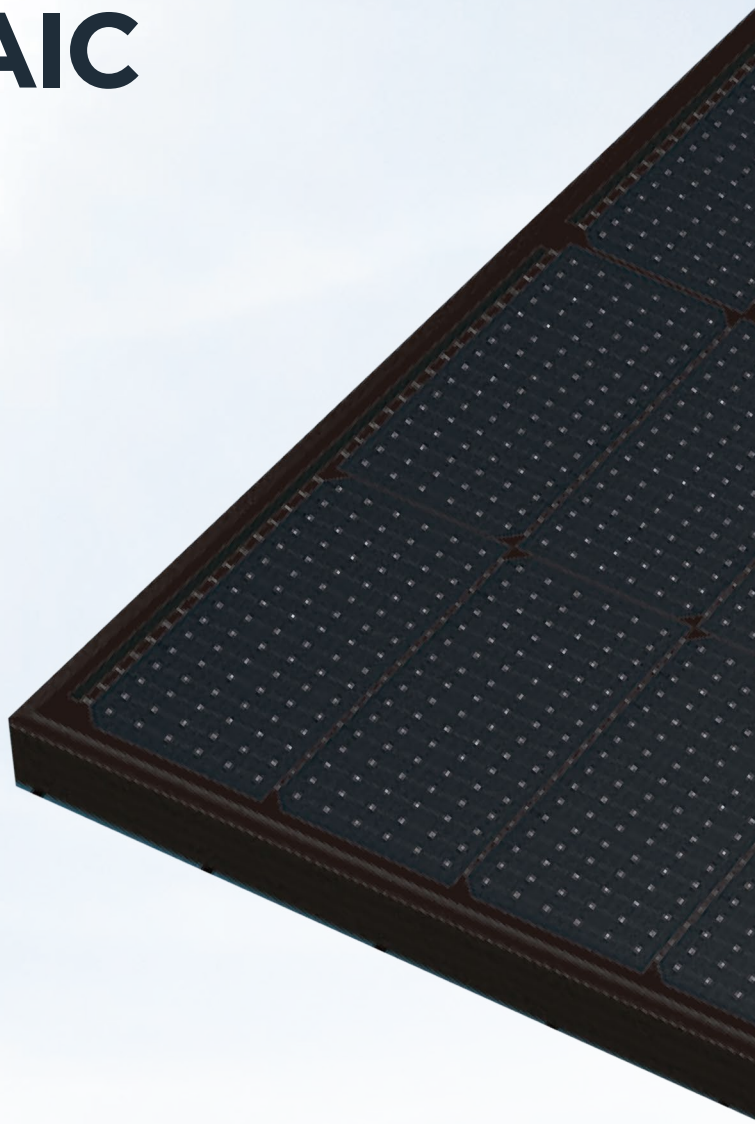
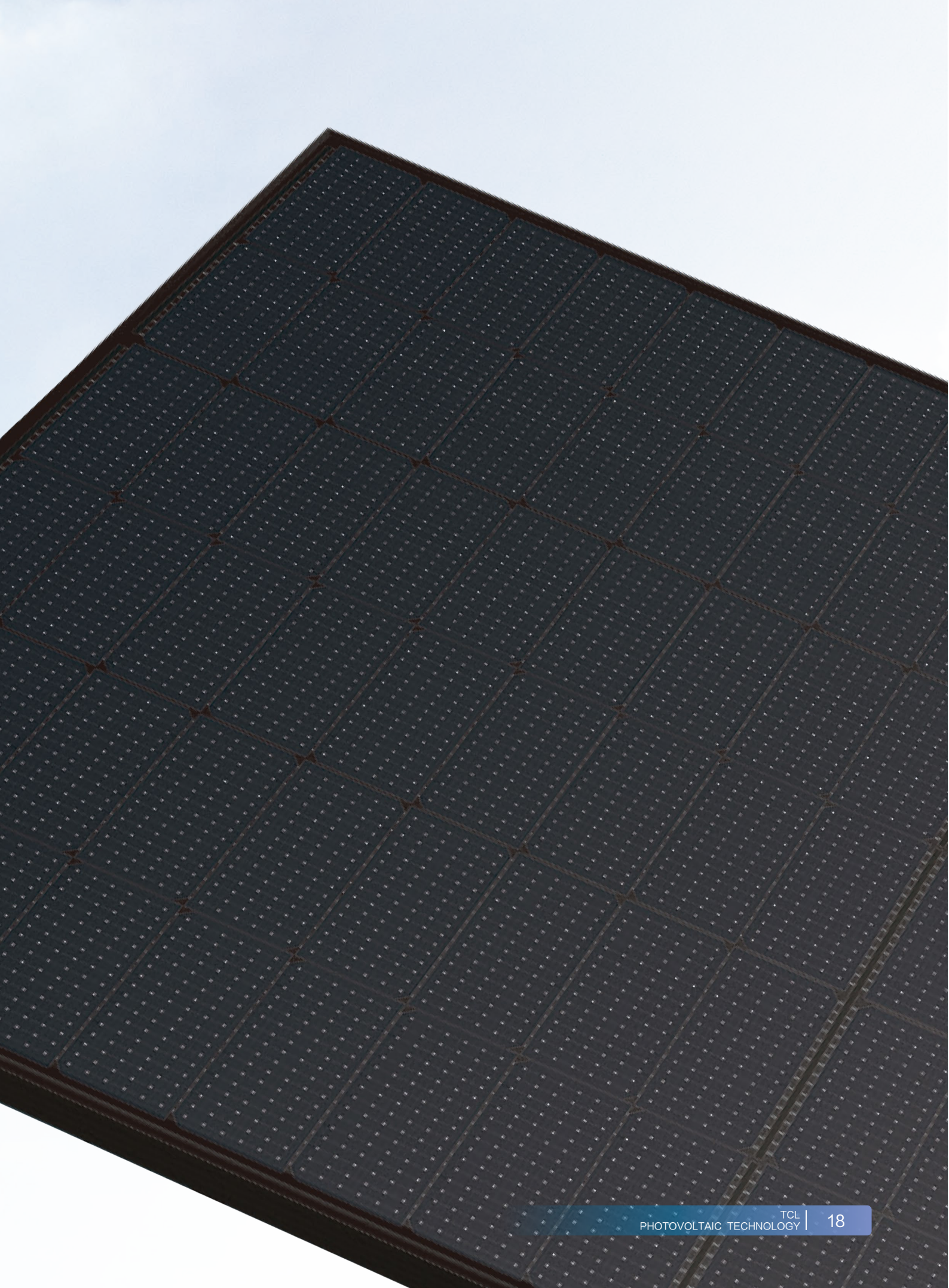
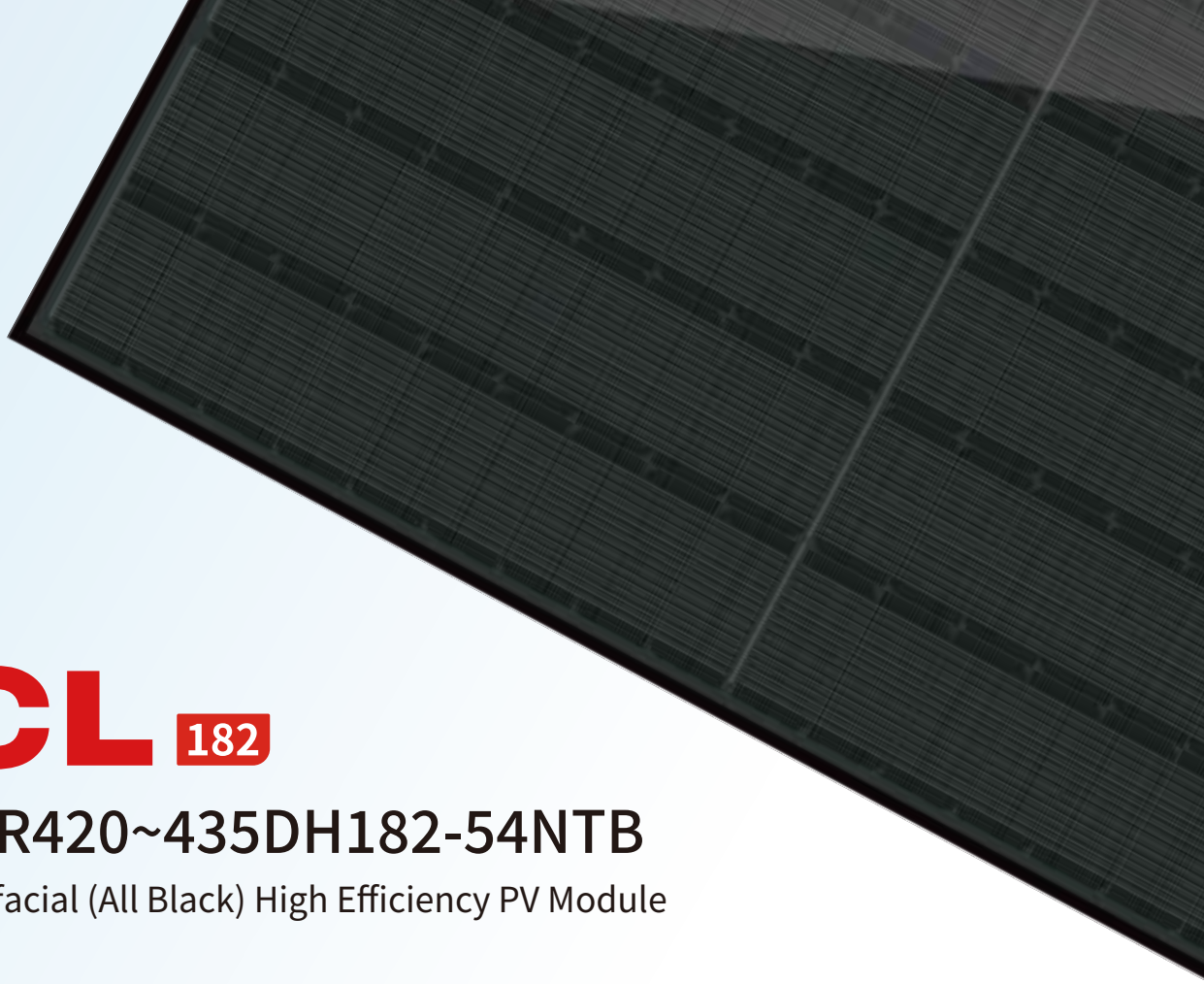
PHOTOVOLTAIC MODULES







