1. General Description

The WR0115-AT series is a set of low power wide input voltage regulators implemented in CMOS technology. The WR0115-AT can source 150mA of output current with an input voltage range of 3.2V to 36V and an output range of 1.2V to 5.0V, making the device can be used for a wide variety of applications.

The devices can be used in a variety of applications with large dropout voltages and low quiescent currents. The low quiescent current make this series of devices ideal for a wide range of battery powered devices. The WR0115-AT has the fixed maximum output current which depends on the output voltage. So WR0115-AT features short circuit protection and output current limiter. These devices offer a new cost-effective option for mobile phones, laptops and other portable devices.

The WR0115-AT regulators are available in Green SOT89-3, SOT23-5 and SOT223-3 packages.

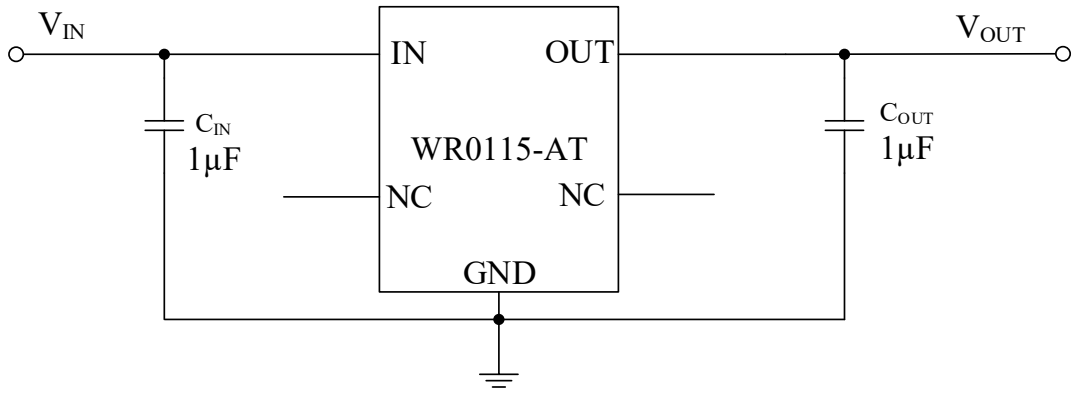
2. Features

- Input Voltage Range: 3.2V to 36V
- Output Voltage: 1.2V to 5.0V
- Output Current: 150mA
- Dropout Voltage: 800mV @ V_{OUT}=3.3V, I_{OUT} = 100mA
- Ultra-low Quiescent Current: 3.5μA (Typical)
- Low Temperature Coefficient
- Output Voltage Accuracy: ±2%
- AEC-Q100 qualified for automotive applications: Ambient temperature grade 1: -40ºC to +125ºC

3. Applications

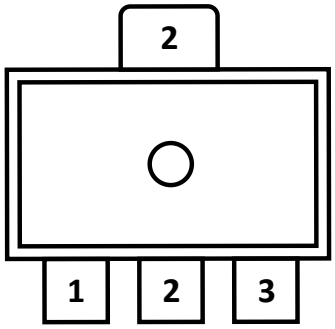
- Automotive infotainment
- ADAS cameras and radar
- Navigation systems
- Telematics systems
- Battery-Powered Equipment
- Communication Equipment
- Audio/Video Equipment

4. Typical Application Circuit

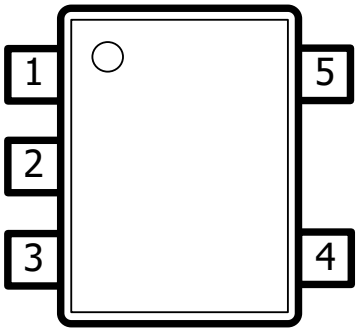


5. Pin Configuration

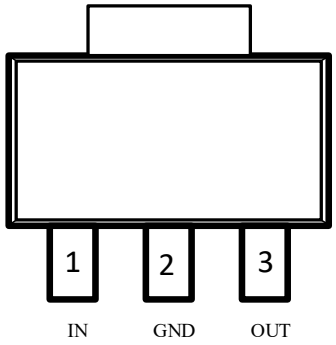
(Top View)



SOT89-3



SOT23-5



SOT223-3

6. Pin Description

PIN NUMBER						PIN NAME	I/O	PIN FUNCTIONS
SOT23-5			SOT89-3		SOT223-3			
A50	A51	A52	A20	A21	A70			
2	1	3，4	2	1	2	GND	-	Common ground.
1	2	1	3	2	1	IN	I	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.
5	3	5	1	3	3	OUT	O	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.
3,4	4,5	2	-	-	-	NC	-	Not connect.

7. Absolute Maximum Ratings[1]

SYMBOL	PARAMETER		RATING	UNIT
V_{IN}	Input voltage range		-0.3 ~ 44	V
V_{OUT}	Output voltage range		-0.3 to 6	
I_{OUT}	Maximum output current		150	mA
P_D	Power Dissipation P_D@T_A = 25℃		1000	mW
$R_{\theta JA}$	Thermal Resistance[2] [3]	SOT89-3	125	℃/W
		SOT23-5	250	
		SOT223-3	95	
T_J	Junction Temperature		150	℃
T_{SDR}	Lead Temperature (10s)		260	
T_{STG}	Storage Temperature Range		-65 to 150	
ESD	ESD Susceptibility	HBM	±4000	V

NOTE1: Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE2: Measured on 2cm x 2cm 2-layer FR4 PCB board, 1 oz copper, no via holes on GND copper.

NOTE3: Power dissipation is calculate by $P_{D(MAX)} = (T_J - T_A) / R_{\theta JA}$.

