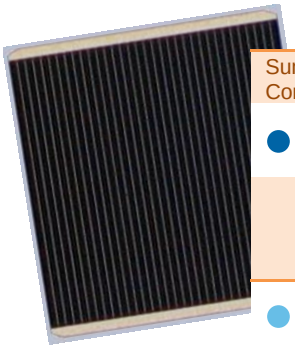
Concentrator Triple Junction Solar Cell

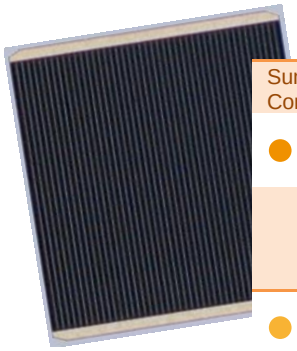
Cell Type: 3C44 – 5,5 x 5,5mm²

Application: Concentrating Photovoltaic (CPV) Modules

Typical Average Electrical Data

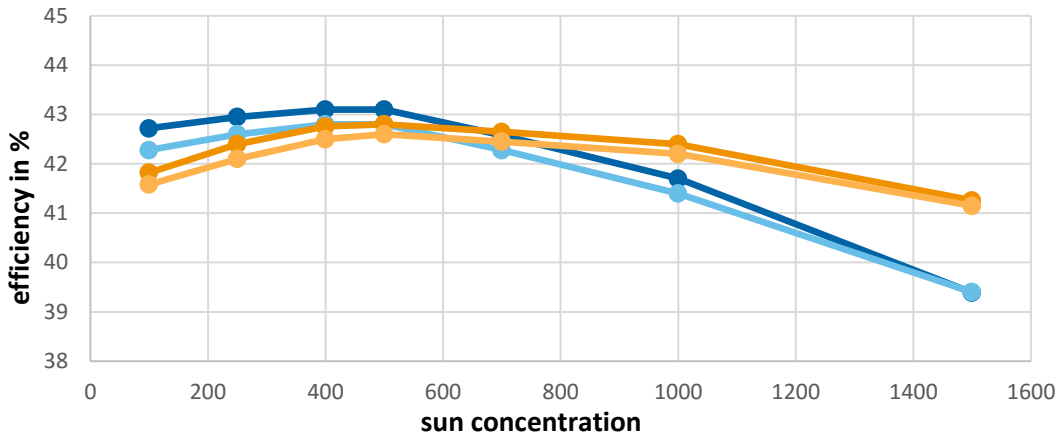


Sun Concentration	I_{sc} [A]	V_{oc} [V]	I_{MPP} [A]	V_{MPP} [V]	P_{MPP} [W_{MPP}]	FF [%]	ŋ [%]
Version MC/Air Grid optimized for medium concentration + Antireflective Coating adapted to air							
X 250	1,19	3,08	1,17	2,80	3,28	89,5%	42,9
X 500	2,39	3,11	2,34	2,81	6,55	88,3%	43,1
X 1000	4,80	3,14	4,66	2,73	12,74	84,5%	41,7
Version MC/Glass Grid optimized for medium concentration + Antireflective Coating adapted to glass							
X 250	1,18	3,08	1,16	2,80	3,26	89,5%	42,6
X 500	2,37	3,11	2,32	2,81	6,51	88,5%	42,8
X 1000	4,74	3,14	4,63	2,73	12,65	85,0%	41,4



Sun Concentration	I_{sc} [A]	V_{oc} [V]	I_{MPP} [A]	V_{MPP} [V]	P_{MPP} [W_{MPP}]	FF [%]	ŋ [%]
Version HC/Air Grid optimized for high concentration + Antireflective Coating adapted to air							
X 250	1,17	3,07	1,15	2,80	3,25	90,0%	42,4
X 500	2,35	3,11	2,31	2,83	6,55	89,3%	42,8
X 1000	4,71	3,15	4,60	2,82	13,00	87,5%	42,4
Version HC/Glass Grid optimized for high concentration + Antireflective Coating adapted to glass							
X 250	1,16	3,05	1,14	2,82	3,21	90,8%	42,1
X 500	2,33	3,13	2,28	2,86	6,53	89,3%	42,6
X 1000	4,68	3,16	4,59	2,81	12,90	87,4%	42,2

Efficiency versus Sun Concentration



Measurement conditions: 1.5 AMd – 1000 W/m² (ASTM G 173-03), T = 25 °C, designated measurement area = 30,53 mm²

