Automotive LDO Selector Guide

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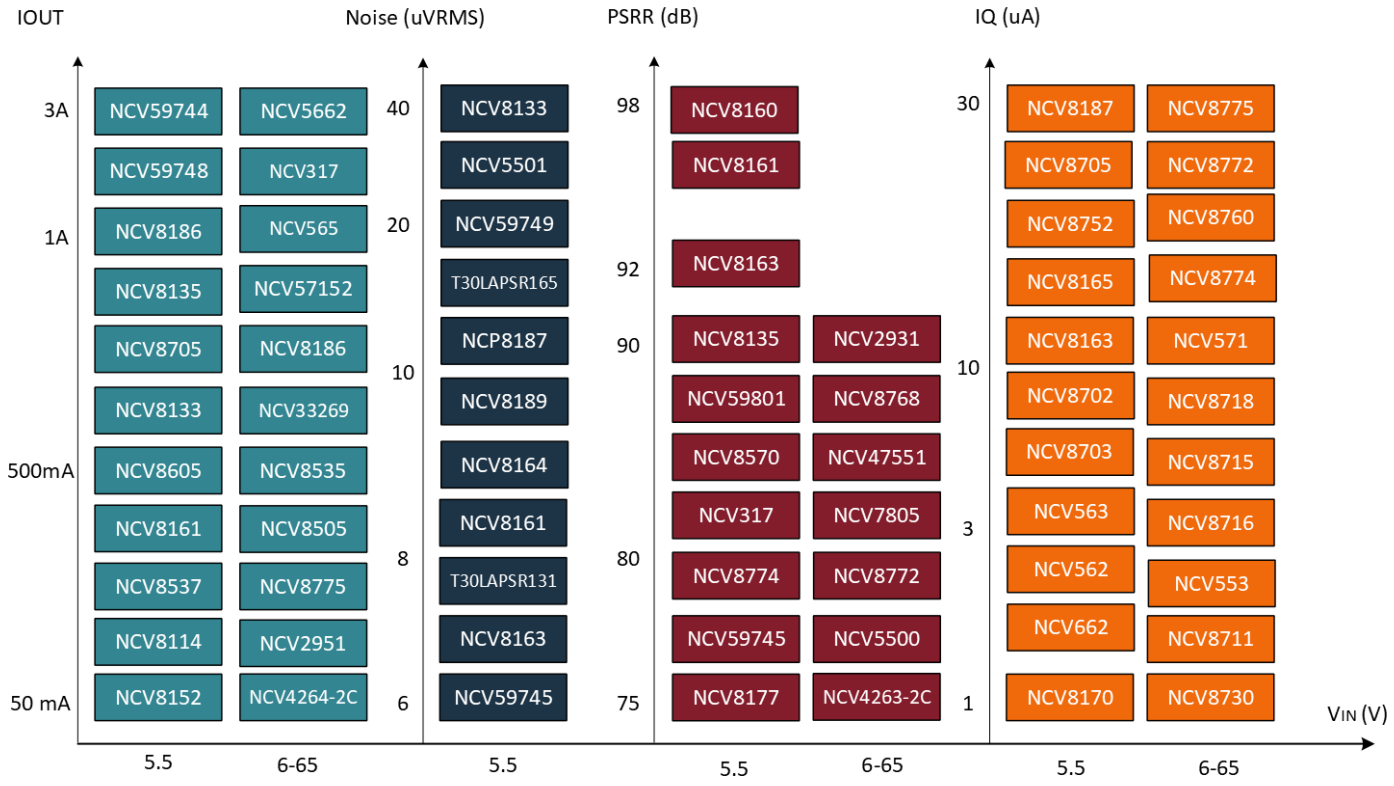
An **LDO** is a type of linear regulator that has a lower dropout voltage. The dropout voltage is the minimum voltage required across the regulator for it to be able to maintain regulation. The desired output voltage plus the dropout voltage equals the minimum required input voltage. onsemi's wide portfolio of LDO products features high performance devices. They are suitable for battery-powered applications due to their wide input voltage ranges, high PSRR (power supply rejection rate), low quiescent current, high efficiency and fast transient response. Wide input (VIN) and output (VOUT) voltage ranges allow for higher flexibility in setting up the power tree. Quiescent current (IQ) is the current that flows into a system in standby mode. The lower quiescent current has a positive effect on the battery life. Fast load transient response limits excessive voltage dips and overshoots.