8. Recommended Operating Conditions

SYMBOL	PARAMETER	RATING	UNIT
V_{IN}	Input voltage range	3.2 to 36	V
V_{OUT}	Nominal output voltage range	1.2 to 5	
I_{OUT}	Output current	0 to 150	mA
C_{IN}	Input capacitor	1	μF
C_{OUT}	Output capacitor	1	
T_A	Operating temperature range	-40 to 125	℃

9. Electrical Characteristics

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

SYMBOL	PARAMETER	TEST CONDITIONS		MIN	TYP.	MAX	UNIT
V_{IN}	Input Voltage			3.2		36	V
V_{OUT}	Output Voltage Range	0≤I_{OUT}≤150mA		0.98 V_{OUT}	V_{OUT}	1.02 V_{OUT}	V
V_{DO}	Dropout Voltage[1]	I_{OUT} =50mA			400	700	mV
		I_{OUT} =100mA			800	1500	
		I_{OUT} =150mA			1300	2000	
LNR	Line Regulation	V_{IN}=V_{OUT}+2V or 4V to 36V, I_{OUT}=1mA			0.01		%/V
LDR	Load Regulation[2]	V_{IN}= 5.3V, V_{OUT} = 3.3V, I_{OUT}=1mA to 150mA			5		mV
		V_{IN}=7.0V, V_{OUT} = 5.0V, I_{OUT}=1mA to 150mA			15		
I_{LIM}	Output Current Limit	V_{IN}=$V_{OUT(NOMINAL)}$+2V			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 T_A= -40℃ to 125℃		100			
I_{SHORT}	Short Current	V_{IN}=$V_{OUT(NOMINAL)}$+2V			200		mA
I_Q	Quiescent Current	I_{OUT}=0mA			3.5	10	μA
PSRR	Power Supply Rejection Ratio	V_{OUT}=2.2V, I_{OUT}=10mA	f=217Hz		70		dB
			f=1kHz		50		dB
		V_{OUT}=3.3V, I_{OUT}=10mA	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			190		μV_{RMS}
$\frac{\Delta V_{OUT}}{\Delta T_A \times V_{OUT}}$	Output Voltage Temperature Coefficient	I_{OUT}=1mA			53		ppm/℃

SYMBOL	PARAMETER	TEST CONDITIONS	MIN	TYP.	MAX	UNIT
T_{SD}	Thermal Shutdown Temperature			150		℃
ΔT_{SD}	Thermal Shutdown Hysteresis			20		℃

NOTE1: The dropout voltage is defined as (V_{IN}-V_{OUT}) when V_{OUT} is $V_{OUT(NOM)}$*98%.

NOTE2: The Load regulation is measured by pulse test.

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_{DO}.

NOTE4: Limits over full temperature are guaranteed by design, but not tested in production.

10. 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)

