High PSRR, High speed, CMOS LDO

General Description

The WR0332 series is a high accuracy, low noise, high speed, low dropout CMOS Linear regulator with high ripple rejection. The devices offer a new level of cost-effective performance in cellular phones, laptop and notebook computers, and other portable devices.

The WR0332 has the fold-back maximum output current which depends on the output voltage. So the current limit functions both as a short circuit protection and as an output current limiter.

The WR0332 regulators are available in standard SOT23-3 package、SOT23-5 package and DFN1x1-4 Package. Standard products are Pb-free and Halogen-free.

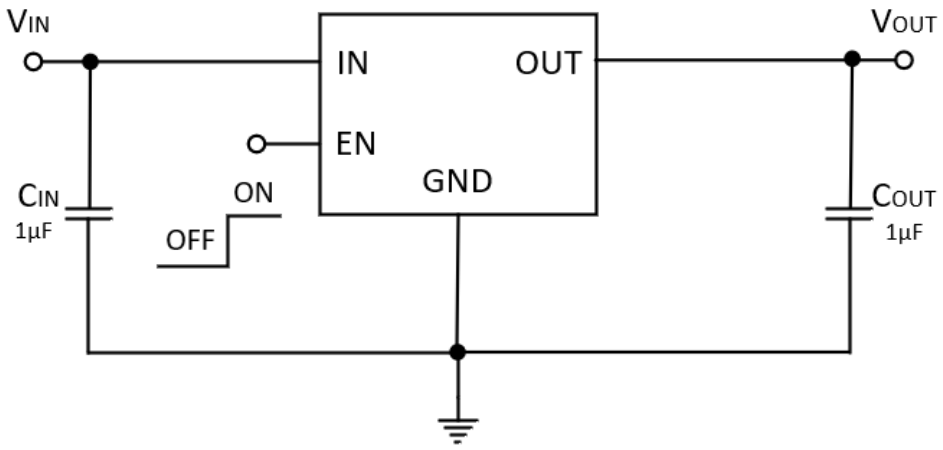
Features

- Input Voltage: 2.0V~5.5V
- Output Voltage: 1.0V~3.3V
- Output Current: 300mA
- PSRR: 70dB@1KHz
- Dropout Voltage: 220mV @ I_{OUT} = 300mA
- Operating Temperature: -40~+125ºC
- Shut-down Current: < 1μA
- Quiescent Current: 60μA Typ.
- Recommend Capacitor: 1μF

Applications

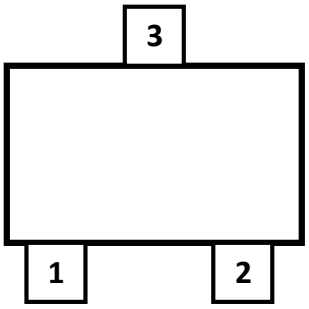
- MP3/MP4 Players
- Cellphones, radiophone, digital cameras
- Bluetooth, wireless handsets
- Others portable electronic device

Typical Application

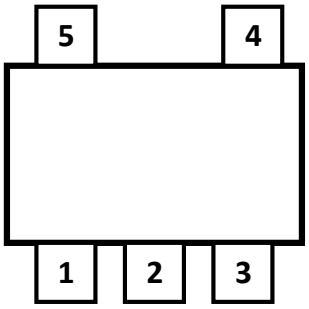


Pin Configuration

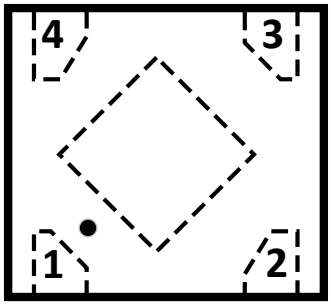
(Top View)



SOT23-3



SOT23-5



DFN-4

Pin Description

Pin Number			Pin Name	Description
SOT23-3	SOT23-5	DFN-4		
3	1	4	IN	Input Voltage
1	2	2	GND	Ground
-	3	3	EN	Enable, Active High
-	4	-	NC	NC
2	5	1	OUT	Output Voltage
-	-		EPAD	Exposed pad should be connected directly to the GND pin. Soldered to a large ground copper plane allows for effective heat removal.

Absolute Maximum Ratings

Parameter		Rating	Unit
Input voltage range		-0.3 ~ 6.5	V
EN Input voltage range		-0.3 ~ V_{IN}	V
Output voltage range		-0.3 ~ V_{IN}	V
Power Dissipation P_D @T_A = 25ºC	SOT23-3 & SOT23-5	500	mW
	DFN-4	500	mW
Thermal Resistance, θ_{JA}	SOT23-3 & SOT23-5	250	ºC/W
	DFN-4	250	ºC/W
Junction Temperature		150	ºC
Lead Temperature Range		260	ºC
Storage Temperature Range		-55 ~ 150	ºC
ESD Susceptibility	HBM	±4000	V

Recommended Operating Conditions

Parameter	Rating	Unit
Operating Supply voltage	2.0 ~ 5.5	V
Operating Temperature Range	-40 ~ 125	ºC

Electrical Characteristics

(T_A=25 ºC, V_{IN}=V_{OUT}+1V, C_{IN}=C_{OUT}=1μF, unless otherwise noted)

