



LR9212

CMOS IC

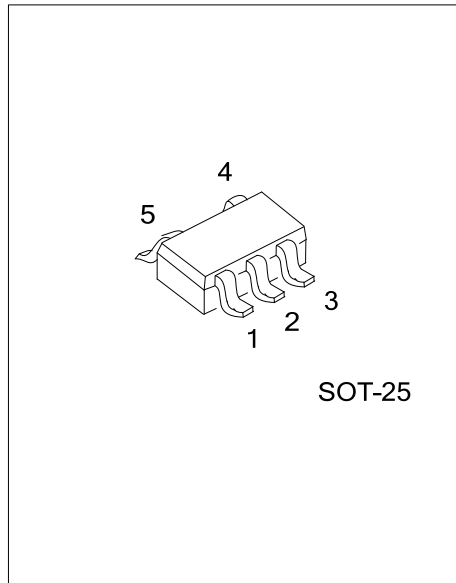
1A LOW DROPOUT LINEAR REGULATOR

DESCRIPTION

The UTC **LR9212** is a high speed LDO regulator that features high accurate, low noise, high ripple rejection, low dropout and low power consumption. Designed with a P-channel MOSFET series pass transistor, the UTC **LR9212** yields extremely low dropout voltage and maintains very low ground current (70µA).

The UTC **LR9212** does not require a bypass capacitor, hence achieving the smallest PCB area.

Other features include foldback overcurrent protection, quick soft start, and overtemperature protection. The UTC **LR9212** is available in fixed output voltage from 0.8V to 3.3V with 0.1V per step or as an adjustable device with a 0.8V reference voltage. The device comes in various packages.



FEATURES

- * Wide Input Voltage Range from 2.5V to 5.5V
- * Ultra Low Dropout Voltage: 300mV @ $V_{OUT} = 3.3V, 600mA$
- * Ultra Fast Response in Line/Load Transient
- * Stable with 1µF Ceramic Output Capacitor
- * Low Ground Current: 70µA Typical
- * Low Shutdown Current: <1µA
- * Foldback Output Current Limit
- * High Output Accuracy
 - 1.5% Initial Accuracy
 - Fixed Output Voltages: 0.8V~3.3V
 - Adjustable Output Voltage from 0.8V to 4.5V
- * Over-Temperature Protection

ORDERING INFORMATION

Ordering Number		Package	Packing
Lead Free	Halogen Free		
LR9212L-xx-AF5-R	LR9212G-xx-AF5-R	SOT-25	Tape Reel

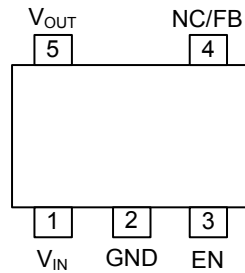
Note: xx: Output Voltage, refer to Marking Information.

<p>LR9212G-xx-AF5-R</p>	<ul style="list-style-type: none"> (1) R: Tape Reel (2) AF5: SOT-25 (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-25	33: 3.3V AD: ADJ	

