WR0115

150mA, wide input Voltage Regulator

1. General Descriptions

The WR0115 series is a set of low power high voltage regulators implemented in CMOS technology which can provide 150mA output current. The device allows input voltage as high as 36V. The WR0115 series is available in several fixed output voltages.

Although designed primarily as fixed voltage regulators, the device can be used with external components to obtain variable output voltages.

The WR0115 series is available in Green SOT23-3, SOT23-5/L and SOT89-3/L packages. It operates over an ambient temperature range of -40ºC to +125ºC.

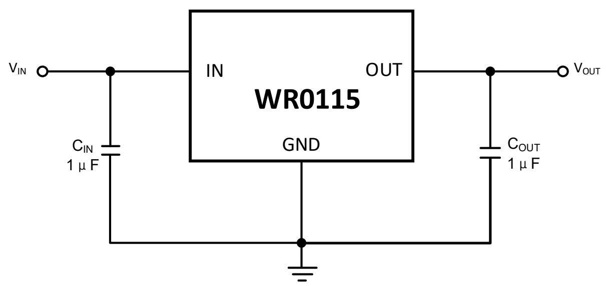
2. Applications

- Battery-Powered Equipment
- Communication Equipment
- Audio/Video Equipment

3. Features

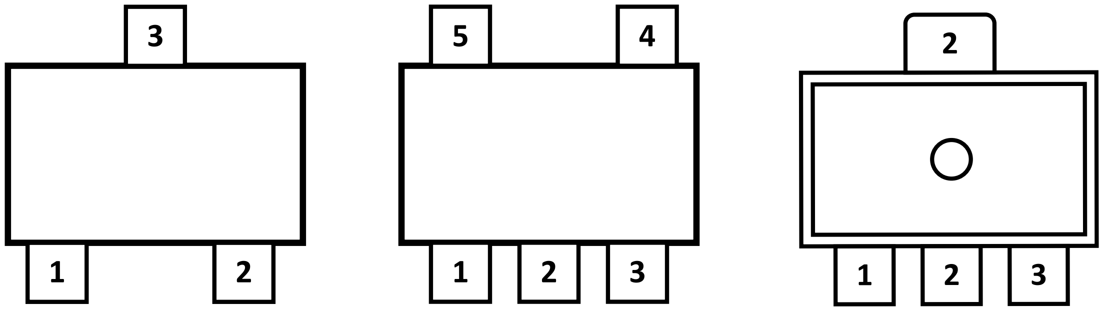
- High Input Voltage (up to 36V)
- Output Voltage: 0.8V to 4.7V with 0.1V per Step 5V to 12V with 0.25V per Step
- Low Dropout Voltage
- Low Power Consumption
- 150mA Nominal Output Current
- Low Temperature Coefficient
- Output Voltage Accuracy: ±3%
- Operating temperature：-40°C to 125°C
- Available in Green SOT23-3, SOT23-5/L and SOT89-3/L Packages
- Recommend Capacitor: 1μF

4. Typical Application



5. Pin Configuration

(Top View)



SOT23-3 SOT23-5/L SOT89-3/L

6. Pin Description

PIN NUMBER					PIN NAME	PIN FUNCTIONS
SOT23-3	SOT23-5L	SOT23-5	SOT89-3	SOT89-3L		
1	1	2	2	1	GND	Common ground.
2	3	5	1	3	OUT	Regulated output voltage. A low equivalent series resistance (ESR) capacitor, typically 1μF, is required from OUT to ground for stability. Place the output capacitor as close to the OUT and GND pins of the device as possible.
3	2	1	3	2	IN	Input voltage supply. Bypass with a typical 1μF capacitor to GND. Place the input capacitor as close to the IN and GND pins of the device as possible.
-	4,5	3,4	-	-	NC	NC.

7. Absolute Maximum Ratings[1]

PARAMETER		RATING	UNIT
Input voltage range		-0.3 ~ 44	V
Output voltage range		-0.3 to 6	V
Maximum output current		150[2]	mA
Power Dissipation PD @T_A = 25ºC	SOT23-3	500	mW
	SOT23-5/L	500	mW
	SOT89-3/L	1000	mW
Thermal Resistance[3] [4], θ_{JA}	SOT23-3	250	℃/W
	SOT23-5/L	250	℃/W
	SOT89-3/L	125	℃/W
Junction Temperature		150	℃
Lead Temperature Range		260	℃
Storage Temperature Range		-65 to 150	℃
ESD Susceptibility	HBM	±4000	V

Note1: Greater than these given values, the device will be damaged.
Note2: The maximum current that can be output, and guaranteed to work properly.
Note3: Measured on 2cm x 2cm 2-layer FR4 PCB board, 1 oz copper, no via holes on GND copper.
Note4: Power dissipation is calculate by $P_{D(MAX)}=(T_J-T_A)/R_{\theta JA}$.

8. Recommended Operating Conditions

PARAMETER	RATING	UNIT
Input voltage range	2.7 to 36	V
Nominal output voltage range	1.2 to 12	V
Output current	0 to 150	mA
Input capacitor	1	μF
Output capacitor	1	μF
Operating temperature range	-40 to 125	℃

9. Electrical Characteristics

(V_{IN} = V_{OUT}+2V or 4.0V, whichever is greater, C_{IN} = C_{OUT} = 1μF, Full = -40ºC to +125ºC, unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNIT
V_{IN}	Input Voltage			2.7		36	V
V_{OUT}	Output Voltage Range	0⩽I_{OUT}⩽150mA, T_A=25℃		0.97 V_{OUT}	V_{OUT}	1.03 V_{OUT}	V
V_{DO}	Dropout Voltage[1]	I_{OUT} =50mA, T_A=-40℃ to 85℃			400	700	mV
		I_{OUT} =100mA, T_A=-40℃ to 85℃			800	1500	
		I_{OUT} =150mA, T_A=-40℃ to 85℃			1300	2000	
LNR	Line Regulation	V_{IN}=V_{OUT}+2V or 2.7V to 36V, I_{OUT}=1mA,T_A=25℃			0.01		%/V
LDR	Load Regulation[2]	V_{IN}= 5.3V, V_{OUT} = 3.3V, I_{OUT}=1mA to 150mA,T_A=25℃			5		mV
		V_{IN}=7.0V, V_{OUT} = 5.0V, I_{OUT}=1mA to 150mA,T_A=25℃			15		
I_{LIM}	Output current limit	V_{IN}=$V_{OUT(NOMINAL)}$+2V, T_A=25℃			240		mA
I_{OUT}	Maximum output current in the accuracy range[3]	V_{IN}=$V_{OUT(NOMINAL)}$+2V, T_A=-40℃ to 85℃		150			mA
		V_{IN}=$V_{OUT(NOMINAL)}$+2V, Full		100			
I_Q	Quiescent Current	I_{OUT}=0mA , Full			3.5	6.0	μA
I_{SHORT}	Short Current	V_{IN}=$V_{OUT(NOMINAL)}$+2V, T_A=25℃			200		mA
PSRR	Power Supply Rejection Ratio	V_{OUT}=2.2V, I_{OUT}=10mA, T_A=25℃	f=217Hz		70		dB
			f=1kHz		50		dB
		V_{OUT}=3.3V, I_{OUT}=10mA, T_A=25℃	f=217Hz		65		dB
			f=1kHz		50		dB
V_{NO}	Output noise voltage	BW = 10 Hz to 100 kHz, V_{OUT} = 3.3 V, I_{OUT} = 10 mA, C_{OUT}=1μF ,T_A=25℃			190		$μV_{RMS}$

Electrical Characteristics

(V_{IN} = V_{OUT}+2V or 4.0V, whichever is greater, C_{IN} = C_{OUT} = 1µF, Full = -40ºC to +125ºC, unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	Output Voltage Temperature Coefficient	I_{OUT}=1mA , Full		53		ppm/ºC
T_{SD}	Thermal Shutdown Temperature			145		ºC
ΔT_{SD}	Thermal Shutdown Hysteresis			20		ºC

Note1: The dropout voltage is defined as V_{IN}-V_{OUT}, when V_{OUT} is 95% of the value of V_{OUT} for V_{IN}=V_{OUT}+2V.
Note2: The Load regulation is measured using pulse techniques with duty cycle < 5%.
Note3: Maximum output current is affected by the PCB layout, size of metal trace, the thermal conduction path between metal layers, ambient temperature and the other environment factors of system. Attention should be paid to the dropout voltage when V_{IN}< V_{OUT} + V_{DROP}.

10. Typical Performance Characteristics

(V_{IN} = V_{OUT}+2V or 4.0V, whichever is greater, C_{IN} = C_{OUT} = 1µF, Full = -40ºC to +125ºC, unless otherwise noted.)

