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NABCEP – What you need to know

- IV Curve

Learning Objectives

- An understanding of the IV Curve
- How to use with sample NABCEP Problems

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The IV Curve

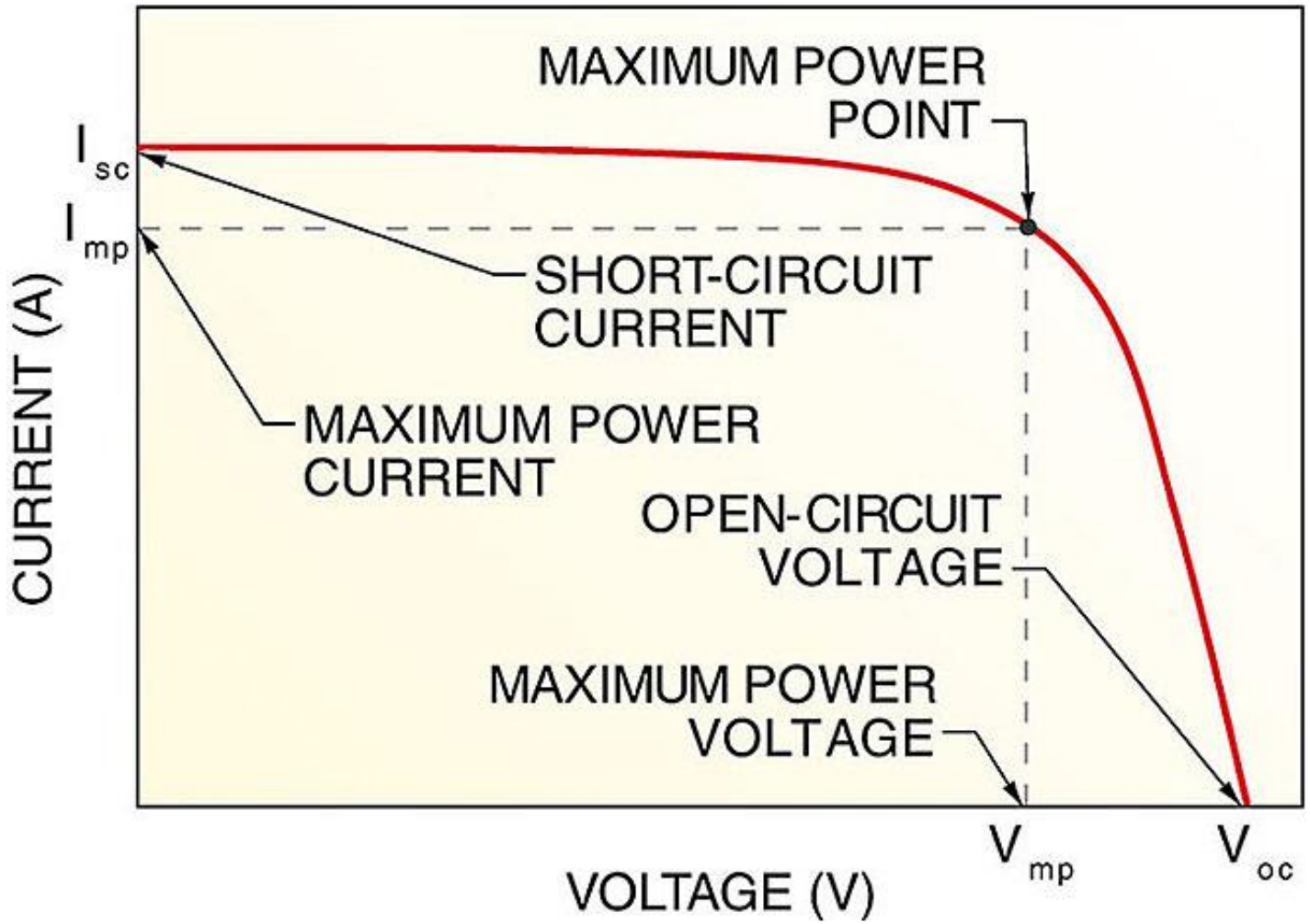

Image from Photovoltaic Systems 2nd Edition, by James Dunlop

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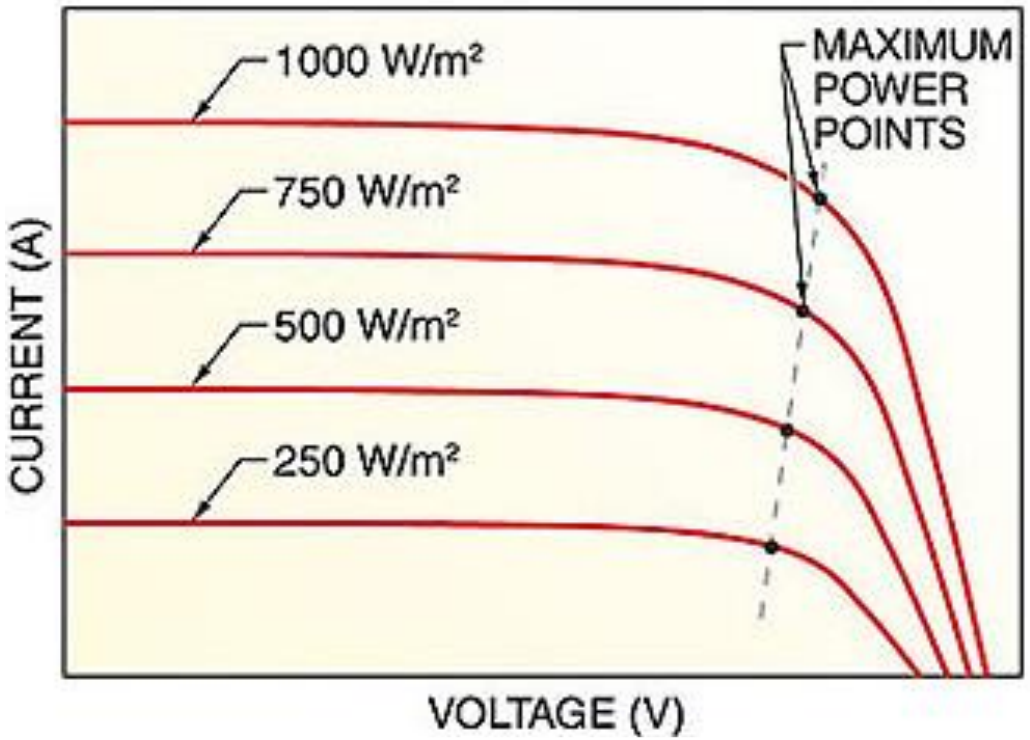
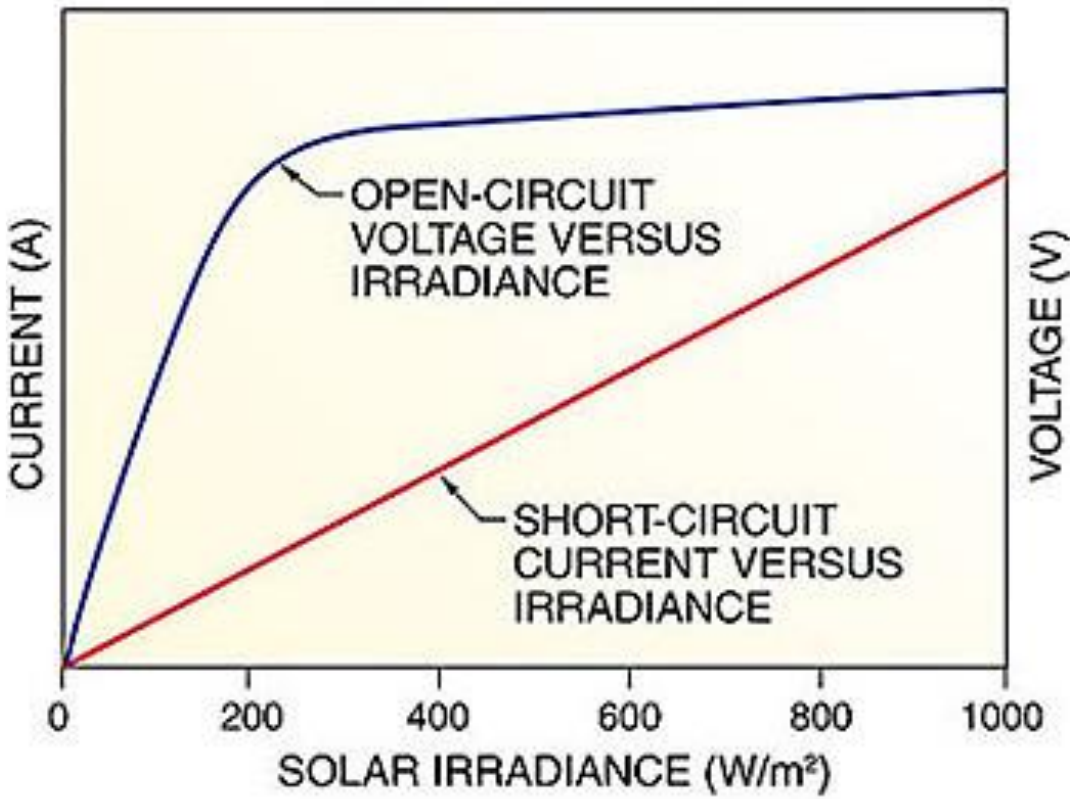
IV Curve

