



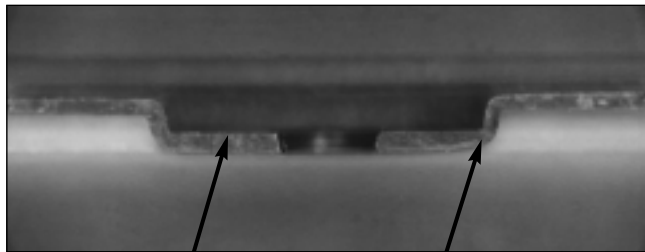
Conductive Polycarbonate 3000BD Precision Carrier

Technical Data – September, 2001

Product Description

3M™ Conductive Polycarbonate 3000BD Precision Carrier for bare die applications is designed to meet the demanding needs of many bare die, flip chip, and micro BGA applications traditionally served by trays or other carrier devices. 3M innovation has led to the development of precision pockets, a technical breakthrough allowing 3M to produce highly precise and accurate pockets conforming to and helping protect your chip. Compare 3M 3000BD Carrier to a typical, traditional heat-formed pocket:

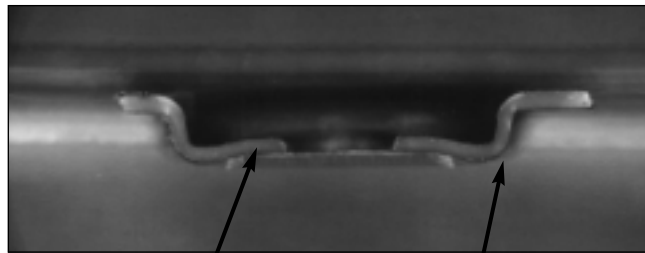
Precision Polycarbonate Pocket



Flat Pocket Bottom

<3° sidewall draft angle

Typical, Traditional Pocket



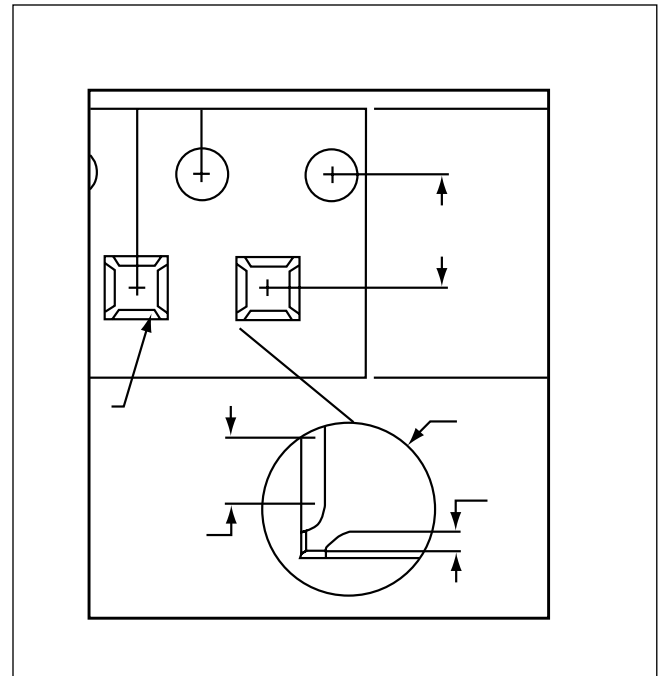
Curved Pocket Bottom

"Bathtub" Corners

A large sidewall draft angle in the traditional pocket allows chip movement up the wall and a pocket that is not flat allows Z-axis movement which can cause repeatability problems at the pick-up point.

Product Format

3M 3000BD Precision Carrier is available as a splice-free, 8mm-44mm carrier in planetary format on 330m (13") plastic reels for cleanroom applications. For non-cleanroom applications, 3M 3000BD Carrier is available in planetary or level-wind format on a recyclable 560mm (22") cardboard reel. Reel capacity will typically be from 30 to 1,000 meters, depending upon pocket depth, pitch and winding format.

