

Technical Datasheet

PSR-4000 GP01
/CA-40 GP01



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Two-Component Photoimageable Solder Mask

PSR-4000 GP01/CA-40 GP01

UL Suffix: PSR-4000 HA / CA-40 HA

1. Features

PSR-4000 GP01 / CA-40 GP01 is a two-component photoimageable solder resist ink for screen printing with the following features:

- a) Halogen free.
- b) High sensitivity
- c) Excellent Ni/Au plating resistance

2. General specifications

Main agent	PSR-4000 GP01
Hardener	CA-40 GP01
Mixing ratio	Main agent: 70, Hardener: 30 (by weight)
Color	Green
Viscosity	200dPa-s (Cone plate viscometer, 5 min ⁻¹ / 25°C)
Solid content	80wt%
Specific gravity	1.5
Tack Free Window	80°C, 70 min. (max)
Exposure Energy	200 – 300mJ/ cm ² (Below Mylar film) 140 – 210mJ/ cm ² (On the solder mask)
Pot life	24 hours, stored in a dark place below 25 °C.
Shelf life	6 months, stored in dark place Below 20 °C.

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3. Process

		Tolerance window
Substrate:	FR-4 1.6mmt	
Pretreatment:	Acid rinse - buff scrubbing	
Printing:	100 mesh, Tetron screen	100 to 125 mesh
Hold time:	10 min.	10 – 20 min.
Tack Free:	Hot air convection oven	
	For double side	
	1 side :80°C, 15min.	80°C, 15 - 30min.
	2 side :80°C, 25min.	80°C, 20 - 40min.
	For single side	
	80°C, 30min.	80°C, 20 - 70min.
Exposure:	Metal Halide Lamp 7kw (ORC-HMW680) 300mJ/cm ² (under Myler) 250mJ/cm ² (on the solder mask)	200 – 300mJ/cm ² 140 – 210mJ/cm ²
Hold time:	10 min.	10 – 20 min.
Development	Developing agent: 1 wt% Na ₂ CO ₃ Liquid temperature: 30°C Spray pressure: 0.2MPa Developing time: 60 sec.	0.2 – 0.25Mpa 60 – 100sec.
Water rinse	Liquid temperature: 25°C Spray pressure: 0.1Mpa Rinsing time: 45sec.	Below 30°C 0.1 – 0.15Mpa 45 – 60sec.
Final bake (Post-cure):	Hot air convection oven 150 °C, 60 minutes	

For marking, final bake condition should be set at 150°C / 30min. before applying nomenclature ink, then 140°C 20min. x for 2 cycle for final bake.

In case of no-marking cure – final bake: 150°C / 60min.

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4. Process recommendations

Recommendable workshop condition:

Operation under yellow lamp in a clean room with ambient temperature at 20 - 25 °C/50 - 60%RH.

- a) Open up the package when it becomes ambient temperature. Stir well before use.
- b) Before mixing with main agent, stir well hardener.
- c) The coating thickness after curing is 10 to 20 µm.
- d) Coating thickness less than the said may lower solder heat resistance, chemical resistance and gold plating resistance.
- e) Coating thickness more than the said may cause undercut problem and insufficient tackiness.
- f) 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.
- g) 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 the optimum condition.
- h) 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.
- i) Final baking condition should be set with consideration of curing time of nomenclature ink. Shortage or excess in curing may cause deterioration of coating properties.
- j) 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.
- k) Recommended to make UV bumping in case if white haze is detected on solder mask after leveling treatment and Ni/Au plating.

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5. Characteristics

a) Tack Dry Window

Drying time (min.80°C)	40	50	60	70	90
Developability	Good	Good	Good	Good	Fair

b) Photosensitivity

Item	Thickness	Energy	Developing time	Step
Sensitivity Kodak No.2	22±2µm	200mJ/cm ² (140mJ/ cm ²)	60 sec.	7
		300mJ/ cm ² (210mJ/ cm ²)		8
		400mJ/ cm ² (280mJ / cm ²)		9
Resolution Between QFP pads	50±2µm	200mJ/ cm ² (140mJ/ cm ²)	60 sec.	70µm
		300mJ/ cm ² (210mJ/ cm ²)		60µm
		400mJ/ cm ² (280mJ/ cm ²)		50µm

Remarks:

-Upper column of exposing energy indicate values under Mylar film, lower on the ink surface.

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6. End properties

Test Item	Test Condition	Results
Adhesion	Crosscut tape-peel test - Taiyo's internal test method	100/100
Pencil hardness	No scratch on the copper foil surface - Taiyo's internal test method	7H
Solder resistance	Rosin flux, 260°C, 30 sec., 1 cycle, Solder float	Pass
Solvent resistance	Tape-peel test after immersion in PGM-AC, 20 °C, 20 min.	Pass
Chemical resistance (Acid)	Tape-peel test after immersion in 10 vol % H ₂ SO ₄ , 20 °C, 20 min.	Pass
Chemical resistance (Alkaline)	Tape-peel test after immersion in 10 wt % NaOH, 20 °C, 20 min.	Pass
Insulation resistance	IPC comb type (B pattern) Condition: 25-65°C cycle 90%RH DC100V for 7 days Measurement: DC500V 1 min. value at RT	Initial: 6.6 x 10 ¹³ Conditioned: 2.4 x 10 ¹²
Dielectric constant	JIS C6481 values at 1 MHz Humidification: 25-65°C cycle 90%RH for 7 days Measurement: After the above treatment, measured at room temperature	Initial: 4.1 Conditioned: 4.7
Dissipation factor	JIS C C6481 values at 1 MHz Humidification: 25-65°C cycle 90%RH for 7 days Measurement: After the above treatment, measured at room temperature	Initial: 0.022 Conditioned: 0.023
Electroless Ni/Au plating	Taiyo's internal test method Ni 3µm Au 0.03µm	Pass

Remarks:

- All test data shown above in this technical data sheet are based on our laboratory test result and only for reference, not to guarantee the same in your process.
- All chemicals used in this product might have unknown toxicity. Please handle with your most care referring to the MSDS for use.