- **Ultra-Low Quiescent Current (Iq)**
  - Quiescent currents as low as 500 nA, and can drop to 100 nA in standby mode.
  - This is ideal for modules that remain connected to the battery, helping reduce parasitic drain and extend battery life.
- **Integrated Functional Safety Features**
  - Many automotive LDOs include:
    - Reset and Early Warning
    - Window Watchdog for microcontroller fault detection
    - Programmable delay times
    - Enable pins for power sequencing and control
- **High PSRR (Power Supply Rejection Ratio)**
  - PSRR values up to 98 dB, which is excellent for noise-sensitive automotive applications like camera modules and infotainment systems.
- **Wide Input Voltage Range**
  - Support for .04V to 65V input range, suitable for 12V and 24V automotive systems.
- **AEC-Q100 Qualification & TS16949 Manufacturing**
  - All automotive-grade LDOs are AEC-Q100 qualified, ensuring reliability under harsh conditions.
  - Manufactured in TS16949-certified facilities, meeting stringent automotive quality standards.
- **Compact and Thermally Efficient Packaging**
  - Available in SOIC-8 EP, DPAK, DFN, and WDFN packages with thermal enhancements.
  - Miniaturized options like XDFN4 (1×1 mm) support space-constrained designs without sacrificing performance.

Automotive LDO Quick Reference

Automotive Applications

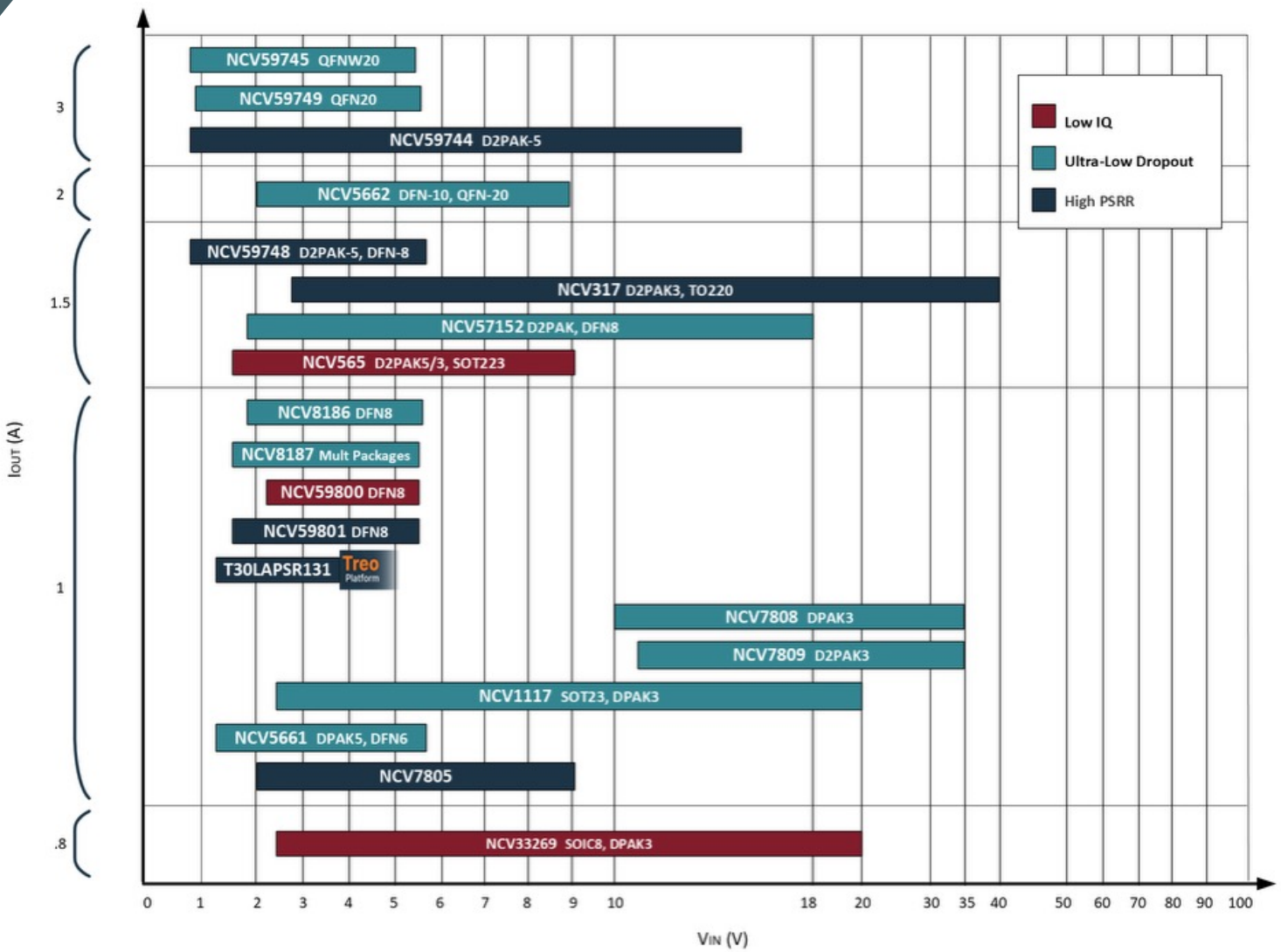
- Rear camera modules
- Instrument clusters
- Body and chassis control units
- Battery management systems
- Wireless charging and sensors
- Safety-critical ECUs
- Zonal Architecture



