Boost Converter Observations:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameters  Shading  Conditions | PV Voltage (Vpv) | PV Current (Ipv) | PV  Power  (Ppv) | Output Voltage (Vout) | Output Current (Iout) | Output Power (Pout) | Duty Cycle  (d) |
| Centre | 195.8 | 36.63 | 7171 | 420.2 | 16.81 | 7063 | 0.537 |
| Corner | 198.7 | 36.43 | 7240 | 422.6 | 16.9 | 7144 | 0.533 |
| Diagonal | 186.8 | 44.02 | 8224 | 450.8 | 18.03 | 8130 | 0.583 |
| Frame | 197.0 | 23.57 | 4643 | 338.4 | 13.54 | 4582 | 0.421 |
| Random | 193.7 | 37.80 | 7322 | 425.6 | 17.02 | 7245 | 0.541 |
| Right Side End | 194.4 | 36.47 | 7090 | 418.3 | 16.73 | 6998 | 0.535 |
| Uniform | 186.4 | 52.53 | 9792 | 492.0 | 19.68 | 9683 | 0.622 |

Buck-Boost Converter Observations:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameters  Shading  Conditions | PV Voltage (Vpv) | PV Current (Ipv) | PV  Power  (Ppv) | Output Voltage (Vout) | Output Current (Iout) | Output Power (Pout) | Duty Cycle  (d) |
| Centre | 197.7 | 36.07 | 7130 | 417.4 | 16.7 | 6970 | 0.681 |
| Corner | 196.1 | 36.95 | 7248 | 419.4 | 16.78 | 7036 | 0.685 |
| Diagonal | 190.5 | 43.15 | 8218 | 448.3 | 17.93 | 8039 | 0.703 |
| Frame | 199.3 | 23.04 | 4592 | 334.1 | 13.37 | 4466 | 0.631 |
| Random | 189.8 | 38.02 | 7216 | 422.1 | 16.88 | 7126 | 0.685 |
| Right Side End | 195.7 | 36.07 | 7059 | 415.5 | 16.62 | 6904 | 0.681 |
| Uniform | 183.5 | 53.43 | 9805 | 490.3 | 19.61 | 9614 | 0.725 |

Cuk Converter Observations:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameters  Shading  Conditions | PV Voltage (Vpv) | PV Current (Ipv) | PV  Power  (Ppv) | Output Voltage (Vout) | Output Current (Iout) | Output Power (Pout) | Duty Cycle  (d) |
| Centre | 192.1 | 37.09 | 7123 | 418 | 16.72 | 6988 | 0.682 |
| Corner | 198.2 | 36.59 | 7250 | 418.5 | 16.74 | 7005 | 0.678 |
| Diagonal | 186.1 | 44.12 | 8211 | 449.1 | 17.97 | 8069 | 0.707 |
| Frame | 193.7 | 23.97 | 4643 | 337.0 | 13.48 | 4543 | 0.635 |
| Random | 197.7 | 36.92 | 7298 | 421.9 | 16.87 | 7118 | 0.683 |
| Right Side End | 191.0 | 37.02 | 7070 | 416.2 | 16.65 | 6928 | 0.685 |
| Uniform | 181.2 | 54.01 | 9787 | 489.9 | 19.6 | 9602 | 0.729 |

Positive Output Super-Lift Luo Converter Observations:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameters  Shading  Conditions | PV Voltage (Vpv) | PV Current (Ipv) | PV  Power  (Ppv) | Output Voltage (Vout) | Output Current (Iout) | Output Power (Pout) | Duty Cycle  (d) |
| Centre | 194.0 | 36.93 | 7162 | 422.1 | 16.88 | 7126 | 0.150 |
| Corner | 196.1 | 36.95 | 7245 | 424.7 | 16.99 | 7216 | 0.140 |
| Diagonal | 186.9 | 44.00 | 8224 | 451.8 | 18.07 | 8165 | 0.293 |
| Frame | 138.1 | 27.59 | 3810 | 307.0 | 12.28 | 3770 | 0.194 |
| Random | 196.0 | 37.44 | 7336 | 425.8 | 17.03 | 7245 | 0.163 |
| Right Side End | 192.8 | 36.8 | 7095 | 419.4 | 16.78 | 7037 | 0.157 |
| Uniform | 181.9 | 53.84 | 9795 | 492.5 | 19.71 | 9717 | 0.409 |

SEPIC Converter Observations:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameters  Shading  Conditions | PV Voltage (Vpv) | PV Current (Ipv) | PV  Power  (Ppv) | Output Voltage (Vout) | Output Current (Iout) | Output Power (Pout) | Duty Cycle  (d) |
| Centre | 188.5 | 37.23 | 7020 | 416.9 | 16.68 | 6953 | 0.682 |
| Corner | 190.8 | 37.24 | 7105 | 419 | 16.76 | 7023 | 0.680 |
| Diagonal | 190.4 | 43.18 | 8220 | 447.2 | 17.89 | 8000 | 0.705 |
| Frame | 201.5 | 22.33 | 4499 | 331.6 | 13.27 | 4400 | 0.628 |
| Random | 192.1 | 37.90 | 7283 | 421.5 | 16.86 | 7107 | 0.682 |
| Right Side End | 192.7 | 36.82 | 7094 | 414.1 | 16.57 | 6860 | 0.680 |
| Uniform | 183.2 | 53.53 | 9804 | 489.7 | 19.59 | 9592 | 0.725 |

Zeta Converter Observations:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameters  Shading  Conditions | PV Voltage (Vpv) | PV Current (Ipv) | PV  Power  (Ppv) | Output Voltage (Vout) | Output Current (Iout) | Output Power (Pout) | Duty Cycle  (d) |
| Centre | 198.4 | 35.77 | 7099 | 418.2 | 16.73 | 6996 | 0.680 |
| Corner | 200.3 | 35.83 | 7177 | 420.1 | 16.8 | 7059 | 0.680 |
| Diagonal | 183.7 | 44.34 | 8147 | 445.7 | 17.83 | 7946 | 0.705 |
| Frame | 1932. | 24.01 | 4637 | 334.4 | 13.38 | 4472 | 0.630 |
| Random | 193.1 | 37.85 | 7310 | 420.9 | 16.84 | 7087 | 0.682 |
| Right Side End | 192.9 | 36.79 | 7095 | 414.5 | 16.58 | 6874 | 0.680 |
| Uniform | 185.4 | 52.85 | 9801 | 496.1 | 19.67 | 9668 | 0.728 |

Ultra-Lift Luo Converter Observations:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Parameters  Shading  Conditions | PV Voltage (Vpv) | PV Current (Ipv) | PV  Power  (Ppv) | Output Voltage (Vout) | Output Current (Iout) | Output Power (Pout) | Duty Cycle  (d) |
| Centre | 191.6 | 37.11 | 7112 | 413.0 | 16.52 | 6824 | 0.438 |
| Corner | 192.7 | 37.17 | 7164 | 415.7 | 16.63 | 6911 | 0.436 |
| Diagonal | 185.3 | 44.20 | 8192 | 444.7 | 17.79 | 7912 | 0.455 |
| Frame | 188.3 | 24.20 | 4557 | 332.9 | 13.32 | 4432 | 0.392 |
| Random | 192.0 | 37.92 | 7280 | 417.8 | 16.71 | 6982 | 0.440 |
| Right Side End | 191.0 | 37.01 | 7069 | 410.7 | 16.43 | 6746 | 0.440 |
| Uniform | 181.3 | 53.98 | 9787 | 485.5 | 19.42 | 9472 | 0.477 |