

SOL9652B Series



DP Packages
> + 0.1 %
Eta gain

efficiency

Patent Pending

FRONT-SIDE DOUBLE-PRINT PASTE



Front-side Double-Print Paste Package

- Evolutionally upgraded double-print packages
- High efficiency with all advantages from latest SOL9651B platforms
- A+A, A+A', A+B double-print packages available

Double-printing for Ultra finger line (DP-UFL) is a technique many c-Si PV cell manufacturers support for improving cell efficiency. Conceptually, double printing gives them the ability to print very narrow line widths without compromising line quality by printing finger lines on top of each other. This can be technically challenging for both cell manufacturer and metallization paste supplier.

Collaborating with customers, Heraeus Photovoltaic has developed SOL9652B double-print front-side silver paste packages. The SOL9652B package has been formulated based on our unique patent-pending 9651B glass chemistry, combined with the upgraded organic vehicle system for DP-UFL; This new double print package has the state-of-art paste formulation with perfectly balanced metallization contact and passivation damage.

KEY BENEFITS

- Outstanding efficiency gain through improved ultra-fine-line (DP-UFL) and contact on PERC
- Improved paste rheology with better finger geometry that can print through (< 18 μm) screen opening
- Compatible to different screens design and type (high mesh and Knotless screen);
- Better 1st layer and 2nd layer pastes compatibility and overlapping
- Great yield rate in high throughput mass production (> 350 mm/s) without printing defects
- A+A, A+A', A+B printing packages available for higher Fill-Factor and Voc
- Flexible packages to balance paste laydown and efficiency under different test conditions

WELL BALANCED FEATURES OF SOL9652B

The SOL9652B package features a unique metallization contact system. All the key ingredients, exclusively are developed and manufactured by Heraeus. Such unique paste chemistry was optimized to get the best electrical and printability performance on different wafers (Figure 1).

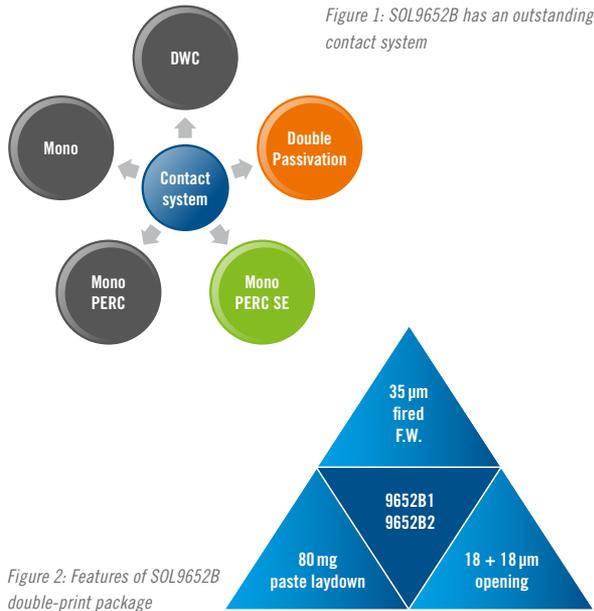


Figure 1: SOL9652B has an outstanding contact system

Figure 2: Features of SOL9652B double-print package

OUTSTANDING EFF. GAIN FROM SOL9652B

Combined with DP-UFL and superior metallization contact, SOL9652B package has achieved > +0.1% Efficiency gain in customer mass production.

Wafer	PERC Mono	
Screen	DP1: 380 Mesh-22 Opening/DP2: 380 Mesh-24 Opening	
Paste	Paste	Paste
Screen Printing	ΔDeposit/Pcs	-4 mg
	ΔFired L.W.	-3 µm
	ΔFired L.H.	0
	ΔFired A.R.	+3 %
	ΔPrint speed [mm/s]	+50
Electrical Performance	ΔEff [%]	+0.11 %
	ΔVoc [mV]	+1
	ΔIsc [mA]	+18
	ΔFF [%]	+0.05
	ΔRs [mΩ]	-0.08
	ΔRsh [Ω]	0

TYPICAL PROPERTIES

Wafer types:

- Multicrystalline, including DWC wafer
- Monocrystalline PERC or regular mono

Recommended finger opening:

- Single Print: 28–45 µm
- Double Print: to be optimized based on customer case

Solid content: 91.00±1.0%

Fineness of Grind (FOG):

- 10 µm
- 5 µm

Viscosity:

CPE-51 spindle (Brookfield):
100–180 kcps at 1 RPM, 25°C

RECOMMEND PROCESSING GUIDING PRINTING

Printing: Screen parameter recommendations with stainless steel screen:

28–45 µm opening:

- calendared 360 mesh, 16 µm or
- calendared 430 mesh, 13 µm or
- calendared 325 mesh, 16 µm
- EOM thickness: 12–20 µm

Drying: Typically dried in an IR dryer with set points of 250–300°C in less than 30 seconds or 150–200°C for 10 minutes in circulated air oven.

Firing:

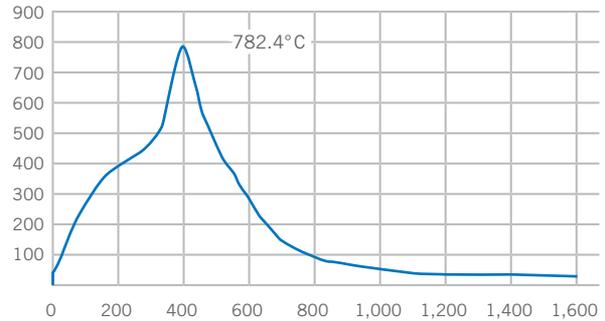


Figure 3: A typical firing profile for Mono ULDE PERC cell

Storage:

Store in a dry location at 5°C–25°C.

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