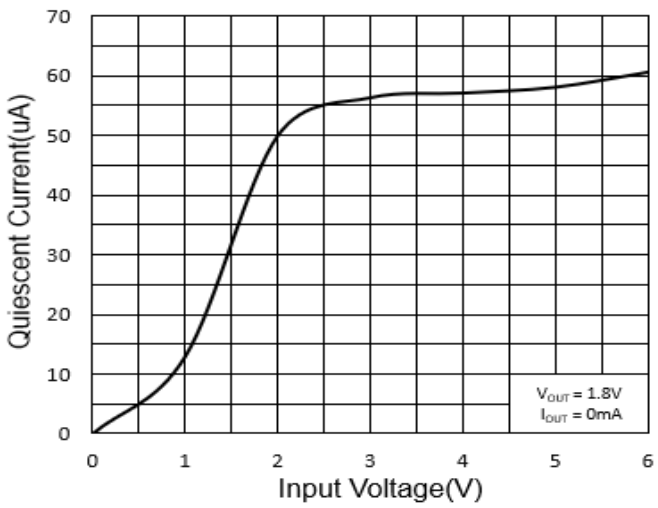
symbol	Parameter	Test Condition	Min	Typ	Max	Unit
V_{OUT}	Output Voltage	V_{OUT} ≤1.5V, V_{IN}=2.7V, I_{OUT}=1mA	0.97 V_{OUT}	V_{OUT}	1.03 V_{OUT}	V
		V_{OUT} > 1.5V, I_{OUT}=1mA	0.98 V_{OUT}	V_{OUT}	1.02 V_{OUT}	
V_{DO}	Dropout Voltage[1]	V_{OUT}=3.3V, I_{OUT}=300mA		220	330	mV
		V_{OUT}=3.0V, I_{OUT}=300mA		240	360	
		V_{OUT}=2.8V, I_{OUT}=300mA		250	375	
		V_{OUT}=2.5V, I_{OUT}=300mA		280	420	
		V_{OUT}=2.2V, I_{OUT}=300mA		310	465	
		V_{OUT}=1.8V, I_{OUT}=300mA		400	600	
I_{OUT}	Maximum Output Current[2]	V_{EN}=V_{IN}	300			mA
LNR	Line Regulation	V_{OUT}=3.3V, V_{IN}=4.3~5.5V, I_{OUT}=1mA		0.05	0.1	%/V
LDR	Load Regulation[3]	V_{OUT}=3.3V, I_{OUT}=1~300mA		15		mV
I_Q	Quiescent Current	V_{OUT}=3.3V, I_{OUT}=0mA		60	80	μA
I_{SHDN}	Shut-down Current	V_{EN} = 0V		0.1	1.0	μA
I_{SHORT}	Short Current	V_{EN}=V_{IN}, V_{OUT} Short to GND		150		mA
PSRR	Power Supply Ripple Rejection	V_{IN}=(V_{OUT}+1V) $_{DC}$+0.5V_{P-P} F=1KHz, I_{OUT}=10mA, @V_{OUT}=3.3V		70		dB
		V_{IN}=(V_{OUT}+1V) $_{DC}$+0.5V_{P-P} F=10KHz, I_{OUT}=10mA, @V_{OUT}=3.3V		55		
V_{NO}	Output noise voltage	10Hz to 100KHz, C_{OUT}=1μF		140		μV_{RMS}
V_{IH}	EN logic high voltage	V_{IN}=5.5V, I_{OUT}=1mA	1.2			V
V_{IL}	EN logic low voltage	V_{IN}=5.5V, I_{OUT}=1mA			0.4	V
T_{SD}	Thermal shutdown threshold			165		ºC
Δ T_{SD}	Thermal shutdown hysteresis			30		ºC
R_{DIS}	Output Discharge resistance	V_{IN}=4.0V, V_{EN}=0V		150		Ω

Note1: The dropout voltage is defined as (V_{IN}-V_{OUT}) when V_{OUT} is 100mV below the target value of V_{OUT}. V_{DO} is measured for devices with $V_{OUT(nom)}$ ≥ 1.8 V.

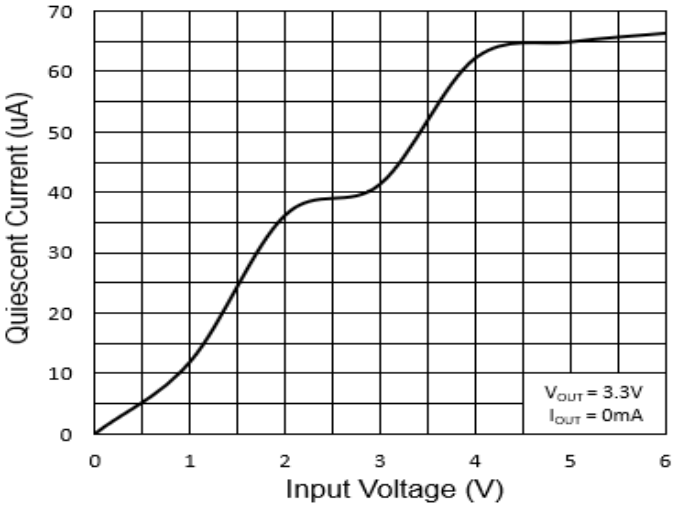
Note2: Maximum output current is affected by the PCB layout, size of metal trace, the thermal conduction path between metal layers, ambient temperature and the other environment factors of system. Attention should be paid to the dropout voltage when V_{IN} < V_{OUT} + V_{DROP}.

Note3: The Load regulation is measured using pulse techniques with duty cycle < 5%.