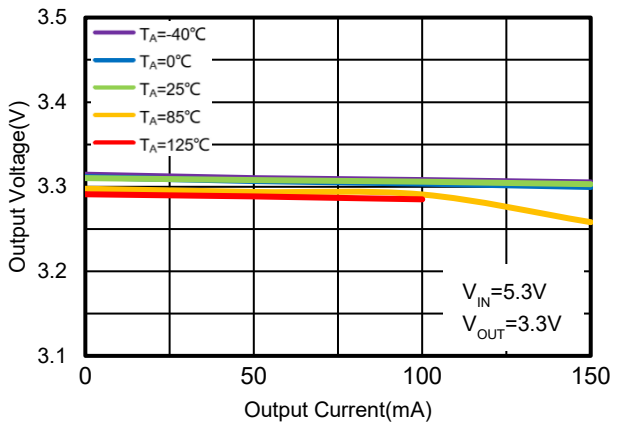


Figure 1. WR0115-33A20R-AT
Load Regulation vs. I_{OUT} & Ambient Temperature

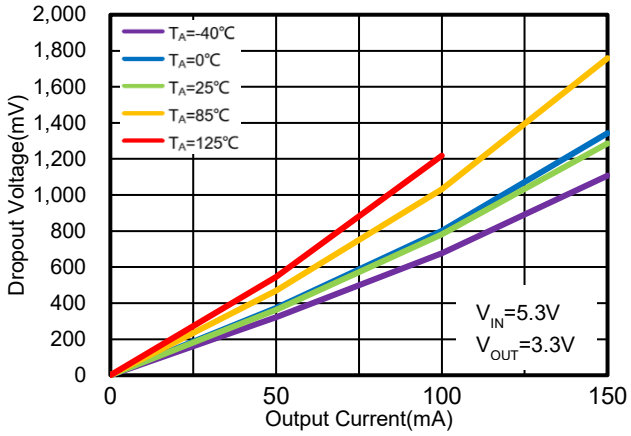


Figure 2. WR0115-33A20R-AT
Dropout Voltage vs. I_{OUT} & Ambient Temperature

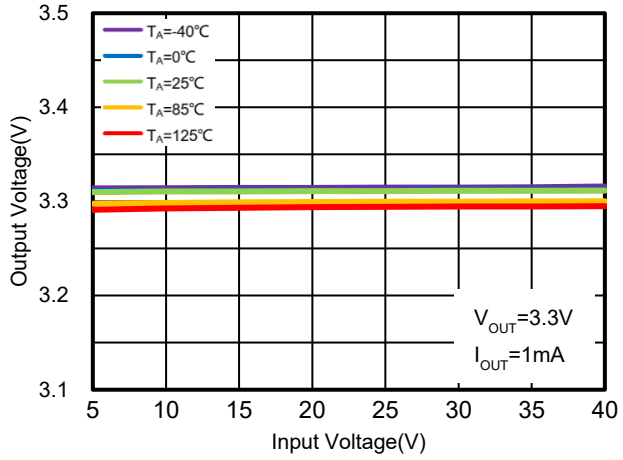


Figure 3. WR0115-33A20R-AT
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

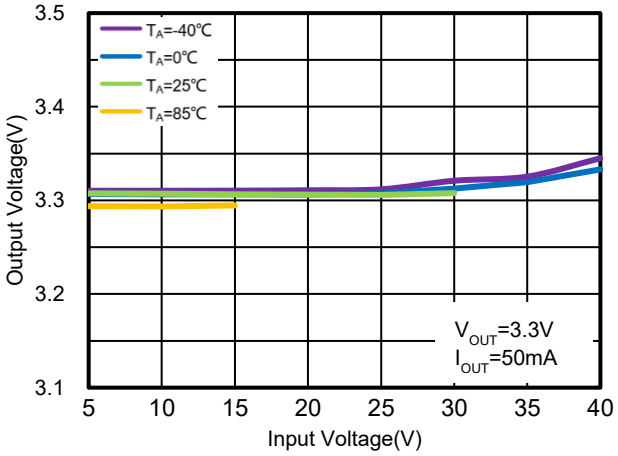


Figure 4. WR0115-33A20R-AT
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

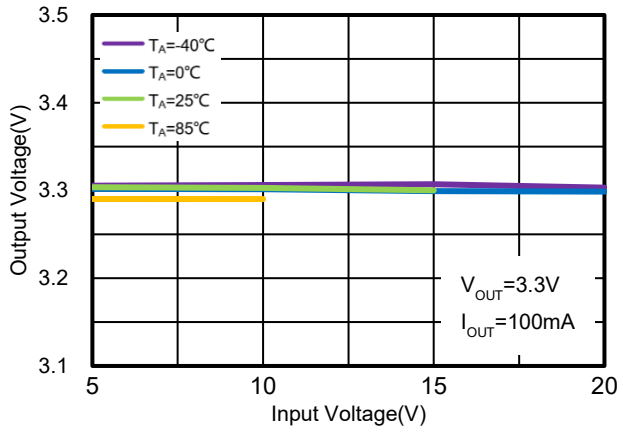


Figure 5. WR0115-33A20R-AT
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

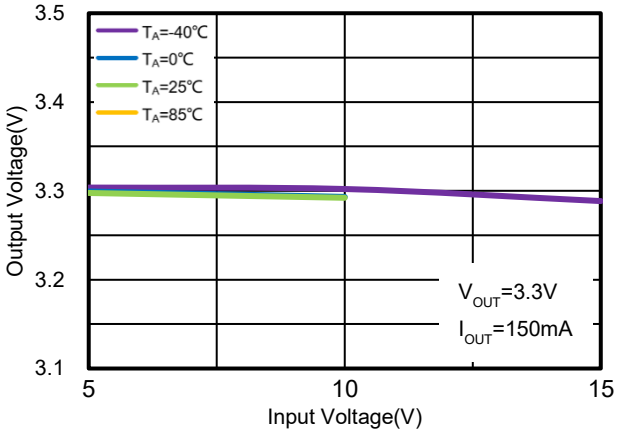


Figure 6. WR0115-33A20R-AT
Regulation vs. V_{IN} (Line Regulation) & Ambient Temperature

