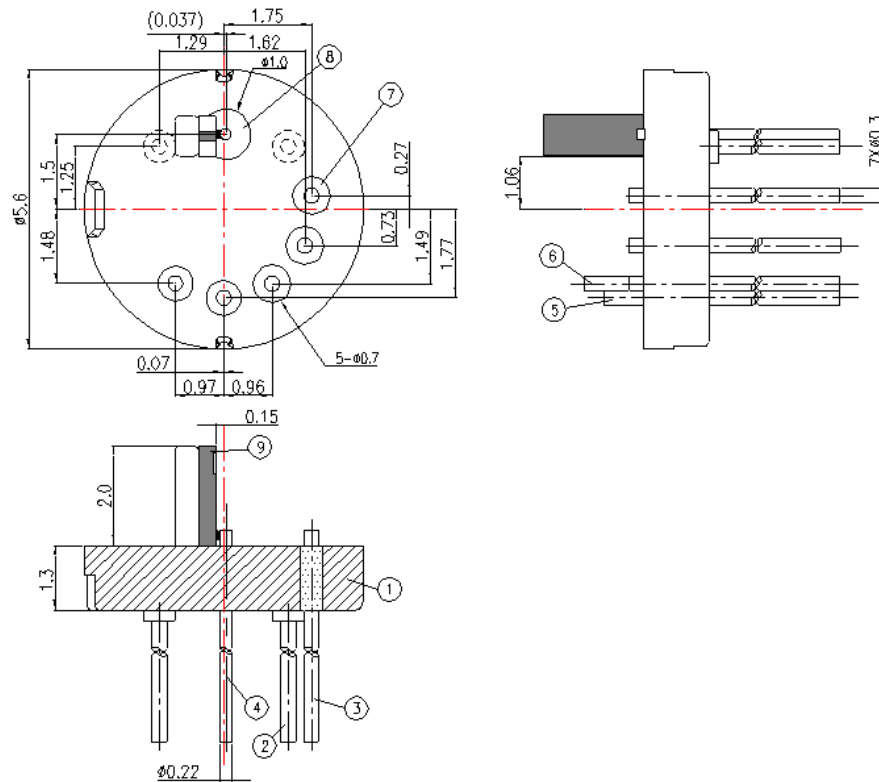
Cooled EML, $Z_0:50\Omega$



- ① Eyelet : Steel
- ②~⑥ Leads : 50%Ni-Fe
- ⑦ Glass : Soft Glass
- ⑧ Glass : Soft Glass(AE)
- ⑨ Submount : AlN

TO-5656, TO-56 6P8L

Cooled EML, $Z_0:50\Omega$



- ① Eyelet : Steel
- ②~⑥ Leads : 50%Ni-Fe
- ⑦ Glass : Soft Glass
- ⑧ Glass : Soft Glass(AE)
- ⑨ Submount : Alumina

*With or without submount. Please contact us about submount Design.

TO-46

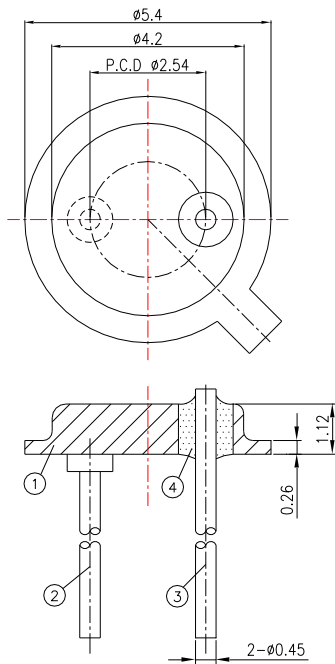
#3D Modeling



#Photograph

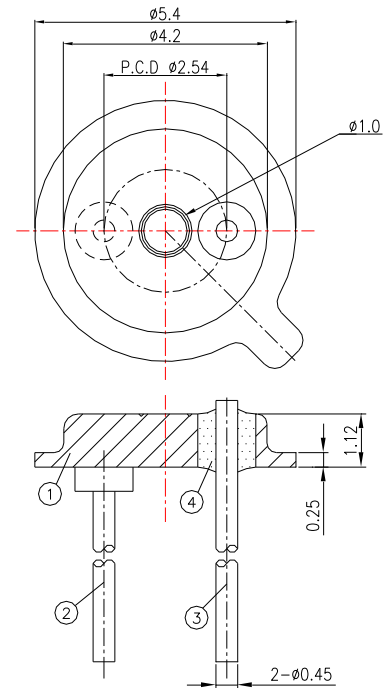


TO-4601, TO-46 1P2L



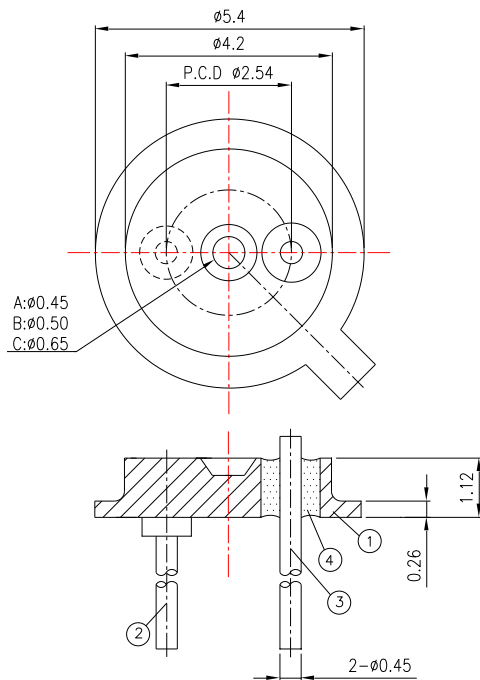
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4602, TO-46 1P2L



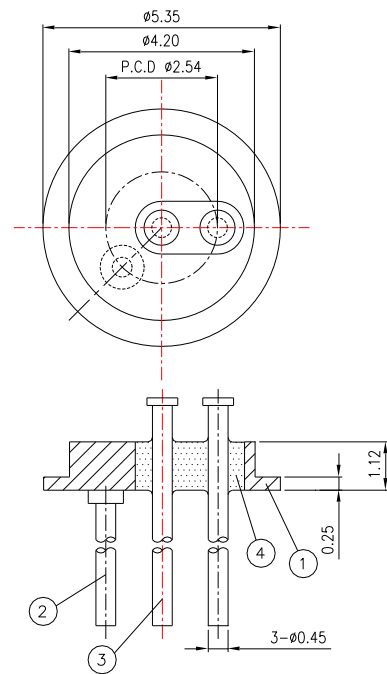
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4603, TO-46 1P2L



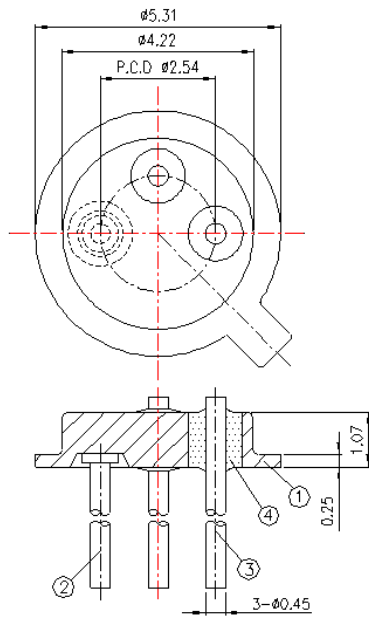
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4604, TO-46 2P3L



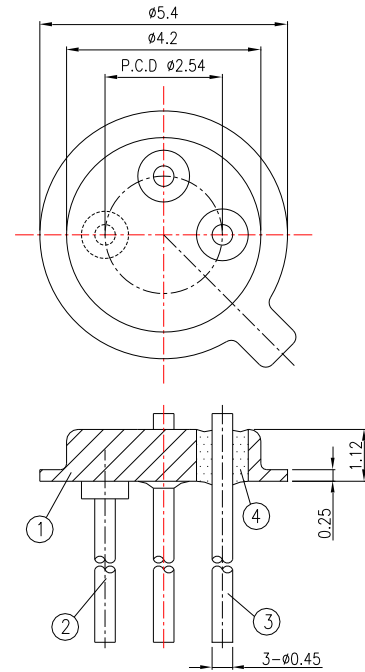
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4605, TO-46 2P3L



