

# TI Live! INDIA AUTOMOTIVE SEMINAR

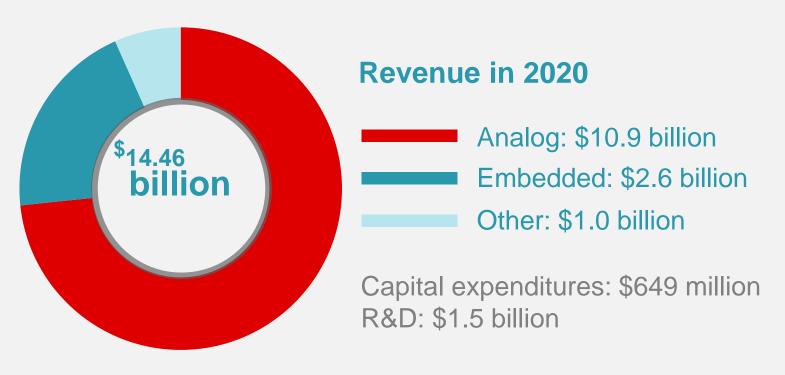
RAVNEET KOTWAL, STEVE FISHER

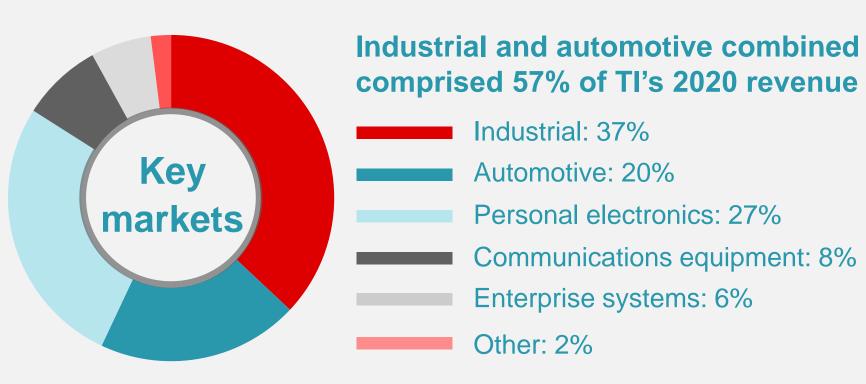
INAUGURAL KEYNOTE

#### **Topics**

- Company overview
- TI manufacturing
- Buying on Tl.com
- TI automotive overview
- Inauguration for the seminar

#### Our company at a glance









80,000+ products for over 100,000 customers



15 manufacturing sites worldwide, tens of billions of chips produced each year



Web presence, 110+ Sales & Applications sites across the globe

Barron's 100 Most Sustainable Companies



Humans Rights Campaign Corporate Equality Index, 100% rating

National Association for Female Executives, Top Companies for Executive Women



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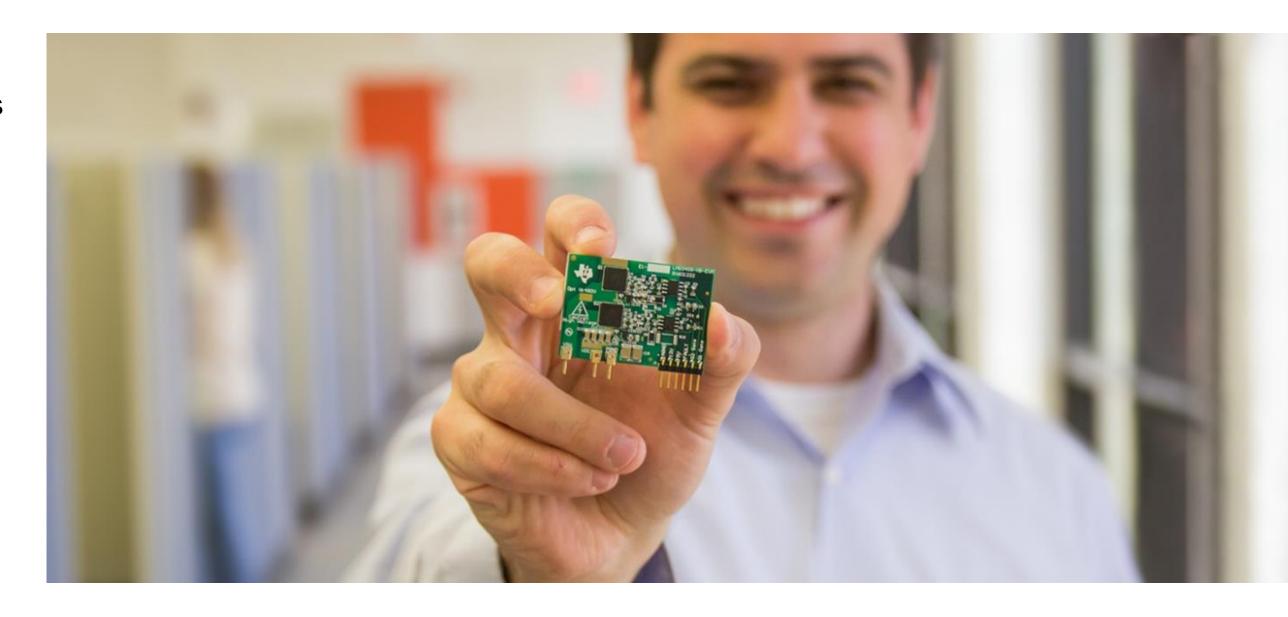
# We design and manufacture analog and embedded semiconductors

