

CPV Point Focus Solar Cells

C4MJ Metamorphic Fourth Generation CPV Technology

- ✓ First 40% production cell
- ✓ First fully qualified metamorphic cell

Product Description

Typical Efficiency 40%
 Recommended operating temperature <110°C

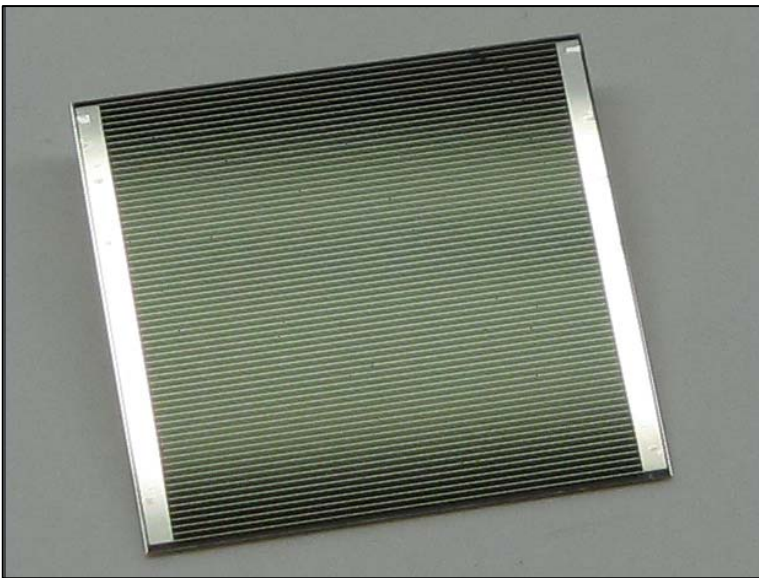
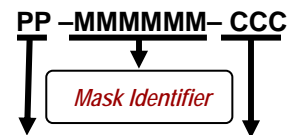
Epitaxial Structure

Triple junction solar cell on Germanium substrate
 GaInP (1.82 eV) / GaInAs (1.33 eV) / Ge (0.66 eV)

Metallization

- Silver metallization on front busbar and grid fingers (optional gold flash finish)
- Silver metallization with 500Å gold on back surface

CPV Cell Ordering Guide



Packaging Format

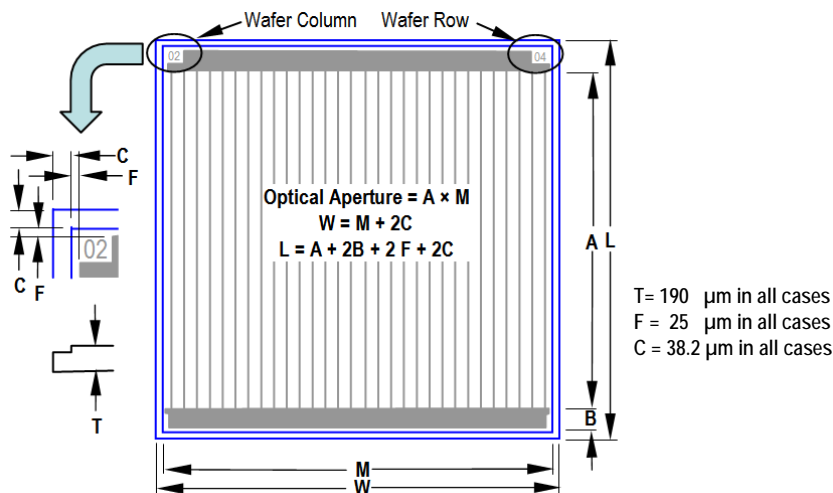
11 – Processed Wafer
 21 – Bare Cell in Waffle Tray

Configuration Options

401 – C4MJ, Silver front contact finish, 100% Tested
 411 – C4MJ, Gold front contact finish, 100% Tested

Example: 21 – 046191 – 411 Bare Cell in Waffle Tray -- 9.99x9.95mm Aperture -- C4MJ Gold Front Contact, 100% Tested

