vitesco
TECHNOLOGIES

BUILDING AN ELECTRIFICATION POWERHOUSE – OUR SOLUTIONS

TECHNICAL INFORMATION

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ELECTRIFICATION
COMBUSTION
BEYOND POWERTRAIN

01

ELECTRIFICATION

ELECTRIFICATION

Powertrain electrification holds the key to sustainable future mobility. Vehicles with electrified powertrain architectures, such as battery electric (EV), hybrid (HEV), and fuel cell electric (FCEV), will shape the propulsion landscape over the next decade.

As an electrification pioneer, Vitesco Technologies offers propulsion solutions for all types of electrified vehicles based on our long-standing expertise in powertrain systems, ranging from stand-alone components, to intelligent operating strategies and full turn-key systems. The future of mobility is electric.

ELECTRONIC CONTROL

Intelligent, networked powertrain electronics are the brain of efficient and clean propulsion systems. While this was already true on internal combustion engine (ICE) powertrains, smart electronics are even more prominent in electrified vehicles.

While continuing to deliver ever higher performance, powertrain electronics are also undergoing a transformation within the vehicle electrical and electronic (E/E) architecture. As the typical vehicle migrates from distributed electronics, towards domain-based, cross-domain and even server-based architectures, Vitesco Technologies, with its strong DNA in both electronics and software, remains at the forefront in enabling car makers to manage the ever-increasing complexity of electronics across their vehicle fleets.

CONTROL UNIT - ELECTRIC DRIVE

Compact powertrain controller for small to medium sized electric and hybrid 2/3 wheelers.

Facts & Benefits
> Uses Vitesco Technologies automotive electronics and technologies
> Integrates complete powertrain function (from driver request to motor control)
> Flexible control for various synchronous machines
> Smart battery energy management compatible with removable multi-batteries
> Compact and light weight design

Technical Information
> Input voltage from 39 V to 58 V
> Scalable Inverter performance: 3 to 7kW
> Protection class: IP67
> CAN interface
> Functional safety: up to ASIL-B / MSIL-C

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

DRIVETRAIN CONTROL UNIT - DRIVELINE - ATTACHED

Versatile DCU suitable for different driveline control and supply applications like shifting mechanisms, clutch / axle-disconnect systems and electric pumps.

Facts & Benefits
> Compact and lightweight packaging concept
> High robustness allowing direct mounting on driveline systems
> Precise and efficient electric motor control with in-house developed driver

Technical Information
> Suitable for -40 °C to +125 °C applications
> Infineon AURIX Gen. 2 microcontroller and in-house developed integrated circuit components
> Up to 1x brushless DC motor control outputs
> Up to 2x CAN communication lines
> Functional Safety level up to ASIL-C

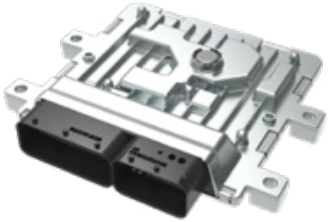
PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

FUEL CELL CONTROL UNIT



The fuel cell control unit (12 V) reads the sensor values and controls the actuators of the fuel cell system, to ensure an adequate supply of hydrogen, air and cooling.

Facts & Benefits
> Multicore electronic control unit (12 V) to run a fuel cell stack
> Electrical diagnosis of all in- and outputs, characteristic translation
> Infrastructure for measurement & calibration, cybersecurity

Technical Information
> Infineon AURIX TC387 @ 300 MHz
> 10 Mb Dflash, Hardware Security Module
> Connector: 154 Pins
> Housing & Cover: Aluminum
> Sealing: Dow Corning
> AUTOSAR Standard Version 4.3
> 12 V, operates in passenger cars, trucks and stationary applications
> Firmware & Basic Software

PROPULSION TYPES

BEV

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway

LOW VOLTAGE POWER DISTRIBUTION UNIT

Distribute power supply from batteries & DC/DC to different control units and electrical loads, replaces the traditional fuses with electronic switches (e-fuse).

Facts & Benefits
> Low voltage (12 V) power distribution to replace relays and fuses
> Internal intelligent power switch for redundant 12 V power supply

Technical Information
> Core: Infineon AURIX 2G TC377
> Flash size: 6 MB (Over the air flash optional)
> Interfaces: 1 CAN FD
> Power distribution: 4 x 100 A, 8 x 40 A, 16 x 15 A
> Drivers: up to 40 high side/low side drivers
> For passenger vehicles (12 V)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car — Commercial Vehicle & Off-Highway — 2-Wheeler & Powersports

MASTER CONTROLLER

Calculates and distributes torque request to various powertrain control units (engine, e-motor, battery, transmission).

Facts & Benefits
> Off-the-shelf usage
> Leads to reduced number of ECU variants
> Communications gateway
> All customer specific applications are possible for mass production

Technical Information
> Core: Tricore TC375, TC387, opt. TC397
> Flash size: up to 16 MB (OTA Flash optional)
> Interfaces: 100 Mbit Ethernet, Up to 6 CAN-FD and 4 LIN, up to 5 SENT
> Charging Interface: J1772AC / China GB/T - AC/DC
> Inputs: Up to 21 analog or up to 21 digital
> Drivers: 7 high- / 18 low-side / 6 configurable LS/HS outputs, up to 2 H-bridges
> 4 channels solenoid driver with configurable current control

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car — Commercial Vehicle & Off-Highway — 2-Wheeler & Powersports

MASTER CONTROLLER - HIGH PERFORMANCE

Central management of multiple domain functions e.g. powertrain, chassis, gateway, charging and similar.

Facts & Benefits
> Centralizing of generic software, functions and features
> Supervising and plausibility checks
> System solution to manage vehicle overall functions
> Wide range of communication interfaces and I/O's

Technical Information
> Micro Core up to two TC3xx or mixture with TC4D or optional micro processor
> Interface: Ethernet multiple ports, FlexRay, CAN, LIN and Sent
> Software AUTOSAR flex up to vApplications and optional AR adaptive
> Housing IP40 up to IP5K2
> Connector: 32 + 32 + 4 pins plus dedicated connectors for ethernet

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

ZONE CONTROLLER

Gateway functions between components e.g. Vehicle Control Unit, Charging Control Unit, server and interfaces to sensors & actuators.

Facts & Benefits
> Controllers for zonal architecture
> Communications gateway and IO interfaces
> Power distributions

Technical Information
> Core: Tricore TC387
> Flash size: 10 MB (OTA Flash optional)
> Interfaces: 100 Mbit Ethernet, Up to 6 CAN-FD and 4 LIN, optional for Flexray
> Power distribution: 4x40 A, 8x15 A
> Inputs: Up to 24 analog and 10 digital
> Drivers: up to 16 configurable LS/HS outputs
> For passenger vehicles (12 V)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH-VOLTAGE

Vitesco Technologies was among the first suppliers to launch an electric high-voltage (HV) axle drive with integrated power electronics and reducer, into volume series production at the end of 2019. This launch was the result of twelve years of high-voltage technology development. As early as 2007, Vitesco Technologies began development of the powertrain for the first generation of the Renault Zoe and has been advancing HV propulsion technology ever since.

HV drive solutions used in EVs as well as in FCEVs, facilitate locally emission-free driving. We are already on the path towards zero emission mobility and Vitesco Technologies is among the pioneers.

In Hybrid powertrains, HV systems operate in tandem with an ICE, to significantly lower vehicle CO_2 emissions. Hybrid powertrains provide a substantial positive impact on car maker fleet fuel consumption globally.

Outlook: To reduce Plug-in Hybrid Electric Vehicle (PHEV) cost and to thus increase its market penetration, Vitesco Technologies has developed the innovative ”Cost-efficient PHEV“ concept, which integrates the transmission and electric motor, while also facilitating an intelligent compact all-wheel-drive solution.

To increase the efficiency and range of electric powertrains, Vitesco Technologies is developing inverters utilizing state-of-the-art silicon carbide technology (SiC).

CHARGING COMMUNICATION UNIT

Central communication management for High Voltage Charging. Useable for Plug-In Hybrids and Electric Vehicles.

Facts & Benefits

> Support of charging communication standards e.g. ISO15118, CCS1, CCS2, CHAdeMO and China GB/T
> Integration of charging management or third party software possible
> Control of charging socket, vehicle inlet and charging cradle
> Privacy and security measures
> AUTOSAR compliant software

Technical Information

> Micro Core: TC3xx 32 bit, Flash 4 MB…16 MB
> Interfaces: Ethernet, Powerline Communication (PLC), Flexray, Controller Area Network (CAN/FD), Local Interconnect Network (LIN) and Sent
> Drivers: 4 to 10 output power lines (High Side/Low Side), H-Bridges
> Housing: IP40 up to IP6K9
> Connector: 12 + 16(38) pins (example)

PROPULSION TYPES

BEV · PHEV · MHEV · Gasoline · Diesel

VEHICLE TYPES

Passenger Car · Commercial Vehicle & Off-Highway · 2-Wheeler & Powersports

ELECTRIFICATION
ELECTRONIC CONTROLS
HIGH VOLTAGE
LOW VOLTAGE
THERMAL MANAGEMENT
FUEL CELL
COMBUSTION
BEYOND POWERTRAIN

HIGH VOLTAGE AXLE DRIVE (EMR3)

Highly integrated high voltage axle drive consisting of a permanent-magnet synchronus e-motor, inverter and reducer.

Facts & Benefits
> Integration of motor, inverter and reducer
> High power density for a compact packaging
> No connectors, no cables between motor and inverter
> Reduced efforts for integration, sourcing and validation

Technical Information
> E-motor: permanent-magnet synchronous machine
> Max. torque: 310 Nm
> Max. power: 150 kW
> Continuous power: 50 kW
> Weight: 76 kg
> Size (LxHxW): 400 x 350 x 550 mm
> Electric parking lock included

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE AXLE DRIVE (EMR4)

Highly scalable axle drive consisting of a permanent-magnet synchronus machine, inverter and reducer.

Facts & Benefits
> Integration of motor, inverter and reducer
> Highly scalable to cover various customer demands
> High power density for a compact packaging
> No connectors, no cables between motor and inverter
> Reduced efforts for integration, sourcing and validation

Technical Information
> Power: 80 kW - 230 kW
> Torque: 1,700 – 4,000 Nm (peak)
> E-motor: permanent-magnet synchronous machine
> Weight: approx. 45 to 80 kg
> Functional Safety: ASIL - D

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE BATTERY JUNCTION BOX

Junction box for (dis-)connection of up to two battery cell stacks to the vehicles high voltage powertrain and auxiliary/charging devices.

Facts & Benefits
> Localized HV interfaces and ease of serviceability
> Aluminum and copper bus bar design possible
> Different contactor and switch off components
> Easily customizable to various battery designs
> Interfaces: DC charging, auxiliaries
> Integration of electronics (BMC and sensors) possible

Technical Information
> Voltage: 400 V, 800 V or switchable 400 V/800 V
> Max. current capability of ± 750 A
> Charging power: up to 350 kW
> Overcurrent switch-off capability of up to 2000 A with contactors or up to 25 kA with conventional or pyrotechnical fuses

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE BATTERY MANAGEMENT CONTROLLER

Battery Management Controller (BMC) for batteries of hybrid and battery electric vehicles.

Facts & Benefits
> Wired or wireless communication with CSCs
> Scalable control module for hybrid-, plug-in- and battery electric vehicles
> Calculation State of Function (SOF), State of Charge (SOC) and State of Health (SOH) of battery cells
> Controls internal and external actuators
> Design compatible for different battery chemistry technologies

Technical Information
> Scalable for 400 V and 800 V batteries
> Battery current measurement up to 1500 A
> Integrated passive cell balancing for high battery performance
> Cell voltage accuracy: ± 5 mV (@-40 °C - 65 °C ambient temperature, -2 V up to 5 V)
> AutoSAR 4.2.2 compliant software
> Functional safety: up to ASIL D

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE BOX 2.0

Re-charge high voltage battery from power grid - AC charging.
Bi-directional functionality - vehicle to load (home and grid capable).

Facts & Benefits
> Developed for worldwide charging requirements
> Galvanic isolated power transfer, bi-directional
> Wide band gap, vehicle to load, vehicle to grid, vehicle to home
> Reduced packaging volume due to electrical synergies
> Improvement of weight and size

Technical Information
> Charging performance: 11 kW and 22 kW for DC out 800 V
> Customized solution 400 V possible
> Low voltage converter 3.6 kW DC/DC (400 V/800 V to 12 V)
> Grid supply: AC in 100 V to 240 V
> Communication unit supports: ISO15118, CCS1, CCS2, CHAdeMO, China GB/T

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE CELL SUPERVISING CIRCUIT

Measurement of voltage and temperature of each battery cell inside the battery pack.

Facts & Benefits
> Wireless or wired communication with BMC
> Active cell balancing as option
> Available for blade cells

Technical Information
> ASIL D Compliant
> ASIL accuracy: +/-8 mV
> Main ADC accuracy: +/- 1,7 mV
> Number of channels: 12/14/16/18/24
> Temperature Channels: up to 15 GPIOs

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

ELECTRONIC CONTROLS
HIGH VOLTAGE
LOW VOLTAGE
THERMAL MANAGEMENT
FUEL CELL
ELECTRIFICATION
COMBUSTION
BEYOND POWERTRAIN

HIGH VOLTAGE CURRENT MODULE

The high voltage current sensor meets accurate energy management standards for all electric vehicles. Easy to install, highly accurate and robust.

Facts & Benefits
> Very accurate shunt-based current measurement
> Very large measurement range
> Very high stability over temperature range
> Galvanic isolated communication and supply interface
> Compliant with ISO26262, ASIL D

Technical Information
> High accuracy: ± 0.5 % gain error and ± 100 mA offset over temp. range and lifetime
> Large measurement range: ± 2500 A in normal operation and up to ± 5500 A over current monitoring
> Communication with Daisy chain interface
> 1000 V Galvanic isolation between High Voltage and low Voltage area

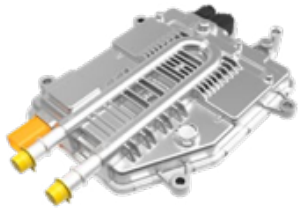
PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE DC/DC CONVERTER – 4TH GENERATION



High voltage DC/DC converter for hybrid or electric vehicle applications.

Facts & Benefits
> Increased output power (peak/cont.) / High power density
> Customizable for input voltages of 400 - 800 V and output voltages of 12 - 48 V
> Stand alone or integrated

Technical Information
> DC/DC power scalable up to 3.6 kW
> Output current two phase: 248 A at 14.5 V cont.
> Output peak current two phase: 265 A for 10 sec. at 14.5 V cont.
> Nominal operating voltage range HV: 245 V - 450 V
> Nominal operating voltage range LV: 8 V - 16 V
> Functional safety: ASIL B
> Size (LxWxH): 252 x 202 x 48 mm
> Weight: 2.85 kg

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE DC/DC CONVERTER FOR ELECTRICAL HEATED CATALYST

DC/DC converter for electrical heated catalyst for PHEV applications.

Facts & Benefits
> Optimized for heated catalyst applications
> Stand alone unit
> Mode: buck mode
> EMC legal requirements / AUTOSAR compliant software architecture
> OBD supporting

Technical Information
> DC/DC power 5 kW – 60 sec / 6 kW - 10 sec
> Nominal operating voltage range HV: 230 V - 460 V (full power)
> Nominal operating voltage range LV: 43 V - 48 V (full power)
> Temperature range (air cooled): -40 °C up to 85 °C
> Functional safety: up to ASIL C
> Chassis mounted
> Size (LxWxH): 250 x 215 x 60 mm

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE POWER ELECTRONICS INVERTER + DC/DC CONVERTER

High voltage inverter and DC/DC converter for hybrid and electric vehicles.