TCL 182

TCL-MR420~435DH182-54NTB

TOPCon Bifacial (All Black) High Efficiency PV Module

PRODUCT FEATURES

HIGHER POWER DENSITY
- Output up to 435watt on 1.952M²
- Module efficiency high to 22.3%
- Gain more solar power per square meter

SEMI+SMBB
- Semi design deduce working temperature of operation and minimize hot-spot risk
- SMBB design deduce cover of busbars and improve current collection ability on windy days
- Improve the output/watt

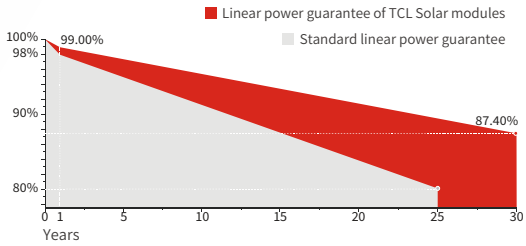
ENHANCED MECHANICAL LOAD
- Wind load 2400 Pascal
- Snow load 5400 Pascal

APPLIED UNDER STRICT CONDITIONS
- Modules could be applied under ammonia, salt mist, high temperature, high humidity condition

IP68
- IP68 junction boxes improve water-proof performance

EXCELLENT FIRE-PROOF PERFORMANCE
- Modules have passed anti-fire test

LINEAR PERFORMANCE WARRANTY



15 YEARS product warranty

0.40 % Linear attenuation of 0.40% per year within30years

30 YEARS linear power warranty

CERTIFICATES

- IEC 61215，IEC 61730
- ISO 9001：2015 Quality Management System
- ISO 14001：2015 Environment Management System
- ISO 45001：2018 Occupational health and safety management systems

Electrical Data (STC)

Rated Power In Watts-Pmax (Wp)	420	425	430	435
Maximum Power Voltage-Vmpp (V)	31.84	32.05	32.26	32.47
Maximum Power Current-Impp (A)	13.19	13.26	13.33	13.40
Open Circuit Voltage-Voc (V)	38.04	38.23	38.42	38.61
Short Circuit Current-Isc (A)	14	14.08	14.16	14.24
Module Efficiency (%)	21.5%	21.8%	22.0%	22.3%

STC: Irradiation 1000 W/m², Cell Temperature 25—, Air Mass AM1.5 according to EN 60904-3.

Electrical Data (NMOT)

Maximum Power-Pmax (Wp)	318	322	326	330
Maximum Power Voltage-Vmpp (V)	29.95	30.11	30.24	30.39
Maximum Power Current-Impp (A)	10.62	10.7	10.78	10.86
Open Circuit Voltage-Voc (V)	36.2	36.38	36.56	36.74
Short Circuit Current-Isc (A)	11.21	11.27	11.33	11.39

NOCT: Irradiation: 800 W/m², ambient temperature: 20—, air mass: 1.5, wind speed 1 m/s

Electrical Characteristics With Different Rear Side Power Again (Reference To 435w Front0

Pmax gain (%)	5%	10%	15%	20%	25%
Maximum Power (Pmax/W)	457	479	500	522	544
Maximum Power Voltage (Vmpp/V)	32.47	32.47	32.47	32.47	32.47
Maximum Power Current (Impp/A)	14.07	14.74	15.41	16.08	16.75

Mechanical Characteristics

Solar Cells	Monocrystalline N-type, SMBB
Cell Configuration	108 cells (6 x 9 x 2)
Module Dimensions	1722 x 1134 x 30 mm
Weight	22.0 kg
Glass	1.6mm Tempered ARC Glass
Back Sheet	1.6mmGlass, Black
Frame	Anodized Aluminium Alloy, Black
J-Box	IP68, 3 bypass diodes
Cables	4.0mm², (+) 380mm, (-) 380mm or customized length
Connector	MC4 EVO2 & Compatible