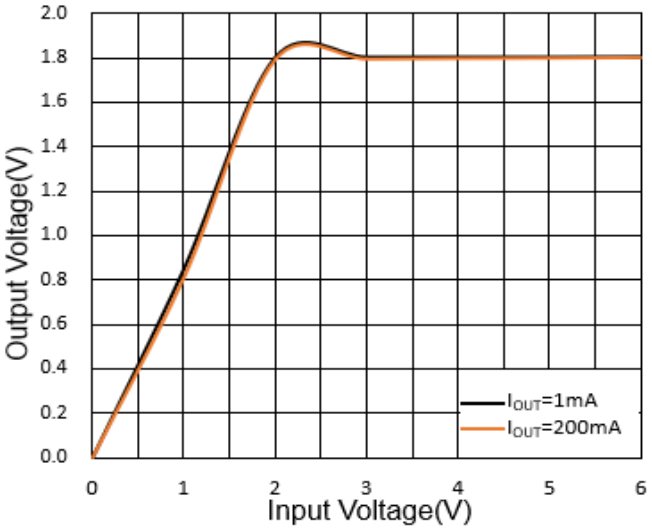
Typical Characteristics (T_a=25° C, V_{IN}=V_{OUT}+1V, C_{IN}=C_{OUT}=1μF, unless otherwise noted)