Our 80,000 products are the essential building blocks of all types of electronics systems to help:

- Efficiently manage power
- Accurately sense and transmit data
- Provide the core control or processing

Our 100,000 customers are in all markets including:

- Industrial
- Automotive
- Personal electronics
- Communications equipment
- Enterprise systems



## The benefits of working with TI

Diversity and longevity of our products, markets and customer positions



Reach of market channels



Large worldwide sales and applications team for local support, plus Tl.com to conveniently select, design, purchase.

Broad portfolio of analog and embedded processing products



1000s of product families to meet your system solutions needs

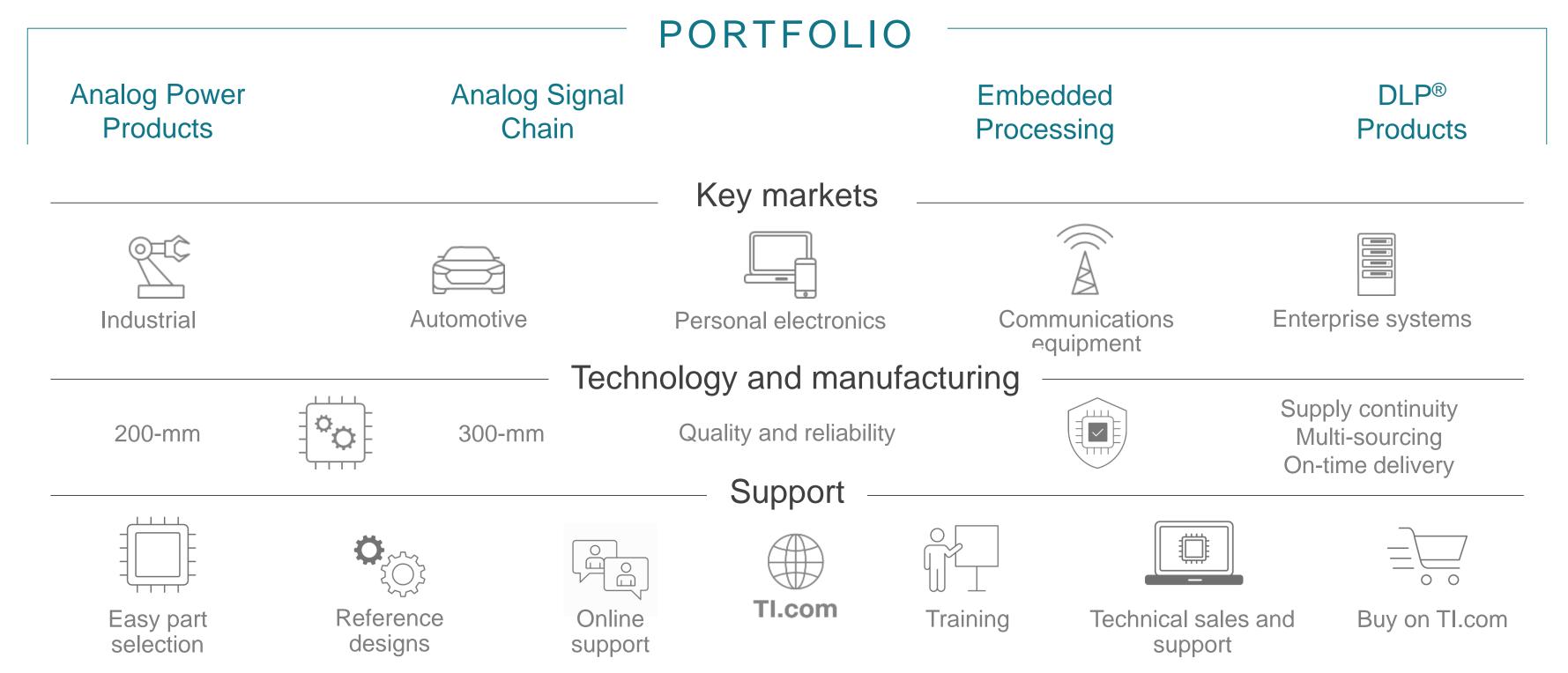
Strong foundation of manufacturing and differentiated technology



