

Some Semiconductor Products and Components

Here are tables listing products, components and services that need some amount of semiconductor technology (**ST**) in this module

First let's look at obvious and not so obvious products and their components:

Illustration

Product	Abbreviation	(Major) Components	Remarks
Personal computer	PC	Integrated circuits (IC) or "Chips"	There is much more ST inside a PC than just chips!
Almost anything with a battery inside or a power connection. (Cars, communication entertainment, satellites, MRT machines, ...)	World Economy	Integrated circuits (IC) or "Chips", optoelectronics	The major enabling business for nearly everything
Solar cells	Save the world	Cheap large-area semiconductors	See table below
Microsystems	MEMS	Si-based special chips	Axiomatic product: Air bag sensor, " DLP " in beamers
Diode Lasers		III-V compound Heterojunction	There is one in every DVD player.
Lights	Save the world, part 2	III-V LED's	Will soon replace the old-fashioned light bulb.
Radio frequency identification device	RFID	Very cheap chip (organic semiconductor?), printed antenna	You may have one implanted soon.
LCD Flat panel displays	LCD OLED	transistor matrix plus "liquid crystals" or organic light emitting <i>diodes</i>)	First OLED's are on teh market
...

Here is a table detailing the product "Solar Cell" some more:

Product=Solar Cell	Remarks
"Bulk" Solar Cells	
General definition	The light absorbing part is relatively thick (> 100 μm); no substrate for mechanical stability is needed. Nearly all solar cells on roof tops now (=2007) fall into this category; and they are practically always made from Si .
Single crystalline Si	Best Mass product in terms of solar cell efficiency (about 21 % by now)
"Multi"crystalline Si	Slightly worse and somewhat cheaper than single crystalline Si , but market leader
GaAs solar cell	Very good . And very expensive. Some space applications
Thin film Solar Cells	
General definition	Typically (0.5 - 30 μm) film on substrate.
Amorphous Si	The classic thin film cell; found in most small-scale applications (watches, pocket calculators, ...). Major performance problems even after > 20 a R&D
Nanocrystalline Si	The solar cell of the future? Not yet in production
CuIn_xGa_{1-x}Se_yS_{1-y}	So-called " CIGS " solar cells. Mass production has started.
CdTe	Some production; future unclear
Organic semiconductors	Max. efficiency at present (2007) around 5 % . We shall see.
Specialities	
TiO₂ plus	The so-called "Grätzel Cell". Sintered TiO₂ nanoparticles coated with organic molecules absorb the light; carrier transport occurs via the TiO₂ and a Redox electrolyte
Tandem cells	Several thin layers of semiconductor with different band gaps on top of each other. Very high efficiency and price.
Concentrator cells	"Small" high-efficiency cell mounted in the focus of a parabolic mirror. Saves on (expensive) semiconductor on the expense of mirror and positioning device, Only usable in countries with lots of direct sun light (not in S.-H.). Gets hot!