

● Topics

High Performance Indoor Dye-sensitized Solar Module

A dye-sensitized solar cell (DSC) is a photo transducer to generate power efficiently even in indoor low or diffused light. We developed a new DSC module capable of generating power almost twice as much power as ordinary amorphous solar cells under indoor light conditions (100 - 200 lux). This module has a desirable photo absorption spectrum for indoor lighting fixtures such as a fluorescent light and white LED. Thus, the module works effectively at indoor light levels from <100 lux such as in warehouses to >1000 lux such as in showrooms. Because of this property, the DSC is the best photo transducer for energy harvesting systems, which work without battery replacement or wiring. Name card or passport sized samples of DSC module can provide enough power for wireless sensing modules for detecting temperature, humidity, motion or CO₂ concentration. Thanks to its production process by a printing method, our DSCs offer great flexibility in design to suit customer requirements. These DSCs can also be built to fit their operating conditions such as incident light levels and light sources by appropriately preparing dye and electrolyte. We expect optimally designed DSC modules will find wider application fields.

Table 1. Specifications of sample modules.

	Name card sized 4-series module	Passport sized 8-series module	Remark
Output (P_m)	140 μ W (min.) 170 μ W (typ.)	340 μ W (min.) 385 μ W (typ.)	white LED 200 lux 25 °C
Operating voltage (V_{op})	1.5 V	3.0 V	
Ambient temperature	-30 °C ~ 50 °C		
Luminance	0 ~ 100 klux		outdoor light-enabled



Fig. 1. Wireless temperature/humidity/motion sensor powered by a 4-series DSC module.

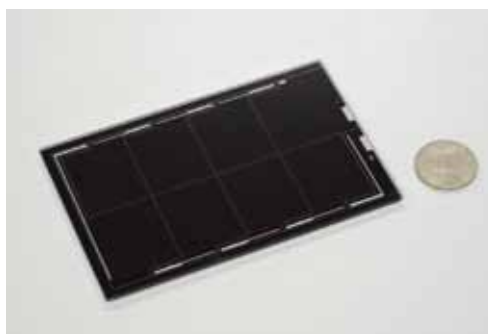


Fig. 2. Passport sized 8-series DSC module.

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