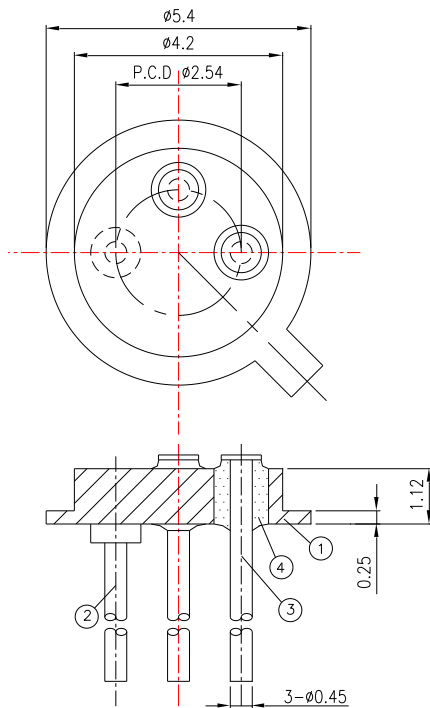
- ① Eyelet : Steel
- ②③ Leads : 50%Ni-Fe
- ④ Glass : Soft Glass

TO-4606, TO-46 2P3L



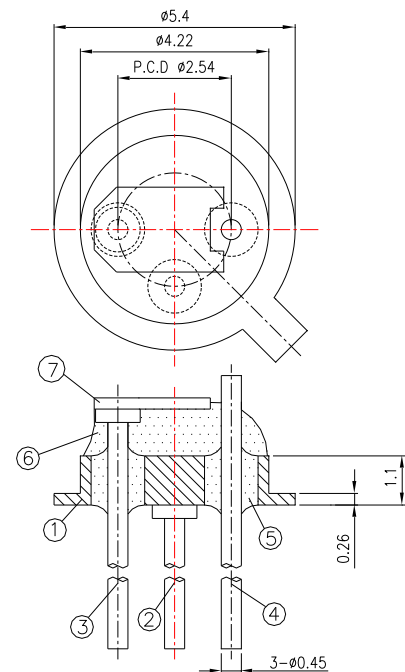
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4607, TO-46 2P3L



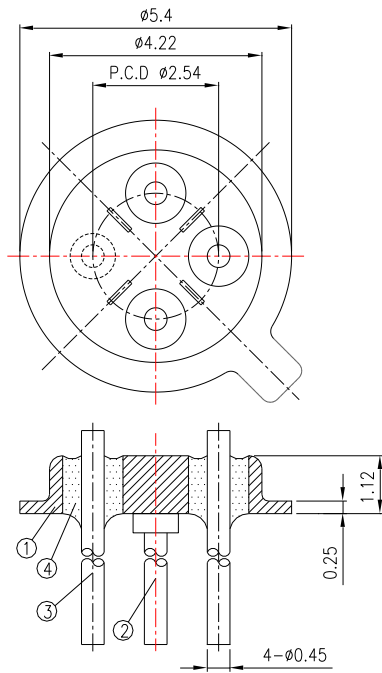
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4608, TO-46 2P3L



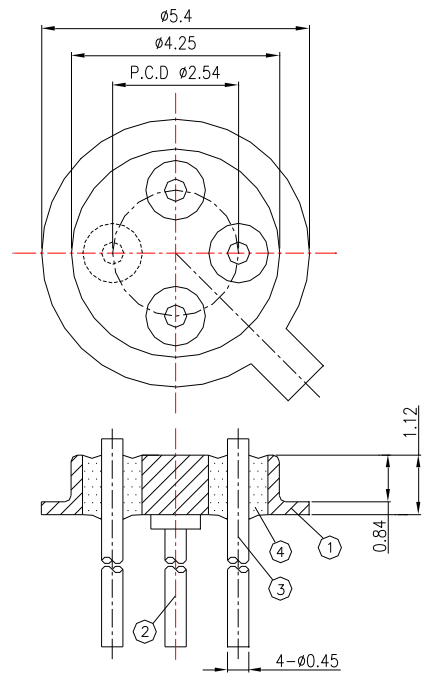
- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤⑥ Glass : Hard Glass
- ⑦ Attachment : Kovar

TO-4609, TO-46 3P4L



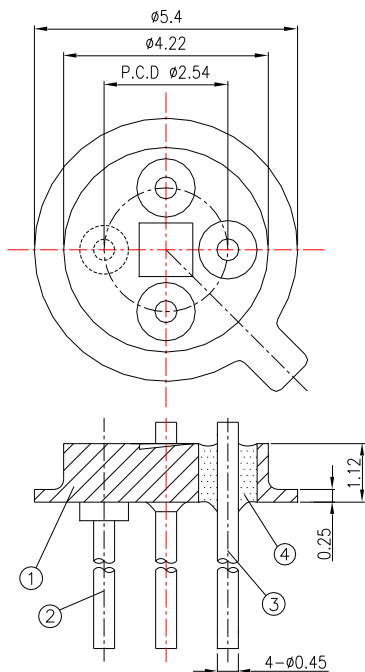
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4610, TO-46 3P4L



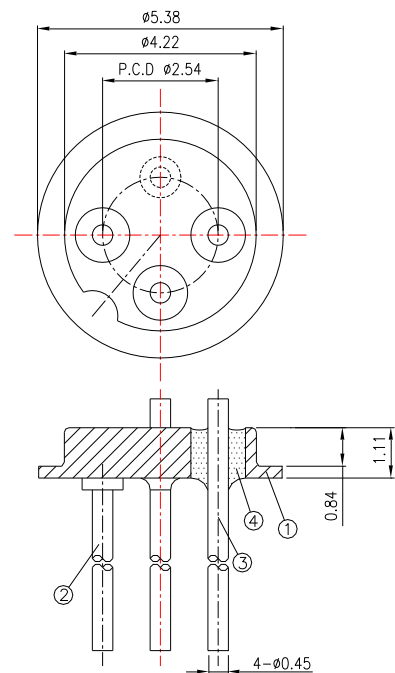
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4611, TO-46 3P4L



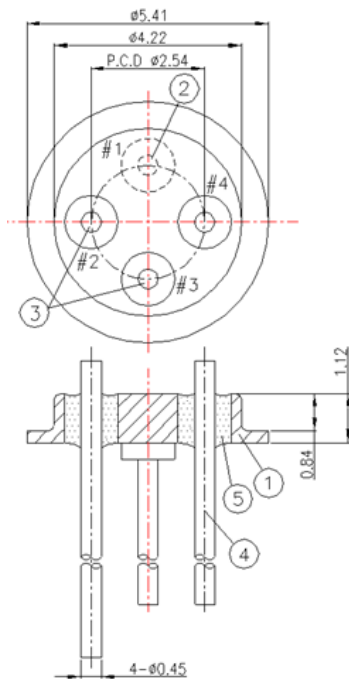
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4612, TO-46 3P4L



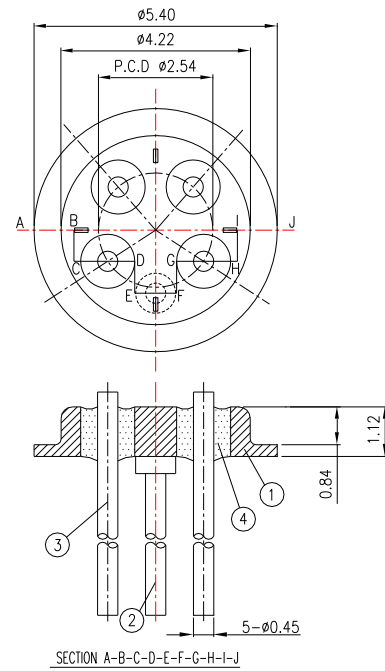
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4613, TO-46 3P4L



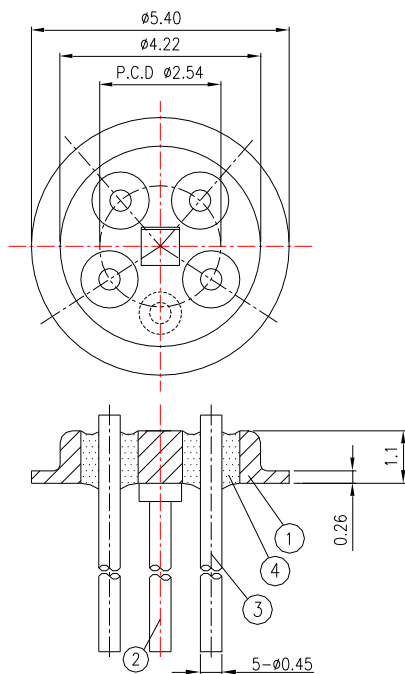
- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤ Glass : Hard Glass

