

LDOs Boast 98-dB PSRR, Benefitting Imaging And Wireless Applications

[ON Semiconductor](#)'s new range of ultra-low noise low dropout regulators (LDOs) are said to offer the industry's best power supply rejection ratio (PSRR). The NCP16x series, along with the AEC-Q100 qualified NCV81x automotive variants, deliver improved performance in applications such as automotive ADAS image sensor modules, portable devices and wireless applications including 802.11ad WiGig, Bluetooth and WLAN (Fig. 1).

The NCP16x series comprises four devices with a wide input voltage range from 1.9 to 5.5 V to support a variety of end applications. Output current of 250 mA, 450 mA and 700 mA in a common package footprint enable scalability of designs. A high PSRR of 98 dB blocks unwanted power supply noise from reaching sensitive analog circuits, while a low noise of 6.5 μ Vrms is said to eliminate the need for additional output capacitance.

The LDOs have a dropout voltage of just 80 mV, supporting and helping to prolong the operating life of battery-powered end products. This is further enhanced by a no-load quiescent current of only 12 μ A. They are available in fixed output voltages from 1.2 V to 5.3 V with an accuracy of \pm 2% over the entire application range. Stable operation is achieved with only 1 μ F of capacitance on the input and output enabling lower system cost and size. Key electrical specs for the NCV816x and NCP16x series are given in Tables 1 and 2, respectively.

A new patented architecture is implemented to achieve the high PSRR performance. Providing high PSRR over a wide frequency range (10 kHz to 100 kHz) is important to end application performance. In image sensor applications for ADAS cameras, for example, the NCV8163 provides improved image quality by filtering out power supply noise that would otherwise corrupt the voltage signal applied to the pixel. In wireless applications such as WiGig 802.11ad, the combination of high PSRR and low noise as seen in the NCP167 ensure the power-per-bit efficiency capability of the system is realized by providing a clean power supply. Fig. 2 shows the data sheet specifications of PSRR for the various members of this LDO series.

"This new series of ultra-low noise LDOs dramatically improves PSRR, exceeding some conventional LDOs by 30 dB. Our customers are excited about the new level of performance they are able to achieve with this product family," said Tim Kaske, Sr. business unit director, ON Semiconductor.

NCP16x devices are available in TSOP-5, XDFN-4, and WLCSP-4 packages. NCV816x automotive variants are available in TSOP-5 and XDFN-4 packages. For more information, see the product [page](#).

