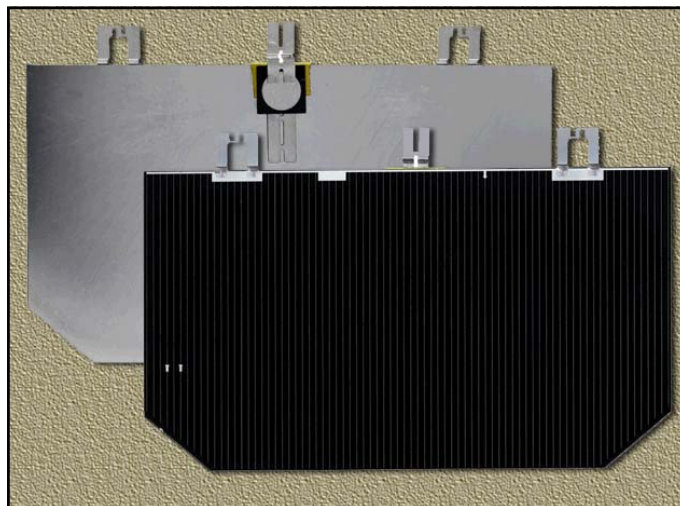


28.0% Ultra Triple Junction (UTJ) Solar Cells

Features

- High efficiency n/p design (28°C, AM0)
 - BOL: 28.0% min. average efficiency @ maximum power (27.7% @ load voltage)
 - EOL: 24.1% min. average efficiency @ maximum power, 1 MeV 1E15 e/cm²
- Monolithic diode-ready/ heritage bypass diode protection
- 140 µm Ge wafer thickness



Product Description

Substrate	Germanium
Solar Cell Structure	GaInP ₂ /GaAs/Ge
Method of GaAs Growth	Metal Organic Vapor Phase Epitaxy
Device Design	Monolithic, two terminal triple junction. n/p GaInP ₂ , GaAs, and Ge solar cells interconnected with two tunnel junctions
Sizes	Up To 32 cm ²
Assembly Method	Multiple techniques including soldering, welding, thermocompression, or ultrasonic wire bonding

Note: Other Variations Are Available Upon Request

Heritage

- More than 800 kW of multi-junction cells produced
- More than 300 kW of multi-junction arrays *on orbit*
- 1 MW annual capacity - cells, panels & arrays
- On orbit performance for multi-junction solar cells validated to ± 1.5% of ground test results

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Typical Electrical Parameters

(AM0 (135.3 mW/cm²) 28°C, Bare Cell)

J_{sc}= 17.00 mA/cm²

J_{mp}= 16.16 mA/cm²

J_{load min avg}= 16.22 mA/cm²

V_{oc}= 2.660 V

V_{mp}= 2.345 V

V_{load}= 2.310 V

Cff= 0.83

Eff_{load}= 27.7%

Eff_{mp}= 28.0%

Radiation Degradation

(Fluence 1MeV Electrons/cm²)

Parameters	1x10 ¹⁴	5x10 ¹⁴	1x10 ¹⁵
I _{mp} /I _{mp0}	0.99	0.98	0.95
V _{mp} /V _{mp0}	0.94	0.92	0.90
P _{mp} /P _{mp0}	0.93	0.90	0.86

Thermal Properties

Solar Absorptance= 0.92 (Ceria Doped Microsheet)

Emittance (Normal)= 0.85 (Ceria Doped Microsheet)

Weight

84 mg/ cm² (Bare) @ 140 μm (5.5 mil) Ge wafer thickness

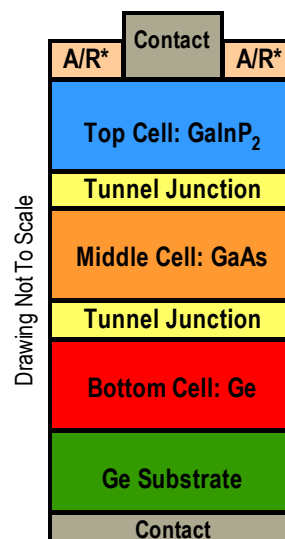
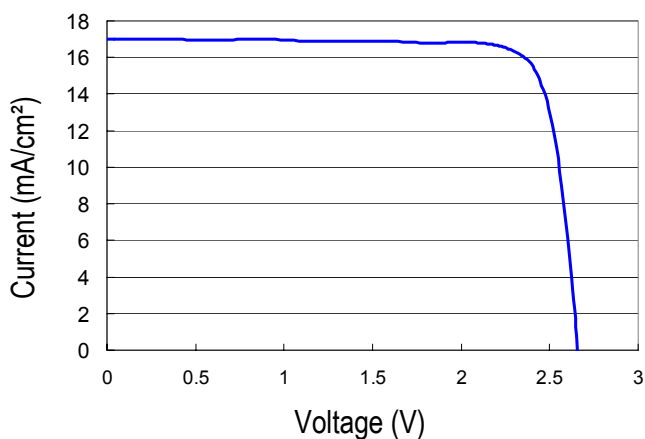
Temperature Coefficients (15°C - 75°C)

(Preliminary)

Parameters	BOL	5x10 ¹⁴ (1 MeV e/cm ²)
J _{mp} (μA/cm ² /°C)	2	5
J _{sc} (μA/cm ² /°C)	5	7
V _{mp} (mV/°C)	-6.5	-6.7
V _{oc} (mV/°C)	-5.9	-6.3

Typical IV Characteristic

AM0 (135.3 mW/cm²) 28°C, Bare Cell



*A/R: Anti-Reflective Coating

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The information contained on this sheet is for reference only.
Specifications subject to change without notice. 9/22/2003