HELIENE

96HC G12R NTYP SL Monofacial Module

96 Half-Cut Monocrystalline 435W – 460W

23.02%

Utilizes the latest G12R size super high efficiency N-type silicon solar cells. Half cut design further reduces cell to module (CTM) losses.

Stability & Looks

Enhanced frame design built for high wind, snow, and mechanical loads, with a perfect all-black, framed glass–backsheet aesthetic ideal for visible residential rooftops

High Energy Yield

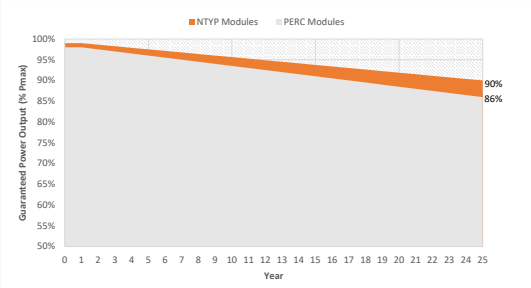
Highest efficiency & Low temperature coefficient of N-type silicon solar cells enable High Energy yield

High Reliability

N-type silicon solar cell result in low LID, reducing annual degradation and guaranteeing more power throughout the lifetime.

No Compromise Guarantee

25 Year Product Warranty
25 Year Linear Performance Guarantee



Highly efficient N-type Silicon Solar Cells

Low LCOE enabled by High Power Output & Low BOS Cost

1% First year degradation & 0.4% Annual Power degradation

World-class Quality

- Heliene's fully automated manufacturing facilities with state-of-the-art robotics and computer aided inspection systems ensure the highest level of product quality and consistency
- All manufacturing locations are compliant with international quality standards and are ISO 9001 certified
- Heliene modules have received Top Performer rankings in several categories from PV Evolution Labs (PV EL) independent quality evaluations

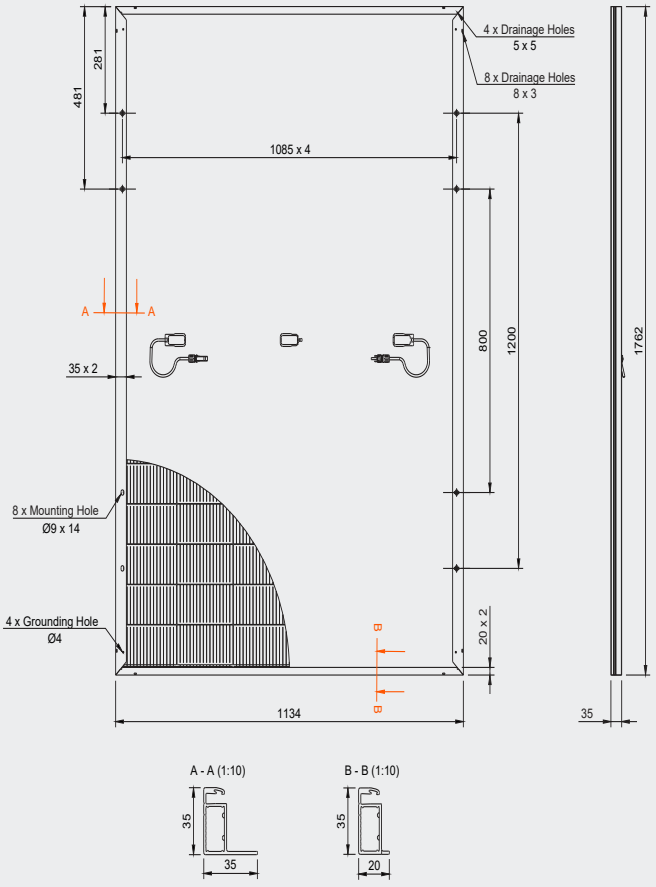
Bankable Reputation

- Established in 2010, Heliene is recognized as highly bankable Tier 1 manufacturer of solar modules and has been approved for use by the U.S. Department of Defense, U.S. Army Corps of Engineers and from numerous top tier utility scale project debt providers
- By investing heavily in research and development, Heliene has been able to stay on the cutting edge of advances in module technology and manufacturing efficiency