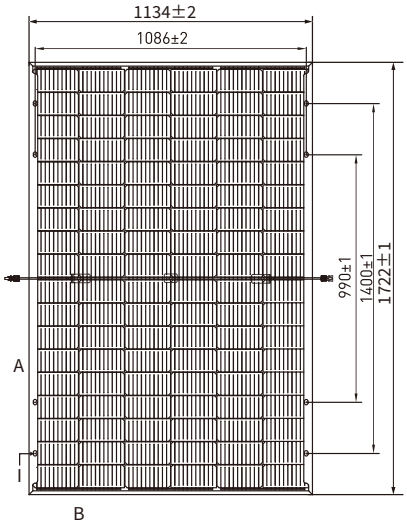
Temperature & Maximum Ratings

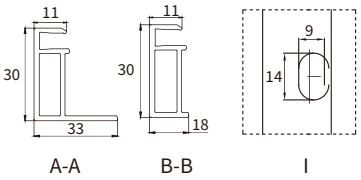
Nominal Module Operating Temperature (NMOT)	44±2℃
Temperature Coefficient of VOC	-0.25% / ℃
Temperature Coefficient of ISC	0.045% / ℃
Temperature Coefficient of PMAX	-0.30% / ℃
Operational Temperature	-40 ℃~+85℃
Maximum System Voltage	1500VDC
Max Series Fuse Rating	25A

Packaging Configuration

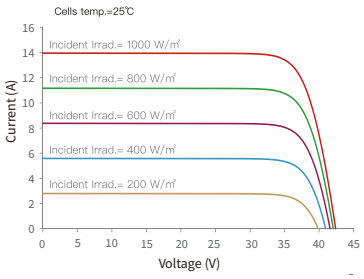
	40 FT (HQ)
Number of Modules Per Container	936
Number of Modules Per Pallet	36
Number of Pallets Per Container	26

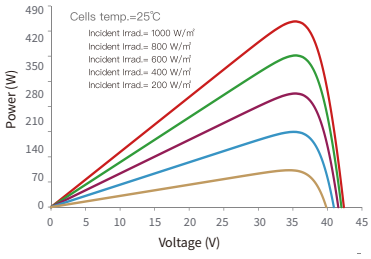
Module Dimensions (mm)





I-V Curve





TCL 182

TCL-MR440~455DT182-58NSB

TOPCon Shingled Bifacial All Black High Efficiency PV Module

PRODUCT FEATURES

HIGH LIFETIME ENERGY PRODUCTION

・The shingled-cell design helps to manage shade and keep cell temperatures low to produce more power over time.

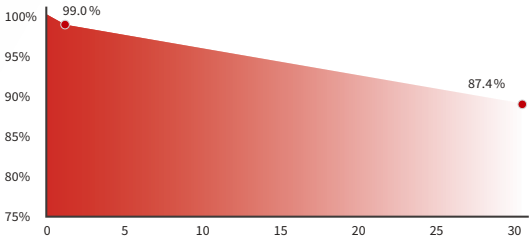
MADE FOR REAL WEATHER

・It's strong frame and cell connection design helps to protect the panels against weather challenges like temperature swings, snow loads, and hail.

NO SACRIFICES FOR CURB APPEAL

・Smaller metallic wires help to achieve a sleek black appearance to seamlessly integrate into your roof.

LINEAR PERFORMANCE WARRANTY



15 YEARS product warranty

30 YEARS linear power warranty

0.40% Linear attenuation of 0.40% per year within 30 years

CERTIFICATES

・IEC 61215/IEC 61730
・IS0 9001:2015
・IS0 45001:2018
・IS0 14001:2015

Electrical Data, Front STC Characteristics

	TCL-MR455-DT182-58NSB	TCL-MR450-DT182-58NSB	TCL-MR445-DT182-58NSB	TCL-MR440-DT182-58NSB
Nominal Power (Pnom)	455 W	450 W	445 W	440 W
Power Tolerance	+3/0%	+3/0%	+3/0%	+3/0%
Panel Efficiency	22.4%	22.2%	21.9%	21.7%
Rated Voltage (Vmpp)	35.70 V	35.45 V	35.20 V	34.95 V
Rated Current (Impp)	12.75 A	12.70 A	12.65 A	12.60 A
Open-Circuit Voltage (Voc) (+/–3%)	42.13 V	41.95 V	41.77 V	41.59 V
Short-Circuit Current (Isc) (+/–4%)	13.45 A	13.38 A	13.32 A	13.29 A

Bifacial Gain

Pmax with 5% Bifacial Gain	478 W	473 W	467 W	462 W
Isc with 5% Bifacial Gain	14.12 A	14.05 A	13.99 A	13.95 A
Pmax with 10% Bifacial Gain	501 W	495 W	490 W	484 W
Isc with 10% Bifacial Gain	14.80 A	14.72 A	14.65 A	14.62 A
Pmax with 20% Bifacial Gain	546 W	540 W	534 W	528 W
Isc with 20% Bifacial Gain	16.14 A	16.06 A	15.98 A	15.95 A

Electrical Data

Bifaciality (φPmax)	80% +/–10%
Maximum System Voltage	1000 V & 1500 V IEC
Temperature	–40°C to +85°C
Maximum Series Fuse	25 A
Power Temp. Coef.	-0.29% / °C
Voltage Temp. Coef.	-0.25% / °C
Current Temp. Coef.	0.045% / °C

Packaging configuration

Number of modules per pallet	36
Number of pallets per 40ft HQ container	24
Number of modules per container	864

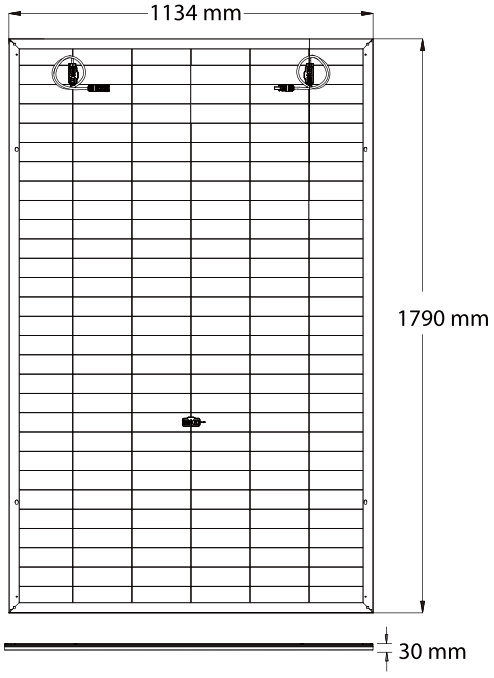
Tests And certifications

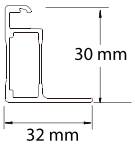
Standard Tests	IEC 61215, IEC 61730
Fire Rating	Class C (IEC 61730)
Quality Certs	ISO 9001:2015, ISO 14001:2015
EHS Compliance	ISO 45001-2018, Recycling Scheme
Ammonia Test	IEC 62716
Dust and Sand	IEC 60068-2-68
Salt Spray Test	IEC 61701 (Severity 8)
LeTID Test	TUV 2fg 2689/04.19 (LeTID Detection)
PID Test	IEC 62804
Cradle to Cradle Certified™ Bronze	Panel line certified for material health, water stewardship, material reutilization, renewable energy & carbon management, and social fairness.[5]