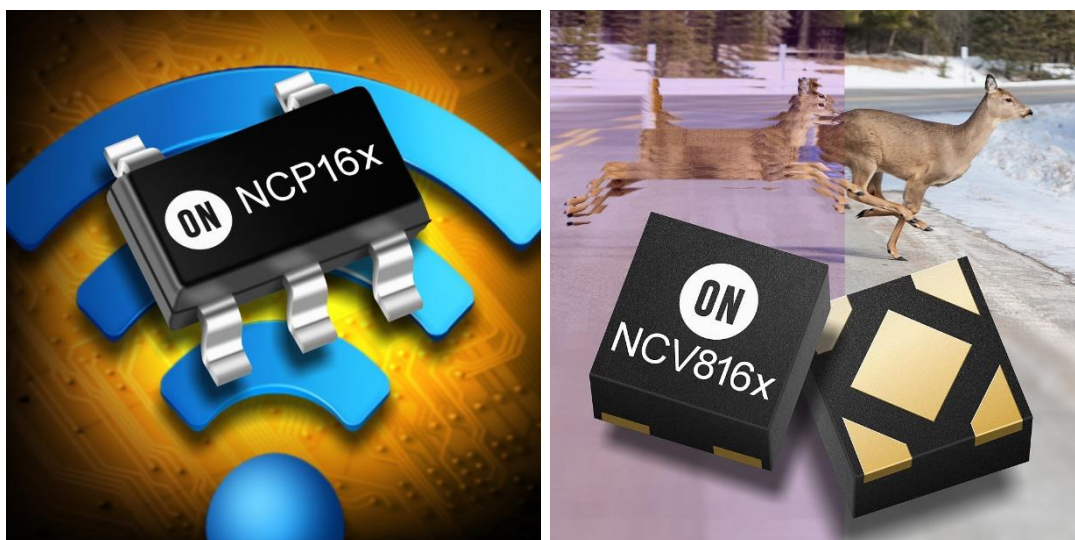


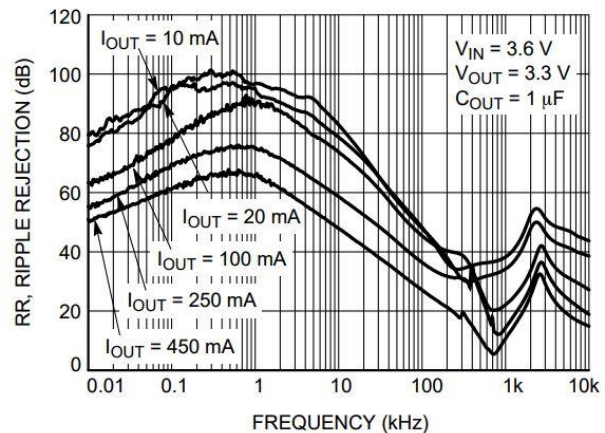
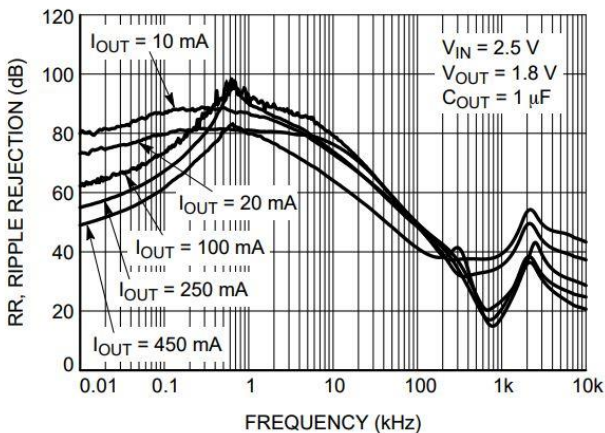
Fig. 1. The NCP16x and NCV816x series of LDOs provide up to 98 dB of PSRR to improve performance in the targeted applications. For example, the NCP16x series is intended for wireless connectivity applications such as noise-sensitive WiFi modules for which it also provides low quiescent current to support battery-powered operation and low-noise performance for signal integrity. Meanwhile, the NCV816x series LDOs are meant to power automotive image sensors for which they provide high PSRR over a wide frequency range of 1 kHz to 1 MHz, high efficiency with low dropout capability, and small packages for easy integration into camera modules.

Table 1. Key electrical specs for NCV816x LDOs.

