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**Interface Materials**

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# Insulators

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Enter a part number for pricing and availability.

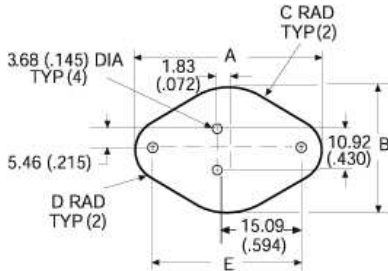
**Aluminum Oxide Ceramic**

Aluminum oxide insulating washers have a dielectric strength of approximately 21.7 x 103 volts/mm for 0.76mm material (550 volts/mil for 0.030 inch material) and 16.9 x 103 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 @ 75° (8.71 BTU/hr-ft°F @ 167°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 +/- 0.13mm (0.005"), angularity is +/- 1° and flatness is 0.05mm (0.002") TIR unless otherwise specified.

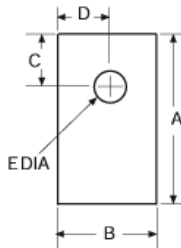
**For TO-3**



Part Number	RoHS	PCN	A	B	C	D	E
4103G*	RoHS <b>Compliant</b>	Product Change Notice	39.70 (1.563)	26.67 (1.050)	13.34 (0.525)	4.75 (0.187)	30.40 (1.197)

\*Thickness:  
4103: 1.78 (0.070) to 2.03 (0.080)

**For TO-220**




Part #	RoHS	PCN	A	B	C	D	E	Thickness
4169G*	RoHS <b>Compliant</b>	Product Change Notice	19.30 (0.760)	13.97 (0.550)	4.78 (0.188)	6.98 (0.275)	3.68 (0.145)	1.57mm +/- 0.08 (0.062" +/- 0.003")
4170G**	RoHS <b>Compliant</b>	Product Change Notice	19.30 (0.760)	13.97 (0.550)	4.78 (0.188)	6.98 (0.275)	3.68 (0.145)	1.57mm +0.51/-0.08 (0.062" + 0.020/-0.003)
4171G**	RoHS <b>Compliant</b>	Product Change Notice	16.51 (0.650)	12.70 (0.500)	4.32 (0.170)	6.35 (0.250)	3.81 (0.150)	1.778mm +/- 0.254 (0.070" +/- 0.010")
4177G**	RoHS <b>Compliant</b>	Product Change Notice	17.45 (0.687)	14.27 (0.562)	5.54 (0.218)	7.14 (0.281)	3.18 (0.125)	1.778mm +/- 0.254 (0.070" +/- 0.010")

\* Surface flatness is 0.10mm (0.004") TIR  
\*\* Surface flatness is 0.05mm (0.002 TIR)

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

Part Number	RoHS	PCN	A	B	C	D	E
4180*			23.24	18.80	6.98	9.40	3.96

		(0.915)	(0.740)	(0.275)	(0.370)	(0.156)
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\*Thickness: 2.03mm +/- .25 (0.080" +/- .010")

### Insulating Covers

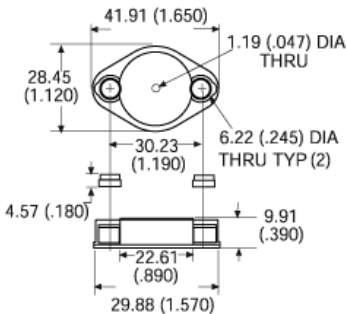
TO-3 Insulating Covers are designed to provide protection from accidental shock during field service or repair.





#### 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).

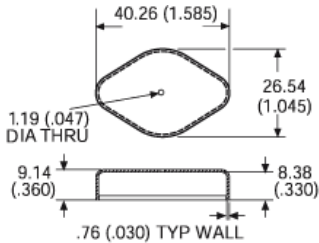




Part Number	RoHS	PCN	Material	Color	Flammability Standards
8903NWG			Nylon	White	Self-extinguishing UL 94 V-2
8903VBG			Thermoplastic Polyester	Black	Self-extinguishing UL 94 V-0 UL 492 Type 1

#### 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.

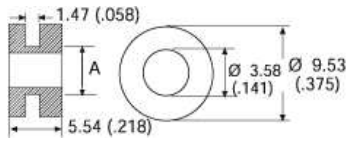
The 8903 cover shown above is recommended for most applications due to the typical size variation of the TO-3 package.



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

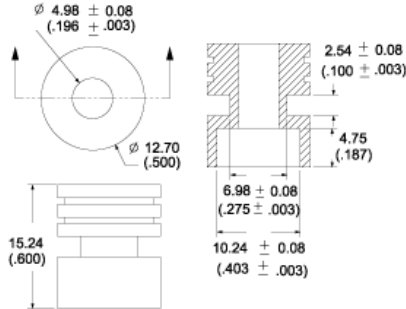
### Bushings

#### PTFE-Filled Acetal Insulators

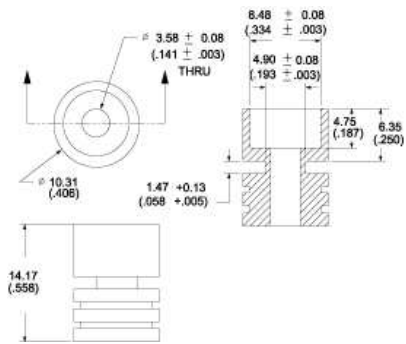


Part Number	RoHS	PCN	FITS Notch	A Dim
103G	RoHS Compliant	Product Change Notice	4.83 (0.190)	4.90 (0.193)
109G	RoHS Compliant	Product Change Notice	6.35 (0.250)	6.35 (0.250)

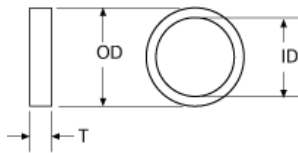
Part Number: 110500F00000



Part Number: 110700F00000

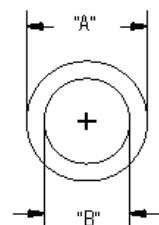


**PTFE-Filled Acetal Bushings**



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

**Nylon Bushings - Material is Nylon type 6**



Part Number	A	B	C
114*	4.50 / 4.63	3.56 / 3.81	1.40 / 1.66

	(0.177 / 0.182)	(0.140 / 0.150)	(0.055 / 0.065)
116**	9.19 / 9.45	6.71 / 6.96	1.45 / 1.70
	(0.362 / 0.372)	(0.264 / 0.274)	(0.057 / 0.067)

\*Formerly Motorola Part Number B51547F002

\*\*Formerly Motorola Part Number B51547F013

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