Click for a complete list of Automotive LDOs

Automotive LDO (Low Dropout Regulators)

I_{OUT} .8A to 3A



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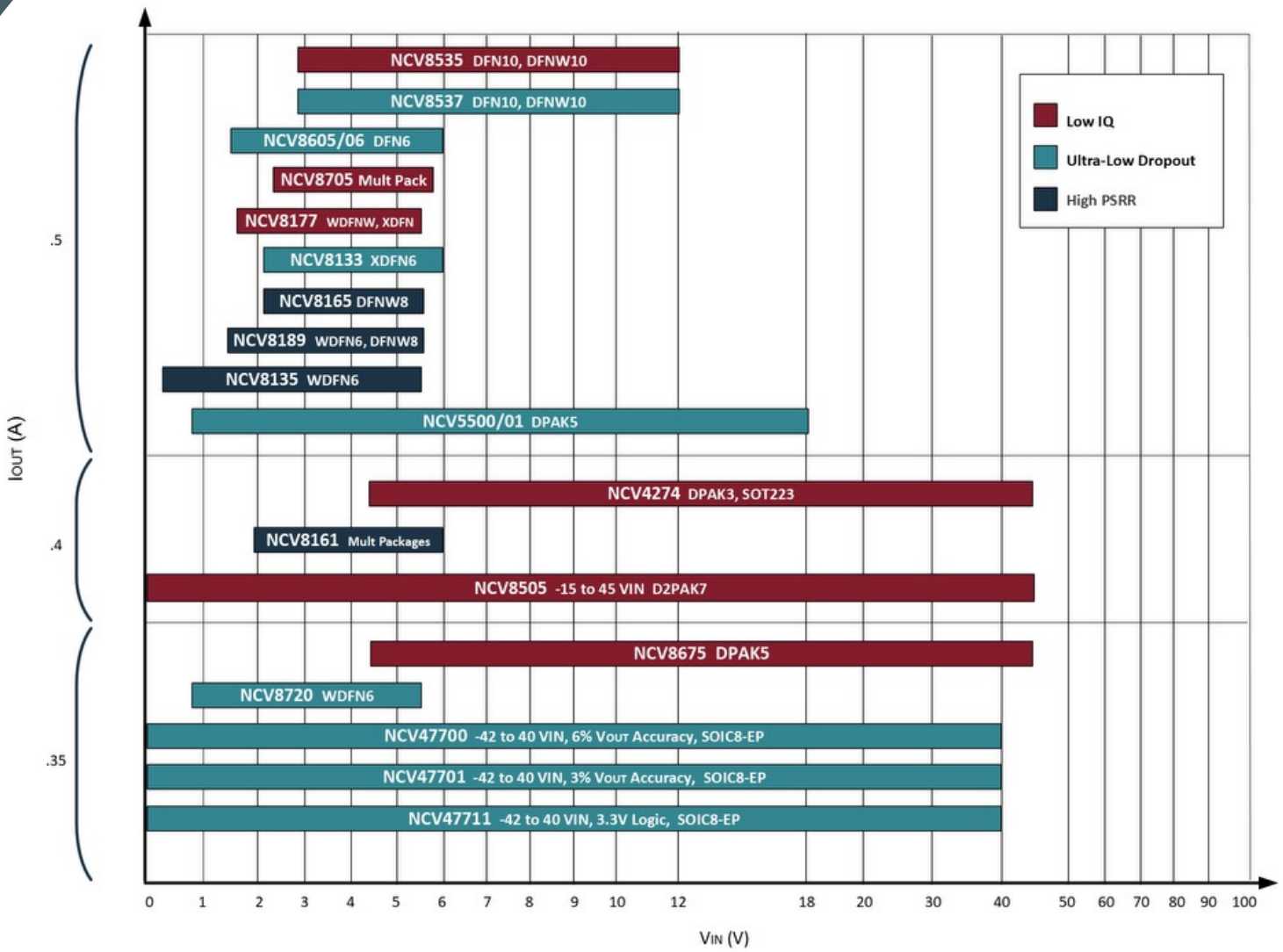
Automotive LDO (Low Dropout Regulators) *continued*

