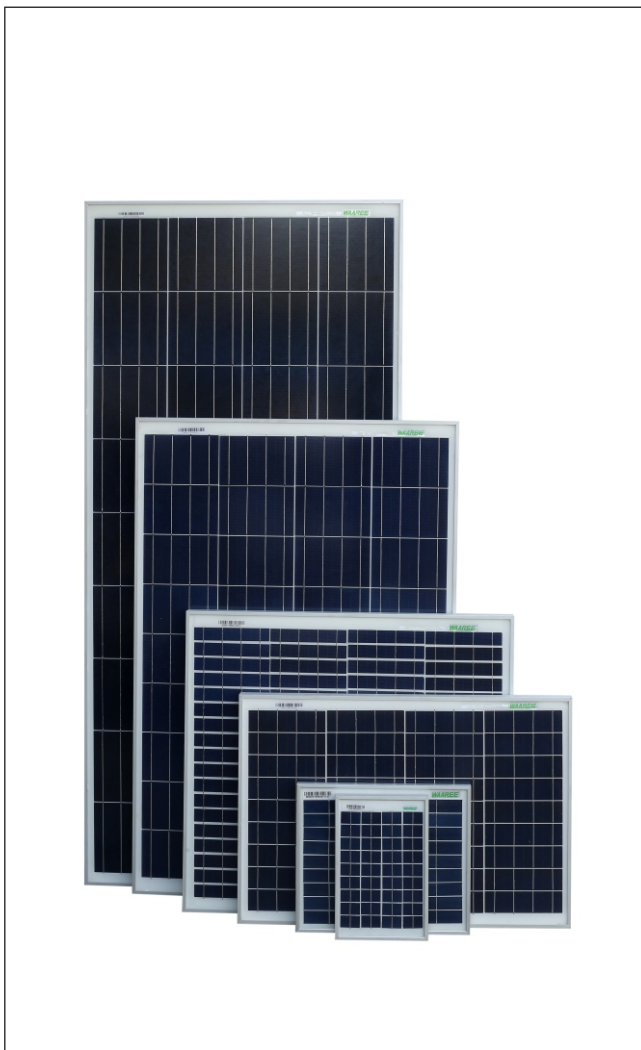
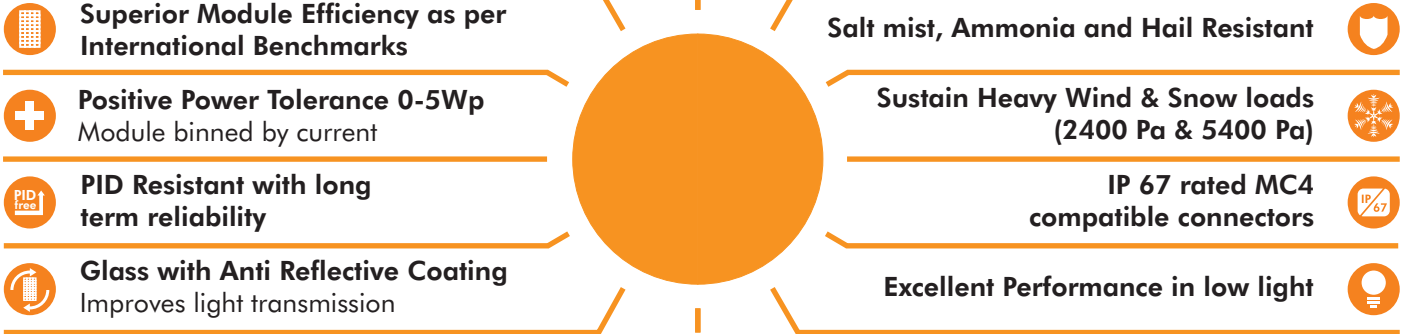


# WS-100 to WS-235

ARUN SERIES

# WAAREE®

One with the Sun



## THERMAL CHARACTERISTICS

|                                       |             |
|---------------------------------------|-------------|
| Temperature coefficient of Current/°C | 0.0154      |
| Temperature coefficient of Voltage/°C | -0.2775     |
| Temperature coefficient of Power/°C   | -0.3859     |
| NOCT                                  | 46° ± 2°    |
| Operating Temperature Range           | -40° to 85° |

## WARRANTY

|                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| -5 years Limited Product Warranty**                                                                                                                                         |
| -25 years Limited Power Output Warranty** <ul style="list-style-type: none"><li>♦ Minimum 90% at the end of 10 years</li><li>♦ Minimum 80% at the end of 25 years</li></ul> |

