High Voltage Low Power Consumption 500 mA LDO

DESCRIPTION

SUM3570-120PL is is a high voltage (up to 40 V) ultra-low quiescent current low dropout voltage regulator (LDO) manufactured in CMOS processes. It can deliver up to 500 mA of current while consuming only 2.5 μA of quiescent current. It consists of a reference voltage generator, an error amplifier, a current foldback circuit, and a phase compensation circuit plus a driver transistor. The SUM3570-120PL is designed specifically for applications where very-low I_Q is a critical parameter. This device maintains low quiescent current consumption even in dropout mode to further increase the battery life.

FEATURES

- Ultra-low Quiescent Current: 2.5 μA
- Maximum Input Voltage: 40 V
- Output Voltage Highly Accurate: ±2%
- Maximum Output Current: 500 mA
- Dropout Voltage: 300 mV@I_{OUT} = 100 mA
- Temperature Stability: ±50 ppm/℃
- Protections Circuits: Current Limiter, Thermal shutdown
- Output Capacitor: Low ESR Ceramic Capacitor Compatible
- Package is SOT89 -3 (L-Type)

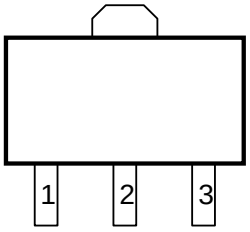
APPLICATION

- Mobile device
- Cameras
- Wireless communication equipment
- Battery-power device

ORDER INFORMATION

Model	Package	Ordering Number	Packing Option
SUM3570-120PL	SOT89 -3 (L-Type)	SUM3570-120PL	Tape and Reel, 1000

PIN CONFIGURATION (Top View)



SOT89-3 (L-Type)

PIN DESCRIPTIONS

Pin	Symbol	Description
1	OUT	Output pin.
2	GND	Ground.
3	IN	Supply input pin.

RECOMMENDED OPERATING CONDITIONS

Parameter	Rating	Unit
Operation Temperature range	-40 to 125	°C

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter		Value	Unit
V_{IN}	Input Voltage(1)		-0.3 to 45	V
V_{OUT}	Output Voltage		V_{SS} -0.3 ~ V_{IN}+0.3V	V
P_D	Power Dissipation		1000	mW
θ_{JA}	Thermal Characteristics, Thermal Resistance, Junction-to-Air(2)	SOT89-3	135	°C/W
T_{STG}	Storage Temperature		-65 to 150	°C
ESD (HBM)	ESD Protection		5000	V

NOTES:

Stresses beyond those listed under “ABSOLUTE MAXIMUM RATINGS” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

1. Refer to Electrical Characteristics and Application Information for Safe Operating Area.
2. This particular frame decreases the total thermal resistance of the package and increases its ability to dissipate power when an appropriate area of copper on the printed circuit board is available for heat-sinking.

CAUTION

This integrated circuit can be damaged by ESD if you don’t pay attention to ESD protection. SUMSEMI recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications. SUMSEMI reserves the right to make any change in circuit design, specification or other related things if necessary without notice at any time. Please contact SUMSEMI sales office to get the latest datasheet.

ELECTRICAL CHARACTERISTICS

(unless otherwise noted. Typical values are at T_A = +25°C.)

