

# SolarMagic™ power optimizers.

Maximizing solar energy for the real world.

SolarMagic™ power optimizers are the perfect solution for maximizing the energy harvest of solar photovoltaic (PV) arrays affected by real world conditions. Solar PV arrays are susceptible to large amounts of energy loss from small amounts of shade caused by light barriers like trees, roof obstructions, and debris. In addition, solar arrays require installation with a single orientation and tilt to avoid array mismatch energy loss. SolarMagic power optimizers reclaim up to 57% of the energy lost to real-world shade and mismatch conditions and enable flexible design installation.



## Optimizing solar systems—even in shaded conditions.

When it comes to solar energy, the power of the solar array is only as strong as the weakest-performing panel. And in real world conditions, where mismatch is common from sources like shade, chimneys, power lines, intermittent clouds and even bird droppings, solar efficiency can be decreased significantly. In fact, as little as 10% shade can result in as much as 50% less energy. SolarMagic power optimizers maximize the energy potential of each individual panel so up to 57% of the lost energy can be restored. That means customers living in less-than-ideal conditions can install effective solar systems and take advantage of a larger solar array setup. SolarMagic power optimizers are designed to maximize the solar energy harvest by increasing kilowatt hours despite unavoidable, real-world conditions.

## Offer your customers a greater return on their investment.

With 50 years of power management leadership, National Semiconductor is an industry leader in the core technology underlying solar energy harvest. With SolarMagic power optimizers, National brings established experience and expertise to photovoltaic solar systems, and offers a 20-year power optimizer warranty that delivers a level of performance unparalleled in the industry.

## Easy to install and highly effective.

Besides reclaiming up to 57% of the energy lost from mismatch conditions like shade and infrastructure, SolarMagic power optimizers offer extensive flexibility. In fact, as many as 87% of installers say they design solar panel configurations around shade, often resulting in awkward or unattractive configurations. SolarMagic technology gives installers the freedom to position panels sensibly, without working around shade.

## Key Features

- Reclaims up to 57% of lost energy from real-world conditions
- Makes installation easier and more flexible
- Provides system owners a faster return on their investment





## SolarMagic power optimizers SM1230-3A1/3B1/4A1/4B1 specifications

### 20-Year Warranty

All SolarMagic power optimizers come with a limited 20-year warranty, ensuring the reliability of the panel-mounted electronics matches the panels themselves.

#### Electrical Operating Parameters

SM1230-3A1/4A1 – Operating Specifications				
Symbol	Parameter	Min	Typical	Max
$V_{SYS}$	UL System String Voltage			600 Vdc
	CE System String Voltage			1000 Vdc
$V_{MPP}$	PV Module MPP Voltage	15 Vdc	28 Vdc	40 Vdc
$I_{MPP}$	PV Module MPP Current			8.5A
$P_{MPP}$	PV Module Power	5W		230W
$V_{OC}$	PV Module Open-Circuit Voltage			50 Vdc
$I_{SC(OC)}$	PV Module Short-Circuit Current			
	Over-Current Protection Threshold	9.2A		10.4A
$V_{OUT}$	Output Voltage	0 Vdc		43 Vdc
$I_{OUT}$	Output Current	0A		8.5A
$\eta$	Efficiency		98.5%	
$T_A$	Operating Temperature	-40°F (-40°C)		158°F (70°C)

#### Electrical Operating Parameters

SM1230-3B1/4B1 – Operating Specifications				
Symbol	Parameter	Min	Typical	Max
$V_{SYS}$	UL System String Voltage			600 Vdc
	CE System String Voltage			1000 Vdc
$V_{MPP}$	PV Module MPP Voltage	30 Vdc	56 Vdc	80 Vdc
$I_{MPP}$	PV Module MPP Current			5.5A
$P_{MPP}$	PV Module Power	5W		230W
$V_{OC}$	PV Module Open-Circuit Voltage			100 Vdc
$I_{SC(OC)}$	PV Module Short-Circuit Current			
	Over-Current Protection Threshold	5.9A		6.4A
$V_{OUT}$	Output Voltage	0 Vdc		86 Vdc
$I_{OUT}$	Output Current	0A		5.5A
$\eta$	Efficiency		98.5%	
$T_A$	Operating Temperature	-40°F (-40°C)		158°F (70°C)

#### Physical Specifications:

Model	Body Dimension	Weight	Connector Type
SM1230-3A1	5.27" x 4.24" x 1.86"	2.3 lbs	MC3
SM1230-3B1	(13.4 x 10.8 x 4.7 cm)	(1.1 kg)	
SM1230-4A1	5.27" x 4.24" x 1.86"	2.3 lbs	MC4
SM1230-4B1	(13.4 x 10.8 x 4.7 cm)	(1.1 kg)	

#### Safety and conformance certifications

Each SolarMagic power optimizer is designed and tested to comply with the appropriate sections of the UL 1741, IEC 61010 and IEC 60529 standards.

## SolarMagic blocking diodes SM2060-3A1/4A1/SM2100-3A1/4A1 specifications

### 20-Year Warranty

All SolarMagic blocking diodes come with a limited 20-year warranty.



#### Electrical Operating Parameters

SM2060-3A1/4A1 – Operating Specifications				
Symbol	Parameter	Min	Typical	Max
$V_{SYS}$	System voltage			600 Vdc
$I_{IN}$	Input current (PV $I_{SC}$ )			9A
$V_F$	Forward voltage drop		0.7 Vdc	1.26 Vdc
$\eta$	Efficiency		99.80%	
$T_A$	Operating Temperature	-40°F (-40°C)		158°F (70°C)

#### Electrical Operating Parameters

SM2100-3A1/4A1 – Operating Specifications				
Symbol	Parameter	Min	Typical	Max
$V_{SYS}$	System voltage			1000 Vdc
$I_{IN}$	Input current (PV $I_{SC}$ )			9A
$V_F$	Forward voltage drop		0.7 Vdc	1.26 Vdc
$\eta$	Efficiency		99.80%	
$T_A$	Operating Temperature	-40°F (-40°C)		158°F (70°C)

#### Physical Specifications:

Model	Body Dimension	Weight	Connector Type
SM2060-3A1	3.93" x 3.33" x 1.68"	12.5 oz.	MC3
SM2100-3A1	(10 x 8.45 x 4.28 cm)	(0.36 kg)	
SM2060-4A1	3.93" x 3.33" x 1.68"	12.5 oz.	MC4
SM2100-4A1	(10 x 8.45 x 4.28 cm)	(0.36 kg)	

Visit [www.solarmagic.com](http://www.solarmagic.com) and click Partner Portal for design support and more information

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