## INTERNATIONAL & NATIONAL CERTIFICATIONS



IEC 62804 | UI1703 | ROHS Compliance | REACH Compliance  
| INMETRO\* | FIDE\*

ISO 9001:2015 | ISO 14001:2004 | OHSAS 18001:2007 | IEC 61215  
IEC 61730-1&2 | IEC 61701 | IEC 62716 | IEC 60068-2-68

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# WS-100 to WS-235

ARUN SERIES



## ELECTRICAL CHARACTERISTICS

| Model                              | WS-100                  | WS-100 | WS-105 | WS-110 | WS-110 | WS-115 | WS-120 | WS-125 | WS-125 | WS-130 | WS-130 | WS-135 | WS-140 | WS-140 | WS-145 | WS-150 | WS-150 | WS-155 | WS-160 | WS-165 |       |
|------------------------------------|-------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
|                                    | / 12V                   | / 24V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 12V  | / 24V  | / 24V  | / 24V  | / 24V |
| Nominal Maximum Power, Pm (W)*     | 100                     | 100    | 105    | 110    | 110    | 115    | 120    | 125    | 125    | 130    | 130    | 135    | 140    | 140    | 145    | 150    | 150    | 155    | 160    | 165    |       |
| Power Tolerance                    | Positive Tolerance Only |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |       |
| Open Circuit Voltage, Voc (V)*     | 22.2                    | 44     | 22.02  | 22.07  | 44.1   | 22.12  | 22.17  | 22.22  | 44.15  | 22.27  | 44.1   | 22.32  | 22.37  | 44.2   | 22.42  | 22.47  | 44.3   | 44.35  | 44.4   | 44.45  |       |
| Short Circuit Current, Isc (A)*    | 6.07                    | 3.03   | 6.36   | 6.65   | 3.33   | 6.93   | 7.22   | 7.5    | 3.78   | 7.78   | 3.93   | 8.06   | 8.34   | 4.22   | 8.62   | 8.9    | 4.51   | 4.66   | 4.8    | 4.95   |       |
| Voltage at Maximum Power, Vmp (V)* | 17.46                   | 35.6   | 17.49  | 17.71  | 35.65  | 17.54  | 17.56  | 17.59  | 35.73  | 17.61  | 35.75  | 17.64  | 17.66  | 35.8   | 17.69  | 35.85  | 35.88  | 35.9   | 35.93  |        |       |
| Current at Maximum Power, Imp (A)* | 5.73                    | 2.81   | 6.01   | 6.29   | 3.09   | 6.56   | 6.84   | 7.11   | 3.5    | 7.39   | 3.64   | 7.66   | 7.93   | 3.92   | 8.2    | 8.47   | 4.19   | 4.32   | 4.46   | 4.6    |       |
| Maximum System Voltage (V)         | 1000                    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |       |
| Module Efficiency (%)              | 12.93%                  | 13.42% | 13.92% | 13.92% | 13.92% | 14.42% | 14.91% | 13.32% | 13.75% | 14.18% | 12.93% | 13.42% | 13.92% | 13.92% | 14.42% | 14.91% | 14.91% | 13.32% | 13.75% | 14.18% |       |
| Maximum Series Fuse Rating (A)     | 15                      | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     |       |
| Limiting Reverse Current (A)       | 15                      | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     |       |
| Rated Voltage (V dc)               | 17.46                   | 35.6   | 17.49  | 17.51  | 35.7   | 17.54  | 17.56  | 17.59  | 35.8   | 17.61  | 35.9   | 17.64  | 17.66  | 35.7   | 17.69  | 36.1   | 36.1   | 36.15  | 36.2   | 36.25  |       |
| Rated Current (A dc)               | 5.73                    | 2.81   | 6.01   | 6.28   | 3.08   | 6.56   | 6.83   | 7.11   | 3.49   | 7.38   | 3.62   | 7.66   | 7.93   | 3.92   | 8.2    | 8.47   | 4.16   | 4.29   | 4.42   | 4.55   |       |