Facts & Benefits
> Integrated inverter & DC/DC converter
> Sintered power stage for highest reliability
> Very high power density
> Modular design for standalone / integrated solutions

Technical Information
> Inverter performance: Up to 450 V / 450 A peak
> DC/DC: 3.6 kW peak / 3.04 kW cont.
> AUTOSAR 4.0.3 compliant software architecture
> Functional safety: Inverter ASIL C / DC/DC ASIL C optional
> Weight: 11.5 kg

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE POWER ELECTRONICS (EPF4 800 V)

High voltage stand-alone inverter with silicon carbide power stage for enhanced efficiency and improved power density.

Facts & Benefits
> Sintered power stage for maximum reliability
> High efficiency and power density
> For plug-in hybrid and battery electric vehicle applications

Technical Information
> Silicon carbide (SiC) powerstage
> Inverter performance: Up to 930 V / 650 A peak
> AUTOSAR 4.0.3 compliant software architecture
> Functional safety: ASIL C / ASIL D certified multi core µC
> Communication Interface: CAN, Flexray

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE POWER ELECTRONICS (EPF4 EESM)

High voltage stand-alone inverter for Externally Excited Synchronous Machines (EESM).

Facts & Benefits
> High power inverter for stator supply
> Exitiation circuit for rotor supply
> Efficiency optimization using EESM characteristics
> High voltage auxiliary outputs (optional)
> Motor mode / generator mode

Technical Information
> Inverter performance: up to 470 V / 600 A peak
> AUTOSAR 4.0.3 compliant software architecture
> Functional safety: ASIL C / ASIL D certified multi core µC
> Communication Interface: CAN, Flexray

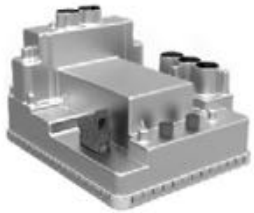
PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE POWER ELECTRONICS (EPF4 GENERIC DESIGN)



High voltage stand-alone inverter for hybrid and electric vehicles.

Facts & Benefits
> Improved power density
> Vitesco Technologies software platform
> Motor and generator mode
> Pos. sensor: resolver, sincos sensor

Technical Information
> Inverter performance: up to 920 V / 400 - 650 A peak
> AUTOSAR compliant software architecture
> Protection class for stand alone IP6k9k
> Size (LxHxW): 270 x 126 x 221 mm
> Functional safety: ASIL D
> Si power stage, SiC available optional

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE POWER ELECTRONICS (OPEN INVERTER)

High voltage open inverter for axle-drive integration for plug-in hybrid and battery electric vehicles.

Facts & Benefits
> Sintered power stage for maximum reliability
> Increased peak apparent power by 25 %
> Enhanced control software enables high class smooth and quiet acceleration
> For plug-in hybrid and battery EV applications
> Motor mode / generator mode
> Direct integrated into the vehicles drive unit

Technical Information
> Inverter performance: Up to 460 V / 650 A peak
> AUTOSAR 4.0.3 compliant software architecture
> Functional safety: ASIL C / ASIL D certified multi core µC
> Communication Interface: CAN, CAN FD, Flexray

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH VOLTAGE POWER ELECTRONICS SINGLE INVERTER (EPF 2.8+)

High voltage stand-alone inverter for hybrid and electric vehicles.

Facts & Benefits
> Sintered power stage for maximum reliability
> Enhanced control software enables high class smooth and quiet acceleration
> For plug-in hybrid and battery electric vehicle applications
> Motor mode / generator mode

Technical Information
> Inverter performance: Up to 460 V / 650 A peak
> AUTOSAR 4.0.3 compliant software architecture
> Functional safety: ASIL C / ASIL D certified multi core µC
> Communication Interface: CAN, Flexray
> Packaging Volume: 7.8 liter
> Weight: 9.1 kg

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

INDUCTIVE ROTOR POSITION SENSOR (IRPS)

iRPS is a compact inductive sensor dedicated to high speed sensing. It provides accurate position in order to drive Brushless DC (BLDC) motors with the best efficiency. Also for Aeronautics & Industry.

Facts & Benefits
> Immune to low frequency magnetic fields
> Low cost aluminium target (no magnet)
> Light weight for sensor & target

Technical Information
> Temperature: -40 °C up to 150 °C (160 °C in peak)
> Supply Voltage: 5 V (3.3 V possible)
> Supply Current: < 23 mA
> Output signal: Analog Sin / Cos
> Typical airgap: 2 mm ± 0.5
> Response time < 6 µs
> Speed: up to 120 krpm (for 4 pairs of pole)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

LOW-VOLTAGE

Low-voltage electrification, in combination with continued improvements in the combustion engine, makes a valuable contribution to further reduction of vehicle carbon dioxide (CO_2) and pollutant emissions. Such mild-hybrid electrification, e.g. 48-volt electrification of ICE powertrains is a compelling low-cost hybridization option for many vehicles and its adoption is already underway on a large scale across car maker fleets.

Outlook: With innovations like the 48-volt HighPower electric motor, Vitesco Technologies enables low-speed purely electric urban driving at an attractive low cost. The 48-volt HighPower motor also increases energy recuperation in the hybrid vehicle and provides higher torque assistance to the ICE, resulting in even higher fuel and CO_2 savings.

48 V BELT-DRIVEN STARTER GENERATOR (AIR-COOLED)

Air-cooled 48 Volt Belt-driven Starter Generator (BSG) system including inverter. Generates high CO_2 benefits together with drivability improvements.

Facts & Benefits
> Air cooled BSG with integrated inverter
> Permanent magnet synchronous motor
> Generates CO_2 benefits and drivability improvements
> No service required
> IP2X / IP6K9K compliant
> very high power density

Technical Information
> Start torque: 50 Nm
> Peak power: 12 kW in generator mode
> Weight: ~10 kg
> Ambient temperature: -40 °C up to +105 °C
> Dimensions: length 155 mm (w/o pulley)/ diameter 150 mm
> Functional safety: ASIL-B

PROPULSION TYPES

BEV | PHEV | MHEV (48V) | Gasoline | Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

48 V BELT-DRIVEN STARTER GENERATOR (HYBRID-COOLED)

Hybrid-cooled 48 Volt Belt Starter Generator system including inverter. Generates high CO_2 benefits together with drivability improvements.

Facts & Benefits

> Hybrid-cooled (air-cooled e-motor/water-cooled inverter) BSG incl. Inverter
> Permanent magnet-assisted synchronous reluctance machine
> Generates CO_2 benefits and drivability improvements
> No service required
> IP2X / IP6K9K compliant

Technical Information

> Start torque: 60 Nm
> Peak power: 17 kW
> Weight: ~10 kg
> Ambient temperature: -40 °C up to 120 °C
> Coolant temperature: -40 °C up to 85 °C
> Dimensions (w/o pulley): length: 167 mm / diameter: 156 mm
> Functional safety: ASIL-B (ASIL D on overvoltage)

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

48 V DC/DC CONVERTER (AIR-COOLED)

Air-cooled 48 V DC/DC converter for 12 V / 48 V power transformation. The converter stabilizes and connects the two voltage levels of the vehicles electrical system.

Facts & Benefits

> Bi-directional DC/DC converter 48 V - 12 V
> Stabilization of 12 V electrical system
> Pre-charging function for 48 V DC-link
> Self-protection
> Digital voltage and current control

Technical Information

> Power (buck mode): Up to 1,5 - 3 kW cont.; 215 A
> Power (boost mode): Up to 1,3 - 2,8 kW cont.; 58 A
> Input voltage: 24 V up to 54 V (VDA320 compl.)
> Output voltage: 6 V up to 16 V
> Protection class: IP6k9k
> Functional safety: ASIL B, up to ASIL C possible

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

48 V DC/DC CONVERTER (LIQUID-COOLED)

Liquid-cooled 48 V DC/DC converter for 12 V / 48 V power transformation. The converter stabilizes and connects the two voltage levels of the vehicles electrical system.

Facts & Benefits
> Bi-directional DC/DC converter 48 V – 12 V
> Stabilization of 12 V electrical system
> Pre-charging function for 48 V DC-link
> Self-protection
> Digital voltage and current control

Technical Information
> Power (buck mode): Up to 3,8 kW cont.; 271 A
> Power (boost mode): Up to 3,5 kW cont.; 73 A
> Input voltage: 24 V up to 54 V (VDA320 compl.)
> Output voltage: 6 V up to 16 V
> Protection class: IP6k9k
> Functional safety: ASIL B, up to ASIL C possible

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

48 V DC/DC CONVERTER FOR EHC (AIR AND WATERCOOLED)

DC/DC converter as electrical heated catalyst controller (eHCC) for mild hybrid solutions.

Facts & Benefits
> Optimized buck converter for electrical heated catalyst (EHC)
> Cooling option water and air
> Scalable power with same mechanical outlines
> Cyber security and OBD compliance

Technical Information
> DC/DC power: 3.5-7 kW for diesel and gasoline
> Nominal input voltage: 36 V – 54 V
> Nominal output voltage: 6 V – 48 V
> Ambient temperature (air cooling): -40 °C up to 85 °C
> Ambient temperature (liquid cooling): -40 °C up to 125 °C
> Functional safety: up to ASIL-D

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

48 V E-MOTOR

Compact electric machine for small to medium sized electric and hybrid 2/3 wheelers.

Facts & Benefits
> Very high power density permanent magnet motor
> Designed to optimize magnet quantity vs performance
> Low cogging torque
> Maintenance free

Technical Information
> Scalable ouput power 3 to 7 kW
> Scalable ouput torque up to 27 Nm peak
> Max speed 7500 rpm
> Protection class IP67
> Weight up to 8.5 kg

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

48 V TRANSMISSION INTEGRATED MOTOR

48 V transmission-integrated oil-cooled motor including transmission-attached water-cooled power electronics.

Facts & Benefits
> Compact inverter design, high power density
> Allows advanced CO_2 benefits, significant traction assistance and pure electric driving
> No service required

Technical Information
> Peak torque: 55 Nm
> Peak power: 18 kW in generator mode
> Weight: ≤ 10 kg
> Ambient temperature: -40 °C up to 120 °C
> Dim (w/o inverter, w/o pulley): length 160 mm / diameter 150 mm
> Protection class: IP6k9k (inverter)

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

ACTIVE PURGE PUMP

Supports active regeneration of the active carbon canister by flowing evaporated hydro-carbon gases into the intake manifold.

Facts & Benefits
> System integration capability for OEM's
> HC purging is independent from manifold vacuum
> OBD monitoring for HC evaporative leak detection
> ”Hose Off“ detection for emissions compliance
> Architecture enables smooth refueling event

Technical Information
> Radial pump with integrated electronics
> Purge flow: 60 slpm @ 8 kPa @ 9.8 V, RT, dry air
> Operating temp.: -40 °C up to 120 °C
> Pressure sensing option
> Brushless DC motor: ~30 W
> Motor speed: 60.000 rpm max

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

CONTROL UNIT - INTEGRATED - STARTER GENERATOR

For up to 150cc engine displacement in scooters and small motorcycles applications.

Facts & Benefits
> Replace conventional starter system and voltage regulator
> Faster & smoother start, less noise, reduced weight & size
> High reliable solution for start & stop function
> Built-in start & stop logic and Inputs/Outputs
> Configurable Inputs / Outputs for alternative functions

Technical Information
> Standalone Electronic Control Unit
> Drive up to 100 A starting and 60 Amp generating current
> Dual core 32 bit microcontroller @ 80 MHz, 512 KB Flash
> IP66 and IP6K9K (high pressure cleaning)
> Operating temperature range -30 °C up to 85 °C
> Size (L x H x W) 118 x 48 x 148 mm

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

EMICAT® – ELECTRICALLY HEATED CATALYST

Electrically heated catalyst (EMICAT®) with integrated highly effective support catalyst. Applicable for passenger cars and LCV.

Facts & Benefits

> Rapid catalyst light off temperature
> Reduced catalyst cooling during no-load phases
> Potential for precious metal reduction
> Additional energy added to the exhaust improves vaporization of liquids

Technical Information

> Application as three-way catalyst for gasoline engines as well as DOC, NOx-adsorber and SCR catalyst for diesel engines
> Operation voltage: 12 V - 24 V - 48 V
> Maximum current: 300 A
> Diameter: 115 - 342 mm

PROPULSION TYPES

BEV | PHEV | MHEV | Gasoline | Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

THERMAL MANAGEMENT

Smart thermal management significantly extends the driving range of an EV or HEV by maximizing the use of battery energy for real driving. By careful re-use of heat energy in the car for air conditioning of the vehicle interior, thermal management conserves battery energy for extending vehicle driving range, and its benefits are especially significant at hot and cold temperature extremes.

Vitesco Technologies' thermal management solutions cover a full-system scope, from control strategies to intelligent components such as electric coolant pumps, multi-port valves, and sensors. We manage both temperature extremes by flexible distribution of heat generated by powertrain components during operation. By allowing all components to operate at their optimal temperatures, our thermal management solutions reduce charging times and prolong battery life.

BATTERY SAFETY MONITORING

Direct measurement of pressure in Battery case.

Facts & Benefits

> Detects pressure rise due to battery cell venting
> Designed for systems that comply with EVS-GTR (EV safety regulation)
> Suitable ASIL rating according ISO26262
> Fulfills toughest EMC requirements
> Flexible housing, connector and mounting design

Technical Information

> Pressure range: 10 kPa up to 150 or 400 kPa (adjustable)
> Accuracy: 1 % full scale
> Temp. range: -40 °C up to 140 °C
> Supply voltage: 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max
> Output: analog or SENT

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

COOLANT FLOW CONTROL VALVE

Rotary valve is used for shutting off the coolant flow, switching over coolant circuits and regulating the coolant flow.

Facts & Benefits
> Modular/flexible design (up to 5 ports with different flow directions)
> Full movement range, high speed
> Smart (integrated electronics)

Technical Information
> Temp. range environment: -40 °C up to 125 °C
> Temp. range fluid: -40 °C up to 135 °C
> Movement speed: < 2 s over 180° @ 13.5 V and RT
> Tube inner diameter: 16 mm
> Communication interface: LIN

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

COOLANT FLOW SENSOR

Differential pressure measurement used for coolant flow rate in battery systems. Design has two pressure ports and calculates the delta pressure.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High Accuracy and temperature stability

Technical Information
> Pressure range: -10 kPa to 30 kPa (Differential)
> Operating temp.: -40 °C up to 125 °C
> Supply voltage: 5 V ± 0.25 V
> Accuracy over full-scale: 1.5 % full span (10 °C up to 85 °C)
> Response Time < 1 ms

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

ELECTRIC WATER PUMP - 3

Modular and scalable coolant pumps for highly efficient thermal management in combustion and electrified vehicles.

Facts & Benefits
> Centrifugal Pump based on a modular and scalable design concept to ensure high total efficiency
> BLDC motor with sensorless field oriented commutation

Technical Information
> Volume flow: 500 l/h to 3.800 l/h
> Differential Pressure: 200 hPa up to 2.000 hPa
> Electrical Power: 40 W up to max. 150 W
> Coolant temp.: -40 °C up to 125 °C (depending on electrical power)
> Ambient temp.: -40 °C up to 125 °C (depending on electrical power)
> Dimensions: Ø - 82 mm, Length - 89 mm (without connector and coupling)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

PRESSURE SENSOR - AIR CONDITIONING

Direct measurement of line pressure in air conditioning systems.

Facts & Benefits
> Robust sensing technology compatible with typical exhaust environment
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability

Technical Information
> Flexible calibration of transfer functions
> Pressure range: Typical 35 bar high side & 10 bar low side
> Accuracy: 1 % full scale
> Temp. range: -40 °C up to 140 °C
> Supply voltage: 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max
> Output: P Analog, P LIN, P+T LIN

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

SMART FLUID ACTUATOR (ELECTRICAL OIL PUMP)

The Smart Fluid Actuator can be used as electrical oil pump for thermal management and lubrification in IC, HEV and BEV systems. The pump is available as smart and non smart version.