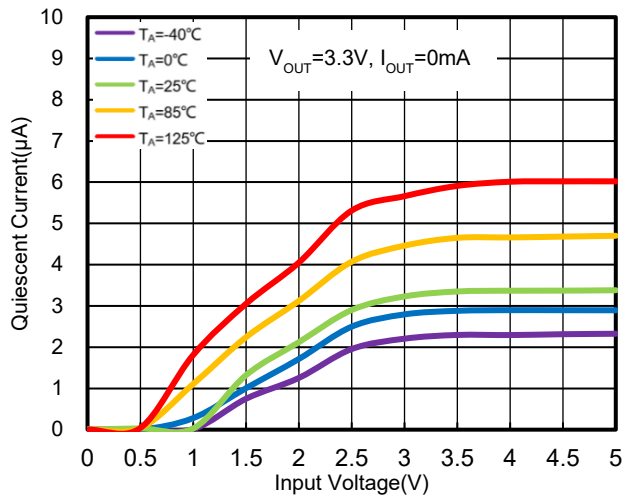


Figure 7. WR0115-33A20R-AT
Quiescent Current vs. V_{IN} & Ambient Temperature

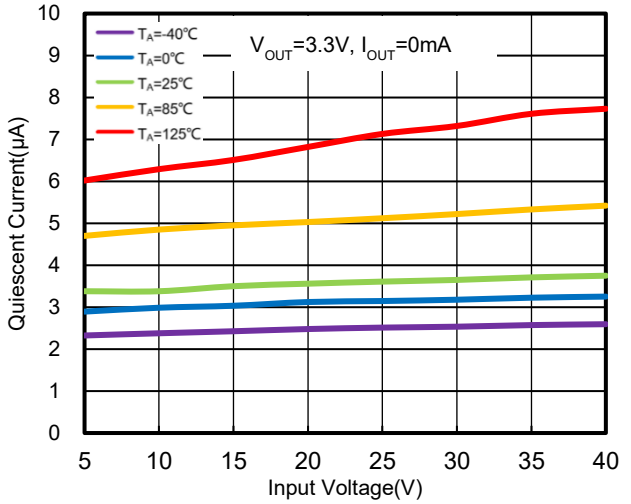


Figure 8. WR0115-33A20R-AT
Quiescent Current vs. V_{IN} & Ambient Temperature

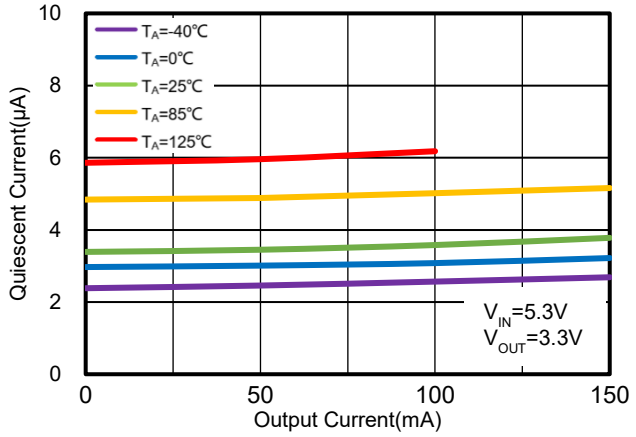


Figure 9. WR0115-33A20R-AT
Quiescent Current vs. I_{OUT} & Ambient Temperature

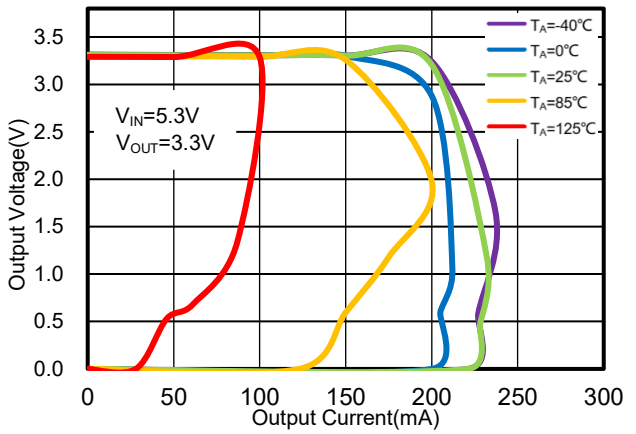


Figure 10. WR0115-33A20R-AT
Current Limit vs. I_{OUT} & Ambient Temperature

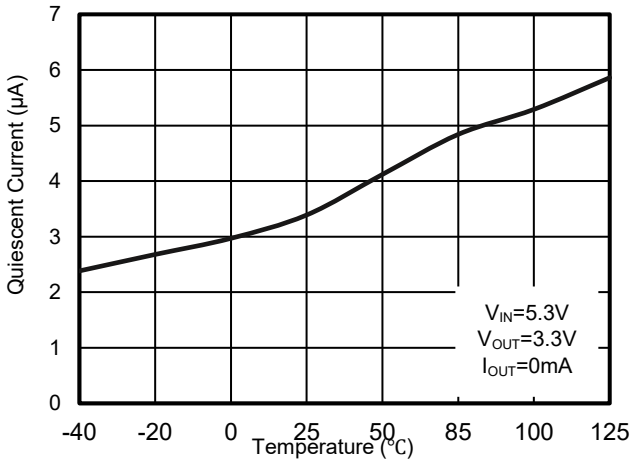


Figure 11. WR0115-33A20R-AT
Quiescent Current vs. Ambient Temperature

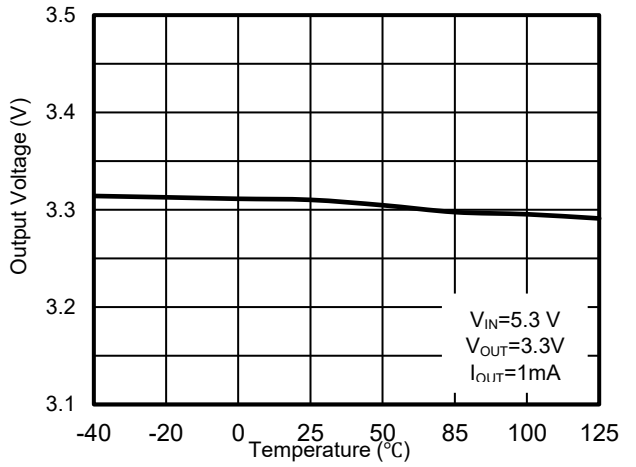


Figure 12. WR0115-33A20R-AT
Output Voltage vs. Ambient Temperature

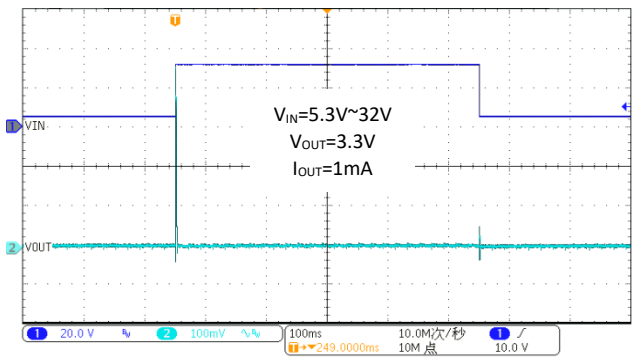


Figure 13. WR0115-33A20R-AT
Line Transient

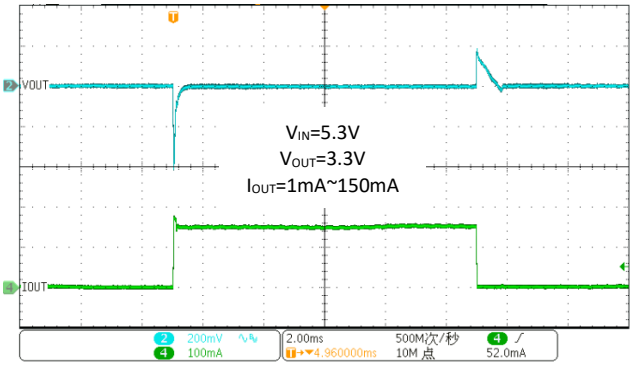


Figure 14. WR0115-33A20R-AT
Load Transient

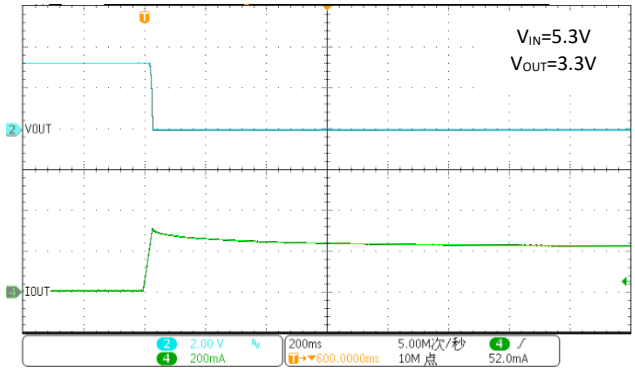


Figure 15. WR0115-33A20R-AT
Current Limit & I_{SHORT}

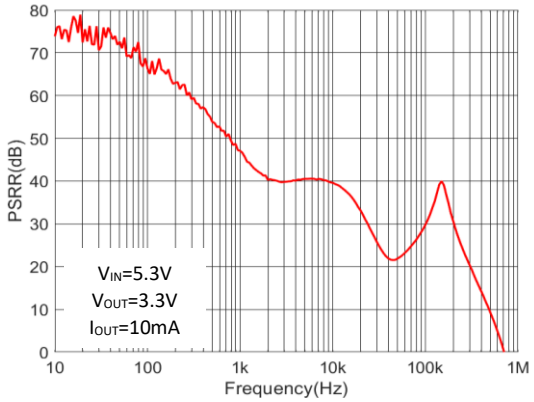


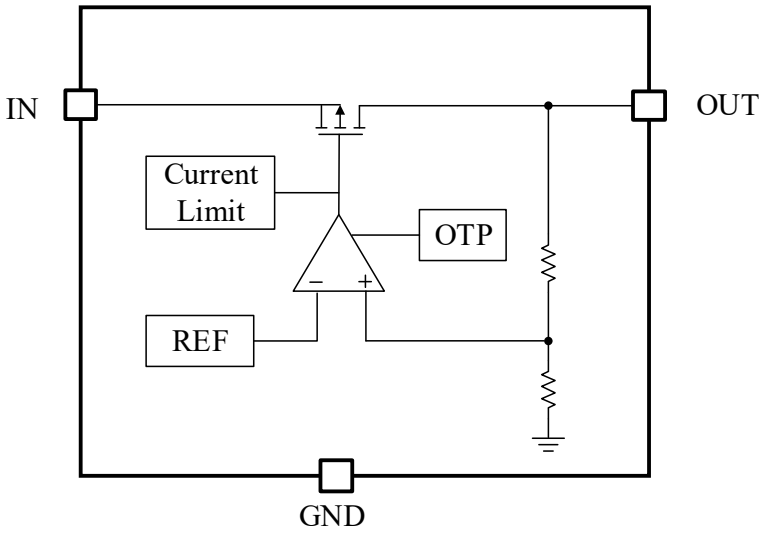
Figure 16. WR0115-33A20R-AT
PSRR

11. Function Description

11.1 Overview

The WR0115-AT series is a set of low power wide input voltage regulators implemented in CMOS technology which can provide 150mA output current. The device allows input voltage as high as 36V and the output voltage range is 1.2V to 5V, 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

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. The output voltage accuracy of WR0115-AT is about 2%.