TO-4614, TO-46 4P5L



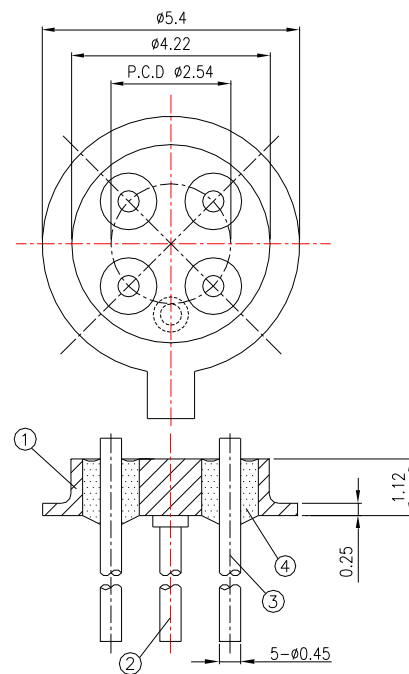
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4615, TO-46 4P5L



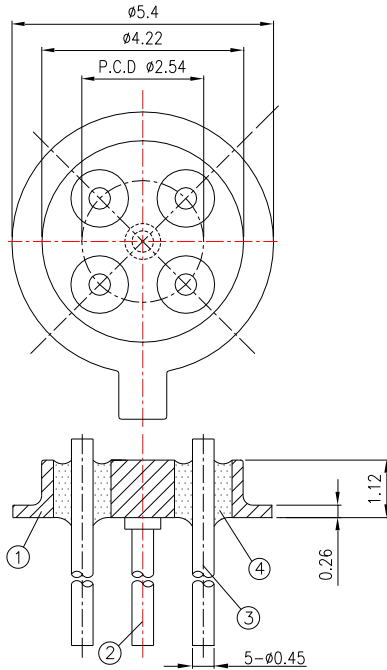
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4616, TO-46 4P5L



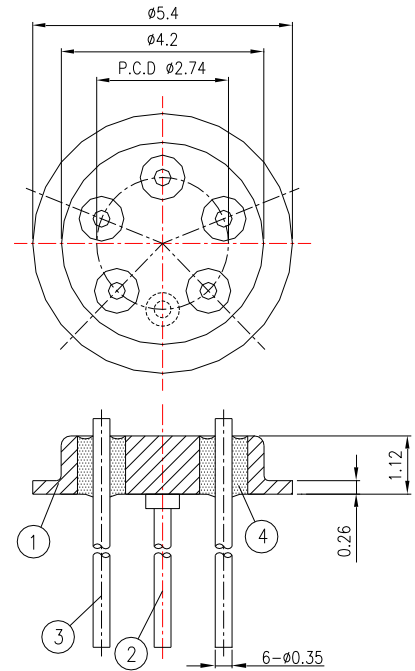
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4617, TO-46 4P5L



- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

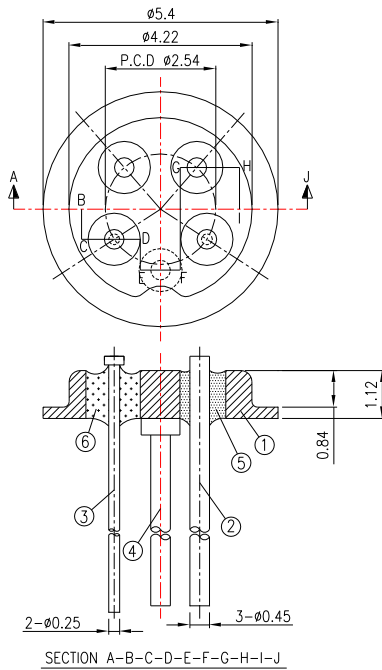
TO-4618, TO-46 5P6L



- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-4619, TO-46 4P5L

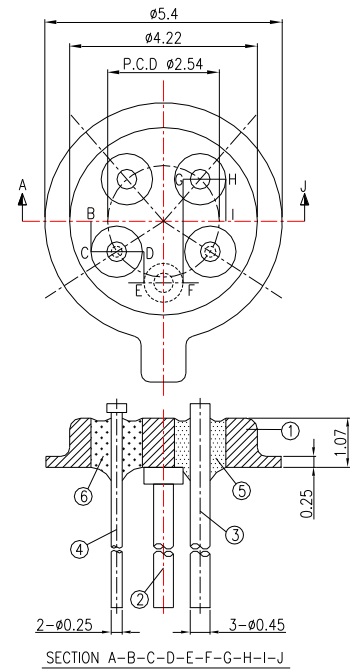
$Z_0:50\Omega$



- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤ Glass : Hard Glass
- ⑥ Glass : Hard Glass(AE)

TO-4620, TO-46 4P5L

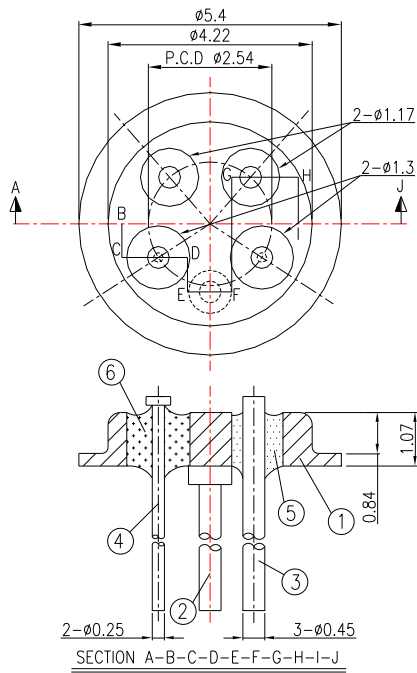
$Z_0:50\Omega$



- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤ Glass : Hard Glass
- ⑥ Glass : Hard Glass(AE)

TO-4621, TO-46 4P5L

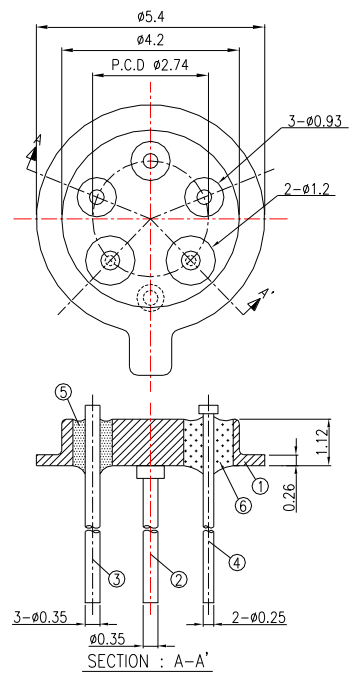
$Z_0:50\Omega$



- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤ Glass : Hard Glass
- ⑥ Glass : Hard Glass(AE)

TO-4622, TO-46 5P6L

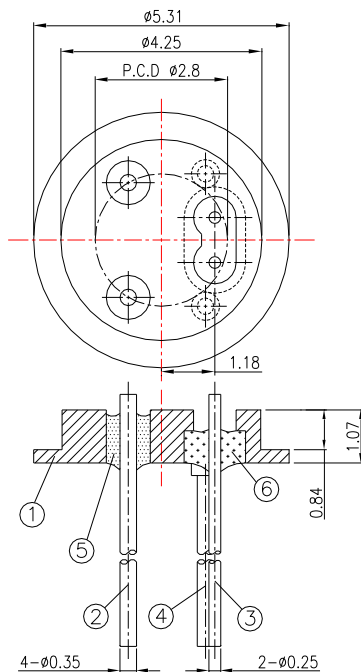
$Z_0:50\Omega$



- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤ Glass : Hard Glass
- ⑥ Glass : Hard Glass(AE)

TO-4623, TO-46 4P6L

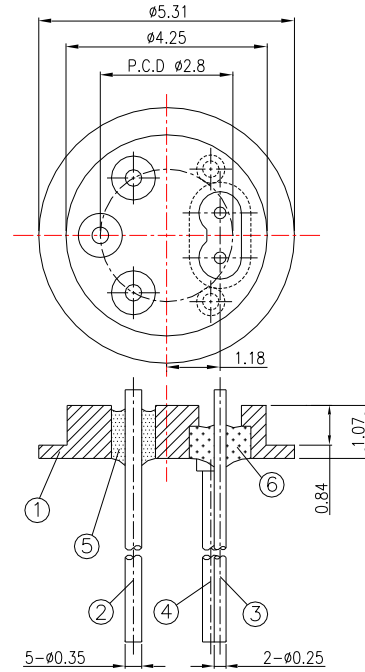
$Z_0:50\Omega$



- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤ Glass : Hard Glass
- ⑥ Glass : Hard Glass(AE)

