

MODULE CHARACTERISTICS

4 I V CURVE, FILL FACTOR, OPERATING POINT

MPP (MAXIMUM POWER POINT)

CELL TEMPERATURE

PV CELL EQUIVALENT CIRCUIT

I V CURVE FAMILY FOR PV MODULES

PV MODULE RATING

P.V CONFIGURATION

MODULE DAILY ENERGY OUTPUT ACCURATE METHOD

CALCULATE THE DAILY ENERGY OUTPUT OF A 100W POLYCRYSTALLINE MODULE OPERATING UNDER THE FOLLOWING CONDITION.

MAXIMUM POWER POINT TRACKING REGULATOR (MPPT)

AMBIENT DAY TIME TEMPERATURE: 25°C

IRRADIATION = 5.5 kWh/m^2

ENVIRONMENT WITH ANNUAL MAINTENANCE ONLY

THE MANUFACTURER WHO TESTS THE MODULES TO INTERNATIONAL STANDARD GUARANTEE THAT MAXIMUM MODULE POWER RATING 95W AND $\text{NOCT} = 45^{\circ}\text{C}$, $T_{\text{ref}} = 35^{\circ}\text{C}$

$\gamma = 0.5\%$

$T_A = 25^{\circ}\text{C}$

P_{STC} - STANDARD TEST = 95W
POWER

T_{cell} = CELL TEMPERATURE

T_{ref} = AMBIENT AIR TEMPERATURE

f_{man} = MANUFACTURING TOLERANCE FACTOR

$$E_{\text{module}} = P_{\text{STC}} \left[1 - \gamma (T_{\text{cell}} - T_{\text{ref}}) f_{\text{man}} \times f_{\text{dirt}} \times H_{\text{DAILY}} \right]$$

$$T_{\text{cell effective}} = T_A + K (80 H_{\text{DAILY}} + 150)$$

$$K = \frac{\text{NOCT} - 20}{800} = \frac{45 - 20}{800} = 0.031$$

$$T_{\text{cell effective}} = 25 + 0.031 (80 \times 5.5 + 150) = 46^{\circ}\text{C}$$

$$E_{\text{module}} = 95 \left[1 - \frac{0.5}{100} (46 - 35) \times 1 \times 0.95 \times 5.5 \right] = 435 \text{ W-hr}$$

f_{dirt} = module power RATING FACTOR = 0.95 DUE TO DIRT

H_{DAILY} = DAILY IRRADIATION = 5.5