Facts & Benefits
> Modular BLDC motor concept fitting broad range of power classes
> Modular pump sizing fitting different working points
> Optimized Design for Cold start
> Bolt on design / externally mounted

Technical Information
> Hydraulic: Gerotor, Dual Stroke Vane Pump, External Gear, Screw Pump
> Electrical power: 50 - 600 W
> Hydraulic power: 15 - 300 W
> Displacement: 1 - 4.5 cm³ / rev insert space: 1 - 4.5 cm³ / rev

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

SMART POSITION SENSOR COVER

Smart Position Sensor used for controlling Electrical Actuators (Thermal Management, Parklock,...).

Facts & Benefits
> Inductive position sensor with ASIC
> Immune to low frequency magnetic fields (metal target, no magnet)
> H-bridge driver for DC motor (ASIC)
> Micro controller for position control

Technical Information
> Sensor measuring range: up to 360°
> Sensor accuracy: ± 1 %, no hysteresis
> End of shaft or off axis sensor configuration
> H bridge driver with 4 Amp current capability
> 16 bit MCU with embedded PID control
> Operating temp.: up to 140 °C

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

TEMPERATURE SENSOR - COOLANT

Temperature measurement used in oil and coolant circuits.

Facts & Benefits
> Clip or screw-in design
> Wide range of applications
> High accuracy
> Short response time
> Long-term stability

Technical Information
> Engine coolant: -40 °C up to 140 °C
> Accuracy: ± 0.45 °C @ 50 °C (Plug in design)
> Response time: ~3.5 s (Plug in design)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

THERMAL MANAGEMENT MODULE

Smart Thermal Management in a single product. A cost effective way to safe space and complexity.

Facts & Benefits
> Scalable and modular integration of coolant components
> Optional combination of refrigerant components in a single unit
> developed and produced inhouse
> Global footprint to support local production and supply chain

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

FUEL CELL

There are two viable ways to supply an electric motor with electric energy: One can use a battery as a storage device, or one can utilize a fuel cell as an energy converter. In the near future, fuel cells are likely to remain the exception in passenger cars. In this domain the battery can make the most of its advantages. Things look different with commercial vehicles, though: As a sufficiently large truck battery would be uneconomically expensive and heavy – plus requiring long charging times – the fuel cell does indeed offer potential for transport logistics. Many products and systems for battery electric vehicles and fuel cell cars – in particular the electric drive – are very similar so that they can easily support both technologies. As an example, an electric axle drive can be used in a fuel cell car in just the same way. Other components from the Vitesco Technologies portfolio include, e.g., sensors, actuators, water pumps, electronics (such as control units) and thermal management solutions. Without entering into the development and manufacturing of energy storage or conversion (i.e., battery or fuel cell), Vitesco Technologies will therefore primarily support the fuel cell development in the truck application area at first.

H2 SENSOR ANODE

Sensor measure H2 concentration at Fuel Cell anode path. Support system diagnosis (closed control loop).

Facts & Benefits
> Real time high accuracy measurement
> long time reliability

Technical Information
> Measuring principle: thermal conductivity
> Output signals: H2 concentration
> Supply voltage: 12 V
> Data link: CAN ISO11898 (CAN FD tolerant)
> Operating temp.: -40 °C up to +85 °C
> H2-accuracy: ± 1.5 Vol % H2
> Housing material: PPS

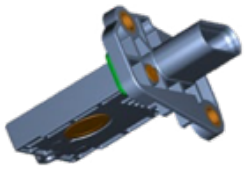
PROPULSION TYPES

BEV | PHEV | MHEV | Gasoline | Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

H2 SENSOR EXHAUST



Sensor measure H2 concentration in Fuel Cell exhaust path. Support system diagnosis (closed control loop).

Facts & Benefits
> Real time high accuracy measurement
> long time reliability

Technical Information
> Measuring principle: thermal conductivity
> Output signals: H2 concentration
> Supply voltage: 12 V
> Data link: CAN ISO11898 (CAN FD tolerant)
> Operating temp.: -40 °C up to +85 °C
> H2-accuracy: ± 0.5 Vol % H2
> Housing material: PPS
> Safety requirements: ASIL B per ISO26262

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

H2 SENSOR LEAKAGE

Sensor detect hydrogen leakage at a certain threshold.

Facts & Benefits
> Real time high accuracy measurement
> long time reliability
> Adress legal requirement ECE-Trans-180a13e

Technical Information
> Measuring principle: thermal conductivity
> Output signals: H2 concentration
> Supply voltage: 12 V
> Data link: CAN ISO11898 (CAN FD tolerant)
> Operating temp.: -40 °C up to +85 °C
> H2-accuracy: ± 0.3 Vol % H2
> Housing material: PBT-GF30
> Safety requirements: ASIL B per ISO26262

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

STACK BYPASS VALVE (SBPV)

The SBPV can be used as a backpressure valve - continuous valve positioning enables continuous stack pressure control and as a bypass valve. Multiple use cases such as humidifier bypass or wastegate valve.

Facts & Benefits

> Various throttle plate diameters available
> Continuous valve positioning
> Default position: closed or open
> Multiple functions possible: backpressure, wastegate, bypass valve
> Compact design

Technical Information

> Housing: double flat, 3 or 4 bolt holes, different interface connections
> Throttle plate Ø: various diameters 35 mm / 52 mm (others available)
> Position sensor: analog or SENT signal output
> Temperature load: -40 °C to 140 °C
> Response time @ 14 V: ≤ 120 ms @ all temperatures
> Current less return time: ≤ 400 ms @ RT, 140 °C (< 800 ms @ -40 °C)
> Int. leakage: ≤ 1.5 kg/h (Ø 35 mm, closed position, RT, dp = 600 hPa)
> Weight: 525 g (Ø 35 mm)

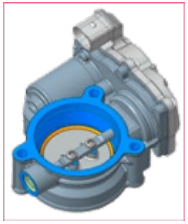
PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

STACK CONTROL VALVE (SCV) „SCV 1.4“



Use cases of the SCV 1.4
- Stack isolation valve – very low leakage prevents air intrusion within the fuel cell stack
- Stack isolation valve and backpressure valve – continuous valve positioning allows fine pressure control within the fuel cell stack

Facts & Benefits

> Very tight sealing function in closed throttle plate position
> Continuous valve positioning
> Two functions in one possible: stack isolation and backpressure valve
> Default position: closed

Technical Information

> Int. leakage: 0.0005 l/min (closed position, RT, dp = 60 kPa)
> Throttle plate Ø: 49 mm
> Position sensor: analog or SENT signal output
> Temperature load: -40 °C to 120 °C
> Response time @ 14 V: ≤ 120 ms @ all temperatures
> Current less Return: ≤ 400 ms @ RT, 140 °C (< 800 ms @ -40 °C)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

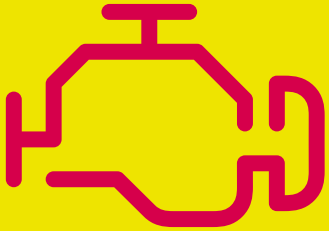
02

COMBUSTION

COMBUSTION

Further ICE efficiency and emission improvements are still necessary to meet ever more stringent legislative requirements. Vitesco Technologies' engine management solutions increase engine thermal efficiency, while our electrically heated catalyst and accompanying catalyst controller greatly reduce pollutant emissions through smart exhaust after treatment.

Between improvements of the ICE, innovative exhaust after treatment solutions, and various degrees of electrification, Vitesco Technologies offers a wide range of solutions for car makers in their journey to sustainable mobility.



ELECTRIFICATION
COMBUSTION
BEYOND POWERTRAIN
TRANSMISSION
COMBUSTION & EX. AFTER-TREATMENT
FLUID & EVAPORATION MANAGEMENT
AIR MANAGEMENT
ELECTRONIC CONTROLS

ELECTRONIC CONTROL

A special expertise in system development, software and electronics has made Vitesco Technologies a global leader in engine and transmission control units. Our modular portfolio of micro controllers, application-specific integrated circuits (ASICs), circuit blocks, and software library enable a short time-to-market and to harvest scale effects while ensuring the highest quality level.

Working closely with car makers, we have leveraged our electronics and software DNA to create a family of Master Controllers for domain and cross-domain E/E architectures. Our PowerSAR (an efficiency-optimized software technology based on AUTOSAR) platform software provides a flexible software integration framework for high performance Master Controllers which host the higher-level control algorithms for hybrid powertrain management.

DRIVETRAIN ACTUATOR MODULE - CLUTCH CONTROL

The newly developed Drivetrain Actuator Module (DAM) for dry 7-speed double clutch transmissions allows easy integration and modularity. Its compact size and high robustness against vibration and temperature allows it to be attached directly onto the gearbox.

Facts & Benefits
> Actuator module with TCU functionality (transmission controller)
> 2x integrated BLDC motors
> Sensors: 2x rotor position, 2x current, 2x temperature
> Vitesco Technologies B6 driver ASICs for BLDC motor control
> Maturity: in production

Technical Information
> Rated motor shaft torque: 0.9 Nm
> Microprocessor: 32-bit microcontroller TC275
> Operating temperature: -40 °C to +125 °C
> Protection Class: IP6K9K

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

DRIVETRAIN CONTROL UNIT - DRIVELINE - STANDALONE

Versatile DCU suitable for different driveline control and supply applications like shifting mechanisms, clutch / axle-disconnect systems.

Facts & Benefits

> Compact and cost effective packaging concept for in-cabin mounting
> Addresses wide range of 4x4 driveline control applications
> Configurable for brushless and brushed DC motor, solenoid valve or electromagnetic actuator control

Technical Information

> Suitable for -40 °C to +85 °C applications
> Infineon TRAVEO / AURIX Gen 2 microcontroller and in-house developed integrated circuit components
> Up to 2x CAN communication lines
> Functional Safety level up to ASIL-C

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

DRIVETRAIN CONTROL UNIT - TRANSMISSION - ATTACHED CV

High robustness commercial vehicle DCU suitable for heavy-duty automated manual transmissions as well medium-duty double-clutch transmission applications.

Facts & Benefits

> Directly attached to the gearbox housing for simplified packaging
> Pass-through connector system for higher robustness
> Long service life with Over-the-air updates

Technical Information

> Suitable for -40 °C to +125 °C applications
> Compatible with both 12 V and 24 V application (max input voltage of 35 V)
> Infineon AURIX Gen. 2 microcontroller and in-house developed integrated circuit components
> Up to 20x solenoid valve control outputs
> Up to 4x CAN FD communication lines
> Functional Safety level up to ASIL-D

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

DRIVETRAIN CONTROL UNIT - TRANSMISSION - ATTACHED PV

Light and compact DCU for automatic gearbox control. Can be directly attached to the gearbox housing or other drivetrain components due to its robust design.

Facts & Benefits

> Compact and light-weight packaging
> Robust design allowing for flexibility with regards to the mounting location
> Scalable architecture with regards to input and output count
> Suitable for step, double-clutch, continuous variable automatic transmissions

Technical Information

> Suitable for -40 °C to +125 °C applications
> Infineon AURIX Gen. 2 microcontroller and in-house developed integrated circuit components
> Up to 12x solenoid valve control outputs
> Functional Safety level up to ASIL-D

PROPULSION TYPES

BEV, PHEV, MHEV (48V), Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

DRIVETRAIN CONTROL UNIT - TRANSMISSION - STANDALONE

Stand-alone DCU for engine compartment, passenger/trunk compartment or chassis mounting location. Suitable for automatic gearbox control for conventional and electrified powertrains.

Facts & Benefits

> Cost effective packaging concept
> Flexible mounting position in engine, passenger compartment or chassis
> Robust design with aluminium housing
> Off-the-shelf availability

Technical Information

> Suitable for -40 °C to +105 °C applications
> Infineon AURIX Gen. 2 microcontroller and in-house developed integrated circuit components
> Up to 12x solenoid valve control outputs
> Functional Safety level up to ASIL-D
> IP6K9K ingress protection class

PROPULSION TYPES

BEV, PHEV, MHEV (48V), Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

DRIVETRAIN CONTROL UNIT - TRANSMISSION - INTEGRATED

Latest generation of Integrated DCU with Comprehensive Over-molding Technology for automatic gearbox control. Compact design with high level of robustness for harsh automotive applications.

Facts & Benefits

> Up to 50 % less manufacturing process steps
> Up to 50 % less individual components and materials
> Significant size reduction in both out-of-plane and in-plane direction
> Significant weight reduction of more than 30 %
> High robustness with twofold (2x) increase of solder joint reliability

Technical Information

> Suitable for -40 °C to +150 °C applications
> Standard FR-4 PCB material with packaged electronic components
> Direct PCB to solenoid valve and electric motor contact points
> Infineon AURIX Gen. 2 microcontroller and in-house developed integrated circuit components
> Up to 12x solenoid valve control
> Up to 2x brushless DC motor control

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

ENGINE CONTROL UNIT - AIR MODULE

For single cylinder, 4 stroke engines from 50 cc up to 250 cc in light motorcycles and scooters.

Facts & Benefits

> ECU with integrated throttle body, sensors and actuator
> Uses Vitesco Technologies automotive electronics and technologies
> Very compact size and easy mounting
> Several configurations: engine mounting interface, throttle size, cable interface
> Throttle body size from ø 16 up to 34 mm
> Integrated 3-axis accelerometer (Tilt sensor)

Technical Information

> Single pocket 26 / 34 pins connector (equivalent to a 35 / 43 pins standalone ECU)
> IPX6 and IPX9K (high pressure cleaning)
> Operating temperature range: -30 °C up to +85 °C
> 32 bit microcontroller, 32 MHz, 768 Kb Flash
> CAN interface
> EURO5 OBDII stage 2 compliant

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

ENGINE CONTROL UNIT - AIR MODULE - ELECTRONIC GOVERNOR

For 1-2 cylinder, 4 stroke engines, Power Equipment applications including riding lawn mowers, generators, and general purpose engines.

Facts & Benefits

> ECU with integrated throttle body and sensors
> Electronic Governor applications
> Very compact size. Easy mounting
> Throttle body size: Ø 26 up to 36 mm
> Versatile configuration: engine mounting interface, canister purge

Technical Information

> Throttle Position Sensor (TPS), Temperature Manifold Air Pressure (TMAP) integrated
> 32 bit mitrocontroller, 32 MHz
> 768 KB Flash, 64 KB RAM
> IP66 and IP6K9K (high pressure cleaning)
> Operating temperature range: -30 °C up to 85 °C

PROPULSION TYPES

BEV · PHEV · MHEV · Gasoline · Diesel

VEHICLE TYPES

Passenger Car · Commercial Vehicle & Off-Highway · 2-Wheeler & Powersports

ENGINE CONTROL UNIT - AIR MODULE - RIDE BY WIRE

For single cylinder, 4 stroke engines from 250 cc up to 500 cc for middle range motorcycles, scooters, ATV.

Facts & Benefits

> ECU with integrated electronic throttle control and sensors
> Electronic Throttle Control (ETC)
> Uses Vitesco Technologies automotive electronics and technologies
> Very compact size and easy mounting
> Several configurations: engine mounting interface, throttle diameters
> Throttle body size from ø 38 up to 46 mm

Technical Information

> Single pocket 36 pins connector (equivalent to a 47 pins standalone ECU)
> IPX6 and IPX9K (high pressure cleaning)
> Operating temperature range: -30 °C up to 85 °C
> 32 bit microcontroller, 80 MHz, 1.5 Mb Flash Memory
> CAN interface
> EURO5 OBDII stage 2 compliant
> Separate safety monitoring unit for ETC system (ISO-26262 compliant)

PROPULSION TYPES

BEV · PHEV · MHEV · Gasoline · Diesel

VEHICLE TYPES

Passenger Car · Commercial Vehicle & Off-Highway · 2-Wheeler & Powersports

ENGINE CONTROL UNIT - COMMERCIAL VEHICLE

Scalable, modular electronic platform for diesel or gas solenoid medium and heavy duty engines with or without integrated aftertreatment functions.