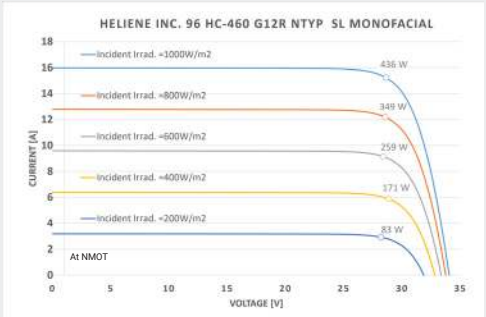
Local Sales, Service, and Support

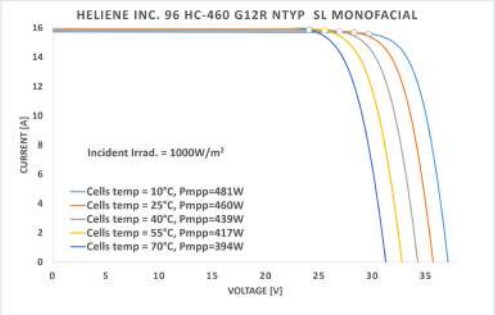
- With sales offices across the U.S. and Canada, Heliene prides itself on unsurpassed customer support for our clients. Heliene has become the brand of choice for many of the leading residential installers, developers and Independent Power Producers due to our innovative technology, product customization capability and just in time last-mile logistics support
- Local sales and customer support means answered phone calls and immediate answers to your technical and logistics questions. We understand your project schedules often change with little warning and endeavor to work with you to solve your project management challenges

Dimensions for 96HC G12R NTYP SL Monofacial Modules



I-V Curves for 96 HC G12R NTYP SL Monofacial Modules





Electrical Data (STC)

Peak Rated Power*	P_{mpp} (W)	460	455	450	445	440	435
Maximum Power Voltage	V_{mpp} (V)	30.52	30.33	30.08	29.87	29.67	29.45
Maximum Power Current	I_{mpp} (A)	15.07	15.00	14.96	14.90	14.83	14.77
Open Circuit Voltage*	V_{oc} (V)	35.69	35.60	35.50	35.41	35.31	35.21
Short Circuit Current**	I_{sc} (A)	15.85	15.80	15.72	15.68	15.63	15.58
Module Efficiency	Eff (%)	23.02	22.77	22.52	22.27	22.02	21.77
Maximum Series Fuse Rating	MF (A)	30	30	30	30	30	30
Power Sorting Range		[- 0/+3%]					

STC - Standard Test Conditions: Irradiation 1000 W/m² - Air mass AM 1.5 - Cell temperature 25 °C,
*P_{mpp} Production Tolerance ± 3%, V_{oc} Production Tolerance ± 5%, **I_{sc} Production Tolerance ± 5% ,

Electrical Data (NMOT)

Maximum Power	P_{mpp} (W)	349	345	342	338	334	330
Maximum Power Voltage	V_{mpp} (V)	29.23	29.04	28.80	28.60	28.41	28.20
Maximum Power Current	I_{mpp} (A)	11.95	11.89	11.86	11.81	11.76	11.71
Open Circuit Voltage	V_{oc} (V)	34.17	34.09	33.99	33.91	33.81	33.71
Short Circuit Current	I_{sc} (A)	12.78	12.74	12.67	12.64	12.60	12.56

NMOT - Nominal Module Operating Temperature:
Irradiance at 800W/m², Ambient Temperature 20ºC, Wind speed 1m/s

Mechanical Data

Solar Cells	96 Half-Cut, G12R, N-type Cells
Module Construction	Framed Glass–Black Backsheet
Dimensions (L x W x D)	1762 x 1134 x 35 mm (61.14 x 44.65 x 1.38 inch)
Weight	21.70 kg (47.84 lbs)
Frame	Double Webbed 15-Micron Anodized Aluminum Alloy
Glass	3.2mm Low-Iron Content, High-Transmission, PV Solar Glass with Anti Reflective Coating
Junction Box	IP-68 rated with 3 bypass diodes
Output Cables	4mm² (12AWG),1.5 meter Symmetrical Cables (Standard) 0.3-1.2 meter Symmetrical Cables (Optional)
Connectors	Multi-Contact/ Stäubli MC4

Certifications

UL Certification (pending)	UL 61215, UL61730, CSA C22.2#61730:2019

Temperature Ratings

Nominal Module Operating Temperature (NMOT)	+42°C(±2°C)
Temperature Coefficient of P_{max}	-0.30%/°C
Temperature Coefficient of V_{oc}	-0.25%/°C
Temperature Coefficient of I_{sc}	0.045%/°C

Maximum Ratings

Operational Temperature	-40°C to +85°C
Max System Voltage	1500
Mech. Load Test (Front)	113psf / 5400Pa
Mech. Load Test (Back)	50 psf / 2400 Pa
Fire Rating	Type 1

Warranty

25 Year Product Warranty
25 Year Linear Power Guarantee

Packaging Configuration

Modules per Pallet 40' Container:	31 pieces
Modules per 40' Container:	806 pieces
Modules per Pallet 53' Trailer:	28 pieces
Modules per 53' Trailer:	896 pieces