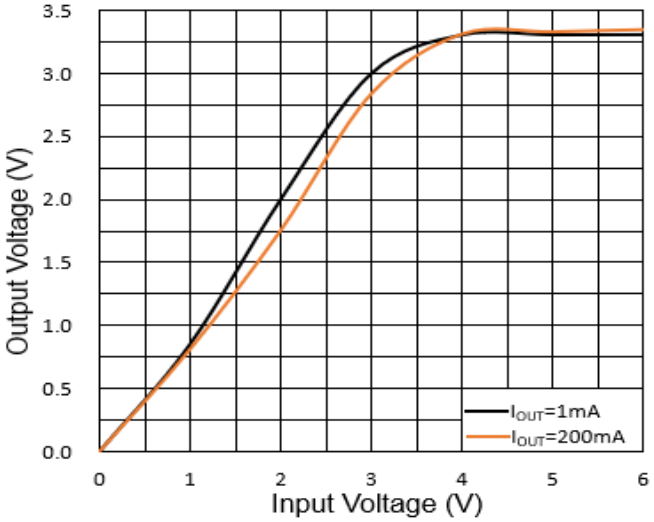
Quiescent Current vs. Supply Voltage



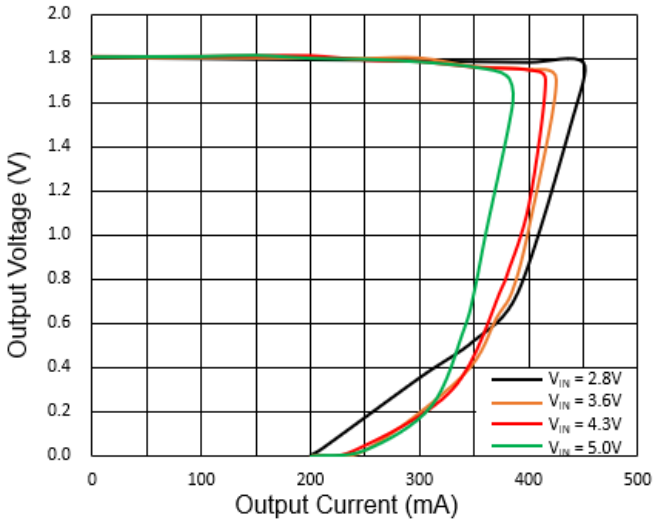
Quiescent Current vs. Supply Voltage



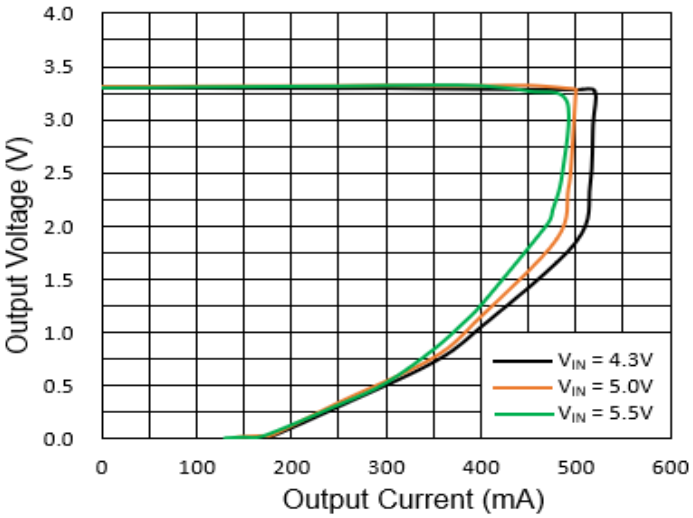
Output Voltage vs. Supply Voltage



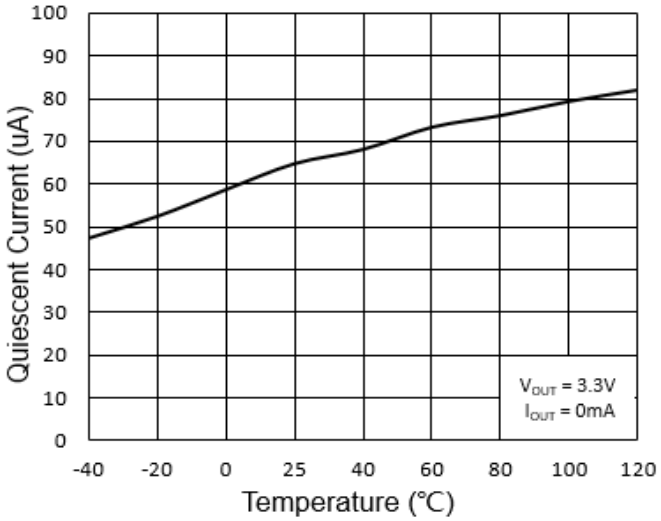
Output Voltage vs. Supply Voltage



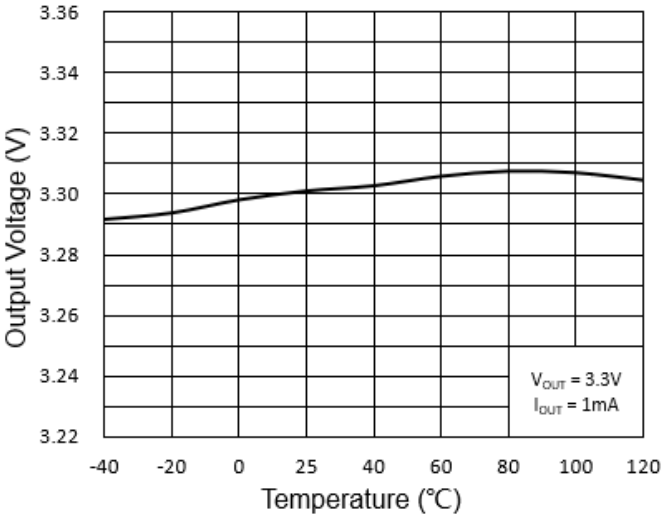
Output Voltage vs. Output Current