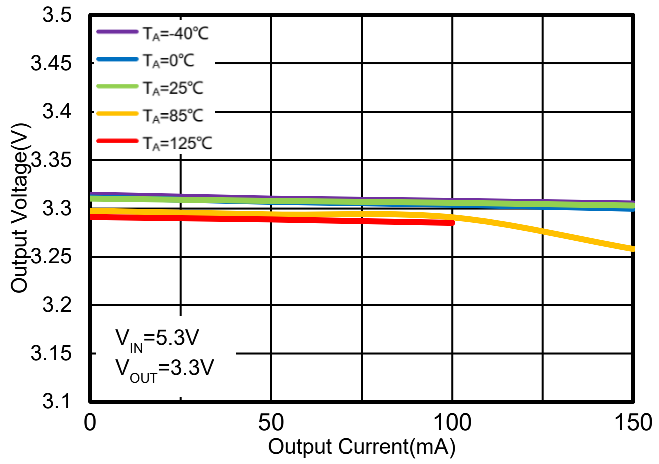


Figure 1. WR0115-33A20R
Load Regulation vs. I_{OUT} & Ambient Temperature

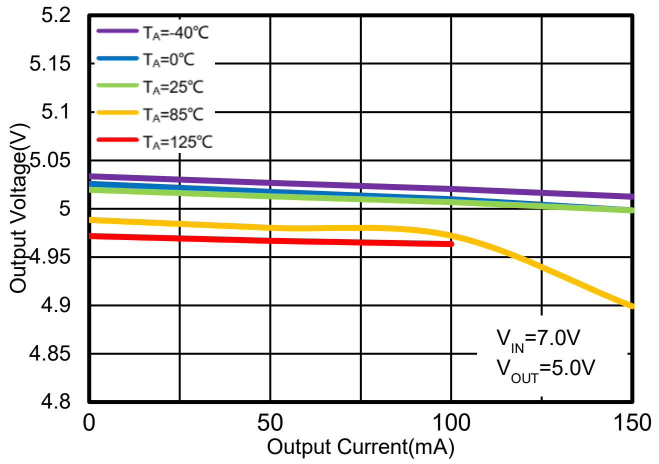


Figure 2. WR0115-50A21R
Load Regulation vs. I_{OUT} & Ambient Temperature

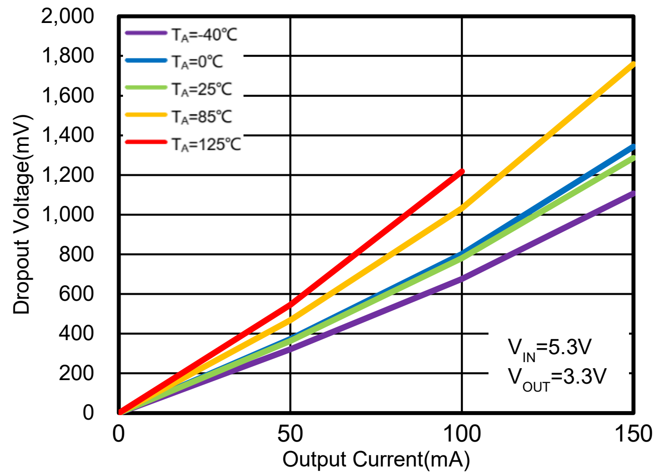


Figure 3. WR0115-33A20R
Dropout Voltage vs. I_{OUT} & Ambient Temperat

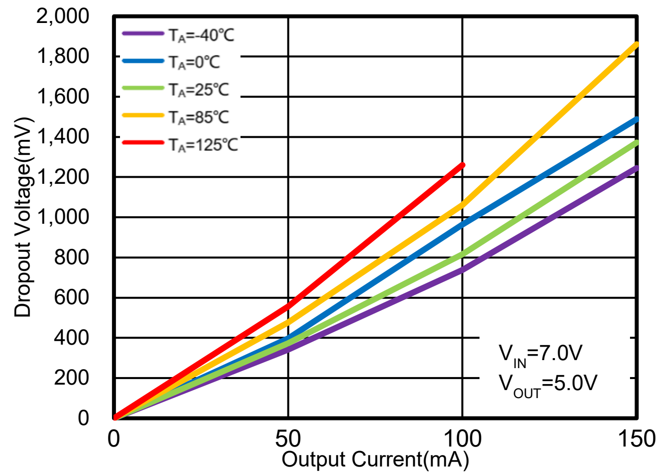


Figure4. WR0115-50A21R
Dropout Voltage vs. I_{OUT} & Ambient Temperature

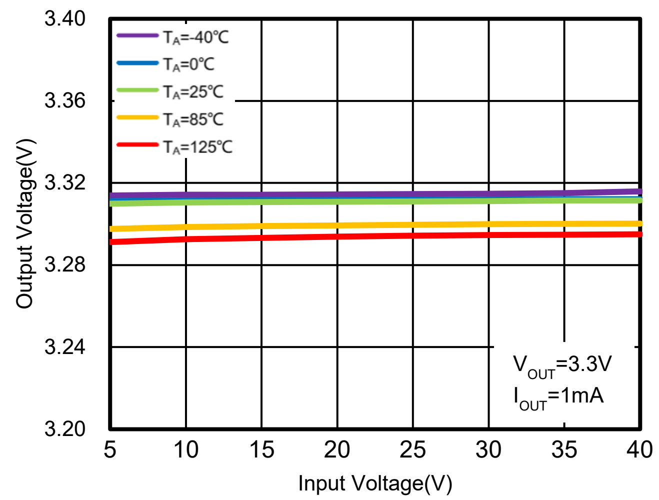


Figure 5. WR0115-33A20R
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

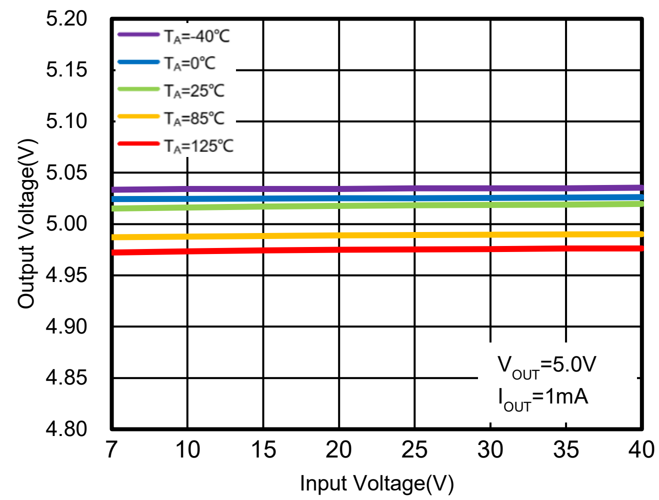


Figure 6. WR0115-A2A20R (V_{OUT}=12V)
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

Typical Performance Characteristics

(V_{IN} = V_{OUT}+2V or 4.0V, whichever is greater, C_{IN} = C_{OUT} = 1μF, Full = -40ºC to +85ºC, unless otherwise noted.)

