

## Long Lasting, Cost Saving Printheads for PV Contact Printing & Etchant Dispensing

*For more than 30 years, Trident has been a world leader in the design and manufacture of industrial ink jet printheads. A versatile additive and digital process, our piezo technology is ideal for producing solar photovoltaic cells.*

Trident printheads provide precise, controlled dispensing capabilities for PV manufacturing processes such as jetting silver contact lines and bus lines, jetting etching patterns with acid or alkaline materials, and jetting dopants to enhance cell efficiency.

### Ink Jet Benefits:

- Lower materials/fluids cost
- Lower processing cost
- Lower capital cost
- Non-contact printing to reduce substrate breakage
- Thinner substrates with lower substrate cost
- Environmentally-friendly additive process
- Less waste

### Why Trident is the Best Choice:

- Stainless steel construction is inert to corrosive acids or alkaline etchants from 2 to 14 pH
- Droplets as small as 7 picoliters for narrow contact lines and small etched features
- Elevated printhead temperature control allows jetting fluids with viscosities from 5 to 30 cps
- Removable, cleanable, repairable stainless steel nozzle plate for long life and optimum return on investment
- Because each channel has an expected life of 90 billion firings, Trident printheads last 8 times longer than alternative ink jet technologies

Trident offers two PV production printheads. Both can be used with Trident's optional calibration electronics, which are capable of individually adjusting the waveform and drive voltage of each jetting channel.



**256Jet™ S**  
256 orifices and 256 controllable channels



**PixelJet™ 64**  
64 orifices and 64 addressable channels

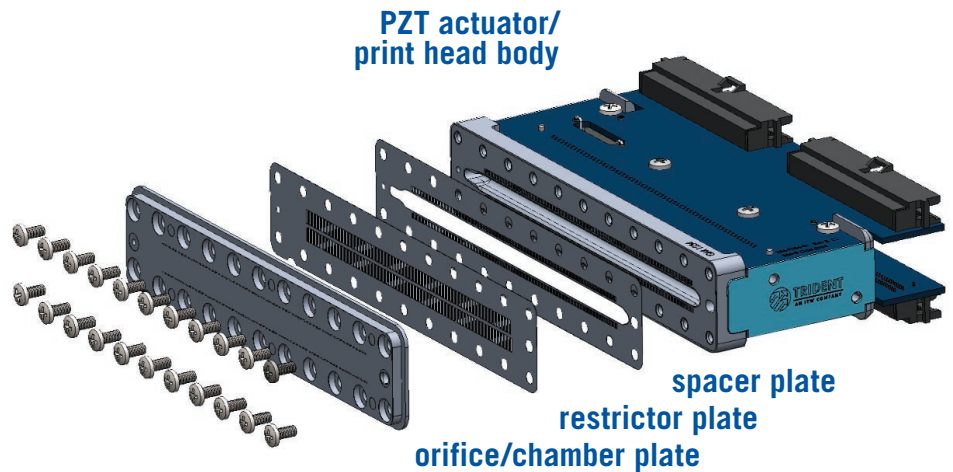


**TRIDENT**  
AN ITW COMPANY  
**SOLAR INK JET**

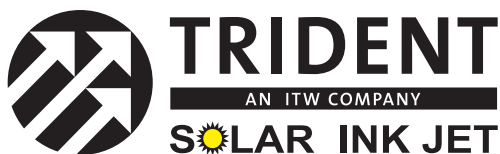
For more information, go to  
[www.tridentsolarcell.com](http://www.tridentsolarcell.com)

# You don't throw away Trident printheads!

*Trident industrial-grade printheads are designed to be easily cleaned and repaired, which saves a lot of money compared to the high cost of replacing “disposable” or unrepairable printheads.*



Specification	256Jet™ S	PixelJet™ 64
Addressable channels	256	64
Nozzle pattern	Dual row or Single row, inline	
Nozzle spacing	0.397 mm	0.747 mm
Native resolution	64 dpi	34 dpi
Drop volume (per PH configuration)	7, 30, 50, 80 pL	
Drop velocity	5–8 m/s @ 1 mm standoff	
Drop voltage	< 90 Volts	
Drop volume variation	± 2% per jet	
Straightness	< 0.5 degree	
Maximum frequency	10-20 kHz	
Nozzle position accuracy	± 2.0 µm	
Operating temperature	up to 70° C	
Jetable fluid viscosities (at jetting temperature)	5-30 cps	
Fluid surface tension range	25–35 dyne/cm	
Jetable acids/alkalines	2-14 pH	
Life expectancy	100 billion jetting cycles	
Displacement accuracy (excluding print system error)	± 7.5 µm @ 1 mm standoff	
Physical dimensions (W x L x D)	43.2 x 134.6 x 114.3 mm	28 x 71 x 73.7 mm



1114 Federal Road • Brookfield, CT 06804-1140 USA  
 Phone: 203.740.9333 • Fax: 203.775.9660  
 Web: [www.tridentsolarcell.com](http://www.tridentsolarcell.com) • Email: [hq@trident-itw.com](mailto:hq@trident-itw.com)  
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