

# Paper-thin Electronics

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Thin, ultra-light weight, 175°C Tj-max temperature capable for greater power density, MHz operating frequency, flexible circuits, chemically/mechanically rugged systems and eventually cheaper electronics become possible by shrinking the thicknesses of components: the heat sinks, inductors, capacitors, embedding chips as SiC power MOSFETs, LEDs, power diodes, resistors integrate with sensors plus other semiconductors, thin connectors, antennas, switches, EMI shielded chassis, etc these components along with integrated electronics can all be thin and light weight.

Presented will be two examples of our novel “paper-thin” electronics and components: embedded high power SiC chips and air core inductors. Two bare LEDs are embedded in film coil to receive wireless power transmission. Second example is patented “paper-thin” inductors. Both have copper coils in polyimide and they could operate above 175°C. If without magnetic core and by embedding thinner than 1 mil thick flat copper, these air core inductors minimize skin effect to operate above 15 MHz. We made “paper-thin” inductors to fold like origami paper. After folding, one increases coil’s inductance up to 3x the original value. We now have variable, adjustable inductors for designers to tune RF circuits in order to achieve resonance for efficient, wireless power transmission. Air core inductors to 1 milli-Henry inductance can be custom produced in the US. If one inserts a secondary coil between folded primary coils; two or more adjacent film coils become isolated sensing transformers.