## MECHANICAL CHARACTERISTICS

|                                            |                                                           |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
|--------------------------------------------|-----------------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--|
| Model                                      | WS-100                                                    | WS-100        | WS-105        | WS-110        | WS-110        | WS-115        | WS-120        | WS-125        | WS-125        | WS-130        | WS-130        | WS-135        | WS-140        | WS-140        | WS-145        | WS-150        | WS-150        | WS-155        | WS-160        | WS-165        |  |
| Length x Width x Thickness (LxWxT) - mm    | 1035x 675x 35                                             | 1035x 675x 35 | 1150x 675x 35 | 1260x 675x 35 | 1260x 675x 35 | 1260x 675x 35 | 1260x 675x 35 | 1260x 675x 35 | 1260x 675x 35 | 1490x 675x 35 | 1490x 675x 35 | 1490x 675x 35 | 1490x 675x 35 | 1490x 675x 35 | 1490x 675x 35 | 1490x 675x 35 | 1490x 675x 35 | 1195x 990x 35 | 1195x 990x 35 | 1195x 990x 35 |  |
| Mounting holes pitch (Y)-mm                | 545                                                       | 645           | 645           | 645           | 645           | 645           | 645           | 645           | 645           | 915           | 915           | 915           | 915           | 915           | 915           | 915           | 915           | 915           | 915           | 915           |  |
| Mounting holes pitch (X)-mm                | 633                                                       | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 633           | 950           |  |
| Weight (kg)                                | 10.15                                                     | 10.15         | 10.15         | 11.30         | 11.30         | 11.5          | 13            | 13            | 13            | 13            | 13            | 13            | 13            | 13            | 13            | 13            | 13            | 14.45         | 14.45         | 14.45         |  |
| Cells per module (Units)/ Arrangement      | 36 / (9x4)                                                | 72 / (18x4)   | 36 / (9x4)    | 36 / (9x4)    | 72 / (18x4)   | 36 / (9x4)    | 36 / (9x4)    | 36 / (9x4)    | 72 / (18x4)   | 36 / (9x4)    | 72 / (18x4)   | 36 / (9x4)    | 36 / (9x4)    | 72 / (18x4)   | 36 / (9x4)    | 36 / (9x4)    | 36 / (9x4)    | 72 / (12x6)   | 72 / (12x6)   | 72 / (12x6)   |  |
| Cell Type                                  | Polycrystalline Silicon                                   |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
| Front Cover (Material/ Thickness)          | Tempered & Low Iron Glass, 3.2 / 4.0 mm                   |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
| Encapsulate                                | Ethylene Vinyl Acetate                                    |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
| Frame Material                             | Anodized Aluminium Alloy                                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
| Junction Box (Protection degree/ Material) | Ip65 rated/ Weatherproof PPO enclosure with bypass diodes |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
| Connector                                  | Optional                                                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
| Cable                                      | Optional                                                  |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
| Fire Safety Class                          | C                                                         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
| Application Class                          | A                                                         |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |
| Safety Class                               | II                                                        |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |               |  |

\* Mentioned electrical data are reference values which was derived at STC condition - Temp: 25°, Irradiance: 1000w/m2 and Am: 1.5Am with cleaned modules

\*\*Refer To Waaree's Warranty Document For Terms & Conditions  
 \*The Specifications Are For The References Purpose Only.  
 Waaree Reserves The Right To Change The Specifications Without Prior Notice.

# WS-100 to WS-235

ARUN SERIES



## ELECTRICAL CHARACTERISTICS

| Model                              | WS-170 | WS-175 | WS-180 | WS-185 | WS-190 | WS-195 | WS-200 | WS-205 | WS-210 | WS-215 | WS-220 | WS-225 | WS-230 | WS-235 |
|------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                    | / 12V  | / 24V  | / 24V  | / 24V  | / 24V  | / 24V  | / 24V  | / 24V  | / 12V  | / 24V  | / 12V  | / 24V  | / 230  | / 235  |
| Nominal Maximum Power, Pm (W)*     | 170    | 175    | 180    | 185    | 190    | 195    | 200    | 200    | 210    | 215    | 220    | 220    | 230    | 235    |
| Positive Tolerance Only            |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Power Tolerance                    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Open Circuit Voltage, Voc (V)*     | 44.5   | 32.5   | 32.6   | 32.7   | 32.8   | 32.9   | 32     | 22.97  | 33.1   | 36.4   | 23.07  | 43.6   | 36.6   | 36.9   |
| Short Circuit Current, Isc (A)*    | 5.09   | 7.18   | 7.36   | 7.54   | 7.72   | 7.9    | 8.08   | 5.95   | 8.33   | 7.69   | 6.42   | 7.85   | 8.01   | 8.49   |
| Voltage at Maximum Power, Vmp (V)* | 35.95  | 35.98  | 36     | 36.03  | 36.05  | 36.08  | 27     | 11.13  | 5.55   | 18.02  | 36.15  | 27.3   | 27.4   | 27.7   |
| Current at Maximum Power, Imp (A)* | 4.73   | 4.87   | 5      | 5.14   | 5.28   | 5.41   | 7.41   | 11.41  | 5.57   | 11.66  | 5.81   | 7.88   | 8.03   | 8.49   |
| Maximum System Voltage (V)         | 1000   |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Module Efficiency (%)              | 14.61% | 15.04% | 12.20% | 12.54% | 12.88% | 13.22% | 13.56% | 13.56% | 13.90% | 14.24% | 14.24% | 14.58% | 14.91% | 15.93% |
| Maximum Series Fuse Rating (A)     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     |
| Limiting Reverse Current (A)       | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     | 15     |
| Rated Voltage (V dc)               | 36.3   | 26.5   | 26.6   | 26.7   | 26.8   | 26.9   | 26     | 17.97  | 36.3   | 30     | 18.02  | 35.15  | 30.1   | 30.5   |
| Rated Current (A dc)               | 4.68   | 6.6    | 6.77   | 6.93   | 7.09   | 7.25   | 7.41   | 5.51   | 7.7    | 7      | 5.97   | 7.25   | 7.14   | 7.7    |