TO-4624, TO-46 5P7L

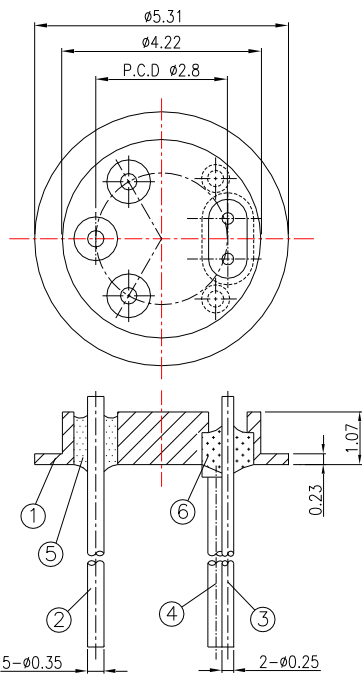
$Z_0:50\Omega$



- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤ Glass : Hard Glass
- ⑥ Glass : Hard Glass(AE)

TO-4625, TO-46 5P7L

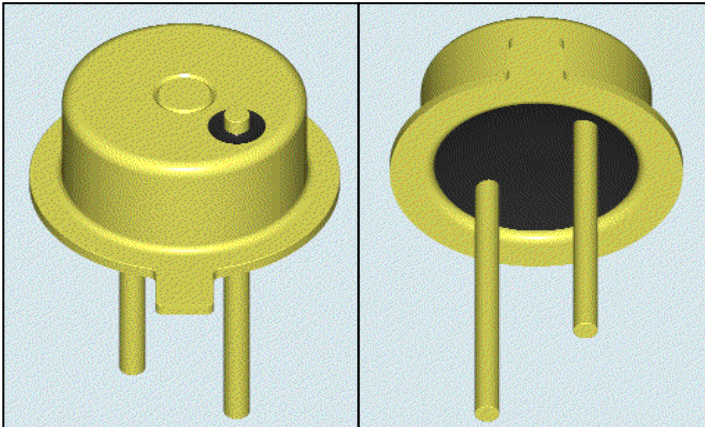
Z₀:50Ω



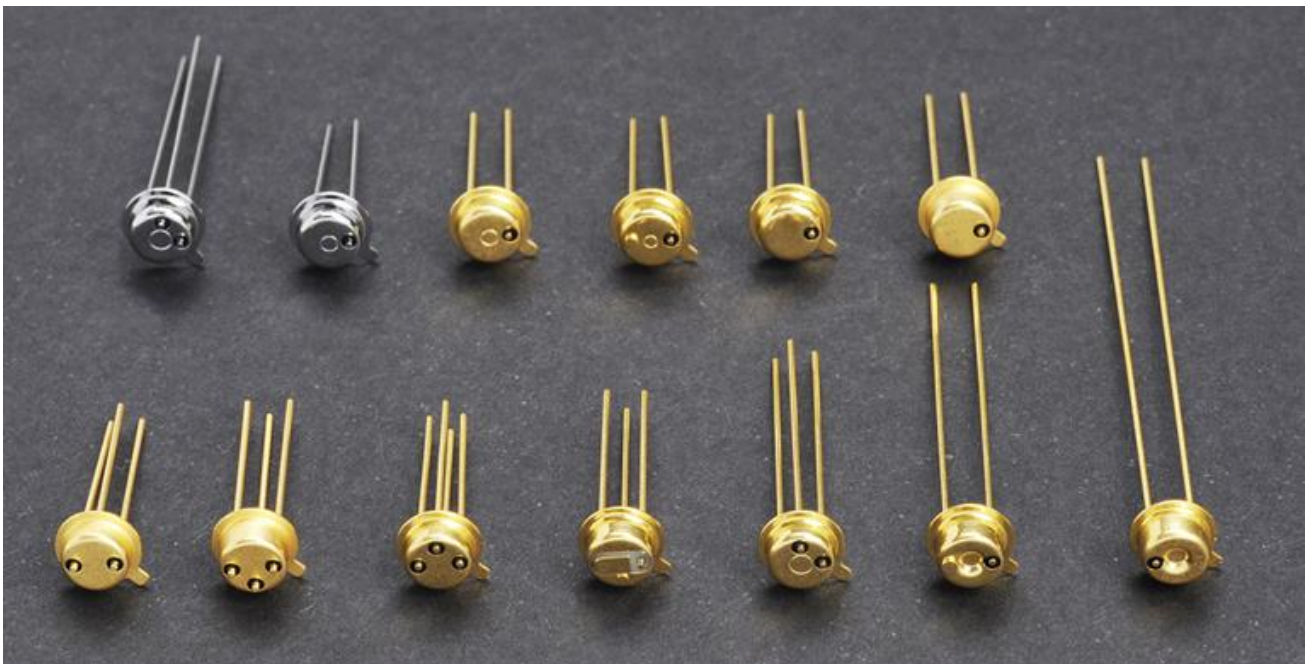
- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤ Glass : Hard Glass
- ⑥ Glass : Hard Glass(AE)

TO-18

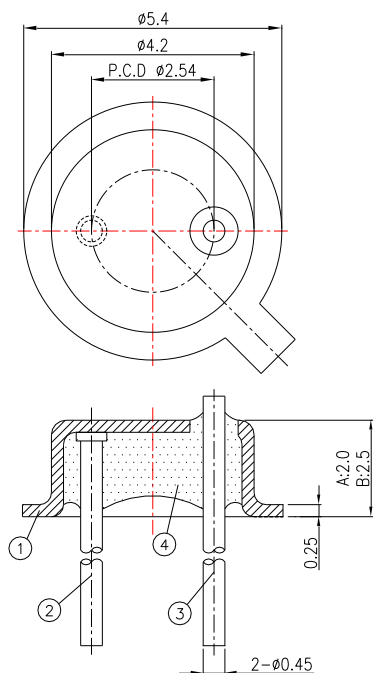
#3D Modeling



#Photograph

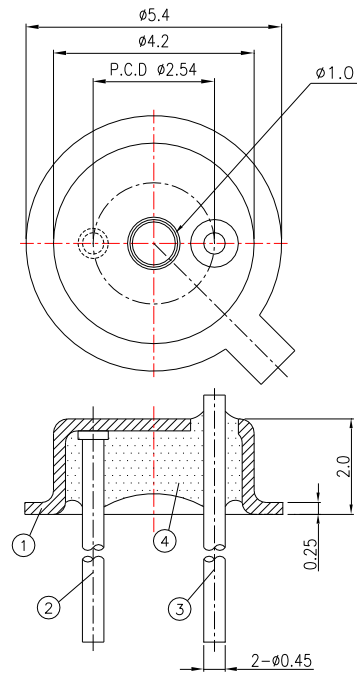


TO-1801, TO-18 1P2L



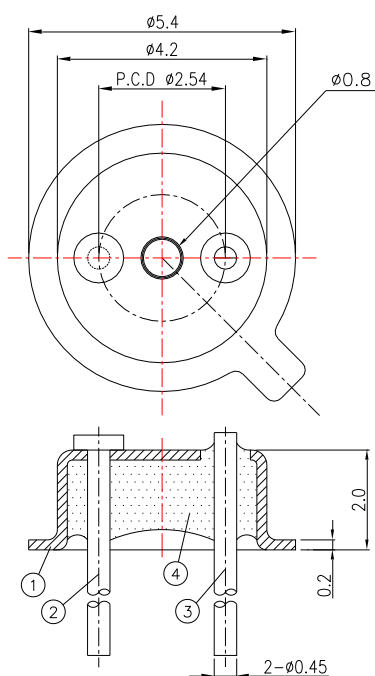
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-1802, TO-18 1P2L



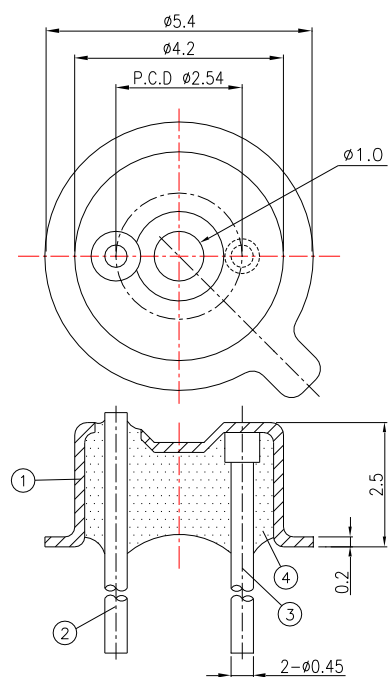
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-1803, TO-18 1P2L



