

Description

AUR9503 is a low-noise and high-PSRR LDO linear voltage regulator which operates from 2.5V to 5.5V and provides up to 150mA output current.

AUR9503 achieves ultra low quiescent current to be ideally used with green operational portable products. Fixed output voltage options are provided with an internal built-in feedback circuit and optimized for stable operations with small 1µF ceramic output capacitors for excellent transient performance. EN pin enables the main chip operation and enables the output to be turned off to allow reduced power consumption in shutdown mode with a smaller than 0.1µA shutdown current. The low dropout voltage is 100mV at a load current of 150mA for system power efficiency. An internal current limit circuit is designed and operated as a short circuit protection for the regulator output pin.

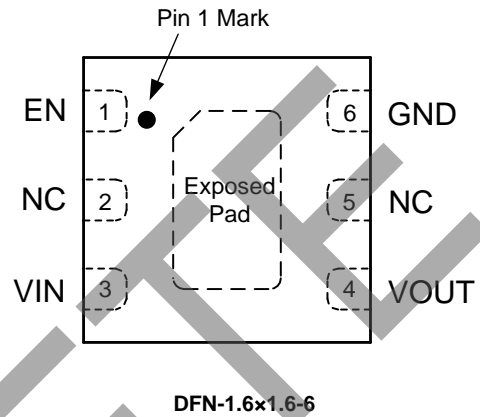
The AUR9503 is available in tiny DFN-1.6x1.6-6 package for a small footprint solution to satisfy the portable design needs.

Features

- Low Noise for RF Application
- Low Dropout Voltage: 100mV @ 150mA
- Standby Current: 55µA
- < 0.1µA Standby Current When Shutdown
- Thermal Shutdown Protection
- Current Limiting Protection
- Only 1µF Output Capacitor Required for Stability
- Wide Operating Voltage Range: 2.5V to 5.5V

Pin Assignments

(Top View)