Mechanical Dimensions



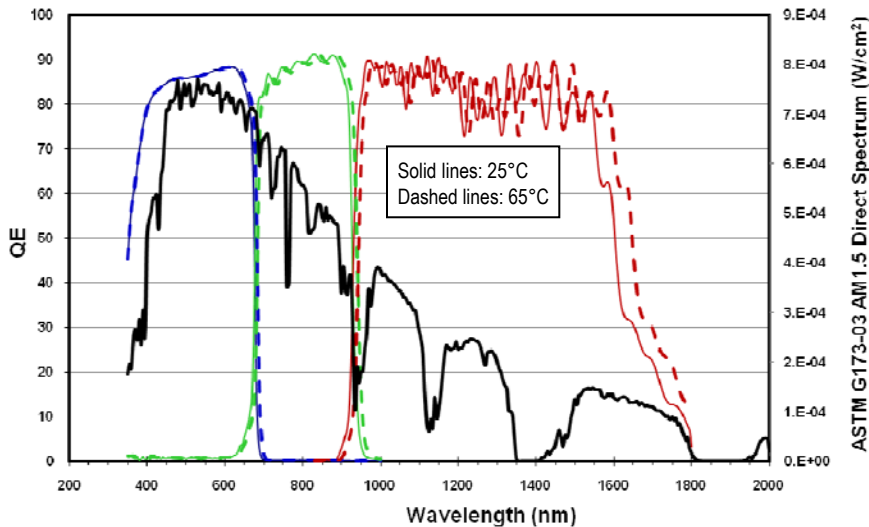
Product	Aperture Area (mm ²)	Aperture Dimensions (mm)		Busbar (μm)
		M	A	
CPV Cell #				
PP-046191 – CCC "CDO-100"	99.00	10.000	9.900	400 μm
PP-046167 – CCC "CDO-086"	86.47	9.299	9.299	252 μm
PP-046192 – CCC "CDO-076"	76.50	8.854	8.640	300 μm
PP-046193 – CCC "CDO-030"	30.74	5.547	5.542	300 μm



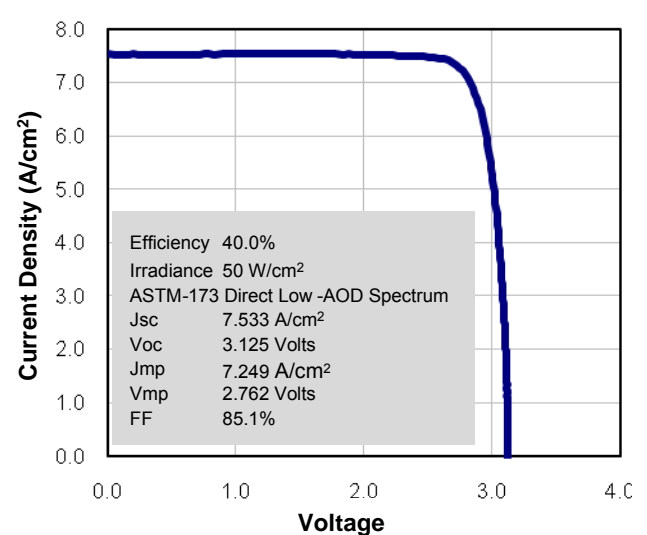
Spectrolab, Inc. 12500 Gladstone Avenue, Sylmar, California 91342 USA

• Phone 818.365.4611 • FAX: 818.361.5102 • Website : www.spectrolab.com

Spectral Response



Typical Current-Voltage Characteristics



Typical Performance Over Temperature

Temperature coefficient of efficiency: $< -0.06\%/^{\circ}\text{C}$

Qualification Tests Completed

Full Qualification Report is available on request (May 2011)

Test	Conditions	Requirement	Results
Performance	50 W/cm ²	Effmp > 37.6% target avg = 40.0%	Avg = 39.8%
Thermal Cycle	1500 cycles, -40°C to +110°C with 10 m dwell	unprotected cell < 2% degradation	NEff = 1.0
Unprotected Cell Damp Heat	1000 hrs, 85°C/85% RH	characterization	NEff > 0.98
High Temperature Soak	Unbiased soak at 180°C, 200°C, 225°C and 250°C	< 0.5% degradation after 25 year lifetime	NEff = 1.0
Outdoor Field Trial	> 10 kW on sun for 6 months	characterization	> 10 kW total
High Temperature Reverse Bias	-0.8V and -1.6V @ 140°C until failure	characterization	Complete
HTOL	1 A & 4 A dark forward bias at 160°C	characterization	NEff > 0.99
ESD	HBM 4000 V, CDM 2000 V	characterization	NEff = 1.0