I_{OUT} .35A to .5A



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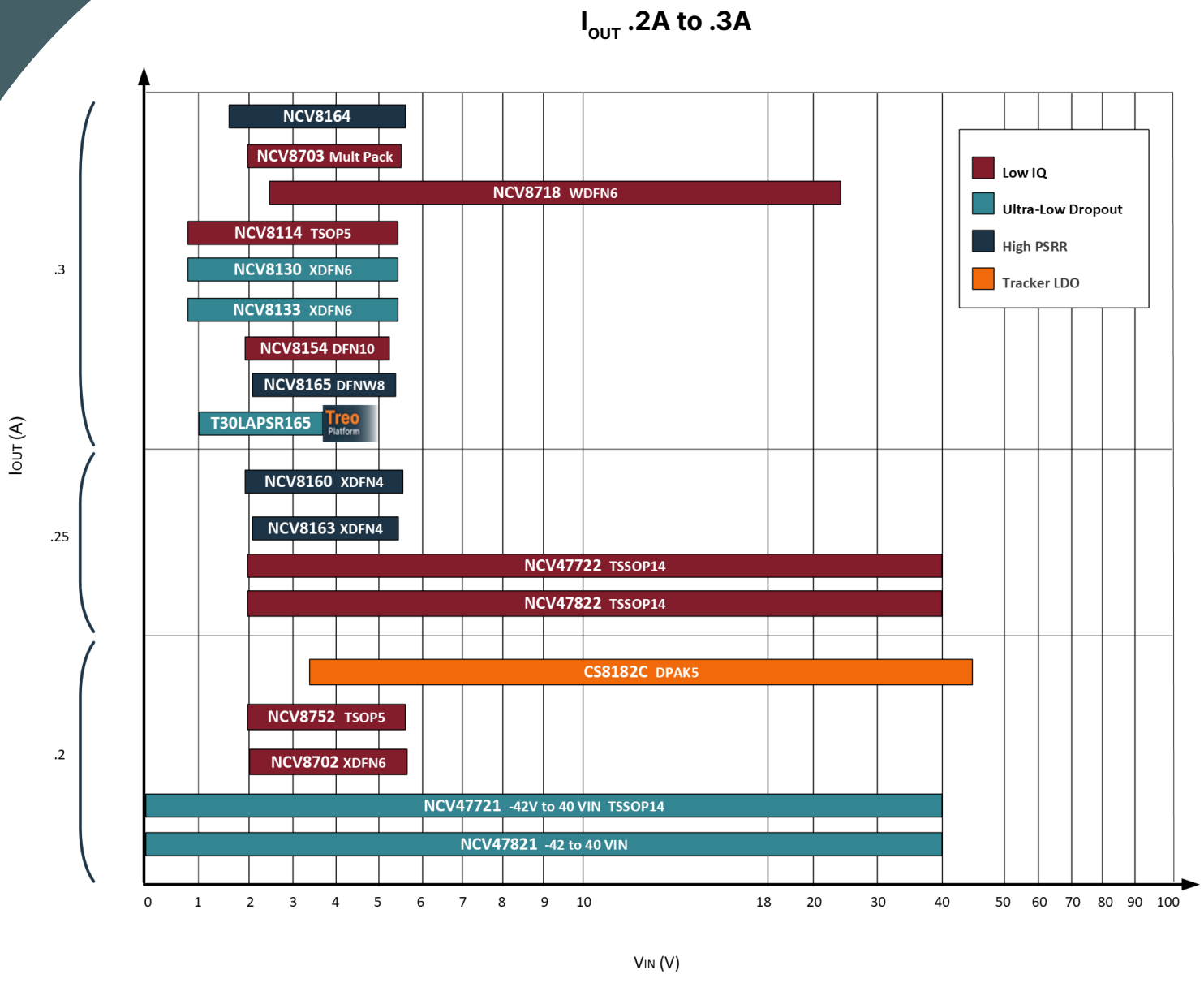
Automotive LDO (Low Dropout Regulators) *continued*



