Texas Instruments

Haptics Solutions for Automotive Applications

Easy-to-use, advanced HMI improves safety on the road

Automotive Interface Challenges

With all of the new technologies coming into the cabin of your automobile, driver distraction has become a huge issue. Due to this, the automotive industry has placed a large importance on creating safe and innovative ways to keep the driver's eyes on the road and hands on the wheel. One of the main problems with the current technologies within vehicles comes from the infotainment center console. More and more companies are moving toward using capacitive touch buttons/sliders/knobs to replace mechanical controls. A major drawback in the use of these capacitive touch LCDs, buttons, sliders and knobs, is that they give no tactile feedback when the driver is navigating through different menus and settings. This leads to the driver taking their eyes off the road to see if their input was accepted.

- Touch interfaces are managing an increasing amount of dynamic content and features
- New guidelines published from NHTSA and the SAE set the criteria for maximum task & glance times
- Today's auto interface must be intuitive, easy to use, and offer rich features while maintaining safety standards and minimizing distractions

The Value of Tactile Automotive User Experience

One of the main ways to fix the problem that automotive manufacturers are having with the capacitive touch elements within the vehicle is to add haptics to all their devices. Haptics, by definition, refers to the sense of touch and is a technology that adds tactile feedback to electronic devices through the use of vibrations. By adding haptics, your finger will get the impression that you are pressing an actual button. Haptics technologies are advancing, but ultimate success lies in the value it bring to the automotive user experience.

Visit www.ti.com/haptics for more information.

Where does TI come in?

Texas Instruments offers a total touch solution, providing a complete line of haptic drivers. With automotive qualified haptic drivers, automotive manufacturers can reduce driver distraction and increase confidence within the vehicle by adding clear and fast response from the capacitive touch elements in their infotainment center console.

Demonstrations from TI

Haptic Touch Pad and Touch Screen

- TI DRV8662
- Provides forceful haptic feedback by using a piezo actuator
- 3.5” capacitive touch pad with Immersion Touchsense®
- 7” Touch screen with piezo haptics
- Android OS

7” Haptic Touch Module

- TI DRV8601
- Provides haptic effects through an industrial-grade ERM actuator
- 7” floating-screen LCD
- Produces localized haptics
- Suitable for automotive applications

Haptic Drivers

Device	Description	V_{OUT} (Max) (V)	Input Signal	I_Q (Typ) (mA)	Startup Time (ms)	Haptic Actuator Type	V_S (Max) (V)	V_S (Min) (V)	Operating Temp Range (°C)	Automotive Qualified (Q1)	Package	Price*
DRV2667	Piezo Haptic Driver with Boost, Digital Front End, and Internal Waveform Memory	200	I²C, PWM, Analog	0.13	2	Piezo	5.5	3	–40 to 85	—	QFN-20	2.95
DRV2604	Haptic Driver for ERM/LRA with Waveform Memory and Smart Loop Architecture	5.5	I²C, PWM, Analog	0.6	0.7	ERM, LRA	5.5	2.5	–40 to 85	—	9DSBGA	1.15
DRV2605	Haptic Driver for ERM/LRA with Built-In Library and Smart Loop Architecture	5.5	I²C, PWM, Analog	0.6	0.7	ERM, LRA	5.5	2.5	–40 to 85	Coming Soon	9DSBGA	1.60
DRV2603	Haptic Driver with Auto Resonance Tracking for LRA and Optimized Drive for ERM	5.5	PWM, Analog	1.5	1.3	ERM, LRA	5.2	2.5	–40 to 85	—	QFN-10	0.70
DRV2665	Piezo Haptic Driver with Integrated Boost Converter and Digital Front End	200	I²C, PWM, Analog	5	2	Piezo	5.5	3	–40 to 70	—	QFN-20	2.50
DRV8662	Piezo Haptic Driver with Integrated Boost Converter	200	PWM, Analog	5	1.5	Piezo	5.5	3	–40 to 70	Coming Soon	QFN-20	1.75
DRV8601	400 mA Fully Differential Motor Driver with 1.8-V Input Logic Thresholds	5.5	PWM, Analog	1.7	0.1	ERM, LRA	5.5	2.5	–40 to 85	—	BGA-8 MICROSTAR JUNIOR™, SON-8	0.48

**Suggested resale price in U.S. dollars in quantities of 1,000.*

Visit www.ti.com/haptics for more information.

TEXAS INSTRUMENTS

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