

MiaSolé

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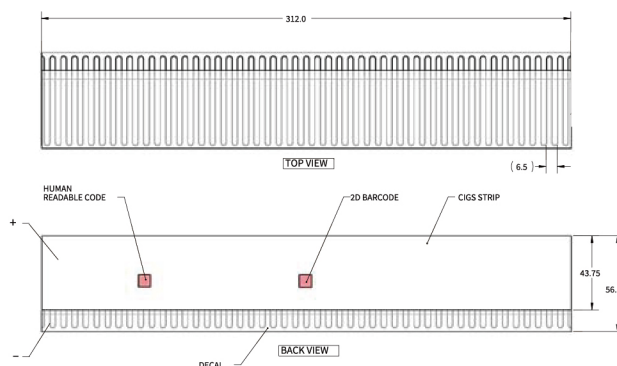
CIGS Solar Cell

MiaSolé thin-film CIGS solar cells on stainless steel substrate have high efficiency levels and provide significant advantages over conventional, rigid solar cells.

KEY FEATURES

- Cell efficiency level of up to 17% in a flexible form factor.
- Thin—0.33mm
- Lightweight—7.5 gm
- Ideal for many specialized uses. Versatile cell architecture means the size can be modified to suit various applications.
- Bendable and shatterproof

CELL DIAGRAM



ELECTRICAL PERFORMANCE BY 5% EFFICIENCY BINS

Cell Efficiency			15.5%	16.0%	16.5%	17.0%
Nominal Power	P_{MPP}	[W]	2.12	2.18	2.25	2.32
Power Output Tolerance		[W]	+0.1/-0	+0.1/-0	+0.1/-0	+0.1/-0
Maximum Power Voltage	V_{MPP}	[V]	0.526	0.531	0.538	0.545
Maximum Power Current	I_{MPP}	[A]	4.04	4.11	4.17	4.26
Open Circuit Voltage	V_{OC}	[V]	0.661	0.664	0.670	0.673
Short Circuit Current	I_{SC}	[A]	4.70	4.70	4.70	4.70

THERMAL CHARACTERISTICS*

NOCT	[°C]	48
Temperature Coefficient of P_{MPP}	[%/°C]	-0.38
Temperature Coefficient of V_{OC}	[%/°C]	-0.28
Temperature Coefficient of I_{SC}	[%/°C]	0.008

* based on MiaSolé FLEX—02 module measurements

PHYSICAL AND MECHANICAL SPECIFICATIONS

Length	312 mm +2/-4 mm
Width	43.75 mm ± 0.05 mm
Thickness	0.33 mm ± 0.1 mm
Weight	7.5 gm ± 0.1 gm
Cell Type	Copper Indium Gallium Diselenide (CIGS)



FLEX-03N & M Series Modules

KEY FEATURES

- Record efficiency levels in a flexible form factor
- Low installed weight at less than 2.4 kg/m² (<0.5lb/ft²)
- No penetrations, ballast or racking required
- Applicable for high wind load and high seismic hazard areas
- Bypass diodes reduce PV system shading losses
- Directly bonds to many approved surfaces

RELIABILITY AND SAFETY

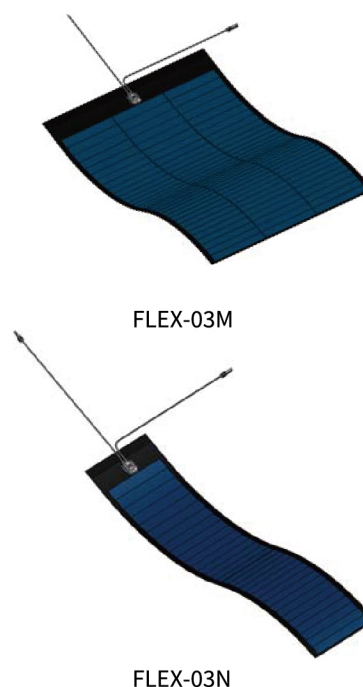
- IEC 61646, IEC 61730, IEC 62716, Australia CEC
- UL 1703, cUL 1703
- UL Class A over TPO – slope up to 2.5

WARRANTY

- 5-year workmanship
- 10/25 year warranty against power loss

FLEX-03M Specifications

	FLEX-03M
Length	2580 mm (101.6 in)
Width	1000 mm (39.4 in)
Module Thickness	17 mm (0.7 in), 2.5 mm (0.1 in)
Weight	5.1 kg (11.1 lb) without adhesive 6.2 kg (13.7 lb) with adhesive
Weight/Area	1.7 kg/m ² (0.3 lb/ft ²) w/out adhesive, 2.0 kg/m ² (0.4 lb/ft ²) with adhesive
Junction Box Type	IP68
Cable Connections	Amphenol Technology Shenzhen = (E346053)
Cell Type	Copper Indium Gallium Selenide (CIGS)
Warranty*	5 year workmanship; 10/25 year power output
Certifications	UL 1703, IEC 61646, IEC 61730, cUL 1703, IEC 62716, Australia CEC



