Attracting Tomorrow

TDK

# PowerHap Piezoelectric Actuators

## For Haptic Displays

**TDK Electronics AG**
Piezo & Protection Devices Business Group
Munich, Germany
June 2025

# Bringing Touchscreens to Life

Touchscreen in today’s vehicles are

- a central hub for configurable features and controls
- a mandatory integration with backup camera systems
- a key design element that influences buyer decisions,

**but their true value lies in how they connect with users.**

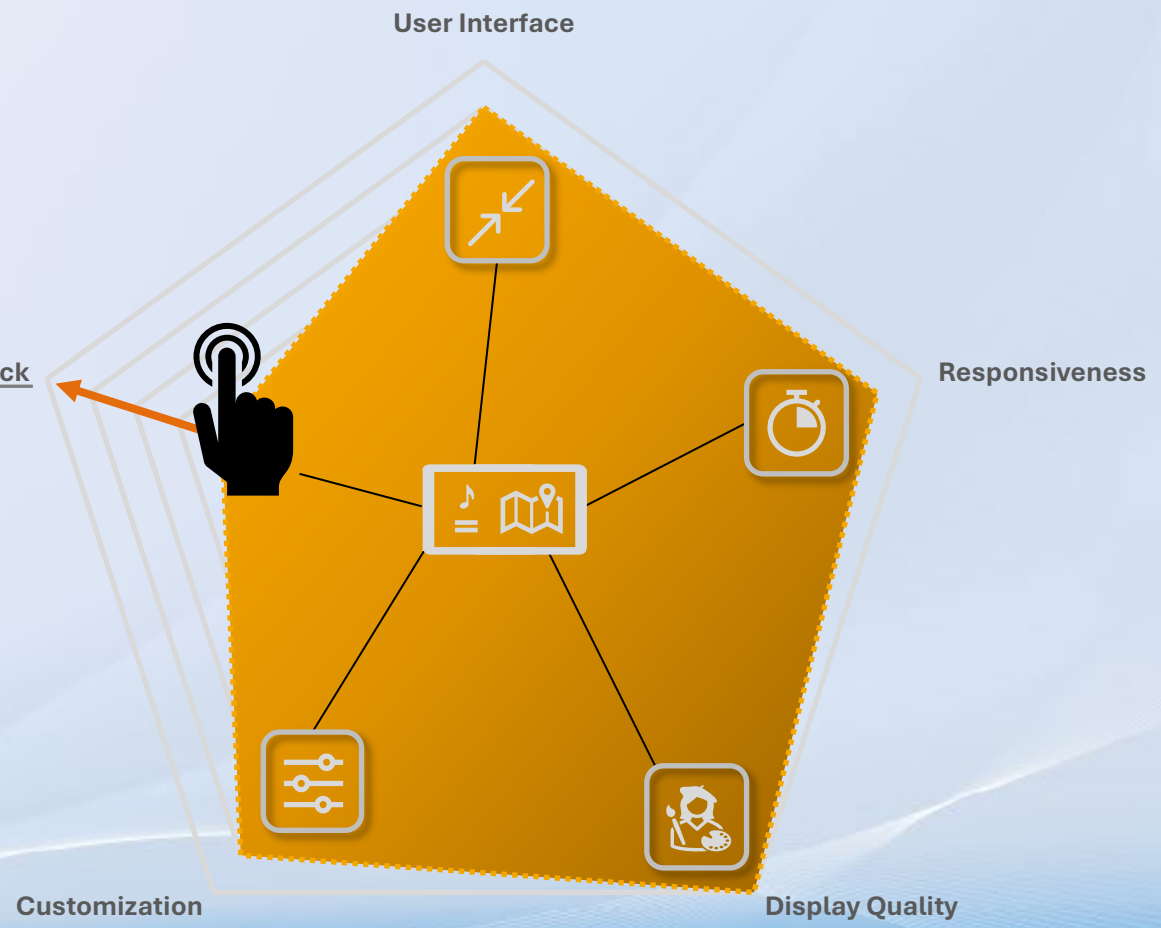

© TDK Electronics AG • 2025

# Haptics: The Emerging Edge of Infotainment Technology

While today's infotainment systems impress with high-resolution visuals, fluid responsiveness, and seamless feature integration, haptic feedback remains a largely untapped dimension. Two main challenges contribute to this:

- Technical complexity:
  Delivering precise, localized tactile responses across screen formats is demanding.
- Production integration:
  Ensuring consistent haptic performance within tight mass-production tolerances adds complexity and cost.

