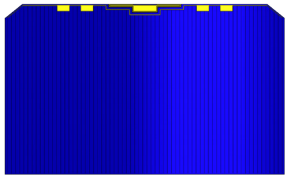
ZTJM Space Solar Cell

Advanced Triple-Junction Solar Cell with Monolithically Integrated Bypass Diode (MBD) for Space Applications

DATASHEET - JUNE 2015

29.0% Minimum Average Efficiency

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

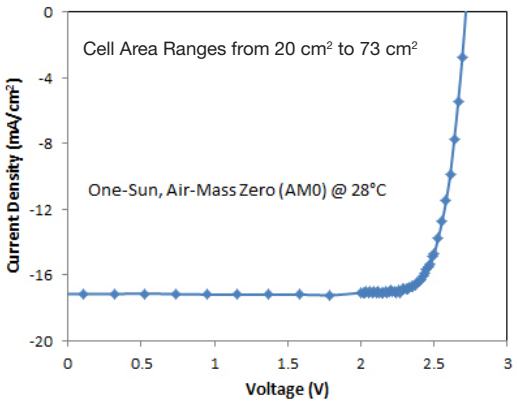


ZTJM Solar Cell

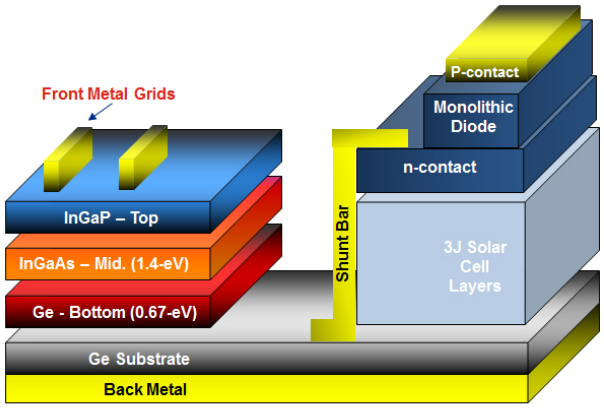
Features & Characteristics

- Solar cell mass of 84 mg/cm^2
- 3rd generation triple-junction (ZTJ) InGaP/InGaAs/Ge solar cells with n-on-p polarity
- ZTJ cell is fully space-qualified with proven large volume manufacturing and flight heritage
- Excellent radiation resistance with P/Po = 0.90 @ 1-MeV, 5E14 e/cm^2 fluence
- ESD-hard monolithically integrated 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

Typical ZTJM Illuminated I-V Plot



ZTJM Solar Cell Structure



ZTJ Solar Cell & Monolithic Bypass Diode Structure

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Typical Performance Data

Electrical Parameters @ 28°C, AM0 (135.3 mW/cm²)	
BOL Efficiency at Maximum Power Point	29%
Voc (V)	2.715
Jsc (mA/cm²)	17.1
Vmp (V)	2.38
Jmp mA/cm²)	16.5

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

Fluence (e/cm²)	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

Temperature Coefficients

Fluence (e/cm²)	Voc (mV/°C)	Jsc(1) (µA/cm²-°C)	Jmp(2) (µA/cm²-°C)	Vmp (mv/°C)	Pmp (µW/cm² - °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

Key Space Qualification Results

Test Performed	Industry Quality Standard	Typical Test Results
Metal Contact Thickness	4-8 µm	8 µm
Dark Current Degradation after reverse bias	ΔIspec<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
MBD ESD Exposure (64A/1.8us/10x, 30A/150us/10x, 10.5A/300us/100x)	N/A	Irb <50 uA @ -2.5V, VDTO < 2.3 V @ 650 mA (pass)
Bias Testing	N/A	Pass
Electron Irradiation (1MeV @ 5E14, 1E15, 3E15)	N/A	< ±25% VDTO change, pass
Humidity (45 °C/90% RH/60days)	<2% average, <3% max Pmp degradation	Cell and Diode Pass

MADE IN USA · ISO 9001 QUALITY ASSURANCE · AS 9100

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