Solar Irradiance Effects





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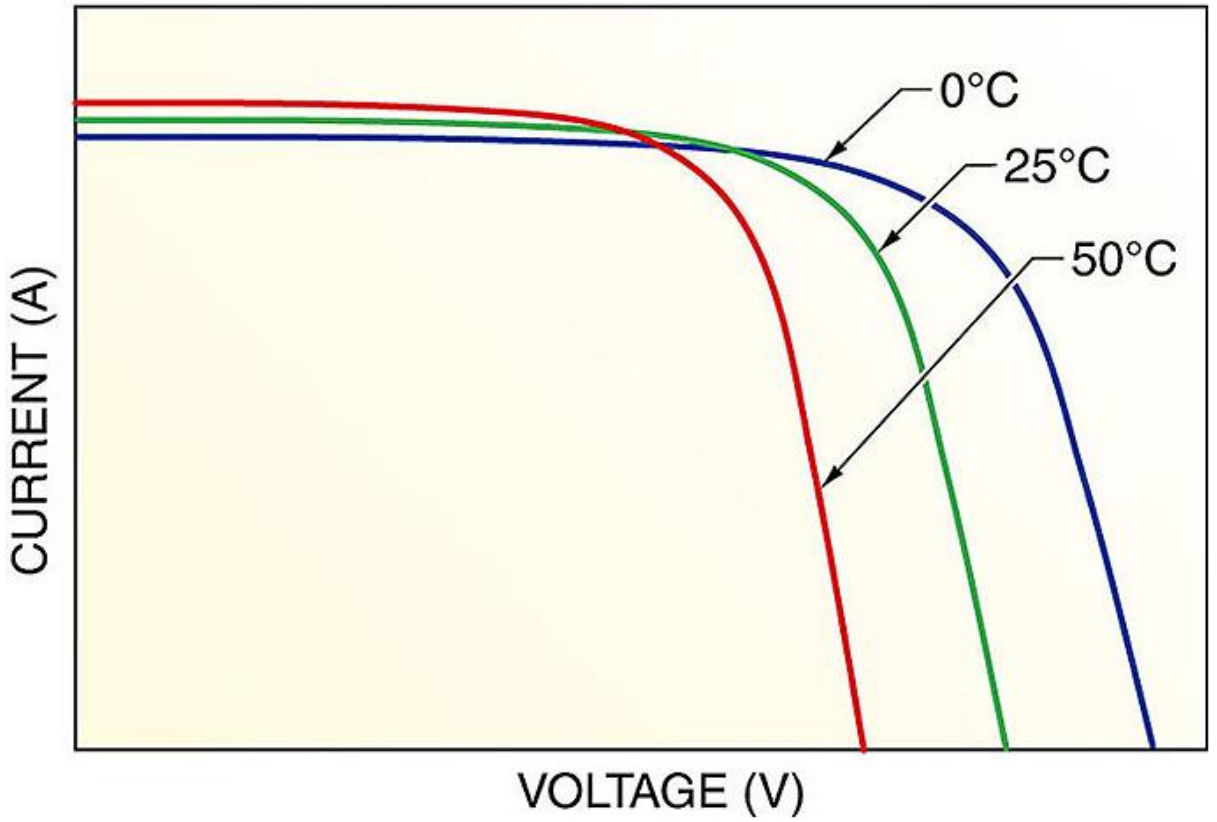
IV Curve

