GS2806LF

500mA Adjustable LDO Linear Regulator

Product Description

The GS2806LF is a highly precise, low noise, positive voltage LDO regulator manufactured using CMOS processes. It achieves high ripple rejection and low dropout and consists of a standard voltage source, an error correction, current limit, and a phase compensation circuit plus a driver transistor. External output feedback, customers can easily get the required voltage. In order to make the load current does not exceed the current capacity of the output transistor, built-in over-current protection, over temperature protection and short circuit protection.

The GS2806LF is available in SOT-23-5L surface mount package.

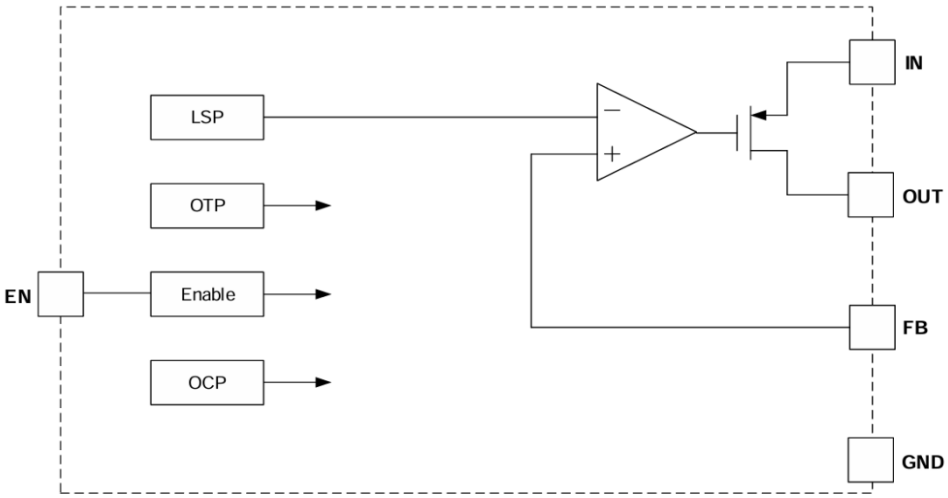
Features

- Vin range up to 6.5V
- PSRR is 70dB @ 1KHz typically
- Output Voltage can be programmed to min. 1.0V
- Output Voltage Accuracy ±2%
- Output Current of 500mA
- Internal Thermal Protection
- Internal Current Limit and Short Circuit Protection

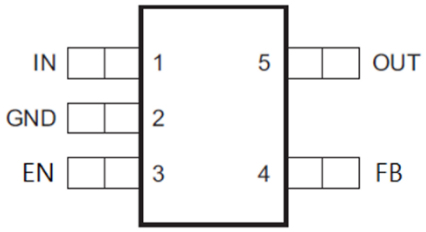
Applications

- Battery Powered Equipment
- Hand-Held Instruments
- Portable Information Application

Functional Block Diagram



Packages & Pin Assignments



SOT-23-5L

Pin Name	Pin Description
IN	Input Power
GND	Ground Pin.
EN	Enable Pin. “High” to turn on the IC.
FB	The reference voltage is 0.8V.
OUT	The pin is the power output of the device.

Ordering & Marking Information

Ordering Information			
Part Number	**Package**	**Marking**	**Quantity / Reel**
GS2806LF	SOT-23-5L	NB□□□	3,000 PCS

GS2806 1 2

Product Name:
GS2806

Package Code:
1 is L for SOT-23-5L

Green Level:
2 is F stands for RoHS Compliant and Halogen Free

Marking Information

NB□□□

Product Code:
NB

GS Code:
□□□ is GS Code

Absolute Maximum Ratings [1, 2] (T_A=25°C, unless otherwise specified.)