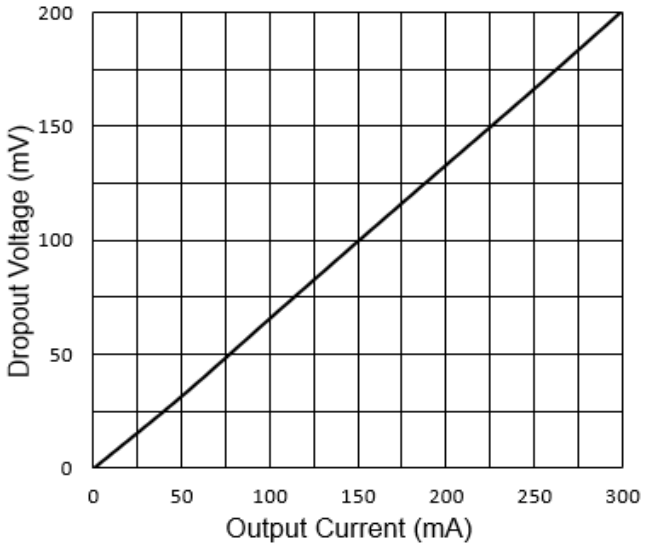
Output Voltage vs. Output Current



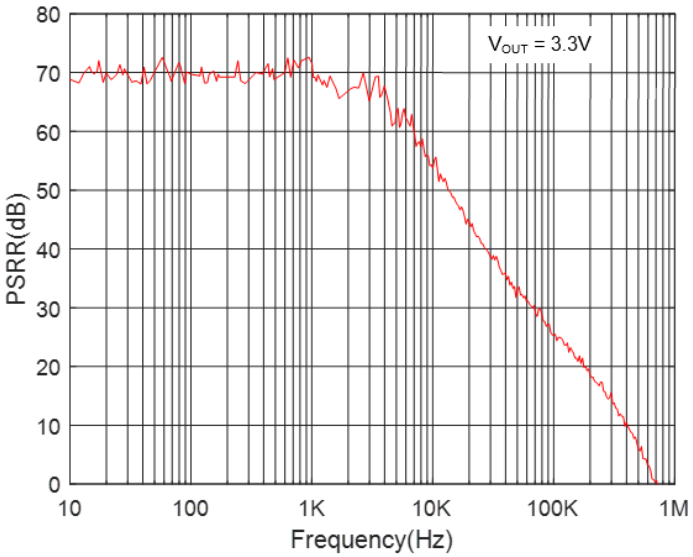
Quiescent Current vs. Temperature



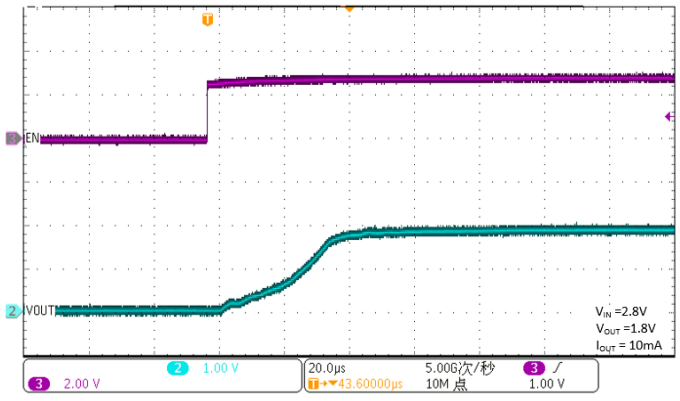
Output Voltage vs. Temperature



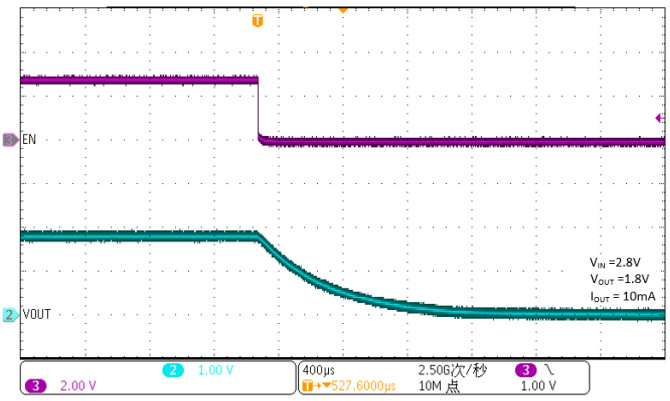
Dropout Voltage vs. Output Current



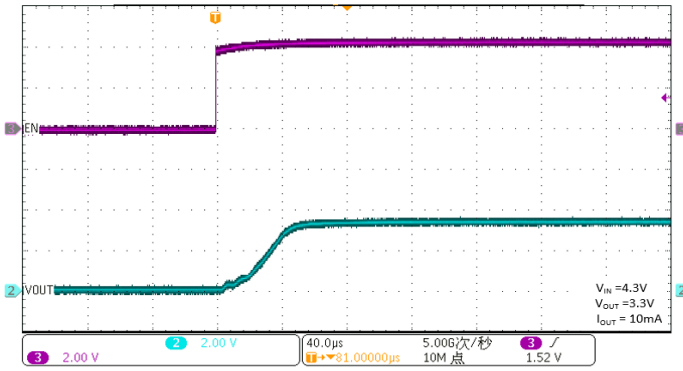
Power Supply Rejection Ratio vs. Frequency