Mechanical Data

Solar Cells	N-type TOPCon
Glass	2.0 mm + 2.0 mm, high transmission heat strengthened glass, AR coating on front glass
Junction Box	IP-68, 3 bypass diodes
Connector	Stäubli MC4 or EVO2
Weight	24.8 kg
Max. Load[6]	Wind: 2400 Pa, 244 kg/m² front & back Snow: 5400 Pa, 550kg/m² front
Impact Resistance	40 mm diameter hail at 27.5 m/s
Frame	Black anodized aluminum alloy

Module Dimensions (mm)





(A) Cable Length: 1200 mm +/-15 mm

TCL 182

TCL-MI535~555DH182-72PP

PERC Bifacial High Efficiency PV Module

PRODUCT FEATURES

High Efficiency
Power can be generated on both sides to support additional output gains of up to 25%.

The multi-busbar half-cut technology can boost energy density to deliver higher output.

High Reliability
Certified in TUV salt spray, ammonia corrosion, 2400Pa wind load and 5400Pa snow load testing. Highly reliable.

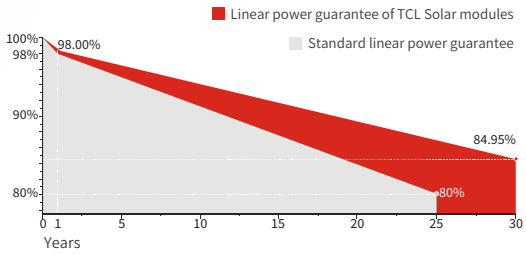
High ROI
Effectively reducing BOS costs to achieve lower LCOE and enhanced project profitability.

Low Degradation
First-year degradation is less than 2.0%, with linear degradation of 0.45% per year for 30 years.

Low Risk of Hot Spot
The next-generation cell technology and optimized circuit design adopted can support improved temperature coefficient and better hotspot resistance.

Low Risk of Micro-Crack
The multi-busbar technology contributes to more effective prevention of Micro crack and broken busbars.

LINEAR PERFORMANCE WARRANTY



15 YEARS product warranty

0.45 % Linear attenuation of 0.45% per year within 30 years

30 YEARS linear power warranty

CERTIFICATES

- IEC 61215，IEC 61730
- ISO 9001：2015 Quality Management System
- ISO 14001：2015 Environment Management System
- ISO 45001：2018 Occupational health and safety management systems

Electrical Data (STC)

Maximum Power (Pmax/W)	535	540	545	550	555
Open Circuit Voltage (Voc/V)	49.38	49.53	49.68	49.83	49.98
Short Circuit Current (Isc/A)	13.54	13.63	13.71	13.80	13.88
Voltage at Maximum Power (Vmp/V)	40.88	41.03	41.18	41.31	41.43
Current at Maximum Power (Imp/A)	13.10	13.17	13.24	13.32	13.40
Module Efficiency (%)	20.71	20.90	21.10	21.29	21.48
Operating Temperature	-40° C~+85° C				
Maximum System Voltage	1000/1500V DC				

STC (Standard Testing Conditions): Irradiance 1000W/m^2, Cell Temperature 25°C , AM1.5

Electrical Data (NMOT)

Maximum Power (Pmax/W)	400	404	408	412	416
Open Circuit Voltage (Voc/V)	45.41	45.56	45.71	45.85	46.00
Short Circuit Current (Isc/A)	11.29	11.37	11.44	11.53	11.60
Voltage at Maximum Power (Vmp/V)	37.64	37.79	37.94	38.05	38.17
Current at Maximum Power (Imp/A)	10.64	10.70	10.77	10.83	10.90

NMOT (Nominal Moudule Operating Temperature): Irradiance 800W/m^2, Ambient Temperature 20°C , AM1.5, Wind Speed 1m/s.

Bifacial Power Generation Parameters (Backside Gains)

5%	Maximum Power (Pmax/W)	562	567	572	578	583
	Module Efficiency (%)	21.75	21.95	22.15	22.36	22.56
15%	Maximum Power (Pmax/W)	615	621	627	633	638
	Module Efficiency (%)	23.82	24.04	24.26	24.48	24.71
25%	Maximum Power (Pmax/W)	669	675	681	688	694
	Module Efficiency (%)	25.89	26.13	26.37	26.61	26.86

Mechanical Data

Cell Type	182×91mm Mono
Cell Orientation	144(6×24)
Module Dimensions	2278×1134×30mm
Weight	32.0kg
Glass	2.0mm high transmittance, reinforced glass
Backsheet	2.0mm part of the structure is grid-like white ceramic glass
Frame Material	Anodized aluminum alloy
Junction Box	Protection class IP68
Cable	4.0 mm^2 positive pole: 200 mm negative pole: 250 mm wire length can be customized
Connector	**MC4 EVO2 & Compatible**

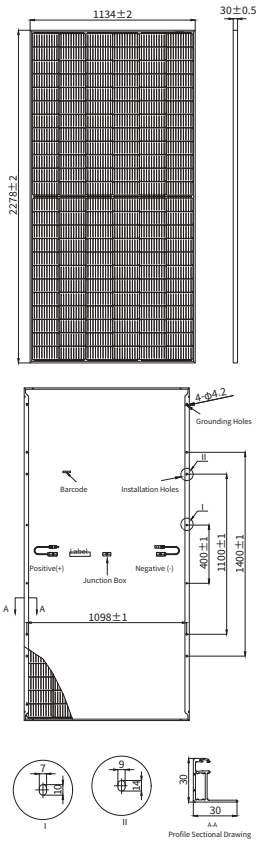
Temperature Coefficients

Temperature Coefficient (Pm)	-0.340%/°C
Temperature Coefficient (Voc)	-0.270%/°C
Temperature Coefficient (Isc)	0.048%/°C
NMOT (Nominal Moudule Operating Temperature)	41±3°C

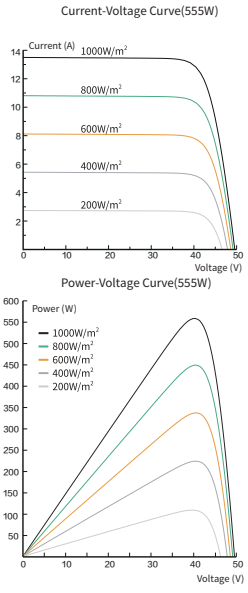
Packaging

Transportation methods	Number of modules per cabinet	Number of modules per pallet
40HQ container	720 pcs	36 pcs

Module Dimensions (mm)



I-V Curve



TCL 182

TCL-MI555~575DH182-72NT

TOPCon Bifacial High Efficiency PV Module

PRODUCT FEATURES

Hi Power Output
N-type MBB half cut technology, improve energy density, bring higher power output.
High Bifacial Factor, up to 25% extra power generation

