



## PV module - TSM-510NEG18R.28

Manufacturer	Trina Solar	Commercial data	
Model	TSM-510NEG18R.28	Data source :	TSL 2023 11
P <sub>nom</sub> STC power (manufacturer)	510 W <sub>P</sub>	Technology	Si-mono
Module size (W x L)	1.134 x 1.961 m <sup>2</sup>	Rough module area (A <sub>module</sub> )	2.22 m <sup>2</sup>
Number of cells	2 x 54	Sensitive area (cells) (A <sub>cells</sub> )	2.03 m <sup>2</sup>
<b>Specifications for the model (manufacturer or measurement data)</b>			
Reference temperature (T <sub>Ref</sub> )	25 °C	Reference irradiance (G <sub>Ref</sub> )	1000 W/m <sup>2</sup>
Open circuit voltage (V <sub>oc</sub> )	40.6 V	Short-circuit current (I <sub>sc</sub> )	15.93 A
Max. power point voltage (V <sub>mpp</sub> )	33.7 V	Max. power point current (I <sub>mpp</sub> )	15.14 A
=> maximum power (P <sub>mpp</sub> )	510.2 W	I <sub>sc</sub> temperature coefficient (μI <sub>sc</sub> )	6.4 mA/°C
<b>One-diode model parameters</b>			
Shunt resistance (R <sub>shunt</sub> )	300 Ω	Diode saturation current (I <sub>oRef</sub> )	0.016 nA
Series resistance (R <sub>serie</sub> )	0.15 Ω	V <sub>oc</sub> temp. coefficient (μV <sub>oc</sub> )	-96 mV/°C
Specified P <sub>max</sub> temper. coeff. (μP <sub>MaxR</sub> )	-0.29 %/°C	Diode quality factor (Gamma)	1.06
		Diode factor temper. coeff. (μGamma)	0.000 1/°C
<b>Reverse Bias Parameters, for use in behaviour of PV arrays under partial shadings or mismatch</b>			
Reverse characteristics (dark) (B <sub>Rev</sub> )	3.20 mA/V <sup>2</sup>	(quadratic factor (per cell))	
Number of by-pass diodes per module	3	Direct voltage of by-pass diodes	-0.7 V
<b>Model results for standard conditions (STC: T=25 °C, G=1000 W/m<sup>2</sup>, AM=1.5)</b>			
Max. power point voltage (V <sub>mpp</sub> )	33.7 V	Max. power point current (I <sub>mpp</sub> )	15.19 A
Maximum power (P <sub>mpp</sub> )	510.3 W <sub>P</sub>	Power temper. coefficient (μP <sub>mpp</sub> )	-0.29 %/°C
Efficiency(/ Module area) (Eff <sub>mod</sub> )	22.9 %	Fill factor (FF)	0.789
Efficiency(/ Cells area) (Eff <sub>cells</sub> )	25.2 %		