In-house manufacturing capacity, process and package technologies for optimized designs, quality excellence

For more information, check out the "About TI" section of TI.com.

#### Great products, engineering expertise and support



# TI manufacturing

# Globally owned, regionally diverse manufacturing footprint



15 manufacturing sites worldwide, including wafer fabs, assembly and test factories, and bump and probe facilities.

#### Investing in 300-mm wafer fab capacity

#### DMOS6 – Dallas, TX



 Ramped for 300-mm analog technologies in 2014.

#### **RFAB** – Richardson, TX



- RFAB1: Ramped in 2010 as the world's first 300-mm analog wafer fab.
- RFAB2: 300-mm wafer fab expansion on existing Richardson site:
  - Equipment installations to begin in 1H 22.
  - First production output expected in 2H 22.

#### LFAB - Lehi, UT



- Acquisition completed in October 2021.
- Will run 65-nm and 45-nm production for TI's analog and embedded products.
- First output expected in early 2023.

#### **New fabs in Sherman, TX**



Construction of new 300-millimeter wafer fabs in Sherman, Texas, announced in November 2021:

- Potential for up to four fabs to meet demand over time.
- Construction of the first and second fabs is set to begin in 2022.
- Production from the first new fab is expected as early as 2025.

45-nm – 130-nm technology nodes, optimized for analog and embedded products

#### Next 300-mm wafer fabs in Sherman, Texas



Design concept for Texas Instruments' new 300-millimeter semiconductor wafer fabs in Sherman, Texas. Construction of the first two fabs is to begin in 2022, with potential for up to four fabs over time.

Construction of new 300-millimeter wafer fabs in Sherman, Texas, announced in November 2021:

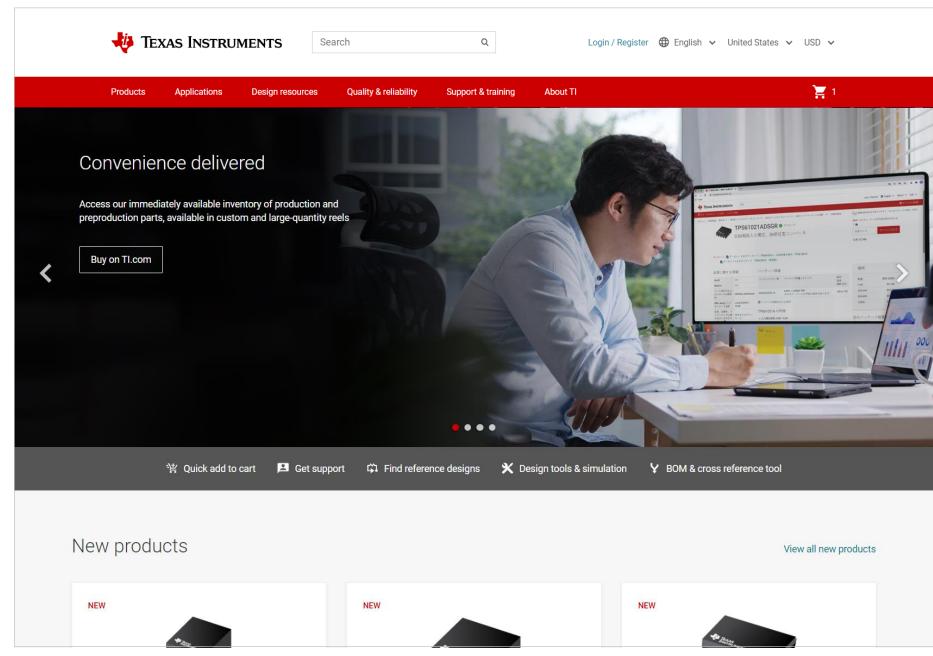
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# Buying on Tl.com

