



Vishay Intertechnology, Inc.

Automotive Internal Combustion Engine Vehicles, Conventional Power Trains





Automotive

Internal Combustion
Engine Vehicles,
Conventional Power Trains

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The Engineer's Toolbox highlights, by market application, some innovative components Vishay manufactures that help design engineers develop superior end products. We recognize that offering unique component solutions helps improve the performance of next-generation devices, overcome technical barriers, and create new markets.

More information on the Engineer's Toolbox, including product datasheet links, can be found at www.vishay.com/ref/et2. For inquiries, please contact your local sales representative.



Key components for
**INTERNAL COMBUSTION
ENGINE VEHICLES,
CONVENTIONAL POWER TRAIN**



ENGINE CONTROL UNITS (ECUs)



EXHAUST SYSTEMS



**HEATING, VENTILATION,
AIR CONDITIONING (HVAC)**

THE VISHAY ADVANTAGE
AEC Qualifications
High-Temperature Performance
High Reliability
Low Profile
Long Life
and more...



ENGINE CONTROL UNITS (ECUs)

CAPACITORS

146 CTI - High Temperature SMD Aluminum Capacitor

125 °C, Low Impedance, High Ripple, SMD

Features

- Soldering heat resistant according to IPC/JEDEC J-STD-020 (up to 260 °C/40 s)
- Long useful life: up to 6000 h at 125 °C
- AEC-Q200 qualified
- Sizes 10 mm x 10 mm up to 18 mm x 21 mm; vibration-proof, 4-pin and 6-pin versions



RESISTORS, NON-LINEAR

NTCS0603E3

Glass Protected SMD 0603 NTC Thermistor

Features

- Tolerance on R_{25} down to 1 %, and on $B_{25/85}$ down to 1 %
- High operating temperature up to 150 °C
- AEC-Q200 qualified



RESISTORS

MM_/SMM

Precision Thin Film MELF Resistors

Features

- AEC-Q200 qualified, automotive grade
- Available from 10R to 15M
- TC down to 5 ppm/K, tolerance down to ± 0.02 %
- Unrivaled pulse load robustness



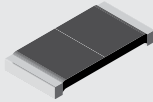
RESISTORS

WSLP0805

SMD, Power Metal Strip® Resistor

Features

- 0.5 W current sensing resistor in the compact 0805 package size
- Very low resistance value range: 10 mΩ to 50 mΩ
- Standard tolerance of 1.0 % with 0.5 % available
- High-temperature performance: up to + 170 °C



CAPACITORS

MKT1820

Automotive Grade DC MKT Film Capacitor

Features

- AEC-Q200 qualified, automotive grade
- Maximum application temperature: 125 °C
- Maximum operating temperature for limited time: 150 °C
- Capacitance range: 1000 pF up to 15 μF



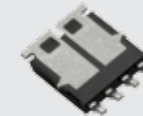
MOSFETs

SQJ500EP

40 V Dual N/P MOSFET in PowerPAK® SO-8L

Features

- AEC-Q101 qualified
- Dual n-channel/p-channel solution for synchronous buck DC/DC
- 175 °C maximum temperature



CAPACITORS

TH3

SMD Tantalum Molded Case, High Temperature: 150 °C

Features

- Automotive and industrial applications
- Operating temperature: up to 150 °C synchronous buck DC/DC
- AEC-Q200 qualified
- 100 % surge current tested (B, C, D, E case sizes), RoHS-compliant



RESISTORS

TNPW e3 Series

High-Stability Thin Film Chip Resistors

Features

- Low temperature coefficient and tight tolerances: ± 0.1 %, ± 10 ppm/K
- Excellent overall stability at different environmental conditions
- AEC-Q200 qualified
- Case sizes: 0402 to 1210



INDUCTORS

IHLP-4040DZ

Low-Profile, High-Current IHLP® Inductor

Features

- AEC-Q200 qualified
- Shielded construction
- Handles high transient current spikes without saturation
- Ultra-low buzz noise due to composite construction



RECTIFIERS

SS2PH10

High-Current Density Surface-Mount Schottky

Features

- Very low profile: typical height of 1.0 mm
- T_j max = 175 °C
- Low forward voltage drop, low power losses
- Meets MSL level 1, RoHS-compliant, halogen-free



THE VISHAY ADVANTAGE

AEC Qualifications

High-Temperature Performance

High Reliability

Low Profile

Long Life

and more...