Facts & Benefits
> Standardized, scalable and modular electronics
> Up to on-engine mounted with dampers
> 12 / 24 V universal voltage

Technical Information
> Core: Multicore TC297
> Flash size: 8 MB
> Interfaces: Controller Area Network (CAN), CAN FD, LIN
> Injector drivers: up to 6 cylinders, 3 banks
> Driver outputs: 59 + 3 H-bridges
> Tightness: IP6K9K
> Connector pins: 248

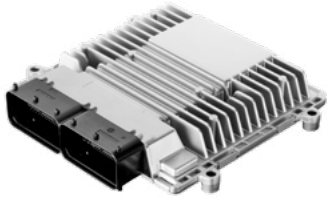
PROPULSION TYPES

BEV, PHEV, MHEV (48V), Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

ENGINE CONTROL UNIT - INTEGRATED DRIVETRAIN CONTROL UNIT



Scalable, modular, validated electronic and software platform with standardized chipset for various engines.

Facts & Benefits
> Combined control unit for gasoline solenoid direct injection (SDI) and drivetrain control
> FF 8AT automatic drivetrain control with 6AT and Continously Variable Transmission (CVT) functional capability
> Supports Euro 6 / Euro 7 / SULEV30

Technical Information
> Core: Tricore architecture with 2 microcontroller (1xEMS, 1xTMS - Engine & Transmission Managment System)
> Flash size: EMS 4 MB; TMS 4 MB
> Interfaces: CAN, CAN FD, LIN
> Injector drivers: 4 SDI + 4 Multi Point Injection
> Driver outputs: 48 + up to 6 H-bridges + 8 linear solenoids
> Tightness: IP69K
> Connector pins: 238

PROPULSION TYPES

BEV, PHEV, MHEV (48V), Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

ENGINE CONTROL UNIT - PORT FUEL INJECTION (PFI)

Scalable, modular, validated electronic and SW platform with standardized chipset for various Port Fuel Injection (PFI) engines.

Facts & Benefits
> One flexible design for all Euro6 PFI engines
> 3/4 cyl engine feed with gasoline, flex-fuel (ethanol), Gasoline Petrol Liquid (GPL)
> Chassis mounted, engine bay

Technical Information
> Core: Tricore multicore architecture
> Flash size: 4 MB up to 10 MB
> Interfaces: Controller Area Network (CAN), CAN-WakeUP, Local Interconnect Network (LIN), Single Edge Nibble Transmission (SENT)
> Injector drivers: 4 PFI, CNG, E100
> Driver outputs: 38, 3 H-bridges
> Tightness: IP6K9K
> Connector pins: 160

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

ENGINE CONTROL UNIT - SOLENOID DIRECT INJECTION (SDI)

Scalable, modular and validated electronic and SW platform with standardized chipset for various Solenoid Direct Injection (SDI) engines.

Facts & Benefits
> For customized gasoline SDI direct injection systems; Supports Euro 7
> ECU with multiple options: variable valve lift control, lambda control local interconnect network (LIN)/ Schnittstelle für Binäre Lambdasonde (BIN), turbocharger

Technical Information
> Core: Tricore and Power PC multicore architecture
> Flash size: 4 MB up to 16 MB
> Interfaces: Controller Area Network (CAN FD), Local Interconnect Network (LIN), FlexRay, Single Edge Nibble Transmission (SENT)
> Injector drivers: 3 up to 6 SDI / Port Fuel Injection (PFI)
> Driver outputs: high- / low-side, up to 6 H-bridges
> Connector pins: scalable up to 336
> Housing: aluminium-die-cast / aluminium-sheet-metal
> ISO 26262, PowerSAR®, AUTOSAR 4.3.x / 20-11

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

ENGINE CONTROL UNIT - STANDALONE - RIDE BY WIRE

For 1 up to 4 cylinder, 2 and 4 stroke engines up to 16,000 rpm in medium & high-end motorcycles, scooters, ATV & Off-road.

Facts & Benefits
> Control up to 2 electric throttle body OR mechanical throttle body and stepper
> Control up to 2 injectors per cylinder
> Knock control (option)
> Binary / Linear O2-sensor management (option)
> Euro 5 with OBD-II compliance - ISO26262
> Small and compact design

Technical Information
> 32 bit microcontroller family
> 1.5 MB to 2 MB Flash Memory
> IP67 and IP6K9K (high pressure cleaning)
> Single pocket (64 or 120 pins connector)
> Operating temperature range: -40 °C up to 85 °C
> SAE J1939 CAN Interface

PROPULSION TYPES

BEV PHEV MHEV **Gasoline** **Diesel**

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | **2-Wheeler & Powersports**

EXHAUST GAS AFTERTREATMENT - CONTROL MODULE

Controller for exhaust aftertreatment systems (selective catalytic reduction, diesel particulate filter).

Facts & Benefits
> 12 V / 24 V universal voltage
> Supports Controller Area Network (CAN) based sensors (e.g. NOx, urea quality)
> Chassis mounted

Technical Information
> Core: Andorra
> Flash size: 4 MB
> Interfaces: 3 CAN
> Injector drivers: 3 urea or Hydrocarbons dosing
> Driver outputs: 4 high-side + 19 low-side
> Tightness: IP5K6K
> Connector pins: 62

PROPULSION TYPES

BEV PHEV **MHEV** Gasoline **Diesel**

VEHICLE TYPES

Passenger Car | **Commercial Vehicle & Off-Highway** | 2-Wheeler & Powersports

EXHAUST GAS AFTERTREATMENT - DOSING CONTROL UNIT

Standardized, validated electronic and software platform for NOx aftertreatment control of passenger vehicles.

Facts & Benefits
> Proven mechanical and electronic concepts (driver, ASICs etc.)
> One or two chambers connector approach enables optimized wiring harness
> Direct connection to ECU and pump module
> 12 V application

Technical Information
> Core: TC233
> Flash size: 1.5 - 2 MB
> Interfaces: Communication Area Network (CAN), Single Edge Nibble Transmission (SENT), Pulse Width Modulation (PWM)
> Injector drivers: high- / low-side
> Heater driver: 2 + 1 optional
> Pump driver: Brushless DC electric motor + optional transfer pump

PROPULSION TYPES

BEV PHEV MHEV Gasoline **Diesel**

VEHICLE TYPES

Passenger Car Commercial Vehicle & Off-Highway 2-Wheeler & Powersports

FUEL DELIVERY CONTROLLER

Fuel Delivery Controllers to control electric fuel pumps either electronically commutated or with direct current motors.

Facts & Benefits
> Reduced consumption of electric energy
> Enhanced lifetime
> Reduced vibration and noise level
> installation space optimized
> Flange integrated: CO_2 reduction through Improved electrical efficiency, as well as weight and volume reduction up to - 20 %

Technical Information
> Stand-alone device or integrated in fuel module
> Operating voltage: 6 up to 16 V
> Electrical power: 100 up to 200 W
> Operating temperature: -40 °C up to 85 °C
> Control input / output signal: PWM
> Degree of protection: IP6K7 and IP44

PROPULSION TYPES

BEV PHEV MHEV Gasoline **Diesel**

VEHICLE TYPES

Passenger Car Commercial Vehicle & Off-Highway 2-Wheeler & Powersports

ELECTRIFICATION
COMBUSTION
BEYOND POWERTRAIN
TRANSMISSION
ELECTRONIC CONTROLS
AIR MANAGEMENT
FLUID & EVAPORATION MANAGEMENT
COMBUSTION & EX. AFTER-TREATMENT

TANK DOMAIN CONTROLLER

Central controller to sensors and actuators in tank domain. Tank domain controller controls the fuel delivery module and associated sensors (eg. fuel level sensor, pressure sensor, leakage detection).

Facts & Benefits

> Reduced consumption of electric energy
> Enhanced lifetime
> Reduced vibration and noise level
> Processing of other signals (e. g. fuel level sensor, pressure sensor, leakage detection)
> Integration of software functionality

Technical Information

> Operating Voltage: 6 up to 16 V
> Electrical power: 100 up to 200 W
> Operating temperature: -40 °C up to 85 °C
> Control input / output signal: CAN
> Degree of protection: IP6K7 and IP44

PROPULSION TYPES

BEV, PHEV, MHEV (48V), Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

AIR MANAGEMENT

The air path provides an important lever to further increase the ICE efficiency and to reduce emissions. For air path management, Vitesco Technologies offers a highly efficient turbocharger to facilitate engine downsizing, and a portfolio of actuators and valves which control the intake of air and the dosage of recirculated exhaust gas (EGR).

In tandem with mass air flow and pressure sensors, these products ensure that the air path contributes to the optimal conditions required for a high thermodynamic efficiency and for reducing nitrogen oxide (NO_x) and particle emissions.

AIR CONTROL VALVE 8.6 - PERFORMANCE LINE

Intake air pressure control on diesel combustion engines. Supports EGR & particle filter regeneration.

Facts & Benefits
> Modular capable for 12 V and 24 V systems
> Capable for big throttle plate diameters, high flow
> Capable for turbo- and supercharged applications
> High torque, fast response

Technical Information
> Temp. range: -40 °C up to 150 °C
> Response Time (typ.): 90 ms (13.5 V, RT)
> Pressure range: up to 4 bar peak
> TP Ø range: 57 mm to 100 mm
> Signal output: analog 5 V
> Weight: 1.1 kg (TP Ø 80 mm)

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

AIR CONTROL VALVE 11.1 - ECONOMY LINE

Intake air pressure control on diesel combustion engines. Supports EGR & particle filter regeneration on diesel engines. Full plastic design concept.

Facts & Benefits
> Low cost performance, full functional range
> Low weight, small package
> Capable for turbo applications

Technical Information
> Temp. range: -40 °C up to 140 °C
> Response Time (typ.): < 120 ms (13.5 V, RT)
> Pressure range: up to 4 bar peak
> Leakage (at stop): < 3 kg/h (TP Ø 48 mm, RT, dp = 600 hPa)
> TP Ø range: 40 mm to 57 mm
> Signal output: analog 5 V or digital SENT
> Weight: 570 g (TP Ø 55 mm)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

AIR CONTROL VALVE 12 - MODULAR PERFORMANCE

Intake air flow and pressure control on combustion engines. Supports EGR & particle filter regeneration on diesel applications.

Facts & Benefits
> Modular design concept
> High torque, fast response
> Low weight, very small package
> Low leakage

Technical Information
> Temperature range: -40 °C up to 140 °C / 180 °C for High Temperature
> Response Time (typ.): < 90 to 120 ms (13.5 V, RT)
> Pressure range: up to 4 bar peak
> Leakage (at stop): < 2.5 kg/h (TP Ø 52 mm, RT, dp 600 hPa), < 3.5 kg/h for High Temperature, dp 600 hPa
> TP Ø range: 40 up to 90 mm

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

AIR CONTROL VALVE 13 - ECONOMY LINE

Intake air flow and pressure control on combustion engines. Supports EGR and particle filter regeneration on diesel engine applications and secures smooth engine shut-off.

Facts & Benefits
> Modular design concept
> Lowest weight with hybrid housing, very small package
> Low cost performance, full functional range
> Leakage requirement as aluminum housing

Technical Information
> Temperature range: -40 °C up to 140 °C
> Response Time (typ.): < 90 to 120 ms (13.5 V, RT)
> Pressure range: up to 3 bar peak
> Leakage (at stop): < 2.5 kg/h (TP Ø 44 mm)
> TP Ø range: 40 up to 57 mm
> Weight (TP Ø 52 mm): 438 g

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

BYPASS VALVE

Continuously position controlled Compressor Bypass Valve on charged applications.

Facts & Benefits
> Modular design concept
> High torque, fast response
> Low weight, very small package
> Low leakage

Technical Information
> Temperature range: -40 °C up to 140 °C / 180 °C for High Temperature
> Response Time (typ.): < 90 to 120 ms (13.5 V, RT)
> Pressure range: up to 4 bar peak
> Leakage (at stop): < 2.5 kg/h (TP Ø 52 mm, RT, dp 600 hPa), < 3.5 kg/h for High Temperature, dp 600 hPa
> TP diameter range: 40 up to 95 mm

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

ELECTRICAL COMPRESSOR BYPASS VALVE

Compressor surge prevention and turbocharger lag reduction by opening a bypass for the compressor.

Facts & Benefits
> Electromagnetic on-off solenoid
> Improved performance and size
> No vacuum lines, tank, or vacuum control valve needed
> Mounted directly on turbocharger or air duct
> fast actuation

Technical Information
> Nominal operating voltage: 12 V
> Response time: < 50 ms at 20 °C; 13.5 V
> operation (gas) temperature: -40 °C up to 200 °C; short term: +210 °C
> Ambient temp.: -40 °C up to 160 °C
> Storage temp.: -40 °C up to 200 °C
> Stroke: ≥ 5 mm; Poppet Ø: 26 mm

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

ELECTRONIC THROTTLE CONTROL 11.2 - ECONOMY LINE

Torque / load control on gasoline combustion engines. Supports idle speed, cruise and traction control.

Facts & Benefits
> Low weight, small package
> Low leakage
> Capable for turbo- and supercharged applications

Technical Information
> Temperature range: -40 °C up to 140 °C
> Pressure range: up to 4 bar peak
> Response Time (typ.): < 120 ms (13.5 V, RT)
> Leakage (at stop): < 2.5 kg/h (TP Ø 52 mm, RT, dp 600 hPa)
> TP Ø range: 40 up to 80 mm
> Signal output: analog 5 V or digital SENT
> Weight: 600 g (TP Ø 55 mm)

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

ELECTRONIC THROTTLE CONTROL 12 - MODULAR PERFORMANCE

Torque / load control on gasoline combustion engines. Supports idle speed, cruise and traction control.

Facts & Benefits
> High performance throttle body actuator
> Modular design concept
> Low weight, very small package
> Low leakage, spherical bore optional

Technical Information
> Temp. range: -40 °C up to 140 °C / 180 °C for High Temperature
> Response Time (typ.): < 90 to 120 ms (13.5 V, RT)
> Pressure range: up to 4 bar peak
> Leakage (at stop): < 2.5 kg/h (TP Ø 52 mm, RT, dp 600 hPa), < 3.5 kg/h for High Temperature, dp 600 hPa
> TP diameter range: 40 up to 95 mm

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

ELECTRONIC THROTTLE CONTROL 13 - ECONOMY LINE

Torque / load control on gasoline combustion engines. Supports idle speed, cruise and traction control.

Facts & Benefits
> Modular design concept
> Lowest weight with hybrid housing, very small package
> Low leakage, equal to standard aluminum housing
> Capable for turbo applications

Technical Information
> Temperature range: -40 °C up to 140 °C
> Response Time (typ.): < 90 to 120 ms (13.5 V, RT)
> Pressure range: up to 3 bar peak
> Leakage (at stop): < 2.5 kg/h (TP Ø 44 mm)
> TP Ø range: 40 up to 57 mm
> Weight (TP Ø 52 mm): 438 g

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

ELECTRONIC THROTTLE CONTROL - SINGLE

For single cylinder high end motorcycle, scooter, ATV, snowmobile.

Facts & Benefits
> Contactless redundant magneto resistive sensor
> Core components from automotive ETC
> Air channels designed to customer requirements (shape, diameter)
> Integration of Injector, TMAP & canister purge valve (option)
> Compatible with Vitesco Technologies and other drive by wire ECU

Technical Information
> Minimum idle flow at 40 kPa ΔP: 2 kg / h
> Response time < 100 ms (at 25 °C & supply voltage 13,5 V)
> E-motor nominal supply voltage: 12 V
> Vibration level: 30 g
> Operating temperature range: -40 °C up to 140 °C

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

ELECTRONIC THROTTLE CONTROL - TWIN

For 2 cylinder high end motorcycle, scooter, ATV, snowmobiles.

