

Electronic Inks and Pastes

Dielecttic

MicromaxTM QM44 is a filled, crystallizable screen printed thick film dielectric composition and is an integral element of the MicromaxTM QM44 multilayer system. It is a versatile dielectric for use in both high reliability and low cost MCM (Multi-Chip Module) and hybrid interconnect applications.

Product benefits

- Broad conductor compatibility (gold, silver, and mixed metal)
- Thin, 2 print, hermetic dielectric film.
- High resistance to E.M.F. (electro-motive force) blistering and shorting.
- Robust electrical and mechanical properties.
- · Compatible co-fire conductors.

Product information

Solvent or thinner Micromax™ 4553

Rheological properties

Viscosity 80 - 1	20 ^[1]	Pa.s
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[1]: Brookfield HBT, UC&SP, 50rpm, 25°C

Application technique

Mask mesh	230 - 280	
Drying time	10 - 15	min
Drying temperature	150	
Theoretical coverage	110 - 130 ^[2]	cm ² /g
Recommended film thickness, fired	28 - 32	μm
Via, diameter resolution	250 - 300	μm
Leveling time	5 - 10	min

[2]: based on a fired thickness of 14 μm

Electrical properties

Dielectric Constant	8 - 10 ^[3]
Dissipation Factor	≤0.2 ^[3] %
Insulation Resistance, DC	≥1E12 Ohm
Surface Leakage Current	≤1 ^[5] μA/cm²
Breakdown Voltage	≥1000 V

[3]: at 1 KHZ

[4]: at 100VDC

[5]: Standard measurements made after 5 min at 10 VDC.

[6]: at 30µm

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Storage and stability

Shelf life 6^[7] months

[7]: in unopened containers, from date of shipment, at room temperature (<25°C)

Additional information

How to use Processing

Substrates

 Properties are based on tests on 96% alumina substrates.
 Substrates of other compositions and from various manufacturers may result in variations in performance properties.

Printing

 $^{\circ}$ Printing should be carried out in a clean and well ventilated area. The combined fired thickness of the dielectric should be 30±2 μm . This can generally be obtained by printing the individual layers with a 230-280 mesh stainless steel screen at speeds of 6 ips.

Drying

Allow prints to level at room temperature, then dried.

Firing

 Fire each dielectric print separately in well ventilated moving conveyor furnace, in air. A 30-minute cycle with a peak temperature of 850°C held for 10 minutes should be used.

Properties

Typical Fired & Electrical Properties

Test	Properties
Max.no.circuit layers	< 8
Camber*1 (mil/in)	< 2
EMF Blister Resistance*2 (firings)	> 30

^{*1} Measured deflection of 5"x1" substrate with 5 circuit layers. Single-sided.

Information in this datasheet shows anticipated typical physical properties for MicromaxTM QM44 based on specific controlled experiments in our labs and are not intended to represent the product specifications, details of which are available upon request.

System Elements

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^{*2} Maximum no. of firings performed without blisters observed with Substrate/gold/dielectric/silver configuration.



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	Silver	Mixed Metal	Gold
Top Conductor	Micromax TM QM22 (3:1) Micromax TM 7484 (3:1) Micromax TM 6277 (6:1) Micromax TM QM18 (100:1)	Micromax TM 5771 (Gold) Micromax TM 4597R (Solderable) Micromax TM QG150 (Fine line)	Micromax [™] 5771 Micromax [™] 4597R Micromax [™] QG150
Inner Conductor	Micromax [™] QM17 (Pt/Ag) Micromax [™] QM14 (Ag)	Micromax [™] QM17 Micromax [™] QM14	Micromax [™] 5771 Micromax [™] QG150
Via Fill	Micromax [™] QM34	Micromax TM QM34 (Inner) Micromax TM QM35 (Top)	Micromax [™] 5747
Resistor Series	Micromax™ S1X0	Micromax™ S1X0	Micromax™ S1X0

Micromax TM QM14, QM17, QM18, QM22, QM34, QM35, QG150, 5771 denotes that the conductor may be cofired on Micromax TM QM44.

Dielectric

Micromax™ QM44 : A filled, crystallizable, two print Dielectric Compositon.

Silver Conductors

- Micromax™ QM22 : A unique 3:1 silver/palladium, cofire or sequentially fire, not for aluminum Wirebonding.
- MicromaxTM 7484: 3:1 silver/palladium sequentially fire only, used when Al wire bonding is needed
- MicromaxTM 6277 : 6:1 silver/palladium sequentially fire only.
- Micromax™ QM17: Silver/palladium, cofire or sequentially fire internal conductor, sequentially fire top conductor for traces only.
- Micromax™ QM18 : Silver/palladium, cofire or sequentially fire top conductor.
- MicromaxTM QM14 : Silver, cofire or sequentially fire internal conductor, sequentially fire top conductor, sequentially fire top conductor for traces only.
- Micromax™ QM34 : A unique silver via fill, cofire or sequentially fire, not for connecting silver to gold conductors.
- Micromax[™] QM35 : A unique silver/platinum via fill, used as transition via for connecting silver to gold conductors, not recommended for stacked vias.

Gold Conductors

• Micromax[™] 5771 : A general purpose cadmium-free* gold, internal & top conductor, cofire or sequentially fire, not for large (>2 mil) aluminum wire bonding.

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- MicromaxTM QG150: Cadmium-free* high density gold conductor, cofire or sequentially fire.
- Micromax[™] 4597R: Cadmium-free* replacement of Micromax[™] 4596 (solderable gold), cofire
 or sequentially fire.
- Micromax[™] 5747 : Cadmium-free* replacement of Micromax[™] 5727 (gold via fill), cofire or sequentially fire.

Resistors

Micromax[™] S1X0: Variant of Micromax[™] 2000 Series Resistor Composition for Micromax[™] QM44, 10 ohm-1Meg ohm, sequentially fire.

*Cadmium 'free' as used herein means that these are not intentionally added to the referenced product. Trace amounts however may be present.

Storage and shelf life

Containers should be stored, tightly sealed, in a clean, stable environment at room temperature (<25 °C). Shelf life of material in unopened containers is six months from date of shipment. Some settling of solids may occur and compositions should be thoroughly mixed prior to use.

Safety and handling

For safety and handling information pertaining to this product, read Safety Data Sheet (SDS).

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NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colourants or other additives may cause significant variations in data values. Properties of moulded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design conditions and environmental exposure. Other than those products expressly identified as medical grade (including by MT® product designation or otherwise), Celanese's products are not intended for use in medical or dental implants. Regardless of any such product designation, any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. The information contained in this publication should not be construed as a promise or guarantee of specific properties of our products. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that exist. We recommend that persons intending to rely on any recommendation or to use any equipment, processing technique or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards. We strongly recommend that users seek and adhere to the manufac

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