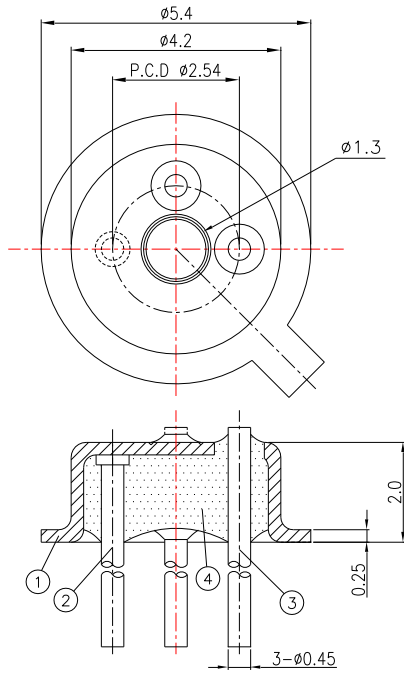
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-1804, TO-18 1P2L



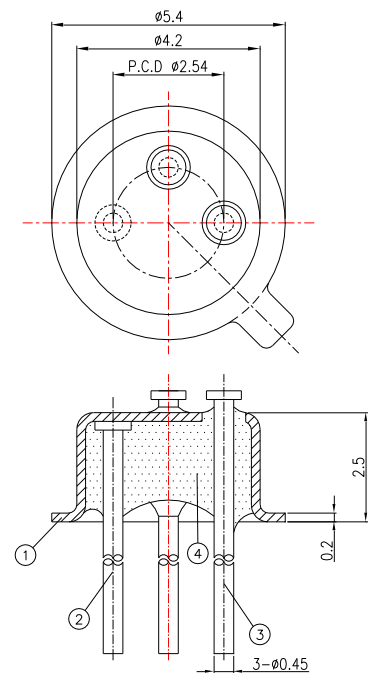
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-1805, TO-18 2P3L



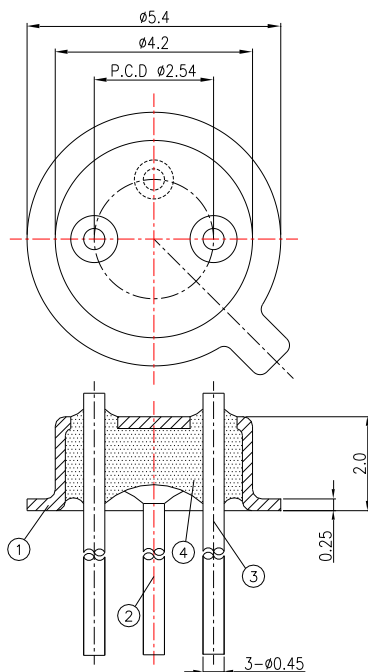
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-1806, TO-18 2P3L



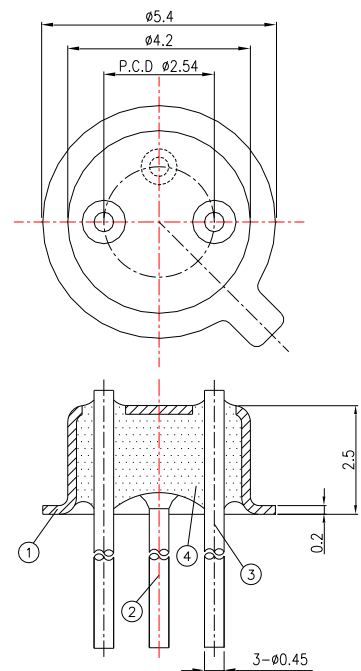
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-1807, TO-18 2P3L



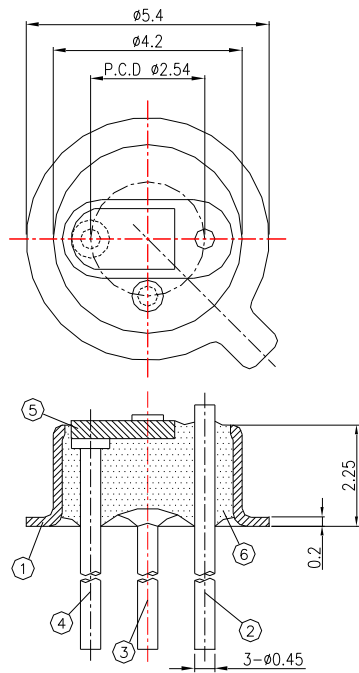
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-1808, TO-18 2P3L



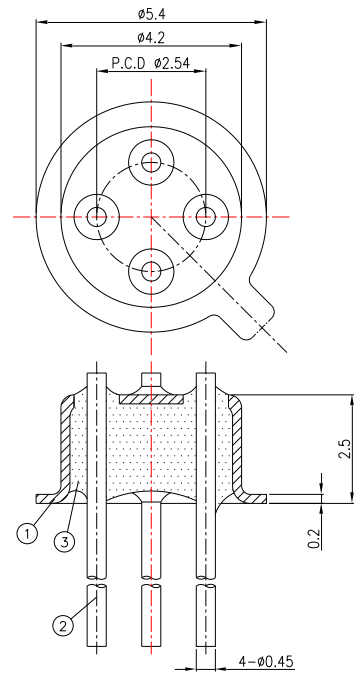
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-1809, TO-18 2P3L



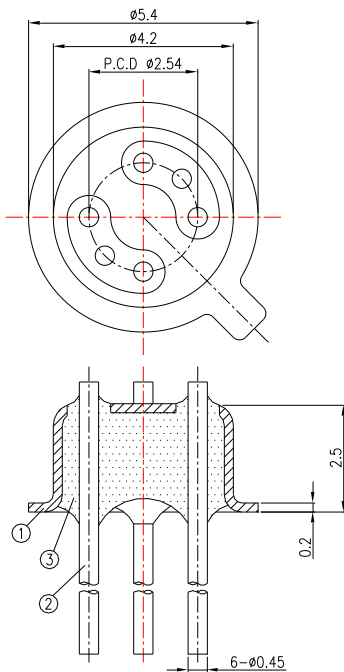
- ① Eyelet : Kovar
- ②~④ Leads : Kovar
- ⑤ Attachment : Kovar
- ⑥ Glass : Hard Glass