Convenience delivered



#### Aiming to provide you with convenience



Ordering resources and help

https://www.ti.com/ordering-resources/buy.html

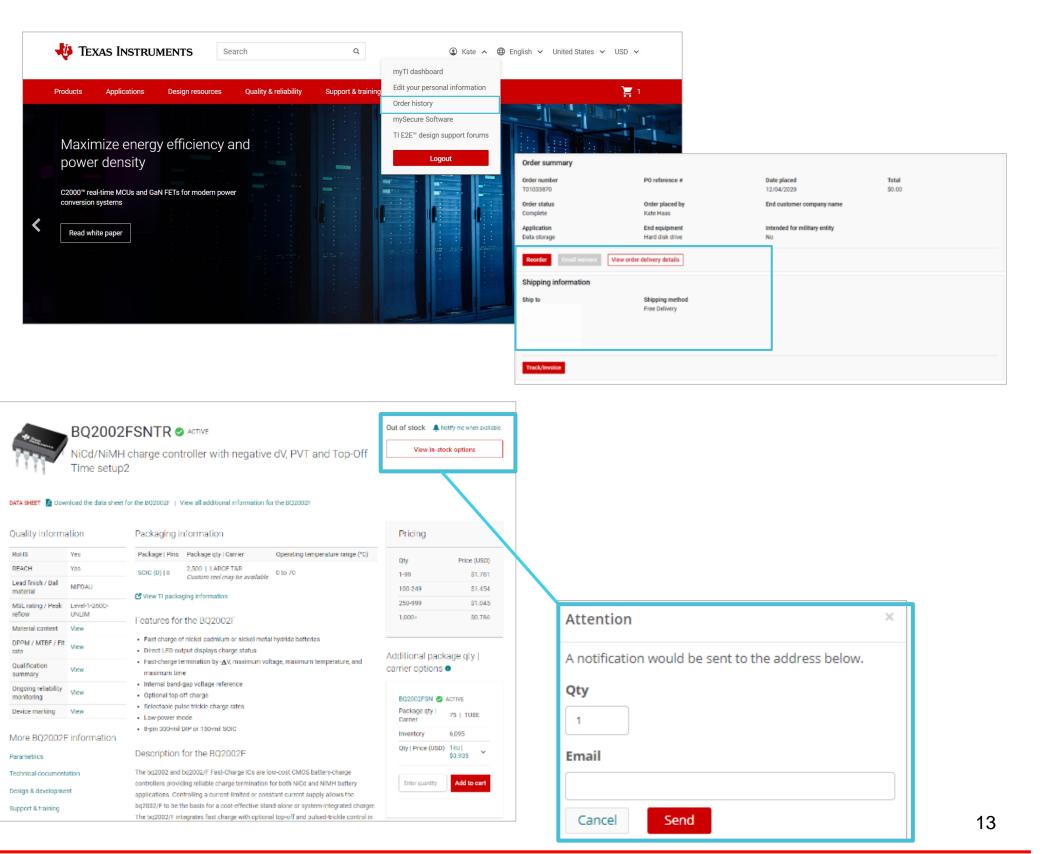
- Authentic TI products
- TI HiRel products with date and lot code options prior to ordering
- Lowest online prices\*
- Cut tape, custom and full quantity reels
- Purchase in INR with TI as the importer of record to simplify delivery and customs clearance
- On-demand delivery and Self-service & ordering details
- Exclusive access to preproduction devices
- Quickly add multiple parts to your cart

<sup>\*</sup>Lowest online prices on 1K unit quantities for 99% of TI's immediately available inventory. Excludes expired products and products sold by non-authorized sources.

# Self-service order and tracking details

Sign up and order with your myTl account to:

- Quickly reorder
- View order delivery details
- Get access to invoices and waivers
- Track shipments
- Receive back in stock notifications





#### Convenient payment options for India

Currency conversions to INR\* & Line of credit (net 30 terms)

\*conversion rate is calculated daily via Bloomberg

Cart						1 item   <b>₹31,860.00</b>		
ID: C115198	6-UAT Name: Active cart					Downl	load cart	
PO reference Optional	#   End customer company name  End customer company name					Continue shop	oping Chec	<mark>ckout</mark> ? Login
Item		Package qty   Carrier	Inventory	Qty	Carrier options	Unit price	Total	×
	LP590712QDQNRQ1 ACTIVE  Automotive, 250-mA, low-noise, high-PSRR, ultra-low-dropout voltage regulator with low IQ and enable  Type: IC  Customer reference #  Optional	3,000   LARGE T&R	5,891	3000	Full reel 3,000	₹10.62	₹31,860.00	×
Coupon code	Apply					Subtotal ₹31,860.00  Order total (INR) ₹31,860.00  *Taxes are not included in the total  Continue shopping Checkout		

# TI automotive overview

#### Accelerating the future of automotive systems



Our products and system expertise help you solve complex design challenges to get electrified, connected and automated cars to market faster.