FLEX-03NS, FLEX-03N and FLEX-03NL Specifications

	FLEX-03NS Series	FLEX-03N Series	FLEX-03NL Series
Length	1710 mm (67.3 in)	2585 mm (101.8 in)	5910 mm (232.7 in)
Width	348 mm (13.7 in)	348 mm (13.7 in)	348 mm (13.7 in)
Module Thickness	2.5 mm (0.1 in)	2.5 mm (0.1 in)	2.5 mm (0.1 in)
Weight	1.1 kg (2.4 lb) without adhesive 1.3 kg (2.9 lb) with adhesive	1.6 kg (3.6 lb) without adhesive 1.9 kg (4.3 lb) with adhesive	3.6 kg (7.9 lb) without adhesive 4.3 kg (9.5 lb) with adhesive
Weight/Area	1.8 kg/m ² (0.4 lb/ft ²) without adhesive, 2.2 kg/m ² (0.5 lb/ft ²) with adhesive		
Junction Box Type	IP68		
Cable Connections	MC4 Compatible		
Cell Type	Copper Indium Gallium Diselenide (CIGS)		
Warranty*	5 year workmanship, 10/25 year power output		
Certifications	UL 1703, IEC 61646, IEC 61730, cUL 1703, IEC 62716, Australia CEC		

*Please see full warranty for details.

ELECTRICAL PERFORMANCE AT STC¹

FLEX-03M SERIES CIGS MODULE

2580 mm (101.6 in) x 1000 mm (39.4 in)			FLEX-03 350M	FLEX-03 360M	FLEX-03 370M	FLEX-03 380M	FLEX-03 390M
Nominal Power	P_{MPP}	[W]	350	360	370	380	390
Aperture Efficiency	η_l	[%]	15.3%	15.7%	16.1%	16.6	17.0%
Power Output Tolerance		[W]	+10/-0	+10/-0	+10/-0	+10/-0	+10/-0
Maximum Power Voltage	V_{MPP}	[V]	29.2	29.5	29.9	30.2	30.5
Maximum Power Current	I_{MPP}	[A]	12.00	12.20	12.39	12.59	12.78
Open Circuit Voltage	V_{OC}	[V]	36.9	37.1	37.3	37.5	37.7
Short Circuit Current	I_{SC}	[A]	14.10	14.10	14.10	14.10	14.10
Maximum Series Fuse Rating		[A]	25				
Maximum System Voltage	(IEC/UL)	[V]	1000/1000				

FLEX-03NS SERIES CIGS MODULE

1710 mm (67.3 in) x 348 mm (13.7 in)			FLEX-03 70NS	FLEX-03 75NS	FLEX-03 80NS	FLEX-03 85NS
Nominal Power	P_{MPP}	[W]	70	75	80	85
Aperture Efficiency	η_l	[%]	14.3%	15.3%	16.3%	17.3%
Power Output Tolerance		[W]	+5/-0	+5/-0	+5/-0	+5/-0
Maximum Power Voltage	V_{MPP}	[V]	18.3	18.8	19.3	19.8
Maximum Power Current	I_{MPP}	[A]	3.85	4.00	4.15	4.30
Open Circuit Voltage	V_{OC}	[V]	23.5	23.7	24.0	24.3
Short Circuit Current	I_{SC}	[A]	4.70	4.70	4.70	4.70
Maximum Series Fuse Rating		[A]	10			
Maximum System Voltage	(IEC/UL)	[V]	1000/1000			

FLEX-03N SERIES CIGS MODULE

2585 mm (101.8 in) x 348 mm (13.7 in)			FLEX-03 110N	FLEX-03 115N	FLEX-03 120N	FLEX-03 125N	FLEX-03 130N
Nominal Power	P_{MPP}	[W]	110	115	120	125	130
Aperture Efficiency	η_l	[%]	14.4%	15.0%	15.7%	16.4%	17.0%
Power Output Tolerance		[W]	+5/-0	+5/-0	+5/-0	+5/-0	+5/-0
Maximum Power Voltage	V_{MPP}	[V]	28.5	29.0	29.5	30.0	30.5
Maximum Power Current	I_{MPP}	[A]	3.81	3.87	3.93	4.00	4.06
Open Circuit Voltage	V_{OC}	[V]	36.5	36.8	37.1	37.4	37.7
Short Circuit Current	I_{SC}	[A]	4.70	4.70	4.70	4.70	4.70
Maximum Series Fuse Rating		[A]	10				
Maximum System Voltage	(IEC/UL)	[V]	1000/1000				