TO-1811, TO-18 4P4L



- ① Eyelet : Kovar
- ② Leads : Kovar
- ③ Glass : Hard Glass

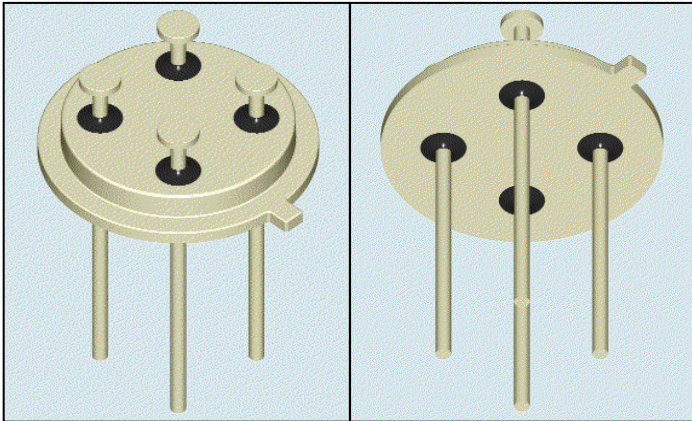
TO-1812, TO-18 6P6L



- ① Eyelet : Kovar
- ② Leads : Kovar
- ③ Glass : Hard Glass

TO-39

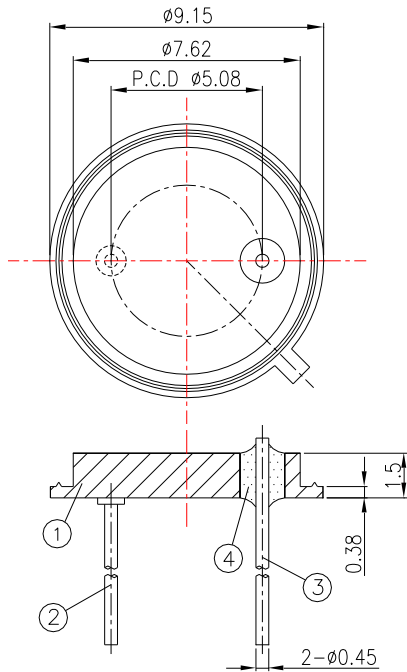
#3D Modeling



#Photograph

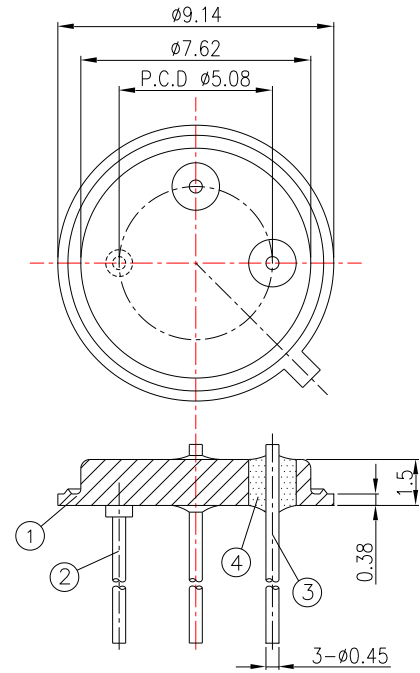


TO-3901, TO-39 1P2L



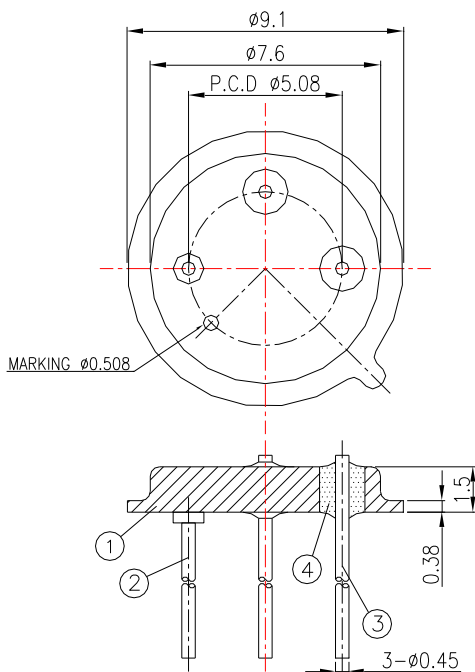
- ① Eyelet : Steel
- ②③ Leads : 50%Ni-Fe
- ④ Glass : Soft Glass

TO-3902, TO-39 2P3L



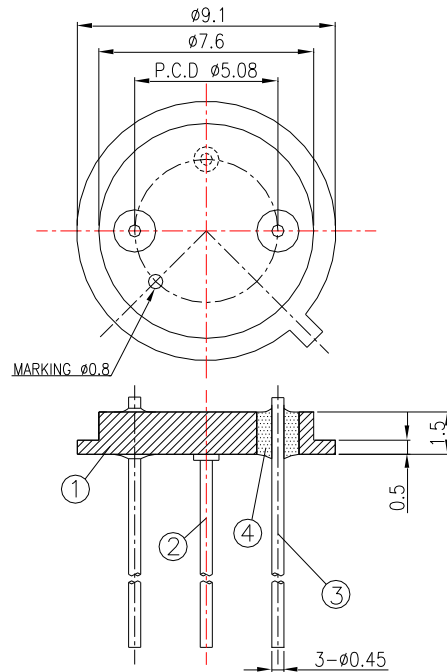
- ① Eyelet : Steel
- ②③ Leads : 50%Ni-Fe
- ④ Glass : Soft Glass

TO-3903, TO-39 2P3L



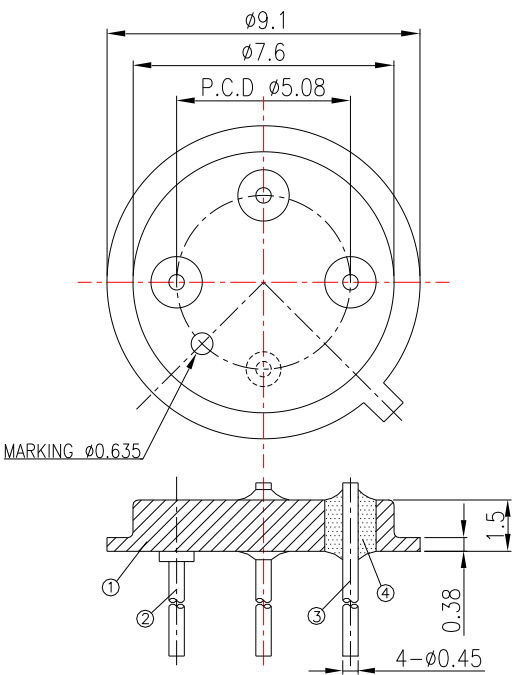
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-3904, TO-39 2P3L



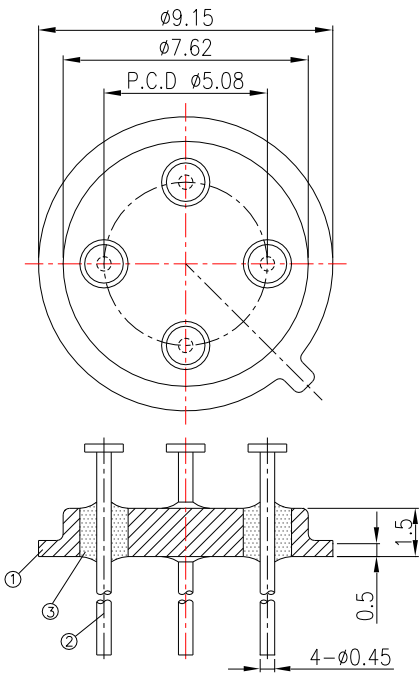
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-3905, TO-39 3P4L



- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

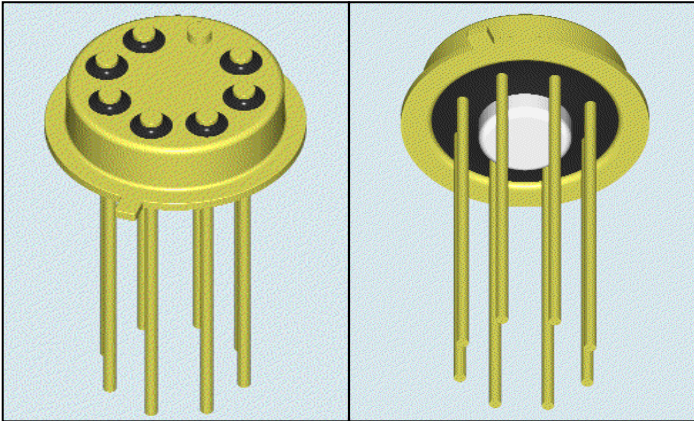
TO-3906, TO-39 4P4L



- ① Eyelet : Steel
- ② Leads : 50%Ni-Fe
- ③ Glass : Soft Glass

TO-5

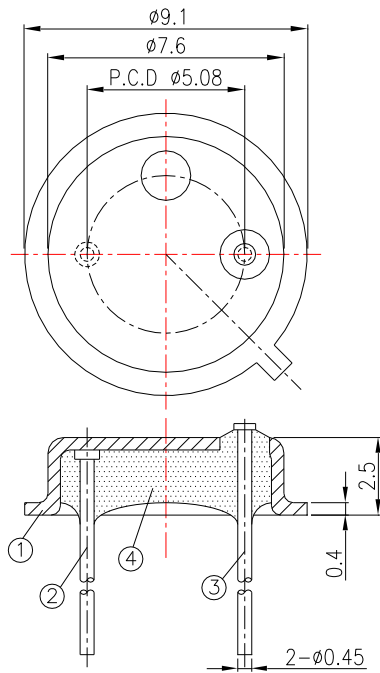
#3D Modeling



#Photograph

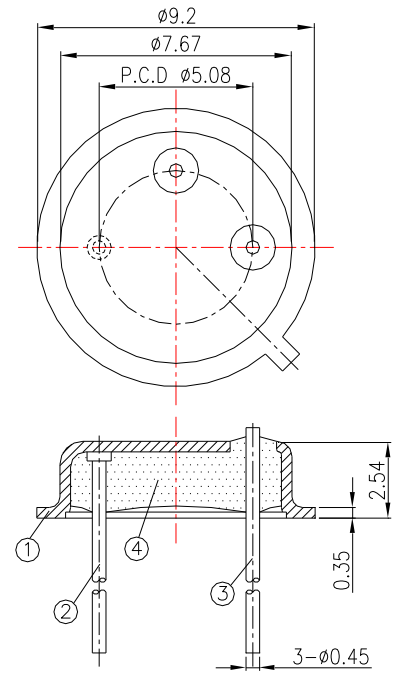


TO-501, TO-5 1P2L



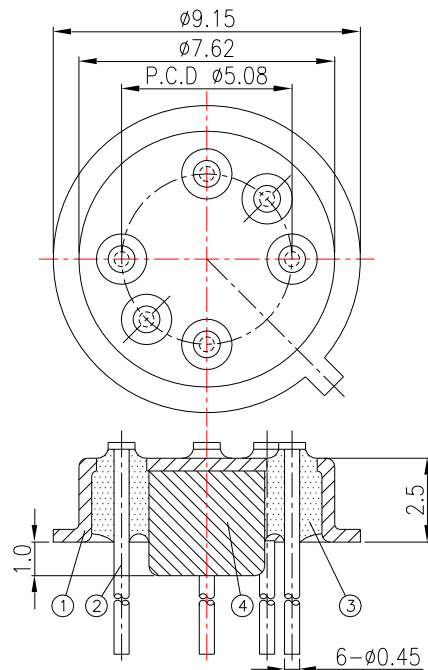
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-502, TO-5 2P3L



