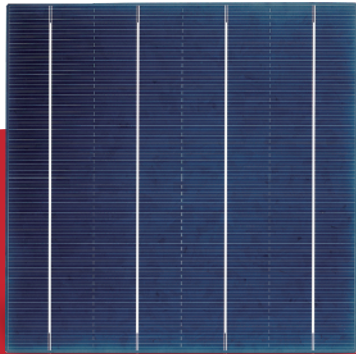


# V-Cell

## Multi Series

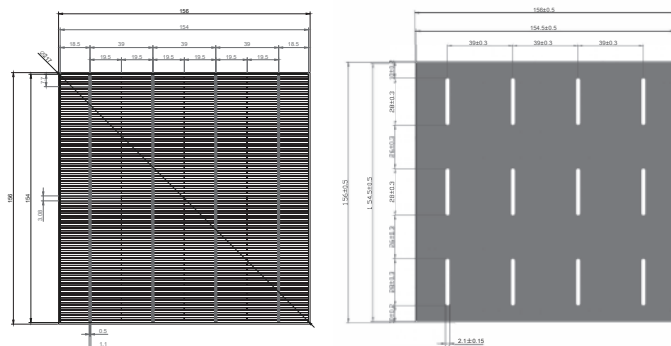
### TSM64TN

6" Multi c-Si Solar Cell



#### Physical Characteristics

Dimensions	156mm X 156mm ± 0.5mm
Thickness(Si)	180μm ± 20μm, 200μm ± 30μm
Front(-)	Acid texturized surface with Silicon nitride anti-reflecting coating Color: Dark Blue, Blue, Sky Blue & Light Blue 4 X 1.1 mm ±0.1 mm wide bus bars Distance between bus bars : 39 mm
Back(+)	Aluminum back surface field 4x3 soldering pads, 2.1 mm±0.15 mm wide bus bars Distance between bus bars : 39 mm



#### Features

- High Cell-To- Module ratio through precise cell conversion efficiency sorting, classified efficiency grade by both minimum power and current.
- Excellent electrical long-term stability and reliability by using of best raw materials and through strict quality inspection control.
- Low breakage rate by using high qualified and stable wafers.
- High quality homogeneous appearance by sorting into defined color classes.
- 100% screened for reverse current and shunt resistance.
- Excellent solderability through high quality conductive materials and regular monitor soldering properties.
- The best solution for PV module with above 260W outputs.

#### Quality Control and Professional Service

- Regular calibration of test equipment using Fraunhofer ISE reference cell.
- Environmental friendly due to REACH-SVHC and RoHS compliances.
- Professional on-site service and support for module certification.
- Regular light source AAA class calibration for stable conversion efficiency.
- Lowest LID by periodic monitoring and superior wafer incoming control.

#### Electrical Characteristics

Efficiency Code		196	194	192	190	188	186	184	182	180	178
Efficiency	Eff(%)	19.60	19.40	19.20	19.00	18.80	18.60	18.40	18.20	18.00	17.80
Power	Pmpp(W)	4.77	4.72	4.67	4.62	4.58	4.53	4.48	4.43	4.38	4.33
Max. Power Current	Impp(A)	8.628	8.585	8.535	8.508	8.474	8.437	8.407	8.373	8.320	8.246
Short Circuit Current	Isc(A)	9.109	9.069	9.014	8.990	8.954	8.914	8.883	8.847	8.786	8.710
Max. Power Voltage	Vmpp(V)	0.553	0.550	0.547	0.543	0.540	0.536	0.533	0.529	0.526	0.525
Open Circuit Voltage	Voc(V)	0.659	0.656	0.650	0.646	0.642	0.638	0.634	0.630	0.628	0.626

Standard test condition: AM1.5, 1000W/m<sup>2</sup>, 25°C  
Average accuracy of all tests is +/-1.5% rel.