Symbol	Description	Range	Unit
V_{IN}	Supply Voltage	8	V
P_D	Power Dissipation [3]	0.54	W
$R_{\theta JA}$	Thermal Resistance Junction to Ambient [4,5]	230	°C/W
$R_{\theta JC}$	Junction-to-case (top) thermal resistance	152	°C/W
T_J	Junction Temperature	150	°C
T_{LEAD}	Lead Temperature (Soldering) 10 Sec.	260	°C
T_{STG}	Storage Temperature Range	-50 to +150	°C

Recommended Operating Conditions

V_{IN}	Max Supply Voltage [6]	6.5	V
V_{OUT}	Output Voltage Range	1.0 – 4.0	V
T_A	Operating Ambient Temperature Range	-40 to +85	°C
I_{OUT}	Output Current	0 - 500	mA

NOTE:

1. Exceeding these ratings may damage the device.
2. The device is not guaranteed to function outside of its operating conditions.
3. Exceeding the maximum allowable power dissipation causes excessive die temperature, and the regulator goes into thermal shutdown. Internal thermal shutdown circuitry protects the device from permanent damage. Thermal shutdown engages at T_J=155°C (typical) and disengages at T_J= 140°C (typical).
4. The package thermal impedance is calculated in accordance to JESD 51-7.
5. Thermal Resistances were simulated on a 4-layer, JEDEC board
6. All limits specified at room temperature (T_A = 25°C) unless otherwise specified. All room temperature limits are 100% production tested. All limits at temperature extremes are ensured through correlation using standard Statistical Quality Control (SQC) methods. All limits are used to calculate Average Outgoing Quality Level (AOQL).

Electrical Characteristics (T_A=25°C, unless otherwise specified.)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V_{IN}	Supply Voltage Range	-	-	-	6.5	V
I_{OUT}	Output Current	$V_{IN}=V_{OUT}$+1.0 V	-	500	-	mA
I_Q	Quiescent Current	$V_{IN}=V_{OUT}$+1.0 V	-	80	-	μA
I_{SD}	Shutdown Current	V_{IN}=5V, V_{EN}=0	-	-	0.5	μA
V_{FB}	Feedback Voltage	-	784	800	816	mV
V_{DROP}	Dropout Voltage	Iout=100mA, Vout=3.3V	-	70	-	mV
		Iout=500mA, Vout=3.3V	-	350	-	
		Iout=100mA, Vout=2.5V	-	80	-	
		Iout=500mA, Vout=2.5V	-	540	-	
I_{CL}	Current Limit	-	510	-	-	mA
RLine	Line Regulation	Vout +1V< Vin < 6.5V I_{OUT} = 300mA	-	0.2	0.6	%/V
RLoad	Load Regulation	V_{IN} = V_{OUT} + 1V 50mA < Iout < 300mA	-	0.5	2	%
PSRR	Power Supply Rejection Ratio	V_{OUT}=2.5V I_{OUT}=10mA, f=1KHz	-	70	-	dB
V_{ENHI}	Enable Pin Threshold	-	1.0	-	-	V
V_{ENLO}		-	-	-	0.4	V
T_{SD}	Thermal Shutdown	-	-	155	-	°C
ΔT_{SD}	Thermal Shutdown Hysteresis	-	-	15	-	°C

Typical Performance Characteristics (T_A=25°C, unless otherwise specified.)