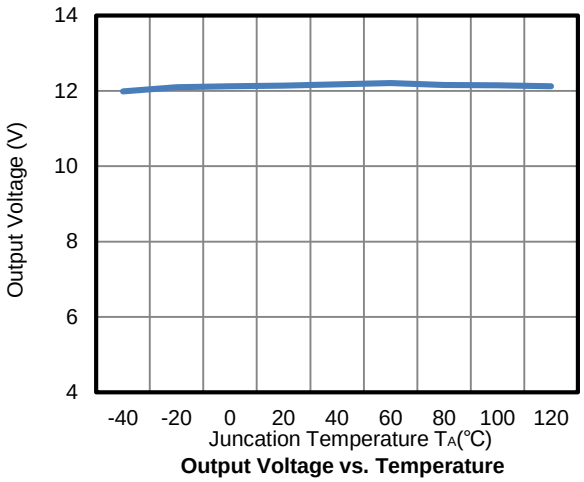
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{IN}	Input Voltage		12		40	V
$V_{OUT(S)}$	Output Voltage*1	V_{IN} = $V_{OUT(S)}$+2 V， I_{OUT} = 1 mA	$V_{OUT(S)}$ × 0.98	$V_{OUT(S)}$	$V_{OUT(S)}$ × 1.02	V
V_{DROP}	DropoutVoltage*2	I_{OUT} = 1 mA		4	8	mV
		I_{OUT} = 300 mA		1200	1800	mV
$Load_{REG}$	Load Regulation	V_{IN} = $V_{OUT(S)}$ + 2 V 1 mA ≤ I_{OUT} ≤ 400 mA		50	80	mV
$\frac{\Delta V_{OUT(S)}}{\Delta T_A \bullet V_{OUT(S)}}$	Temperature Stability	V_{IN} = $V_{OUT(S)}$ + 2 V, I_{OUT} = 10 mA -40°C ≤ T_A ≤ 125°C		±50		ppm/℃
I_Q	Quiescent Current	V_{IN} ≤ 40 V, I_{OUT} = 0 V		2.5	3.5	μA
I_{OUTMAX}	Maximum Output Current			500		mA
I_{LMT}	Current Limit	V_{IN} = $V_{OUT(S)}$ + 2 V V_{OUT} = 0.95 × $V_{OUT(S)}$		550		
PSRR	Power Supply Rejection Ratio	f = 100 Hz, I_{OUT} = 10 mA		79		dB
		f = 1 kHz, I_{OUT} = 10 mA		62		
		f = 10 kHz, I_{OUT} = 10 mA		48		
		f = 100 kHz, I_{OUT} = 10 mA		40		
OTP	Over Temperature Protection	I_{OUT} = 1 mA		170		℃

NOTES:

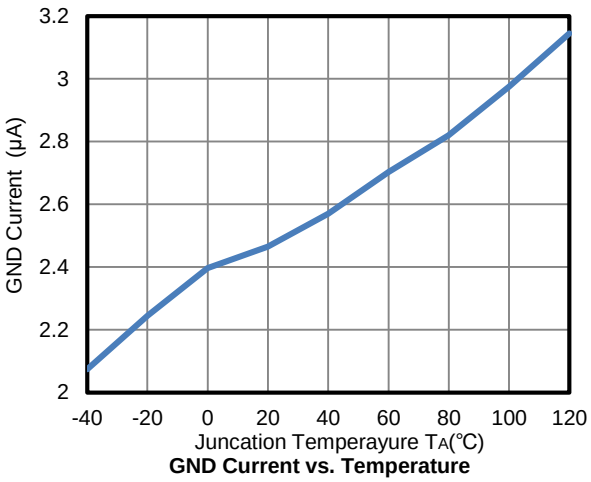
1. $V_{OUT(S)}$: Output voltage when V_{IN}=V_{OUT}+2 V, I_{OUT}=1 mA.
2. V_{DROP}=V_{IN1} -（$V_{OUT(S)}$× 0.98）where V_{IN1} is the input voltage when V_{OUT} = $V_{OUT(S)}$× 0.98.
3. I_{LIM}: Output current when V_{IN}=$V_{OUT(S)}$+2 V and V_{OUT} = 0.95*$V_{OUT(S)}$.

TYPICAL CHARACTERISTICS

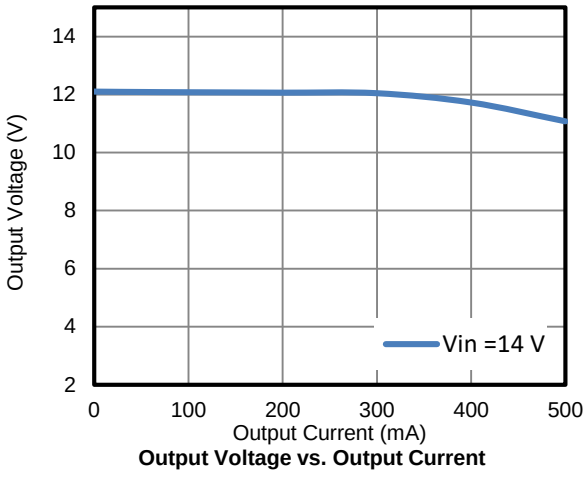
Voltage set 12 V (V_{IN} = V_{OUT} + 2 V, C_{IN} =2.2 μF, C_{OUT} = 2.2 μF, T_A = +25°Cunless otherwise noted.)



