

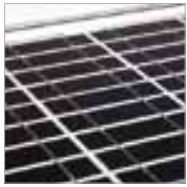
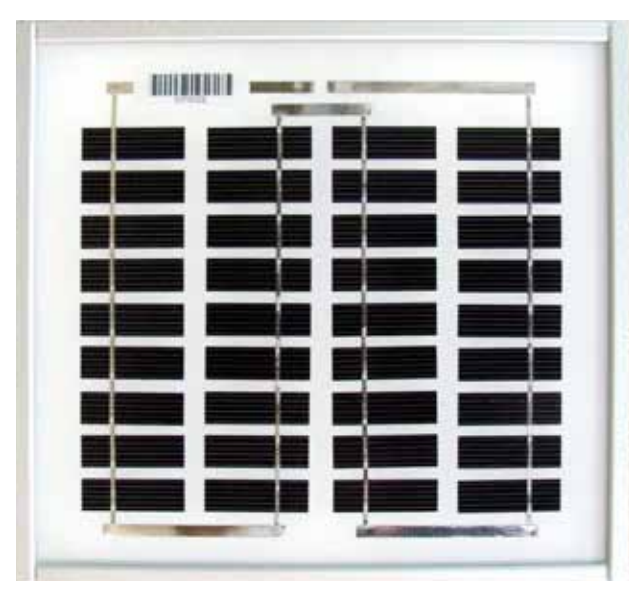
## 4.5W Photovoltaic module 405M

This line of modules is the direct result of over three decades of design, manufacturing and use. Attending to every detail in the design and manufacture of our products, our process controls and testing methods have optimized module life and electrical energy production.

Ameresco Solar's off-grid module line offers the following features and benefits:

### ► Built to last

From mountaintops to off-shore platforms, on weather stations in the bitter cold of Antarctica and on telephone signal repeaters in the hot Australian outback, the technology has been proven in the harshest environments.



### ► Multiple mounting possibilities

Multimount frame allows even greater flexibility in mounting. Positioned parallel to the edge and back of the module, its dual channels accept either M8 or 5/16" hex-head bolts, allowing the module to be mounted from the side or back.



### ► Easier bolt management

Bolts may be located anywhere along the channels; the channel groove is specially designed to prevent the bolt from rotating when tightening, allowing installation with just one wrench.



### ► Long cable for easier battery connections

A 4.6 meter PVC-jacketed AWG 18-2 polarized cable is potted into the fully sealed junction box located on the module back. The module's electrical connections are sealed for prevention against corrosion and moisture penetration.

### ► Quality and certifications

ISO 9001 factory certification ensures that our manufacturing facilities use proven manufacturing and quality control processes.

ISO 9001



Certified to UL1703 and ULC1703  
Certified for use in Class 1, Division 2 Hazardous locations

# 4.5W PHOTOVOLTAIC MODULE 405M

## Electrical characteristics

	(1) STC 1000W/m <sup>2</sup>	(2) NOCT 800W/m <sup>2</sup>
Maximum power ( $P_{max}$ )	4.5W	3.2W
Voltage at $P_{max}$ ( $V_{mpp}$ )	16.5V	14.7V
Current at $P_{max}$ ( $I_{mpp}$ )	0.27A	0.22A
Short circuit current ( $I_{sc}$ )	0.3A	0.24A
Open circuit voltage ( $V_{oc}$ )	20.5V	18.7V
Module efficiency	6.7%	
Tolerance ( $P_{max}$ )	±10%	
Nominal voltage	12V	
Efficiency reduction at 200W/m <sup>2</sup>	<5% reduction (efficiency 6.3%)	
Limiting reverse current	0.3A	
Temperature coefficient of $I_{sc}$	0.105%/°C	
Temperature coefficient of $V_{oc}$	-0.360%/°C	
Temperature coefficient of ( $P_{max}$ )	-0.45%/°C	
(3) NOCT	47±2°C	
Maximum series fuse rating	1A	
Maximum system voltage	50V	
Application class (according to IEC 61730:2007)	Class C	

1: Values at Standard Test Conditions (STC): 1000W/m<sup>2</sup> irradiance, AM1.5 solar spectrum and 25°C module temperature

2: Values at 800W/m<sup>2</sup> irradiance, Nominal Operation Cell Temperature (NOCT) and AM1.5 solar spectrum