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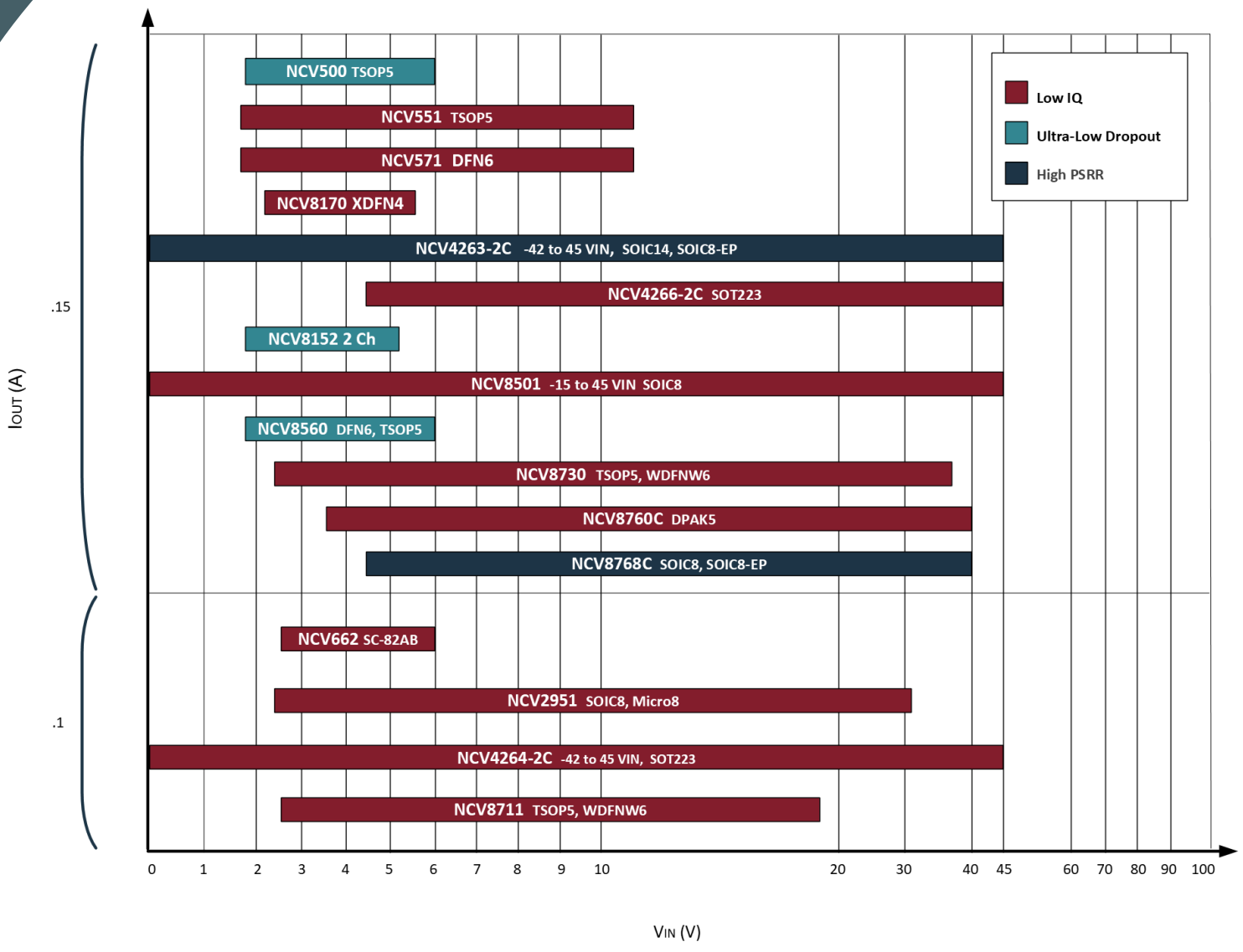
Automotive LDO (Low Dropout Regulators) *continued*