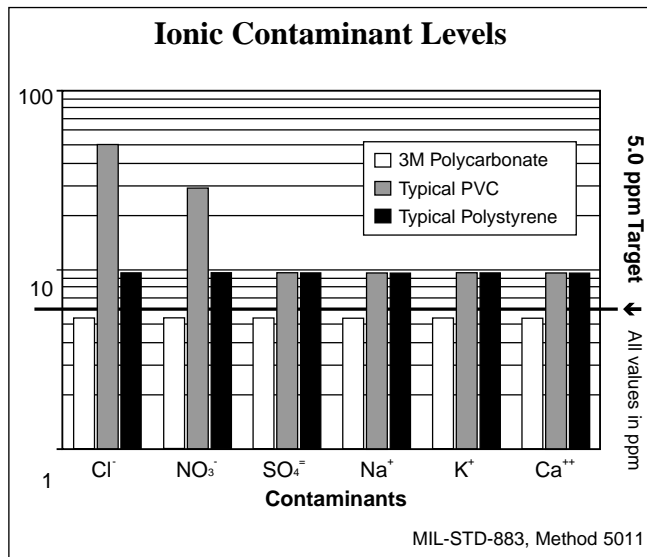


Component Protection is Critical

3M precision capabilities allow for innovative ways to help protect your chips from corner damage. 3M 3000BD Carrier corner protection helps prevent die edge chipping, one of the most common problems when shipping die products.

Chemical Analysis of Extractable Contaminants

The effect of contaminants on the solderability of SnPb, InPb, Au or Cu solder bumps is a concern to many manufacturers of flip chips. 3M™ Conductive Polycarbonate 3000BD Precision Carrier contains a minimum of identified corrosive, water-extractable ionic contaminants which are present in more significant levels in some other typical carriers. The following chart compares some typical carriers tested according to the requirements of MIL-STD-883E, Method 5011.



Electrical Properties

The electrical and triboelectric properties of 3M 3000BD Carrier have been engineered to help provide protection of static-sensitive chip-size packages through an effective balance between the electrostatic shielding and electrostatic decay properties of the carrier. 3M 3000BD Carrier is electrically conductive, exhibiting a nominal surface resistivity in the pocket of $\geq 10^4 \Omega/\text{square}$ and $\leq 10^8 \Omega/\text{square}$. The surface resistance of 3M carrier minimizes d_v/d_t , affording ESD protection to devices in Classes I through III. 3M 3000BD Carrier also exhibits triboelectric properties which may be appropriate for packaging electrostatically-sensitive chip-size packages.

Packaging Format

3M 3000BD Carrier is available in a cleaned and cleanroom compatible format for maximum protection from particle contamination. The 3M 3000BD Carrier is cleaned and packaged in a class 10,000 cleanroom environment. Each planetary wound 13" plastic reel is then sealed individually into a 3M™ 1900 Static Shielding Bag for protection.

Note: 3M 3000BD Carrier is also available in standard 22" cardboard planetary and level-wind reels for less sensitive components and non-cleanroom applications.

Storage Conditions

3M 3000BD Carrier should be stored indoors, in its original packaging, in a controlled climate environment, typically at or below 35°C (95°F) and 70% relative humidity. Storage conditions should not exceed 85°C (185°F) for prolonged periods, and the product must be protected from exposure to direct sunlight. Exposure to elevated humidity reduces the compressive strength of corrugated, cardboard containers. The recommended stacking height must be followed to avoid damaging the packaged product. It is recommended that the product be used on a "first-in, first-out" basis.

Shelf Life

It is recommended that 3M 3000BD Carrier be used within five years from the date of manufacture when stored according to the recommended storage conditions.

Recyclability

3M 3000BD Carrier is a carbon-filled thermoplastic polymer film which can be recycled after use.

Cover Tape Recommendations

Bare die, flip chip and microBGA components require extreme care during the de-taping process to prevent the components from bouncing out of the carrier. For this reason, we recommend 3M™ 2666 Pressure Sensitive Adhesive (PSA) Cover Tape. For packaging components in 8mm and 12mm wide carrier tape, we recommend using 3M™ Conductive 2668 High Shear Pressure Sensitive Cover Tape for use on higher speed de-taping equipment. 3M PSA cover tapes provide a consistent peel force, which is ideal for many thin and small component applications.