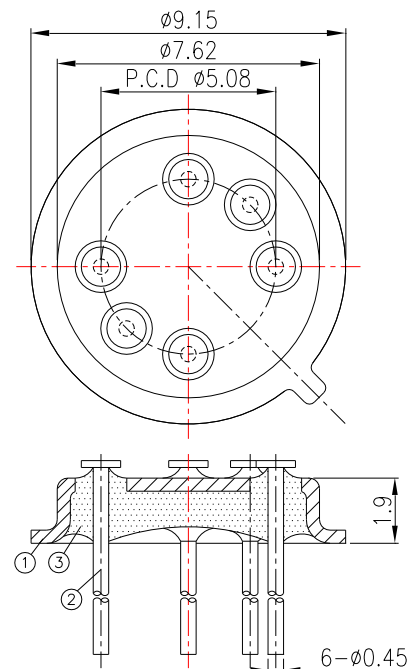
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass

TO-503, TO-5 6P6L



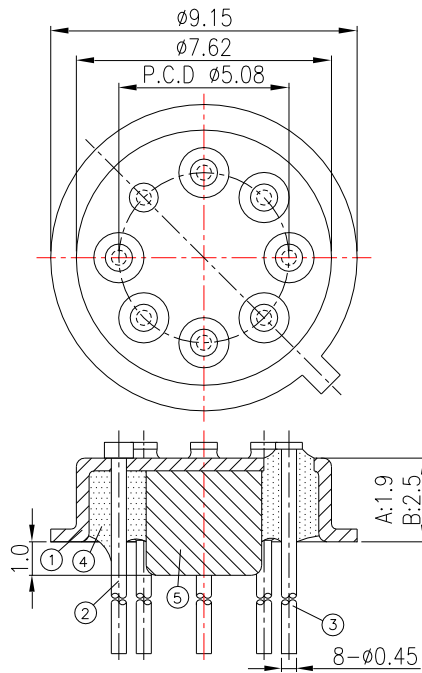
- ① Eyelet : Kovar
- ② Leads : Kovar
- ③ Glass : Hard Glass
- ④ Stand off : Glass-ceramic

TO-504, TO-5 6P6L



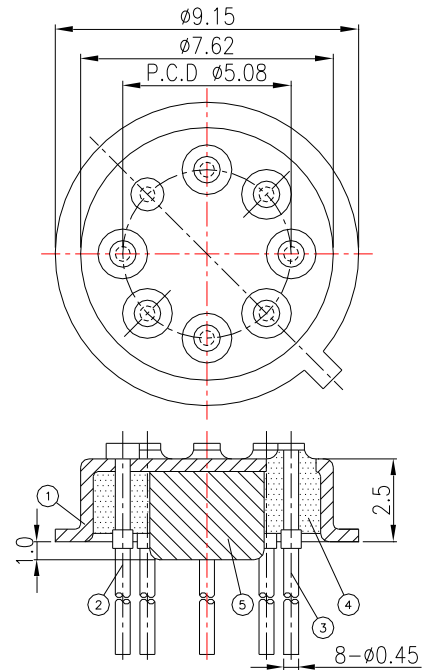
- ① Eyelet : Kovar
- ② Leads : Kovar
- ③ Glass : Hard Glass

TO-505, TO-5 7P8L,



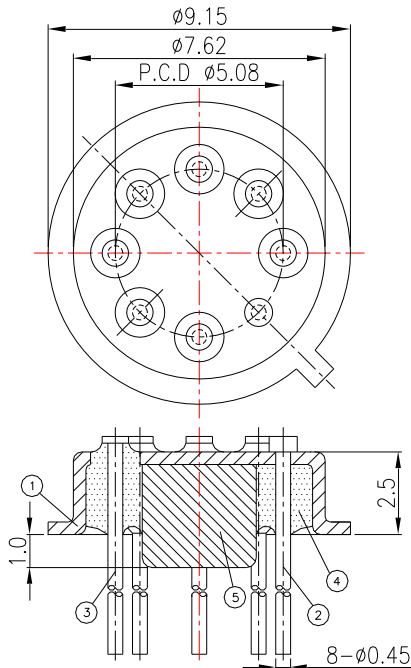
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass
- ⑤ Stand off : Glass-ceramic

TO-506, TO-5 7P8L



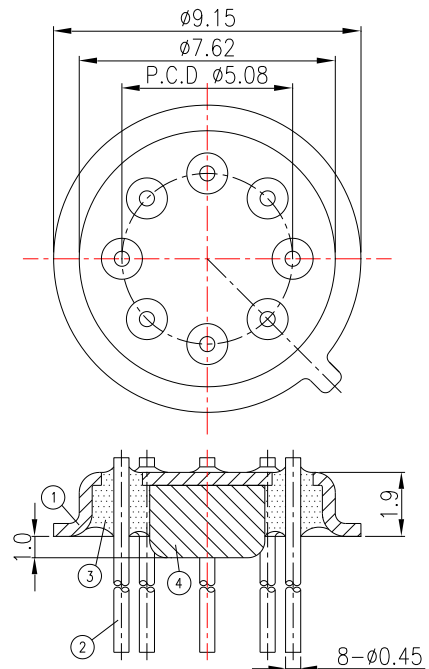
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass
- ⑤ Stand off : Glass-ceramic

TO-507, TO-5 7P8L



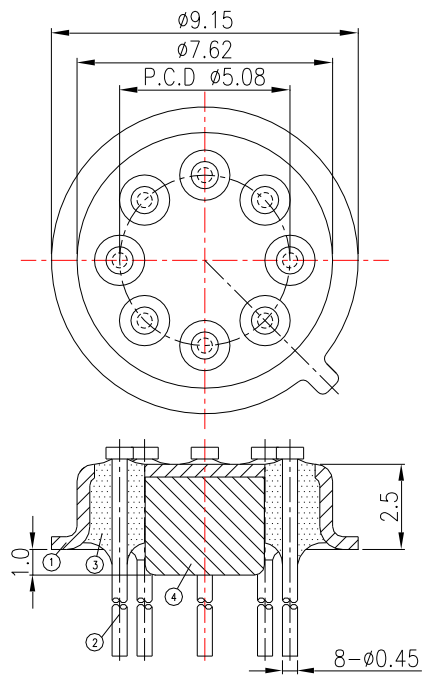
- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass
- ⑤ Stand off : Glass-ceramic

TO-508, TO-5 8P8L



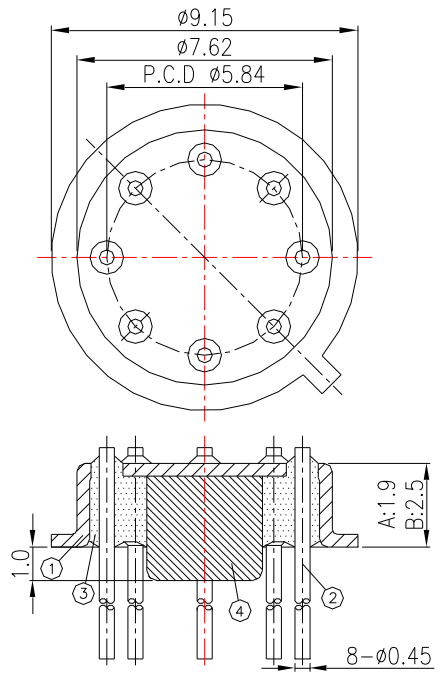
- ① Eyelet : Kovar
- ② Leads : Kovar
- ③ Glass : Hard Glass
- ④ Stand off : Glass-ceramic