3: Nominal Operation Cell Temperature: Module operation temperature at 800W/m<sup>2</sup> irradiance, 20°C air temperature, 1m/s wind speed

## Mechanical characteristics

Solar cells	36 monocrystalline silicon cut cells connected in series
Front cover	High transmission 3.2mm (1/8th in) glass
Encapsulant	EVA
Back cover	White polyester
Frame	Silver anodized aluminum
Junction box	Lo-Pro junction box
Output cables	AWG#18 (0.75mm <sup>2</sup> ) 2 core, ITC / PLTC Lengths 4572mm / 15 ft. ("+" red; "-" black)
Dimensions	251 x 269 x 23mm / 9.9 x 10.6 x 0.9in
Weight	0.8kg / 1.7lbs

All dimensional tolerances within ±1% unless otherwise stated.

## Warranty\*

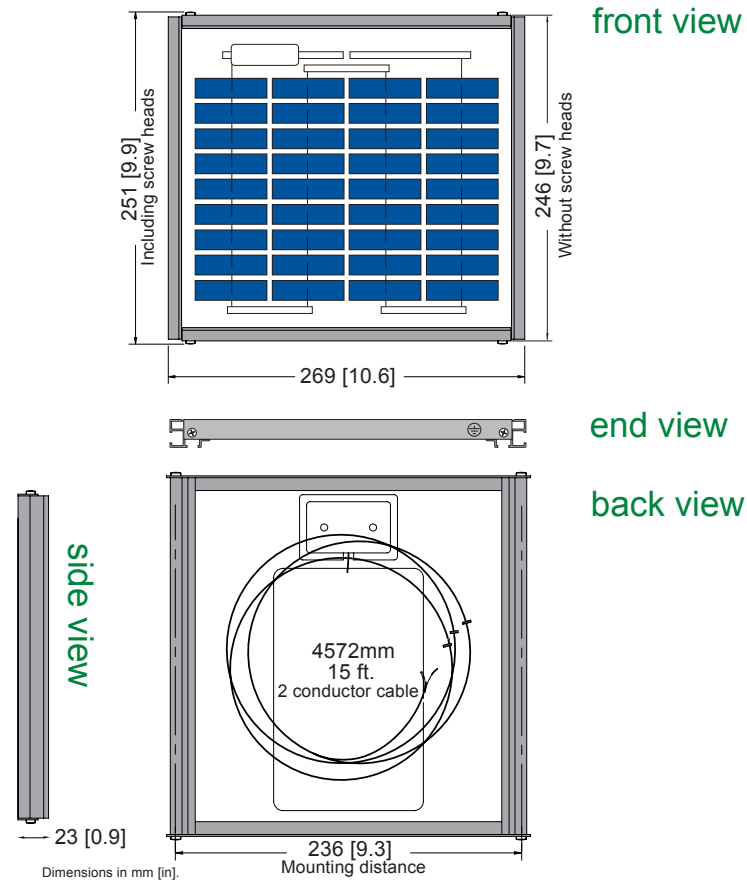
- ▶ Free from defects in materials and workmanship for 2 years
- ▶ 90% min. power output over 12 years
- ▶ Optional 25 years available

\* Refer to warranty document for terms and conditions.

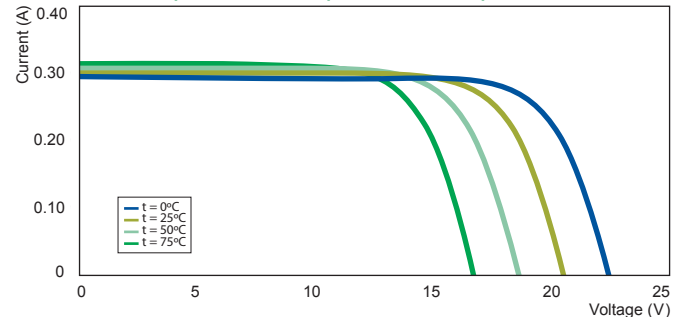
## Certification

Listed to UL 1703 & ULC ORD-C1703 Standard for Safety Intertek ETL Class C Fire Rating.

Approved by Intertek ETL according to FM 3611, Dec 2004, and according to CAN/CSA C22.2 No. 213-M1987, 1st Edition, Reaffirmed 2004, for use in a Class I, Division 2, Group A, B, C, D Hazardous (Classified) Location.



## Temperature - dependence of performance



## Irradiance - dependence of performance

