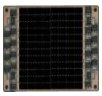
Advanced Dense Array Module (ADAM)
Product Type: Concentrator Triple Junction Solar Cell Module – 3C30M
Application: Concentrating Photovoltaic (CPV) Sytem for Dish Application

General

AZUR SPACE's **A**dvanced **D**ense **A**rray **M**odule (ADAM) is intended to be used in HCPV receivers with reflective optics, e.q. parabolic mirrors. It consists of a two-dimensional array of high efficiency solar cells mounted on a cooling element. Electrical protection of solar cells against reverse voltage is provided by bypass diodes. The solar cells and diodes within ADAM are completely interconnected and only electrical connection to the external circuitry and connection to cooling system shall be provided by system integrator. For requested thermal management of the module, an active liquid cooling system is necessary. The ADAM module has to be protected against all environmental influences (e.q. water, humidity, dust, pollution, etc.).



Design and Mechanical Data

Base Solar Cell Material	GaInP/GaAs/Ge on Ge substrate
Base Cooler Material	Copper and AlN Ceramic
AR Coating Solar Cell	TiO_x/Al_2O_x
Module Size	17,8 cm x 12,7 cm
Module Active Area	11,77 cm x 12,1 cm = 142,417 cm²
Cooler Thickness without fittings	ca. 0,9 cm
Cooler Thickness with fittings	ca. 2,9 cm
Total module thickness	ca. 3,4 cm
Electrical plus contact	suitable for clamp process
Electrical minus contact	suitable for clamp process

Typical Electrical Data

(Measurement condition: 1.5 AMd – 1000 W/m² (ASTM G 173-03), T = 25° C)

Sun concentration	I_{SC} [A]	V_{OC} [V]	I_{MPP} [A]	V_{MPP} [V]	P_{MPP} [kW_{MPP}]	FF [%]	η [%]
x 700	53	76	50	64	3,20	79,5	32,0

Values are valid for homogeneous illumination only!

Bypass diode protection is provided for each segment.
Inhomogeneous illumination, a lower light intensity or higher temperatures will reduce the power output.

Typical Temperature Coefficients of Solar Cell (@ 500 suns)

Temperature range (25 – 80°C)

Parameter	$(\Delta I_{sc} / I_{sc\ (25°C)}) / \Delta T$	$(\Delta V_{oc} / V_{oc\ (25°C)}) / \Delta T$	$(\Delta P_{mpp} / P_{mpp\ (25°C)}) / \Delta T$
value	0,074 %/°K	- 0,137 %/°K	- 0,106 %/°K

Recommended Cooling Unit

Wafer connection:	2 inlet and 2 outlet fittings on the rear side
Wafer flow rate:	14 – 18 l/min
Pressure drop:	0,3 bar @ 15 l/min

3C30M

AZUR SPACE Solar Power GmbH
Theresienstr. 2
74072 Heilbronn
phone: +49 7131 67 2603
telefax: +49 7131 67 2727
e-mail: info@azurspace.com
website: www.azurspace.de

Certified Company
ISO 9001
ISO 14001
OHSAS 18001

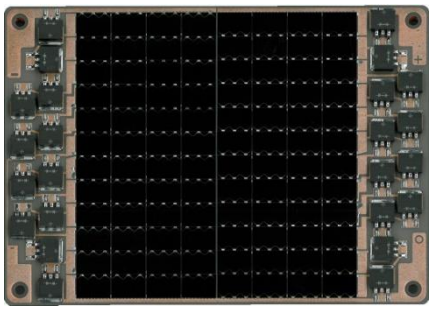
Max. water inlet temperature: 60° C
Max. system peak preassure: 3 bar

Failure of cooling unit or interruption of cooling flow has to be avoided; otherwise damage will result within seconds.

Thermal Power Output

At 700 sun concentration approximately ~ 6 kW

Picture of Front Side



Picture of Rear Side

Water Inlets Water Outlets

Order information

ADAM fittings	picture	SAP-Material number for order
with thread connector outer thread: M20 inner thread: G 1/4 height: 2 cm		80563
with hose connector (20 mm outer tube diameter)		80420

Storage and Operation Conditions Requirements

Humidity protection is highly recommended.
The cooling circuit should be electrically grounded for safety reason.
Electrical output (high voltage) can be dangerous even in unconcentrated sunlight.
Hot spots in the light distribution may damage the module.

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