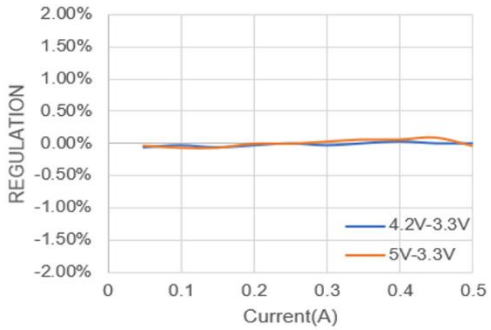


Fig 1. Load Regulation

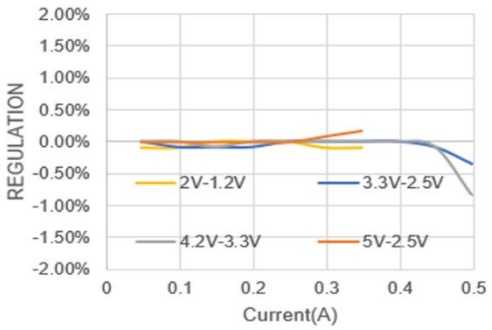


Fig 2. Load Regulation

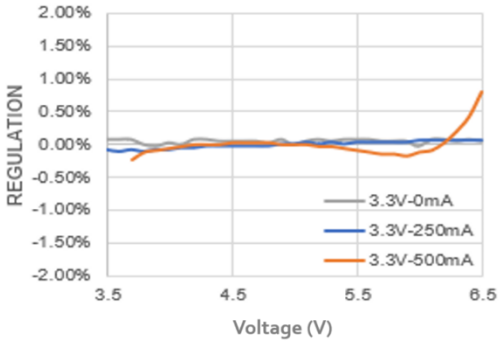


Fig 3. Line Regulation

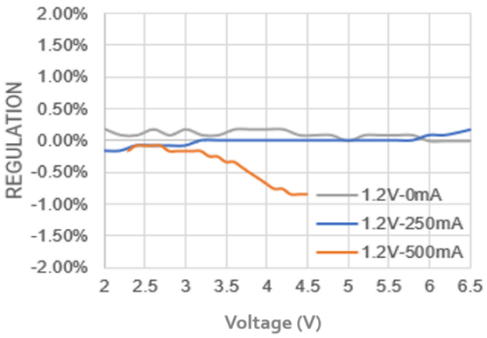


Fig 4. Line Regulation

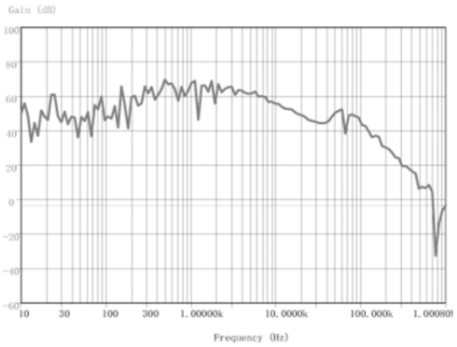


Fig 5. PSRR
(V_{IN}=3.3V, V_{OUT}=1.2V, I_{OUT}=20mA)

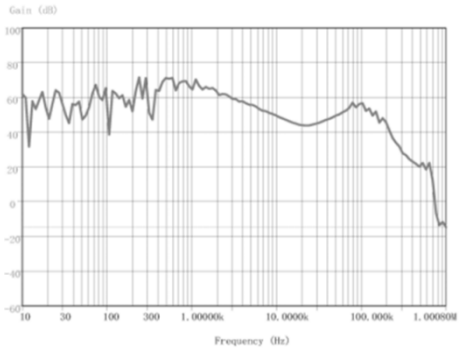


Fig 6. PSRR
(V_{IN}=5V, V_{OUT}=3.3V, I_{OUT}=20mA)

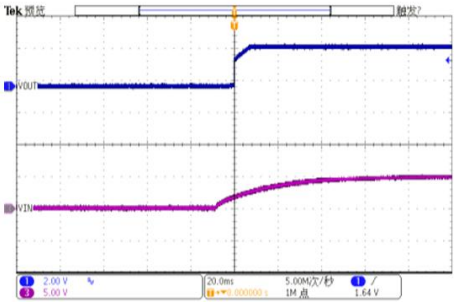


Fig 7. Vin Start Up
(V_{IN}=3.3V, V_{OUT}=2.5V, I_{OUT}=1mA)

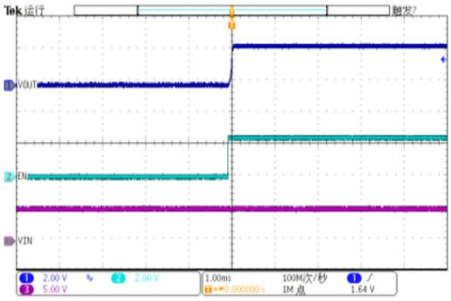
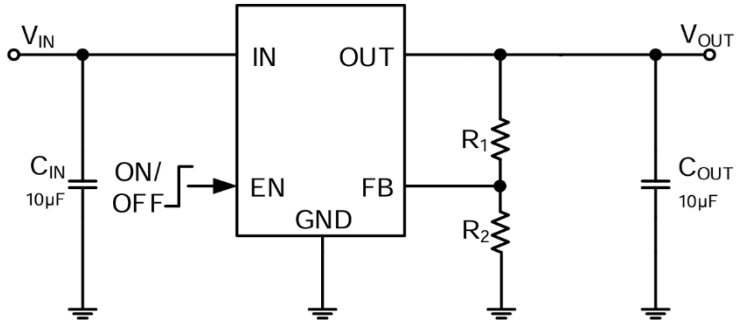


Fig 8. EN Start Up
(V_{IN}=3.3V, V_{OUT}=2.5V, I_{OUT}=1mA)

Typical Application Circuit



$V_{OUT}=0.8\times(1+R1/R2)$

Application Information

Setting the Output Voltage

GS2806 required an input capacitor and an output capacitor. These components are critical to the performance of the device. The output voltage can be programmed by resistor divider.