I_{OUT} .1A to .15A



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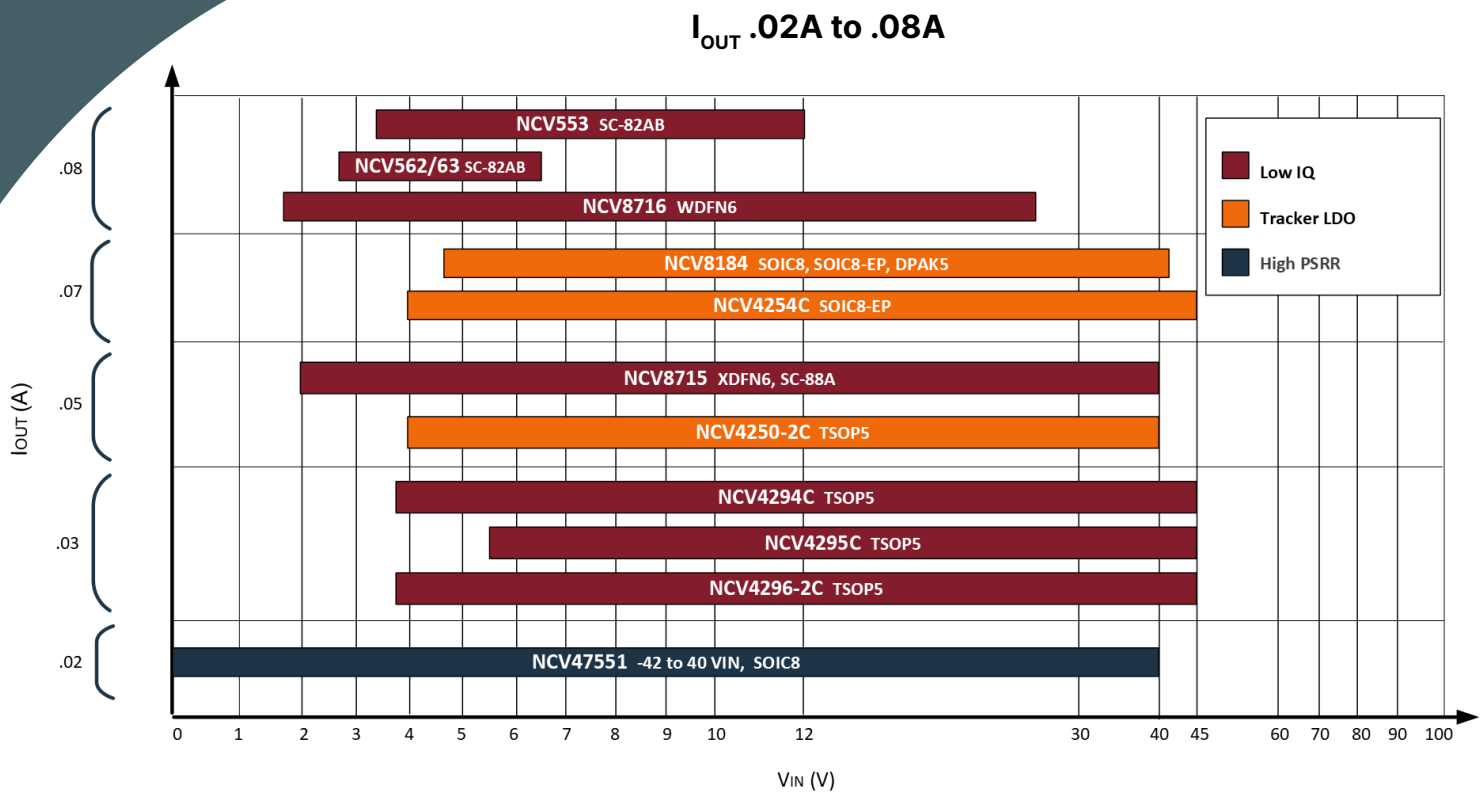
Automotive LDO (Low Dropout Regulators) *continued*