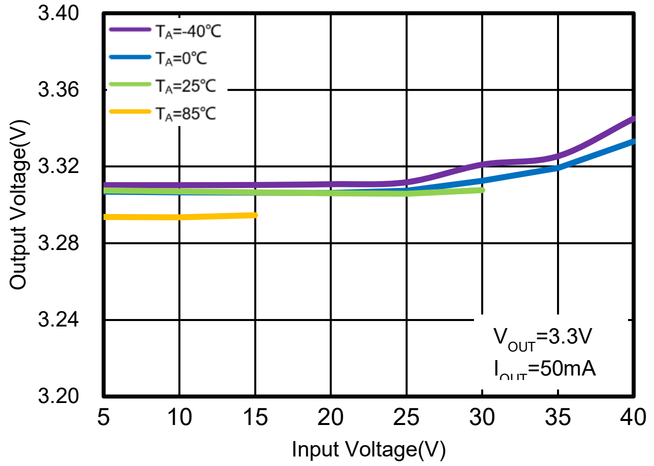


Figure 7. WR0115-33A20R
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

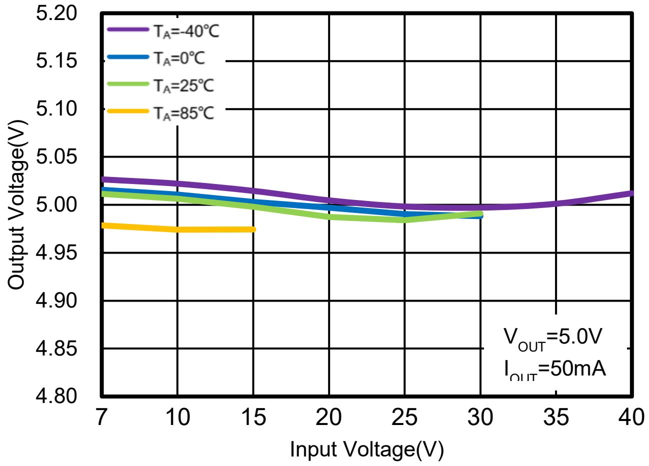


Figure 8. WR0115-50A21R
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

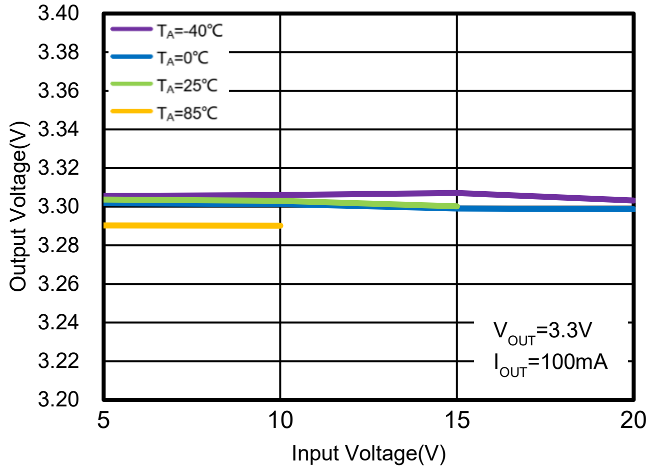


Figure9. WR0115-33A20R
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

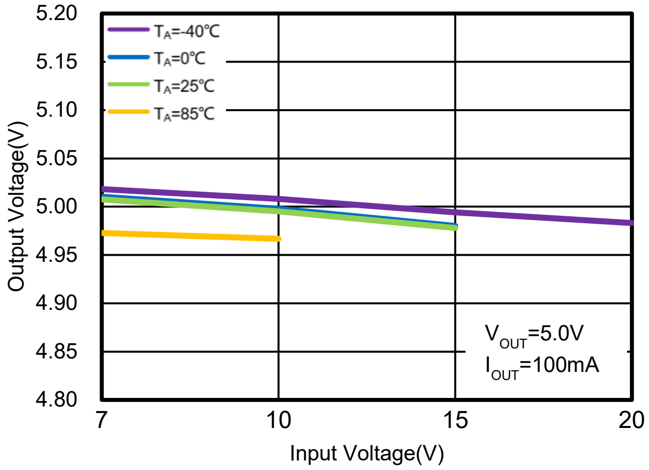


Figure10. WR0115-50A21R
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

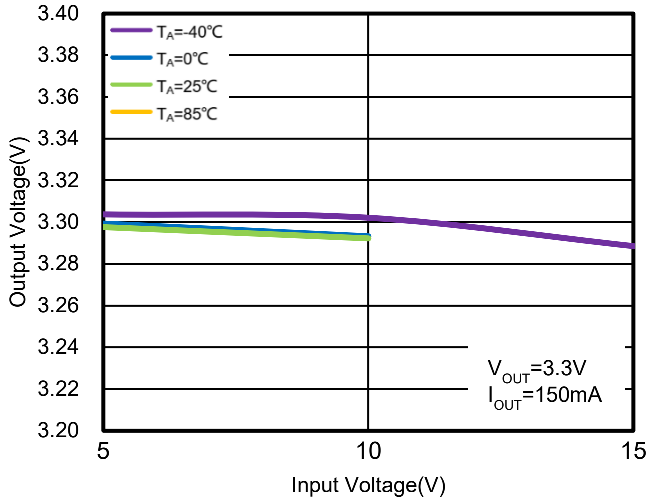


Figure11. WR0115-33A20R
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

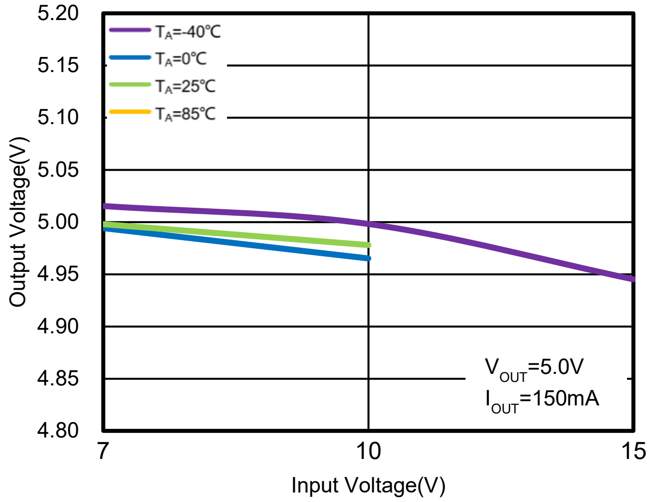


Figure12. WR0115-50A21R
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

Typical Performance Characteristics

(V_{IN} = V_{OUT}+2V or 4.0V, whichever is greater, C_{IN} = C_{OUT} = 1μF, Full = -40ºC to +125ºC, unless otherwise noted.)