Facts & Benefits
> Contactless redundant magneto resistive sensor
> Core components from automotive ETC
> Air channels designed to customer requirements (shape, diameter)
> Integration of injector, TMAP and canister purge valve (option)
> Compatible with Vitesco Technologies and other drive by wire ECU

Technical Information
> Airflow balancing between the 2 bores: max 0,2 kg/h at 60 kPa ΔP
> Response time < 100 ms (at 25 °C & supply voltage 13.5 V)
> Single TPS linearity ± 1.5 %
> TPS synchronous tolerance ± 3 %
> TPS hysteresis < 0.1°

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

ELECTRICAL WASTEGATE ACTUATOR

Performing waste-gate adjustment to optimize functional application and reduce fuel consumption.

Facts & Benefits
> Continuous adjustment of external application using rotating output shaft
> Ideal for use in turbocharger applications
> Option: default position
> Permanent feedback signal (contactless)

Technical Information
> Max external load without return function: 92 Ncm
> Max continuous holding torque without return function at 140 °C: 144 Ncm
> Holding torque capability at 140 °C: 420 Ncm
> Response time less than: 100 ms/80 °C 160 °C
> Operation temp.: -40 °C up to 160 °C

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

MASS AIRFLOW SENSOR - FMT MAF+HPT SENT

Measurement of the intake airflow humidity, pressure and temperature for the engine management system.

Facts & Benefits
> High flow measurement accuracy
> Integral protection against water & contamination
> Excellent performance with intake airflow pulsation
> Customer specific output characteristic
> High dynamic range
> SENT V4 interface, 3 pin device
> Options for humidity and pressure sensors

Technical Information
> Sensing technology: Next generation MEMS
> Flow range: 4.5 kg/h up to 900 kg/h (62 mm tube)
> New-part tolerance: 1.5 %

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

MASS AIRFLOW SENSOR - FMT MAF SENT

Measures intake airflow and temperature for the engine management system.

Facts & Benefits
> High flow measurement accuracy
> Integral protection against water & contamination
> Excellent performance with intake airflow pulsation
> Customer specific output characteristic
> High dynamic range
> 3 pin device with SENT V4 interface

Technical Information
> Sensing technology: Next generation MEMS
> Flow range: 4.5 kg/h up to 900 kg/h (62 mm tube)
> New-part tolerance: 1.5 %
> Supply voltage: 5 V ± 0.5 V; Supply current: 5 mA

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

MASS AIRFLOW SENSOR - MT MAF

Measurement of the intake airflow and temperature for the engine management system.

Facts & Benefits
> High flow measurement accuracy & signal stability
> Integral protection against water & contamination
> Excellent performance with intake airflow pulsation
> Customer specific programmable output characteristic

Technical Information
> Sensing technology: hot-film bi-directional MEMS
> Flow range: 5 kg/h up to 800 kg/h (62 mm tube)
> New-part tolerance: 1.5 %
> Supply voltage: 5 V ± 0.5 V
> Supply current: 8 mA max
> Output signal: frequency
> Intake air temperature sensor optional

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

PRESSURE SENSOR - AIR FILTER GAUGE

Relative pressure measurement used to monitor performance of intake air filter pressure measurement. For use in clean air environment.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability
> Fulfills toughest EMC requirements

Technical Information
> Adjustable characteristic via electronic calibration
> Pressure range: -10 kPa up to 10 kPa
> Operating temp.: -40 °C up to 125 °C
> Supply voltage: 5 V ± 0.25 V
> Output signal: Analog or SENT
> Transfer function: linear, ratiometric (analog version)

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

PRESSURE SENSOR - CRANKCASE GAUGE

Relative pressure measurement used to monitor performance of positive crankcase ventilation system thru pressure measurement in fresh air tube. Design can snap fit to plastic tube.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability

Technical Information
> Adjustable characteristic via electronic calibration
> Pressure range: -10 kPa up to 10 kPa
> Operating temp.: -40 °C up to 125 °C
> Supply voltage: 5 V ± 0.25 V
> Output signal: Analog or SENT
> Transfer function: linear, ratiometric (analog version)
> Accuracy over full-scale: 3 % full span (10 °C up to 85 °C)

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

PRESSURE SENSOR - MANIFOLD ABSOLUTE

Direct measurement of pressure in manifold.

Facts & Benefits
> Flexible calibration of transfer functions
> High accuracy and temperature stability
> Low cost design and high quality
> Fulfills toughest EMC requirements
> Flexible housing, connector and mounting design

Technical Information
> Pressure range: 40 kPa up to 120 kPa (for BAP)
> Pressure range: 7 kPa up to 500 kPa (for MAP and Turbo MAP)
> Accuracy: 1 % full scale (10 °C up to 85 °C)
> Temp. range: -40 °C up to 140 °C
> Output signal: Analog or SENT

PROPULSION TYPES
BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES
Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

PRESSURE SENSOR - MANIFOLD ABSOLUTE WITH TEMPERATURE SENSOR

Small and robust Pressure Sensor with integrated temperature sensing for manifolds.

Facts & Benefits
> Flexible calibration of transfer functions
> High accuracy and temperature stability
> Low cost design and high quality
> Fulfills toughest EMC requirements
> Flexible housing, connector and mounting design

Technical Information
> Pressure range: 40 kPa up to 120 kPa (for TBAP)
> Pressure range: 7 kPa up to 500 kPa (for TMAP and Turbo TMAP)
> Accuracy: 1 % full scale (10 °C up to 85 °C)
> Temp. range: -40 °C up to 140 °C
> Output signal: Analog or SENT

PROPULSION TYPES
BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES
Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

PRESSURE SENSOR - MANIFOLD GAUGE

Relative measurement of pressure or vacuum in the intake manifold.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability
> Fulfills toughest EMC requirements

Technical Information
> Pressure range: -105 kPa up to 40 kPa (gauge)
> Accuracy: 1 % full scale (10 °C up to 85 °C)
> Temp. range: -40 °C up to 125 °C
> Supply voltage: 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max
> Load resistance: > 4.7 kΩ

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

VARIABLE TURBINE GEOMETRY ACTUATOR

Best performance for VTG adjustment to optimize functional application and reduce fuel consumption.

Facts & Benefits
> Continuous adjustment of external application using rotating output shaft
> Ideal for use in VTG applications
> Permanent feedback signal (contactless)
> Options: default position, integrated electronic

Technical Information
> Max external load without return function: 40 Ncm
> Max continuous holding torque without return function at 140 °C: 65 Ncm
> Response time less than: 150 ms at 120 °C
> Operation temp.: -40 °C up to 160 °C

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

FLUID & EVAPORATION MANAGEMENT

Considering the increasingly stringent emissions legislations worldwide, pollutant sources such as re-fueling and evaporation emissions are gaining importance. Vitesco Technologies has a true expert's long-standing system knowledge in this field, with the modules, pumps, and valves, which effectively minimize this source of emissions.

CANISTER PURGE SOLENOID

The Canister Purge Solenoid controls hydrocarbon vapors from the canister to the intake manifold.

Facts & Benefits
> Higher flow than competitive valves
> Linear flow curve & fast response
> Sonic nozzle flow control
> Integrated particle trap to control contamination

Technical Information
> Flow at > 30 kPa – 110 SLPM (2.3 g/s, 7.9 kg/h)
> Operating voltage: 9 V - 16 V (13.5 V optimal)
> Coil resistance : 21Ω
> OBD leakage (6.7 kPa vacuum on port): < 3.0 SCCM
> Operating temp.: -25 °C up to 125 °C

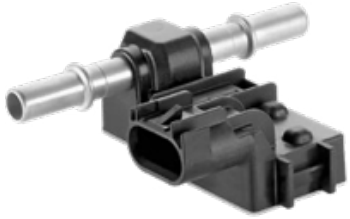
PROPULSION TYPES

BEV | PHEV | MHEV | Gasoline | Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

FLUID SENSOR - FLEX FUEL ETHANOL



Detects ethanol concentration in gasoline / ethanol fuel mixture.

Facts & Benefits
> Highly accurate prediction of ethanol concentration
> Enables ethanol detection before inject./combustion
> Outputs ethanol concentration and fuel temperature within 250 ms after start-up
> Self diagnostic capability
> Calibrations available for worldwide market

Technical Information
> Measurement principle: capacitive (0-100 % ethanol content)
> Accuracy: ± 5 % ethanol concentration
> Pressure range: < 10 bar (145 psi)
> Fuel temp. range: -40 °C up to 80 °C
> Environmental temp.: -40 °C up to 140 °C

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

FLUID SENSOR - OIL LEVEL ELECTROTHERMIC

Sensor monitors correct engine oil level to avoid overfill or underfill during driving or at key-on.

Facts & Benefits
> Overfill and low level indication
> Absolute measurement of oil level in static and dynamic conditions
> Replacement of oil dipstick
> Different mounting positions
> Temperature measurement optional

Technical Information
> Measuring principle: thermo resistive heated wire
> Measuring range: 100 mm between min & max
> Accuracy approx.: ± 3 mm
> First measurement: available 0.6 s after key-on
> Measuring interval: > 10 s
> Operating temp.: -40 °C up to 160 °C

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

FLUID SENSOR - OIL LEVEL ULTRASONIC

Oil level measurement providing early warning of oil loss/fuel in oil or overfilling.

Facts & Benefits
> CO_2 reduction enabler via accurate oil level measurement allowing a reduction in the total amount of engine oil which in turn needs less engine heat up time from cold starts.
> Replacement of oil dipstick
> Detection of low level & overfill
> Absolute measurement of oil level in static and dynamic conditions

Technical Information
> Measuring principle: ultrasonic echo
> Measuring range: 18 mm up to 150 mm
> Level accuracy: ± 2 mm
> Power supply: 12 V / 10 mA typical
> Protection class: IP X9K

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

FLUID SENSOR - UREA CONCENTRATION AND LEVEL

Sensor supports to fulfill emission legislation and Onboard Diagnose (OBD) requirements for SCR systems.

Facts & Benefits
> Fast and accurate measurement of urea concentration (AdBlue®/ DEF) in the SCR System
> Additional measurement of urea level and temperature
> Flexible mounting positions (In-tank, In-extraction unit, In-heater)

Technical Information
> Measuring principle: Ultrasonic
> Output signal: CAN, SENT
> Measuring range: concentration: 0 % - 50 % (urea mass) above freezing point
> Measuring range: level: 20 mm - 500 mm
> Measuring interval: 1s

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

FUEL DELIVERY MODULES FOR DIFFERENT APPLICATIONS: FROM ENTRY LEVEL VEHICLES UP TO HIGH-END APPLICATIONS

In-tank Fuel Delivery Modules for diesel and gasoline engines with the opportunity to integrate various functions. It delivers pressurized fuel to the engine.

Facts & Benefits

> Very cost-effective: Module with high flange integration and serviceable elements for entry level vehicles, two-wheelers and recreational vehicles
> Configuration available for high performance requirements: With dual fuel pumps, level sensors und multiple jet-pumps
> Electronics Controller can be integrated to ensure maximum electrical efficiency, as well as weight and volume reduction (CO_2 reduction)

Technical Information

> Hydraulic performance: Up to 280 l/h at 6.5 bar
> Up to >40 % system efficiency and controllable to 0 l/h flow
> Brushless EC pumps or brushed-type DC pumps
> Optional integration: Fuel level sensor, filter, pressure regulator, electronic controller, vent valves and tank leakage detection sensor

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

FUEL LEVEL SENSORS WITH OPEN & SEALED CONTACT SYSTEMS

Fuel level sensors with either open contact systems, or fully capsulated sensor element.
Picture: MAPPS® Sensor Element (left) Modular Tank Sensor (right)

Facts & Benefits

> Open: Redundant contacts and various materials for different technical requirements and market specific fuel compositions
> Sealed (MAPPS®): Assure robust protection against corrosion, increased lifetime (>10 million cycles) because of a lowest-wear measurement system; unique hermetically sealed housing (gas tight)

Technical Information

> Measuring range: Up to 100°
> Operating current: Up to 20 mA
> Max. resistor tolerance: ±1 %
> Operating temperature: -40 °C up to 80 °C

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

FUEL PRESSURE REGULATOR

Calibrated pressure regulator for Diesel and Gasoline applications. It is responsible for regulating the pressure of the fuel flowing through the system.

Facts & Benefits
> Media compatibility up to E100
> High particle robustness
> Plastic cover flexible for all kind of applications

Technical Information
> Flow Range: up to 250 l/h
> Pressure Range: < 800 kPA
> Leakage in air @ 80 % of p nominal: < 10 cm³/min
> Burst pressure: > 55 bar

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

FUEL PUMPS WITH DIRECT CURRENT (DC) AND ELECTRONICALLY COMMUTATED (EC) MOTOR

In-tank fuel pumps that are used inside the car to convey the required quantity of fuel from the tank to the engine at the necessary pressure. According to customer requirements, the most cost-effective solution (DC) or the most efficient solution (EC) out of our portfolio can be applied.

Facts & Benefits
> DC: stand-alone, no external electronic required
> EC: Precise rpm control, highest durability (fewer parts, no commutation wear)

Technical Information
> Gerotor, side-channel turbine and screw pump design available
> Pressure: up to 700 kPa
> Flow, typ.: 230 - 330 l/h at 500 kPa
> Efficiency, typ.: 30 - 35 %
> Media: gasoline (up to E100), diesel (incl. RME)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

LATCHING VALVE

Latching refueling valve is a bi-stable valve used to a seal pressurized tank or isolated HC vapors in a normal tank.

Facts & Benefits
> Significantly less energy consumption
> Maintains valve position using zero current draw
> Very low flow restriction
> Able to determine valve position (open/closed)
> Passive relief function for fuel tank over pressure
> Flexible packaging configurations

Technical Information
> 14 V DC pulse for 100 ms to change valve state
> Flow > 115 SLPM at 1.5 kPa
> Overpressure relief at 43.5 kPa
> Leak < 1 sccm at 5 kPa and 20 kPa tank pressure
> Leak < 3.5 sccm at 35 kPa tank pressure
> Leak < 10 sccm at -9 kPa tank pressure

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

LINEAR PURGE VALVE

The Linear Purge Valve controls the flow of hydrocarbon vapors from the canister to the intake manifold.

Facts & Benefits
> Very low operating noise
> Fast response for incremental flow control at all operating conditions
> Excellent low end flow control preventing unwanted surges of fuel vapor

Technical Information
> Typical flow: 70 SLPM at 57 kPa
> Operating voltage: 14 V
> Coil resistance: 14.0 Ω
> Max current: 500 mA
> Control circuit constant current at 150 up to 200 Hz
> Weight: 200 g

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

NATURAL VACUUM LEAK DETECTION (NVLD III)

Engine off OBD monitoring for Hydrocarbon evaporative leak detection. Legislation compliance.

Facts & Benefits
> With integrated electronics
> OBD HC leak diagnostic performed after key off
> Integrated solenoid for improved purge flow capacity
> Effective flow area independent of system vacuum
> Passive over pressure venting (including refueling)
> Temperature sensing, switch sensing

Technical Information
> Detection capable to 0.5 mm diameter leak
> Bit serial communication with ECU
> High In Use Monitor Performance
> Nominal coil resistance of 21 Ω
> Operating voltage: 9 - 16 V
> Operating Temp.: -40 °C up to 85 °C

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

OIL PRESSURE SENSOR

Direct measurement of Oil pressure.

Facts & Benefits
> Robust sensing technology compatible with typical oil environment
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability

Technical Information
> Flexible calibration of transfer functions
> Pressure range: Typical 10 bar
> Accuracy: 1 % full scale
> Temp. range: -40 °C up to 140 °C
> Supply voltage: 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

PRESSURE SENSOR - FUEL RAIL DIESEL

Direct measurement of pressure in diesel fuel rail.

Facts & Benefits
> High accuracy and temperature stability
> High vibration robustness (low/high frequencies)
> Modular design for connector and mounting
> Flexible calibration of transfer functions
> Internal and output diagnostic capability

Technical Information
> Pressure range: 0 bar up to 3.400 bar
> Temp. range: -40 °C up to 140 °C
> Supply: 5 V, 10 mA
> Output signal: Analog or SENT
> Accuracy: 0.5 % full scale output
> Response time: < 1 ms

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

PRESSURE SENSOR - FUEL RAIL GASOLINE

Direct measurement of pressure in fuel rail gasoline.

