

Technical Information

KOAR-COOL ALUMINUM NITRIDE

Koartan offers flat aluminum nitride substrates in a variety of sizes, thicknesses, and surface finishes. With a thermal conductivity of 170 W/mK or better, these substrates are well suited for many applications including RF/Microwave

circuits and heaters. Also available from Koartan are conductors, resistors, and dielectrics compatible with KOAR-COOL and other makes of aluminum nitride substrates.

TYPICAL MATERIAL CHARACTERISTICS

Thermal Conductivity	170 W/mK
Coefficient of Thermal Expansion	5.0×10^{-6} cm/cm/°C
Specific Gravity	3.27 g/cm ³
Dielectric Constant 1 KHz to MHz	9.0
Dissipation Factor	≤ 0.1%
Bulk Electrical Resistivity	10 ¹⁴ Ohm-Cm

SIZES AND SURFACE CHARACTERISTICS⁽¹⁾

Part Number	Dimensions	Thickness	Surface	Availability
KC-4545-40-LL	4.5"x4.5"	0.040" (1.016 mm)	L-L ⁽²⁾	Stock Item
KC-4545-25-LL	4.5"x4.5"	0.025" (0.635mm)	L-L	4-6 Weeks ⁽⁴⁾
KC-4040-40-LL	4.0"x4.0"	0.040" (1.016 mm)	L-L	4-6 Weeks
KC-3030-40-LL	3.0"x3.0"	0.040" (1.016 mm)	L-L	Stock Item
KC-3030-25-LL	3.0"x3.0"	0.025" (0.635mm)	L-L	Stock Item
KC-2525-30-LL	2.5"x2.5"	0.030" (0.7874 mm)	L-L	4-6 Weeks
KC-2020-40-LL	2.0"x2.0"	0.040" (1.016 mm)	L-L	Stock Item
KC-2020-25-LL	2.0"x2.0"	0.025" (0.635mm)	L-L	Stock Item
KC-2020-20-LL	2.0"x2.0"	0.020" (0.508 mm)	L-L	4-6 Weeks
KC-2020-15-LL	2.0"x2.0"	0.015" (0.381 mm)	L-L	4-6 Weeks

KC-2020-10-LL	2.0"x2.0"	0.010' (0.254 mm)	L-L	4-6 Weeks
KC-2020-40-PP	2.0"x2.0"	0.040" (1.016 mm)	P-P ⁽³⁾	4-6 Weeks
KC-2020-25-PP	2.0"x2.0"	0.025" (0.635mm)	P-P	4-6 Weeks
KC-1010-40-LL	1.0"x1.0"	0.040" (1.016 mm)	L-L	4-6 Weeks
KC-1010-25-LL	1.0"x1.0"	0.025" (0.635mm)	L-L	4-6 Weeks
KC-1010-20-LL	1.0"x1.0"	0.020" (0.508 mm)	L-L	4-6 Weeks
KC-1010-15-LL	1.0"x1.0"	0.015" (0.381 mm)	L-L	4-6 Weeks
KC-1010-10-LL	1.0"x1.0"	0.010' (0.254 mm)	L-L	4-6 Weeks
KC-1010-40-PP	1.0"x1.0"	0.040" (1.016 mm)	P-P	4-6 Weeks
KC-1010-25-PP	1.0"x1.0"	0.025" (0.635mm)	P-P	4-6 Weeks

- (1) As-fired, L-P (lapped one side polished the other), and a number of less common sizes are available on request. Please contact us for availability and lead times.
- (2) L-L means lapped to 25 micro inches or smoother on both sides.
- (3) P-P means polished to 2 micro inches on both sides.
- (4) The lead time for items marked 4-6 weeks is normally about four to six weeks, depending on the quantity required. Limited quantities may, however, sometimes be available from stock. Please contact us with your requirements.

Application Notes: Aluminum nitride substrates with lapped surfaces are sufficiently smooth for most applications. At the same time the microscopic roughness results in some mechanical adhesion, which helps and enhances the chemical bonding designed in the paste. It is generally a good practice to fire the as-received substrates once in a standard 850°C profile, followed by blowing with compressed air. Optionally, an ultrasonic cleaning step in

IPA may be inserted between the firing and compressed air cleaning steps.

Aluminum nitride substrates outgas slightly above 700°C. The firing step described above reduces the extent of further outgassing during the paste firing and creates a very thin layer of aluminum oxide on the surface, which further enhances thick film adhesion.

The following Koartan thick film pastes are compatible with KOAR-COOL substrates:

6122 Silver Paste

6292 Palladium-Silver Paste

4906 Gold Paste (600°C)

7961 Series Pd-Ag Resistors, ± 100 ppm/°C

7981 Series Pd-Ag Resistors, $+300 \pm 100$ ppm/°C

5652 Overglaze Paste (500°C)

5660 Acid-Resistant Overglaze Paste (600°C)

5662 Pd-Saver Overglaze Paste (600°C)

The information presented herein is based on data believed to be dependable and is accurate and reliable to the best of our knowledge and belief, but not guaranteed to be so. Koartan Company assumes no liability arising from the use of this product or the information provided herein. It is the responsibility of the user to verify the information and to establish the suitability of the product(s) for any particular application. Nothing herein is to be construed as recommending any practice or any product in violation of any patent or in violation of any law or regulation.