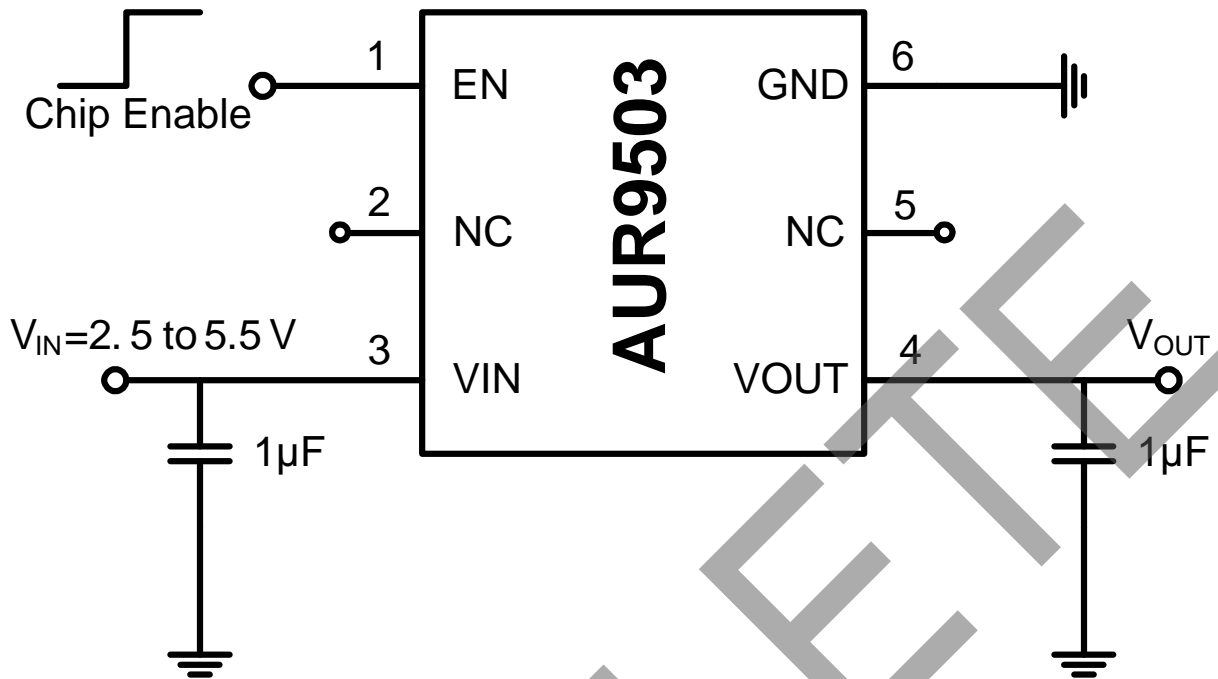


Applications

- Battery-powered Device or Equipment
- Mobile Phone, Digital Camera and MP3 Player
- Radios, Other Hand-held Games and Instruments
- Post DC-DC Voltage Regulation
- Mini PCI & PCI-E Card
- WiFi Card

OBSOLETE

Typical Applications Circuit

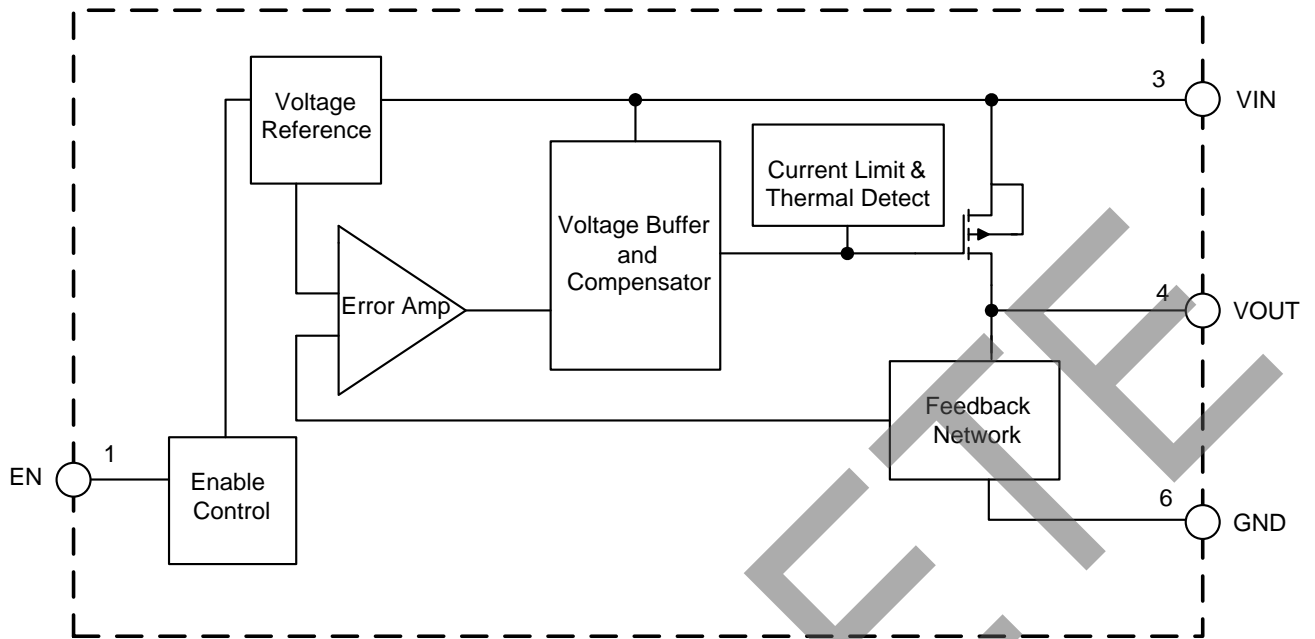


Pin Descriptions

Pin Number	Pin Name	Function
1	EN	Enable input signal, a 100kΩ pull-down resistor is needed when there is no digital signal connected
2, 5	NC	No internal connection
3	VIN	Regulator input supply voltage with 1µF or greater capacitor
4	VOUT	Regulator voltage output pin, 1µF or greater capacitor is needed
6	GND	Ground connection