High Durability
Passed TUV Salt & Ammonia corrosion test, and 2400Pa wind load, 5400Pa snow load test, higher reliability

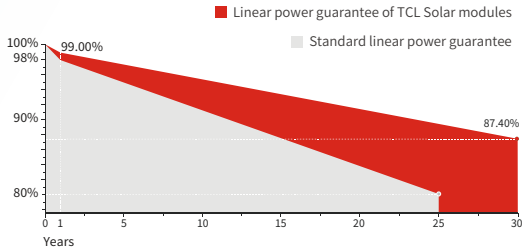
Better Low Light Performance
Higher power generation compare with standard module in cloudy, foggy and low light condition

Low Power Degradation
First year power degradation <1.0%，year 2-30 power degradation <0.40% each year

Low Temperature coefficient
Passivated contact cell technology for higher power generation in operating

Better Anti-PID
N-type cells with boron-oxide-free composite LID to increase module power generation

LINEAR PERFORMANCE WARRANTY



15 YEARS product warranty

0.40% Linear attenuation of 0.40% per year within 30 years

30 YEARS linear power warranty

CERTIFICATES

- IEC 61215，IEC 61730
- ISO 9001：2015 Quality Management System
- ISO 14001：2015 Environment Management System
- ISO 45001：2018 Occupational health and safety management systems

Electrical Data (STC)

Maximum Power (Pmax/W)	555	560	565	570	575
Open Circuit Voltage (Voc/V)	50.73	50.88	51.03	51.18	51.33
Short Circuit Current (Isc/A)	13.68	13.76	13.84	13.92	14.00
Voltage at Maximum Power (Vmp/V)	42.00	42.15	42.30	42.45	42.60
Current at Maximum Power (Imp/A)	13.22	13.29	13.36	13.43	13.50
Module Efficiency (%)	21.48	21.68	21.87	22.07	22.26
Operating Temperature	-40° C~+85° C				
Maximum System Voltage	1000/1500V DC				

STC (Standard Testing Conditions): Irradiance 1000W/m^2, Cell Temperature 25°C , AM1.5

Electrical Data (NMOT)

Maximum Power (Pmax/W)	418	422	426	430	434
Open Circuit Voltage (Voc/V)	48.16	48.31	48.46	48.61	48.76
Short Circuit Current (Isc/A)	11.19	11.26	11.33	11.40	11.47
Voltage at Maximum Power (Vmp/V)	39.53	39.68	39.83	39.98	40.13
Current at Maximum Power (Imp/A)	10.58	10.64	10.70	10.76	10.82

NMOT (Nominal Moudule Operating Temperature): Irradiance 800W/m^2, Ambient Temperature 20°C , AM1.5, Wind Speed 1m/s.

Bifacial Power Generation Parameters (Backside Gains)

5%	Maximum Power (Pmax/W)	583	588	593	599	604
	Module Efficiency (%)	22.56	22.76	22.97	23.17	23.37
15%	Maximum Power (Pmax/W)	638	644	650	656	661
	Module Efficiency (%)	24.71	24.93	25.15	25.37	25.60
25%	Maximum Power (Pmax/W)	694	700	706	713	719
	Module Efficiency (%)	26.86	27.10	27.34	27.58	27.82

Mechanical Data

Cell Type	182×91mm Mono
Cell Orientation	144(6×24)
Module Dimensions	2278×1134×30mm
Weight	32.0kg
Glass	2.0mm high transmittance, reinforced glass
Backsheet	2.0mm part of the structure is grid-like white ceramic glass
Frame Material	Anodized aluminum alloy
Junction Box	Protection class IP68
Cable	4.0 mm^2 positive pole: 200 mm negative pole: 250 mm wire length can be customized
Connector	**MC4 EVO2 & Compatible**

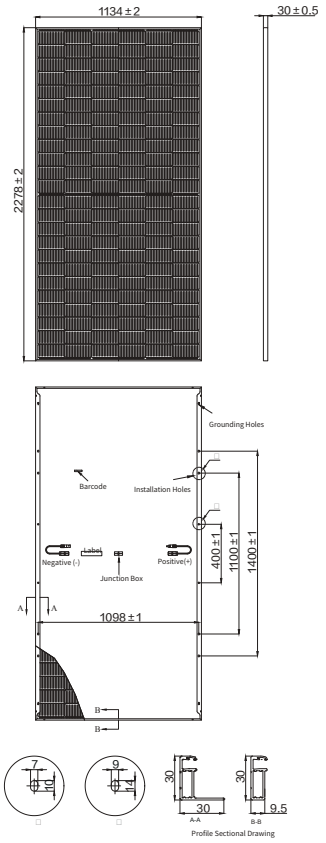
Temperature Coefficients

Temperature Coefficient (Pm)	-0.300%/°C
Temperature Coefficient (Voc)	-0.250%/°C
Temperature Coefficient (Isc)	0.045%/°C
NMOT (Nominal Moudule Operating Temperature)	41±3°C

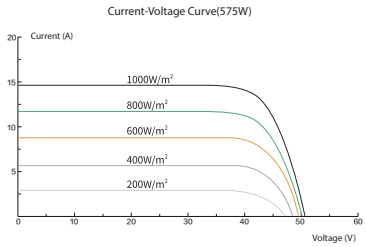
Packaging

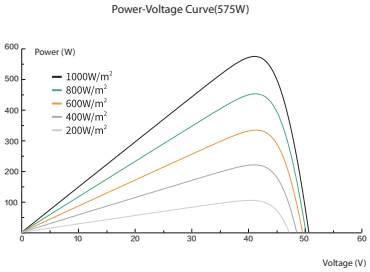
Transportation methods	Number of modules per cabinet	Number of modules per pallet
40HQ container	720 pcs	36 pcs

Module Dimensions (mm)



I-V Curve





TCL 210R

TCL-MI590~615DT210RP-66NS

TOPCon Shingled Bifacial High Efficiency PV Module

PRODUCT FEATURES

HIGH ENERGY YIELD

- High-density cell package, increasing 2% cells
- Lower temperature coefficient (Pmax): -0.29%/°C
- Up to 80% power bifaciality

INDUSTRY-LEADING G12R WAFER

- <1% degradation in the first year
- Smaller wafer chamfer, larger light receiving area
- Wafer:210R ,Thickness:⩽130um

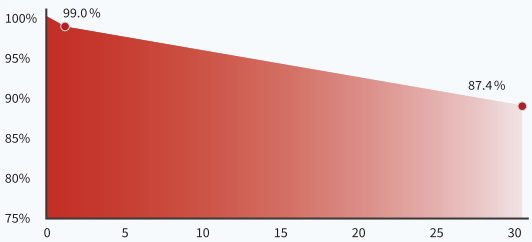
SUPERIOR CUSTOMER VALUE

- Integrated technology: TOPCon + Shingling
- Optimized dimension design for all scenarios
- More artistic beauty with no-gap design