**Still, haptics offer strong potential to enhance user experience and safety, making them a promising area for innovation.**




**Infotainment System Feature Comparison**
Values shown in the radar chart were illustrative estimate

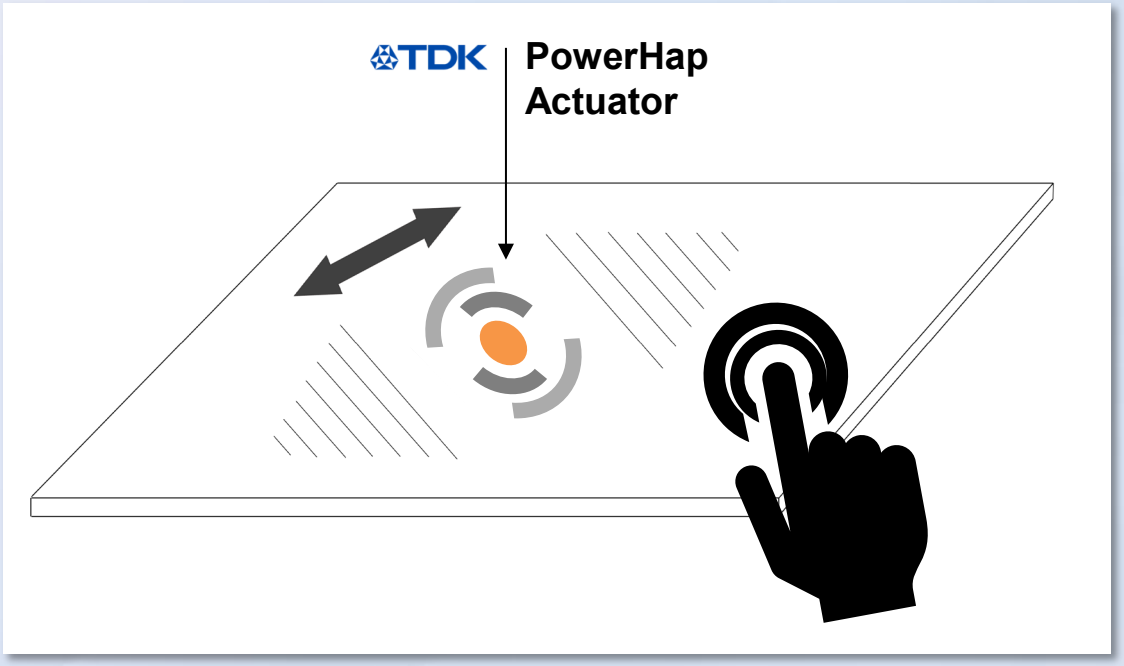

© TDK Electronics AG • 2025

# The New PowerHap Bridges the Gap Delivering Best-in-Class Haptics for Touchscreens

Vibrotactile feedback

The redesigned PowerHap piezo actuator enables streamlined haptic touchscreen designs.

Optimized for mass-production tolerances, it ensures consistent, high-fidelity feedback across the surface with single-actuator support.