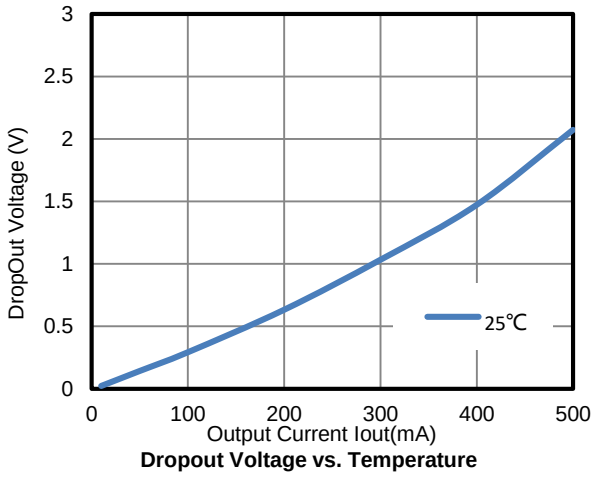
Output Voltage vs. Temperature



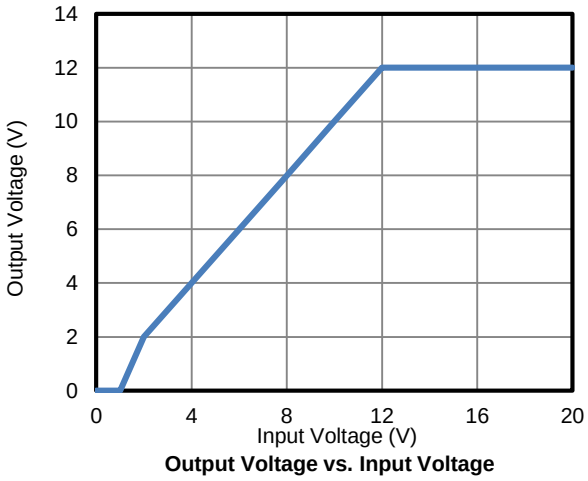
GND Current vs. Temperature



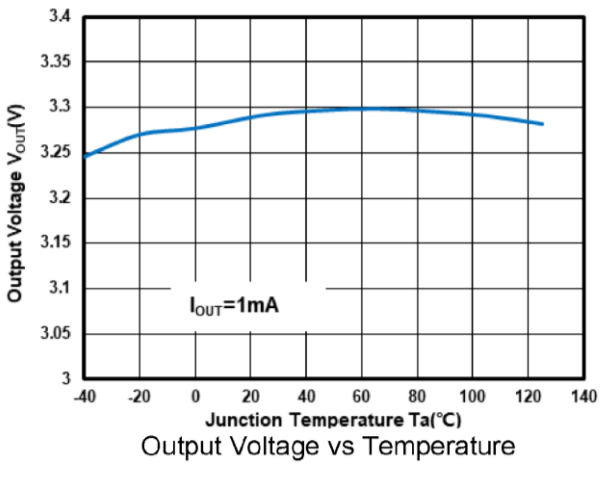
Output Voltage vs. Output Current



Dropout Voltage vs. Temperature

