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## Insulators

Aluminum Oxide Ceramic **RoHS Compliant**Insulating Covers **RoHS Compliant**Bushings **RoHS Compliant**

## Aluminum Oxide Ceramic

Aluminum oxide insulating washers have a dielectric strength of approximately  $21.7 \times 10^3$  volts/mm for .76mm material (550 volts/mil for 0.030 inch material) and  $16.9 \times 10^3$  volts/mm for 1.57mm material (430 volts/mil for 0.062 inch material). The thermal conductivity of aluminum oxide is 15.06 W/mK at 75° (167° F) [8.71 BTU/hr-ft° F].

Aluminum oxide has unique thermal conductivity qualities and features low loss factors at high frequencies. It has high compressive strengths, high volume resistivity, low thermal expansion and it resists radiation.

Note: Hole diameters are +/- .13mm (.500"), angularity is +/- 1° and flatness is .05mm (.002") TIR unless otherwise specified.

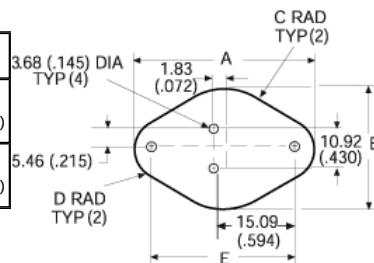
## For TO-3

| Part Number | RoHS                    | PCN                                   | A                | B                | C                | D               | E                |
|-------------|-------------------------|---------------------------------------|------------------|------------------|------------------|-----------------|------------------|
| 4103G*      | <b>RoHS ✓ Compliant</b> | <a href="#">Product Change Notice</a> | 39.70<br>(1.563) | 26.67<br>(1.050) | 13.34<br>(.525)  | 4.75<br>(.187)  | 30.40<br>(1.197) |
| 4104*       | <b>RoHS ✓ Compliant</b> | N/A                                   | 44.45<br>(1.750) | 31.75<br>(1.250) | 15.88<br>(0.625) | 7.16<br>(0.282) | 30.15<br>(1.187) |

\*Thickness:

4103: 1.78 (0.070) to 2.03 (.080)

4104: 1.52 (0.060) to 2.03 (0.080)

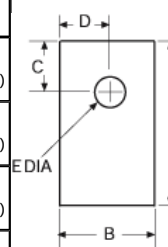


## For TO-220

| Part Number | RoHS                    | PCN                                   | A                | B                | C               | D               | E               |
|-------------|-------------------------|---------------------------------------|------------------|------------------|-----------------|-----------------|-----------------|
| 4169G*      | <b>RoHS ✓ Compliant</b> | <a href="#">Product Change Notice</a> | 19.30<br>(0.760) | 13.97<br>(0.550) | 4.78<br>(0.188) | 6.98<br>(0.275) | 3.68<br>(0.145) |
| 4170G**     | <b>RoHS ✓ Compliant</b> | <a href="#">Product Change Notice</a> | 19.30<br>(0.760) | 13.97<br>(0.550) | 4.78<br>(0.188) | 6.98<br>(0.275) | 3.68<br>(0.145) |
| 4171G**     | <b>RoHS ✓ Compliant</b> | <a href="#">Product Change Notice</a> | 16.51<br>(0.650) | 12.70<br>(0.500) | 4.32<br>(0.170) | 6.35<br>(0.250) | 3.81<br>(0.150) |
| 4177G**     | <b>RoHS ✓ Compliant</b> | <a href="#">Product Change Notice</a> | 17.45<br>(0.687) | 14.27<br>(0.562) | 5.54<br>(0.218) | 7.14<br>(0.281) | 3.18<br>(0.125) |

\*Thickness 1.57mm +/- 0.08 (0.062" +/- 0.003"); surface flatness is 0.10mm (0.004") TIR

\*\*Thickness 1.78mm +/- 0.25 (0.070" +/- 0.010")



## For TO-218, TO-247, and TO-3P

| Part Number | RoHS                    | PCN                                   | A                | B                | C               | D               | E               |
|-------------|-------------------------|---------------------------------------|------------------|------------------|-----------------|-----------------|-----------------|
| 4180*       | <b>RoHS ✓ Compliant</b> | <a href="#">Product Change Notice</a> | 23.24<br>(0.915) | 18.80<br>(0.740) | 6.98<br>(0.275) | 9.40<br>(0.370) | 3.96<br>(0.156) |

\*Thickness: 2.03mm +/- .25 (.080" +/- .010")

## Insulating Covers

TO-3 Insulating Covers are designed to provide protection from accidental shock during field service or repair.

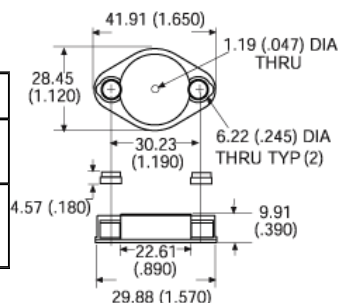
#### 8903 Screw Mounted Cover

Pan head screws not provided - MS 51957-30 or equivalent recommended - secure the cover to the TO-3. At the typical mounting screw torque of .68 - .90 Nm (6-8 inch pounds), the TO-3 cover material cold-flows around the screw head to securely fasten the cover.