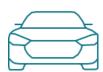
#### **Product innovation**



7,000 automotive-qualified analog and embedded products



500 new automotive ICs annually since 2014

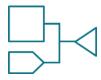


Decades of advancing automotive electronics

#### System expertise



150 automotive systems



350+ fully tested, circuitbased reference designs



Meets rigorous quality requirements, including IATF, ISO and OHSAS certifications

#### Commitment to long-term supply



14 manufacturing sites worldwide



Proprietary processes and packaging



Proven track record of on-time delivery for product orders estimated ship date

#### Accelerating the future of automotive systems



## Passive safety systems

Reliable solutions to increase passenger safety



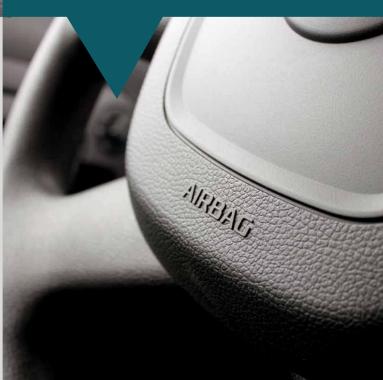
#### Infotainment and cluster

Immersive systems that keep drivers more informed and less distracted



# Advanced driver assistance system

Advanced-assist and autonomous-driving capabilities for reducing human error



#### **Body electronics** and lighting

Innovative analog and embedded processors to optimize comfort and convenience

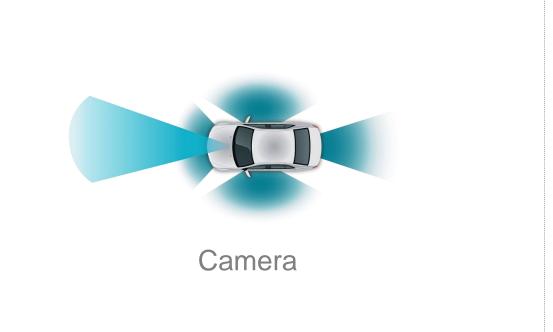


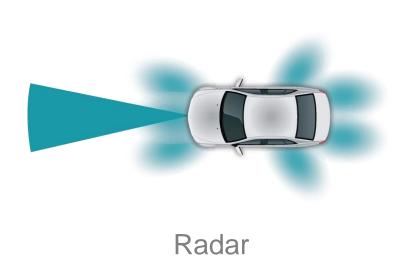
#### Hybrid and electric vehicles

Reducing emissions by electrifying systems from the car to the grid

#### Advanced driver assistance systems







Enable assisted, automated driving features by accelerating ADAS design for a safer, less stressful driving experience.







#### Infotainment & cluster systems





Cluster

Telematics



Display

The next-generation digital cockpit.

Enable infotainment, display and V2X systems that minimize distractions, and help drivers stay informed and connected to the world.