3C44

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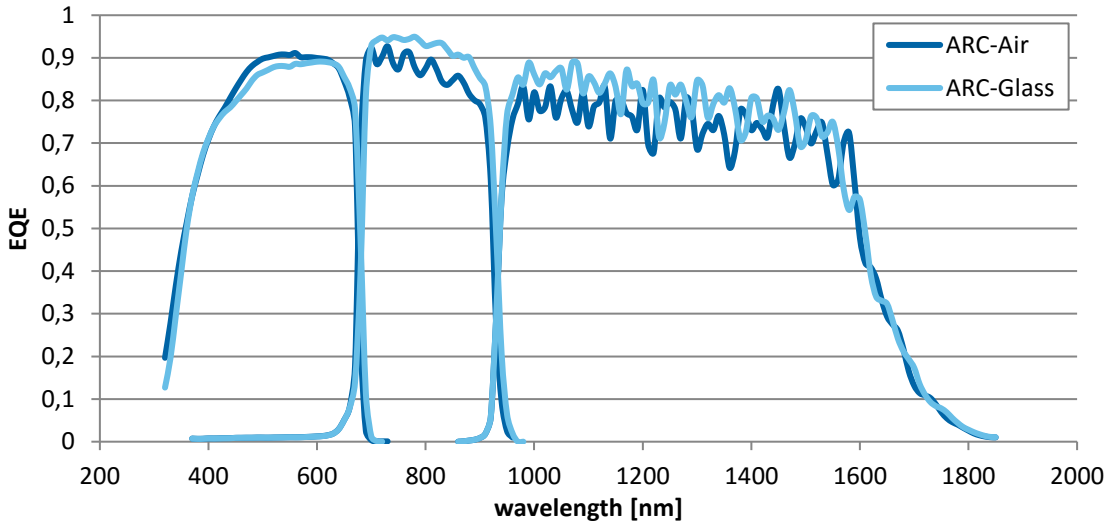
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Certified Company

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CPV

Spectral Response



Typical Temperature Coefficients

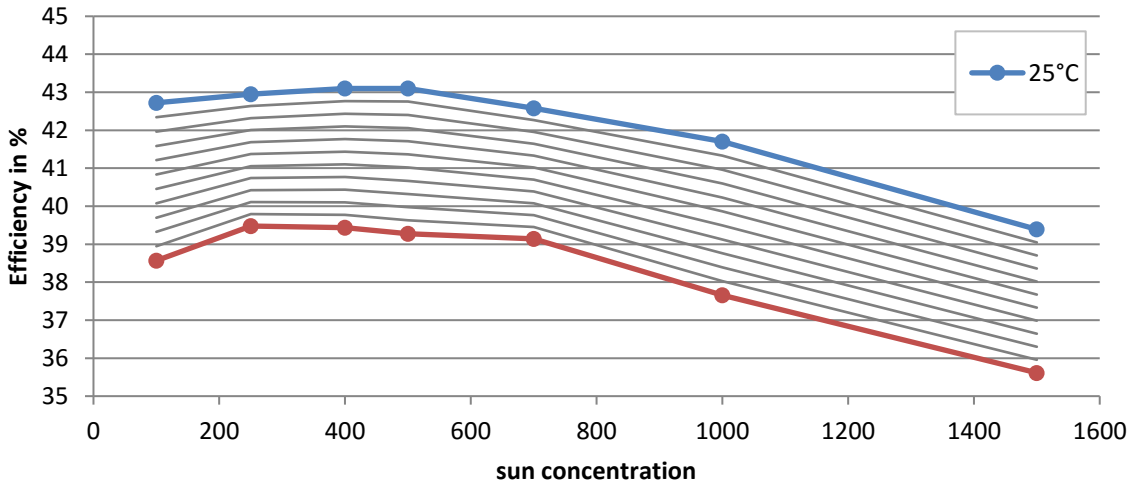
Temperature range (25 – 80 °C)

Parameter	$(\Delta I_{sc} / I_{sc\,(25°C)}) / \Delta T$	$(\Delta V_{oc} / V_{oc\,(25°C)}) / \Delta T$	$(\Delta P_{mpp} / P_{mpp\,(25°C)}) / \Delta T$	$(\Delta \eta / \eta_{(25°C)}) / \Delta T$
Value	0,080%/K	-0,135%/K	-0,106%/K	$-0{,}106\%_{(rel)}$/K
Parameter	$\Delta I_{sc} / \Delta T$	$\Delta V_{oc} / \Delta T$	$\Delta P_{mpp} / \Delta T$	$\Delta \eta / \Delta T$
Value	1,8 mA/K	-4,2 mV/K	-6,9 mW/K	$-0{,}046\%_{(abs)}$/K