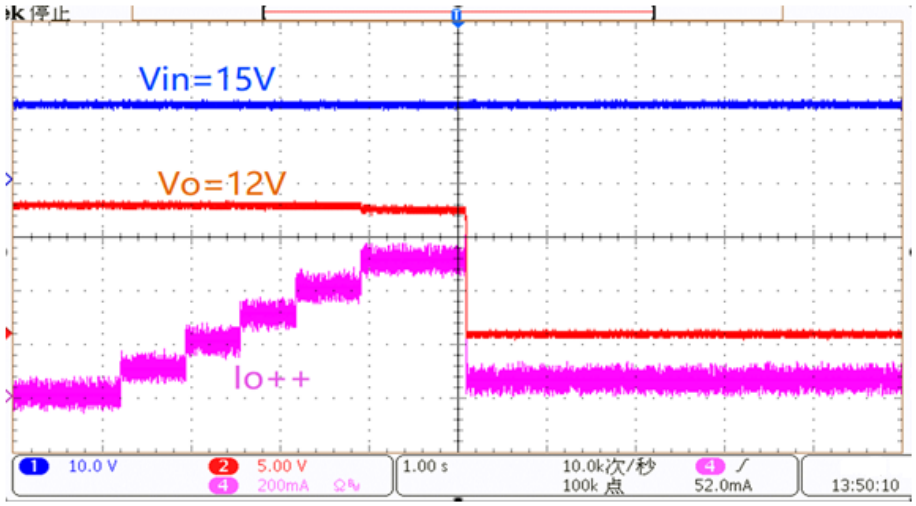


Output Voltage vs. Input Voltage

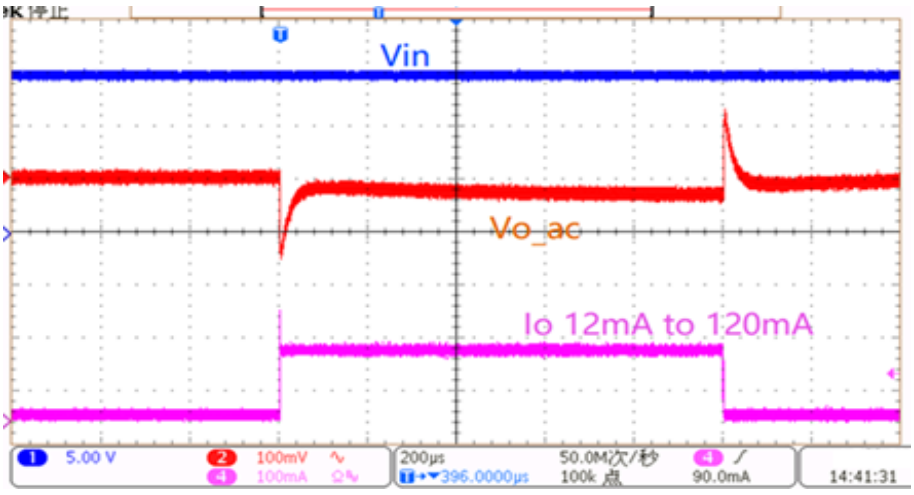


Output Voltage vs Temperature

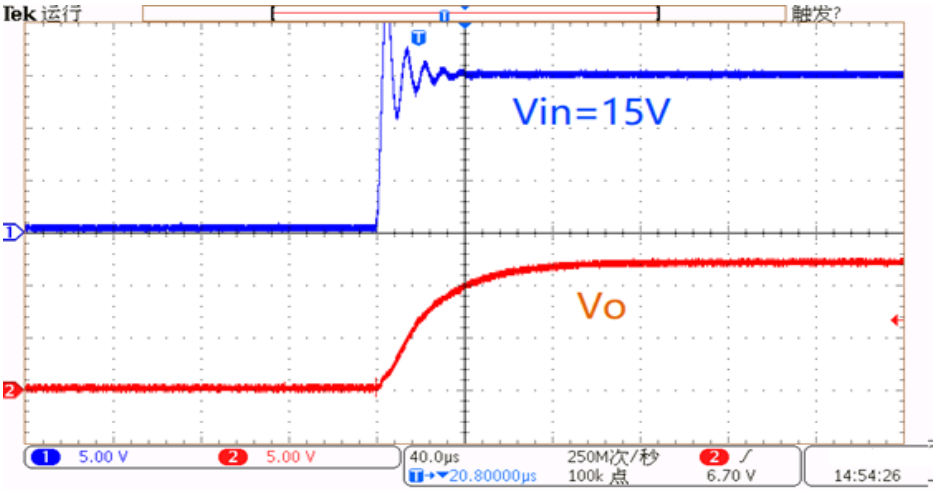
TYPICAL CHARACTERISTICS (Continued)



