DSR-18 Series

Liquid Photoimagible Solder mask ink

1. Product Feature

1) Two-component solder mask designed for screen printing
2) Develop with a mild alkaline solution. Excellent resolution capabilities.
3) Excellent adhesion, heat resistance and chemical resistance.
4) Excellent electric characteristic and physical mechanism properties.
5) Color and luster stability, abundant in color.
6) Utilize import raw material to keep quality steadily.

2. Description and Material Properties

1) Type	G, Y, R, BK, W, BL, N
2) Color	light/middle/dark green, yellow, red, blue, white, black, clear ect.
3) Viscosity before mix(PS/25℃)	200±30(VT-40)
4) Solids Contents	80±5%
5) Hardener	DSR-18/DSR-10H
6) Ink/Hardener mix ratio	75/25
7) Viscosity after mix	150±30 PS
8) Pot life of the mixed product	72 hours
9) Heat resistance	288℃ ×10 sec. ×3 times
10) Storage shelf-life	6 months

3. Chemical Resistance

Chemical Properties	Immersion time	Result
Iso propenol	Room temperature 2 minutes	Normal
Isopropenol 75%	46℃ 2 minutes	Normal
sulfuric acid 10%	Room temperature 30 minutes	Normal
hydrochloric acid 10%	Room temperature 30 minutes	Normal
sodium hydroxide 10%	Room temperature 30 minutes	Normal
Toluene	Room temperature 30 minutes	Normal
1,1,1 Trichloroethane	Room temperature 30 minutes	Normal
Ethanol amine	Room temperature 30 minutes	Normal

4. Physical Properties

Item	Performance	Test Condition
Coating Pencil Hardness	≧6H	IPC-SM-840B 3.5.1.2. (Mitsubishi Pencil)
Grind resistance	Normal	IPC-SM-840B3.5.1.1
Adhesion	Normal	IPC-SM-840B(adhesion to Gold or Nickel/Tin surface)
Machinability	Normal	IPC-SM-840B 3.5.3. Visual inspect in drilling and punching
Flammability	UL-94V-0	IPC-SM-840B3.6.4.

5. Electronic Characteristics

Item	Performance	Test Condition
Dielectric strength	1000V De/mil	IPC-SM 840B3.8.1
Volume resistance	$1\times10^{15}\Omega$	ASTM D-257
Wear resistance	$1\times10^{15}\Omega$	ASTM D-257 IPC-SM 840B 3.8.2.
Insulation Resistance	$1\times10^{15}\Omega$ $1\times10^{15}\Omega$ $1\times10^{15}\Omega$	Class 1 35℃ 90%RH 4 days Class 2 50℃ 90%RH 7 days Class 3 25-65℃ 90%RH 7-day cycle
Dielectric capacitance	3.1	JIS C6481 1MHz
Dielectric Loss Tangent	0.02	JIS C6481 1MHz

6. Process Sequence

Process Sequence	Condition
Board Preparation	Acid clean and abrasive brush.
Base/hardener mixing	Thoroughly mix the material by hand or by mechanical mixer until a homogenous blend is produced.
Hold the material	≧20 minutes
Coat Side A	36-51T mesh. After coating, hold 10 minutes is required
Dry Side A	15-20 minutes at 75℃
Coat Side B and Hold	The same as coat side A
Exposure	300-500mj/cm2, 10-12 step when using a 21 step Stouffer Step Tablet.
Hold	10 minutes
Development	1% sodium carbonate monohydrate solution at 30℃, time is 45-55 sec., and spray pressure is 1.5-2kg.
Curing	60 minutes at 150℃

Note: 1. If using a double-sided screen process, pre-drying should be processed 40-45minutes at 75℃.

7. During the screen print process, please pay attention to the follows:
   - Environment Requirement : Screen print and exposure step should be processed in clean room at 22±3℃ with relative humidity between 55-65%. In addition, Exposure of ink to sunlight or white fluorescent tubes directly/indirectly may cause photo polymerization, so light with UV output should be avoided.
   - The ink cannot be used until it returns to room temperature. Before using, it should be mixed with hardener in the right ratio thoroughly and hold for a period of time.
   - The optimum mask thickness is 20-25μm. Thin mask thickness will decrease the performance of heat, chemical and gold plating resistance, while heavy thickness will exhibit too much undercut and dry degree decreased by insufficient exposure energy penetrating.
   - Adhesive plaster cannot be used during coating to avoid dent on board caused by residue.
   - Try to avoid print the mask into component hole. If some inks leak-in, additional developing time should be added for eliminating unclean in hole development.
   - Drying conditioner and tolerance will be varied depending on difference oven type and the number of panels in oven; therefore the suitable parameter must be determined experimentally.
   - Since exposure will be varied according to the base materials and the thickness of the resist, a test for confirming the minimum width of ink residue, luster of surface and sensitization degree should be taken before parameter setting.
   - The exposure required for dark green, white and black must be increased to avoid crack after developing and post curing, and ruffle post curing.
   - Insufficient temperature and time will cause unclean in developing. Overtime will cause too heavy undercut, and attacking on mask surface will decrease ink performance. Developer concentrate, temperature, spray pressure and developing time should be controlled strictly. The suitable parameter must be determined experimentally.
   - Soldermask will fall off during HASL process on condition that the lower curing temperature and time was adopted, while excess temperature and time will decrease the compatible to gold plating. The suitable parameter must be determined experimentally.
   - Curing for the board with via hole tenting should be detached to 30-40minutes at 80℃and 50minutes at 150℃.
   - If legend print is needed, you must set proper post cure time to compatible with legend, otherwise, insufficient curing will reduce the performance of coating.
   - If ENIG is required, you should take ENIG before legend print, otherwise over curing will reduce the performance with electro less Ni/Au plating.
   - Special notice for ENIG
     1. Exposure stouffer is 11-13 step.
     2. Undercut after developing should less than 1mil to avoid chemicals attack in the subsequence ENIG process,
     3. If exposure is not enough, excess UV cure should be taken after development.

4. Using 36T screen mesh.