

Kadco Ceramics

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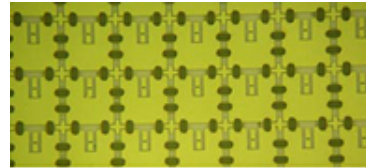
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Process Capabilities

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Kadco has many process capabilities to produce your part perfectly. We can perform several different types of dicing, cutting, chamfering, and finishing. Once your requirements are established, we can lay out a program to meet your specifications. Our engineers have experience in many challenging situations and will decide on the best method of production based on your specifications, budget, and material. Please come to us as early as possible to plan your project.



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BEVEL CUTTING

Bevel cutting creates a V groove or a chamfer in the substrate. The major issues to consider are bottom side chipping and smoothness of the cut surface.

- The simplest bevel cut involves mounting the substrate on dicing tape and cutting about 0.001" into the tape. This allows the singulated parts to be cleaned and removed from the tape easily. The difficulty is that the tape does not support the bottom side of the substrate very well, resulting in bottom side chips of up to several millimeters.
- Wax mounting the substrate on glass gives better bottom side support and consequently less chipping. The trade off is that the final dice are more difficult to remove and clean.
- A third alternative is to tape mount the substrate, but to make the groove 50% to 75% of the depth of the substrate. A second isolation cut with a narrow blade to minimize chipping can then be performed.

We will can evaluate your cutting and provide samples to make sure your chips meet specifications.

BURR FREE DICING

When a diamond tool cuts through a soft metal such as gold, some kind of burr will form on the cut edge. We can select combinations of blades and speeds that will minimize the burr.

For example, a 1 mm burr on a capacitor with a coating of 200 microinches of gold is usually not a problem. However, in some applications even this small burr is unacceptable. We can provide chemical etching and vibratory finishing operations that will remove the burr and etch back the metallization from the cut edge.

CHIP FREE DICING

Our engineers have experience in machining with very tight chipping specifications. A diamond saw removes brittle material by chipping it out and chip out will occur at some level. The important issue is to keep the chipping within the final product specifications. Chipping can be controlled with careful attention to the dicing process parameters:

- Feed
 - Speed
 - Coolant flow
 - Blade exposure and composition
 - Mechanism of mounting the substrate
 - Substrate material selection
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WAFER DICING

Wafer dicing typically means silicon wafer dicing, but may refer to dicing of any hard material. The wafers can be tape mounted for ease of handling or wax mounted on glass for more precise cuts.

DIE SINGULATION

Die singulation requires a mounting medium to hold the substrate as it is being cut. This is usually either tape on a film frame or wax on glass, although mounting directly on a vacuum chuck will work in some cases. The cut can then be a scribe for subsequent breaking or a thru cut.

- Scribing is convenient, but usually results in more chips and rough edges.
 - Thru cuts on tape give tighter tolerances on the final chip size, but may result in some bottom side chipping.
 - Wax mounting on glass normally gives the best edge quality, but requires demounting and cleaning.
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FIBER OPTIC POLISHING

Fiber optics require very smooth cuts at precise angles to minimize subsequent polishing time. We are experienced in designing fixturing to simplify your process. We will make a proposal to eliminate multiple steps of tedious hand mounting and demounting.

ISOLATION CUTTING

Isolation cutting creates an electrical separation between circuit elements on a die. A typical application creates electrically isolated pads on the gold coated surface of a capacitor. Residual debris in the groove or on the surface can compromise the isolation. Important considerations are:

- Depth of the isolation cut
- Width of the isolation cut
- Cleanliness

We are experts in mounting and cleaning to meet your requirements. We can provide samples where necessary.

SUBSTRATE GROOVING AND SLOTING

Substrates may require grooves for electrical isolation or for fixturing requirements. Some potential difficulties that require prior planning are:

- Width and depth tolerances
 - Flatness of the bottom of the groove
 - Squareness of the corners
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SUBSTRATE EDGE CHAMFERING

Substrate edges may require chamfering for various reasons. Chamfering usually requires careful layout of the patterns on the substrate to avoid edge cuts. A 45° chamfer, for example, requires substrate material to be on both sides of the blade to avoid sideways deflection of the blade and possible breakage. We will help you lay out the patterning early in your project to avoid problems later.

WAFER SCRIBING

Wafers can be scribed for subsequent breaking along the scribe lines. Typically these wafers are mounted on tape on a film frame which matches fixturing in subsequent pick and place operations.

WRAP AROUND METALLIZATION

Wrap around metallization serves the same function as plated thru holes in providing good grounding in microwave circuits. There are several ways to implement wrap around metallization. Our engineers will help you find the most economical solution to your design requirements.

CLEANING & PACKAGING

Cleaning and packaging dice can add considerable expense to the final product. Since dicing is an inherently dirty operation, debris will form during the operation. The most common and economical approach usually is to provide a final cleaning after dicing. The dice can then be packaged in bulk or in chip carriers for transport.

An alternative is to coat the substrate with a protective material before dicing. This avoids having the debris come in contact with the substrate surface during the cutting operation. The coating can then be removed before final packaging or simply remain in place until the next manufacturing operation. We are experienced in avoiding or cleaning up contamination.