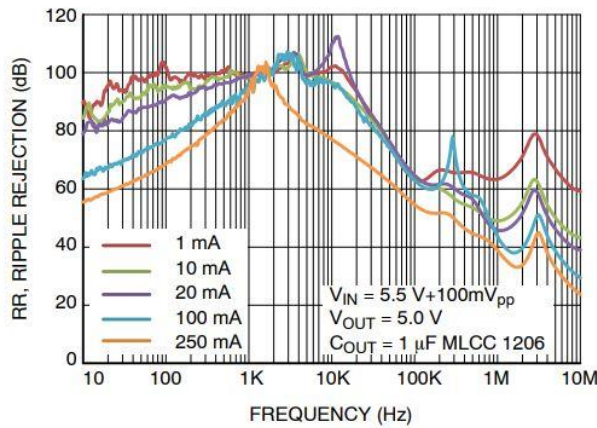
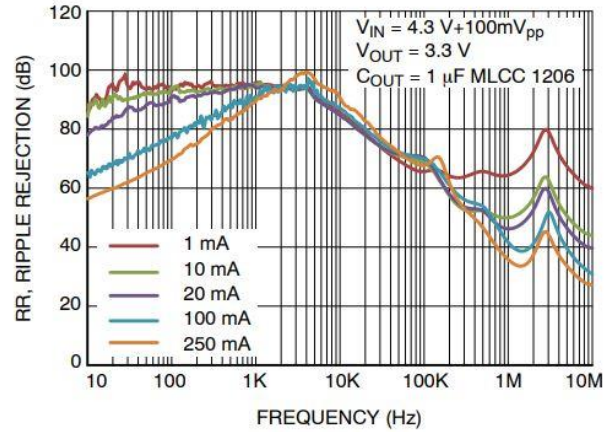
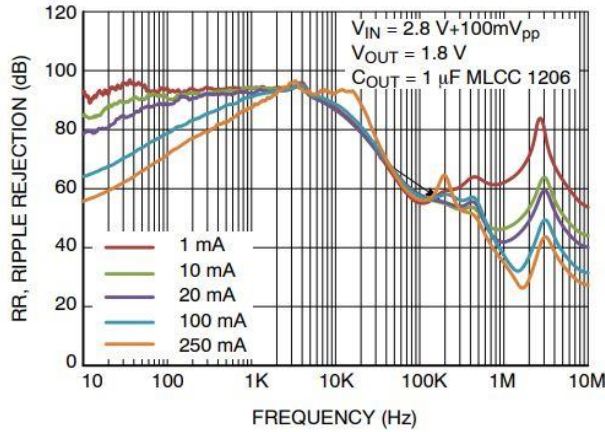
	NCV8160	NCV8161	NCV8163
Output current (mA)	250	450	250
PSRR (dB) at f = 1 kHz	98	98	92
PSRR (dB) at f = 100 kHz	48	48	60
Noise (μ Vrms)	10	10	6.5
I_Q (μ A)	18	18	12
Dropout voltage (mV)	80	150	80

Table 2. Key electrical specs for NCP16x LDOs.

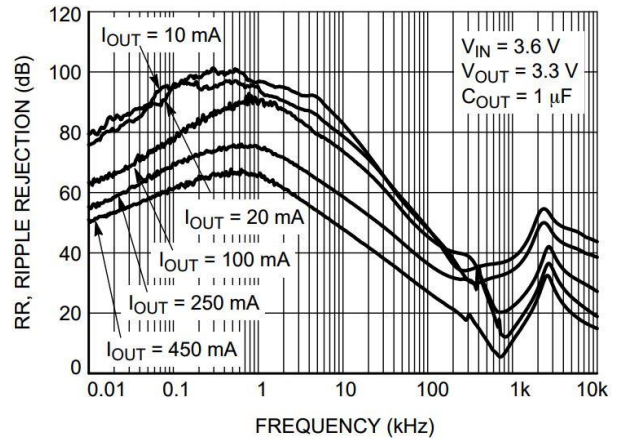
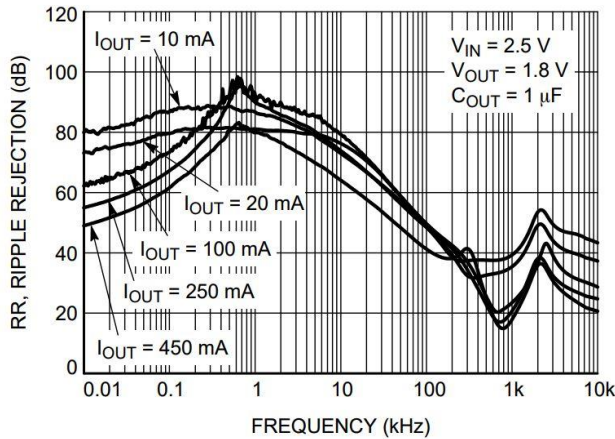
	NCP160	NCP161	NCP163	NCP167
Output current (mA)	250	450	250	700
PSRR (dB) at f = 1 kHz	98	98	92	85
PSRR (dB) at f = 100 kHz	48	48	60	63
Noise (μ Vrms)	10	10	6.5	8.5
I_Q (μ A)	18	18	12	12
Dropout voltage (mV)	80	150	80	210