FLEX-03NL SERIES CIGS MODULE

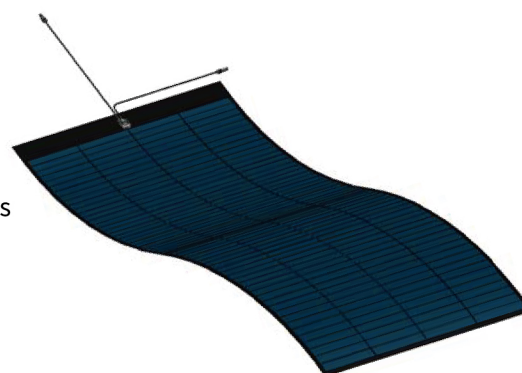
5910 mm (232.7 in) x 348 mm (13.7 in)			FLEX-03 270NL	FLEX-03 280NL	FLEX-03 290NL	FLEX-03 300NL	FLEX-03 310NL
Nominal Power	P_{MPP}	[W]	270	280	290	300	310
Nominal Efficiency	η_l	[%]	15.0%	15.5%	16.1%	16.7%	17.2%
Power Output Tolerance		[W]	+10/-0	+10/-0	+10/-0	+10/-0	+10/-0
Maximum Power Voltage	V_{MPP}	[V]	68.3	69.3	70.3	71.3	72.3
Maximum Power Current	I_{MPP}	[A]	3.96	4.04	4.13	4.21	4.29
Open Circuit Voltage	V_{OC}	[V]	86.8	87.3	87.9	88.4	89.0
Short Circuit Current	I_{SC}	[A]	4.70	4.70	4.70	4.70	4.70
Maximum Series Fuse Rating		[A]	10				
Maximum System Voltage	IEC/UL	[V]	1000/1000				

¹Standard Test Conditions (STC): 1000 W/m², 25°C cell temperature, AM 1.5 spectrum

FLEX-03W Series Modules

KEY FEATURES

- Record efficiency levels in a flexible form factor
- Low installed weight at less than 2.4 kg/m² (<0.5lb/ft²)
- No penetrations, ballast or racking required
- Applicable for high wind load and high seismic hazard areas
- Bypass diodes reduce PV system shading losses
- Directly bonds to many approved surfaces



FLEX-03W

RELIABILITY AND SAFETY

- IEC 61646, IEC 61730, IEC 62716, Australia CEC
- UL 1703, cUL 1703
- UL Class A over TPO – slope up to 2.5

WARRANTY

- 5-year workmanship
- 10/25 year warranty against power loss

FLEX-03W and FLEX-03WS Specifications

	FLEX-03W Series	FLEX-03W S Series
Length	2585 mm (101.8 in)	1010 mm (39.8 in)
Width	1293 mm (50.9 in)	1293 mm (50.9 in)
Module Thickness	17 mm (0.7 in), 2.5 mm (0.1 in)	17 mm (0.7 in), 2.5 mm (0.1 in)
Weight	5.5 kg (12.2 lb) without adhesive 6.6 kg (14.6 lb) with adhesive	2.1 kg (4.7 lb) without adhesive 2.5 kg (5.6 lb) with adhesive
Weight/Area	1.7 kg/m ² (0.3 lb/ft ²) w/out adhesive, 2.0 kg/m ² (0.4 lb/ft ²) with adhesive	
Junction Box Type	IP68	
Cable Connections	Amphenol Technology Shenzhen (E346053)	
Cell Type	Copper Indium Gallium Selenide (CIGS)	
Warranty*	5 year workmanship; 10/25 year power output	

ELECTRICAL PERFORMANCE AT STC¹

FLEX-03WS SERIES CIGS MODULE

1010 mm (39.8 in) X 1293 mm (50.9 in)			FLEX-03 160WS	FLEX-03 170WS	FLEX-03 180WS	FLEX-03 190WS
Nominal Power	P _{MPP}	[W]	160	170	180	190
Aperature Efficiency	η	[%]	14.7%	15.6%	16.5%	17.4%
Power Output Tolerance		[W]	+10/-0	+10/-0	+10/-0	+10/-0
Maximum Power Voltage	V _{MPP}	[V]	20.5	21.0	21.5	22.0
Maximum Power Current	I _{MPP}	[A]	7.82	8.09	8.37	8.64
Open Circuit Voltage	V _{OC}	[V]	26.2	26.5	26.7	27.0
Short Circuit Current	I _{SC}	[A]	9.40	9.40	9.40	9.40
Maximum Series Fuse Rating		[A]	25			
Maximum System Voltage	(IEC/UL)	[V]	1000/1000			

FLEX-03W SERIES CIGS MODULE

2585 mm (101.8 in) X 1293 mm (50.9 in)			FLEX-03 470W	FLEX-03 480W	FLEX-03 490W	FLEX-03 500W	FLEX-03 510W
Nominal Power	P _{MPP}	[W]	470	480	490	500	510
Aperature Efficiency	η	[%]	15.4%	15.7%	16.0%	16.4%	16.7%
Power Output Tolerance		[W]	+10/-0	+10/-0	+10/-0	+10/-0	+10/-0
Maximum Power Voltage	V _{MPP}	[V]	58.5	59.0	59.5	60.0	60.6
Maximum Power Current	I _{MPP}	[A]	8.04	8.13	8.23	8.33	8.42
Open Circuit Voltage	V _{OC}	[V]	73.9	74.2	74.5	74.8	75.1
Short Circuit Current	I _{SC}	[A]	9.40	9.40	9.40	9.40	9.40
Maximum Series Fuse Rating		[A]	25				
Maximum System Voltage	(IEC/UL)	[V]	1000/1000				

¹Standard Test Conditions (STC): 1000 W/m², 25°C cell temperature, AM 1.5 spectrum