



ES-A Series Photovoltaic Modules

* Pending

Valid from 1st August 2008

Module Type	Units	ES-A-190	ES-A-195	ES-A-200	ES-A-205	ES-A-210
Variants		Non-Core	Non-Core	Core	Core	Core
Made in USA		ES-A-190-fa2	ES-A-195-fa2	ES-A-200-fa2	ES-A-205-fa2	ES-A-210-fa2
Warranty						
Product workmanship	[Years]	5	5	5	5	5
Limited power	[Years,% of Pmpp min]	10, 90%; 25, 80%	10, 90%; 25, 80%	10, 90%; 25, 80%	10, 90%; 25, 80%	10, 90%; 25, 80%
Certificates						
Design	-	IEC 61215 Ed.2	IEC 61215 Ed.2	IEC 61215 Ed.2	IEC 61215 Ed.2	IEC 61215 Ed.2
Safety	-	IEC 61730 Class A	IEC 61730 Class A	IEC 61730 Class A	IEC 61730 Class A	IEC 61730 Class A
	-	DIN V VDE V 0126-5	DIN V VDE V 0126-5	DIN V VDE V 0126-5	DIN V VDE V 0126-5	DIN V VDE V 0126-5
	-	UL 1703 (ETL Listed)	UL 1703 (ETL Listed)	UL 1703 (ETL Listed)	UL 1703 (ETL Listed)	UL 1703 (ETL Listed)
	-	UL 4703 (PV-WIRE)	UL 4703 (PV-WIRE)	UL 4703 (PV-WIRE)	UL 4703 (PV-WIRE)	UL 4703 (PV-WIRE)
	-	UL Fire Safety Class C	UL Fire Safety Class C	UL Fire Safety Class C	UL Fire Safety Class C	UL Fire Safety Class C
	-	EU Safety Class 2	EU Safety Class 2	EU Safety Class 2	EU Safety Class 2	EU Safety Class 2
	-	CE	CE	CE	CE	CE
Packaging	-	ISTA 2B	ISTA 2B	ISTA 2B	ISTA 2B	ISTA 2B
Cell Characteristics						
Number cells	[no.]	114	114	114	114	114
Cell type	-	Poly-crystalline	Poly-crystalline	Poly-crystalline	Poly-crystalline	Poly-crystalline
Cell country of origin	-	USA	USA	USA	USA	USA
Cell dimensions	[mm]	150x80	150x80	150x80	150x80	150x80
Electrical Characteristics STC						
Rated power (Pr)	[W]	190	195	200	205	210
Tolerance on rated power	[W]	-0 / + 5W	-0 / + 5W	-0 / + 5W	-0 / + 5W	-0 / + 5W
Maximum power (Pmax)	[W]	194.99	199.99	204.99	209.99	214.99
Minimum power (Pmin)	[W]	190.00	195.00	200.00	205.00	210.00
Peak power voltage (Vmp)	[V]	17.4	17.8	18.1	18.4	18.7
Open circuit voltage (Voc)	[V]	22.0	22.3	22.5	22.8	23.1
Peak power current (Imp)	[A]	10.92	10.96	11.05	11.15	11.23
Short circuit current (Isc)	[A]	11.80	11.90	12.00	12.10	12.20
Series fuse rating	[A]	20	20	20	20	20
Module efficiency	[%]	12.1	12.4	12.7	13.1	13.4
Cell efficiency	[%]	13.9	14.3	14.6	15.0	15.4
CEC PTC rating	-	171.3	175.9	180.6	185.2	189.8
Mechanical Specifications Module						
Outside Dimensions	[mm]/[in]	0.951 x 1.650 / 37.5 x 65.0	0.951 x 1.650 / 37.5 x 65.0	0.951 x 1.650 / 37.5 x 65.0	0.951 x 1.650 / 37.5 x 65.0	0.951 x 1.650 / 37.5 x 65.0
Depth (including junction box)	[mm]/[in]	46 / 1.8	46 / 1.8	46 / 1.8	46 / 1.8	46 / 1.8
Weight	[kg]/[lb]	18.6 / 41	18.6 / 41	18.6 / 41	18.6 / 41	18.6 / 41
Cable type	-	Universal / PV-WIRE	Universal / PV-WIRE	Universal / PV-WIRE	Universal / PV-WIRE	Universal / PV-WIRE
Cable lengths (both same length)	[m]/[in]	1.070 / 42.1	1.070 / 42.1	1.070 / 42.1	1.070 / 42.1	1.070 / 42.1
Cable gauge	[mm2]/[AWG]	6 / 10	6 / 10	6 / 10	6 / 10	6 / 10
Plug type (Multi-Contact)	-	Type 4, clickable	Type 4, clickable	Type 4, clickable	Type 4, clickable	Type 4, clickable
Frame type	-	Screwless, double walled	Screwless, double walled	Screwless, double walled	Screwless, double walled	Screwless, double walled
Packaging Specifications						
Packaging configuration	-	28 / pallet	28 / pallet	28 / pallet	28 / pallet	28 / pallet
Module orientation	-	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal
Packaging dimensions [W:L:H]	[m]/[in]	1.02:1.70:1.77 / 40:67:69.75	1.02:1.70:1.77 / 40:67:69.75	1.02:1.70:1.77 / 40:67:69.75	1.02:1.70:1.77 / 40:67:69.75	1.02:1.70:1.77 / 40:67:69.75
Packaging weight	[kg]/[lb]	580 / 1255	580 / 1255	580 / 1255	580 / 1255	580 / 1255
Electrical Characteristics NOCT						
Temperature (Tnoct)	[degC]	44.8	44.8	44.8	44.8	44.8
Peak power (Pmax)	[W]	139.1	142.7	146.4	150.1	153.7
Peak power voltage (Vmp)	[V]	16.3	16.5	16.7	16.8	17.0
Open circuit voltage (Voc)	[V]	20.0	20.3	20.5	20.7	21.0
Peak power current (Imp)	[A]	8.54	8.65	8.76	8.93	9.04
Short circuit current (Isc)	[A]	9.44	9.52	9.60	9.68	9.76
Data at low irradiance						
Reduction in efficiency	[%]	0	0	0	0	0
Temperature coefficients						
Peak power (Pp)	[%/degC]	-0.45	-0.45	-0.45	-0.45	-0.45
	[W/degC]	-0.86	-0.88	-0.90	-0.92	-0.95
Peak power voltage (Vp)	[%/degC]	-0.43	-0.43	-0.43	-0.43	-0.43
	[mV/degC]	-74.8	-76.5	-77.8	-79.1	-80.4
Open circuit voltage (Voc)	[%/degC]	-0.32	-0.32	-0.32	-0.32	-0.32
	[mV/degC]	-70.4	-71.4	-72.0	-73.0	-73.9
Peak current (Ip)	[%/degC]	-0.02	-0.02	-0.02	-0.02	-0.02
	[mA/degC]	-1.7	-1.8	-1.8	-1.8	-1.8
Short circuit current (Isc)	[%/degC]	-0.003	-0.003	-0.003	-0.003	-0.003
	[mA/degC]	-0.4	-0.4	-0.4	-0.4	-0.4
Maximum System Voltage						
Max. system voltage (UL, Vsyst. max)	[V]	600	600	600	600	600
Max. system voltage (SC2, Vsyst. max)	[V]	1000	1000	1000	1000	1000