



**MBB HC
MONOCRYSTALLINE
PHOTOVOLTAIC MODULE
450W-460W**

ZES-450/460-HC166-01

ZES solar modules are designed with 166 mm multi busbar and Half-cut cell technology. They have high efficiency and are guaranteed by Zorlu Energy.

**HC166-01
Series**

460W_p

Maximum Module Power

0, +5W

Positive Power Tolerance

20,73%

Maximum Module Efficiency

WARRANTY



Product Warranty



Linear Performance Warranty

PRODUCTION FACILITY CERTIFICATES

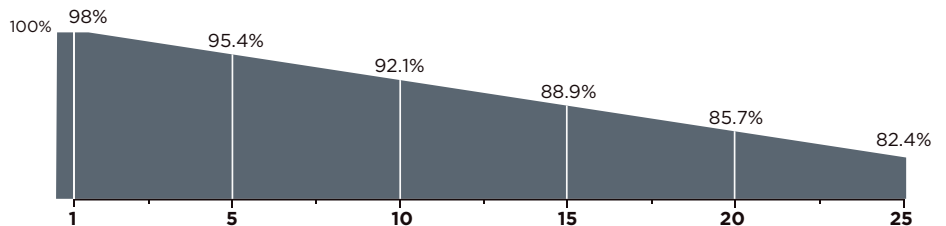
ISO ISO 9001, ISO 14001, ISO 18001,

PRODUCT CERTIFICATES



IEC 61215-1, IEC 61215-1-1, IEC 61215-2,
IEC 61730-1, IEC 61730-2, IEC 61701,
IEC 62804, IEC 62716, OHSAS 18001

Linear Degradation Warranty



For detailed information and requests:
0850 339 99 37/zorluenerji.com.tr

MECHANICAL CHARACTERISTICS

Dimensions	2109 x 1052 x 42 mm
Weight	25.2 kg
Cell Type	PERC Monocrystalline 166 x 83mm (144 pcs)
Front Glass	3.2mm AR Coating Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP68, 3 diodes -MC4 Compatible/ MC4 Original
Output Cables*	4.0 mm ² , 350 mm - 1200 mm
Pressure Rating	Front (Snow) 5400Pa / Back (Wind) 2400Pa

*Output cables length must be specify at order.

**Connector type must be specify at order.

PACKAGING

Pallet Dimensions (Length, Width, Height)	2155 x 1135 x 1210 mm	
Pallet Weight	780 kg	
Container	20'GP	40'HC
Number of Modules in One Pallet	26	26
Number of Pallet in One Container	5	22
Number of Modules in One Container	130	572

ELECTRICAL CHARACTERISTICS

STC Nominal Power (Pmpp)	450 W		455 W		460 W	
	STC	NOCT	STC	NOCT	STC	NOCT
STC Maximum Power (Pmp) (W)	450	342	445	345.8	460	349.6
Open Circuit Voltage (Voc) (V)	49,56	46.43	49,72	46,57	49,80	46,65
Short Circuit Current (Isc) (A)	11,23	8,99	11,25	9.00	11,26	9,01
Maximum Power Voltage (Vmp) (V)	42,75	40,05	42,79	40,08	42,82	40,11
Maximum Power Current (Imp) (A)	10,53	8,54	10,66	8,64	10,76	8,72
STC Module Efficiency (nm) (%)	20,28		20,51		20,73	
Power Tolerance (W)	(0,+5)					
Maximum System Voltage	1500 VDC					
Maximum Circuit Breaker	20A					

*Measurement Tolerance +/- 3%

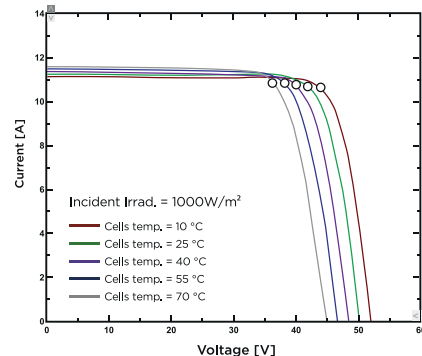
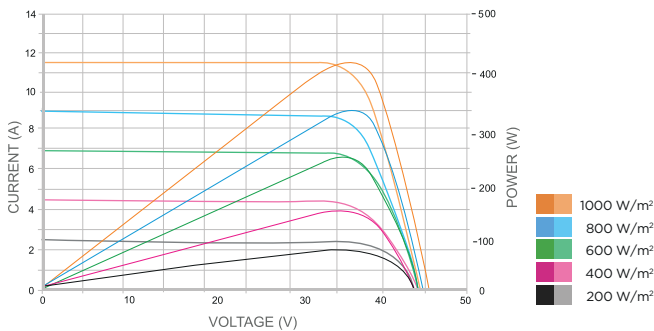
STC: Radiation 1000W/m², Cell Temperature 25°C, AM=1.5

NOCT: Radiation 800W/m², Ambient Temperature 20°C, AM=1.5, Wind speed 1m/s

TEMPERATURE CHARACTERISTICS

Temperature Coefficients of Pmax	-0.36 %/°C
Temperature Coefficients of Voc	-0.28 %/°C
Temperature Coefficients of Isc	+0.05 %/°C
Operating Temperature	-40-+85°C
Nominal Operating Cell Temperature (NOCT)	45±2°C

I-V CURVE



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