11.3.2 Dropout Voltage (V_{DO})

The WR0115-AT is an ultra-low dropout voltage LDO that can achieve nominal output voltage at lower input voltages. Dropout voltage is defined as the minimum of (V_{IN}-V_{OUT}) at the rated maximum output current where V_{OUT} is the minimum of $V_{OUT(NOM)}$. When the input voltage is below $V_{OUT(NOM)}$ plus V_{DO}, the output voltage varies with the input voltage.

For a CMOS regulator, the dropout voltage is determined by the drain-source on-state resistance ($R_{DS\ (ON)}$) of the pass transistor. Therefore, if the linear regulator operates at less than the rated current, the dropout voltage for that current scales accordingly. The $R_{DS\ (ON)}$ is calculated by following equation.

$$R_{DS\ (ON)}=V_{DO}/I_{OUT}$$

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

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

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.

11.3.4 Fixed Current Limiting (I_{LIM})

In LDO circuits, if an output short circuit or excessive load current occurs, the device may be burned out. Especially in the case of a short circuit, not only is there too much current flowing through the regulator, but the voltage across the source drain of the regulator is also at its maximum, which is likely to burn out the regulator and make the device inoperable. The current limiting circuit used in LDO is a constant current limiting circuit, where the maximum load current that the LDO can supply is limited to a set constant I_{LIM}, and when an overload or short circuit occurs, the output current will be maintained at I_{LIM}, and the output voltage will be reduced to $I_{LIM}R_{LOAD}$.

The WR0115-AT uses a fixed current limiting mode where the final current is clamped to around 200mA, thus providing good protection to the device.

More information on current limiting can be found in Electrical Characteristics Figure 10.

12. Application Guide

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-AT is a low power high voltage regulator with an input voltage of 3.2V to 36V and an output voltage of 1.2V to 5.0V. 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.

12.2 Capacitor Recommendation

The WR0115-AT 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-AT 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.

12.3 Power Dissipation (P_D)

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.

P_D 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 ($R_{\theta JA}$) and ambient air temperature (T_A) of the PCB and package and are calculated as follows:

$$T_J = T_A + (R_{\theta JA}{}^{x} P_D)$$

The thermal resistance ($R_{\theta JA}$) 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.

13. Evaluation Modules

Evaluation Modules (EVMs) are available to help evaluate initial circuit performance. We have evaluation modules for different packages, you can contact us to get the evaluation module or schematic, PCB layout and BOM..

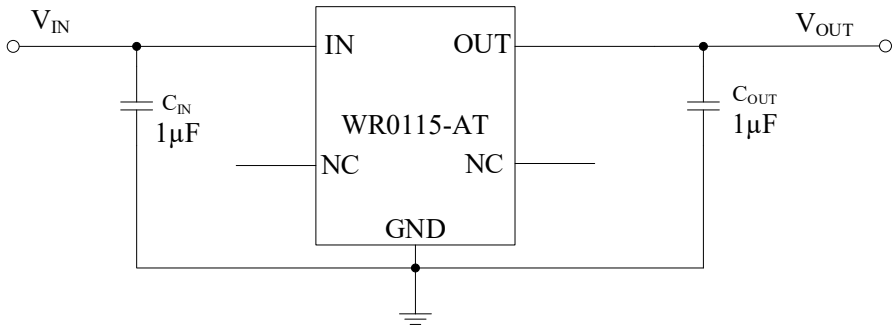
The module names are listed in the following table.

NAME	PACKAGE	EVALUATION MODULE
WR0115-AT	SOT23-5	WAYON LDO EVM V1.1 – SOT23-5
WR0115-AT	SOT89-3	WAYON LDO EVM V1.1 – SOT89-3
WR0115-AT	SOT223-3	WAYON LDO EVM V1.1 – SOT223-3

13.1 Typical Application Circuits

This section discusses the application of the WR0115-AT in the circuit. The following figure shows the schematic of the application circuit.

Circuit schematic :



13.2 Layout of Typical Application Circuits

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. A minimum 1.0μF input capacitor (C_{IN}) is recommended to IN to minimize the effect of resistance and inductance between the source and the LDO input. A minimum 1.0μF output capacitor (C_{OUT}) is recommended to OUT. Connect the ground sides of C_{IN} and C_{OUT} with LDO ground pins as close as possible through a wide copper surface. Through-holes and long wires may seriously affect system performance and is not recommended.

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.

Figure 17 illustrate the PCB layout of SOT89-3, Figure 18 illustrate the PCB layout of SOT23-5.

