

## Benefits of Flex and Rigid-Flex circuits

Flex and Rigid-Flex circuits give the ability to design your circuitry to fit the device, instead of building a device to fit the circuit board. They are designed for the rigors of aerospace, medical and military applications, with dependable reliability.

Flex circuits offer multiple advantages for anyone considering to use this technology in a future project or if you're trying to decide on re-engineering your current design. Below you will find some key benefits of using flex and rigid-flex circuit technology.

### Package Size & Weight Reduction

Combination of design freedom, space, weight and component savings can reduce packaging requirements significantly when using flex circuits as compared to other solutions.

- Flexible circuit boards fit where no other solutions can.
- Flexible circuit boards are thin and light weight which enables a substantial packaging size reduction.
- They have the ability to be folded or creased and positioned into the smallest areas makes miniaturization of many devices possible.
- Space requirements can be minimized by applying the freedom of 3D packaging geometry.
- Utilizing a flex circuit solution into your design can offer a substantial weight reduction benefit over using wires and wire harnesses.
- Flexible circuits can be used to replace wiring reduces the errors common in hand wired assemblies.

### Reliability & Durability

- Increased reliability by eliminating interface connections (solder joints, connectors, contact crimps etc.).
- The fewer number of interconnects, the fewer the sources of potential failure.
- Rigid-Flex technology which integrates both a flex circuit and a rigid PCB further reduces the number of interconnects.
- Flex circuit's ductility and low mass will reduce the impact of vibration and shock and improve performance.
- The exceptional thermal stability of polyimide allows the circuit to withstand applications with extreme heat, as the materials excellent thermal stability provides a better base for surface mounting than traditional boards. Because the compliant base film places less stress on soldered joints, thermal mismatch is less likely to occur.
- Used extensively in high reliability military and medical applications.

### Cost Savings

- Thin and flexible polyimide film requires a much smaller area, reducing the overall finished assembly packaging size and material requirement costs.
- Reduced assembly costs are also seen as fewer parts are needed for the final assembled product.
- A simplified PCB assembly processes can reduce assembly errors as the flex circuit can only be installed one way.
- Flex circuits also eliminate wire routing errors; reducing test time, rework, and rejects.

### High Temperature Applications

- Flex circuits materials (polyimide) dissipate heat at a better rate than other dielectric materials while providing the added benefits of vastly improved flexibility.
- Can be exposed to extreme temperature applications (up to - 200C to 400C).
- Expansion and contraction are minimized when using polyimide material.
- Good chemical resistance to oils, acids, gases etc.
- Flex circuits offer excellent radiation and UV exposure resistance.

### High Density Applications

- Flex material properties work very well in high speed "Controlled Impedance" designs, which allow better control of impedances.
- Flexible circuits allow for narrow lines giving way to high density device population. Denser device populations and lighter conductors can be designed into a product, freeing space for additional product features.

### Shielded Applications

- EMI and RF shielding is available.
- Multiple options including silver ink, copper layers, and EMI shielding films.

### Component / Connector Assembly

- Flex circuits can accept any component or connector that can be assembled to a rigid PCB design.
- Integrated ZIF contacts provide simple modular interfaces to the system environment.

- Additional options are available such as, ZIF Connectors, crimped contacts, direct solder to PCB, etc.