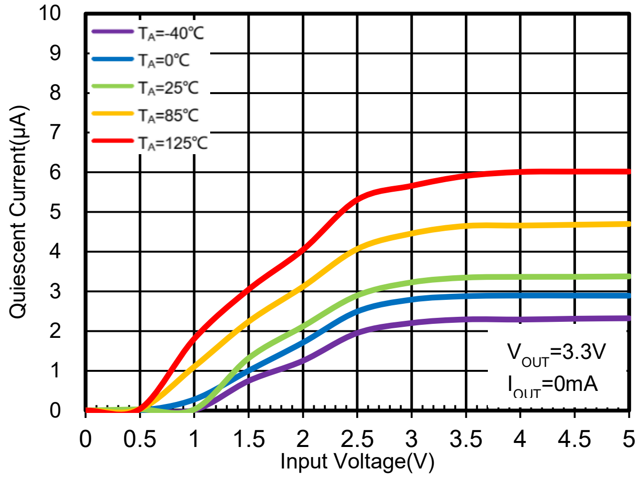


Figure 13. WR0115-33A20R
Quiescent Current vs. V_{IN} & Ambient Temperature

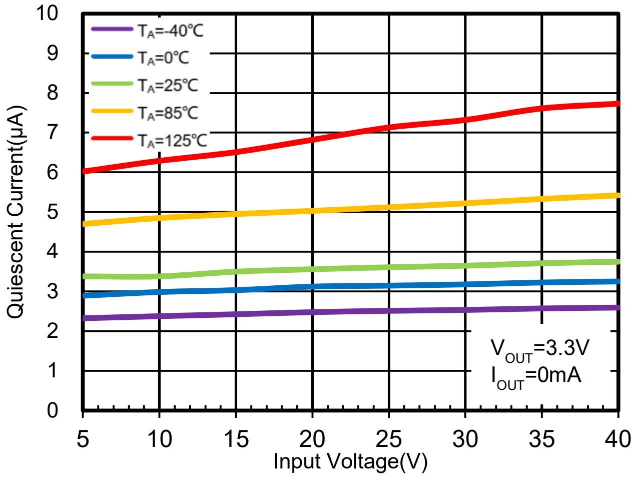


Figure 14. WR0115-33A20R
Quiescent Current vs. V_{IN} & Ambient Temperature

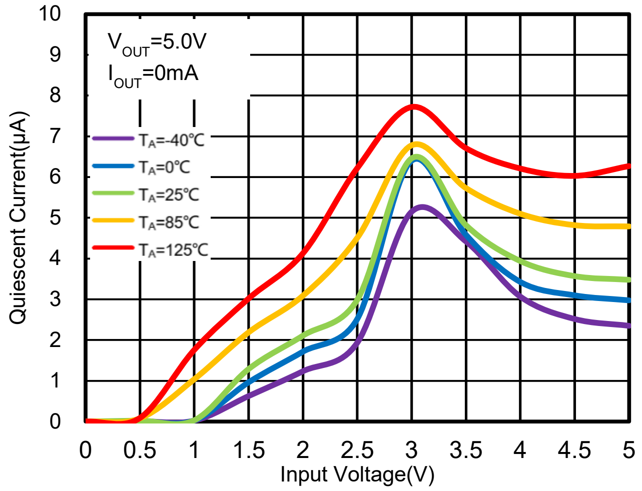


Figure 15. WR0115-50A21R
Quiescent Current vs. V_{IN} & Ambient Temperature

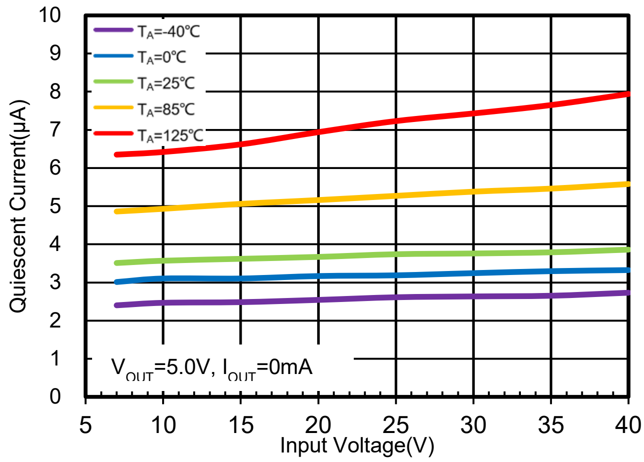


Figure 16. WR0115-50A21R
Quiescent Current vs. V_{IN} & Ambient Temperature

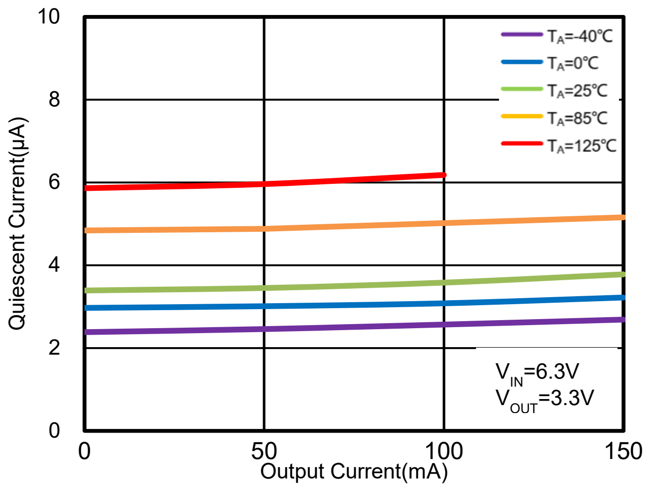


Figure 17. WR0115-33A20R
Quiescent Current vs. I_{OUT} & Ambient Temperature

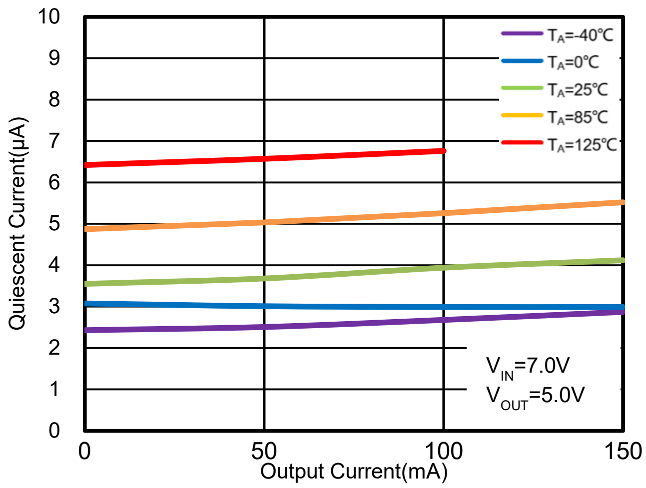


Figure 18. WR0115-50A21R
Quiescent Current vs. I_{OUT} & Ambient Temperature

Typical Performance Characteristics

(V_{IN} = V_{OUT}+2V or 4.0V, whichever is greater, C_{IN} = C_{OUT} = 1μF, Full = -40ºC to +125ºC, unless otherwise noted.)

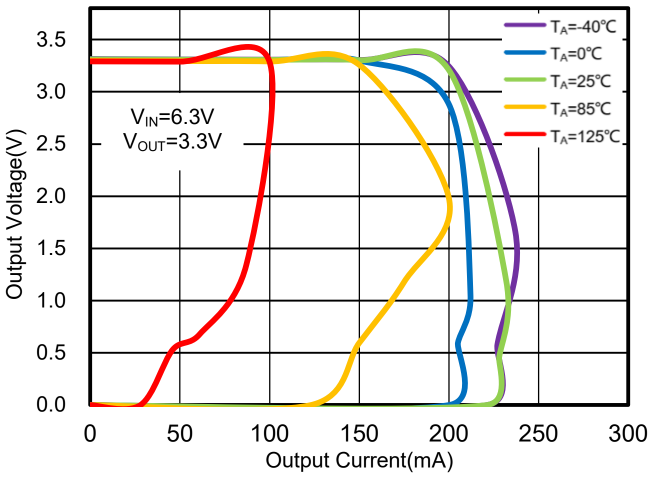


Figure 19. WR0115-33A20R
Current Limit vs. I_{OUT} & Ambient Temperature

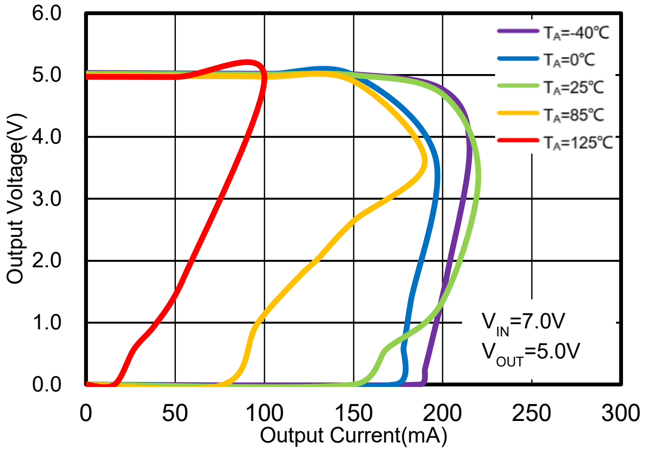


Figure 20. WR0115-50A21R
Current Limit vs. I_{OUT} & Ambient Temperature

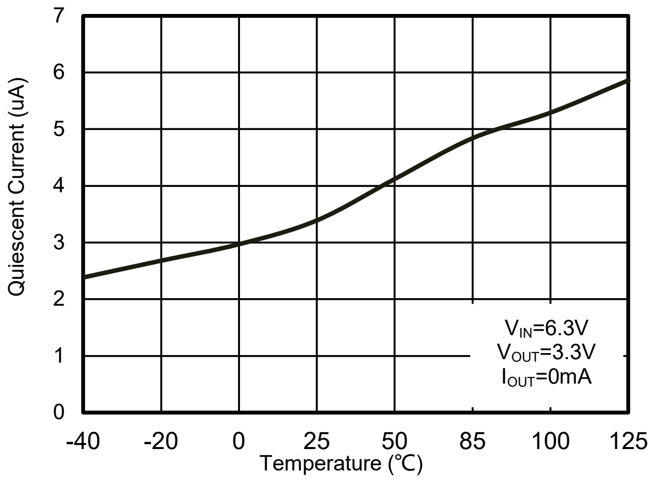


Figure 21. WR0115-33A20R
Output Voltage vs. Ambient Temperature

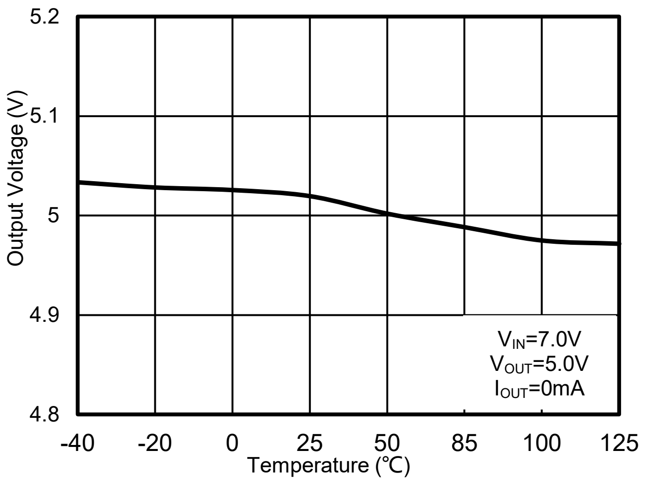


Figure 22. WR0115-50A21R
Quiescent Current vs. Ambient Temperature

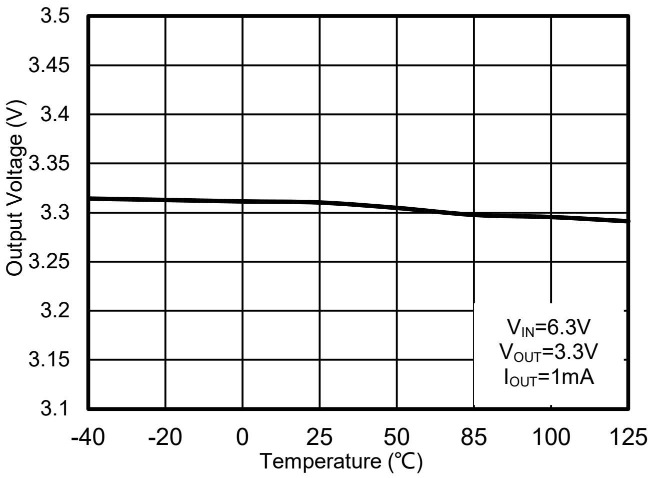


Figure 23. WR0115-33A20R
Quiescent Current vs. Ambient Temperature

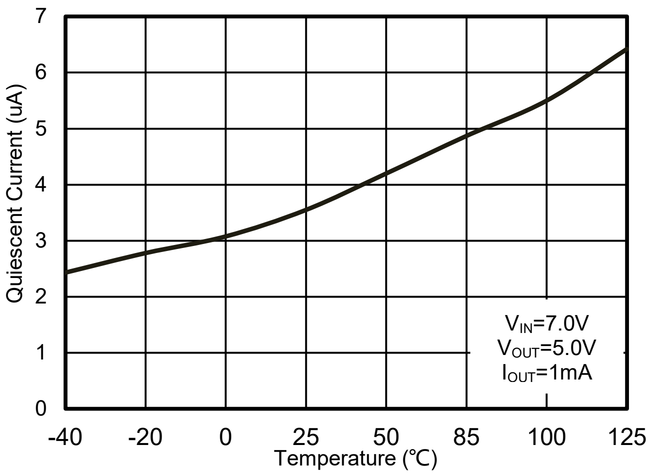


Figure 24. WR0115-50A21R
Enable Threshold vs. Ambient Temperature

Typical Performance Characteristics

(V_{IN} = V_{OUT}+2V or 4.0V, whichever is greater, C_{IN} = C_{OUT} = 1μF, T_A=25℃, unless otherwise noted.)

