

ISO9001:2000 Registered • AS9100 Registered

A BOEING COMPANY

WCA-2300-C3MJ Concentrator Solar Cell

Product Description

Device structure	C3MJ
Aperture area	5.1 mm ²
Minimum average efficiency	>38.5%
Typical efficiency	> 39%
Recommended operating temperature	<110°C
Maximum process temperature	<350°C

Epitaxial Structure

Triple junction solar cell on Germanium substrate
GaInP (1.88 eV) / GaInAs (1.41 eV) / Ge (0.67 eV)

Metallization

Silver metallization w/ 2KÅ gold (diffused) on front contact pads
Silver metallization with 500Å gold (diffused) on back surface

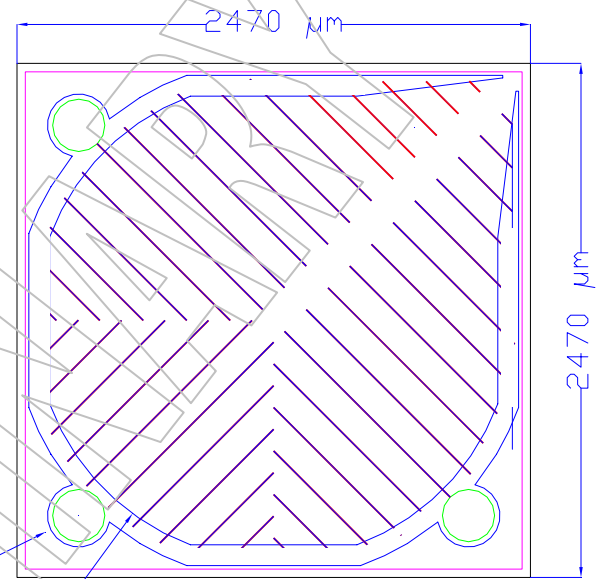
Testing

Wafers can be supplied tested on a sample basis or fully tested with measured current binned at a 2.68V load.

Packaging Format

Parts are in wafer pucks with spider mounts.

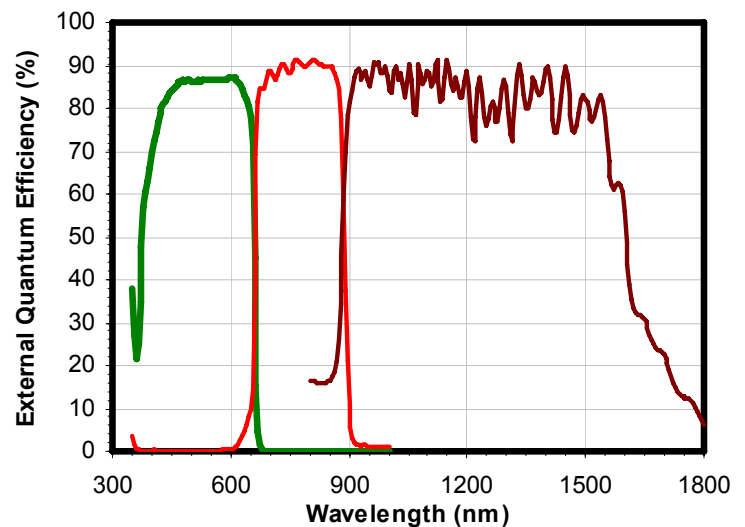
Mechanical Dimensions



Qualification Tests

Test	Test Conditions	Qty	Requirement
Performance Tests			
LIV	50 W/cm ² under ASTM 173G	100%	Avg η_{mp} > 38.5%; Min η_{mp} > 36.2%
Temp Intensity	50, 75 & 100 W/cm ² , ASTM 173G at 10°C, 25°C, 65°C, and 110°C	20	Characterization
Weld Degradation	LIV test before and after weld	100% of scribed parts	$NP_{mp} > 0.98$
Spectral Response			Characterization
Angle of incidence	X25 or SR illumination source	10	Characterization
Solar Absorptance	Measure reflectance	10	Characterization
Accelerated Life Tests			
Damp Heat	85°C, 85% RH for 2000 hours	30	$NP_{mp} > 0.9$
Thermal Cycle	IEEE 1513 (500 cycles -40°C to +110°C)	25	$NP_{mp} > 0.9$
High Temp Soak in Nitrogen	unbiased soak at 200°C and 250°C in Nitrogen	15 at each temperature	$NP_{mp} > 0.95$ after 25 yrs