Exemplary values measured with version MC/Air, at 500 suns

Typical Performance over Temperature

Exemplary for version MC/Air



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Version Comparison

Opto Electrical Behaviour	
Antireflective Coating	Efficiency change on glass covered cells
Version Air	-3,2 %(rel)
Version Glass	-0,4 %(rel)

Efficiency comparison at 500 suns

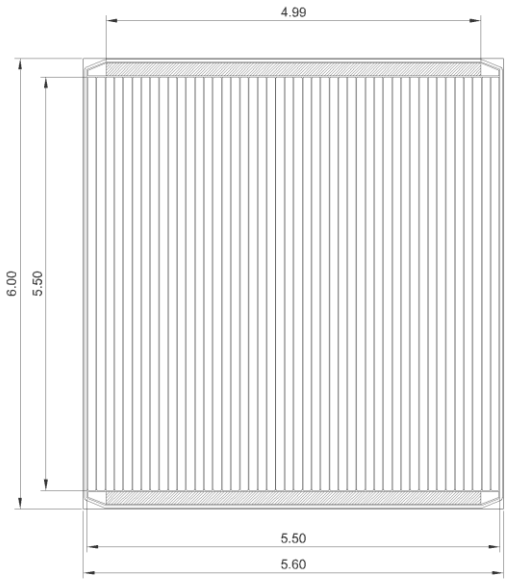
Influence of Cell Dimension	
Active Area	Typical efficiency (Version MC/Air at 250 suns)
3 x 3 mm	44,0 %
5,5 x 5,5 mm	42,9 %
10 x 10 mm	42,1 %

Design and Mechanical Data

Base Material	GaInP/GaInAs/Ge on Ge substrate
AR coating	TiO_x/AlO_x
Chip size	5,6 mm x 6,0 mm = 33,60 mm²
Active Cell Area	5,5 mm x 5,5 mm = 30,25 mm²
Cell thickness	190 µm ± 20 µm
Polarity	N on P
Thickness of front contact	≥ 2,8 µm (finish is an Ag/Au alloy)
Thickness of back contact	≥ 2,6 µm (finish is an Ag/Au alloy)
Assembly methods	suitable for welding, soldering and bonding

Layout details

Drawing dimension are mm



Sample drawing shows version with HC-grid design; More details in drawing HNR 0003781 and HNR 0003780, available on request.

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Storage and Operation Conditions Requirements

- Humidity protection is strongly recommended
- Storage in dry air or nitrogen atmosphere is requested
- As front side interconnector material we recommend gold or silver
- We recommend to use Sn96.5/Ag3.5-solder or another solder with saturated silver for rear side assembly
- A void free rear side assembly (heat sink) is requested to avoid hot spots
- The cell junction shall not exceed a maximum operation temperature of 110° C
- Secondary glass glue on the front side has to be flexible (prefer silicone glue or similar)

Additional Information

- Current values at specific operating voltage can be offered on customer request
- Explanation of ARC versions:
  - AIR:
    The antireflective coating on top of the solar cell is optimized for the interface to air. In this kind of application the light enters the solar cell directly from air. The indoor test measurement (flash test) will be done at air atmosphere.
  - GLASS:
    The antireflective coating on top of the solar cell is optimized for the interface to glass or similar (n≈1.43). At this kind of application the light enters the solar cell through a glass component or similar (e.g. secondary element, homogenizer element, cover glass). However, the indoor test measurement (flash test) will be done at air atmosphere without glass interface. Therefore the flash test results will underestimate the potential cell performance. The performance of a system with glass interfaces is expected to be higher using cells with ARC Glass than with ARC Air.
- Acceptance test rules for delivery lots:
  - Minimum average efficiency = typical average value minus 2% (rel.)
  - Minimum individual cell efficiency = typical average value minus 5% (rel.)

Order Information

Product Version	 wafer (not diced)	 diced wafer, mounted on a tape
MC/Air	81252	81254
MC/Glass	81255	81256
HC/Air	81257	81258
HC/Glass	81259	81260

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