



**1. Reduction in Package Weight:** Flex circuits can reduce the weight of electronic package significantly (up to 76% weight reduction or more is possible). This feature is one of the main reasons flex circuits have been so popular in aerospace applications, and currently in all electronic applications.

---

**2. Reduction in Package Size:** Flex circuits can reduce the size of an electronics package significantly (almost limitless due to the ability to wrap around products, coupled with the ability to eliminate additional interconnects).

---

**3. Compliant Substrate for Surface Mounting:** Surface mount technology has experienced many difficulties regarding the mismatch between coefficients of thermal expansion, and or flexing during handling, resulting in component failures. Flex Circuits offer a substrate surface which is compliant, expanding and contracting, directly with components and also does not allow sufficient stresses during flexing that could otherwise fracture components mounted on rigid boards.

---

**4. Significant reductions in Assembly time, Costs and Error margins:** Due to their ability to seamlessly integrate form, flexible circuits can provide an excellent means of reducing the assembly time of a product. This is especially true when point-to-point wiring is part of the final assembly process. Flexible circuits are not conducive to such human errors as those associated with hand-built wire harnesses.

---

**5. Maximized System Reliability:** Reliability Engineers have often pointed out that when an electronic package of any type fails, it is typically at the point of interconnection. Flexible circuitry minimizes this type of failure, and maximizes reliability.

---

**6. Dynamic Flexure of Circuitry Required:** While other materials, such as flat ribbon cable, have served the purpose satisfactorily on occasion, flexible circuits have proven their worth as the primary method of providing reliable interconnection between moving parts.

---

**7. Controlled Impedance Signal Transmission Required:** The materials used for flexible circuits are very uniform in both their thickness and electrical properties. As a result, it is relatively simple to produce flexible circuits suitable for transmission line cable applications. With such materials, it is only necessary that the circuit manufacturer accurately etch the copper foil to achieve the desired characteristic impedance.

---

**8. Lower Inductance Cabling Needed In certain applications:** Flexible circuits have been used to reduce the inductance of a transmission line. The flat conductor nature of flexible circuits has inherently lower inductance characteristics than their round wire counterparts. In addition, it is possible to design in transposed pair constructions, the low inductance commonly achieved by twisted wire pairs.

**9. Improved Heat Dissipation Capability:** Flat conductors have a much greater surface to volume ratio than round wire. This extra surface area facilitates the dissipation of heat away from the circuit. In addition, when compared to rigid board constructions, the thermal path for flex circuit constructions is not only shorter but also heat can easily be dissipated from both sides of the circuit. With typical rigid boards the dielectric substrate is a thermal insulator inhibiting the flow of heat through it.

---

**10. Airflow Improvement Inside “Box” Required:** The uniform planar nature of flexible circuits serves to improve the flow of cooling air through an electronic box. The massive bundles of wire which they often replace typically act as barriers to good air circulation.

---

---

**11. Dimensional Packaging Scheme:** Much has been written in recent years about the advantages of injection moulded boards as a means of achieving a truly 3 dimensional interconnection structure. With flex circuits, such benefits are a natural by-product of the substrate. In fact, some moulded board technologies actually employ flexible circuits, inserting them into the mould prior to plastic injection.

---

**12. Desire to Improve Appearance:** Although considered trivial to some, the internal appearance of a package can be an indication that a product has evolved to its full potential.



UL Approved