LONG-TERM RELIABILITY

- 1/3 cell technology, lower current loss and hot spot risk
- Harsh environment resistance
- Damage-free laser cutting, lower micro-crack risk
- Mechanical load: Front 5400 Pa, Back 2400 Pa

LINEAR PERFORMANCE WARRANTY



15 YEARS product warranty

30 YEARS linear power warranty

0.40 % Linear attenuation of 0.40% per year within 30 years

CERTIFICATES

- IEC 61215/IEC 61730
- IS0 9001:2015
- IS0 45001:2018
- IS0 14001:2015

Electrical Parameters (STC*)

Maximum Power	Pmax (W)	590	595	600	605	610	615
Open Circuit Voltage	Voc (V)	47.30	47.50	47.70	47.90	48.10	48.30
Short Circuit Current	Isc (A)	15.70	15.73	15.76	15.79	15.82	15.85
Maximum Power Voltage	Vmp (V)	39.75	40.00	40.25	40.50	40.75	41.00
Maximum Power Current	Imp (A)	14.85	14.88	14.91	14.94	14.97	15.00
Module Efficiency	(%)	21.8	22.0	22.2	22.4	22.6	22.8

* STC: Irradiance 1000Wim2, Cell Temperature 25'C,AM1.5, Measuring Tolerance: +2%

Electrical Characteristics with 10% Bifacial Gain*

Maximum Power	Pmax (W)	649	655	660	666	671	677
Open Circuit Voltage	Voc (V)	47.30	47.50	47.70	47.90	48.10	48.30
Short Circuit Current	Isc (A)	17.27	17.30	17.34	17.37	17.40	17.44
Maximum Power Voltage	Vmp (V)	39.75	40.00	40.25	40.50	40.75	41.00
Maximum Power Current	Imp (A)	16.34	16.37	16.40	16.43	16.47	16.50

* The additional gain from the back side depends on mounting (structure, height, tilt angle etc.) and albedo of the ground.

Mechanical Data

No.of Cells	198pcs (6×33)
Dimension	2382×1134×30mm
Weight	33.2kg
Front Glass	2.0mm High Transmission, Heat Strengthened Glass
Back Glass	2.0mm Heat Strengthened Glass
Frame	Anodized Aluminium Alloy
J-Box	IP68
Cables	4.0mm², +350mm, -280mm/±1400mm (can be customized)
Diodes	3
Maximum Static Load	Front: 5400Pa/Back: 2400Pa*
Connector	MC4 EVO2 & Compatible

Temperature Coefficient

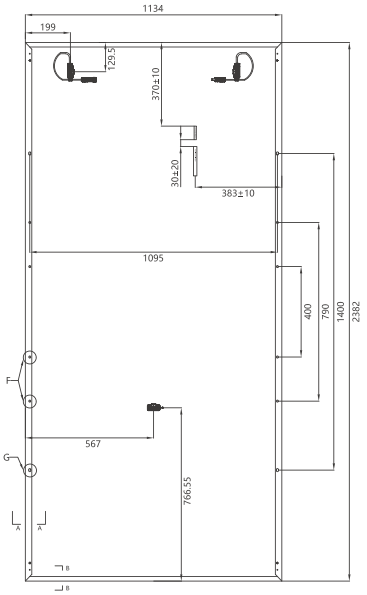
Nominal Module Operating Temperature*	43±2°C
Temperature Coefficient of Isc	+0.045%/°C
Temperature Coefficient of Voc	-0.25%/°C
Temperature Coefficient of Pmax	-0.29%/°C
Operating Temperature	-40~+85°C
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	30A
Power Bifaciality	80±5%

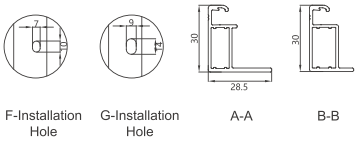
* NMOT: Irradiance 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s

Packaging Configuration

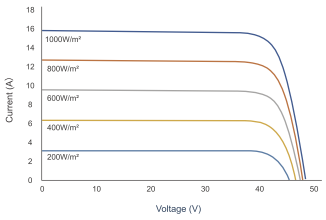
Modules per Pallet	36pcs
Modules per 40'HQ Container	720pcs
Pallets per 40'HQ Container	20plt

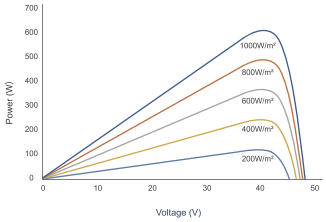
Module Dimensions (mm)





I-V Curves





TCL 210R

TCL-MG600~625DT210R-68NS

TOPCon Shingled Bifacial High Efficiency PV Module

PRODUCT FEATURES

HIGH ENERGY YIELD

- High-density cell package, increasing 2% cells
- Lower temperature coefficient (Pmax): -0.29%/°C
- Up to 80% power bifaciality

INDUSTRY-LEADING G12 WAFER

- <1% degradation in the first year
- Smaller wafer chamfer, larger light receiving area
- Wafer:210,Thickness:≤130um

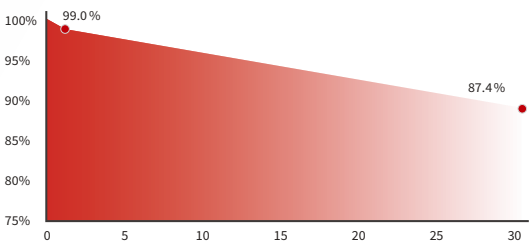
SUPERIOR CUSTOMER VALUE

- Integrated technology: TOPCon + Shingling
- Optimized dimension design for all scenarios
- More artistic beauty with no-gap design

LONG-TERM RELIABILITY

- 1/3 cell technology, lower current loss and hot spot risk
- Harsh environment resistance
- Damage-free laser cutting, lower micro-crack risk
- Mechanical load: Front 5400 Pa, Back 2400 Pa

LINEAR PERFORMANCE WARRANTY



15 YEARS product warranty

30 YEARS linear power warranty

0.40 % Linear attenuation of 0.40% per year within 30 years

CERTIFICATES

- IEC 61215/IEC 61730
- IS0 9001:2015
- IS0 45001:2018
- IS0 14001:2015

Electrical Parameters (STC*)

Maximum Power	Pmax (W)	600	605	610	615	620	625
Open Circuit Voltage	Voc (V)	48.60	48.80	49.00	49.20	49.40	49.60
Short Circuit Current	Isc (A)	15.51	15.54	15.57	15.60	15.63	15.66
Maximum Power Voltage	Vmp (V)	41.20	41.40	41.60	41.80	42.00	42.20
Maximum Power Current	Imp (A)	14.57	14.62	14.67	14.72	14.77	14.82
Module Efficiency	(%)	21.9	22.1	22.3	22.5	22.7	22.8

* STC: Irradiance 1000Wim2, Cell Temperature 25'C,AM1.5, Measuring Tolerance: +2%

Electrical Characteristics with 10% Bifacial Gain*

Maximum Power	Pmax (W)	660	666	671	677	682	688
Open Circuit Voltage	Voc (V)	48.60	48.80	49.00	49.20	49.40	49.60
Short Circuit Current	Isc (A)	17.06	17.09	17.13	17.16	17.19	17.23
Maximum Power Voltage	Vmp (V)	41.20	41.40	41.60	41.80	42.00	42.20
Maximum Power Current	Imp (A)	16.03	16.08	16.14	16.19	16.25	16.30

* The additional gain from the back side depends on mounting (structure, height, tilt angle etc.) and albedo of the ground.