Included are No.6 split washers as inserts to provide electrical connection of mounting screws to the TO-3 collector and an insulating snap-in cover for the screw heads. A test probe hole is provided in the top of the cover.

The 8903VB is made from thermoplastic polyester that meets the requirements of UL Bulletin 94 V-0. In addition to its excellent flammability rating, thermoplastic polyester offers resistance to most chemical environments, heat deflection temperature to 215.6°C (420°F) and UL continuous use temperature of 130 °C (266 °F).

| Part Number | RoHS                                                                                             | PCN                                                                               | Material                | Color | Flammability Standards                           |
|-------------|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------|-------|--------------------------------------------------|
| 8903NWB     | RoHS  Compliant |  | Nylon                   | White | Self-extinguishing<br>UL 94 V-2                  |
| 8903VBG     | RoHS  Compliant |  | Thermoplastic Polyester | Black | Self-extinguishing<br>UL 94 V-0<br>UL 492 Type 1 |



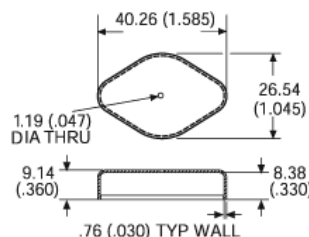
#### 8909 Snap on Cover

Designed to prevent accidental electrical shock, the 8909 fits TO-3 case styles. A test probe hole in top eliminates the need to remove cover for testing. Recommended for low vibration applications. A precise friction fit is required for proper assembly. Please read the [engineering information release](#) for more details on the fit problems that can arise.

[engineering information release](#)

The 8903 cover shown above is recommended for most applications due to the typical size variation of the TO-3 package.

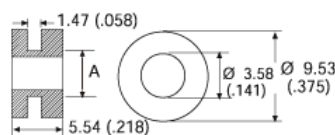
| Part Number | RoHS                                                                                               | PCN                                                                                 | Material | Color | Flammability Standards |
|-------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------|-------|------------------------|
| 8909NBG     | RoHS  Compliant |  | Nylon    | Black | UL 94 V-2              |



## Bushings

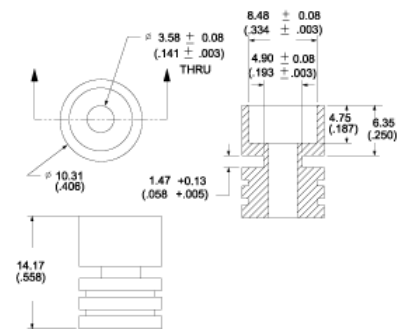
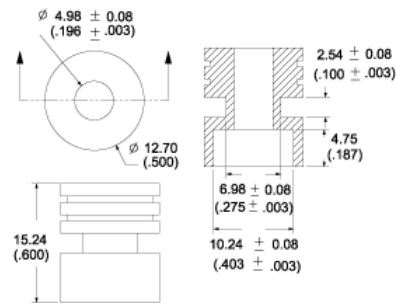
### Teflon-Filled Acetal Insulators

| Part Number | RoHS                                                                                               | PCN                                                                                 | FITS Notch      | A Dim           |
|-------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------|-----------------|
| 103G        | RoHS  Compliant |  | 4.83<br>(0.190) | 4.90<br>(0.193) |
| 109G        | RoHS  Compliant |  | 6.35<br>(0.250) | 6.35<br>(0.250) |



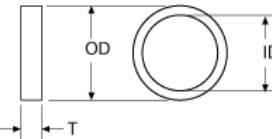
Part Number: 110500F00000

Part Number: 110700F00000



### Teflon-Filled Acetal Bushings

| Part Number | RoHS            | PCN                   | I.D.                           | O.D.                           | T                              |
|-------------|-----------------|-----------------------|--------------------------------|--------------------------------|--------------------------------|
| 110G        | RoHS  Compliant | Product Change Notice | 5.08 / 5.21<br>(0.198 / 0.205) | 6.86 / 6.98<br>(0.268 / 0.275) | 1.57 / 1.40<br>(0.062 / 0.055) |
| 113G        | RoHS  Compliant | Product Change Notice | 6.48 / 6.60<br>(0.253 / 0.260) | 7.87 / 8.00<br>(0.308 / 0.315) | 1.57 / 1.40<br>(0.062 / 0.055) |



### Nylon Bushings - Material is Nylon type 6

| Part Number | A                              | B                              | C                              |
|-------------|--------------------------------|--------------------------------|--------------------------------|
| 114*        | 4.50 / 4.63<br>(0.177 / 0.182) | 3.56 / 3.81<br>(0.140 / 0.150) | 1.40 / 1.66<br>(0.055 / 0.065) |
| 116**       | 9.19 / 9.45<br>(0.362 / 0.372) | 6.71 / 6.96<br>(0.264 / 0.274) | 1.45 / 1.70<br>(0.057 / 0.067) |

\*Formerly Motorola Part Number B51547F002

\*\*Formerly Motorola Part Number B51547F013