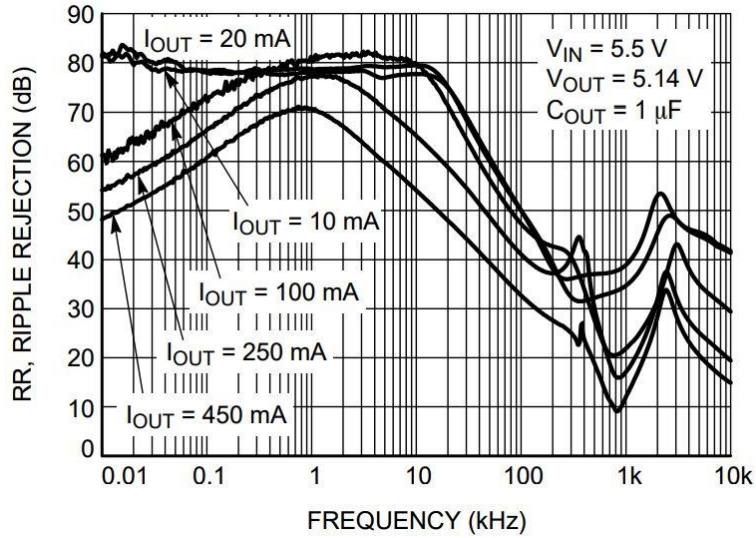
NCV8161 450-A LDO. (NCV8160 250-mA LDO datasheet shows similar performance.)



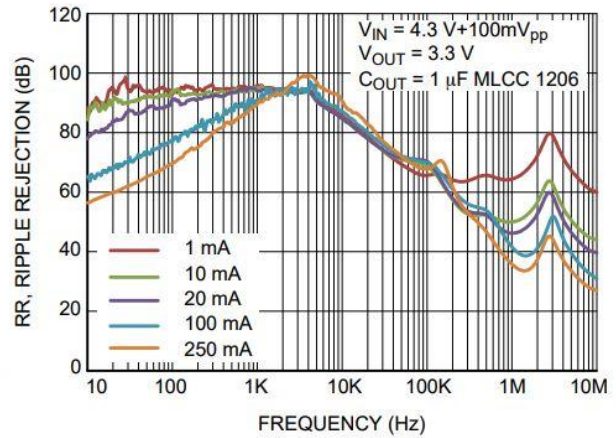
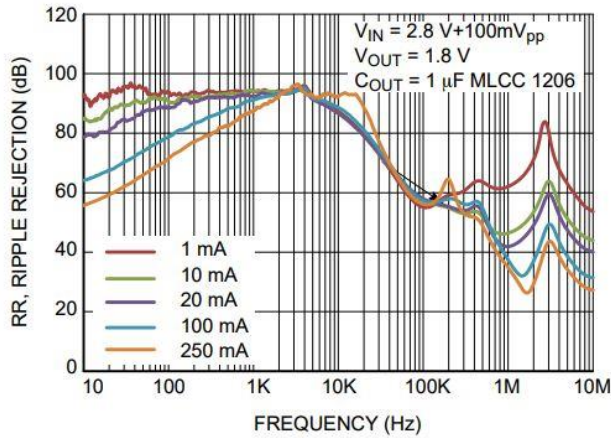
NCV8163 250-mA LDO.



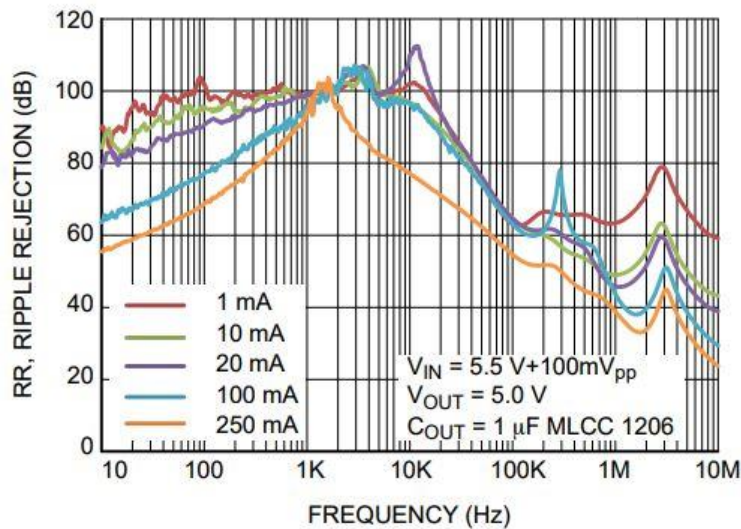
NCP161 450-mA LDO. (NCP160 250-mA LDO datasheet shows similar performance.)