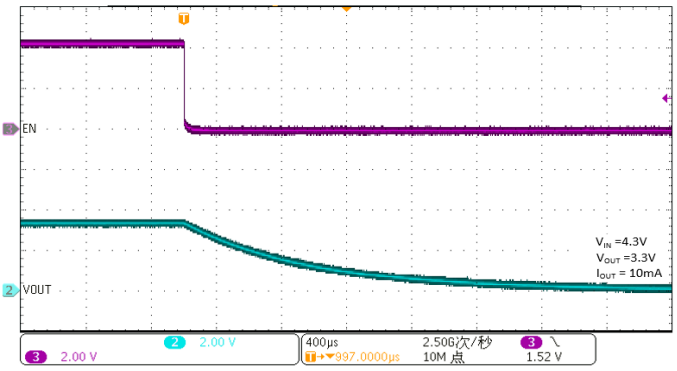
Soft Start from EN



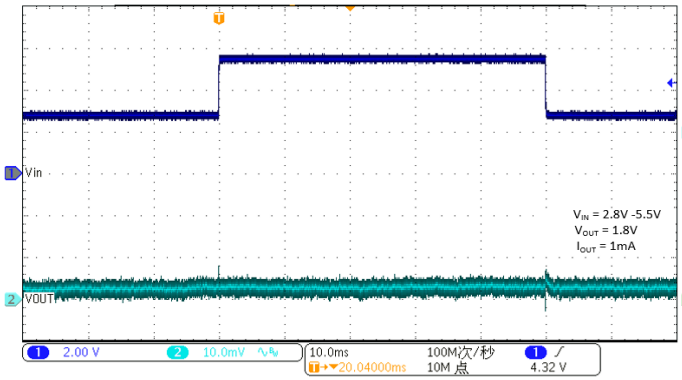
EN Shutdown



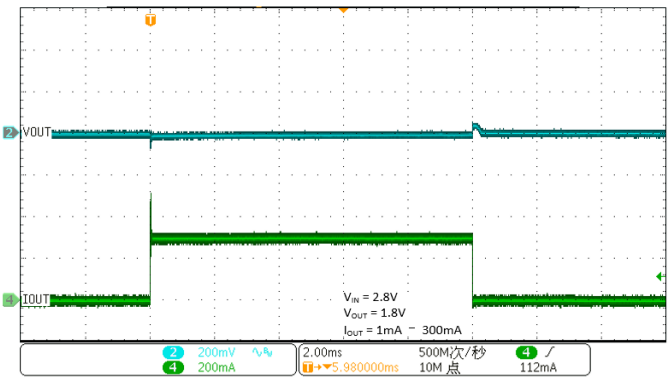
Soft Start from EN



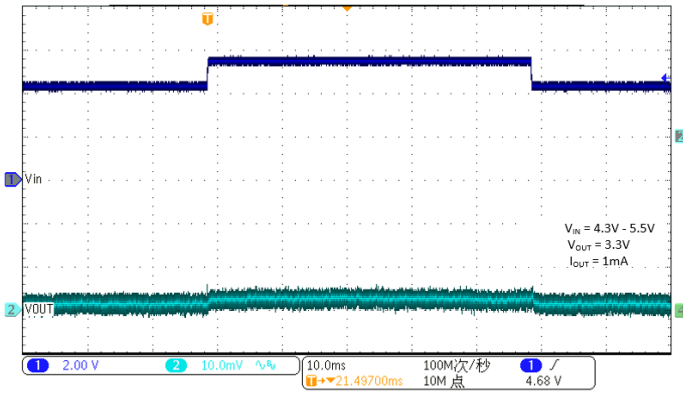
EN Shutdown



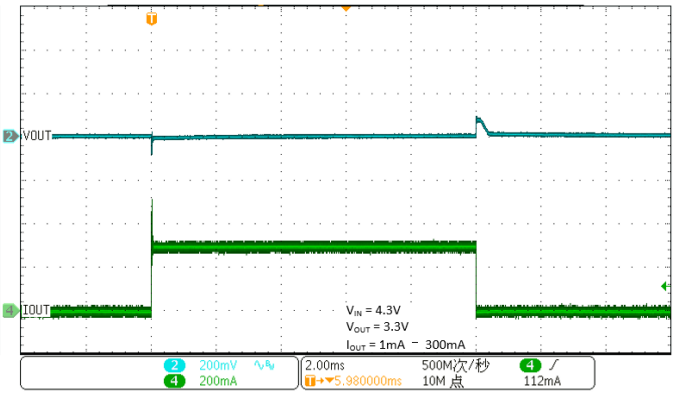
Line Transient



Load Transient

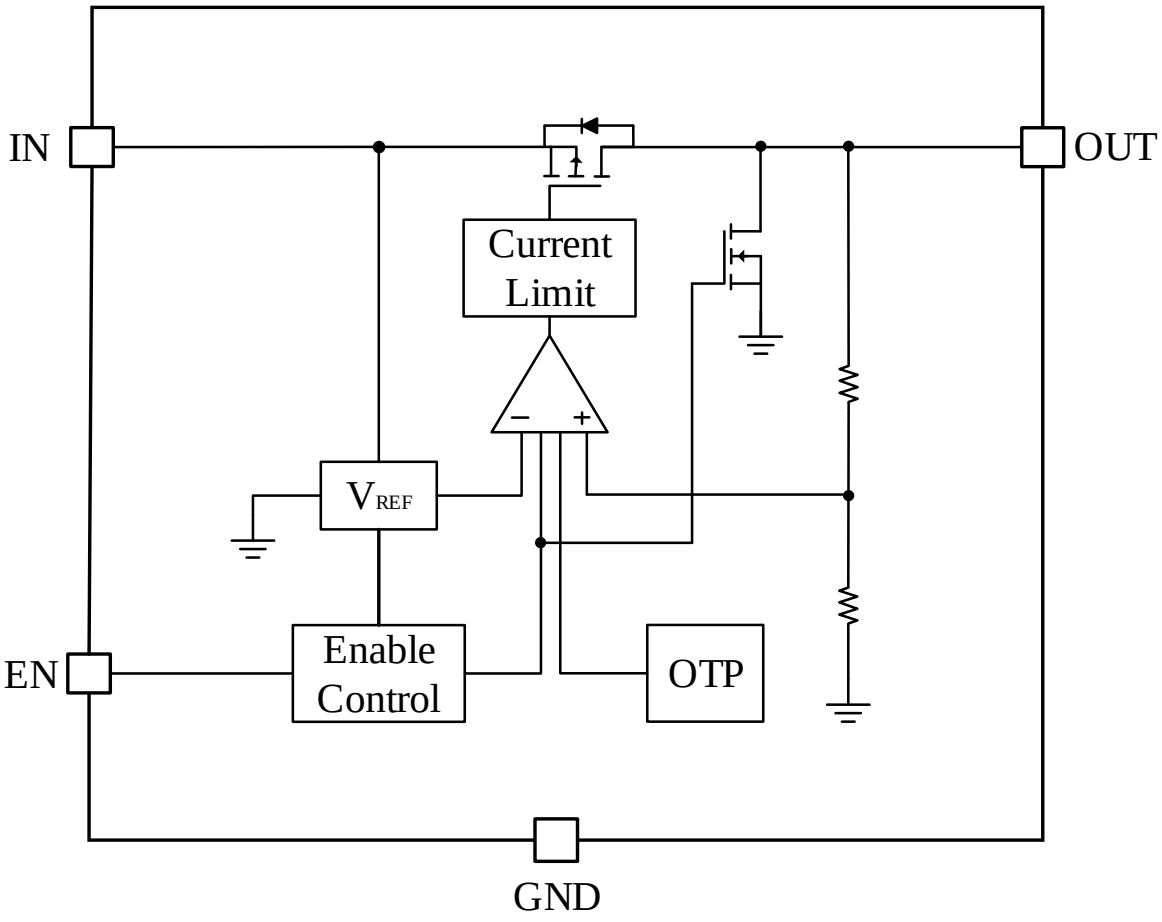


Line Transient

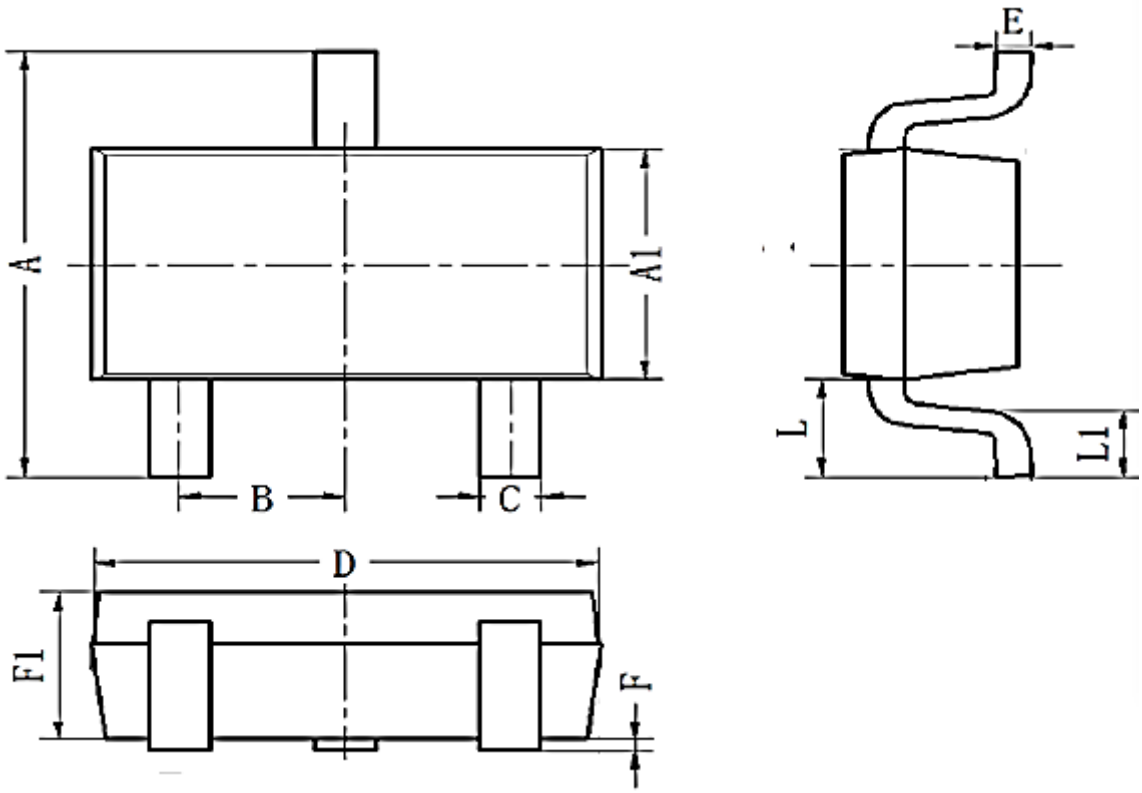


Load Transient

Block Diagram

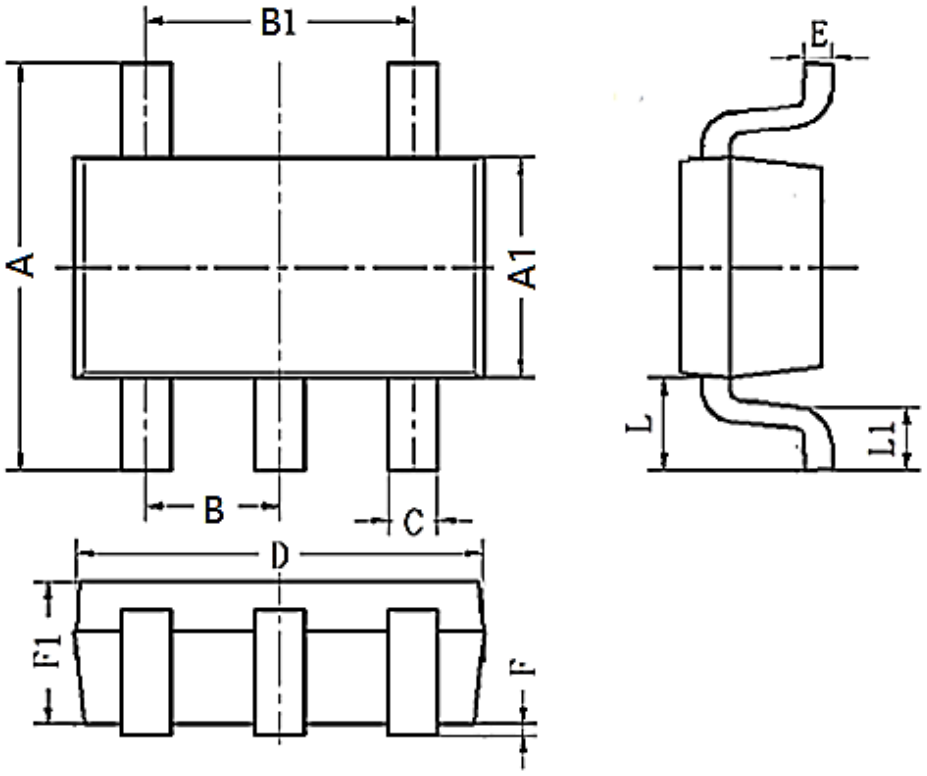


Package Information



