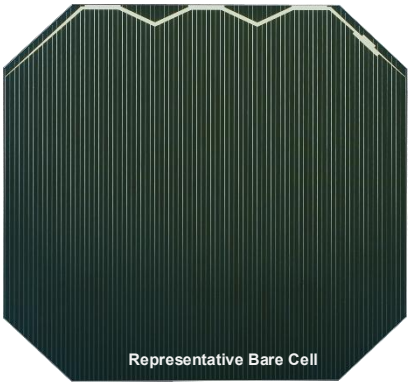
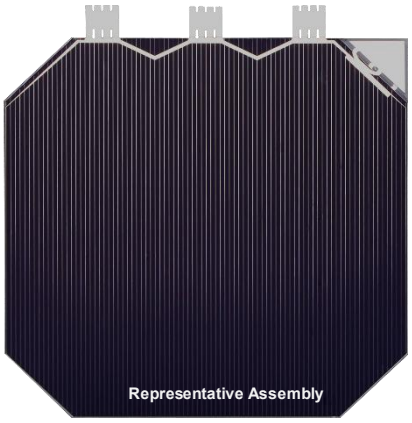
AZUR SPACE
A 5N PLUS COMPANY

30% Triple-Junction (TJ) III-V Bare Solar Cells & Assemblies

TJ 3G30-Advanced (8x8)

Providing best cost-performance ratio for space applications





AZUR SPACE Product Identifiers	Bare Cell	Assembly (SCA / CIC)
AZUR SPACE Material (Part) Number	81780	81752
AZUR SPACE Drawing Number	ZP-0005107	ZP-0005109

AZUR SPACE's 3G30-Advanced bare solar cells and solar cell assemblies ("SCA"), or CICs (Cell-interconnect-coverglass) are the ideal solution for space power applications in conventional or in New Space segments. The award-winning 3G30-Advanced technology design offers proven best-in-class end-of-life (EOL) performance at lowest Cost-per-Watt, enabling a multitude of heritage options for all orbits and missions.

The 3G30C-Advanced bare cell device is a space-qualified InGaP/GaAs/Ge triple-junction solar cell originating from a 100 mm germanium (Ge) substrate and provides 30% class beginning-of-life (BOL) efficiency. This device includes AZUR SPACE's proprietary radiation-hardened design for best EOL performance. Our standard cell features well-proven metallization as well as an improved busbar and grid-design with three contact pads plus one for a discrete bypass diode connection and a standard cell size of 60.35 cm² (8 cm x 8 cm, or "8x8"). This configuration offers a bare cell total thickness of 150 µm. The 3G30C solar cell is compatible with an external bypass diode, which is also available from AZUR SPACE together with bare cell orders.

The 3G30A assembly includes a bare 3G30C-Advanced solar cell, a corner-mounted silicon bypass diode, welded out-of-plane silver-coated Kovar interconnectors ("ICs"), and a 100 µm AR coated coverglass bonded with space-grade heritage adhesive. The assembly has a standard size of 61.46 cm² (glass size) and has an assembly total device thickness of 280 µm. A digital CAD / CAM STEP file as well as digital device photographs of bare cell or assembly are available upon request.

Other non-standard sizes, thicknesses and configurations are also available upon request. Thickness and mass values and variations of the above standard devices are shown below.

The 3G30-Advanced technology, cells and assemblies are ECSS-E-ST-20-08C (Rev. 1) qualified. These devices are all produced in our mature MRL-10 Heilbronn facility. Our technology and products have demonstrated in-orbit TRL-9 level heritage. AZUR SPACE is certified to ISO 9001:2015 (QMS), EN 9100:2018 (QMS, European equivalent to AS 9100D), as well as ISO 14001:2015 (Environmental) and ISO 45001:2018 (Health & Safety).