Facts & Benefits
> High accuracy and temperature stability
> High vibration robustness (low/high frequencies)
> Modular design for connector and mounting
> Flexible calibration of transfer functions
> Internal and output diagnostic capability

Technical Information
> Pressure range: 0 bar up to 500 bar
> Temp. range: -40 °C up to 140 °C
> Supply: 5 V, 10 mA
> Output signal: Analog or SENT
> Accuracy: 0.5 % full scale output
> Response time: < 1 ms

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

PRESSURE SENSOR - FUEL VAPOR GAUGE

Relative pressure measurement used to detect any leak condition in evaporative fuel systems. Design can snap fit to plastic tube if any inline mounting is required.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> High accuracy and temperature stability

Technical Information
> Adjustable characteristic via electronic calibration
> Pressure range: -5 kPa up to 5 kPa (Low range)
> Pressure range: : -15 kPa up to 45 kPa (High range)
> Operating temp.: -40 °C up to 125 °C
> Supply voltage: 5 V ± 0.25 V
> Output signal: Analog or SENT
> Transfer function: linear, ratiometric (analog version)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

PRESSURE SENSOR - IN LINE FUEL VAPOR GAUGE

Relative pressure measurement used to detect any leak condition in evaporative fuel systems.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability

Technical Information
> Adjustable characteristic via electronic calibration
> Pressure range : -5 kPa up to 5 kPa (Low range)
> Pressure range : -15 kPa up to 45 kPa (High range)
> Operating temp.: -40 °C up to 125 °C
> Supply voltage: 5 V ± 0.25 V
> Output signal: Analog or SENT
> Accuracy over full-scale: 1.5 % full span (10 °C up to 85 °C)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

SCR TANK EXTRACTION UNIT GEN 4

Tank extraction unit "Gen 4" allows controlled pressure for stable spray pattern. Designed for passenger cars and light duty trucks.

Facts & Benefits
> Including filter, heating, level and quality sensor
> Silent orbital pump with purge functionality
> Maintenance-free lifetime filter
> Freeze proven
> Welded directly into the tank
> Excellent thawing performance

Technical Information
> Pump capacity: max 4 kg/h
> Operating pressure: 5 - 6.5 bar (relative)
> Operating voltage: 12 V

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

TEMPERATURE SENSOR - COOLANT / FUEL / OIL

Temperature measurement in several liquid media (coolant, fuel, oil).

Facts & Benefits
> Clip or screw-in design
> Wide range of applications
> High accuracy
> Short response time
> Long-term stability

Technical Information
> Engine coolant: -40 °C up to 140 °C
> Engine oil: -40 °C up to 150 °C
> Fuel: -40 °C up to 140 °C
> Accuracy: ± 1.15 °C (at 25 °C)
> Response time: ~ 20s

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

TURBO PURGE VALVE

The Turbo Purge Valve controls the flow of hydrocarbon vapors from the canister to the intake manifold on turbocharged applications.

Facts & Benefits
> EVAP turbo system cost savings for OEM
> Smooth start-to-open characteristics
> Robust design & easy to calibrate
> Multiple turbo purge system function in one assembly
> Flexible configuration using common actuator

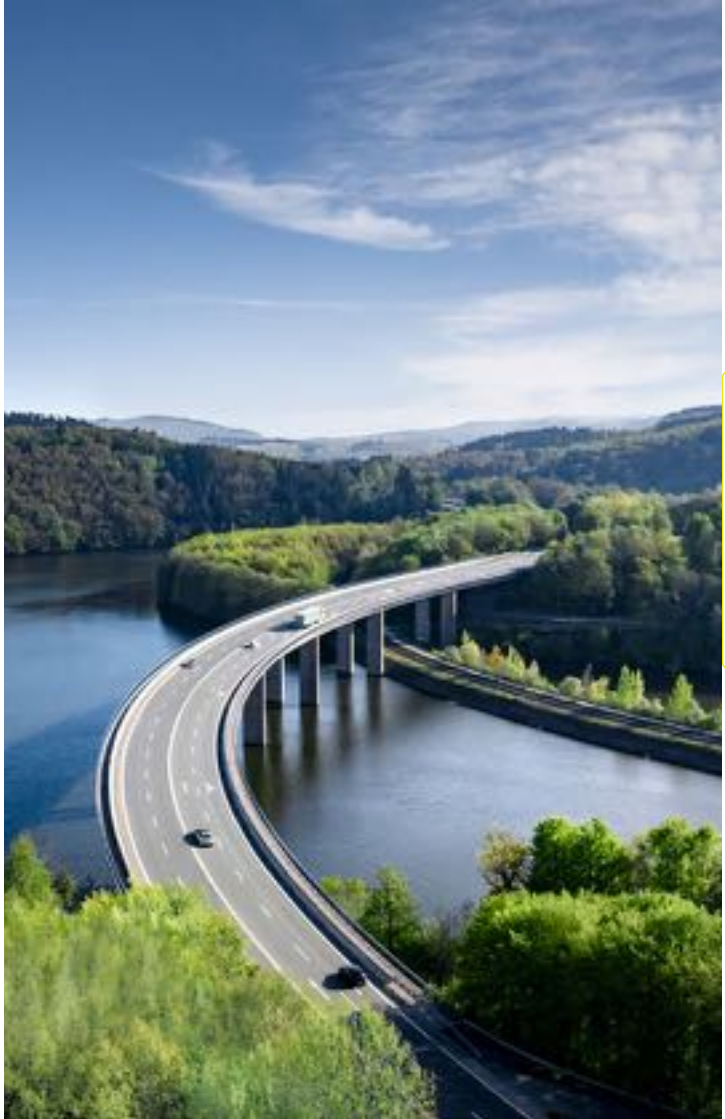
Technical Information
> Incorporates check valves to protect purge system
> Operating voltage: 9 V - 16 V (13.5 V optimal)
> Operating temp.: - 25 °C up to 125 °C
> Operating Pressure: up to 400 kPa
> Frequency: 5 Hz up to 30 Hz (10 Hz recommended)
> Purge flow: 110 SLPM

PROPULSION TYPES

BEV | PHEV | MHEV | Gasoline | Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports



COMBUSTION & EXHAUST AFTER-TREATMENT

Vitesco Technologies' electronics and electrification solutions contribute substantially to meeting the emission targets applicable to an ICE. For instance, our electronics and software provide the needed high precision control of urea dosing and spray formation, for robust Selective Catalytic Reduction (SCR) of NO_x in the exhaust system.

Another Vitesco Technologies solution addresses challenges in exhaust catalyst temperature management. During prolonged engine-off periods - as is the case in hybrid powertrains - the catalytic converter cools down to a point below its minimum operating temperature of 250 °C. When the ICE is re-started, the catalyst requires a certain period to reach its "light-off" operating temperature. During the engine cold start phase, this time lapse until light-off also needs to be short to minimize the total emissions within a cycle. Vitesco Technologies' electrically heated catalyst (EHC) EMICAT® ensures that the catalyst begins to act quickly and that it permanently maintains its operating temperature in order to minimize the emissions after re-starting the engine, e.g. at the end of an engine-off period.

Meeting emission limits requires innovative sensors and actuators. One example is the NO_x sensor which provides the basic input for a precise control of the emissions during real-world driving (Real Driving Emissions, RDE). This sensor along with many others deliver the data for a continuous control of exhaust gas after-treatment.

COMPACTCAT® AS RING-SHAPED DOC CATALYST

Compact ring-shaped metal substrate catalyst (CompactCat®) as Diesel Oxidation Catalysts (DOC) for advanced compact SCR systems with integrated urea decomposition feature in the center.

Facts & Benefits

> Usage of outer mantel design for flow guidance (principle feature of CompactCat® design)
> Inner hot tube with high droplet evaporation capability due to intense turbulent gas flow
> Compact robust system design
> Minimized thermal mass for low temperature urea decomposition

Technical Information

> Optimal performance with metal substrate (METALIT®) in high efficient design structures
> Scalable substrate with inner tube for low guidance towards SDPF
> Easy integration with customized mantel tube design

PROPULSION TYPES

BEV · PHEV · MHEV · Gasoline · Diesel

VEHICLE TYPES

Passenger Car · Commercial Vehicle & Off-Highway · 2-Wheeler & Powersports

COMPACTCAT® FOR GASOLINE ENGINES

Close-coupled compact metal substrate catalyst (CompactCat®) as Three-Way-Catalyst (TWC) directly mounted to the turbocharger.

Facts & Benefits
> Metal substrate (METALIT®) for optimized integration in close-coupled position
> "CompactCat" canning provides optimum exhaust gas temperature utilization
> Lowest emissions due to fast light-off

Technical Information
> Optimal performance with LS-Design® metal substrate
> Catalyst-integrated lambda-sensor (Lambdasondenkat™)
> Close-coupled position directly at turbocharger outlet
> "CompactCat" canning with hot gas circulating the catalyst surfaces

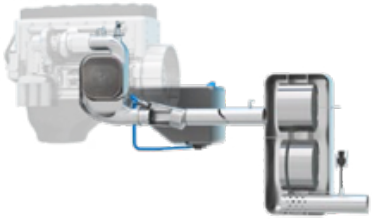
PROPULSION TYPES

BEV PHEV MHEV **Gasoline** Diesel

VEHICLE TYPES

Passenger Car Commercial Vehicle & Off-Highway 2-Wheeler & Powersports

COMPACTCAT® FOR HEAVY - DUTY DIESEL ENGINES



Close-coupled compact metal substrate catalyst (CompactCat®).

Facts & Benefits
> Metal substrate (METALIT®) for design freedom even in space limited engine compartments and chassis frames
> Heat loss reduction for improved cold-start and intra-urban use performance
> Improved thermal efficiency of DOC and the whole exhaust system

Technical Information
> METALIT® available in a wide range of sizes and geometrical shapes
> DOC-volume reduction up to 30 % and volume reduction of the total system
> Optional with electrically heated catalyst EMICAT® for further low temperature decomposition enhancement

PROPULSION TYPES

BEV PHEV MHEV Gasoline **Diesel**

VEHICLE TYPES

Passenger Car **Commercial Vehicle & Off-Highway** 2-Wheeler & Powersports

COMPACTCAT® FOR LIGHT - DUTY DIESEL ENGINES

Close-coupled compact metal substrate catalyst (CompactCat®) as Diesel Oxidation Catalysts (DOC) directly mounted to the turbocharger.

Facts & Benefits
> Metal substrate (METALIT®) for optimized integration in close-coupled position
> "CompactCat" canning provides optimum exhaust gas temperature utilization
> Lowest emissions due to fast light-off

Technical Information
> Optimal performance with LS-Design® metal substrate
> Close-coupled position directly at turbocharger outlet
> "CompactCat" canning with hot gas circulating the catalyst surfaces

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, **Diesel**

VEHICLE TYPES

Passenger Car, **Commercial Vehicle & Off-Highway**, 2-Wheeler & Powersports

ELECTRICAL EXHAUST GAS RECIRCULATION VALVE (EEGR)

Controls the amount of recirculated exhaust gas to reduce NOx emissions & fuel consumption.

Facts & Benefits
> Electric actuation has faster response and more control than conventional vacuum systems
> Eliminates vacuum regulator and connecting hoses
> Can be tailored to customer flow requirements

Technical Information
> Current consumption at max flow: 1.0 A at 20 °C
> Nominal operating voltage: 12 V DC
> Max current consumption: 1.5 A
> Nominal coil resistance: 8.0 Ω at 20 °C
> Nominal operating frequency: 90 Hz up to 175 Hz
> Position sensor supply voltage: 5 V DC
> Response time (total stroke): < 50 ms at 20 °C, 13.5 V DC

PROPULSION TYPES

BEV, **PHEV**, **MHEV**, **Gasoline**, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

EMICAT® INTEGRATED IN COMPACT SCR

Passive NOx-Adsorber (PNA) plus Diesel Oxidation functionality (DOC) in combination with electrical heated catalyst EMICAT® and reverse urea injection for advanced NOx reduction (SCR).

Facts & Benefits
> Bridging due to NOx storage until catalyst light-off
> Lowest emissions due to fast light-off in close-coupled position
> Ammonia formation at lowest temperatures with EHC support

Technical Information
> Optimal performance with LS-Design® metal substrate
> Reverse urea injection on hydrolysis coated heating disc
> "CompactCat" canning with hot gas circulating the catalyst surfaces in close-coupled position
> Electrical Heated Catalyst (EMICAT®) for 12 up to 48 V
> Maximum current: 300 A

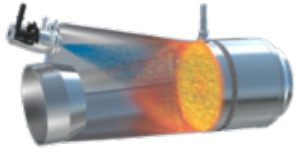
PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

EMICAT® INTEGRATED IN UNIVERSAL DECOMPOSITION PIPE



Universal Decomposition Pipe with an integrated electrically heated catalyst (EMICAT®) for urea decomposition and evaporation. Applicable for LCV and HD (On-Highway and NRMM).

Facts & Benefits
> SCR efficiency improvement in cold and transient operation
> Minimization of Urea deposits due to local efficient thermal management
> Optimization of urea decomposition and ammonia preparation for the SCR catalyst
> Compact flow optimized design

Technical Information
> Limited impact on electrical board net
> Operation voltage: 12 V - 24 V - 48 V
> Maximum current: 300 A

PROPULSION TYPES

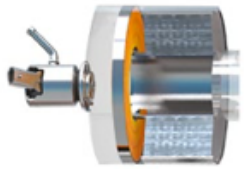
BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

ELECTRIFICATION
COMBUSTION
BEYOND POWERTRAIN
TRANSMISSION
ELECTRONIC CONTROLS
AIR MANAGEMENT
FLUID & EVAPORATION MANAGEMENT
COMBUSTION & EX. AFTER-TREATMENT

EMICAT® - RING-SHAPED SCR CATALYST



Ring-Shaped Electrically Heated Catalyst EMICAT® with integrated mixing and thermolysis pipe for highest NOx reduction (SCR) requirements in advanced compact system design.

Facts & Benefits
> Earlier dosing release by electrical heating
> Inner hot tube with high droplet evaporation
> Increased Ammonia uniformity for SCR catalyst
> Allows very compact system design

Technical Information
> Scalable compact system approach with variation of heating power according to requirements
> EMICAT® for 12, 24 and 48 V application
> EMICAT® in round and non-round ring-shape
> Ring-Shaped EMICAT® with control unit as a complete system

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

EXHAUST GAS RECIRCULATION VALVE - HIGH PRESSURE (HP - EGR)

Helps to reduce emissions of NOx & fuel consumption in gasoline and diesel engines in HP EGR loop.

Facts & Benefits
> Balanced rotary throttle principle for EGR control
> Contactless MR Sensor, flexible output
> Provides accurate low flow precision
> High flow EGR with low gas pressure drop
> Fits high temperature & pressure pulsations

Technical Information
> Torque at flap: 230 Ncm
> Response time (85 %): < 80 ms
> Nominal supply voltage: 12 V DC or 24 V DC
> Position sensor supply voltage: 5 V DC
> Max flow: up to 190 kg/h at 50 hPa
> Exhaust temp.: up to 700 °C

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

EXHAUST GAS RECIRCULATION VALVE - LINEAR (LP - EGR)

Helps to reduce emissions of NOx & fuel consumption in gasoline and diesel engines.

Facts & Benefits
> Linear sensor technology (direct position measurement)
> Reduced friction & short response time
> Low valve seat leakage
> Compact design
> Suitable for high temperature applications (optional water cooling)

Technical Information
> Nominal supply voltage: 12 V DC
> Position sensor supply voltage: 5.0 V DC
> Exhaust gas temp.: > 500 °C with adequate cooling
> Typical flow: 120 kg/h max at dP 100 hPa (single poppet design)
> Response time (t85): < 100 ms

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

EXHAUST GAS RECIRCULATION VALVE - LOW PRESSURE DIESEL (LP - EGR)

Helps to reduce emissions of NOx & fuel consumption in diesel engines in LP EGR loop.