Layout Example：

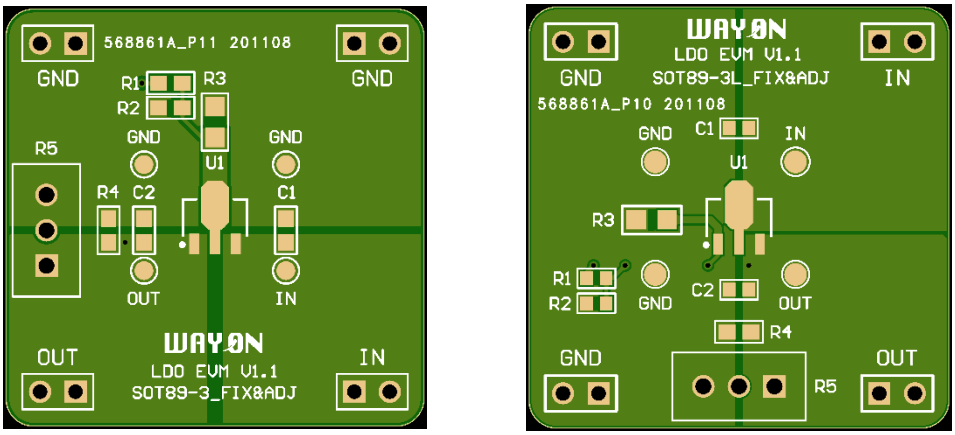


Figure 17 PCB layout of SOT89-3

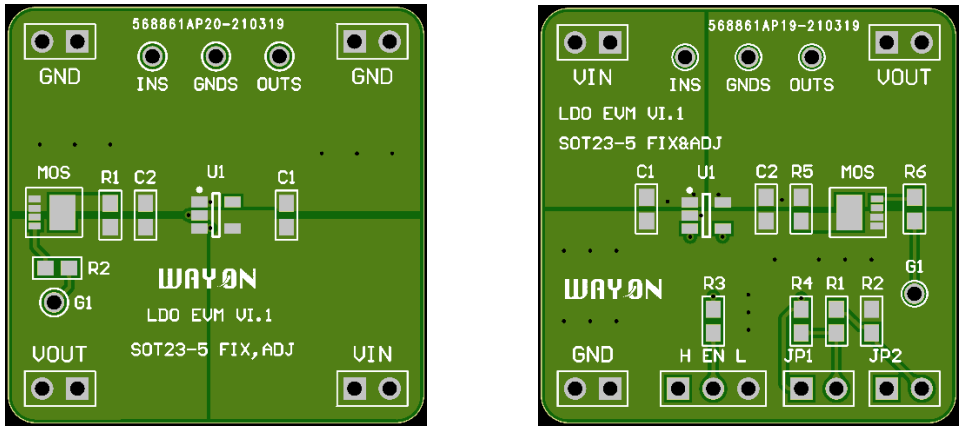


Figure 18 PCB layout of SOT23-5

14. Naming Conventions

WR AA BB-CC DDD E-AT

WR: WAYON Regulator

AA: 01 - Output Current, 150mA

BB: Serial number

CC: Output Voltage

DDD: Package –A50/A51/A52: SOT23-5;
A20/A21: SOT89-3
A70: SOT223-3

E: R-Reel & T-tube

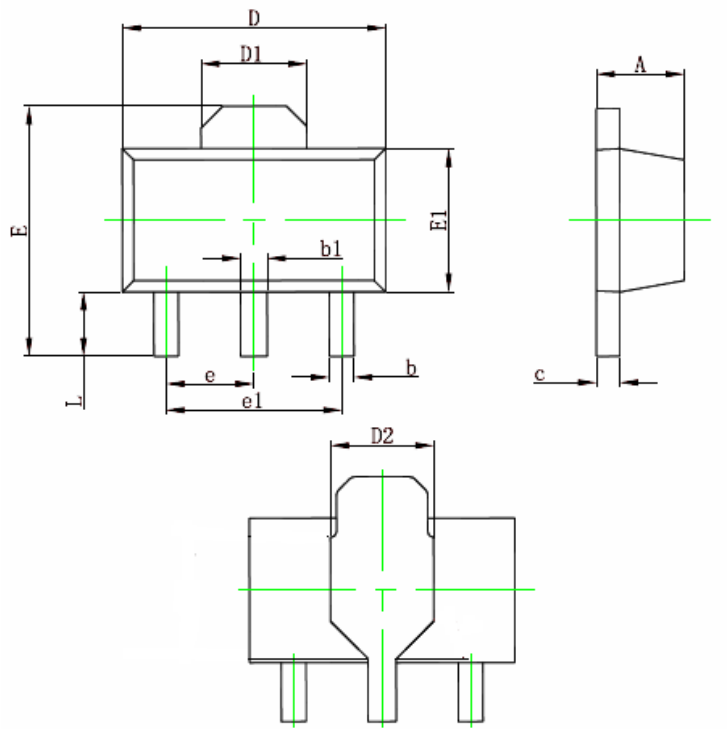
AT: Automotive

15. 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.

