

ZTJ Photovoltaic Cell

Advanced Triple-Junction Solar Cell for Space Applications



DATASHEET

SPACE PHOTOVOLTAICS

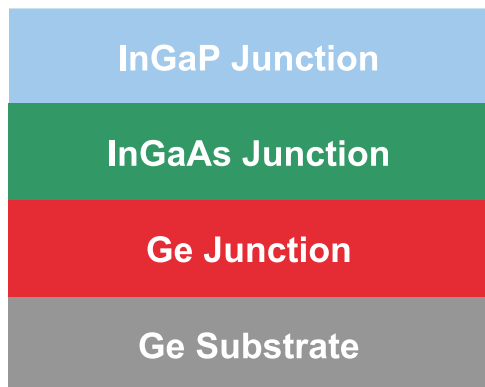


Typical Performance Data

■ Electrical Parameters @ AM0 (135.3 mW/cm²)

BOL Efficiency at Maximum Power Point	29.5%
V _{OC}	2.726V
J _{SC}	17.4 mA/cm ²
V _{MP}	2.41V
J _{MP}	16.5 mA/cm ²

ZTJ Solar Cell Structure



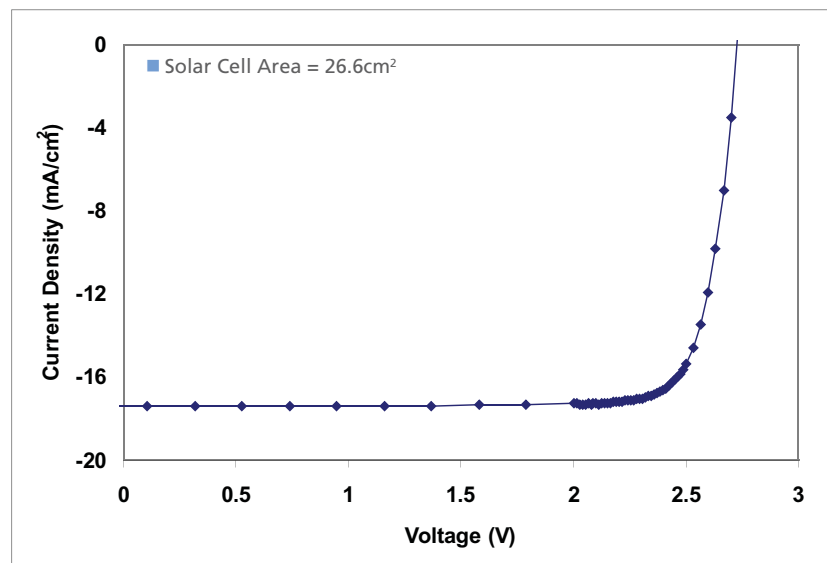
29.5% Minimum Average Efficiency

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

Features & Characteristics

- Lowest solar cell mass of 84 mg/cm²
- 3rd Generation Triple-Junction (ZTJ) InGaP/InGaAs/Ge Solar Cells with n-on-p Polarity on 140- μ m Uniform Thickness Substrate
- Fully space-qualified with proven flight heritage
- Excellent radiation resistance with P/Po = 0.90 @ 1-MeV, 5E14 e/cm² fluence
- Designed to accept corner-mounted silicon bypass diode for individual cell reverse bias protection
- Good mechanical strength for reduced attrition during assembly and laydown
- Weldable or Solderable contacts
- Standard and custom sizes available

Typical ZTJ Illuminated I-V Plot



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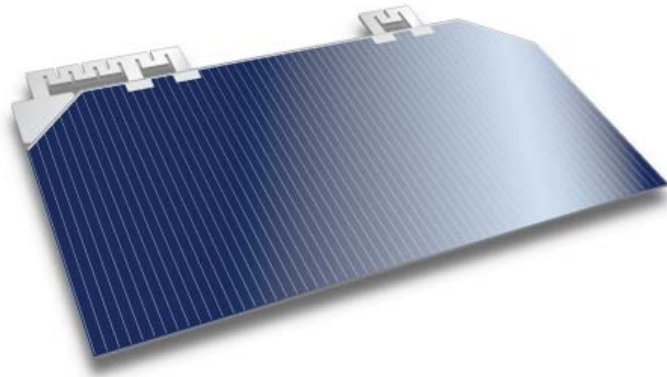
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SOLAR POWER

Optional Covered Interconnect Cell (CIC) Configurations



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	$\Delta I_{\text{spec}} < 2\%$	$< 0.4\%$
Electrical performance after 2,000 thermal cycles -180°C to +95°C	$< 2\%$	No change
Contact pull strength	> 300 grams	> 1000 grams
Electrical performance degradation after 60 day humidity exposure at 45°C and 95% relative humidity	$< 1.5\%$	No change

- For complete qualification results, please request EMCORE's ZTJ Qualification & Characterization Report EWRP0458

About EMCORE Corporation



Emcore Photovoltaics Albuquerque, NM

- Incorporated in 1984
- Appx. 900 Employees
- Nasdaq: EMKR

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

Fluence (e/cm^2)	Voc	Isc	Vmp	Imp	Pmp
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

Temperature Coefficients

Fluence (e/cm^2)	Voc (mV/°C)	Jsc ⁽¹⁾ ($\mu\text{A}/\text{cm}^2\text{-}^\circ\text{C}$)	Jmp ⁽²⁾ ($\mu\text{A}/\text{cm}^2\text{-}^\circ\text{C}$)	Vmp (mV/°C)	Pmp ($\mu\text{W}/\text{cm}^2\text{-}^\circ\text{C}$)
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

Regulatory



EMCORE CORPORATION
ISO 9001 CERTIFIED



EMCORE PHOTOVOLTAICS
AS9100 CERTIFIED