

DuPont™ Solamet® MWT

via and tabbing metallizations for metal wrap through solar cells

Technical Data Sheet

Technical Introduction: Metal Wrap Through (MWT) Technology

Metal wrap through solar cell technology aims to increase cell performance by replacing the busbar of conventional crystalline Si solar cells with small vias so that the busbars can be moved to the rear side of the cell. This increases the active area for light exposure on the front side of the cell, allowing realisation of efficiency

gain on the cell and module level. The front side finger metallization is connected to the rear side busbars through the vias, which are filled with a non-contacting Ag metallization. Figures 1 and 2 show two MWT cell designs for which DuPont have developed single print step via and tabbing metallizations.

Structure 1: Phosphorus diffusion on all surfaces

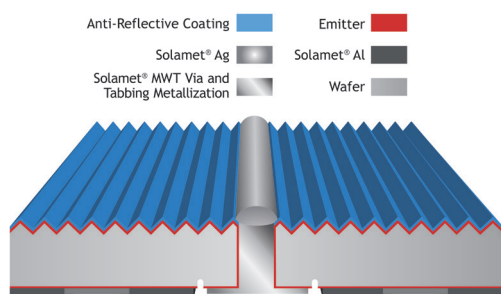


Figure 1: Cross-sectional sketch of metal wrap through cell with phosphorus diffusion on all surfaces.

Structure 2: Phosphorus diffusion on front-side only

No requirement for edge isolation of individual rear n-contacts.

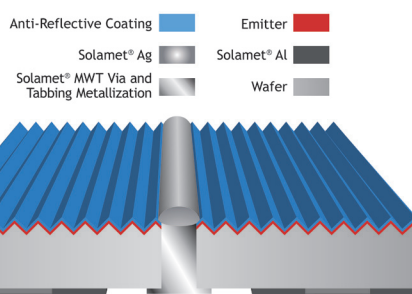


Figure 2: Cross-sectional sketch of metal wrap through cell with phosphorus diffusion on the front side only.

Production Information: Via and Tabbing Metallizations for Structure 1

Product/Development	Via Diameter ø via	Solder Adhesion	Features
DuPont™ Solamet® PV701	<100 µm	High	<ul style="list-style-type: none"> Via fill and tabbing Ag for p- and n- contact High shunt resistance on phosphorus diffused Si Good green strength High soldered adhesion Low laydown Compatible with PV36x local BSF pastes Compatible with i-PERC passivation layers
DuPont™ Solamet® PV70x	>100 µm	High	

Production Information: Via and Tabbing Metallizations for Structure 2

Product/Development	Via Diameter ø via	Solder Adhesion	Features
DuPont™ Solamet® PV70x	100–200 µm	High	<ul style="list-style-type: none"> Via fill and tabbing Ag for p- and n- contact High shunt resistance on bare Si substrate Good green strength High soldered adhesion

Requirements for via and tabbing metallization

- Good shunting performance when in contact with either phosphorus diffused Si substrate (structure 1) or bare Si substrate (structure 2)
- Good via fill forming reliable connection between front-side Ag and rear side tabbing
- Good adhesion of metallization to Si substrate

- Low resistivity
- Compatibility with a range of rear side aluminums
- High solder adhesion for reliable and efficient module interconnection
- Compatibility with a range of module inter-connect technologies

Via Fill Capability

DuPont™ Solamet® PV701 (∅ via <100 μm)

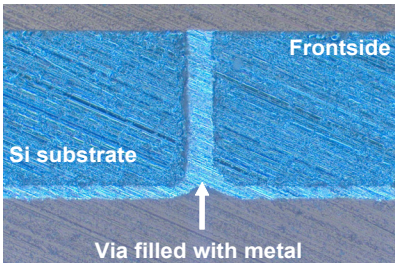


Figure 3: (a) Cross-sectional view of a MWT cell via with PV701 as the via fill.

DuPont™ Solamet® PV70x (∅ via >100 μm)

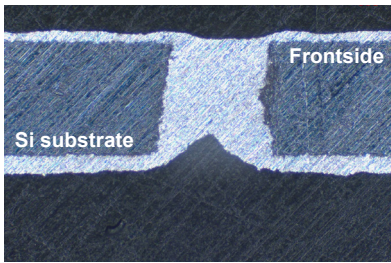


Figure 3: (b) Cross-sectional view of a MWT cell via with development sample/DuPont™ Solamet® PV70x.

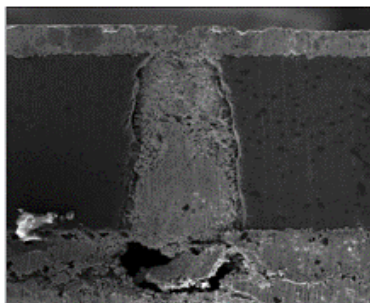


Figure 4: Cross-sectional view of a MWT cell via with DuPont™ Solamet® PV70x as the via fill.

Solder Adhesion Performance

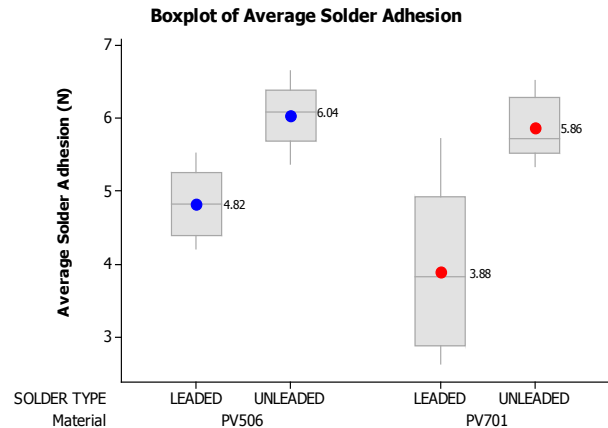


Figure 5: Solder adhesion force of PV701 vs. PV506 with leaded and unleaded solder ribbon.

Module Reliability

MWT module TC Performance

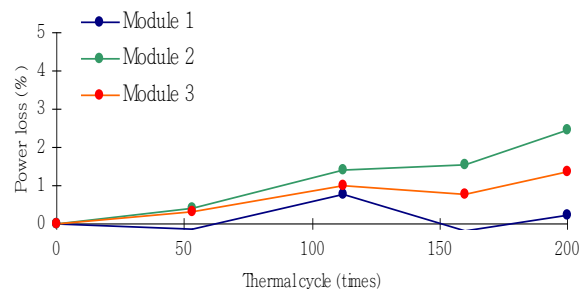


Figure 6: Module reliability testing of a module containing MWT cells consisting of DuPont™ Solamet® PV16A as the front side metallization and DuPont™ Solamet® PV701 as the via and tabbing metallization.



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K25763_Ltr 03/2012



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