$$V_{OUT} = V_{FB} \times \frac{R1+R2}{R2}$$

V_{OUT}(V)	R1(KΩ)	R2(KΩ)	C_{IN}(μF)	C_{OUT}(μF)
1	25.00	100	1~10	10
1.05	31.25	100	1~10	10
1.2	50.00	100	1~10	10
1.5	87.50	100	1~10	10
1.8	125.00	100	1~10	10
2.5	212.50	100	1~10	10
2.8	250.00	100	1~10	10
3.3	312.50	100	1~10	10

Low ESR Capacitor

With the GS2806, a stable output voltage is achievable even if used with low ESR capacitors as a phase compensation circuit is built-in. In order to ensure the effectiveness of the phase compensation, we suggest that an output capacitor (C_{OUT}) is connected as close as possible to the output pin (V_{OUT}) and the GND pin. Please use an output capacitor with a capacitance value of 10uF. Also, please connect an input capacitor (C_{IN}) of 10uF between the V_{IN} pin and the GND pin in order to ensure a stable power input. Stable phase compensation may not be ensured if the capacitor runs out capacitance when depending on bias and temperature. In case the capacitor depends on the bias and temperature, please make sure the capacitor can ensure the actual capacitance.

Current Limiter, Short Circuit Protection

GS2806 includes a combination of a fixed current limiter circuit & a feedback circuit, which aid the operations of the current limiter and circuit protection. When the load current reaches the current limit level, the fixed current limiter circuit operates and output voltage drops. As a result of this drop-in output voltage, the feedback circuit operates, output voltage drops further and output current decreases.

Enable Pin

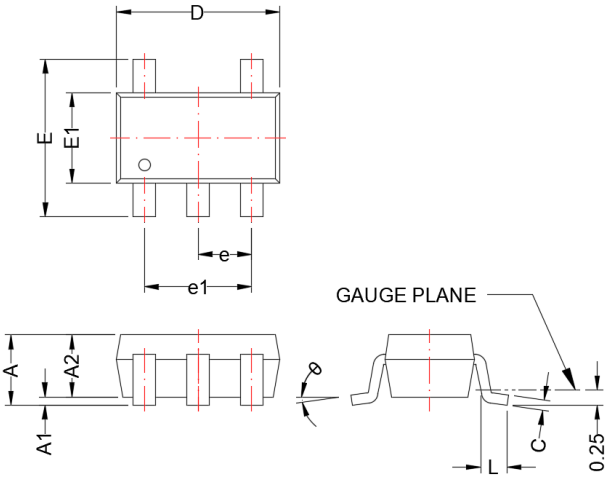
The IC's internal circuitry can be shutdown via the signal from the EN pin. Driving EN over 1 V turns on the regulator. Driving EN below 0.4 V puts the regulator into shutdown mode. The operational logic of the IC's EN pin is selectable.
Note that as the regulator operations will become unstable with the EN pin open. We suggest that you use this IC with either a V_{IN} voltage or a GND voltage input at the EN pin. If this IC is used with the correct specifications for the EN pin, the operational logic is fixed and the IC will operate normally.

Notes of Use

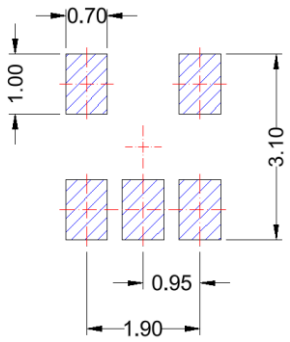
1. Please use this IC within the stated absolute maximum ratings. The IC is liable to malfunction should the ratings be exceeded.
2. Where wiring impedance is high, operations may become unstable due to noise and/or phase lag depending on output current. Please keep the resistance low between V_{IN} and GND wiring.
3. Please wire the input capacitor (C_{IN}) and the output capacitor (C_{OUT}) as close to the IC as possible.

SOT-23-5L

Package Dimension



Recommended Land Pattern



Unit:mm

Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.035	0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.26	0.003	0.010
D	2.70	3.10	0.106	0.122
E	2.20	3.00	0.087	0.118
E1	1.30	1.75	0.051	0.069
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

NOTE:

Dimensions are exclusive of Burrs, Mold Flash & Tie Bar extrusions.

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