Temperature Response

Increasing cell temperature decreases voltage, slightly increases current, and results in a net decrease in power.

Inversely decreasing cell temperature increases voltage, slightly decreases current, and results in a net increase in power.



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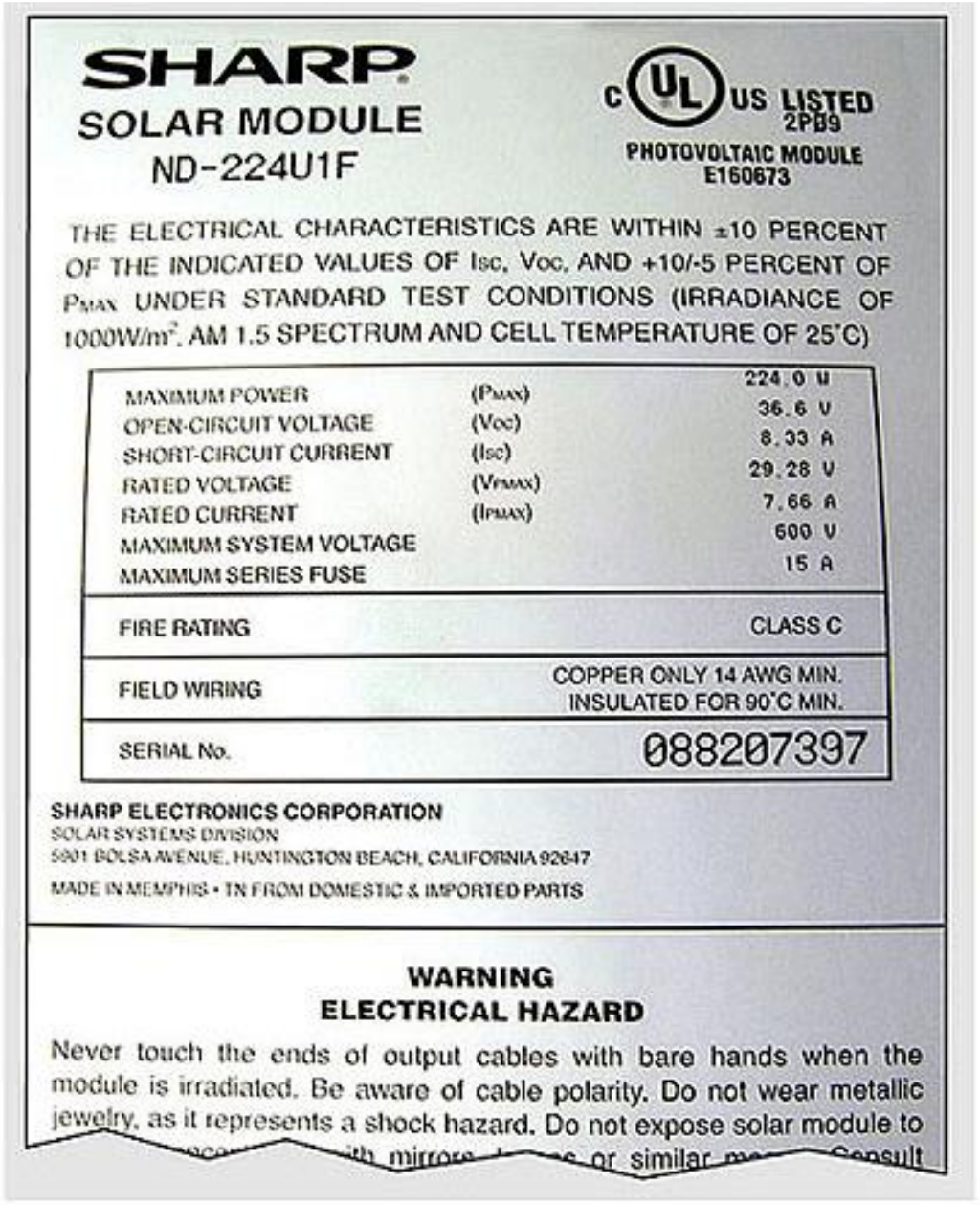
IV Curve