TO-509, TO-5 8P8L



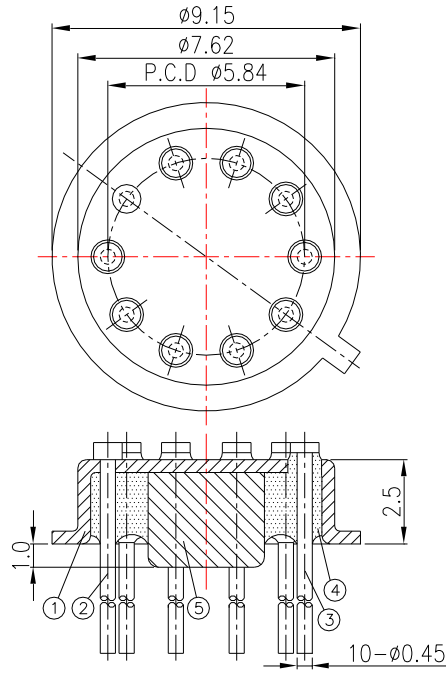
- ① Eyelet : Kovar
- ② Leads: Kovar
- ③ Glass : Hard Glass
- ④ Stand off : Glass-ceramic

TO-510, TO-5 8P8L



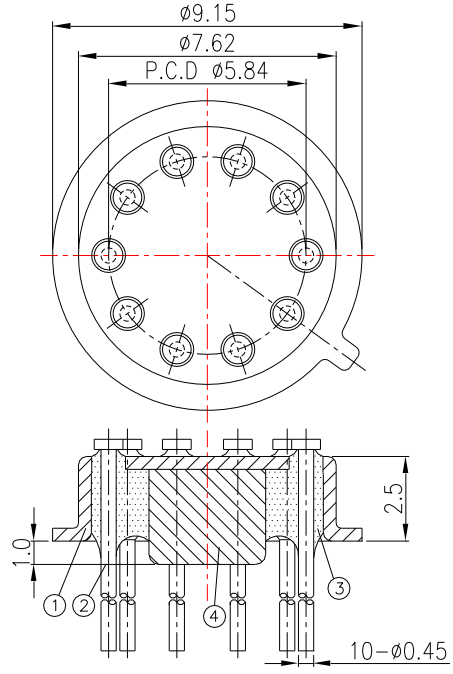
- ① Eyelet : Kovar
- ② Leads: Kovar
- ③ Glass : Hard Glass
- ④ Stand off : Glass-ceramic

TO-511, TO-5 9P10L



- ① Eyelet : Kovar
- ②③ Leads : Kovar
- ④ Glass : Hard Glass
- ⑤ Stand off : Glass-ceramic

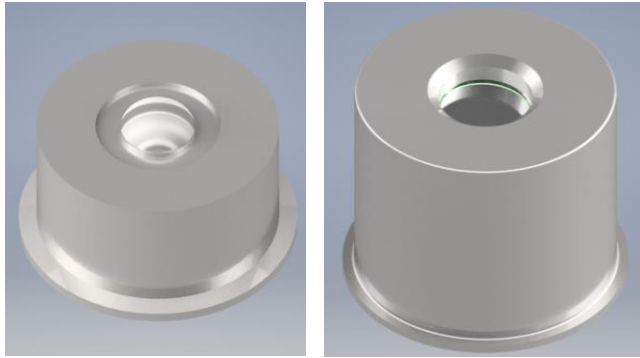
TO-512, TO-5 10P10L



- ① Eyelet : Kovar
- ② Leads: Kovar
- ③ Glass : Hard Glass
- ④ Stand off : Glass-ceramic

Lensed Cap

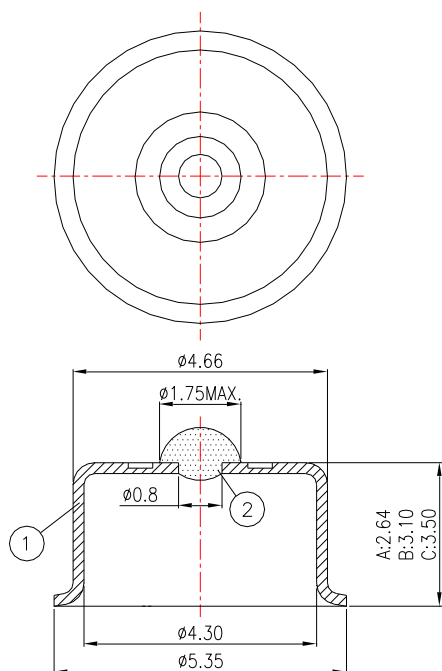
#3D Modeling



#Photograph

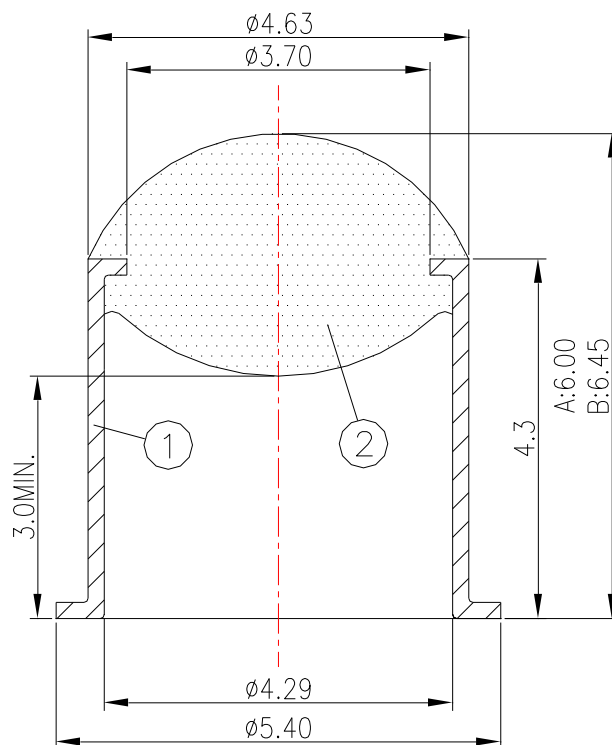


LENS01



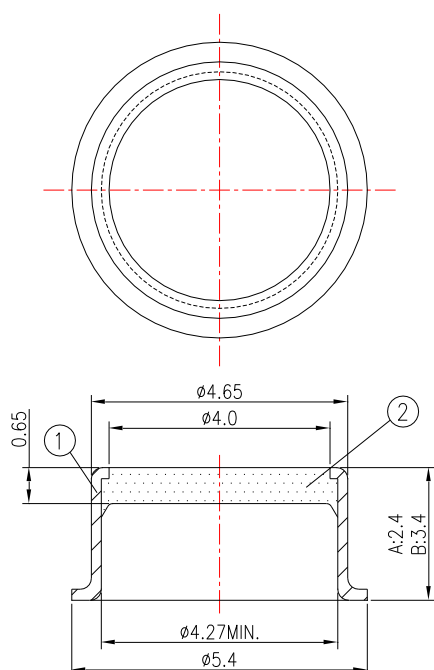
- ① Eyelet : Kovar
② Glass : Hard Glass

LENS02



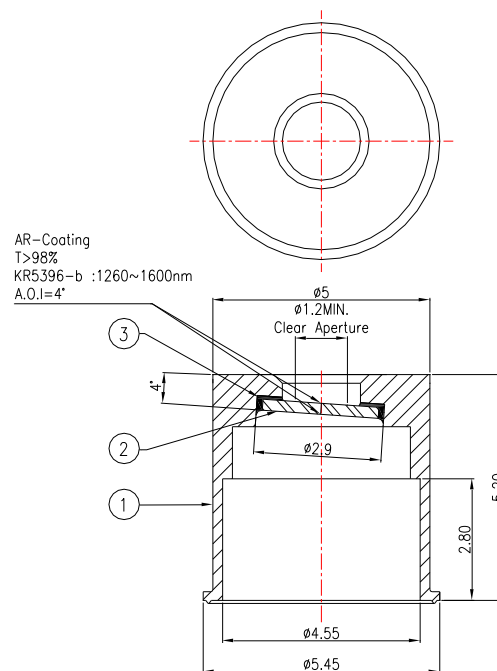
- ① Eyelet : Kovar
② Glass : Hard Glass

LENS03



- ① Eyelet : Kovar
② Glass : Hard Glass

LENS04



- ① Eyelet : SUS
② Glass : Hard Glass
③ Sealing glass : LTG
AR Coat : 1310nm, 1550nm, 1310~1550nm