Mechanical Data

No.of Cells	204pcs (6×34)
Dimension	2413×1134×30mm
Weight	33.5kg
Front Glass	2.0mm High Transmission, Heat Strengthened Glass
Back Glass	2.0mm Heat Strengthened Glass
Frame	Anodized Aluminium Alloy
J-Box	IP68
Cables	4.0mm², +350mm, -280mm/±1400mm (can be customized)
Diodes	3
Maximum Static Load	Front: 5400Pa/Back: 2400Pa*
Connector	MC4 EVO2 & Compatible

Temperature Coefficient

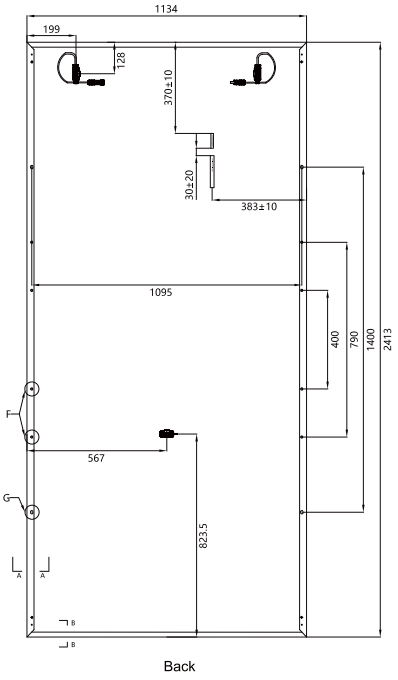
Nominal Module Operating Temperature*	43±2°C
Temperature Coefficient of Isc	+0.045%/°C
Temperature Coefficient of Voc	-0.25%/°C
Temperature Coefficient of Pmax	-0.29%/°C
Operating Temperature	-40~+85°C
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	30A
Power Bifaciality	80±5%

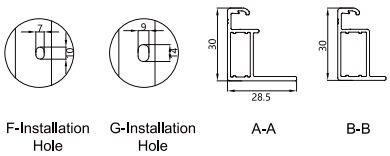
* NMOT: Irradiance 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s

Packaging Configuration

Modules per Pallet	36pcs
Modules per 40'HQ Container	576pcs
Pallets per 40'HQ Container	16plt

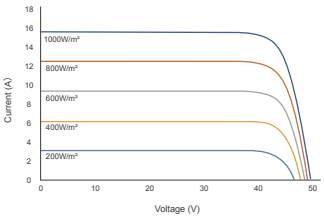
Module Dimensions (mm)

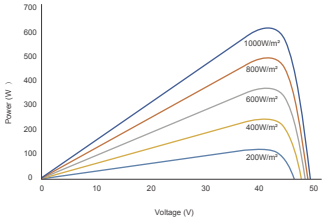




F-Installation Hole | G-Installation Hole | A-A | B-B

I-V Curves





TCL 210

TCL-MG680~700DH210-66NT

TOPCon Bifacial High Efficiency PV Module

PRODUCT FEATURES

Hi Power Output
N-type MBB half cut technology, improve energy density, bring higher power output.
High Bifacial Factor, up to 25% extra power generation

High Durability
Passed TUV Salt & Ammonia corrosion test, and 2400Pa wind load, 5400Pa snow load test, higher reliability

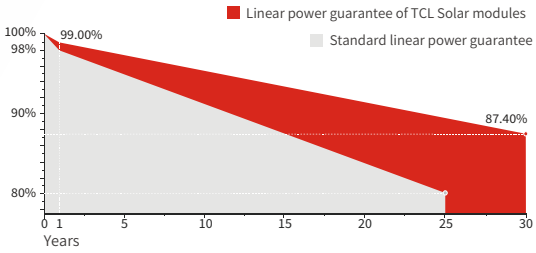
Better Low Light Performance
Higher power generation compare with standard module in cloudy, foggy and low light condition

Low Power Degradation
First year power degradation <1.0%，year 2-30 <0.40% each year

Low Temperature coefficient
Passivated contact cell technology for higher power generation in operating

Better Anti-PID
N-type cells with boron-oxide-free composite LID to increase module power generation

LINEAR PERFORMANCE WARRANTY



15 YEARS product warranty

linear power warranty

0.40 % Linear attenuation of 0.40% per year within 30 years

CERTIFICATES

- IEC 61215，IEC 61730
- ISO 9001：2015 Quality Management System
- ISO 14001：2015 Environment Management System
- ISO 45001：2018 Occupational health and safety management systems

Electrical Data (STC)

Maximum Power (Pmax/W)	680	685	690	695	700
Open Circuit Voltage (Voc/V)	46.26	46.41	46.56	46.71	46.86
Short Circuit Current (Isc/A)	18.56	18.64	18.71	18.79	18.86
Voltage at Maximum Power (Vmp/V)	38.25	38.40	38.55	38.7	38.85
Current at Maximum Power (Imp/A)	17.78	17.84	17.90	17.96	18.02
Module Efficiency (%)	21.89	22.05	22.21	22.37	22.53
Operating Temperature	-40° C~+85° C				
Maximum System Voltage	1000/1500V DC				
Refer.Bifacial Factor	72±5%				

STC (Standard Testing Conditions): Irradiance 1000W/m^2, Cell Temperature 25°C , AM1.5

Electrical Data (NMOT)

Maximum Power (Pmax/W)	510	514	518	522	526
Open Circuit Voltage (Voc/V)	43.45	43.60	43.75	43.9	44.05
Short Circuit Current (Isc/A)	15.07	15.13	15.20	15.26	15.33
Voltage at Maximum Power (Vmp/V)	35.74	35.89	36.04	36.19	36.34
Current at Maximum Power (Imp/A)	14.27	14.33	14.38	14.43	14.48

NMOT (Nominal Moudule Operating Temperature): Irradiance 800W/m^2, Ambient Temperature 20°C , AM1.5, Wind Speed 1m/s.