## MECHANICAL CHARACTERISTICS

|                                            |                                                           |               |               |               |               |               |               |               |               |               |               |               |               |               |
|--------------------------------------------|-----------------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Model                                      | WS-170                                                    | WS-175        | WS-180        | WS-185        | WS-190        | WS-195        | WS-200        | WS-205        | WS-210        | WS-215        | WS-220        | WS-225        | WS-230        | WS-235        |
| Length x Width x Thickness (LxWxT) - mm    | 1035x 675x 35                                             | 1175x 990x 35 | 1490x 990x 42 | 1490x 990x 42 | 1490x 990x 42 | 1490x 990x 42 | 1360x 990x 35 | 1360x 990x 35 | 1360x 990x 35 | 1360x 990x 35 | 1360x 990x 35 | 1640x 990x 40 | 1640x 990x 40 | 1640x 990x 40 |
| Mounting holes pitch (Y)-mm                | 595                                                       | 595           | 900           | 900           | 900           | 900           | 900           | 900           | 900           | 900           | 900           | 900           | 900           | 900           |
| Mounting holes pitch (X)-mm                | 950                                                       | 950           | 942           | 942           | 942           | 942           | 942           | 942           | 942           | 942           | 942           | 942           | 942           | 942           |
| Weight (kg)                                | 14.45                                                     | 14.45         | 17.5          | 17.5          | 17.5          | 17.5          | 17.5          | 17.5          | 17.5          | 17.5          | 17.5          | 17.5          | 17.5          | 17.5          |
| Cells per module (Units)/ Arrangement      | 72 / (12x6)                                               | 72 / (12x6)   | 72 / (12x6)   | 72 / (12x6)   | 72 / (12x6)   | 72 / (12x6)   | 54 / (9x6)    | 54 / (9x6)    | 72 / (12x6)   | 72 / (12x6)   | 72 / (12x6)   | 54 / (9x6)    | 54 / (9x6)    | 54 / (9x6)    |
| Cell Type                                  | Polycrystalline Silicon                                   |               |               |               |               |               |               |               |               |               |               |               |               |               |
| Front Cover (Material/ Thickness)          | Tempered & Low Iron Glass, 3.2mm / 4.0 mm                 |               |               |               |               |               |               |               |               |               |               |               |               |               |
| Encapsulate                                | Ethylene Vinyl Acetate                                    |               |               |               |               |               |               |               |               |               |               |               |               |               |
| Frame Material                             | Anodized Aluminium Alloy                                  |               |               |               |               |               |               |               |               |               |               |               |               |               |
| Junction Box (Protection degree/ Material) | Ip65 rated/ Weatherproof PPO enclosure with bypass diodes |               |               |               |               |               |               |               |               |               |               |               |               |               |
| Connector                                  | Optional                                                  |               |               |               |               |               |               |               |               |               |               |               |               |               |
| Cable                                      | Optional                                                  |               |               |               |               |               |               |               |               |               |               |               |               |               |
| Fire Safety Class                          | C                                                         |               |               |               |               |               |               |               |               |               |               |               |               |               |
| Application Class                          | A                                                         |               |               |               |               |               |               |               |               |               |               |               |               |               |
| Safety Class                               | II                                                        |               |               |               |               |               |               |               |               |               |               |               |               |               |

\* Mentioned electrical data are reference values which was derived at STC condition - Temp: 25°, Irradiance: 1000w/m2 and Am: 1.5Am with cleaned modules