Output Voltage VS Output Current, C_{IN} = C_{OUT} = 1 μF, I_{LIMIT} = 550 mA

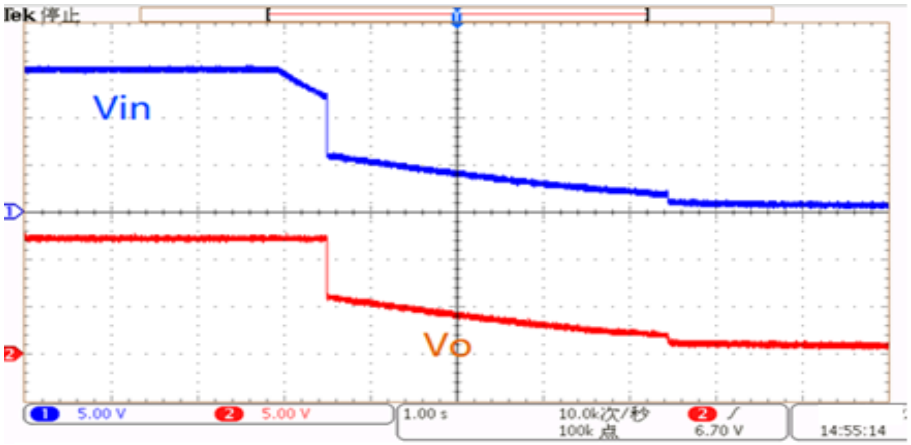


Load Transient, C_{IN} = C_{OUT} = 1 μF, I_{OUT} = 12 mA ~ 120 mA

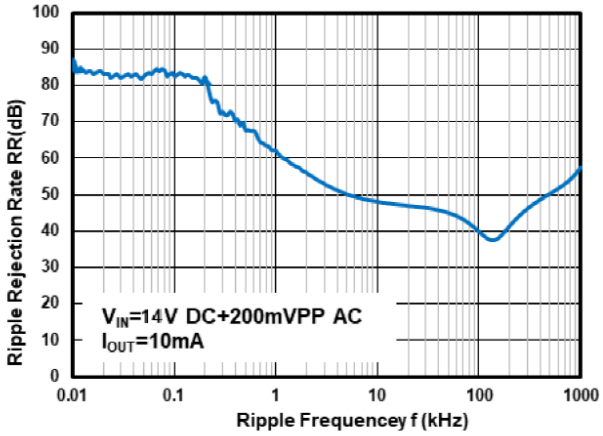


Power On, C_{IN} = C_{OUT} = 1 μF, I_{OUT} = 0 mA, V_{IN} VS Vout

TYPICAL CHARACTERISTICS (Continued)

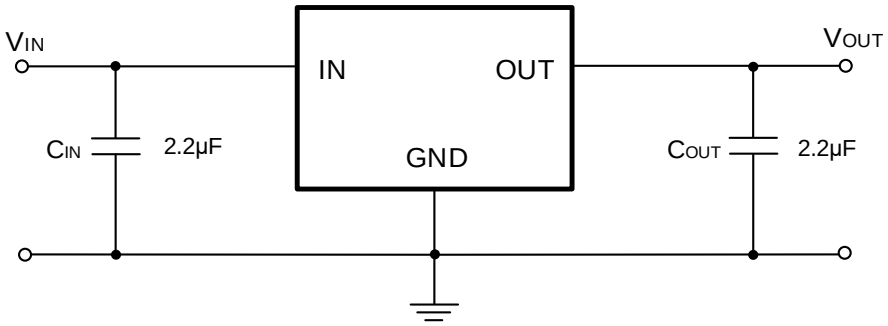


Power Off, C_{IN} = C_{OUT} = 1 μF,I I_{OUT} = 0 mA, V_{IN} VS Vout



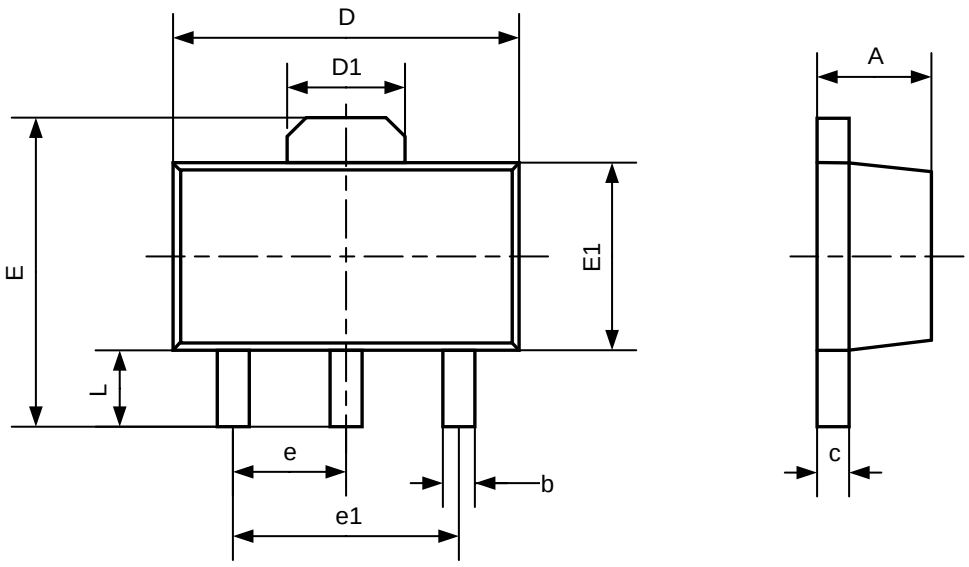
Power Supply Rejection Ratio at V_{OUT}=12 V

APPLICATION CIRCUITS



PACKAGE OUTLINE

SOT89-3



Symbol	Dimensions In Millimeters	
	Min	Max
A	1.400	1.600
b	0.320	0.520
c	0.350	0.440
D	4.400	4.600
D1	1.550REF	
E	3.940	4.250
E1	2.300	2.600
e	1.500BSC	
e1	3.000BSC	
L	0.900	1.200