



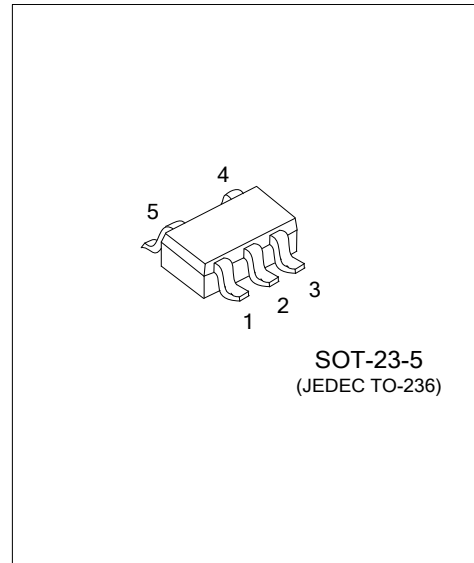
300mA, ULTRA-LOW NOISE, ULTRA-FAST CMOS LDO REGULATOR

DESCRIPTION

The LR1193 low-noise, low-dropout, linear regulator operates from a 2.5V to 5.5V input and is guaranteed to deliver 300mA. The LR1193 is designed and optimized for battery-powered systems to work with low noise and low quiescent current. For further reduction of output noise, a noise bypass pin is available.

The LR1193 also requires only 1µF (typ.) of output capacitance for stability with any load, reducing the amount of board space necessary for power applications, critical in hand-held wireless devices.

The LR1193 consumes less than 0.01µA in shutdown mode. The other features include ultra low dropout voltage, current limiting protection, thermal shutdown protection and high ripple rejection ratio.



SOT-23-5
(JEDEC TO-236)

FEATURES

- * 300mA Guaranteed Output Current
- * 0.01µA Shutdown Current
- * 220mV Dropout at 300mA Load
- * Low Temperature Coefficient
- * Current Limiting Protection
- * Thermal Shutdown Protection
- * Only 1µF Output Capacitor Required for Stability
- * Excellent Line/Load Transient

ORDERING INFORMATION

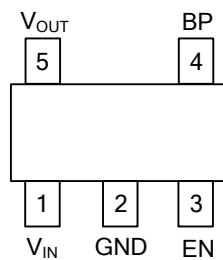
Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR1193L-xx-AE5-R	LR1193G-xx-AE5-R	SOT-23-5	Tape Reel

<p>LR1193G-xx-AE5-R</p> <ul style="list-style-type: none"> (1) Packing Type (2) Package Type (3) Output Voltage Code (4) Green Package 	<ul style="list-style-type: none"> (1) R: Tape Reel (2) AE5: SOT-23-5 (3) xx: Refer to Marking Information (4) G: Halogen Free and Lead Free, L: Lead Free
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MARKING

PACKAGE	VOLTAGE CODE	MARKING
SOT-23-5	15: 1.5V 25: 2.5V	

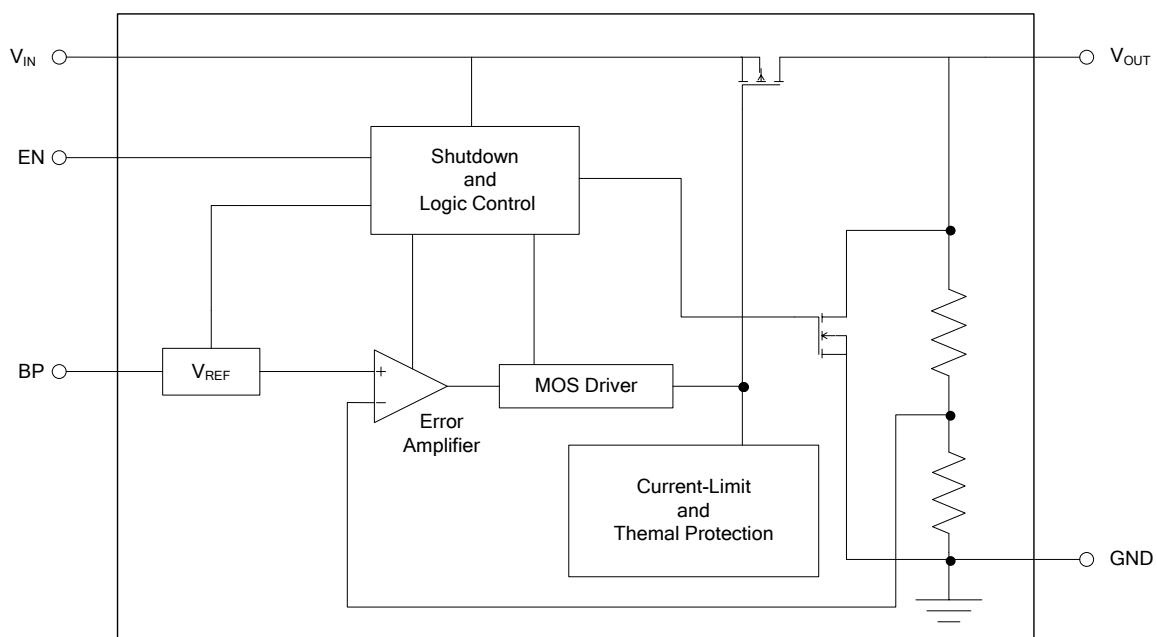
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO	PIN NAME	DESCRIPTION
1	V_{IN}	Power Input Voltage
2	GND	Ground
3	\overline{EN}	Chip Enable (Active High). Note that this pin is high impedance. There should be a pull low 100k Ω resistor connected to GND when the control signal is floating.
4	BP	Reference Noise Bypass
5	V_{OUT}	Output Voltage

BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING (Note 1)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage(Operating)	V_{IN}	2.5 ~ 5.5	V
Supply Input Voltage(Survival)		-0.3 ~ +6	
Junction Temperature	T_J	+125	°C
Operation Temperature Range	T_{OPR}	-40 ~ +85	°C
Storage Temperature Range	T_{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

■ ELECTRICAL CHARACTERISTICS

($V_{IN} = V_{OUT} + 1V$, $C_{IN} = C_{OUT} = 1\mu F$, $C_{BP} = 10nF$, $T_A = 25^\circ C$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Output Voltage Accuracy	ΔV_{OUT}	$I_{OUT} = 1mA$	-2		+2	%
Current Limit	I_{LIM}	$R_{LOAD} = 1\Omega$	360	400		mA
Quiescent Current	I_Q	$V_{EN} \geq 1.2V$, $I_{OUT} = 0mA$		90	130	μA
Dropout Voltage (Note 3)	V_{DROP}	$I_{OUT} = 200mA$		170	200	mV
		$I_{OUT} = 300mA$		220	300	
Line Regulation	ΔV_{LINE}	$V_{IN} = (V_{OUT} + 0.3V)$ to 5.5V $I_{OUT} = 1mA$			0.3	%
Load Regulation	ΔV_{LOAD}	$1mA < I_{OUT} < 300mA$			0.6	%
Standby Current	I_{STBY}	$V_{EN} = GND$, Shutdown		0.01	1	μA
EN Input Bias Current	I_{EN}	$V_{EN} = GND$ or V_{IN}		0	100	nA
EN Threshold	V_{IH}	$V_{IN} = 3 \sim 5.5V$, Start-Up	1.2			V
	V_{IL}	$V_{IN} = 3 \sim 5.5V$, Shutdown			0.4	
Power Supply Rejection Rate	f=100Hz f=10kHz	PSRR $C_{OUT} = 1\mu F$, $I_{OUT} = 10mA$		-70		dB
				-50		
Thermal Shutdown Temperature	T_{SD}			165		°C
Thermal Shutdown Temperature Hysteresis	ΔT_{SD}			30		°C

Notes: 1. Limits beyond which damage to the device may occur is indicated by absolute maximum ratings. Conditions for which the device is intended to be functional is indicated by operating ratings, but specific performance limits isn't be guaranteed. Only for the test conditions listed the guaranteed specifications can be applied. When the device is not operated under the listed test conditions some performance characteristics may degrade.

2. Which discharged through a 1.5k Ω resistor into each pin is a 100pF capacitor in the human body model.
3. The dropout voltage is defined as $V_{IN} - V_{OUT}$, which is measured when V_{OUT} is $V_{OUT(NORMAL)} - 100mV$.

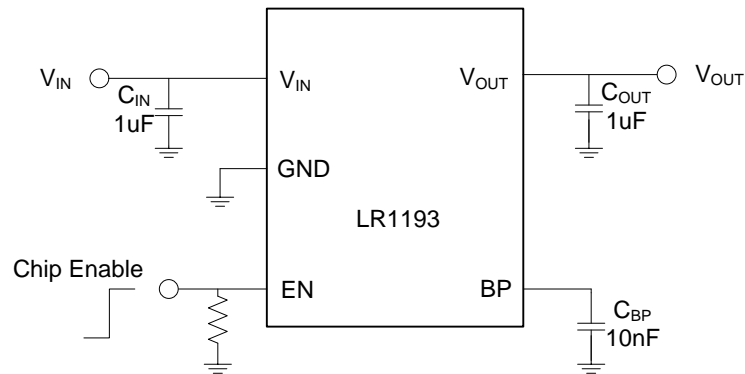
■ APPLICATIONS INFORMATION**Bypass Capacitor and Low Noise**

An external 10nF bypass capacitor between the BP pin and GND pin significantly reduces noise on the regulator output, it is critical that PCB traces should be as short as possible and the capacitor connection between the BP pin and GND pin be direct. DC leakage on this pin can affect the LDO regulator voltage regulation performance and output noise. There is a relationship between the bypass capacitor value and the LDO regulator turn on time.

Enable Function

The **LR1193** has an enable/disable function. Force EN high (>1.2V) enables the V_{OUT} ; force EN low (<0.4V) disables the V_{OUT} . For to protecting the system, the **LR1193** have a quick-discharge function. If it is not used, connect to V_{IN} for normal operation.

■ TYPICAL APPLICATION CIRCUIT



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