**PowerHap Actuator**

Powerful and compact for a Single actuator per system

New design facilitates integration in mass-production tolerances

Automotive qualified
85 °C, 85% RH
Lifetime
Electrical stress

**Homogenous haptic feedback across the entire display**

**Crisp and solid haptic feedback for a better UX while driving**

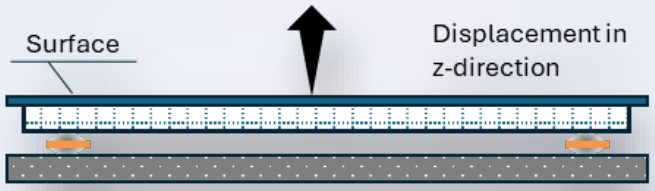
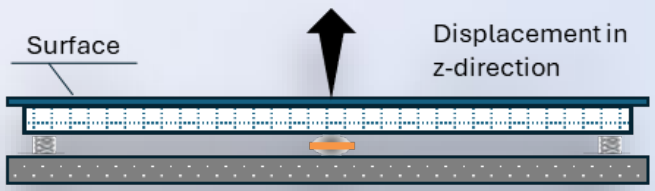
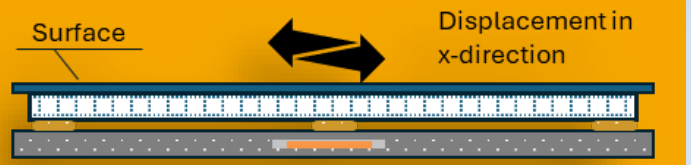
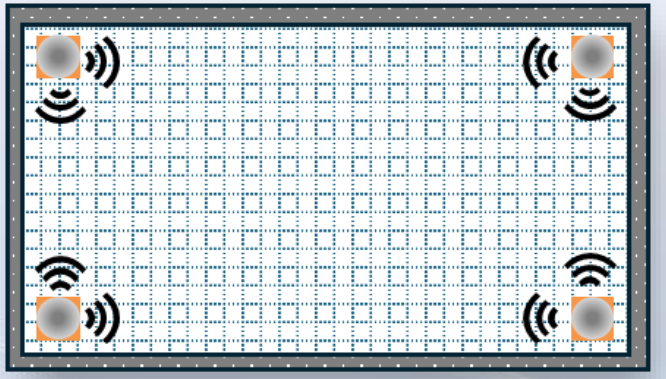
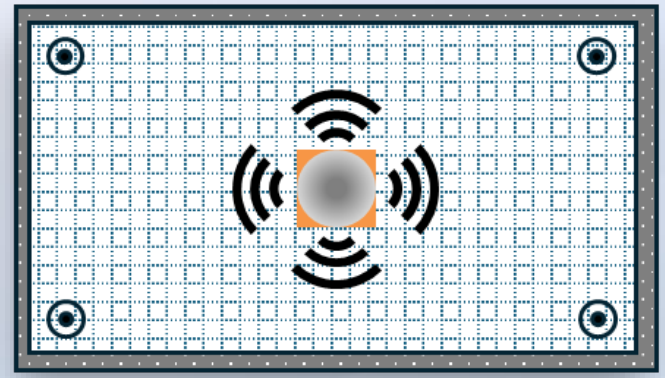
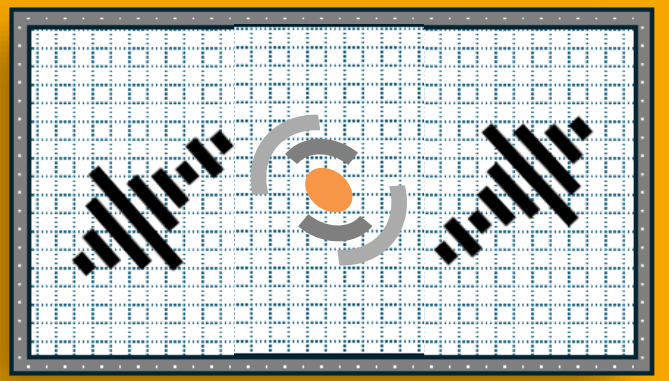
**Endless types of haptic feedback**

**Slim displays with integrated haptics**



© TDK Electronics AG • 2025

# PowerHap in Lateral Setup: Homogeneous and Crisp Feedback with a Single Actuator

| | Perpendicular | | Lateral |
|---|---|---|---|
| Side view |  |  |  |
| Top view |  |  |  |
| Description | **4 small/medium size actuators**<br>→ Commercially seldom acceptable | **1 large actuator in the center of the display**<br>→ Difficult to control | **1 actuator actuating laterally**<br>→ Homogenous feedback across the display<br>→ Slim design<br>→ Cost-effective |