OBSOLETE – PART DISCONTINUED

Functional Block Diagram



OBSOLETE – PART DISCONTINUED

OBSOLETE

Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Value	Unit
V_{IN}	Supply Input Voltage	0 to 6.0	V
V_{EN}	Enable Input Voltage	-0.3 to $V_{IN}+0.3$	V
V_{OUT}	Output Voltage	0 to $V_{IN}+0.3$	V
P_D	Power Dissipation (On PCB, $T_A=+25^{\circ}C$)	0.55	W
θ_{JA}	Empirical Thermal Resistance (On PCB, $T_A=+25^{\circ}C$)	180	$^{\circ}C/W$
T_J	Operating Junction Temperature	+160	$^{\circ}C$
T_{OP}	Operating Temperature	-40 to +85	$^{\circ}C$
T_{STG}	Storage Temperature	-55 to +150	$^{\circ}C$
V_{HBM}	ESD (Human Body Model)	2000	V
V_{MM}	ESD (Machine Model)	200	V

Note 1: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Recommended Operating Conditions

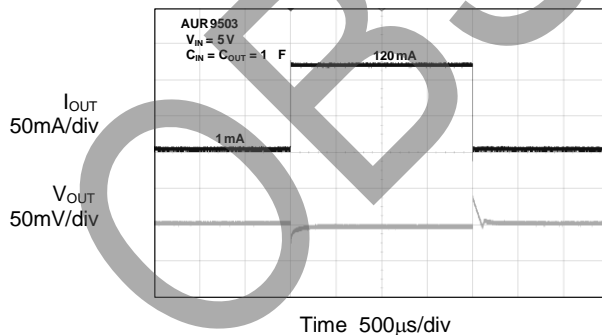
Symbol	Parameter	Min	Max	Unit
V_{IN}	Supply Input Voltage	2.5	5.5	V
T_J	Junction Temperature Range	-40	+125	$^{\circ}C$
T_A	Ambient Temperature Range	-40	+80	$^{\circ}C$

Electrical Characteristics ($V_{IN}=V_{OUT}+0.5V$, $C_{IN}=C_{OUT}=1\mu F$ (Ceramic), $T_A=+25^\circ C$, unless otherwise specified.)

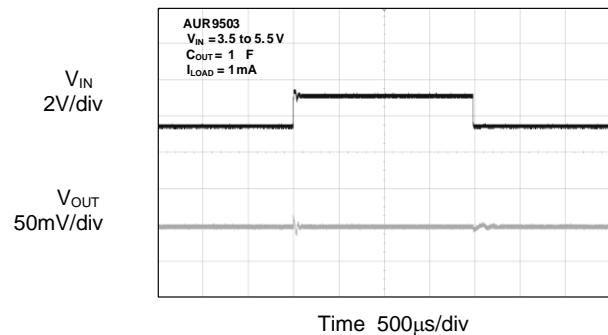
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
V_{IN}	Supply Voltage	–	2.5	–	5.5	V	
$\Delta V_{OUT}/V_{OUT}$	Output Voltage Accuracy	$I_{OUT}=1mA$	-2	–	2	%	
I_{SD}	Shutdown Current	EN=Low, $I_{OUT}=0mA$	–	0.1	1	μA	
I_Q	Quiescent Current	EN=High, No Load	–	55	–	μA	
I_{MAX}	Maximum Output Current	$R_{LOAD}=1\Omega$	180	300	410	mA	
V_{IH}	Enable Input Voltage	“H” Level	–	1.6	5.5	V	
V_{IL}		“L” Level	–	0	0.3		
V_{DO}	Dropout Voltage (Note 3)	$I_{OUT} = 150mA$	50	–	200	mV	
ΔV_{LOAD}	Load Regulation	$1mA < I_{OUT} < 150mA$, $2.5V < V_{IN} < 5.5V$	–	–	1.0	%	
ΔV_{LINE}	Line Regulation	$V_{IN}=(V_{OUT}+0.5V)$ to 5.5V, $I_{OUT}=1mA$ to 150mA	–	0.01	0.2	%	
PSRR	Power Supply Rejection Ratio	$C_{IN}=C_{OUT}=1\mu F$, $I_{OUT}=10mA$	$f = 1kHz$	–	70	–	dB
			$f = 10kHz$	–	60	–	
			$f = 100kHz$	–	40	–	
V_{NO}	Output Voltage Noise	$C_{OUT}=1\mu F$, $I_{OUT}=0mA$, $f=10Hz$ to 100kHz	–	30	–	μV_{RMS}	
T_{SD}	Junction Temperature Shutdown Threshold	–	–	+160	–	$^\circ C$	
T_{SDH}	Thermal Shutdown Temperature Hysteresis	–	–	+30	–	$^\circ C$	