Bifacial Power Generation Parameters (backside gains)

5%	Maximum Power (Pmax/W)	714	719	725	730	735
	Module Efficiency (%)	22.99	23.15	23.32	23.49	23.66
15%	Maximum Power (Pmax/W)	782	788	794	799	805
	Module Efficiency (%)	25.17	25.36	25.54	25.73	25.91
25%	Maximum Power (Pmax/W)	850	856	863	869	875
	Module Efficiency (%)	27.36	27.56	27.77	27.97	28.17

Mechanical Data

Cell Type	210×105mm Mono
Cell Orientation	132(6×22)
Module Dimensions	2384×1303×35mm
Weight	39.0kg
Glass	2.0mm high transmittance, reinforced glass
Backsheet	2.0mm part of the structure is grid-like white ceramic glass
Frame Material	Anodized aluminum alloy
Junction Box	Protection class IP68
Cable	4.0 mm^2 positive pole: 300mm negative pole: 400 mm wire length can be customized
Connector	**MC4 EVO2 & Compatible**

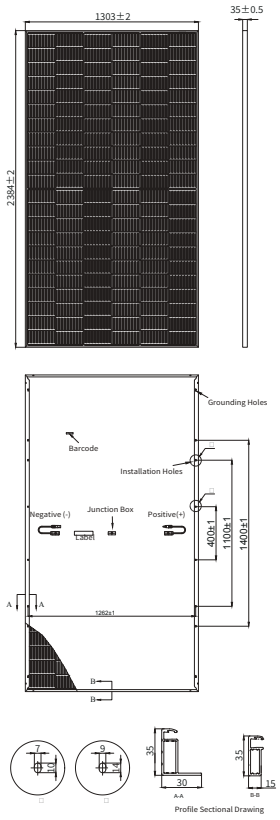
Temperature Coefficients

Temperature Coefficient (Pm)	-0.300%/°C
Temperature Coefficient (Voc)	-0.250%/°C
Temperature Coefficient (Isc)	0.046%/°C
NMOT (Nominal Moudule Operating Temperature)	41±3°C

Packaging

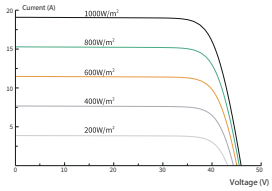
Transportation methods	Number of modules per cabinet	Number of modules per pallet
40HQ container	527 pcs	31 pcs

Module Dimensions (mm)

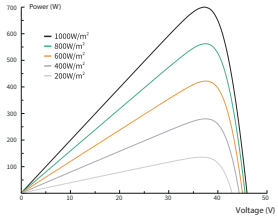


I-V Curve

Current-Voltage Curve(700W)



Power-Voltage Curve(700W)



TCL 210

TCL-MG700~725DT210-68NS

TOPCon Shingled Bifacial High Efficiency PV Module

PRODUCT FEATURES

HIGH ENERGY YIELD

- High-density cell package, increasing 2% cells
- Lower temperature coefficient (Pmax): -0.29%/°C
- Up to 80% power bifaciality

INDUSTRY-LEADING G12 WAFER

- <1% degradation in the first year
- Smaller wafer chamfer, larger light receiving area
- Wafer:210,Thickness:≤130um

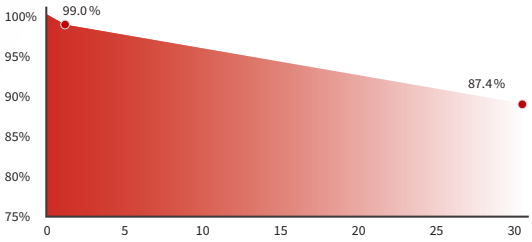
SUPERIOR CUSTOMER VALUE

- Integrated technology: TOPCon + Shingling
- High module efficiency, Lower LCOE&BOS
- More artistic beauty with no-gap design

LONG-TERM RELIABILITY

- 1/3 cell technology, lower current loss and hot spot risk
- Harsh environment resistance
- Damage-free laser cutting, lower micro-crack risk
- Mechanical load: Front 5400 Pa, Back 2400 Pa

LINEAR PERFORMANCE WARRANTY



15 YEARS product warranty

30 YEARS linear power warranty

0.40% Linear attenuation of 0.40% per year within 30 years

CERTIFICATES

- IEC 61215/IEC 61730
- IS0 9001:2015
- IS0 45001:2018
- IS0 14001:2015

Electrical Parameters (STC*)

Maximum Power	Pmax (W)	700	705	710	715	720	725
Open Circuit Voltage	Voc (V)	48.90	49.10	49.30	49.40	49.50	49.60
Short Circuit Current	Isc (A)	17.88	17.92	17.96	17.97	17.98	17.99
Maximum Power Voltage	Vmp (V)	41.40	41.60	41.80	42.00	42.20	42.40
Maximum Power Current	Imp (A)	16.92	16.96	17.00	17.03	17.07	17.11
Module Efficiency	(%)	22.3	22.4	22.6	22.7	22.9	23.1

* STC: Irradiance 1000Wim2, Cell Temperature 25'C,AM1.5, Measuring Tolerance: +2%

Electrical Characteristics with 10% Bifacial Gain*

Maximum Power	Pmax (W)	770	776	781	787	792	798
Open Circuit Voltage	Voc (V)	48.90	49.10	49.30	49.40	49.50	49.60
Short Circuit Current	Isc (A)	19.67	19.71	19.76	19.77	19.78	19.79
Maximum Power Voltage	Vmp (V)	41.40	41.60	41.80	42.00	42.20	42.40
Maximum Power Current	Imp (A)	18.61	18.66	18.70	18.73	18.78	18.82

* The additional gain from the back side depends on mounting (structure, height, tilt angle etc.) and albedo of the ground.

Mechanical Data

No.of Cells	204pcs (6×34)
Dimension	2413×1303×33mm
Weight	38.4kg
Front Glass	2.0mm High Transmission, Heat Strengthened Glass
Back Glass	2.0mm Heat Strengthened Glass
Frame	Anodized Aluminium Alloy
J-Box	IP68
Cables	4.0mm², +350mm, -280mm/±1400mm (can be customized)
Diodes	3
Maximum Static Load	Front: 5400Pa/Back: 2400Pa*
Connector	MC4 EVO2 & Compatible

Temperature Coefficient

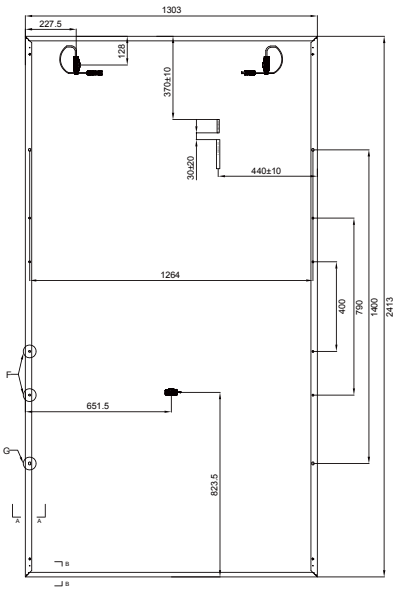
Nominal Module Operating Temperature*	43±2°C
Temperature Coefficient of Isc	+0.045%/°C
Temperature Coefficient of Voc	-0.25%/°C
Temperature Coefficient of Pmax	-0.29%/°C
Operating Temperature	-40~+85°C
Maximum System Voltage	1500V DC
Maximum Series Fuse Rating	35A
Power Bifaciality	80±5%

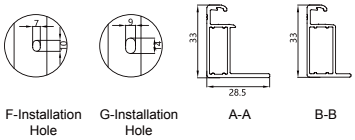
* NMOT: Irradiance 800W/m², Ambient Temperature 20°C, Wind Speed 1m/s

Packaging Configuration

Modules per Pallet	33pcs
Modules per 40'HQ Container	561pcs
Pallets per 40'HQ Container	17plt

Module Dimensions (mm)





I-V Curves