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Certified Company

30% Triple-Junction Bare Solar Cells & Assemblies
TJ 3G30-Advanced (8x8)

Design and Mechanical Data	3G30C-Adv. Bare Cell	3G30A-Adv. Assembly (SCA / CIC)
AZUR SPACE Material (Part) Number	81780	81752
Base Material	InGaP/GaAs/Ge on Ge	InGaP/GaAs/Ge on Ge
AR-Coating	TiO_2/Al_2O_3	TiO_2/Al_2O_3
Outer Dimensions (mm)	80.00 (± 0.1) x 80.00 (± 0.1)	80.15 (± 0.05) x 80.15 (± 0.05)
Cell Area (cm^2)	60.35	61.46 glassed area (cell area is 60.35)
Average Weight	≤ 86 mg/cm^2 / 5.2 grams	≤ 118 mg/cm^2 / 7.1 grams
Thickness (µm)	150 (± 50)	280 (± 50)
Coverglass	n/a	100 µm AR coated
Contacts	3x front side pads (plus diode pad)	3x Interconnects
Interconnector Configuration	n/a	Out-of-Plane
Interconnector Material	n/a	Silver (Ag) coated Kovar
Interconnector Dimensions	n/a	6.5 mm x 7.52 mm x 25 µm

Typical Electrical Performance		BOL		5E13		2.5E14		5E14		1E15		1E16	
		Cell	CIC	Cell	CIC	Cell	CIC	Cell	CIC	Cell	CIC	Cell	CIC
V_{oc}	[mV]	2700	2700	2633	2633	2584	2584	2552	2552	2519	2519	2341	2341
I_{sc}	[mA]	1040	1030	1036	1026	1034	1024	1032	1022	1002	992	796	788
V_{mp}	[mV]	2400	2400	2326	2326	2287	2287	2251	2251	2220	2220	2117	2117
I_{mp}	[mA]	1008	998	1002	992	1000	990	997	987	969	959	720	713
η (1367 W/m^2)	[%]	29.3	29.0	28.2	28.0	27.7	27.4	27.2	26.9	26.1	25.8	18.5	18.3
η (1353 W/m^2)	[%]	29.6	29.3	28.5	28.3	28.0	27.7	27.5	27.2	26.3	26.1	18.7	18.5

QTR 3558-00-01, QTR 4151-01-01, QTR 4761-01-01. Standard: CASOLBA 2005 (05-20MV1, etc.); Spectrum: AM0 WRC, 1367 W/m^2; T = 28°C, fluence 1 MeV e- [e/cm^2], Other fluences and proton degradation data available on request. Radiation hardness is periodically assessed.

Typical Temperature Coefficients		BOL	2.5E14	5E14	1E15
		Cell or CIC	Cell or CIC	Cell or CIC	Cell or CIC
$\Delta V_{oc}/\Delta T$	[mV/°C]	-6.2	-6.5	-6.6	-6.7
$\Delta I_{sc}/\Delta T$	[mA/°C]	0.72	0.66	0.70	0.76
$\Delta V_{mp}/\Delta T$	[mV/°C]	-6.7	-6.8	-7.1	-7.2
$\Delta I_{mp}/\Delta T$	[mA/°C]	0.48	0.40	0.48	0.56

QTR 3558-00-01, QTR 4151-01-01, QTR 4761-01-01; Temperature range 28°C – 140°C; fluence 1 MeV e- [e/cm^2]

Other Information	Item	Typical Value
Diode (Assemblies)	External Si Protection Diode	$V_{forward}$ (620 mA) ⩽ 0.8 V (T = 25°C ± 3°C) $I_{reverse}$ (4 V) ≤ 0.1 µA
Threshold Absorptivity	Absorptivity Value	≤ 0.91 (100 µm AR coverglass)
Threshold Pull Test	Pull Test Values	> 1.6 N at 45° (with 12.5 µm Ag strips) > 7.0 N at 0° (with standard Kovar interconnectors)

These performance data reflect a defined configuration at a specific mission environment across a large manufacturing population. Changes in configuration or production order volume may modify typical performance values.

Please refer to the AZUR SPACE **General Information Sheet** for additional information including in-orbit heritage, quality certifications, business licenses, product registrations and general company information at **www.azurspace.com**. Contact information is shown below and is also available on our website.

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