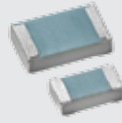


EXHAUST SYSTEMS

RESISTORS, NON-LINEAR

PTS Thin Film Chip

Platinum SMD Chip
Temperature Sensor



Features

- Case sizes: 0603, 0805, and 1206
- Operating temperature: up to 155 °C
- Excellent long term stability: R_0 drift < 0.04 %

CAPACITORS

VJ...31/VJ...34

AEC-Q200 Qualified Multilayer
Ceramic Chip Capacitors



Features

- COG (NP0), X7R, and X8R dielectric
- Case sizes: 0402 to 1812 and voltages up to 3000 V_{DC}
- Operating temperature up to + 175 °C (above + 125 °C derating)
- AgPd termination available for epoxy bonding

DIODES

SMxS24A

PAR® Transient Voltage
Suppressors



Features

- Junction passivation optimized design with passivated anisotropic rectifier technology
- $T_J = 175$ °C capability suitable for high reliability and automotive requirements
- Available in uni-directional polarity only
- Low leakage current, low forward voltage drop, and high-surge capability

RESISTORS, NON-LINEAR

NTCV101E4964HMB0

Very High Temperature NTC
Thermistor



Features

- Long lifetime stability at 900 °C
- Highly resistant to thermal shocks

RESISTORS, NON-LINEAR

NTCSMELF

Glass-Sealed SMD NTC MELF
Thermistor



Features

- Fast response time: Down to 0.9 s
- Resistant to corrosive atmospheres and harsh environments
- Wide temperature range: - 40 °C to + 150 °C
- 100 % surge current tested (B, C, D, E case sizes)
- RoHS-compliant

Vishay Intertechnology's reputation for innovation, reliability and quality is complemented by a decades-long record of service to the automotive industry.

Key Website Content

AEC-Qualified Products Overview
www.vishay.com/doc?49923

Automotive Grade Products Overview
www.vishay.com/doc?49924

Detailed Applications Information

Diesel ECU and Fuel Injector Drivers
www.vishay.com/applications/automotive/diesel_ecuandfuelinjectordrivers/

Electric Power Steering (EPS)
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Automotive Product Quick Links

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HEATING, VENTILATION, AIR CONDITIONING (HVAC)

CAPACITORS

120 ATC - High-Temperature Axial Aluminum Capacitor

Axial Leads; 125 °C; 16 V to 100 V

Features

- Extra long useful life: up to 8000 h at 125 °C, high reliability
- Lowest ESR levels providing very high ripple current capability
- Extended temperature range: usable up to 150 °C
- Sizes 10 mm x 30 mm to 21 mm x 38 mm; low mounting height vibration and shock resistant



RESISTORS, NON-LINEAR

NTCLE203E3

2-Point Radial Leaded NTC Thermistor

Features

- High accuracy over a wide temperature range up to 150 °C
- High stability over a long life
- Exceptional thermal shock withstanding performance
- AEC-Q200 qualified



OPTOELECTRONICS

TCUT1300X01

Dual Channel Transmissive Sensor



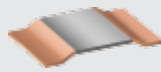
Features

- Resolve direction and speed with dual channel transmissive (interrupter) sensor
- Wide gap of 3 mm; compatible with mechanical tolerances
- Wide operating temperature range from - 40 °C to 105 °C; enhanced temperature release
- Unlimited floor life; moisture sensitivity Level 1 per J-STD-020

RESISTORS

WSLP5931

SMD, Power Metal Strip® Resistor



Features

- High power ratings from 7 W to 10 W in 5931 package size
- Extremely low resistance values: 0.3 mΩ, 0.5 mΩ, 10.0 mΩ, 2.0 mΩ, and 3.0 mΩ
- Tight tolerances of 1.0 % and 5.0 %
- Low thermal EMF (< 3 μV/°C)

CAPACITORS

Axial Leaded A...V Series and Radial Leaded K...V Series MLCCs

Leaded MLCCs for Automotive Applications

Features

- Operating temperature range: - 55 °C to + 160 °C
- Rated voltage: 50 V, 100 V, and 200 V
- Class 1 Ceramic C0G and Class 2 Ceramic X7R, X8R
- Axial or radial leaded, AEC-Q200 qualified



MOSFETS

SQM120N04-2m1

40 V MOSFET in D²PAK: 0.0021 Ω, 120 A



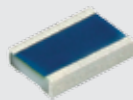
Features

- AEC-Q101 qualified
- Low R_{DS(on)} for motor drive applications
- 175 °C maximum temperature

RESISTORS

MCW 0406 AT Professional and Precision

Wide Terminal Thin Film Chip Resistors



Features

- Rated dissipation up to 300 mW
- Superior temperature cycling robustness
- Operating temperature range: up to 175 °C for 1000 h
- AEC-Q200 qualified (pending)

INDUCTORS

IHLP-6767GZ

Low-Profile, High-Current IHLP® Inductor



Features

- AEC-Q200 qualified
- Shielded construction
- Handles high transient current spikes without saturation
- Ultra-low buzz noise due to composite construction

RECTIFIERS

MBRB1560CT

Dual Common-Cathode Surface-Mount Schottky



Features

- Guardring for overvoltage protection
- Low forward voltage drop
- High reliability grade, AEC-Q101 qualified
- Meets MSL level 1, RoHS-compliant

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into your **DESIGN**