Facts & Benefits
> High flow LP EGR valve with small pressure drop
> Non-contacting sensor, flexible output, not sensitive against magnetic fields
> Improved flow accuracy due to Multi Point Calibration
> Adapted to corrosion requirement for LP EGR path
> Compact, light weighted size

Technical Information
> Response time (t90): < 90 ms
> Nominal supply voltage: 12 V DC
> Position sensor supply voltage: 5 V DC
> Max flow: 245 kg/h at dP 20 hPa (38 mm dia. flap)
> Max differential pressure over flap: 300 kPa
> Internal leakage: < 3 kg/h at dP 600 hPa (38 mm dia. flap)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

EXHAUST GAS RECIRCULATION VALVE - LOW PRESSURE GASOLINE (LP - EGR)

Helps to reduce emissions of NOx & fuel consumption in gasoline engines in low pressure exhaust gas recirculation (LP EGR) loop.

Facts & Benefits
> High flow LP EGR valve with small pressure drop
> Non-contacting sensor, flexible output, not sensitive against magnetic fields
> Improved flow accuracy due to Multi Point Calibration

Technical Information
> Response time (t90): < 90 ms
> Nominal supply voltage: 12 V DC
> Position sensor supply voltage: 5 V DC
> Max flow: 75 kg/h at dP 20 hPa (24 mm dia. flap)
> Max differential pressure over flap: 300 kPa
> Internal leakage: < 1.5 kg/h at dP 600 hPa (24 mm dia. flap)
> Exhaust gas temp.: up to 200 °C

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HIGH TEMPERATURE SENSOR

Temperature acquisition for closed loop after treatment control (DPF/ GPF, SCR, DeNOx/LNT).

Facts & Benefits
> Smart sensor with digital output, high accuracy
> Stable signal over lifetime (ageing compensation)
> High temperature robustness

Technical Information
> Thermocouple sensor technology, Type N
> Response time: 7s at 10 ms flow (5.5 s at 20 ms)
> Sensing temp.: -40 °C up to 950 °C
> Working temp. electronics: -40 °C up to 140 °C
> Accuracy: < 500 °C ± 4 °C over lifetime; > 500 °C ± 0,8 % over lifetime
> Supply voltage: 12 V or 24 V DC (30 mA) / CAN; 5 V DC (< 20 mA) / SENT

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

KNOCK SENSOR - M8 STANDARD DESIGN

Measures structural vibrations in the combustion engine to continuously adjust ignition parameters.

Facts & Benefits
> Optimized ignition timing for maximum efficiency
> High sensitivity
> Compact design, nested bolt possible
> Increase engine power
> Decrease fuel consumption

Technical Information
> Acceleration sensor based on piezo ceramic technology
> Frequency range: 3 kHz up to 25 kHz
> Possible integration of discharge resistor
> Integrated connector or cable version
> Various connector designs
> Nut and glue types assembly technology

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

KNOCK SENSOR - MULTILEAD DESIGN

Knock sensor including small wire-harness.

Facts & Benefits
> Global cost saving on component and assembly process
> Facilitates engine assembly
> Reduce number of parts
> Provide flexibility to design
> Better rooting

Technical Information
> Standard knock sensor characteristics with piezoelectric technology – frequency range 3 kHz - 25 kHz
> Nut and glue types assembly technology for KS
> Many type and number of connector designs available
> Design on customer demand and needs

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

METALIT® AS DIESEL OXIDATION CATALYST

Metal substrate (METALIT®) catalyst for hydrocarbon (HC), carbon monoxide (CO) and nitrogen monoxide (NO) oxidation. Applicable for cars, trucks and non-road mobile machinery (NRMM).

Facts & Benefits

> High-performance catalysts based on turbulence-generating substrate structure
> Optionally with integrated air gap insulation for minimum space requirements in the engine compartment
> Low backpressure for optimum fuel consumption

Technical Information

> Oxidizing catalyst coating with platinum and palladium
> Wide variety of round and non-round geometries available
> Serial production diameter up to 450 mm
> Cell density and foil structure applicable to customer requirements
> Can be combined with the electrically heated catalyst EMICAT®

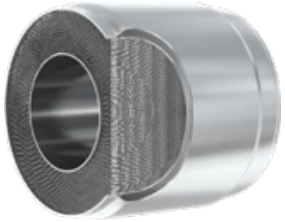
PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

METALIT® AS RING CATALYST



Ring shaped metal substrate (METALIT®) consisting of an outer mantle, a ring shaped matrix and an inner mantle. Exists with or without mantle.

Facts & Benefits

> Improvement of single cylinder lambda distribution due to high turbulent mixing zone
> Less influence of wastegate on flow distribution
> Lower aging

Technical Information

> Application as three-way catalyst for gasoline engines as well as DOC, NOx-adsorber and SCR catalyst for diesel engines
> Substrate length: 50.8 mm – 174 mm
> Cell density: 100 cpsi – 800 cpsi
> Foil design: LS; LS-PE; PE; PM

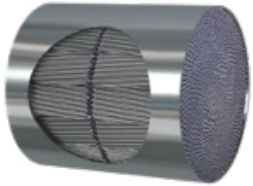
PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

METALIT® AS SCR CATALYST



Metal substrate (METALIT®) catalyst for Selective Catalytic Reduction (SCR) of nitrogen oxides (NOx). Applicable for cars, trucks and Non-Road Mobile Machinery (NRMM).

Facts & Benefits
> High-performance reduction catalysts based on turbulence-generating substrate structure
> Reduced catalyst volume results in lower space requirement
> Low backpressure for optimum fuel consumption
> Enables ammonia slip catalyst as a very short disc in metal design, down to 20 mm

Technical Information
> SCR-coating: base metals (vanadium) or zeolites
> Wide variety of round and non-round geometries available
> Optimal performance with CS-Design metal substrate
> Can be combined with the electrically heated catalyst EMICAT®

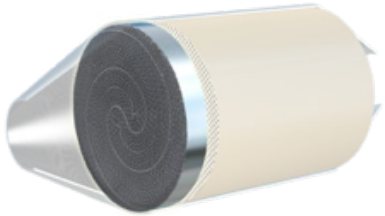
PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

METALIT® AS SCR LIGHT-OFF CATALYST



Small metal substrate (METALIT®) catalyst slice in front of the SCR-catalyzed Diesel Particulate Filter (SPDF). Applicable for passenger cars and LCV.

Facts & Benefits
> Efficiency improvement of the SCR system in cold and transient operation
> Short slice in front of the SDPF to achieve low thermal capacity
> Further reduction of thermal capacity by using PE-Design®
> Low backpressure for optimum fuel consumption

Technical Information
> SCR-coating: base metals (vanadium) or zeolites
> Wide variety of round and non-round geometries available
> Cell density and foil structure optimized to application

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

METALIT® AS SENSOR CATALYST

Metal substrate (METALIT®) catalyst with integrated hole for sensors.

Facts & Benefits
> Optimisation of space compartment
> Protection of the sensors against water splash
> Direct and fast measuring in the catalyst to avoid breakthrough

Technical Information
> Application as three-way catalyst for gasoline engines
> Temperature, NOx and Lambda sensors can be integrated in the METALIT® catalyst
> Combination with LS or PE foil structure is possible for flow uniformity

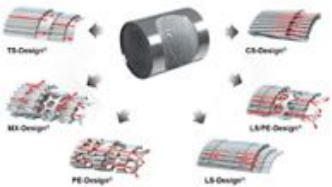
PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

METALIT® AS THREE-WAY-CATALYST



Metal substrate (METALIT®) as Three-Way-Catalyst (TWC) for hydrocarbon (HC), carbon monoxide (CO) and nitrogen oxide (NOx) oxidation. Applicable for cars, trucks and non-road mobile machinery (NRMM). Exists with or without mantle.

Facts & Benefits
> High-performance catalyst based on turbulent flow structure
> Reduced catalyst volume results in lower space requirement
> Low backpressure for optimum fuel consumption and maximum power
> Robust design

Technical Information
> TWC coating with platinum and palladium for oxidation and rhodium for reduction
> Wide variety of round and non-round geometries available
> Serial production diameter up to 450 mm

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

METALIT® FOR 2-WHEELER

Small metal substrate (METALIT®) catalyst for high efficient 2-Wheeler Exhaust Aftertreatment. Applicable for 2- and 3-wheelers. Exists with or without mantle.

Facts & Benefits
> High-performance catalysts based on turbulent flow structure
> Low backpressure for high power applications
> Robust design

Technical Information
> Depending on the λ-control, the catalysts can be used as 3- or 2- way catalyst
> Wide variety of round and non-round geometries available
> Very small diameters possible Ø ≥ 30 mm
> Cell density and foil structure applicable to customer requirements

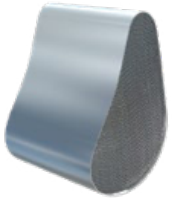
PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

METALIT® WITH ASYMMETRICAL CONTOUR



Asymmetrical metal substrate contours (METALIT®) for extreme close coupled position. Applicable for passenger cars and LCV.

Facts & Benefits
> DOC efficiency improvement in cold and transient operation
> Optimum space utilization in engine compartment
> Installation in ultra close-coupled position without affecting the entire vehicle/frame architecture
> Minimized backpressure due to maximum cross section

Technical Information
> Application as three-way catalyst for gasoline engines as well as DOC, NOx-adsorber and SCR catalyst for diesel engines
> Innovative folded foil design
> High degree of freedom in shape and contour design for maximum space utilization

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

NOX SENSOR - CLASSIC MULTI-PURPOSE DESIGN

Robust exhaust gas sensing for efficient exhaust gas aftertreatment systems.

Facts & Benefits
> Real time high accuracy measurement
> Key component for all future engine management or exhaust aftertreatment systems
> Continuously improved to comply with worldwide emission standards (EU, NA, JP, CN)

Technical Information
> Measuring principle: ZrO_2-based multilayer sensor with integrated heater
> Output signals: NOx, λbin, λlin or O_2-conc.
> Supply voltage: 12 V or 24 V
> Data link: CAN 2.0 or SAE-J-1939
> Operating gas temp.: 100 °C up to 800 °C
> NOx-accuracy: ± 10 ppm for NO < 100 ppm (± 10 % above 100 ppm)

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

NOX SENSOR - COMPACT PASSENGER CAR DESIGN

Robust and compact exhaust gas sensing for efficient exhaust gas aftertreatment systems - also for Gasoline applications.

Facts & Benefits
> Real time high accuracy measurement
> Key component for all future engine management or exhaust aftertreatment systems
> Continuously improved to comply with worldwide emission standards (EU, NA, JP, CN)

Technical Information
> Measuring principle: ZrO_2-based multilayer sensor with integrated heater
> Output signals: NOx, λbin, λlin or O_2-conc.
> Supply voltage: 12 V
> Data link: CAN 2.0
> Operating gas temp.: 100 °C up to 800 °C
> NOx-accuracy: ± 10 ppm for NO < 100 ppm (± 10 % above 100 ppm)

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

PRESSURE SENSOR - EXHAUST BACK PRESSURE

Direct measurement of Exhaust Back Pressure.

Facts & Benefits
> Robust sensing technology compatible with typical exhaust environment
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability

Technical Information
> Flexible calibration of transfer functions
> Pressure range for exhaust back pressure: Typical 6 bar or 4 bar
> Accuracy: 1 % full scale
> Temp. range: -40 °C up to 140 °C
> Supply voltage: 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

PRESSURE SENSOR - PARTICLE FILTER / EGR DIFFERENTIAL

Differential measurement of exhaust treatment particle filter pressure drop. Differential measurement across orifice.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability
> Flexible housing, connector and mounting design

Technical Information
> Pressure range: - 50 kPa up to 100 kPa (differential)
> Accuracy: 1 % full scale (10 °C up to 85 °C)
> Temp. range: -40 °C up to 125 °C
> Supply voltage: 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max
> Load resistance: > 4.7 kΩ
> Output signal: analog or SENT

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

PRESSURE SENSOR - PARTICLE FILTER GAUGE (SINGLE PORT)

Relative measurement of exhaust pressure before or after the DPF.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability
> Fulfills toughest EMC requirements

Technical Information
> Pressure range: 0 kPa up to 125 kPa
> Accuracy: 1 % full scale (10 °C up to 85 °C)
> Temp. range: -40 °C up to 125 °C
> Supply voltage (Vs): 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max
> Load resistance: > 4.7 kΩ
> Response time: < 2 ms

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

PRESSURE SENSOR - SECONDARY AIR ABSOLUTE

Direct measurement of pressure in secondary air flow.

Facts & Benefits
> Flexible calibration of transfer functions
> High accuracy and temperature stability
> Low cost design and high quality
> Fulfills toughest EMC requirements
> Flexible housing, connector and mounting design

Technical Information
> Pressure range: 50 kPa up to 150 kPa (for SAA)
> Accuracy: 1 % full scale (10 °C up to 85 °C)
> Temp. range: -40 °C up to 140 °C
> Supply voltage: 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max
> Load resistance: > 4.7 kΩ

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

PRE-THROTTLE VALVE

Intake air pressure control in combination with low pressure EGR.

Facts & Benefits
> Modular design concept
> Very low weight and small package
> full performance, full functional range at attractive price level

Technical Information
> Housing material: Thermoplast
> Temperature range: -40 °C up to 140 °C
> Response time (typ): < 90 to 120 ms (13.5 V, RT)
> TP Ø range: 40 mm to 57 mm
> Weight (TP Ø 52 mm): < 480 g
> Pressure range: up to 3 bar peak
> Signal output: analog 5 V or digital SENT
> Leakage thermoplast (at stop): < 15 kg/h (TP Ø 48 mm, RT, dp = 600 hPa)

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

UNIVERSAL DECOMPOSITION PIPE

Universal Decomposition Pipe (UDP) for in-pipe AdBlue® (DEF) injection and urea decomposition. Engineered in modular sizes for specific power ratings.

Facts & Benefits
> Flexible in pipe installation
> Fast evaporation of AdBlue® (DEF) droplets
> Integrated thermolysis of AdBlue® (DEF) droplets and hydrolysis to Ammonia
> AdBlue® (DEF) dosing at low temperature duty cycles
> Mixing of Ammonia with exhaust gas

Technical Information
> Stainless steel housing with cockpit for SCR-injector installation
> Defined inlet geometry with confuser for flow guidance
> Evaporator with coated METALIT®
> METALIT® in MX-Design® with integrated shovels for enhanced droplet evaporation

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

TRANSMISSION

Automatic transmission systems are gaining market share worldwide. According to market studies, in 2025 approximately two thirds of all new vehicles are expected to be fitted with some type of automatic transmission. This increase will happen not least because of the expected growing number of hybrid vehicles.

Vitesco Technologies offers intelligent electronic solutions for both automatic and hybrid transmissions, delivering fuel efficiency and comfort. Our portfolio of electrified transmission solutions also includes efficient brushless electric motors, electronic oil pump, electrically actuated clutches, electric gear-shift actuators, sensor clusters, and single position encoders or pressure sensors.

BRUSHLESS DC DRIVES HIGH EFFICIENCY

Best performance motors to reasonable prices for different use out of a scalable, modular concept.

