

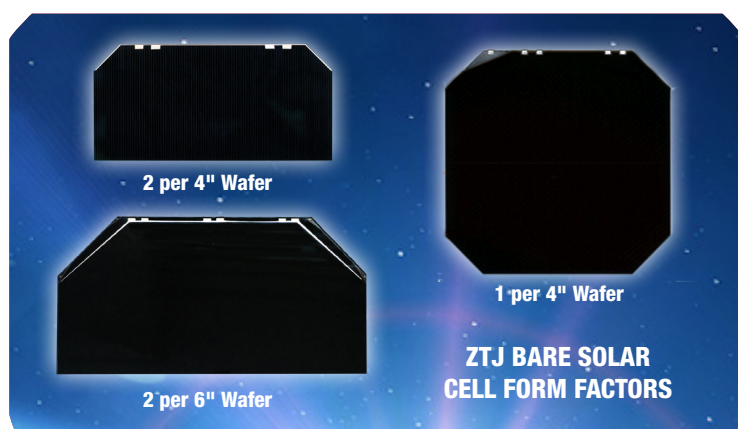
*The World Leader in
Space Power Solutions*

Over 3.5 million flight solar cells delivered!



ZTJ Space Solar Cell

3rd Generation Triple-Junction Solar Cell for Space Applications

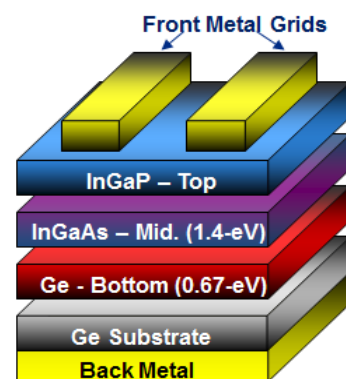


29.5%
Minimum Average Efficiency

Space Qualified & Characterized to the
AIAA-S111-2005 & AIAA-S112-2005 Standards

FEATURES & CHARACTERISTICS

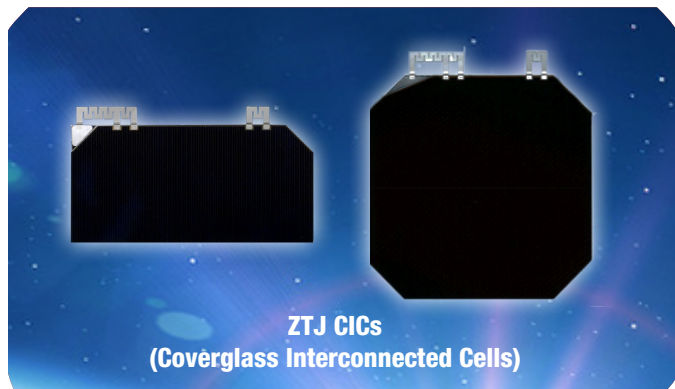
- 3rd generation triple-junction (ZTJ) InGaP/InGaAs/Ge Solar Cells with n-on-p polarity
- Solar cell mass of 84 mg/cm²
- Fully space-qualified with proven large volume manufacturing and flight heritage
- Excellent radiation resistance with P/Po = 0.90 @ 1-MeV, 5E14 e/cm² fluence
- Compatible with corner-mounted silicon bypass diode for individual cell reverse bias protection
- Excellent mechanical strength for reduced attrition during assembly and laydown
- Weldable or solderable contacts
- Custom sizes available
- Available as a Coverglass Interconnected Cell (CIC) for integration onto solar panels



ZTJ Solar Cell Structure

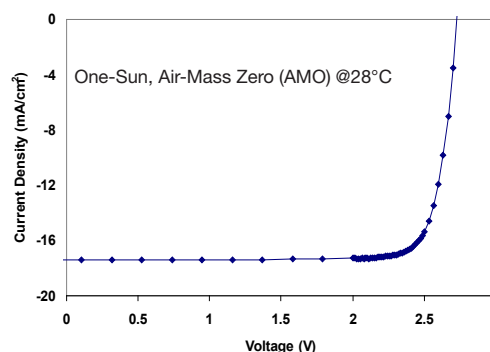
ZTJ Space Solar Cell

3rd Generation Triple-Junction Solar Cell for Space Applications



Typical ZTJ Illuminated I-V Plot

Cell Area Ranges from 20 cm² to 73 cm²



Typical Performance Data

Electrical Parameters @ AMO (135.3 mW/cm ²)	
BOL Efficiency at Maximum Power Point	29.5%
Voc (V)	2.726
Jsc (mA/cm ²)	17.4
Vmp (V)	2.41
Jmp (mA/cm ²)	16.5

Temperature Coefficients

Fluence (e/cm ²)	Voc (mV/°C)	Jsc ⁽¹⁾ (μA/cm ² -°C)	Jmp ⁽²⁾ (μA/cm ² -°C)	Vmp (mV/°C)	Pmp (μW/cm ² -°C)
0	-6.3	11.7	9.1	-6.7	-85.7
1.00 E+ 14	-6.6	11.4	9.1	-7.0	-92.3
1.00 E+ 15	-6.9	11.3	10.6	-7.3	-89.9
1.00 E+ 16	-7.4	11.5	13.4	-6.6	-57.2

(1) Jsc is the symbol for normalized Isc (2) Jmp is the symbol for normalized Imp

Radiation Performance at 1 MeV Electron Irradiation, EOL/BOL Ratios

Fluence (e/cm ²)	Voc	Isc	Vmp	Imp	Pmp ⁽¹⁾
3.00 E+ 13	0.96	0.99	0.98	0.99	0.99
1.00 E+ 14	0.95	0.98	0.97	0.99	0.96
5.00 E+ 14	0.91	0.97	0.93	0.96	0.90
1.00 E+ 15	0.89	0.94	0.91	0.94	0.85
3.00 E+ 15	0.86	0.89	0.87	0.86	0.75
1.00 E + 16	0.82	0.82	0.83	0.74	0.62

(1) Per AIAA-S-111 Standards

Key Space Qualification Results

Test Performed	Industry Quality Standard	Typical Test Results
Metal Contact Thickness	4-8 μm	6 μm
Dark Current Degradation after reverse bias	ΔI _{spec} <2%	<0.4%
Electrical Performance after 2,000 thermal cycles -180°C to +95°C	<2%	No Change
Contact Pull Strength	>300 grams	>600 grams
Electrical Performance Degradation after 40 day humidity exposure at 60°C and 95% relative humidity	<1.5%	No measurable difference