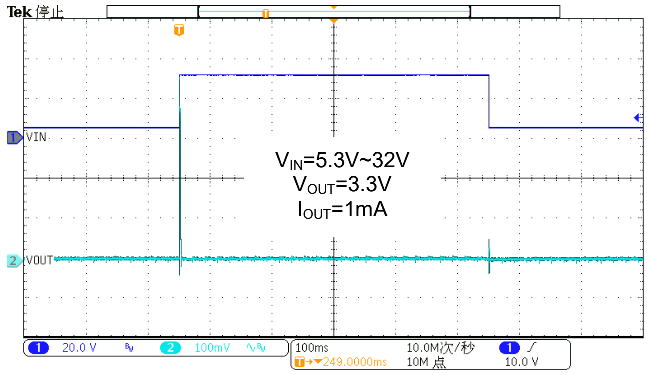


Figure 25. WR0115-33A20R Line Transient

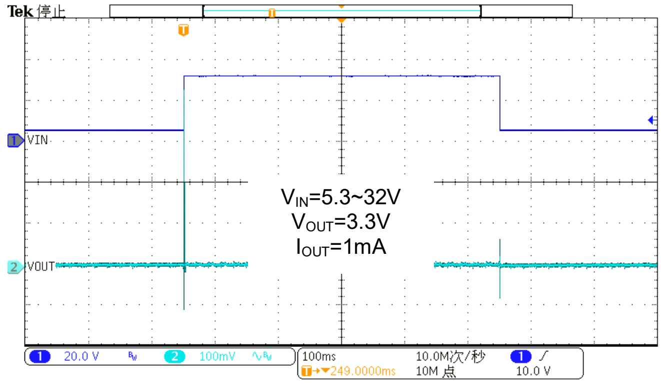


Figure 26. WR0115-33A50R Line Transient

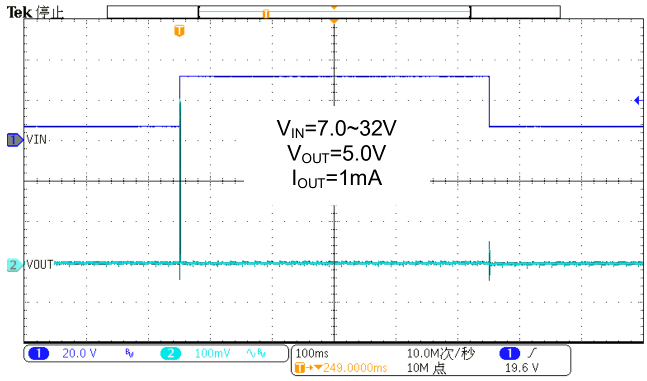


Figure 27. WR0115-50A21R Line Transient

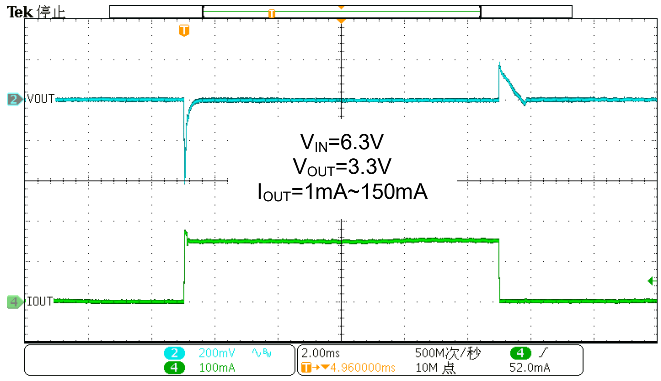


Figure 28. WR0115-33A20R Load Transient

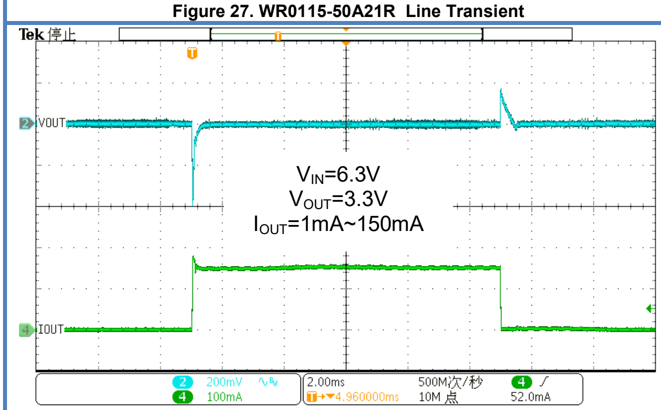


Figure 29. WR0115-33A50R Load Transient

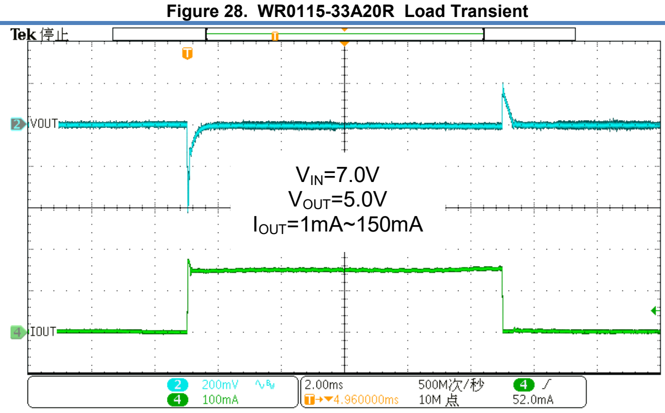


Figure 30. WR0115-50A21R Load Transient

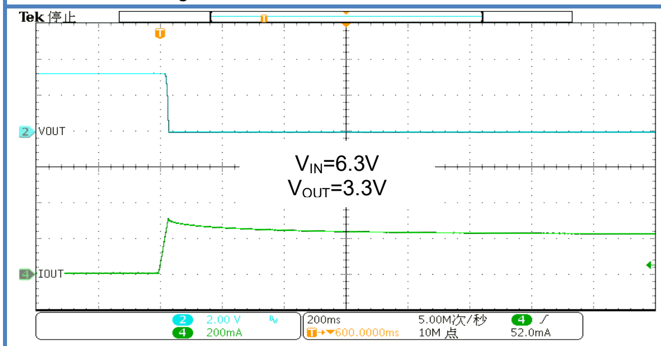


Figure 31. WR0115-33A20R Current Limit & I_{SHORT}

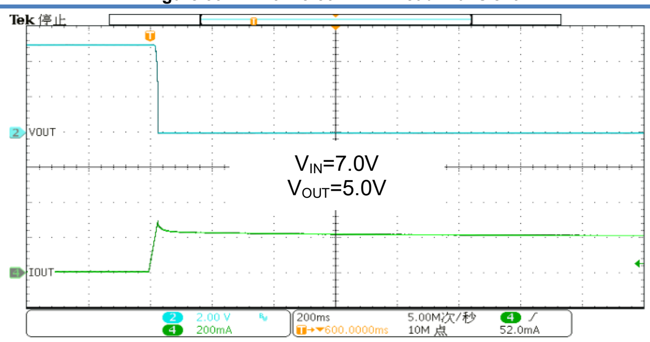


Figure 32. WR0115-50A21R Current Limit & I_{SHORT}

Typical Performance Characteristics

(V_{IN} = V_{OUT}+2V or 4.0V, whichever is greater, C_{IN} = C_{OUT} = 1μF, T_A=25℃, unless otherwise noted.)