Integrated cockpit



Head unit

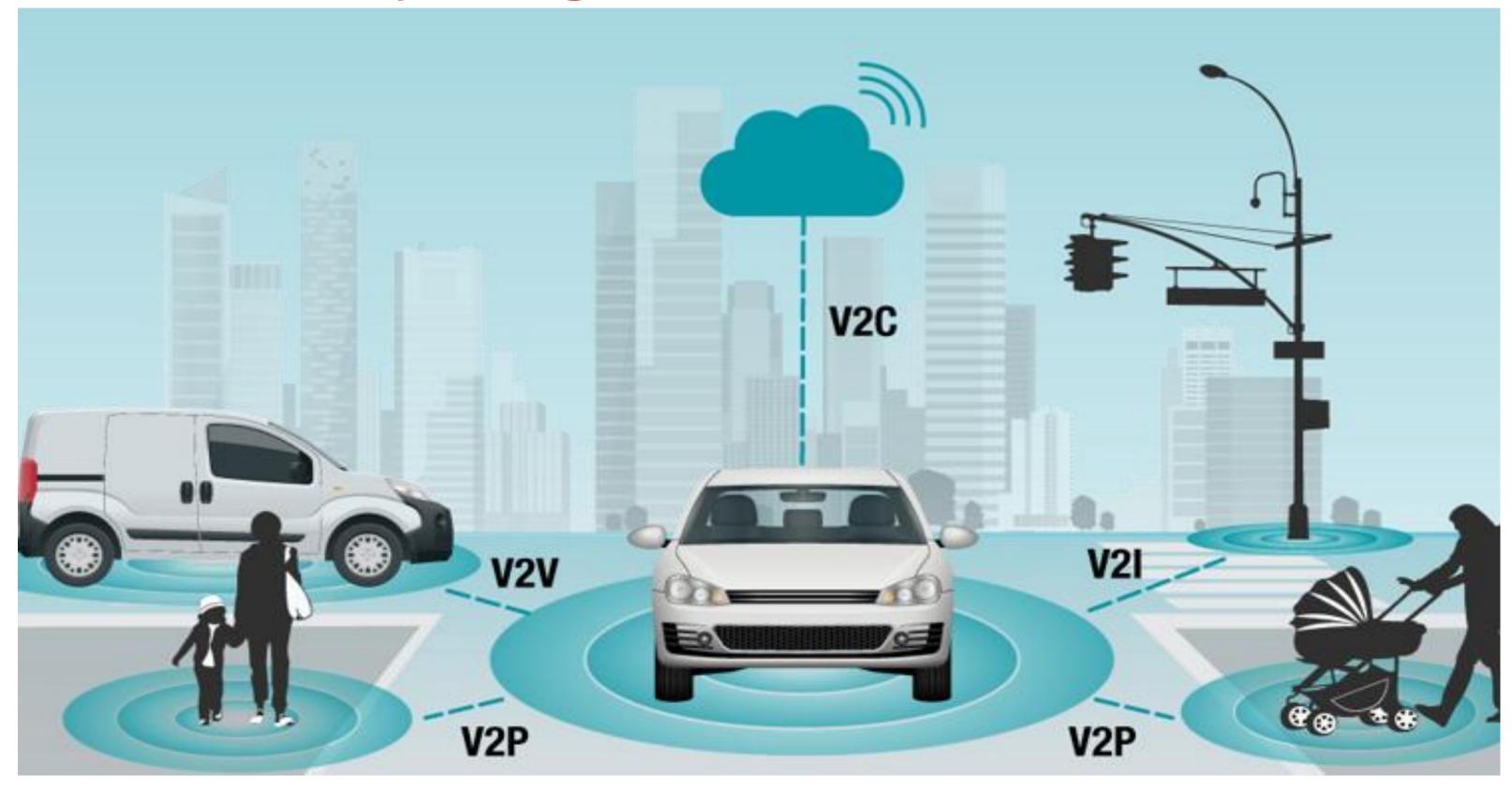


Media interface



Premium audio

## Vehicle-to-everything (V2X)



#### V2X leads to safer and smarter autonomous driving

Adding a predictive element to a reactive system

#### Navigating obscured obstacles



- Blind intersections
- Non-Line of Sight (NLOS) scenarios

#### Conveying intent



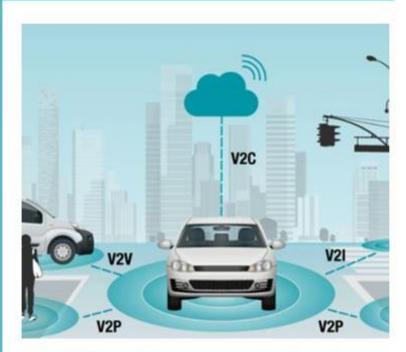
- Pedestrians crossing the road
- Changing lanes

#### Environmental awareness



- Construction indication
- Stopped traffic
- Other hazards on the road

#### Data transmission



- Sharing updated road conditions
- Maintaining up-todate firmware

#### Body electronic & lighting systems



Optimize passenger comfort and convenience. Advance your body electronics and lighting system design with our smart, scalable and efficient solutions.