Performance Characteristics

Load Transient Response



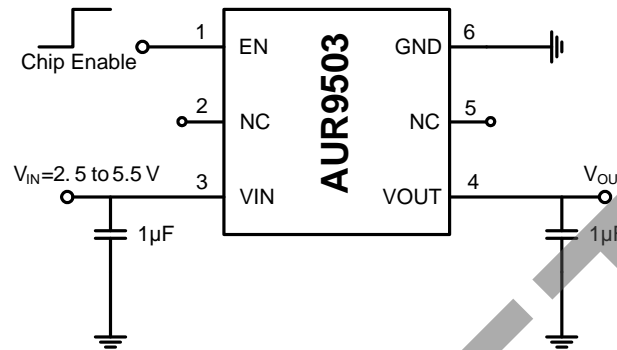
Line Transient Response



Application Information

Along with the highly development of portable devices, the LDO linear regulators are applied in many modern digital products like mobile phone, digital camera and MP3 player, etc. Hence, the battery of the hand-held device is widely used and it is important to design a LDO regulator with low quiescent current to extend the battery's life-time. When applied in RF application which is easily affected by noise, low noise supply voltage is also necessary. AUR9503, a low-noise and high-PSRR product, is ideally designed for such portable applications.

The basic application circuit of AUR9503 is shown in Figure of **Typical Application Circuit of AUR9503**.



Typical Application Circuit of AUR9503

1. Thermal Protection

The efficiency of a LDO linear regulator is determined by the difference between input and output voltage. The larger difference may cause overheat problems within the integrated circuit and reduce the efficiency. AUR9503 has a built-in over-temperature and over-current protection circuit. When the junction temperature exceeds +160°C, thermal shutdown circuit is enabled to prevent heat danger.

2. External Capacitors

The AUR9503 is stable using an output capacitor of 1µF. The ceramic capacitors can be used to attain better AC response. Moreover, low ESR can provide smaller undershoot and overshoot when loading current varies. Besides, an input capacitor of 1µF is required to stabilize VIN. All the capacitors' ground is recommended to share the IC's GND pin as direct and short as possible.