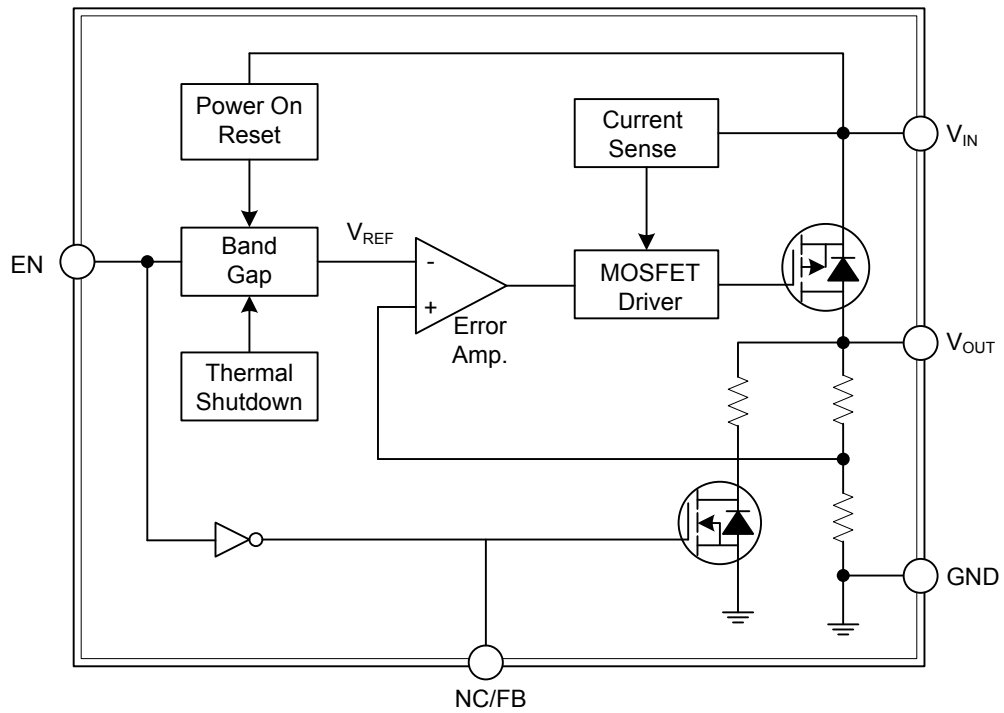
PIN CONFIGURATION



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	V _{IN}	Input Voltage. This pin connects to the source of the internal pass transistor that supplies current to the output pin. Bypass V _{IN} to GND with a minimum 1μF ceramic capacitor. Place the decoupling capacitor physically as close as possible to the device.
2	GND	Ground.
3	EN	Enable Input. Pulling this pin below 0.35V turns the regulator off, reducing the quiescent current to a fraction of its operating value. This pin is not available for 3-pin packages.
4	FB/NC	Feedback Pin(ADJ Version). this pin is connected to an external resistor divider, turns to adjustable output voltage; $V_{OUT}=0.8 \times (R1+R2)/R2(V)$; NC Pin(fixed version);
5	V _{OUT}	Output Voltage. This pin is power output of the device. A pull low resistance exists when the device is disabled by pulling low the EN pin. To maintain adequate transient response to large load change, a minimum 1uF ceramic capacitor is required to reduce the effects of current transients on V _{OUT} .

■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage (Note 1)	V_{IN}	-0.3 ~ +6	V
Other Pins		-0.3 ~ ($V_{IN}+0.3$)	V
Power Dissipation ($T_A=25^{\circ}\text{C}$)	P_D	0.4	W
Junction Temperature	T_J	+150	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-65 ~ +150	$^{\circ}\text{C}$

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.

■ THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Package Thermal Resistance	θ_{JA}	250	$^{\circ}\text{C}/\text{W}$

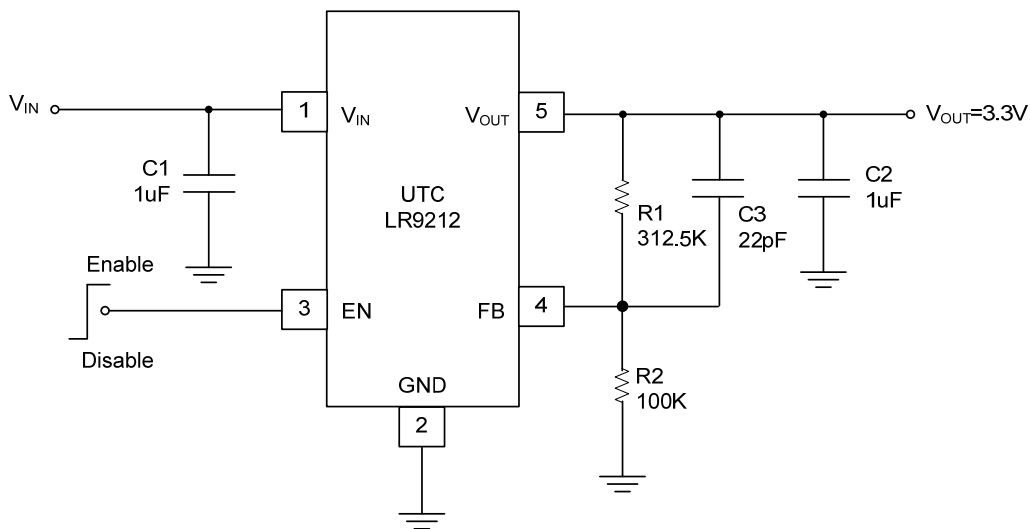
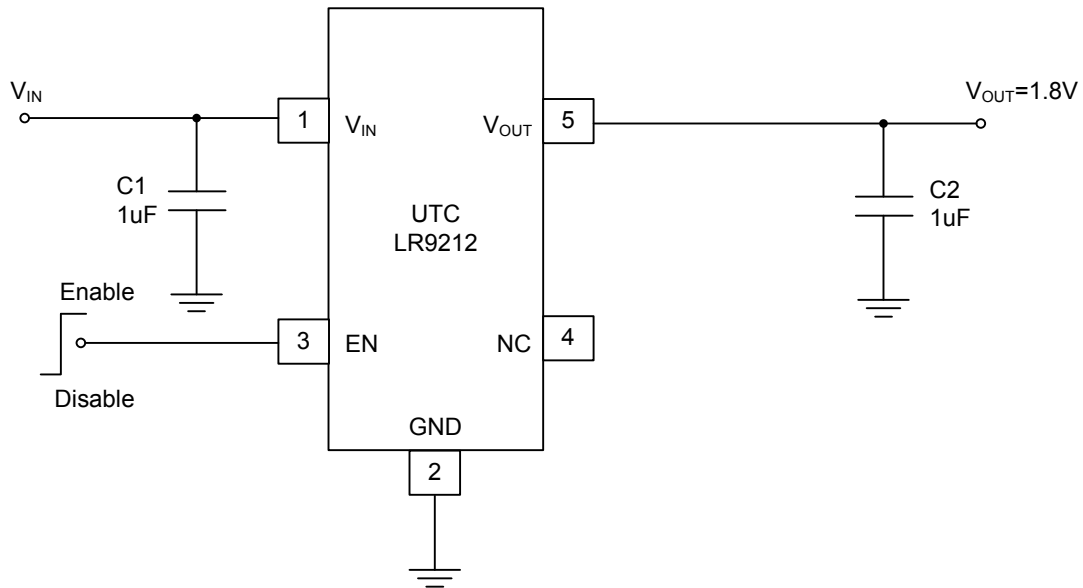
■ RECOMMENDED OPERATION CONDITIONS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Input Voltage	V_{IN}	2.5 ~ +5.5	V
Operating Ambient Temperature Range	T_A	-20 ~ +85	$^{\circ}\text{C}$
Operating Junction Temperature Range	T_J	-20 ~ +125	$^{\circ}\text{C}$