Automotive lighting



Body control module & gateway



Body motors



Heating & cooling



Car access and security systems



Power seats



Steering column



**Automotive HMI** 



Mirrors



Body sensors



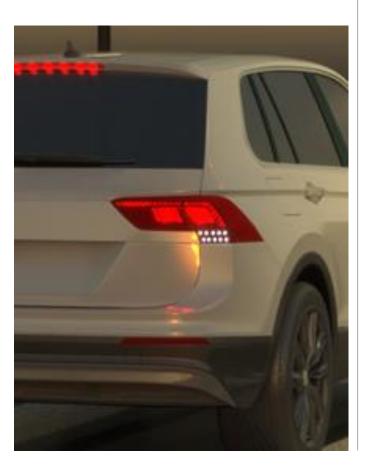
Auxiliary power

# Top semiconductor technologies for lighting

Adaptive front light systems



Animated rear lights



Personalized zone lighting



Brighter, customized small lights



Transparent window display



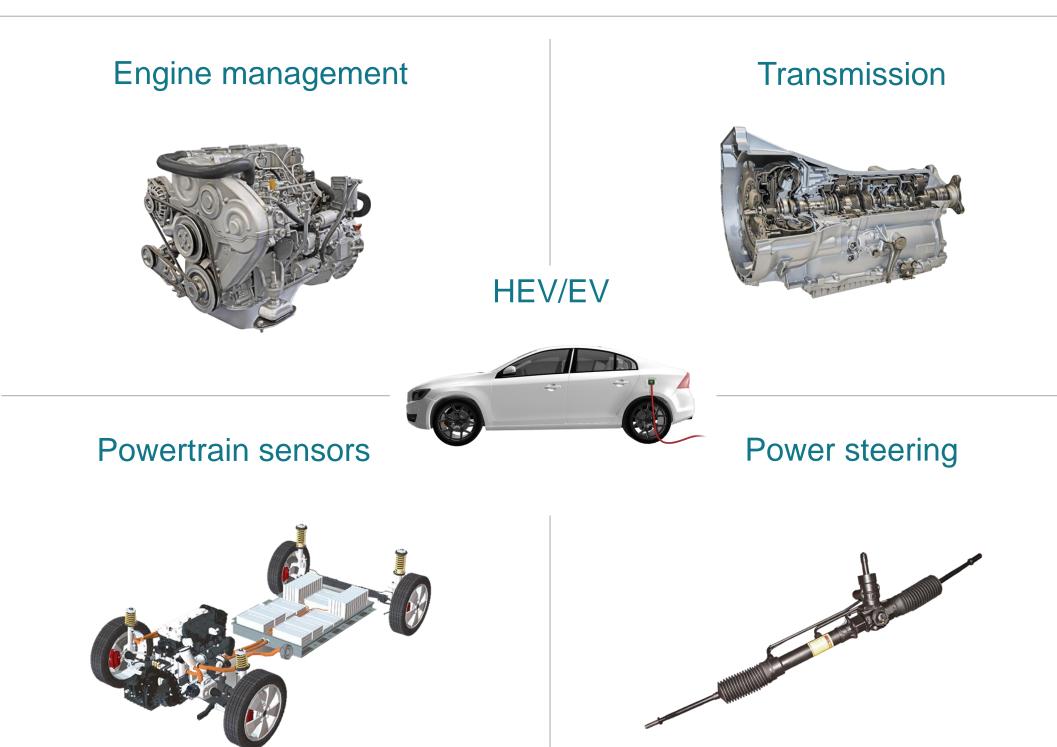
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#### Hybrid, electric & powertrain systems



Giving you the power to electrify.

Accelerating EV and powertrain design by innovating vehicle electrification to reduce emissions, decrease weight and boost efficiency with fewer mechanical components.



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#### Road to zero-emission transportation

Start-Stop, most basic level Downsized internal Electrification of electrification combustion engine (ICE) Electric-only drive mode Electric torque assist Limited recuperation Adds on-board charger Electric propulsion limited by (OBC) for recharging and amount of energy recuperated Limited electric propulsion <5W Entirely propelled by Adds energy increased electrical mileage 5-12(40)KW 20-80KW electric motor harvesting for 3%-10% savings >50KW 8%-16(30)% savings No ICE on board 20%-50% savings Solar 40%-80% savings 48V (some HV) (48V) 100V-400V Shock, Vibration >>50KW (48V) 100V-800V Micro (active suspension) 100% savings **0**00 Mild Hybrid Full 0 B >50KW (48V) 100V-800V Hybrid 000 'Plug-in' Hybrid 100% savings 0 0 8 Hybrid 100V-800V **Battery O B** Electric **Energy O** INV D DC/DC independent CO<sub>2</sub> reduction **B**BMS **O** OBC 25