# TSM64TN

## 6" Multi c-Si Solar Cell

### Temperature Coefficients

Current Temperature Coefficient	$\alpha(I_{SC})$	0.05 %/K
Voltage Temperature Coefficient	$\beta(V_{OC})$	-0.30 %/K
Power Temperature Coefficient	$\gamma(P_{MPP})$	-0.37 %/K

Standard test condition: AM1.5, 1000W/m<sup>2</sup>, 25°C

### Processing Recommendations

#### Solder Joint

Copper ribbons coated with 15~25µm:  
62%Sn/36%Pb/2%Ag or 60% Sn/40%Pb

Standard test condition: AM1.5, 1000W/m<sup>2</sup>, 25°C

#### Solderability

##### Peel Strength Minimum

> 1.25 N/mm

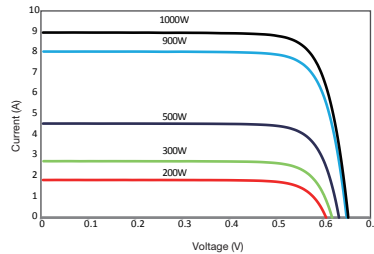
Soldering results may differ due to different flux, ribbons, soldering methods, and parameters.

### Qualifications and Certificates

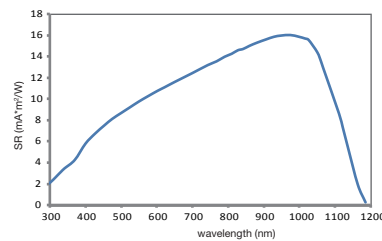


RoHS Compliance  
SVHC tested

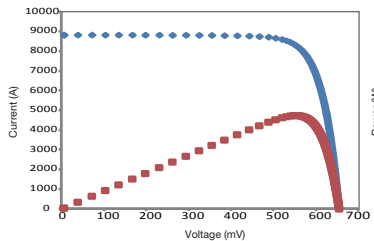
### Typical Current-Voltage Curve



### Typical Spectral Response



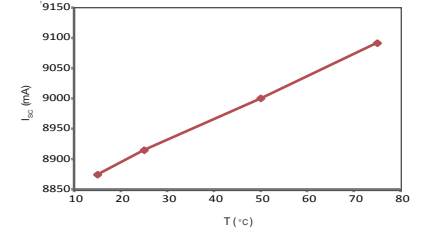
### Typical IV-Power Curve



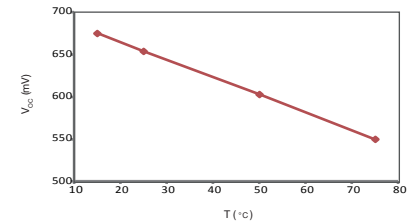
\* All data measured under standard testing condition (STC):  
1000 W/m<sup>2</sup>, AM 1.5, 25 °C.  
\* All figures bear ±2% tolerance.  
\* Reference cell calibrated by the Fraunhofer ISE in Freiburg.

### Calculated Temperature Coefficients

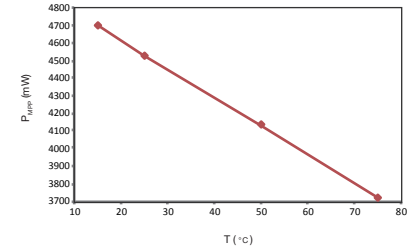
Short Circuit Current  $K(I_{sc}) = (4.40 \pm 0.58) \text{ mA/K}$   
 $K(I_{sc}) = (-0.0493 \pm 0.0065) \% / K$



Open Circuit Voltage  $TK(V_{oc}) = (-1.957 \pm 0.039) \text{ mV / K}$   
 $TK(V_{oc}) = (-0.300 \pm 0.0059) \% / K$



Power  $TK(P_{MPP}) = (-16.979 \pm 0.71) \text{ mW/K}$   
 $TK(P_{MPP}) = (-0.374 \pm 0.016) \% / K$



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Specifications are subject to change without prior notice.  
TSEC reserves the rights of final interpretation  
and revision of datasheet.

Preliminary version-May 2016