Spectral Response

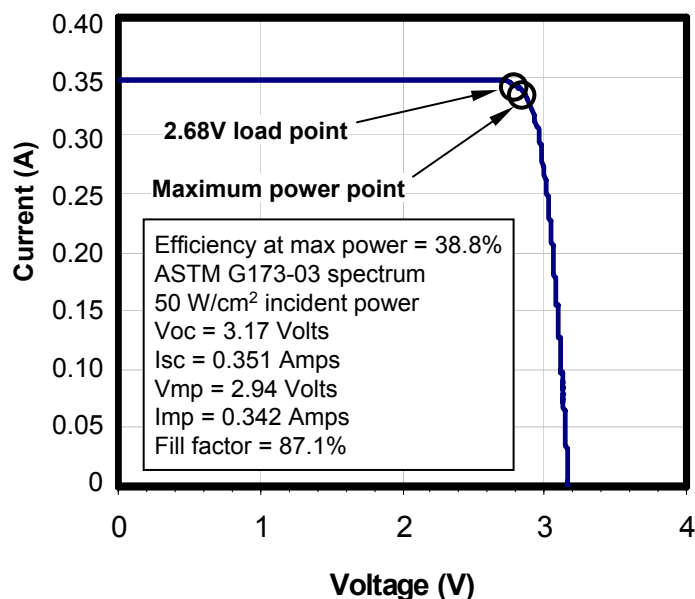


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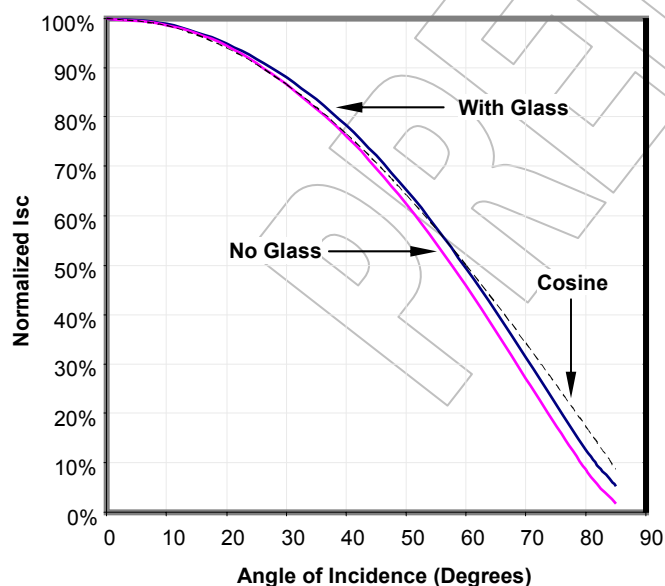
Typical Current-Voltage Characteristics



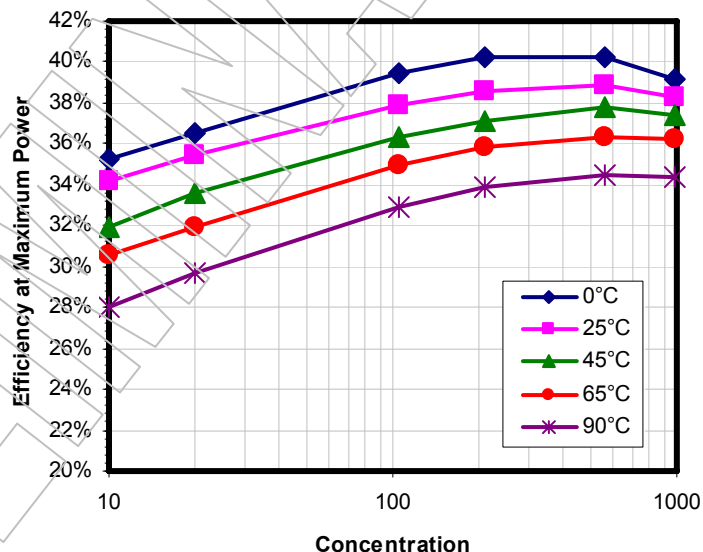
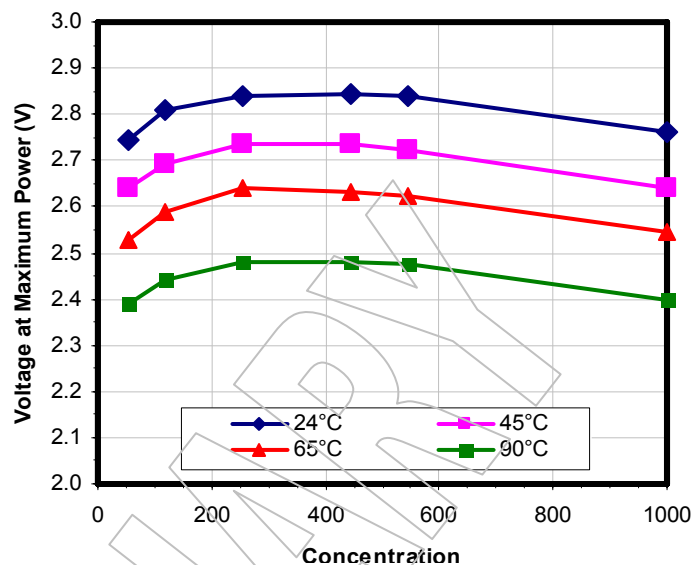
Performance Bins at 2.68V load,
50 W/cm² Intensity

Bin	Current (A)
1	0.317-0.327
2	0.327-0.337
3	0.337-0.347
4	0.347-0.357
5	0.357-0.367
6	0.367-0.377

Response Versus Angle of Incidence



Typical Performance Over Temperature



Typical Population Efficiency Distribution

