



**GENERAL DESCRIPTION**

The GP1101 is a 200mA Low Dropout and Micro-Power Voltage Regulator suitable for battery powered portable equipments.

The GP1101 built-in with internal low  $R_{DS(on)}$  PMOS as the pass device, which does not cause extra ground current in different load and high dropout conditions. The extremely low of maximum 19uA operation current makes the chip suitable for battery-powered devices. Built-in high precision voltage reference, and Current Limit circuits.

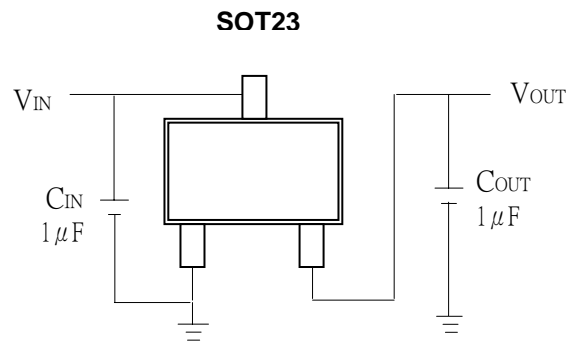
**FEATURES**

- **Guaranteed 200mA Output**
- **Very Low Dropout Voltage of 400mV**
- **low quiescent current - 19uA max.**
- **Output voltages range from 2.0V to 6.0V in 100mV increments**
- **Accuracy within  $\pm 2\%$**
- **Low Temperature Coefficient**
- **Built in Current and Thermal Limiting**
- **SOT-23 Package**

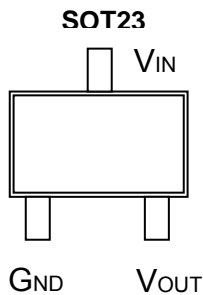
**APPLICATIONS**

- Cellular Telephones
- Battery-powered Equipment
- Hand-held Equipment
- DSC, Laptop, Notebook, and Palmtop Computers

**TYPICAL APPLICATION CIRCUIT**

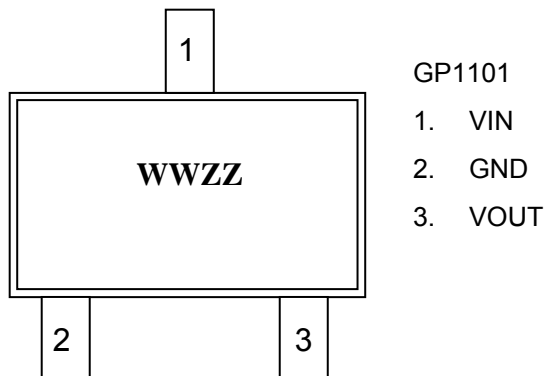


**PACKAGE PIN OUT**



## Package and Pin Configuration

### SOT23 TOP VIEW



### ORDER INFORMATION

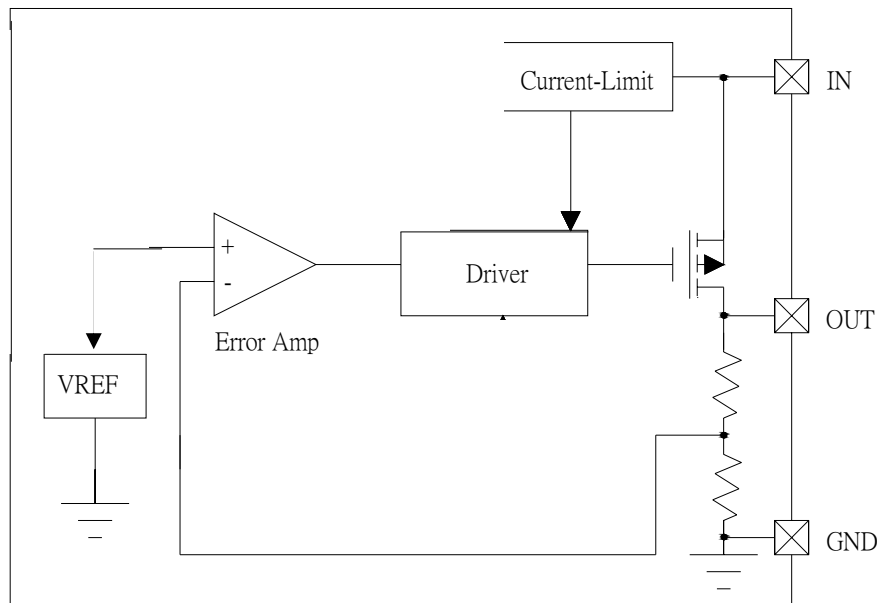
GP1101-XX    200mA Output current, SOT23 package  
XX    : Output voltage: 2.0V, 33: 3.3V, 50: 5.0V

### Marking Information

wwzz :    zz : Output voltage: 2.0V, 33: 3.3V, 50: 5.0V  
         ww : production week code

1. For other output voltages contact GPS marketing.
2. Order quantity  
SOT23 order minimum 3,000 ea per Tape/Reel
3. GPS Pb-free plus anneal products employ with molding compounds, die attach material and 100% matte tin plate termination finish which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations.

**BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS (Note a)**

Input Voltage	12V
Continuous Total Power Dissipation, SOT-23	0.15W
Operating Junction Temperature Range	-40°C to 125°C
Storage Temperature Range	-55°C to 150°C
Package Thermal Resistance, SOT-23, $\theta_{JA}$	250°C/W
Lead Temperature (Soldering, 5 sec.)	260°C
Note a: Exceeding these ratings could cause damage to the device. All voltages are with respect to Ground.	

RECOMMENDED OPERATING CONDITIONS					
Parameter	Symbol	Recommended Operating			Units
		Min.	Typ.	Max.	
Input Voltage	$V_{IN}$	2.0		12.0	V
Input Capacitor ( $V_{IN}$ to GND)		1.0			$\mu$ F
Output Capacitor with ESR of $10\Omega$ max.,		1.0		10	$\mu$ F
Ambient Temperature Range	$T_A$	- 40		85	$^{\circ}$ C
Junction temperature	$T_J$	- 40		150	$^{\circ}$ C

**ELECTRICAL CHARACTERISTICS**

Unless otherwise specified,  $V_{IN} = 5V$ ,  $C_{IN} = 1\mu F$ ,  $C_{OUT} = 1\mu F$ ,  $T_A = 25^{\circ}C$ .

Parameter	Symbol	Test Conditions	GP1101			Units
			Min	Typ	Max	
Output Voltage Accuracy	$V_O$	$I_O = 40mA$	-2.0		2.0	%
Output Current	$I_O$		200			mA
Line Regulation	$\Delta V_{OI}$	$I_O = 40mA$ , $(V_{out}+1V) < V_{IN} < 10V$		0.2	0.3	%V
Load Regulation	$\Delta V_{OL}$	$I_O = 1mA$ to $100mA$			0.04	%mA
Dropout Voltage	$\Delta V$	$I_O = 150mA$	$2.0V < V_O$ (nom) $\leq 2.8V$	280	500	mV
			$2.8V < V_O$ (nom)	240	450	
Quiescent Current	$I_Q$	$I_O = 0mA$		15	19	$\mu$ A
GND Pin Current	$I_G$	$I_O = 100mA$		15	19	$\mu$ A
Current Limit	$I_{CL}$	$R_{LOAD} = 1\Omega$	300			mA
Power Supply Rejection Ratio (Note a)	PSRR	freq = 100Hz, $C_{OUT} = 10\mu F$		65		dB
Vout Temperature Draft	Vcoef	$I_{out} = 10mA$ , $-40 \leq T_{opr} \leq 80^{\circ}C$		$\pm 100$		ppm/ $^{\circ}C$

Note a: These parameters, although guaranteed, are not tested in production.

## Detailed Description

The GP1101 is 200mA CMOS LDO designed with a Low  $R_{DS(on)}$  PMOS pass transistor, Bandgap voltage reference, Error amplifier, Current limit. The P-channel pass transistor receives control signal from the Error amplifier, Current limit. During normal operation, the Error amplifier compares the output voltage to an internal trimmed precision Bandgap reference to regulate and output a preset voltage.

## External Capacitor Selection

The GP1101 is stable with an output capacitor to ground of 1 $\mu$ F or greater and > 100m ohm ESR. Ceramic or tantalum capacitors can be used. The capacitor with larger value and lower ESR provides better PSRR and line-transient response. Ceramic capacitors have the lowest ESR, and will offer the best AC performance. Aluminum Electrolytic capacitors present

the highest ESR and resulting in the poorest AC response.

In addition to the >1 $\mu$ F capacitor connect to  $V_{in}$ , recommend to add a >0.1 $\mu$ F capacitor between  $V_{in}$  to Ground to stabilize  $V_{in}$ .

## Current Limit

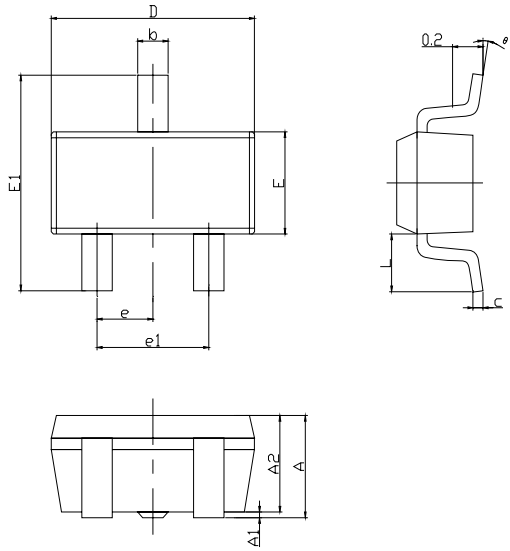
GP1101 built-in with Current Limit protection circuit, which monitors and controls the gate of the pass transistor and limiting the output current to 300mA (Min.).

## Dropout Voltage

Current flow through regulator's pass PMOS transistor cause Input-Output voltage drop, it determines the lowest usable supply voltage. The GP1101 PMOS pass switch low  $R_{DS(on)}$  only present 400mV dropout voltage at 100mA  $I_{out}$ , it further extend the battery useful end-of-life voltage.

## Package Information

### 3-Pin Surface Mount SOT23



Symbol	Dimensions in millimeters		Dimensions in	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.499	1.701	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
$\theta$	0°	8°	0°	8°

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