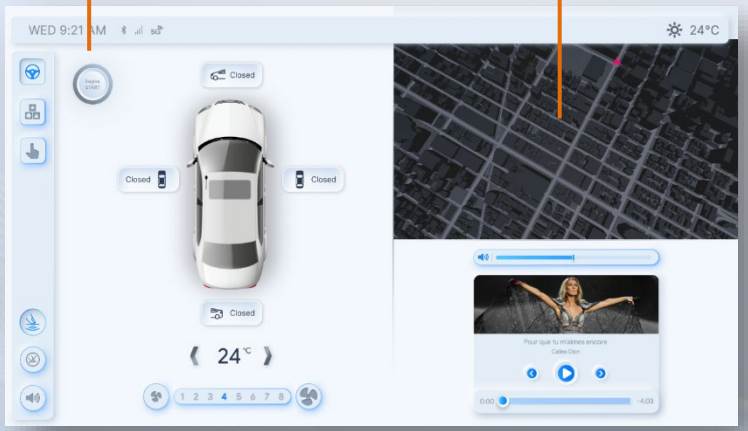


© TDK Electronics AG • 2025

# Exploring the Haptic Spectrum: From Tactile Feedback, Sliding Interactions, and Confirmation

**Experience haptics** – Long press
Strong alternating haptics when turning car on/off

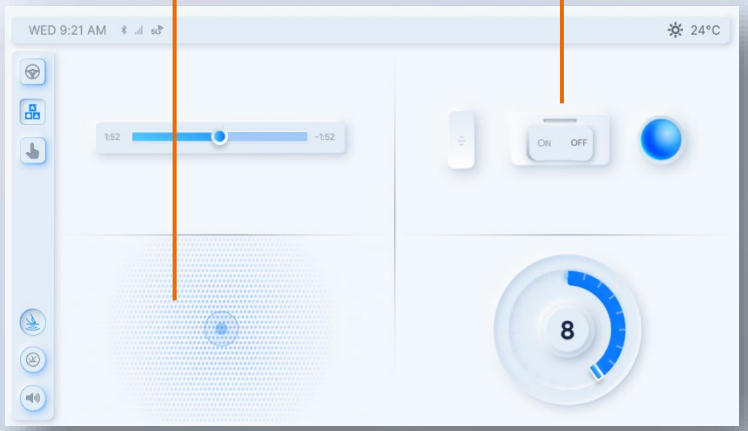
**Zoom haptics** – Two finger pinch
Clicks at zoom in/out




*Car UI*

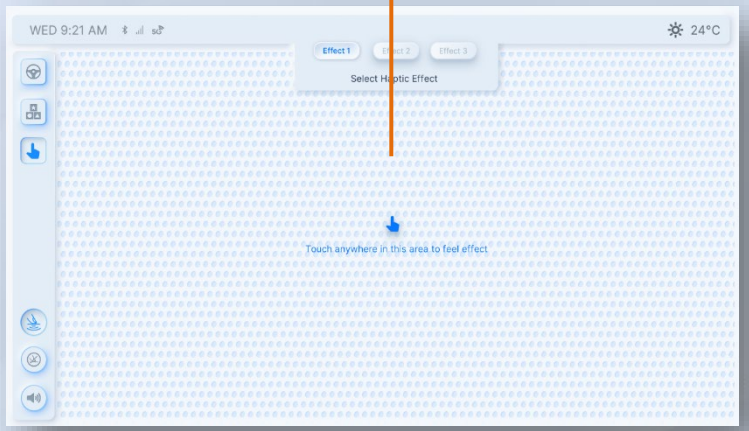
**Search haptics** – Increasing vibrations
Increased intensity when moving closer to the button

**Press haptics** – Various clicks
Which one is your favorite?




*Haptic Lab*

**Homogenous touch** – Press anywhere
The same haptic feeling everywhere on the screen




*Homogenous Touch*

**Change haptic strength, switch sound feedback on/off, or remove haptics completely** – you will notice the difference!


© TDK Electronics AG • 2025

# We Provide all the Support For an Easy Haptic Integration

## New redesigned PowerHap actuator

- Automotive qualified
- Designed for easy integration
- Compact and powerful

## Automotive demonstrator

- Developed by Innovobot, BOE, Microchip and TDK
- Infotainment style with different haptic profiles; confirmation, scroll, surface etc.

## Design Guide

- Reference design for integrating the PowerHap actuator into a 15” TFT display

© TDK Electronics AG • 2025

**Interested in more details?**
**Email us at haptics@tdk.com – let's innovate together.**


© TDK Electronics AG • 2025

www.tdk-electronics.tdk.com