TECHNICAL DATA SHEET

MS-00240200
MS-00240300

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PHOTOFINER.

PSR-4000 LEW3 / CA-40 LEW3
(UL Suffix: PSR-4000 JD/CA-40 JD)

1. FEATURES :

PSR-4000 LEW3 / CA-40 LEW3 is a liquid photoimageable solder mask (alkaline development type), for screen printing with following features:

a) White color, Halogen free
b) Excellent light reflectance
c) Excellent discoloration resistance against UV rays and heat
d) Higher resolution than Conventional white LPISM

2. SPECIFICATION :

Main agent	PSR-4000 LEW3
Hardener	CA-40 LEW3
Color*	White
Mixing ratio	Main agent: 80 / Hardener: 20 (By weight)
Viscosity*	160 dPa･s (R Mode Viscometer, $5min^{-1}$ / 25deg.C)
Solid Content*	76wt%
Tack dry window*	80deg.C / 50min (Maximum)
Exposure energy*	500 - 700 mJ/cm^2 (under Mylar film) 350 - 490 mJ/cm^2 (on solder mask)
Pot life*	24 hours (stored in dark place at less than 25deg.C)
Shelf life**	180 days (stored in dark place at less than 20deg.C)

* After mixing

** After manufacturing

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3. PROCESS CONDITION

Process		Range
Substrate	FR-4, 1.6 mmt	
Pre-treatment	Acid rinse – buff scrubbing	
Printing	100 mesh-count, Tetron screen	100-125 mesh
Hold time	10 min	10-20 min
Tack free	Both sides simultaneous exposure 1st side printing : 80deg.C / 15 min 2nd side printing :80deg.C / 25 min (Hot air convection oven) Single side exposure 80deg.C / 30 min (Hot air convection oven)	 80deg.C/ 10-20 min 80deg.C/ 20-30 min 80deg.C/ 20-60 min
Exposure	7kW Metal Halide Lamp (ORC HMW-680) 600 mJ/cm^2 (under Mylar film) 420 mJ/cm^2 (on solder mask)	 500-700mJ/cm^2 350-490mJ/cm^2
Hold time	10 min	10-20 min.
Development	Aqueous alkaline solution : 1 wt% Na_2CO_3 Temperature : 30deg.C Spray pressure : 0.2 MPa Developing time : 90 sec	 0.15- 0.25 MPa 90-120 sec
Water rinse	Temperature : 25deg.C Spray pressure : 0.1 MPa Rinsing time : 45 sec	Below 30deg.C 0.1- 0.15 MPa 45-60 sec
Post cure	150deg.C / 60 min (Hot air convection oven)	

REMARKS:

For applying legend ink, solder mask should be cured for 30 minutes at 150deg.C, and then legend ink is to be cured at 140deg.C.20 minutes 2 cycles.

In case of not applying legend ink, final bake at 150deg.C for 60 minutes.

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4. PROCESS RECOMMENDATION:

Recommendable workshop condition

1) Operation under yellow (UV cut) lamp in a clean room with ambient temperature at 20 -25 deg.C / 50 -60%RH
2) Open up the package when it becomes ambient temperature. Stir the hardener well first before mixing with the main agent. Keep stirred well when you put the hardener together with the main agent.
3) The coating thickness after curing is 10 to 20 um.
   Coating thickness less than the said may lower solder heat resistance, chemical resistance and Ni/Au plating resistance.
   Coating thickness more than the said my cause undercut problem and insufficient tackiness.
4) As curing conditions and windows are variable depending on the type of the drying oven, the board quantity to input, etc., set it suitable to your process after testing.
5) As exposure energy is variable depending on material type of substrates (UV absorbent, imide-type material etc.) and on coating thickness, prior testing on resolution (no undercut), surface gloss level and shoot-through, etc. should be conducted to set to the optimum condition.
6) Control well the quality of developing agent in its density, temperature, spray pressure and dwelling time. Insufficient control may cause deterioration in developability or undercut.
7) Final baking condition should be set with consideration of curing time of nomenclature ink. Shortage or excess in curing may cause deterioration of end properties.
8) In case of Ni/Au plating, curing time of nomenclature ink should be considered for setting final baking condition of solder mask. Overcure causes lower Ni/Au resistance.

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5. CHARACTERISTIC

(1) TACK DRY WINDOW :

Drying time (80deg.C / min)	40	50	60	70
Developability	Clear	Clear	Slight Residue	Residue

(2) PHOTO SENSITIVITY :

Item	Thickness	Energy	Developing time	Sensitivity
Sensitivity Kodak No.2 (Step density tablet)	20+/-2um	500 mJ/cm^2 (350 mJ/cm^2)	90 sec.	5step
		600 mJ/cm^2 (420 mJ/cm^2)		6step
		700 mJ/cm^2 (490 mJ/cm^2)		7step
Resolution (Between QFP pads)	33+/-2um	500 mJ/cm^2 (350 mJ/cm^2)	90 sec.	70um
		600 mJ/cm^2 (420 mJ/cm^2)		60um
		700 mJ/cm^2 (490 mJ/cm^2)		60um

The exposure energy is measured below the Mylar film by using ORC HMW-680, 7Kw, metal halide lamp.

(3) END-PROPERTIES:

Item	Test method	Test result
Adhesion	TAIYO Internal Test Method Crosscut tape peel test	100 / 100
Pencil hardness	TAIYO Internal Test Method No scratch on copper foil surface	5H
Solder heat resistance	Rosin flux, Solder float: 260deg.C / 30 sec (1 cycle)	Passed
Solvent resistance	Tape-peel test after immersion in PGM-AC, 20deg.C.,20min.	Passed
Acid resistance	Tape-peel test after immersion in 10 vol % H_2SO_4, 20deg.C.,20min	Passed
Alkaline resistance	Tape-peel test after immersion in 10 wt% NaOH, 20deg.C.,20min	Passed
Electroless Ni/Au resistance	TAIYO Internal Test method Ni: 3um Au:0.03um	Passed
Insulation resistance	IPC comb type B pattern 25deg.C, 65% RH, 500V / 1 min Moisture conditioned:DC100V 25-65deg.C (cycle), 90% RH, 7 days	Initial: 2.7 x 10^{13}Ohms Conditioned 6.0 x 10^{12}Ohms
Dielectric constant	Internal Test Method, value at 1MHz Humidify:25-65deg.C cycles, 90%RH, DC100V, for 7 days Measured: at room temperature	Initial: 6.7 Conditioned: 6.9
Dissipation factor	Internal Test Method, value at 1MHz Humidify:25-65deg.C cycles, 90%RH, DC100V, for 7 days Measured: at room temperature	Initial: 0.033 Conditioned: 0.039
Reflectance ratio (Reference value)	TAIYO's Internal Test Method XYZ color system, Y value	85 Solder mask thickness:20um (on Cu)

6. Attention

A. All test data shown above in this technical data sheet are based on our laboratory test result and only for reference, not guarantee the same on your process.

B. All chemicals used in this product might have unknown toxicity. Please handle with your most care referring to the MSDS for use.

C. No intentional use of RoHS subjected 6 substances (Lead, Cadmium, Mercury, Hexavalent chromium, PBBs and PBDEs) for this product.