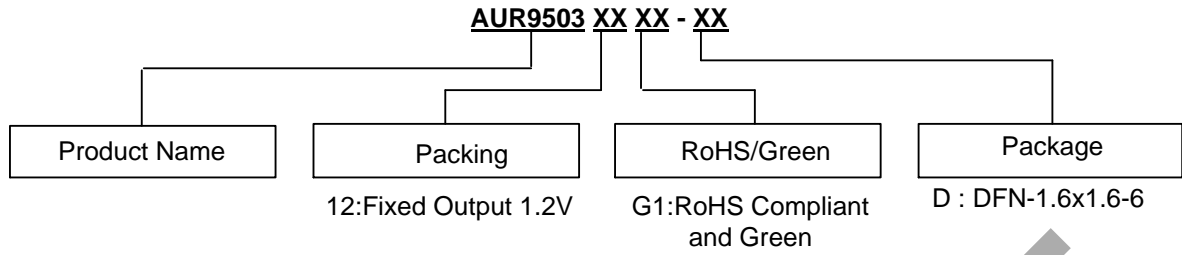
3. Enable Input

The AUR9503 can be operated or shutdown by the voltage level of EN pin. For continuous ON state, the EN pin is tied to VIN.

4. PCB Layout Consideration

The AUR9503 needs 1µF capacitors on VIN and VOUT pin. Place the capacitors as close as possible to the pin.

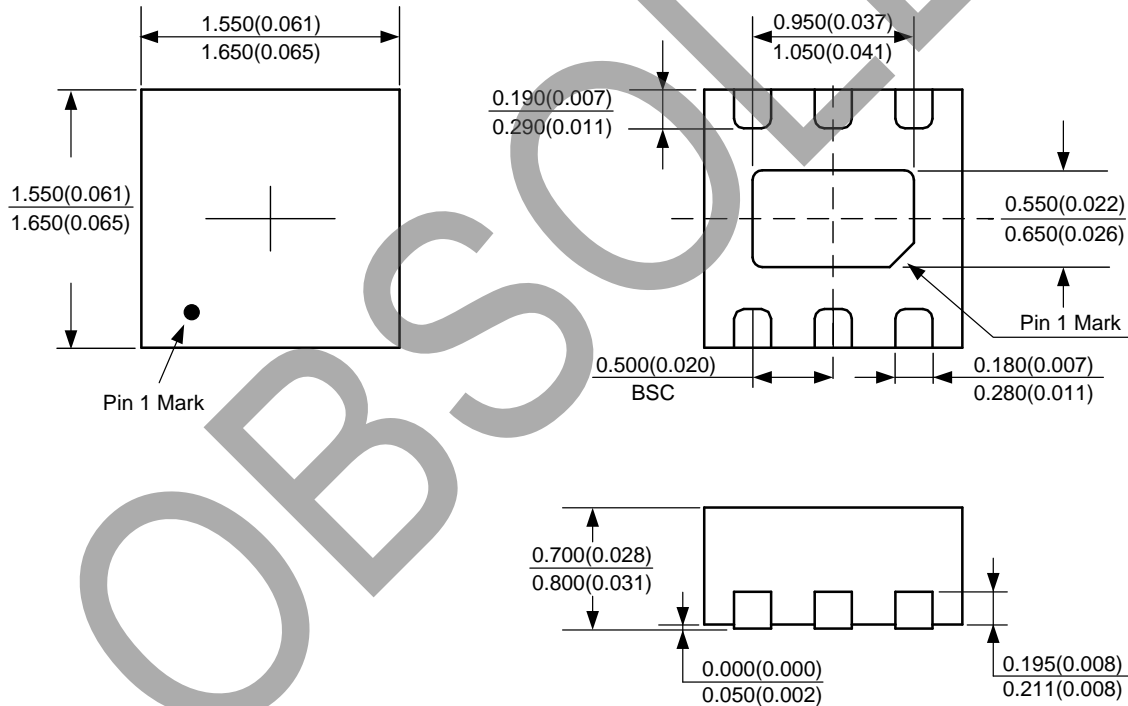
Ordering Information



Package	Temperature Range	Part Number	Marking ID	Packing
DFN-1.6x1.6-6	-40 to +80°C	AUR9503-12GD	503	Tape & Reel

Package Outline Dimensions (All dimensions in mm(inch).)

(1) Package Type: DFN-1.6x1.6-6



OBSOLETE – PART DISCONTINUED

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or
2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2018, Diodes Incorporated

www.diodes.com