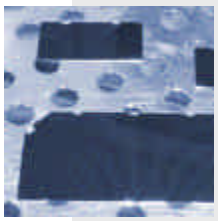
InGaP/GaAs/Ge Triple-Junction Solar Cells



Solar Cell Characteristics

- True Triple-Junction n on p polarity
- Epitaxial materials grown in EMCORE *Turbo*Disc® MOCVD reactors with proven excellent uniformity and repeatability
- Cells can be welded or soldered
- Size: 76.10 ±0.05 x 37.16±0.05 mm² with two cropped triangular corners of 8.5 x 8.5 mm², or any custom sizes
- Area: 27.5 cm² standard or up to 30 cm^2
- Thickness: 155 µm (6 mil), uniform thickness
- Mass: 2.4 g (including one by-pass diode), 86 mg/cm²

Features and Benefits

- Triple-junction 26.0% BOL efficiency
- Highest radiation resistance: P/Po =0.91 @ 1-MeV, 5E14 e/cm^2
- Advanced product roadmap for higher efficiencies
- Mechanical strength enhanced 3X for reduced attrition in CIC and laydown
- Smooth rear surface for ease of laydown with reduced adhesive
- ISO 9001 certified

Basic Triple-Junction Structure

InGaP Junction
GaAs Junction
Ge Junction
Ge Substrate

Typical Performance Data

- BOL Efficiency at 28° C: 26.0%
- Remaining Power after 1E15 e^-/cm^2: 0.87
- Remaining Power after 5E14 e^-/cm^2 : 0.91
- Temperature Ceofficient : 0.060 abs.%/°C
- EOL Efficiency at 5E14 e^-/cm^2 : 23.7%

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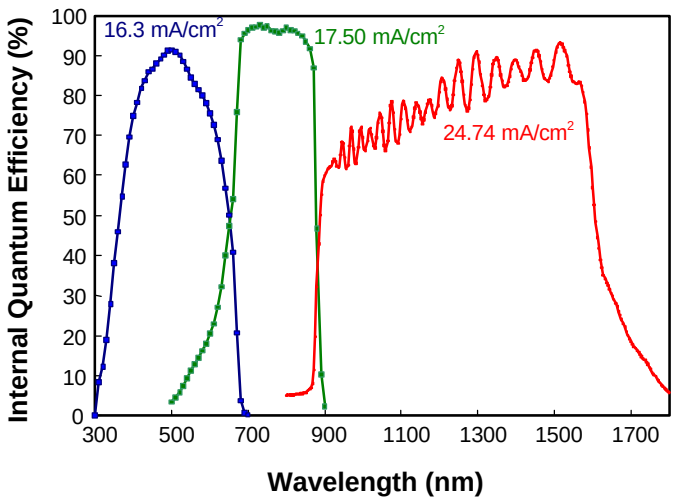
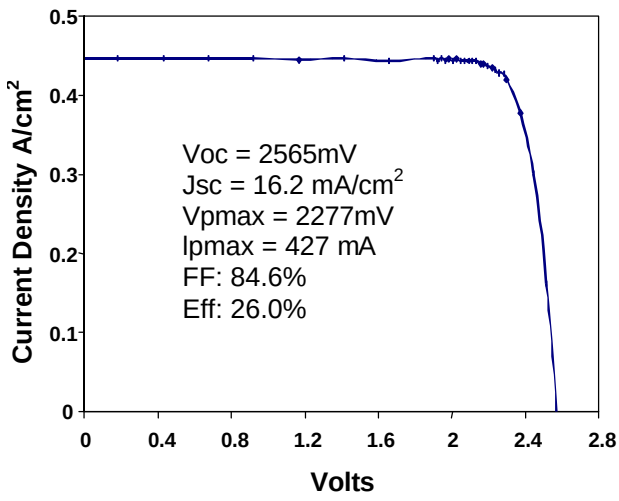
Space Qualification Results

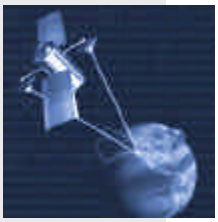
Test	Description	Results
Humidity	+45°C, 95% RH, 30 days	<0.16%
Thermal	2000 Cycles, -180 to +95°C	<0.2% Degradation
Radiation	1 MeV: 1E15 e/cm^2 Electrons: 5E14 e/cm^2	$P_{mp} / P_{mpo} = 0.87$ $P_{mp} / P_{mpo} = 0.91$
Absorbance	CMG MgF_2 coated	0.90



Beginning-of-Life current generation in the multi-junction stack designed for best End-of-Life performance



Flight cell Beginning-of-Life efficiency for any shipment to range from 24.5% to 28%



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