■ ELECTRICAL CHARACTERISTICS (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Supply Input Voltage						
Supply Input Voltage	V _{IN}		2.5		5.5	V
Quiescent Current	I _Q	V _{EN} =5V, I _{OUT} =0mA	40	70	120	μA
Shutdown Current	I _{SHDN}	V _{EN} =0V		0.1	1	μA
Output Voltage						
Output Voltage Accuracy	V _{OUT}	V _{IN} =V _{NOM} +1.0V, I _{OUT} =1mA, fixed output voltage version	-1.5		1.5	%V _{NOM}
Reference Voltage Accuracy	V _{FB}	V _{IN} =3.3V, I _{OUT} =1mA, V _{out} =FB ADJ output voltage version	0.788	0.80	0.812	V
Output Line Regulation	ΔV _{REF(LINE)}	2.5V<V _{IN} <5.5V, and V _{IN} >V _{OUT} +1.0V, I _{OUT} =1mA		0.01	0.2	%/V
Output Load Regulation	ΔV _{REF(LOAD)}	1mA<I _{OUT} <500mA, V _{IN} =V _{NOM} +1.0V		0.5	2.0	%/A
Dropout Voltage	V _{DROP}	I _{OUT} =300mA, V _{OUT} =3.3V		150	225	mV
		I _{OUT} =600mA, V _{OUT} =3.3V		300	450	
Power Supply Rejection Ratio	PSRR	Frequency=10Hz, I _{OUT} =10mA		68		dB
		Frequency=1kHz, I _{OUT} =10mA		65		dB
		Frequency=100kHz, I _{OUT} =10mA		45		dB
		Frequency=10Hz, I _{OUT} =300mA		48		dB
		Frequency=1kHz, I _{OUT} =300mA		62		dB
		Frequency=100kHz, I _{OUT} =300mA		40		dB
Enable						
Enable High Level	V _{EN}		1.2			V
Disable Low Level	V _{SD}				0.35	V
EN Input Current	I _{EN}	V _{IN} =5.5V, V _{EN} =5.5V or 0V	-1		1	μA
Enable Delay Time	T _{DELAY}	from V _{EN} >1.2V to V _{OUT} >10%V _{NOM} , by design		35		us
Output Ramp Up Time	T _{SS}	from V _{OUT} =10% to 90% of V _{NOM} , by design		45		us
Protection						
Current Limit Threshold	I _{LIM}		1.2	2		A
Short Circuit Current			0.8			A
Thermal Shutdown Temperature	T _{SD}	I _{OUT} =0mA, V _{IN} =V _{EN} =5.5V		170		°C
Thermal Shutdown Hysteresis	T _{SDHYS}	I _{OUT} =0mA, V _{IN} =V _{EN} =5.5V		10		°C

■ TYPICAL APPLICATION CIRCUIT



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