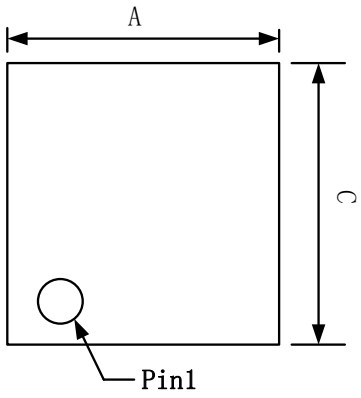
SOT 23-3

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

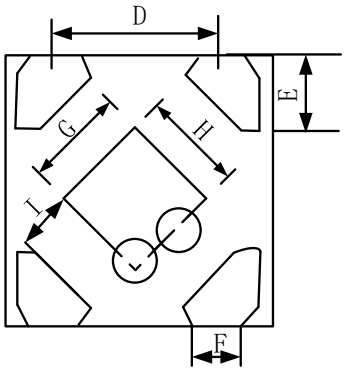


SOT 23-5

SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	2.60	2.80	3.00
A1	1.50	1.60	1.70
B	0.95BSC		
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



Top View

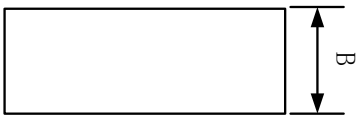


Bottom View

DETAIL A

Pin 1 ID and Tie Bar Mark Options

Note: The configuration of the Pin 1 identifier is optional, but must be located within the zone indicated.