Facts & Benefits

> High efficiency Brushless DC drives for use in double clutch, AWD-disconnect, Oil pumps...
> Small package, low weight, low inertia due to high copperwire filling rate which is caused by the special single tooth winding technology
> Low content of rare earth material
> High torque as well high speed capability

Technical Information

> Different performance classes: 50 W up to 900 W
> Variation of diameter, length and windings depending on customers' needs
> Temp. range: -40 °C up to 140 °C

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

DRIVETRAIN ACTUATOR MODULE - ELECTRONIC CLUTCH ACTUATOR

Basic function: deliver torque for clutch and gear actuation
Use cases: eDrive disconnect, Multispeed eAxle, AMT (automated manual transmission), hydraulic pump actuation, transfer case actuation

Facts & Benefits
> Smart module: integrated BLDC motor, control unit incl. sensors and SW
> Vitesco Technologies B6 driver ASICs for BLDC motor control
> Maturity: C-Sample

Technical Information
> Motor: 12 V BLDC
> Rated torque: 0.9 Nm
> Max. speed: 9000 rpm (in field-oriented control mode)
> Communication interface: CAN / CAN FD
> Temperature range: -40 °C to +125 °C

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car — Commercial Vehicle & Off-Highway — 2-Wheeler & Powersports

DRIVETRAIN ACTUATOR MODULE - ELECTRONIC TRANSMISSION OIL PUMP

The intelligent transmission oil pump for high performance applications fully replaces the mechanical pump. The control unit and sensors are fully integrated, including the Vitesco Technologies inhouse designed ASICs for motor control and safety functions.

Facts & Benefits
> High thermal robustness (continuous operation)
> Pump: double stroke vane cell pump
> Substitution of electrolytic capacitor
> Vitesco Technologies B6 driver ASIC for BLDC motor control
> Optimized NVH
> Maturity: in production

Technical Information
> BLDC motor 600 W, 12 V
> Nom. Pressure – flow * 12 bar – 15 l/min - +80 °C
> Max. operating pressure * 38 bar
> Temp. range -40 °C to 140 °C
> Weight 1.9 kg, Lifetime 8000 h

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car — Commercial Vehicle & Off-Highway — 2-Wheeler & Powersports

DRIVETRAIN ACTUATOR MODULE - ELECTRONIC TRANSMISSION RANGE SELECTOR

ETRS is a highly universal product.
It is capable to cover various use cases such as Park-by-Wire (drive lock), Shift-by-Wire (PRND selection), eDrive disconnect, Gear-Shifting of Multi-Speed-Reducer etc.

Facts & Benefits
> Comfort: substitution of manual shift systems, retro-fit to none-smart systems
> All-in-one: integrated inverter and output shaft sensor
> Safety: implemented sensing redundancy, cyber security, internal diagnosis & protection
> Fit for future: enabler for autonomous driving & parking
> BLDC control: enhanced BLDC motor control with Vitesco ASIC

Technical Information
> Motor: 12 V BLDC
> Rated torque (output shaft): 15 Nm
> Shifting angle: 45 °, Shifting time: 300 ms at 10 V
> Communication interface: CAN, functional safety: ASIL C
> Temperature range: -40 °C to +125 °C

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

DRIVETRAIN ACTUATOR MODULE - GEAR SHIFT - DEDICATED HYBRID TRANSMISSION

Designed as dog clutch actuator for a dedicated hybrid transmission (DHT). While gear shifts a controlled movement of shifting components, special sensors and dedicated software are required to avoid jerk during gear shifting.

Facts & Benefits
> NVH optimized shifting control (soft-landing)
> Applicable, independently from dog clutch design
> Integrated sensors
> 2x integrated DC motors and reduction gears
> Integrated linear actuator (solenoid)
> Maturity: in production

Technical Information
> Actuation force at lever: 300 N, linear travel: 15 mm
> Shifting time: < 150 ms
> Solenoid linear force: 40 N, stroke: 6 mm
> Temperature range: -40 °C to +125 °C

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

DRIVETRAIN ACTUATOR MODULE - GEAR SHIFT - DOUBLE CLUTCH TRANSMISSION

The newly developed Transmission Actuator Module (TAM) for dry 7-speed double clutch transmissions allows easy integration and modularity. It combines 4 actuators and controls into one unit.

Facts & Benefits
> 2x integrated BLDC motors
> 2x integrated liniar actuators (solenoids)
> Sensors: 2x rotor position, 2x current, 2x temperature, 2x linear position
> Vitesco Technologies B6 driver ASICs for BLDC motor control
> Maturity: in production

Technical Information
> Rated motor shaft torque: 0.9 Nm
> Solenoid linear force: 37 N, stroke: 7 mm
> Operating temperature: -40 °C to +125 °C
> Protection Class: IP6K9K

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

POSITION SENSOR - LINEAR CONTACT-LESS - HALL EFFECT TECHNOLOGY

Sensor mainly used for gear neutral & all gears, clutch master cylinder, pedal, fork position sensor.

Facts & Benefits
> Small sensor size
> Through aluminum wall measurement
> Compatible with Ferrite Magnets
> Compliant with ISO26262 (safety requirement)

Technical Information
> Overall accuracy: ± 2 %
> Target: Magnet
> Measurement: linear up to 60 mm
> Air gap: up to 11 mm
> Operating temp.: -40 °C up to 150 °C
> Operating voltage: 5 V ± 0.5 V
> Output signal: Analog, PWM, SPI or SENT

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

POSITION SENSOR - LINEAR CONTACT-LESS - INDUCTIVE TECHNOLOGY

Sensor mainly used for Park/No Park, clutch master cylinder, linear actuators, PRND, fork position sensor.

Facts & Benefits
> Metallic target (Al, Fe, ...), no magnet needed
> Immune versus low frequency magnetic field (electric motor, starter current, ...), no pollution by iron particles
> Single or redundant output
> ASIC available
> Compliant with ISO26262 (safety requirement)

Technical Information
> Measuring range: 6 mm to 60 mm
> Overall accuracy: ± 2 %
> Air gap: up to 5 mm
> Linearity: < ± 1 % full scale
> Operating temp.: -40 °C up to 160 °C
> No hysteresis

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

POSITION SENSOR - ROTARY CONTACTLESS - HALL EFFECT TECHNOLOGY

Sensor used for PRND, rotary valve position (EGR, ETC, ACV, Water valve...), general purpose rotary actuators.

Facts & Benefits
> Small sensor size
> Through aluminum wall measurement
> Compatible with Ferrite Magnets
> Compliant with ISO26262 (safety requirement)

Technical Information
> Overall accuracy: ± 2 %
> Target: NdFeB, ferrite magnet
> Measuring range: up to 360°
> Air gap: up to 11 mm
> Operating temp.: -40 °C up to 150 °C according to application
> Operating voltage: 5 V ± 0.5 V
> Output signal: Analog, PWM, SPI or SENT

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

POSITION SENSOR - ROTARY CONTACTLESS - INDUCTIVE TECHNOLOGY

Sensor used for PRND, rotary valve position (EGR, ETC, ACV, Water valve, Thermal Management).

Facts & Benefits

> Metallic target, no magnet
> Immune to low frequency magnetic field, no pollution by iron particles
> Single or redundant configuration
> ASIC available
> Compliant with ISO26262 (safety requirement)

Technical Information

> Measuring range: up to 360°
> Overall accuracy: ± 1 %
> Air gap: up to 5 mm
> Linearity: < ± 1 % full scale
> No hysteresis

PROPULSION TYPES

BEV, PHEV, MHEV, Gasoline, Diesel

VEHICLE TYPES

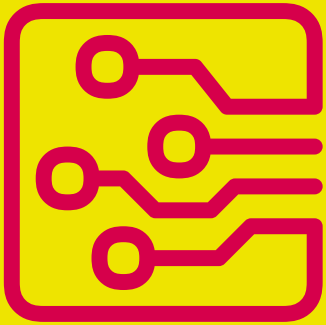
Passenger Car, Commercial Vehicle & Off-Highway, 2-Wheeler & Powersports

03

BEYOND POWERTRAIN

BEYOND POWERTRAIN

Vitesco Technologies is also utilizing its core competencies in applications beyond the powertrain. A comfortable vehicle access system that utilizes our sensor expertise, or the application of pressure sensors in the brake system environment are prominent examples.



ELECTRIFICATION
COMBUSTION
BEYOND POWERTRAIN

BRUSHLESS DC MOTOR HIGH EFFICENCY FOR BRAKE APPLICATIONS

BLDC motor of an innovative braking System.

Facts & Benefits
> Small package, low weight, due to high copperwire filling rate which is caused by the special single tooth winding technology
> Low content of rare earth material
> Symmetrical Back EMF layout for easy electronic commutation
> Low inertia due to optimized rotorcore concept by usage of tube style shaft

Technical Information
> Motorsize: lenght 89 mm, diameter 80 mm
> Motortorqueconstant up to 4.5 Nm at 90 A
> Performanceclass up to 1.400 W in peak
> Temp. range: -40 °C up to 120 °C
> Vibration resistant up to 40 g

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

DOOR HANDLE SENSOR

Sealed module integrating various keyless access functions into a door handle or exterior module.

Facts & Benefits
> Easy integration of various sensors/functions for Keyless Entry System: capacitive lock and unlock, mechanical switch, Hall ICs, LF antenna, pocket/ground lighting and NFC reader, BLE transceiver, inductive switch

Technical Information
> Power consumption: 70 µA to 200 µA for double zone sensor depending on response time
> Response time: 5 ms up to 30 ms
> Detection distance (lock/unlock): ~ 2 mm to 10 mm, depending on door handle type
> Antenna inductance: 100 µH up to 500 µH
> Temp. range: -40 °C up to 85 °C

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

DOOR HANDLE SENSOR - BLE

Door Handle Sensor with BLE reader.

Facts & Benefits
> BLE function integrated into sealed stand alone module
> Vehicle sharing, fleet management
> Smartphone compatibility with most smartphones (Apple, Huawei, Samsung, Sony, LG, Nokia, HTC)
> Vehicle personalization and vehicle status

Technical Information
> BLE protocols: 4.2
> Single module for capacitive, lighting and BLE function
> LIN, CAN communication
> BLE range around 10 m (free field)
> Dark current: ~ 50 µA for BLE function
> BLE scanrate: ~ 100 ms
> Temp. range: -40 °C up to 85 °C

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

DOOR HANDLE SENSOR WITH NFC READER

Sealed module integrating lock/unlock functions (PASE) and vehicle access with smartphone or NFC cards. For passenger cars / light duty / medium duty / heavy duty.

Facts & Benefits
> NFC function integrated into sealed stand alone module
> Vehicle sharing, fleet management
> Back-up to BLE/UWB for smartphone as a key (according CCC Digital Key 3.0)
> Comptability with most smartphones, MFi compatible
> No risk of relay attack due to short detection distance

Technical Information
> NFC protocols ISO/IEC or NFC Forum
> Typical reading distance up to 35 mm
> Dark current adder for NFC function: 150 uA
> Single MCU for capacitive sensors and NFC function
> Temp. range: -40 °C up to 85 °C
> Reaction time: ~ 100 ms (NFC and capa function)

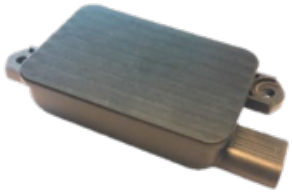
PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

HANDS FREE ACCESS SENSOR



Standalone radar sensor module for keyless access to the trunk or sliding doors.

Facts & Benefits
> Easy hands-free opening or closing of the trunk or sliding doors
> Sensor activated with movement of the leg (no need to press a button or remote control)
> Optimised Integration inside the bumper or directly on the chassis
> Improved performance towards capacitive sensors under harsch conditions (Rain, Snow, Dust, ..)
> Generic Design for different vehicle applications (SUV, Minivan, Sedan,..), compatible with or without trailer hitch

Technical Information
> Temp. range: -40 °C up to 85 °C
> RADAR technology 24 GHz
> Detection width : +/- 30 cm
> Quiescent current: 260 µA (low power mode)
> LIN, logical output

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

PARK LOCK ACTUATOR

Small packaged actuator to activate the park lock of the vehicle with a competitive price.

Facts & Benefits
> Increases safety via activation of park lock (redundancy)
> Small and flat design
> Competitive price

Technical Information
> Drive: Brush DC Motor
> Supply voltage: 12 V
> Actuation torque: 10 Nm
> Actuation time: 350 ms
> Operating Temperature: -40 °C up to +125 °C

PROPULSION TYPES

BEV PHEV MHEV Gasoline Diesel

VEHICLE TYPES

Passenger Car | Commercial Vehicle & Off-Highway | 2-Wheeler & Powersports

PRESSURE SENSOR - BRAKE BOOSTER ABSOLUTE

Pressure measurement for Start-Stop applications.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability
> Fulfills toughest EMC requirements

Technical Information
> Pressure Range: 10 kPa up to 120 kPa
> Accuracy: 1 % full scale (10 °C up to 85 °C)
> Temp. range: -40 °C up to 140 °C
> Supply voltage: 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max
> Output signal: Analog or SENT

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports

PRESSURE SENSOR - BRAKE BOOSTER GAUGE

Relative measurement of vacuum inside brake booster.

Facts & Benefits
> Flexible calibration of transfer functions
> Precision programmable clip levels
> Internal and output diagnostic capability
> High accuracy and temperature stability
> Flexible housing, connector and mounting design

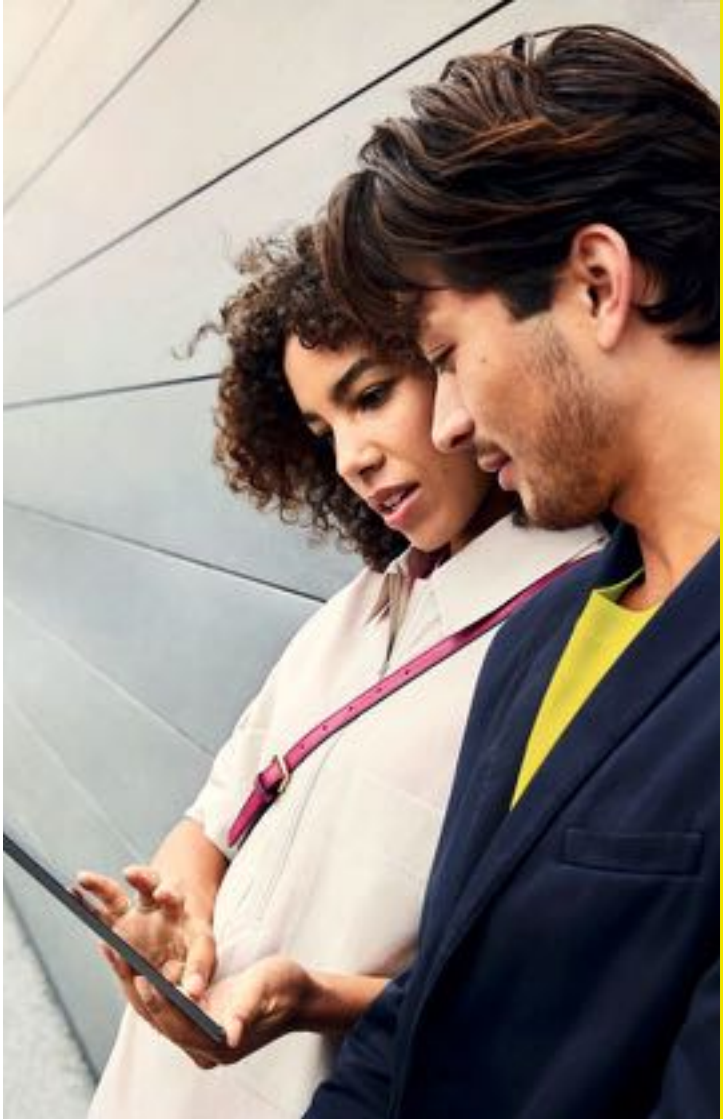
Technical Information
> Pressure range: -105 kPa up to 40 kPa (gauge)
> Accuracy: 1 % full scale (10 °C up to 85 °C)
> Temp. range: -40 °C up to 125 °C
> Supply voltage: 5 V ± 0.5 V
> Supply current at 5 V: 10 mA max
> Load resistance: > 4.7 kΩ
> Output signal: Analog or SENT

PROPULSION TYPES

BEV PHEV MHEV (48V) Gasoline Diesel

VEHICLE TYPES

Passenger Car; Commercial Vehicle & Off-Highway; 2-Wheeler & Powersports



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107 Pressure Sensor - Manifold Absolute
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164 Universal Decomposition Pipe
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018 Zone Controller

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#passionate #partnering #pioneering

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