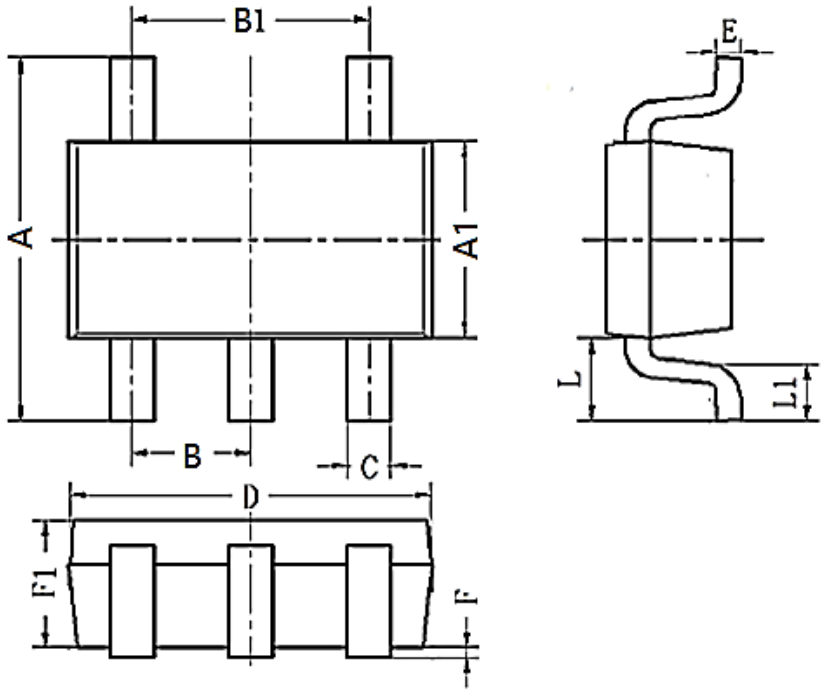
16. Package Information

SOT 89-3



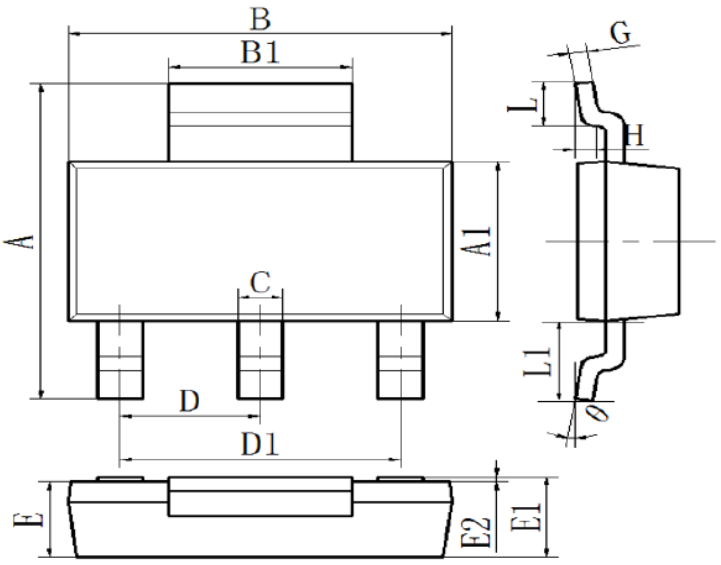
SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	1.4	1.5	1.6
b	0.320	0.420	0.520
b1	0.380	0.480	0.580
c	0.350	0.405	0.460
D	4.400	4.500	4.600
D1	1.65REF		
D2	1.700	1.950	2.200
E	3.940	4.120	4.300
E1	2.300	2.450	2.600
e	1.5BSC		
e1	3.00BSC		
L	0.800	1.000	1.200

SOT 23-5



SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	2.60	2.80	3.00
A1	1.50	1.60	1.70
B	0.85	0.95	1.05
B1	1.80	1.90	2.00
C	0.25	0.37	0.50
D	2.79	2.90	3.02
E	0.10	0.15	0.20
F	0.00	0.10	0.20
L	0.60REF		
L1	0.30	0.45	0.60
F1	0.85	1.10	1.30

SOT 223-3



SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	6.70	7.00	7.30
A1	3.30	3.50	3.70
B	6.20	6.45	6.70
B1	2.90	3.00	3.10
C	0.60	0.72	0.84
D	2.25	2.30	2.35
D1	4.50	4.60	4.70
E	1.45	1.60	1.75
E1	1.51	1.66	1.81
E2	0.02	0.08	0.14
G	0.20	0.29	0.35
H	0.20	0.25	0.30
L	0.75	0.95	1.15
L1	1.65	1.75	1.85
θ	0	4°	10°

17. Ordering Information

PART NUMBER	OUTPUT VOLTAGE	PACKAGE	PACKING QUANTITY	MARKING*
WR0115-12A50R-AT	1.2V	SOT23-5	3k/Reel	0115Q 12 XXXX
WR0115-15A50R-AT	1.5V	SOT23-5	3k/Reel	0115Q 15 XXXX
WR0115-18A50R-AT	1.8V	SOT23-5	3k/Reel	0115Q 18 XXXX
WR0115-20A50R-AT	2.0V	SOT23-5	3k/Reel	0115Q 20 XXXX
WR0115-22A50R-AT	2.2V	SOT23-5	3k/Reel	0115Q 22 XXXX
WR0115-25A50R-AT	2.5V	SOT23-5	3k/Reel	0115Q 25 XXXX
WR0115-28A50R-AT	2.8V	SOT23-5	3k/Reel	0115Q 28 XXXX
WR0115-30A50R-AT	3.0V	SOT23-5	3k/Reel	0115Q 30 XXXX
WR0115-33A50R-AT	3.3V	SOT23-5	3k/Reel	0115Q 33 XXXX
WR0115-36A50R-AT	3.6V	SOT23-5	3k/Reel	0115Q 36 XXXX
WR0115-45A50R-AT	4.5V	SOT23-5	3k/Reel	0115Q 45 XXXX
WR0115-50A50R-AT	5.0V	SOT23-5	3k/Reel	0115Q 50 XXXX
WR0115-12A51R-AT	1.2V	SOT23-5	3k/Reel	0115Q 12 XXXX
WR0115-15A51R-AT	1.5V	SOT23-5	3k/Reel	0115Q 15 XXXX
WR0115-18A51R-AT	1.8V	SOT23-5	3k/Reel	0115Q 18 XXXX
WR0115-20A51R-AT	2.0V	SOT23-5	3k/Reel	0115Q 20 XXXX
WR0115-22A51R-AT	2.2V	SOT23-5	3k/Reel	0115Q 22 XXXX
WR0115-25A51R-AT	2.5V	SOT23-5	3k/Reel	0115Q 25 XXXX
WR0115-28A51R-AT	2.8V	SOT23-5	3k/Reel	0115Q 28 XXXX
WR0115-30A51R-AT	3.0V	SOT23-5	3k/Reel	0115Q 30 XXXX
WR0115-33A51R-AT	3.3V	SOT23-5	3k/Reel	0115Q 33 XXXX
WR0115-36A51R-AT	3.6V	SOT23-5	3k/Reel	0115Q 36 XXXX
WR0115-45A51R-AT	4.5V	SOT23-5	3k/Reel	0115Q 45 XXXX
WR0115-50A51R-AT	5.0V	SOT23-5	3k/Reel	0115Q 50 XXXX
WR0115-12A52R-AT	1.2V	SOT23-5	3k/Reel	0115Q 12 XXXX
WR0115-15A52R-AT	1.5V	SOT23-5	3k/Reel	0115Q 15 XXXX
WR0115-18A52R-AT	1.8V	SOT23-5	3k/Reel	0115Q 18 XXXX