Side View

DFN-4

SYMBOL	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.950	1.000	1.050
B	0.320	0.370	0.420
C	0.950	1.000	1.050
D		0.650BSC	
E	0.170	0.270	0.370
F	0.130	0.235	0.300
G	0.430	0.485	0.540
H	0.430	0.485	0.540
I		0.200REF	

Ordering Information

Part Number	Output Voltage	Package	Packing Quantity	Marking*
WR0332-10A30R	1.0V	SOT23-3	3K/Reel	WR0332 10 (J)XXXX
WR0332-105A30R	1.05V	SOT23-3	3k/Reel	WR0332 105 (J)XXXX
WR0332-11A30R	1.1V	SOT23-3	3k/Reel	WR0332 11 (J)XXXX
WR0332-12A30R	1.2V	SOT23-3	3K/Reel	WR0332 12 (J)XXXX
WR0332-15A30R	1.5V	SOT23-3	3k/Reel	WR0332 15 (J)XXXX
WR0332-18A30R	1.8V	SOT23-3	3k/Reel	WR0332 18 (J)XXXX
WR0332-20A30R	2.0V	SOT23-3	3k/Reel	WR0332 20 (J)XXXX
WR0332-22A30R	2.2V	SOT23-3	3k/Reel	WR0332 22 (J)XXXX
WR0332-25A30R	2.5V	SOT23-3	3k/Reel	WR0332 25 (J)XXXX
WR0332-28A30R	2.8V	SOT23-3	3k/Reel	WR0332 28 (J)XXXX
WR0332-30A30R	3.0V	SOT23-3	3k/Reel	WR0332 30 (J)XXXX
WR0332-33A30R	3.3V	SOT23-3	3k/Reel	WR0332 33 (J)XXXX
WR0332-10A50R	1.0V	SOT23-5	3K/Reel	WR0332 10 (J)XXXX
WR0332-105A50R	1.05V	SOT23-5	3k/Reel	WR0332 105 (J)XXXX
WR0332-11A50R	1.1V	SOT23-5	3k/Reel	WR0332 11 (J)XXXX
WR0332-12A50R	1.2V	SOT23-5	3k/Reel	WR0332 12 (J)XXXX
WR0332-15A50R	1.5V	SOT23-5	3k/Reel	WR0332 15 (J)XXXX
WR0332-18A50R	1.8V	SOT23-5	3k/Reel	WR0332 18 (J)XXXX
WR0332-20A50R	2.0V	SOT23-5	3k/Reel	WR0332 20 (J)XXXX
WR0332-22A50R	2.2V	SOT23-5	3k/Reel	WR0332 22 (J)XXXX
WR0332-25A50R	2.5V	SOT23-5	3k/Reel	WR0332 25 (J)XXXX
WR0332-27A50R	2.7V	SOT23-5	3k/Reel	WR0332 27 (J)XXXX
WR0332-28A50R	2.8V	SOT23-5	3k/Reel	WR0332 28 (J)XXXX
WR0332-29A50R	2.9V	SOT23-5	3k/Reel	WR0332 29 (J)XXXX
WR0332-30A50R	3.0V	SOT-23-5	3k/Reel	WR0332 30 (J)XXXX
WR0332-33A50R	3.3V	SOT-23-5	3k/Reel	WR0332 33 (J)XXXX
WR0332-10FF4R	1.0V	DFN-4	10k/Reel	332 10
WR0332-105FF4R	1.05V	DFN-4	10k/Reel	332 105
WR0332-11FF4R	1.1V	DFN-4	10k/Reel	332 11
WR0332-12FF4R	1.2V	DFN-4	10k/Reel	332 12
WR0332-15FF4R	1.5V	DFN-4	10k/Reel	332 15
WR0332-18FF4R	1.8V	DFN-4	10k/Reel	332 18
WR0332-185FF4R	1.85V	DFN-4	10k/Reel	332 185

Part Number	Output Voltage	Package	Packing Quantity	Marking*
WR0332-20FF4R	2.0V	DFN-4	10k/Reel	332 20
WR0332-21FF4R	2.1V	DFN-4	10k/Reel	332 21
WR0332-22FF4R	2.2V	DFN-4	10k/Reel	332 22
WR0332-25FF4R	2.5V	DFN-4	10k/Reel	332 25
WR0332-27FF4R	2.7V	DFN-4	10k/Reel	332 27
WR0332-28FF4R	2.8V	DFN-4	10k/Reel	332 28
WR0332-30FF4R	3.0V	DFN-4	10k/Reel	332 30
WR0332-33FF4R	3.3V	DFN-4	10k/Reel	332 33

***** XXXX is variable. The chip is universal whether the marking has j or not.

Contact Information

No.1001, Shiwan(7) Road, Pudong District, Shanghai, P.R.China.201202

Tel: 86-21-68960674 Fax: 86-21-50757680 Email: market@way-on.com

WAYON website: **http://www.way-on.com**

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