#### Powertrain system innovation

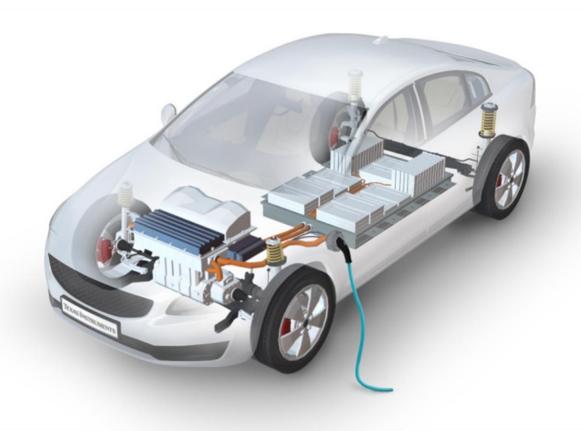
Internal combustion engine (ICE)

Hybrid electric vehicle (HEV)

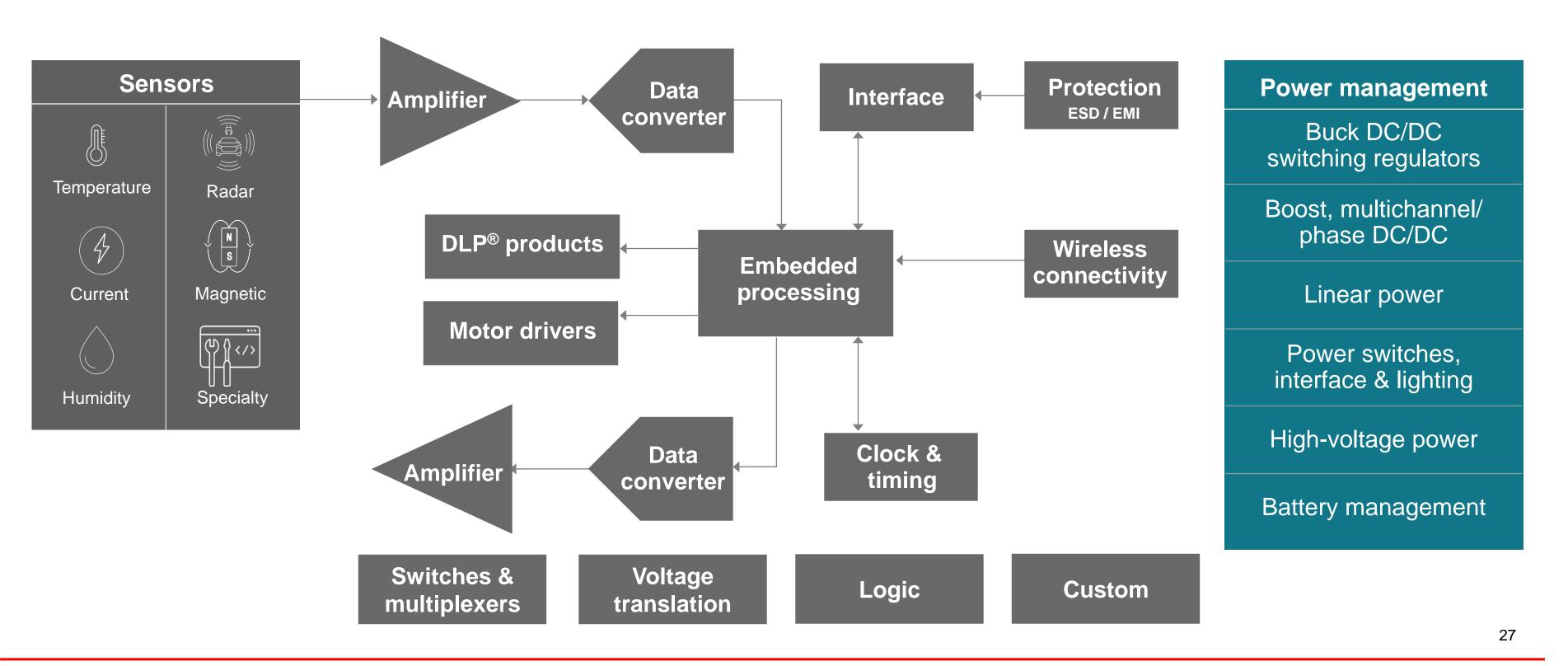
Electric vehicle (EV)







#### Power, signal chain, embedded solutions



# Thank you 28



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