3M™ Conductive Polycarbonate 3000BD Precision Carrier

Description	Units	Typical Performance	Test Notes	Test Method
Material Properties	Type Max, Usable Temperature	Polycarbonate 125 (257)	1	
Physical Properties	Tensile Strength (Yield)	MPa (Kpsi) 63 (9.1)	2	ATSM D 638
	Tensile Strength (Break)	MPa (Kpsi) 72 (10.5)	2	ATSM D 638
	Impact Strength	Nm (F-lb/in) >.15 (1.32)	3	ATSM D 256
	Shrink	% <0.1	4	ASTM D 955
	Camber	mm (in) <1.0 (.039)	5	EIA 481
	Optical	% Opaque	6	ASTM D 1003
Electrical Properties	Resistivity	Ohms/sq 5.0E10 ⁵	7	ASTM D 257
	Static Decay	Seconds 0.01	7	ASTM D 257
Chemical Properties	Extractable Ionics (Cl ⁻ , NO ₃ ⁻ , SO ₄ ⁼ , Na ⁺ , K ⁺ , Ca ⁺⁺)	ppm <5	8	MIL STD 883E
	Flammability Rating	UL94 V-2	9	UL94
Product Format	Reel Type	Material Static Dissipative Plastic		
	Reel Hub Inside Diameter	mm (in) 76.2 (3.0)		
	Pockets per reel	Count Varies per pitch		
	Length	m (f) Varies per Ko		

Note: The technical information and data presented here should be considered representative or typical only, and should not be used for specification purposes.

Test Notes

1. Engineering grade resin.
2. Tensile tests are conducted at 21°C (70°F), 50% RH under controlled conditions with a constant rate of jaw separation of 100mm/minute from an initial separation of 126mm. Yield strength is the force which produces 5% elongation of the sample. Breaking strength is the ultimate strength for the material at the break point.
3. Impact strength testing utilizes a mandrel to hold a section of the material under test. A weight is allowed to strike the material from a known radius and after the strike the swing is measured vs free swing and the strength of the material is calculated from the difference.
4. Shrink is measured at 60°C (140°F)/85% RH as well as the 85°C (185°F) after 24 hours exposure and expressed in percentage of the initial measurement.
5. Camber is a measurement of the weave of the material. Measured in 100mm sections over a 250mm length.
6. Optical properties are measured using a spectrophotometer and measuring wavelengths from 450 to 800nm. Material is considered opaque if light transmission is less than 1%.
7. Resistivity tests are conducted at 21°C (70°F), 50% RH under controlled conditions. Resistivity is measured in the bottom of the pocket of a typical SOIC carrier using the defined test method. Specification tolerances for this carrier is $10^4 \leq R_s \leq 10^8$. Static decay is measured with an Electrotech Systems Static Decay Meter Model 406-C, using the manufacturer's suggested calibration and test methods.
8. Chemical extraction is measured using 20-hour water extraction test as defined in the test method MIL STD 883E, test method 5011. Resultant solutions are measured for anion analysis using chromatography. Levels below 5.0 ppm are not reported.
9. Flammability rating is defined within the UL94 test method from Underwriters Laboratories. Thickness tested was 1.57mm. Flammability results are based on small-scale laboratory tests for comparison purposes only and do not necessarily represent the hazard presented by this or any other material under actual fire conditions.

Additional Information

To request additional product information or to arrange for sales assistance, call toll free 1-800-666-8273. Address correspondence to: 3M Electronic Handling & Protection Division, 6801 River Place Blvd., Austin, TX 78726-9000. Our fax number is 1-800-826-8893.

Important Notice

All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product which are not contained in 3M's current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.

Warranty; Limited Remedy; Limited Liability.

This product will be free from defects in material and manufacture for a period of 1 year from the date of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any loss or damage arising from this 3M product, whether direct, indirect, special, incidental or consequential regardless of the legal theory asserted.**



Electronic Handling & Protection Division Surface Mount Supplies

6801 River Place Blvd.
Austin, TX 78726-9000
800/MMM TAPE (800/666 8273)
FAX 800/826 8893
www.3M.com/ehpd



Minimum 10%
Post-consumer Fiber

Printed in USA.

© 3M IPC 2001 80-6111-0103-3