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Why using a Voltage Tracking LDO?

With a tracking regulator, the reference can be "borrowed" from a more precise regulator.

Example Application:

5 V, +/-1% and 2.5 V, +/-1%

Solution #1:

5 V-1% regulator AND a 2.5 V-1% regulator. In this case it is possible for one output to be +1% high, and the other 1% low, so the ratio of the two outputs could be in error by 2%.

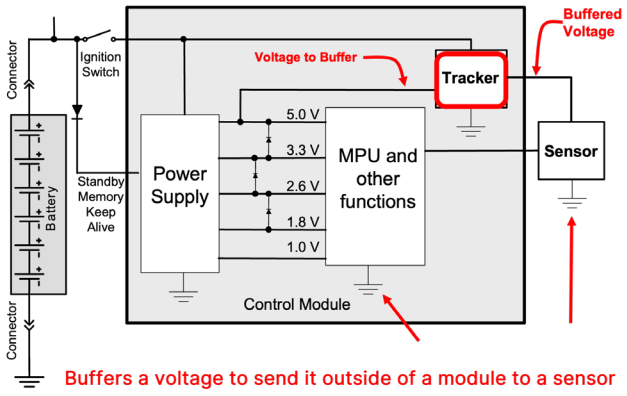
Solution #2 – Tracking Regulator:

5V-1% regulator AND a 1% tracking regulator. In this case the ratio of the error will never exceed 1%.

Key Benefits:

- Reliable protection
- Easy and accurate voltage ratio
- Increased flexibility
- Lower system cost

Tracking LDO



Buffers a voltage to send it outside of a module to a sensor

Typical Applications:

- Sensor power management.
- DDR memory power management, where the termination voltage must be exactly ½ Vcc.
- ECU is more likely to use fast DDR memory (body processing data rates are slower), more value from a solution that controls the ratio between 2 different voltages.

onsemi offers a wide variety of package types optimized for thermal performance, miniaturization, and power dissipation:

- **Miniature Packages**
  - **XDFN4 (1×1 mm), WDFN6 (2×2 mm), TSOP-5, SC70-5 —** ideal for space-constrained designs.
- **Thermally Efficient Packages**
  - **DFN, DPAK, SOIC-EP, TO-220 —** designed for higher power dissipation and robust thermal management.
- **Automotive-Grade Packages**
  - **AEC-Q100** qualified with temperature grades up to 150°C, suitable for harsh environments

Click for a complete list of Automotive LDOs

Popular Package Types

DFN-3 

DFNW-8 

DFN-10 

D2PAK-3 

D2PAK-5 

DPAK-3 

MSOP-8 

QFN-20 

SC-70 

SC88-A 

SOIC-8 

SOT-23 

SOT-223 (TO-261) 

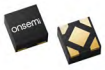
TSOP-5 

TSOT-23 

WDFNW-6 

UDFN-6 

WDFN-6 

XDFN-4 

Additional Resources

- **WebDesigner+**

►► Visit www.onsemi.com for more information and additional resources.

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