PART NUMBER	OUTPUT VOLTAGE	PACKAGE	PACKING QUANTITY	MARKING*
WR0115-20A52R-AT	2.0V	SOT23-5	3k/Reel	0115Q 20 XXXX
WR0115-22A52R-AT	2.2V	SOT23-5	3k/Reel	0115Q 22 XXXX
WR0115-25A52R-AT	2.5V	SOT23-5	3k/Reel	0115Q 25 XXXX
WR0115-28A52R-AT	2.8V	SOT23-5	3k/Reel	0115Q 28 XXXX
WR0115-30A52R-AT	3.0V	SOT23-5	3k/Reel	0115Q 30 XXXX
WR0115-33A52R-AT	3.3V	SOT23-5	3k/Reel	0115Q 33 XXXX
WR0115-36A52R-AT	3.6V	SOT23-5	3k/Reel	0115Q 36 XXXX
WR0115-45A52R-AT	4.5V	SOT23-5	3k/Reel	0115Q 45 XXXX
WR0115-50A52R-AT	5.0V	SOT23-5	3k/Reel	0115Q 50 XXXX
WR0115-12A20R-AT	1.2V	SOT89-3	1k/Reel	0115Q 12 XXXX
WR0115-15A20R-AT	1.5V	SOT89-3	1k/Reel	0115Q 15 XXXX
WR0115-18A20R-AT	1.8V	SOT89-3	1k/Reel	0115Q 18 XXXX
WR0115-20A20R-AT	2.0V	SOT89-3	1k/Reel	0115Q 20 XXXX
WR0115-22A20R-AT	2.2V	SOT89-3	1k/Reel	0115Q 22 XXXX
WR0115-25A20R-AT	2.5V	SOT89-3	1k/Reel	0115Q 25 XXXX
WR0115-28A20R-AT	2.8V	SOT89-3	1k/Reel	0115Q 28 XXXX
WR0115-30A20R-AT	3.0V	SOT89-3	1k/Reel	0115Q 30 XXXX
WR0115-33A20R-AT	3.3V	SOT89-3	1k/Reel	0115Q 33 XXXX
WR0115-36A20R-AT	3.6V	SOT89-3	1k/Reel	0115Q 36 XXXX
WR0115-45A20R-AT	4.5V	SOT89-3	1k/Reel	0115Q 45 XXXX
WR0115-50A20R-AT	5.0V	SOT89-3	1k/Reel	0115Q 50 XXXX
WR0115-12A21R-AT	1.2V	SOT89-3	1k/Reel	0115Q 12 XXXX
WR0115-15A21R-AT	1.5V	SOT89-3	1k/Reel	0115Q 15 XXXX
WR0115-18A21R-AT	1.8V	SOT89-3	1k/Reel	0115Q 18 XXXX
WR0115-20A21R-AT	2.0V	SOT89-3	1k/Reel	0115Q 20 XXXX
WR0115-22A21R-AT	2.2V	SOT89-3	1k/Reel	0115Q 22 XXXX
WR0115-25A21R-AT	2.5V	SOT89-3	1k/Reel	0115Q 25 XXXX
WR0115-28A21R-AT	2.8V	SOT89-3	1k/Reel	0115Q 28 XXXX

PART NUMBER	OUTPUT VOLTAGE	PACKAGE	PACKING QUANTITY	MARKING*
WR0115-30A21R-AT	3.0V	SOT89-3	1k/Reel	0115Q 30 XXXX
WR0115-33A21R-AT	3.3V	SOT89-3	1k/Reel	0115Q 33 XXXX
WR0115-36A21R-AT	3.6V	SOT89-3	1k/Reel	0115Q 36 XXXX
WR0115-45A21R-AT	4.5V	SOT89-3	1k/Reel	0115Q 45 XXXX
WR0115-50A21R-AT	5.0V	SOT89-3	1k/Reel	0115Q 50 XXXX
WR0115-12A70R-AT	1.2V	SOT223-3	2.5k/Reel	0115Q 12 XXXX
WR0115-15A70R-AT	1.5V	SOT223-3	2.5k/Reel	0115Q 15 XXXX
WR0115-18A70R-AT	1.8V	SOT223-3	2.5k/Reel	0115Q 18 XXXX
WR0115-20A70R-AT	2.0V	SOT223-3	2.5k/Reel	0115Q 20 XXXX
WR0115-22A70R-AT	2.2V	SOT223-3	2.5k/Reel	0115Q 22 XXXX
WR0115-25A70R-AT	2.5V	SOT223-3	2.5k/Reel	0115Q 25 XXXX
WR0115-28A70R-AT	2.8V	SOT223-3	2.5k/Reel	0115Q 28 XXXX
WR0115-30A70R-AT	3.0V	SOT223-3	2.5k/Reel	0115Q 30 XXXX
WR0115-33A70R-AT	3.3V	SOT223-3	2.5k/Reel	0115Q 33 XXXX
WR0115-36A70R-AT	3.6V	SOT223-3	2.5k/Reel	0115Q 36 XXXX
WR0115-45A70R-AT	4.5V	SOT223-3	2.5k/Reel	0115Q 45 XXXX
WR0115-50A70R-AT	5.0V	SOT223-3	2.5k/Reel	0115Q 50 XXXX

* XXXX is variable.

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Specifications are subject to change without notice.
The device characteristics and parameters in this data sheet can and do vary in different applications and actual device performance may vary over time.
Users should verify actual device performance in their specific applications.

Product Specification Statement

- The product specification aims to provide users with a reference regarding various product parameters, performance, and usage. It presents certain aspects of the product's performance in graphical form and is intended solely for users to select product and make product comparisons, enabling users to better understand and evaluate the characteristics and advantages of the product. It does not constitute any commitment, warranty, or guarantee.
- The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. WAYON shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and WAYON assumes no responsibility for the application of the product.
- WAYON strives to provide accurate and up-to-date information to the best of our ability. However, due to technical, human, or other reasons, WAYON cannot guarantee that the information provided in the product specification is entirely accurate and error-free. WAYON shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications. WAYON reserves the right to revise or update the product specification and the products at any time without prior notice, and the user's continued use of the product specification is considered an acceptance of these revisions and updates. Prior to purchasing and using the product, users should verify the above information with WAYON to ensure that the product specification is the most current, effective, and complete. If users are particularly concerned about product parameters, please consult WAYON in detail or request relevant product test reports. Any data not explicitly mentioned in the product specification shall be subject to separate agreement.
- Users are advised to pay attention to the parameter limit values specified in the product specification and maintain a certain margin in design or application to ensure that the product does not exceed the parameter limit values defined in the product specification. This precaution should be taken to avoid exceeding one or more of the limit values, which may result in permanent irreversible damage to the product, ultimately affecting the quality and reliability of the system or equipment.
- The design of the product is intended to meet civilian needs and is not guaranteed for use in harsh environments or precision equipment. It is not recommended for use in systems or equipment such as medical devices, aircraft, nuclear power, and similar systems, where failures in these systems or equipment could reasonably be expected to result in personal injury. WAYON shall assume no responsibility for any consequences resulting from such usage.
- Users should also comply with relevant laws, regulations, policies, and standards when using the product specification. Users are responsible for the risks and liabilities arising from the use of the product specification and must ensure that it is not used for illegal purposes. Additionally, users should respect the intellectual property rights related to the product specification and refrain from infringing upon any third-party legal rights. WAYON shall assume no responsibility for any disputes or controversies arising from the above-mentioned issues in any form.