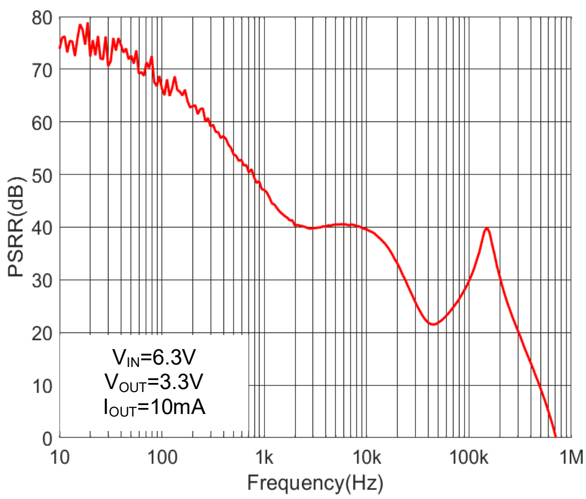


Figure 33. WR0115-33A20R PSRR

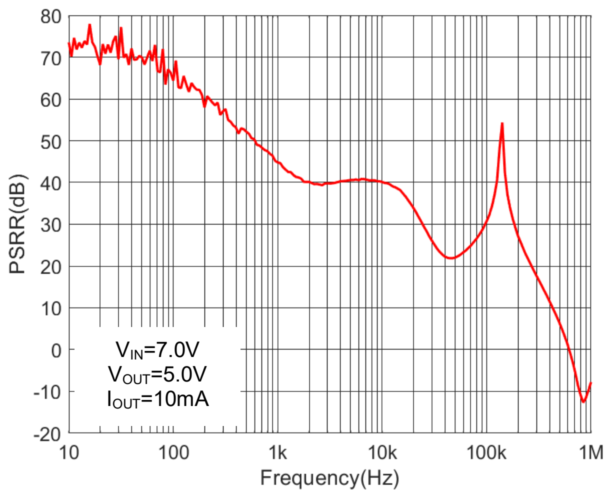


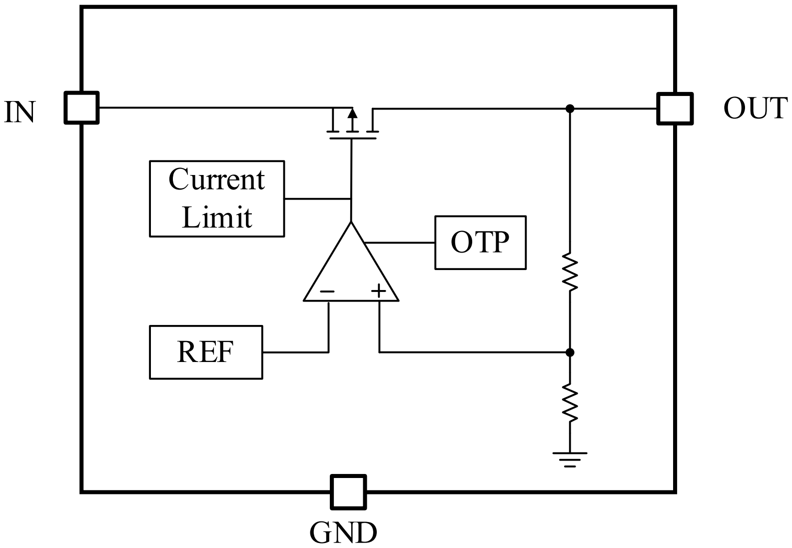
Figure 34. WR0115-33A50R PSRR

11. Function Description

11.1 Overview

The WR0115 series is a set of low power wide input voltage regulators implemented in CMOS technology which can provide 150mA output current. Includes fixed output voltage version and adjustable output voltage version. The device allows input voltage as high as 36Vand the output voltage range is 0.8V to 12V, making the device suitable for use in a variety of low power high voltage electronic devices.

11.2 Block Diagram



11.3 Feature Description

11.3.1 Output Voltage Accuracy

The WR0115 has an output voltage accuracy of 3%. Output voltage accuracy is defined as the maximum and minimum error in output voltage. This includes the errors introduced by internal reference, load regulation and line regulation differences over the full range of rated load and line operating conditions, taking into account differences between manufacturing lots.

11.3.2 Dropout Voltage (V_{DO})

Dropout voltage is defined as the V_{IN}-V_{OUT} at the rated maximum output current. When the input voltage is below the nominal output voltage, the output voltage varies with the input voltage.

11.3.3 Power Supply Rejection Ratio(PSRR)

PSRR, which stands for Power Supply Rejection Ratio, represents the ratio of the two voltage gains obtained when the input and output power supplies are considered as two independent sources.

The basic calculation formula is

$$\mathbf{PSRR = 20log(Ripple(in) / Ripple(out))}$$

The units are in decibels (dB) and the logarithmic ratio is used.

The above equation shows that the output signal is influenced by the power supply in general, in addition to the circuit itself. PSRR is a quantity used to describe how the output signal is affected by the power supply; the larger the PSRR, the less the output signal is affected by the power supply.

As the level of integration continues to increase, the magnitude of supply current required is also increasing. End users want to extend battery life, i.e. they need very efficient DC/DC conversion processes, using more efficient switching regulators. However, switching regulators generate more ripple in the power line than linear regulators.

The PSRR shows the ability of the LDO to suppress input voltage noise. For a clean, noise-free DC output voltage, use an LDO with a high PSRR.

Noise coupling from the input voltage to the internal reference voltage is the main cause of PSRR performance degradation. Using noise reduction capacitors at the input can effectively filter out noise and improve PSRR performance at low frequencies. The LDO can be used not only to regulate the voltage but also to provide an exceptionally clean DC supply for noise sensitive components.

12. Application

Note: The information in the Applications section below is not part of WAY-ON's product specifications and WAY-ON does not guarantee its accuracy or completeness. The customer is responsible for determining the suitability of the component for its intended use and should verify and test its design implementation to confirm system functionality.

12.1 Application Information

The WR0115 is a low power high voltage regulator with an input voltage of 4.0 V to 36 V and an output voltage of 0.8 V to 12.0 V. The maximum output current is 150mA. The efficiency of a linear voltage regulator is determined by the ratio of the output voltage to the input voltage, so in order to achieve high efficiency, the differential voltage (V_{IN} - V_{OUT}) must be as small as possible. This section discusses how best to use this device in practical applications.

12.1.1 Capacitor Recommendation

The WR0115 uses ceramic capacitors with low equivalent series resistance (ESR) at the V_{IN} and V_{OUT} pins to improve its stability, while adding a bypass capacitor to filter out high frequency ripple on the input. Multilayer ceramic capacitors are recommended. These capacitors also have limitations, ceramic capacitors using X7R-, X5R- and COG grade dielectric materials have relatively good capacitance stability over temperature. The WR0115 is designed to use 1μF or larger ceramic capacitors at the input and output, which needs to have low impedance to high frequencies. Place C_{IN} and C_{OUT} as close as possible to the IN and OUT pins to minimize trace inductance from the capacitor to the device.

Increasing the input capacitance can reduce the transient input drop during start-up and load current. If the C_{OUT} produces high Q peak effects during transients, using only very large ceramic input capacitors can cause unwanted ringing at the OUT side, which requires well-designed short interconnects to the upstream supply to reduce ringing. Using a tantalum capacitor with an ESR of several hundred milliohms in parallel with the ceramic input capacitor can avoid unwanted ringing.

The load step transient response is the output voltage response of the LDO to a step change in load current. A larger output capacitor reduces any voltage dips or spikes that occur during the load step, but at the same time the control loop bandwidth is reduced, which slows the response time.

Because, the LDO cannot consume charge, the control loop must close through the FET when the output load is removed or greatly reduced and wait for any excess charge to be depleted.

12.1.2 Power Dissipation(PD)

The reliability of the circuit requires reasonable consideration of the power dissipation of the device, the location of the circuit on the PCB, and the proper sizing of the thermal plane. The regulator should be surrounded by no other heat generating devices as much as possible. The power dissipation of the regulator depends on the input and output voltage difference and the load conditions.

PD can be calculated using the following equation:

$$P_D = (V_{IN} - V_{OUT}) \times I_{OUT}$$

Using the proper input voltage minimizes the power dissipation, resulting in greater efficiency. To obtain the lowest power dissipation, use the minimum input voltage required for normal output voltage.

The maximum power dissipation determines the maximum allowable ambient temperature (T_A) of the device. Power dissipation and junction temperature are typically related to the junction-ambient thermal resistance (θ_{JA}) and ambient air temperature (T_A) of the PCB and package and are calculated as follows:

$$T_J = T_A + (\theta_{JA} \times P_D)$$

The thermal resistance (θ_{JA}) depends primarily on the thermal dispersion capability of the PCB design. The total copper area, copper weight, and the location of the plane all affect the thermal dispersion capability, and the PCB and copper laydown area can only be used as a relative measure of the package's thermal performance.

12.1.3 Estimate the temperature of the junction

As recommended by JEDEC, the psi (Ψ) thermal metrics are used to estimate the junction temperature of the LDO in PCB board applications. These metrics are relative estimates of the junction temperature in actual applications. The thermal indicators Ψ_{JT} or Ψ_{JB} are given in the thermal information table and can be used according to the following equation.

$$\Psi_{JT}: T_J = T_T + \Psi_{JT} \times P_D$$

$$\Psi_{JB}: T_J = T_B + \Psi_{JB} \times P_D$$

Notes.

- P_D is the power dissipated.
- T_T is the temperature at the top center of the device package.
- T_B is the PCB surface temperature measured 1 mm from the device package and centered on the package.

13. Power supply recommendation

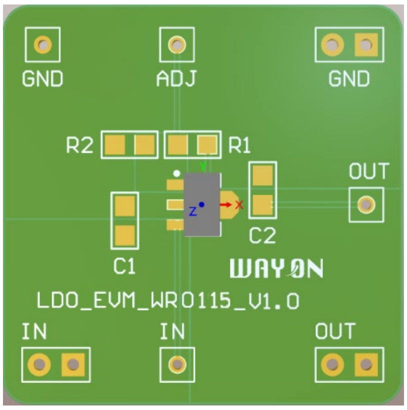
The WR0115 has a V_{IN} range of between 4.0 V and 36 V and an input capacitance of 1µF. The input voltage should have some redundancy to ensure a stable output voltage when the load fluctuates. If the input supply is noisy, additional input capacitors can be used to improve the noise performance of the output.

