molex

USER INTERFACE SOLUTIONS ›

Versatile, Reliable User Interfaces and Capacitive Solutions

USER INTERFACES AND CAPACITIVE SOLUTIONS ›

Beyond interconnects, Molex is a global leader in manufacturing custom user interfaces and flex circuit solutions.

Molex offers:

- Experienced team of multidisciplinary engineers to collaborate with you on designs
- Design centers in the US and Asia
- Regionally located global sales force
- Manufacturing in US, Mexico and Asia
- A global reliability lab to ensure the best possible product quality
- Comprehensive electrical inspection, testing and packaging

With our rich history of innovative design and advanced manufacturing, we are the ideal collaborator for professional grade products. Our team of experts will get your program from prototype to high-volume production on schedule.

molex

INNOVATIVE TECHNOLOGY ACROSS INDUSTRIES ›

MEDICAL:

ISO 13485

Durability and Reliability

Chemically Resistant

Intuitive Design

User Optimized

Sensor Integration

Customization Options

Portable and Wearable

AUTOMOTIVE:

IATF 16949 Compliance

Curved Surface

Roll to Roll (R2R)

Durability

Temperature Resistance

Shock and Vibration Resistance

Electromagnetic Interference Capabilities

Connectivity Features

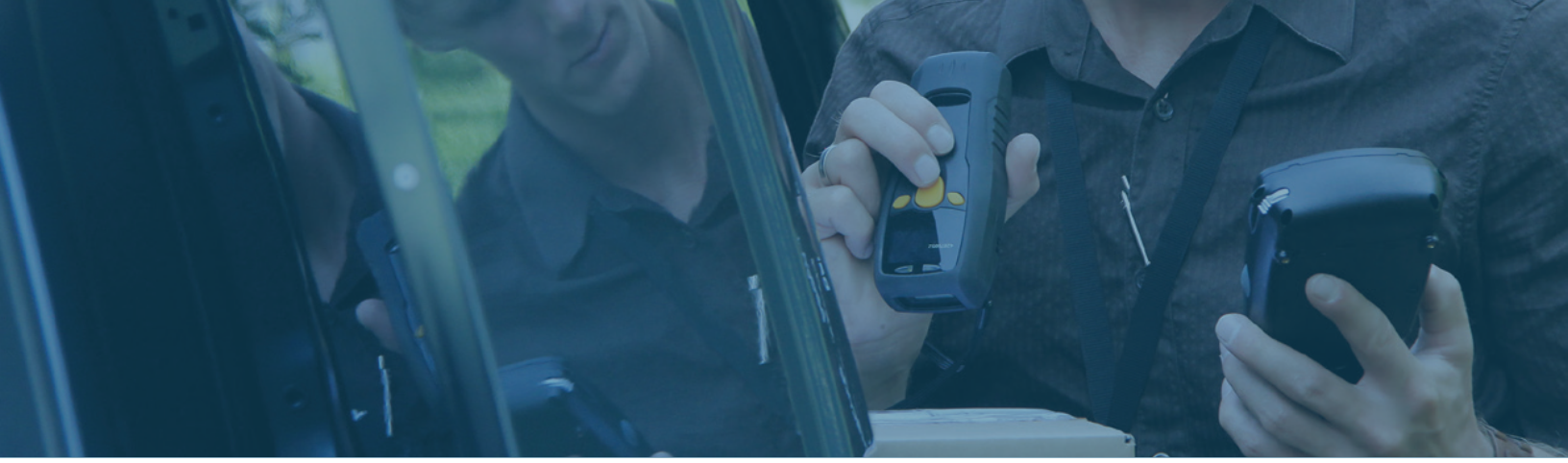
Safety Standards

INDUSTRIAL:

- Compliance with Industry Standards
- Durability
- Shock and Vibration Resistance
- Water and Dust Resistance
- Temperature Tolerance
- Rugged Performance
- Customizable Dashboards
- Non-Tactile and Tactile Feedback
- Smart User Interface

HOME APPLIANCE:

- Curved Surface
- Full Icon Backlighting
- Smart Home Integration
- Durability and Longevity
- Ease of Cleaning
- User-Friendly Controls
- Customization Options
- Connectivity Features



Physical

Substrate:

- Polyester (PET)
  Transparent or white, 0.05mm to 0.38mm thick
- Polyimide and FR4
  Various thicknesses available
- Thermoplastic Polyurethane (TPU)
  Non-Woven Materials
- PMMA
- Glass

Conductive Ink:

- Silver and Silver Blends
- Carbon Ink
- PEDOT

Component Attachment

Component Types on PET:

- SMD
  LEDs, resistors, capacitors, diodes, phototransistors
- 7-Segment Displays
- Microprocessors
  QFN, QFP, SU

Minimum Package Size

- SMD
  0402 on PET
  01005 on PCB / FPC
- Microprocessors
  pitch leads

Membrane Switch Options

Various dome sizes and forces
2.5mm to 20mm

Oval Shape Round Shape Star Shape	Nickle Plated Gold Plated

2.5mm to 20mm

Printing Capabilities

- Panel Printing Maximum
  640mm by 540mm
  (25.2” by 21.3”)
- Roll-to-Roll Printing Maximum
  510mm width

Trace Pitch Capabilities

- Lines 0.12mm (0.005”)
- Spaces 0.2mm (0.008”)

Circuit Construction:

- Screened Crossover Circuit
  2 insulated conductors on same side
- Printed Through Hole
  Double-sided printed circuits with poke through vias
- Print Registration Tolerances
  ±0.1mm print pass-to-print pass

Die-Cut Capabilities

Die-Cut Type	Die-Cut to Print Tolerance
Hard Tool:	± 0.08mm (.003”)
Steel Rule Die:	± 0.25mm (.01”)
Laser Cut:	± 0.08mm (.003”)

Backlighting

- Light Guide Films
- Acrylic Light Guides
- Fiber Optics
- Indication LED
- Alternative Lighting Techniques

Electrical

- Circuit Resistance
  100 Ohms maximum, may vary depending on circuit configuration
- Durability
  Tactile - 1 million operations
  Non-Tactile - 5 million operations
- Contact Bounce
  5 milliseconds typical
- Insulation Resistance
  50 Megohms initial between adjacent traces

Environmental

These parameters may vary depending on specific switch configuration and application requirements

- High/Low Temperature Storage
  -40°C for 1000hrs, +105°C for 1400hrs
- Temperature Cycle
  -40°C~+85°C, 1300hrs, LV124-L03
- Damp Heat Cycling
  -10°C~+65°C @93%RH, LV124-K09
- Silver Migration
  +65°C@95%RH, connected with 5V DC, 1000hrs & 3.3V, 80uA, 85°C & 85%RH, 14 days
- Sunlight Simulation
  DIN75220 Z-IN2, 25 days
- Bending Test
  Radius 2mm, 500,000 cycles
  IPC-TM-650
- Insulation
  300V DC, 50MOhms; High voltage 100V AC for 1min
- Salt Fog
  35±2°C, 5±1% salt water, PH 6.5 ~7.2, 1~2ml/80cm2/h, for 168hrs
- Gas Exposure
  H^2S 3ppm, 40°C, 90%RH, 500hrs
- Mixed Gas Test
  RT, 75%RH, 504hrs. IEC 68-2-60, method 4 (SO^2, H^2S, NO^2, Cl^2)
- High Temperature Durability
  GMW3172 9.4.1: +85°C for 500hrs
- Vibration
  GMW3172 9.3.1.2: 16hrs/X&Y&Z, 2g
- Thermal Shock
  GMW3172 9.4.2: -40°C~+90°C, 406 cycles
- Power Temp Cycle
  GMW3172 9.4.3: -40°C~+85°C, 142 cycles
- Humid Heat Constant
  GMW3172 9.4.6: +85°C@95%RH, 10 days
- Temperature Shock
  IEC 68-2-14, -40°C/+105°C, 15mins each, 100 cycles

*After test, parts must meet electrical characteristics as specified above

molex

The Molex Approach

At Molex, we take a multidimensional approach to develop complete, integrated solutions that turn your ideas into reality. With the industry's broadest line of printed electronics and the expertise to work through your mechanical rigors, we can advise you on the best fit for your needs, balancing cost, performance, durability, weight and other requirements.

Learn whether a Molex user interface solution is right for your end application, and start designing your solution today at www.molex.com/en-us/products/printed-circuit-solutions/user-interface.

Order No. 987652-0225 Rev. 3
USA/AG/2024.02