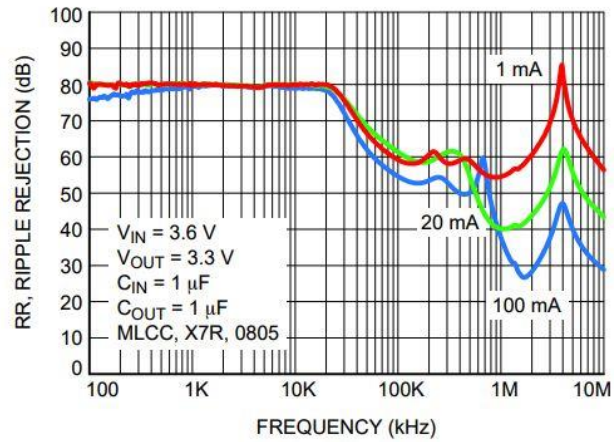
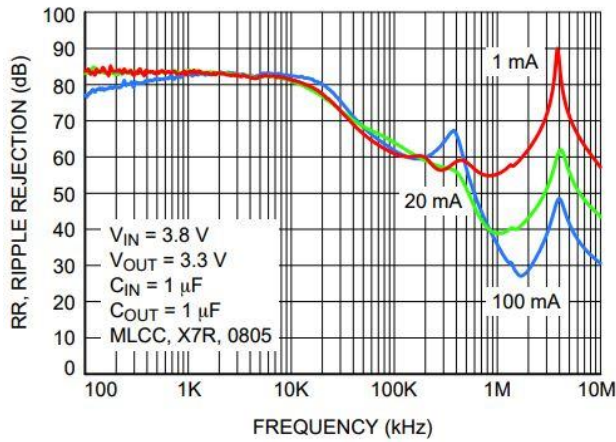
NCP161 at higher V_{IN} . (NCP160 datasheet at higher V_{IN} shows similar performance.)



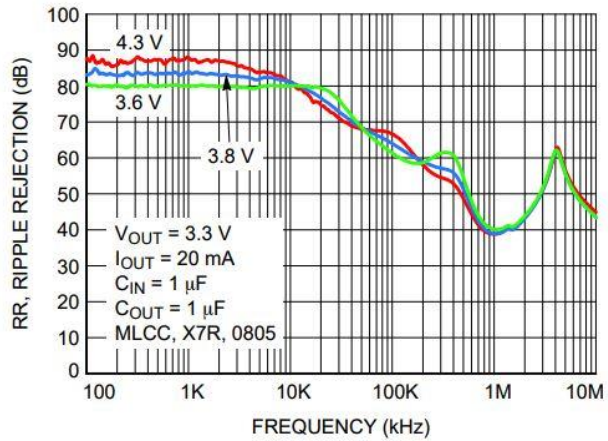
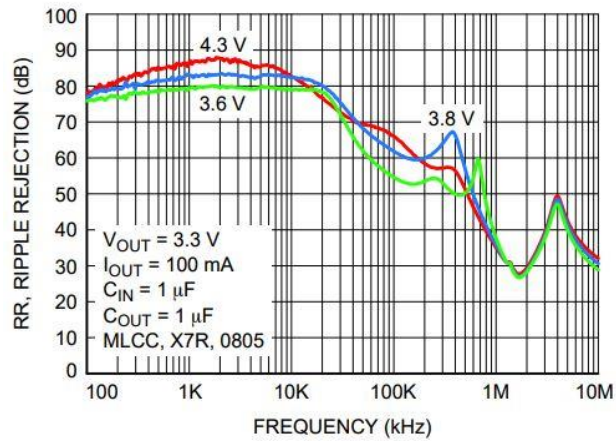
NCP163 250-mA LDO.



NCP163 250-mA LDO at higher V_{IN} .



NCP167 750-mA LDO.



NCP167 750-mA LDO at higher V_{IN} .

Fig. 2. Datasheet graphs of PSRR performance for the various members of the NCV816x and the NCP16x series.