14. Layout Guidelines

The principle of LDO design is to place all components on the same side of the board and connect them as close as possible to their respective LDO pins. Connect the C_{IN} and C_{OUT} grounds, with all LDO ground pins as close together as possible, through a wide copper surface. Using through-holes and long wires for connections is strongly discouraged and can seriously affect system performance.

To improve thermal performance, an array of thermal vias is used to connect the thermal pad to the ground plane. A larger ground plane improves the thermal performance of the device and reduces the operating temperature of the device.

Layout Example：



15. Evaluation Modules

Evaluation Modules (EVMs) are available to help evaluate initial circuit performance. We have evaluation modules for different packages, you can contact us by phone or address at the end to get the evaluation module or schematic.

The module names are listed in the table below.

Name	Package	Evaluation Module
WR0115	SOT23-3	WAYON LDO EVM V1.0 –SOT23-3
	SOT23-5	WAYON LDO EVM V1.0 –SOT23-5
	SOT23-5L	WAYON LDO EVM V1.0 –SOT23-5L
	SOT89-3	WAYON LDO EVM V1.0 –SOT89-3
	SOT89-3L	WAYON LDO EVM V1.0 –SOT89-3L

16. Naming conventions

WRAABB-CCDDDE

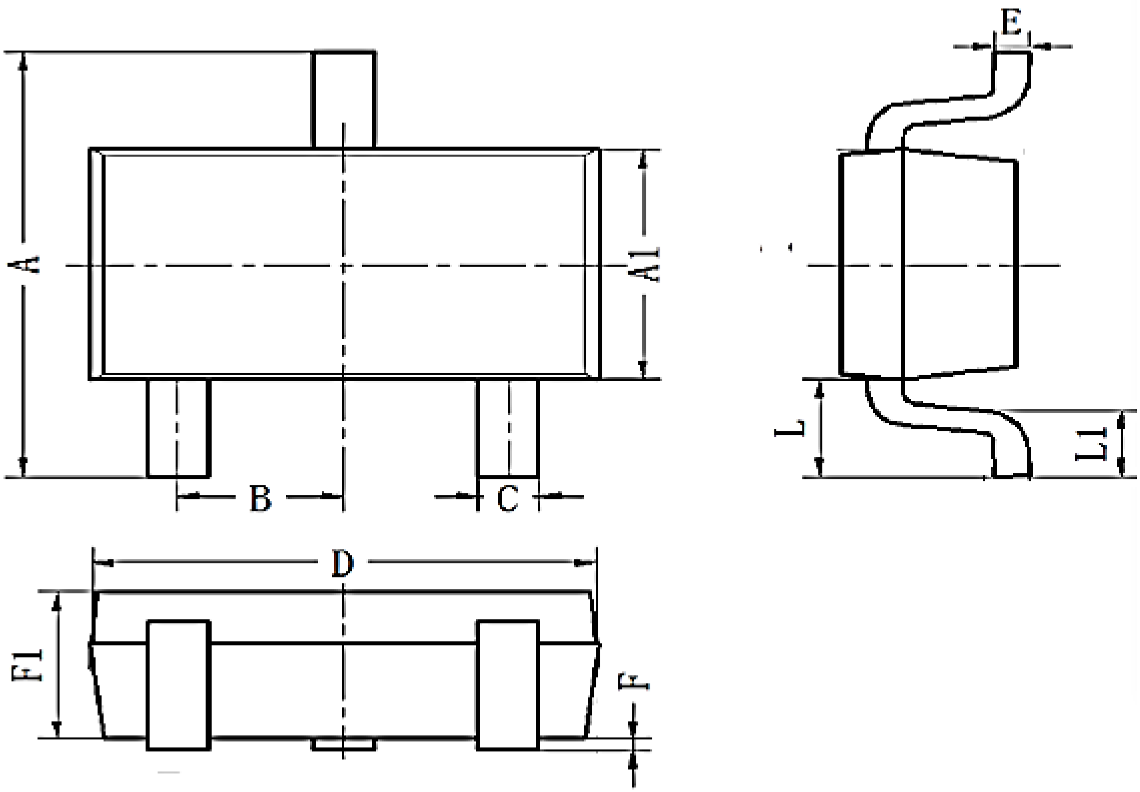
WR: WAYON Regulator
AA: 01 - Output Current, 150mA
BB: Serial number
CC: Output Voltage+
DDD: A30-Package, SOT23-3
A50-Package, SOT23-5
A51-Package, SOT23-5L
A20-Package, SOT89-3
A21-Package, SOT89-3L
E: R-Reel & T-tube

17. Electrostatic discharge warning

ESD can cause irreversible damage to integrated circuits, ranging from minor performance degradation to device failure. Precision ICs are more susceptible to damage because very minor parameter changes can cause the device to be out of compliance with its published specifications. WAY-ON recommends that all ICs be handled with proper precautions. Failure to follow proper handling practices and installation procedures may damage the IC.

18. Package Information

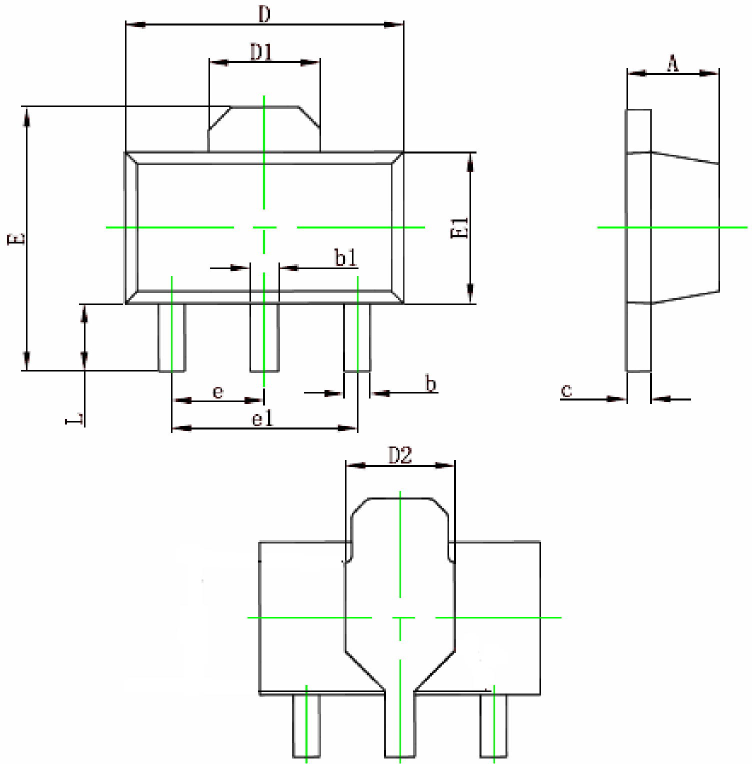
SOT 23-3



SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	2.60	2.80	3.00
A1	1.50	1.60	1.70
B	0.95BSC		
C	0.25	0.40	0.50
D	2.82	2.92	3.02
E	0.10	0.15	0.20
L	0.59REF		
L1	0.30	0.45	0.60
F1	0.90	1.10	1.30
F	0.00	0.08	0.15

Package Information

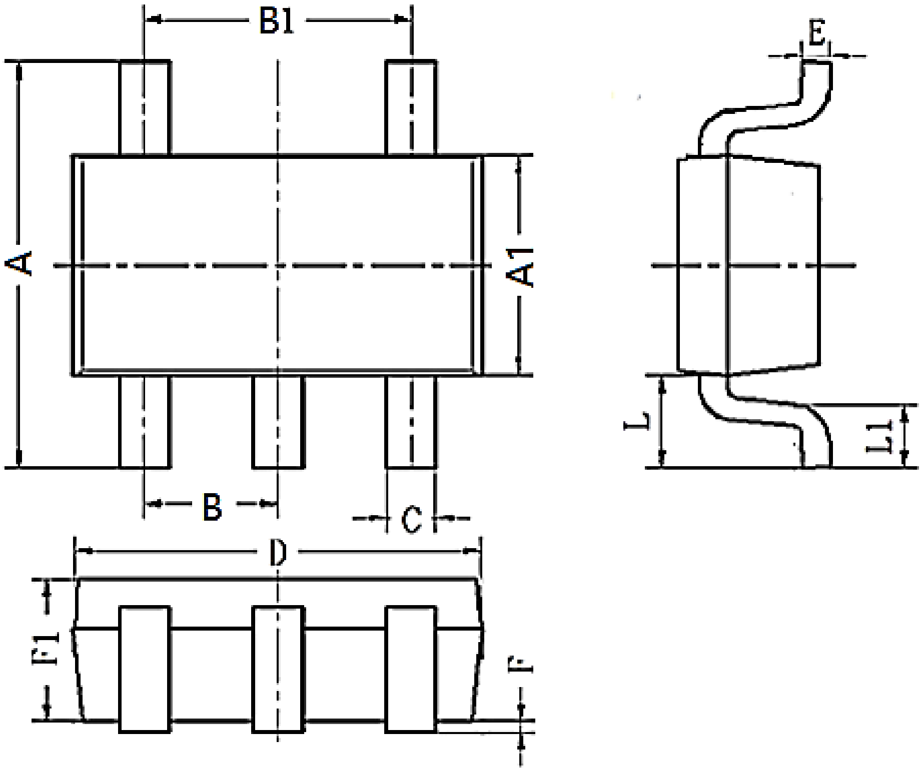
SOT 89-3/L



SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.4	1.5	1.6
b	0.320	0.420	0.520
b1	0.380	0.480	0.580
c	0.350	0.405	0.460
D	4.400	4.500	4.600
D1	1.65REF		
D2	1.700	1.950	2.200
E	3.940	4.120	4.300
E1	2.300	2.450	2.600
e	1.5BSC		
e1	3.00BSC		
L	0.800	1.000	1.200