IV Curve Variables

This module label shows performance rating variables that could be plugged into the IV curve.



SHARP

SOLAR MODULE

ND-224U1F

c UL us LISTED 2PB9

PHOTOVOLTAIC MODULE

E160673

THE ELECTRICAL CHARACTERISTICS ARE WITHIN ±10 PERCENT OF THE INDICATED VALUES OF Isc, Voc, AND +10/-5 PERCENT OF P_{MAX} UNDER STANDARD TEST CONDITIONS (IRRADIANCE OF 1000W/m², AM 1.5 SPECTRUM AND CELL TEMPERATURE OF 25°C)

MAXIMUM POWER	(P_{MAX})	224.0 W
OPEN-CIRCUIT VOLTAGE	(Voc)	36.6 V
SHORT-CIRCUIT CURRENT	(Isc)	8.33 A
RATED VOLTAGE	(V_{PMAX})	29.28 V
RATED CURRENT	(I_{PMAX})	7.66 A
MAXIMUM SYSTEM VOLTAGE		600 V
MAXIMUM SERIES FUSE		15 A
FIRE RATING		CLASS C
FIELD WIRING		COPPER ONLY 14 AWG MIN. INSULATED FOR 90°C MIN.
SERIAL No.		088207397

SHARP ELECTRONICS CORPORATION
SOLAR SYSTEMS DIVISION
5901 BOLSA AVENUE, HUNTINGTON BEACH, CALIFORNIA 92647
MADE IN MEMPHIS • TN FROM DOMESTIC & IMPORTED PARTS

WARNING
ELECTRICAL HAZARD

Never touch the ends of output cables with bare hands when the module is irradiated. Be aware of cable polarity. Do not wear metallic jewelry, as it represents a shock hazard. Do not expose solar module to

Image from Photovoltaic Systems 2nd Edition, by James Dunlop

SAMPLE NABCEP TYPE QUESTION

Q: Using the information on the module label (previous slide), what is the voltage of a series string of 10 modules?

A: Use Voc: 36.6v x 10 = 366v

(Voc is used so that you do not over voltage the inverter.)

SAMPLE NABCEP TYPE QUESTION

Q: Using the information on the module label (previous slide), how many modules can be used in one series string for a residence not factoring the temperature coefficient?

A: 600v (the max series voltage allowed for residential applications) / 36.6v (the Voc) = 16.39 modules (so the answer would be 16.

(Voc is used so that you do not over voltage the inverter.)

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Thank You

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