Package Information

SOT23-5/L



SOT 23-5/L

SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	2.60	2.80	3.00
A1	1.50	1.60	1.70
B	0.95BSC		
B1	1.90BSC		
C	0.25	0.40	0.50
D	2.82	2.92	3.02
E	0.10	0.15	0.20
F	0.00	0.08	0.15
L	0.59REF		
F1	0.90	1.10	1.30
L1	0.30	0.45	0.60

19. Ordering Information

Part Number	Output Voltage	Package	Packing Quantity	Marking*
WR0115-12A30R	1.2V	SOT23-3	3k/Reel	WR0115 12 XXXX
WR0115-15A30R	1.5V	SOT23-3	3k/Reel	WR0115 15 XXXX
WR0115-18A30R	1.8V	SOT23-3	3k/Reel	WR0115 18 XXXX
WR0115-20A30R	2.0V	SOT23-3	3k/Reel	WR0115 20 XXXX
WR0115-22A30R	2.2V	SOT23-3	3k/Reel	WR0115 22 XXXX
WR0115-25A30R	2.5V	SOT23-3	3K/Reel	WR0115 25 XXXX
WR0115-28A30R	2.8V	SOT23-3	3k/Reel	WR0115 28 XXXX
WR0115-30A30R	3.0V	SOT23-3	3k/Reel	WR0115 30 XXXX
WR0115-33A30R	3.3V	SOT23-3	3k/Reel	WR0115 33 XXXX
WR0115-36A30R	3.6V	SOT23-3	3k/Reel	WR0115 36 XXXX
WR0115-45A30R	4.5V	SOT23-3	3k/Reel	WR0115 45 XXXX
WR0115-50A30R	5.0V	SOT23-3	3k/Reel	WR0115 50 XXXX
WR0115-A2A30R	12V	SOT23-3	3k/Reel	WR0115 A2 XXXX
WR0115-12A50R	1.2V	SOT23-5	3k/Reel	WR0115 12 XXXX
WR0115-15A50R	1.5V	SOT23-5	3k/Reel	WR0115 15 XXXX
WR0115-18A50R	1.8V	SOT23-5	3k/Reel	WR0115 18 XXXX
WR0115-20A50R	2.0V	SOT23-5	3k/Reel	WR0115 20 XXXX
WR0115-22A50R	2.2V	SOT23-5	3k/Reel	WR0115 22 XXXX
WR0115-25A50R	2.5V	SOT23-5	3k/Reel	WR0115 25 XXXX
WR0115-28A50R	2.8V	SOT23-5	3k/Reel	WR0115 28 XXXX
WR0115-30A50R	3.0V	SOT23-5	3k/Reel	WR0115 30 XXXX
WR0115-33A50R	3.3V	SOT23-5	3k/Reel	WR0115 33 XXXX
WR0115-36A50R	3.6V	SOT23-5	3k/Reel	WR0115 36 XXXX
WR0115-45A50R	4.5V	SOT23-5	3k/Reel	WR0115 45 XXXX
WR0115-50A50R	5.0V	SOT23-5	3k/Reel	WR0115 50 XXXX
WR0115-A2A50R	12V	SOT23-5	3k/Reel	WR0115 A2 XXXX
WR0115-12A51R	1.2V	SOT23-5L	3k/Reel	WR0115 12 XXXX
WR0115-15A51R	1.5V	SOT23-5L	3k/Reel	WR0115 15 XXXX
WR0115-18A51R	1.8V	SOT23-5L	3k/Reel	WR0115 18 XXXX
WR0115-20A51R	2.0V	SOT23-5L	3k/Reel	WR0115 20 XXXX

Part Number	Output Voltage	Package	Packing Quantity	Marking*
WR0115-22A51R	2.2V	SOT23-5L	3k/Reel	WR0115 22 XXXX
WR0115-25A51R	2.5V	SOT23-5L	3k/Reel	WR0115 25 XXXX
WR0115-28A51R	2.8V	SOT23-5L	3k/Reel	WR0115 28 XXXX
WR0115-30A51R	3.0V	SOT23-5L	3k/Reel	WR0115 30 XXXX
WR0115-33A51R	3.3V	SOT23-5L	3k/Reel	WR0115 33 XXXX
WR0115-36A51R	3.6V	SOT23-5L	3k/Reel	WR0115 36 XXXX
WR0115-45A51R	4.5V	SOT23-5L	3k/Reel	WR0115 45 XXXX
WR0115-50A51R	5.0V	SOT23-5L	3k/Reel	WR0115 50 XXXX
WR0115-A2A51R	12V	SOT23-5L	3k/Reel	WR0115 A2 XXXX
WR0115-12A20R	1.2V	SOT89-3	1k/Reel	WR0115 12 XXXX
WR0115-15A20R	1.5V	SOT89-3	1k/Reel	WR0115 15 XXXX
WR0115-18A20R	1.8V	SOT89-3	1k/Reel	WR0115 18 XXXX
WR0115-20A20R	2.0V	SOT89-3	1k/Reel	WR0115 20 XXXX
WR0115-22A20R	2.2V	SOT89-3	1k/Reel	WR0115 22 XXXX
WR0115-25A20R	2.5V	SOT89-3	1k/Reel	WR0115 25 XXXX
WR0115-28A20R	2.8V	SOT89-3	1k/Reel	WR0115 28 XXXX
WR0115-30A20R	3.0V	SOT89-3	1k/Reel	WR0115 30 XXXX
WR0115-33A20R	3.3V	SOT89-3	1k/Reel	WR0115 33 XXXX
WR0115-36A20R	3.6V	SOT89-3	1k/Reel	WR0115 36 XXXX
WR0115-45A20R	4.5V	SOT89-3	1k/Reel	WR0115 45 XXXX
WR0115-50A20R	5.0V	SOT89-3	1k/Reel	WR0115 50 XXXX
WR0115-A2A20R	12V	SOT89-3	1k/Reel	WR0115 A2 XXXX
WR0115-12A21R	1.2V	SOT89-3L	1k/Reel	WR0115 12 XXXX
WR0115-15A21R	1.5V	SOT89-3L	1k/Reel	WR0115 15 XXXX
WR0115-18A21R	1.8V	SOT89-3L	1k/Reel	WR0115 18 XXXX
WR0115-20A21R	2.0V	SOT89-3L	1k/Reel	WR0115 20 XXXX
WR0115-22A21R	2.2V	SOT89-3L	1k/Reel	WR0115 22 XXXX
WR0115-25A21R	2.5V	SOT89-3L	1k/Reel	WR0115 25 XXXX
WR0115-28A21R	2.8V	SOT89-3L	1k/Reel	WR0115 28 XXXX
WR0115-30A21R	3.0V	SOT89-3L	1k/Reel	WR0115 30 XXXX
WR0115-33A21R	3.3V	SOT89-3L	1k/Reel	WR0115 33 XXXX

Part Number	Output Voltage	Package	Packing Quantity	Marking*
WR0115-36A21R	3.6V	SOT89-3L	1k/Reel	WR0115 36 XXXX
WR0115-45A21R	4.5V	SOT89-3L	1k/Reel	WR0115 45 XXXX
WR0115-50A21R	5.0V	SOT89-3L	1k/Reel	WR0115 50 XXXX
WR0115-A2A21R	12V	SOT89-3L	1k/Reel	WR0115 A2 XXXX

* XXXX is variable.

STATEMENTS

WAY-ON provides data sheets based on the actual performance of the device, and users should verify actual device performance in their specific applications. The device characteristics and parameters in this data sheet can and do vary from application to application, and actual device performance may change over time.This information is intended for developers designing with WAY-ON products. Users are responsible for selecting the appropriate WAY-ON product for their application and for designing and verifying the application to ensure that your application meets the appropriate standards or other requirements, and users are responsible for all consequences. Specifications are subject to change without notice.

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