



**GENERAL DESCRIPTION**

The GP1100 is a 150mA Low Dropout and Micro-Power Voltage Regulator suitable for battery powered portable equipments.

The GP1100 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 typical 1uA operation current makes the chip suitable for battery-powered devices. Built-in high precision voltage reference, and Current Limit circuits.

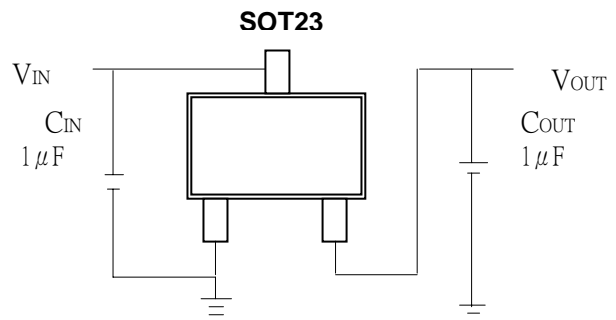
**FEATURES**

- **Guaranteed 150mA Output**
- **Very Low Dropout Voltage of 300mV**
- **low quiescent current - 1uA Typical**
- **Output voltages range from 1.5V to 6.0V in 100mV increments**
- **Accuracy within  $\pm 2\%$**
- **Low Temperature Coefficient**
- **Built in Current and Thermal Limiting**
- **SOT-23 Package**

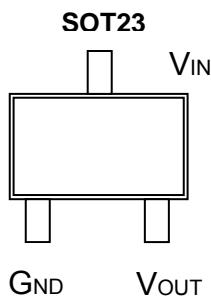
**APPLICATIONS**

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

**TYPICAL APPLICATION CIRCUIT**

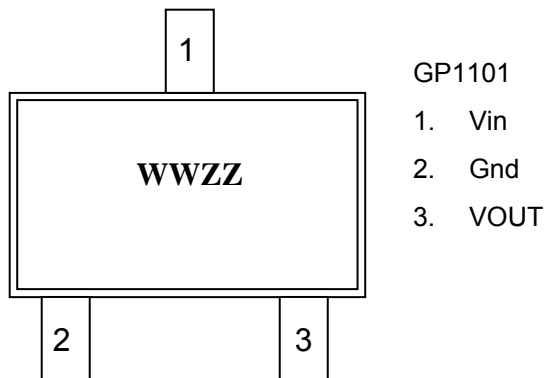


**PACKAGE PIN OUT**



## Package and Pin Configuration

### SOT23 TOP VIEW



### ORDER INFORMATION

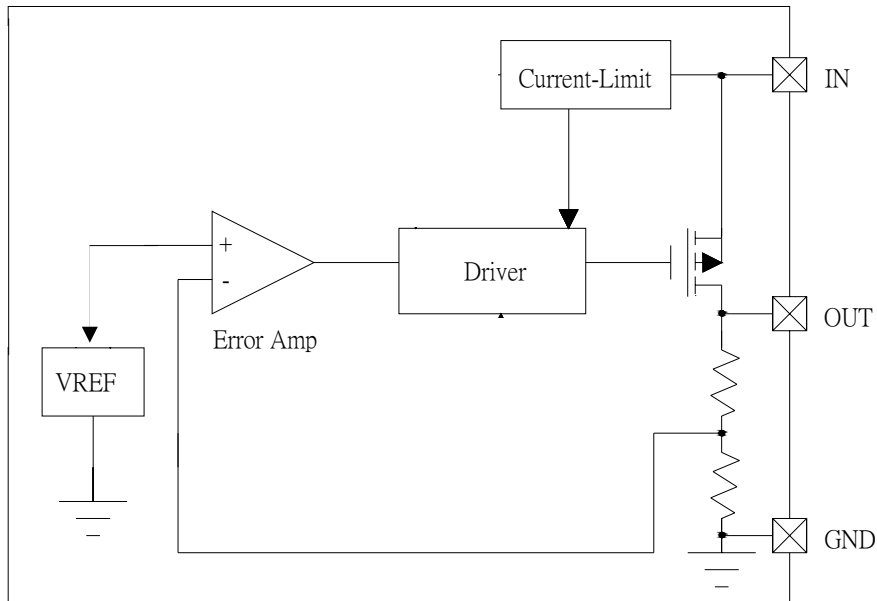
GP1100-XX    150mA Output current, SOT23 package  
XX    : Output voltage: 15: 1.5V, 18:1.8V, 33: 3.3V, 50: 5.0V

### Marking Information

wwzz :    zz : Output voltage: 15: 1.5V, 18:1.8V, 33: 3.3V, 50: 5.0V  
          ww : production week code

1. For special 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 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	$I_O$		150			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	400	mV
			$2.8V < V_O$ (nom)		240	350	
Quiescent Current	$I_Q$	$I_O = 0mA$		1	2.9	$\mu$ A	
GND Pin Current	$I_G$	$I_O = 100mA$		1	2.9	$\mu$ 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	

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

## Detailed Description

The GP1100 is 150mA 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, and Thermal protection circuits. 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 GP1100 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  $V_{in}$ .

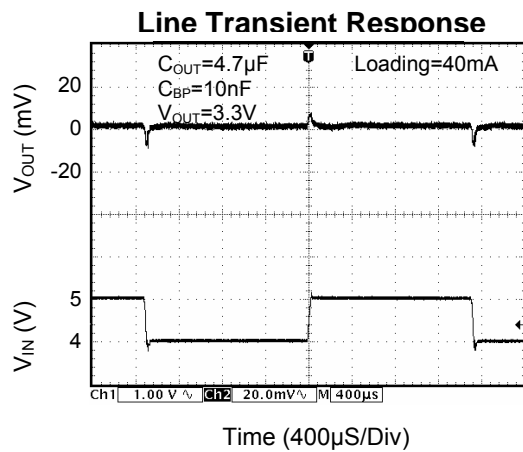
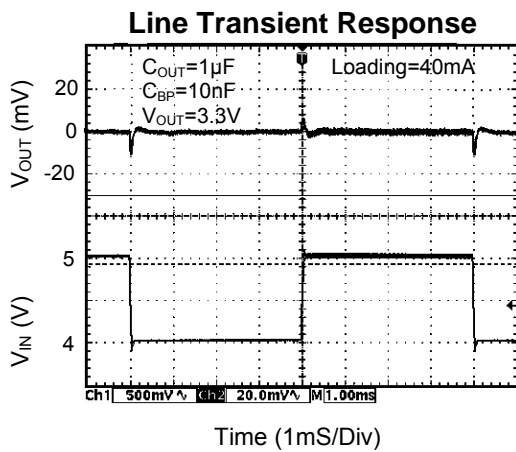
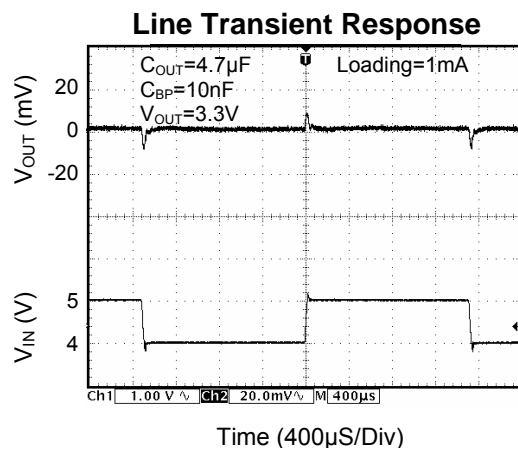
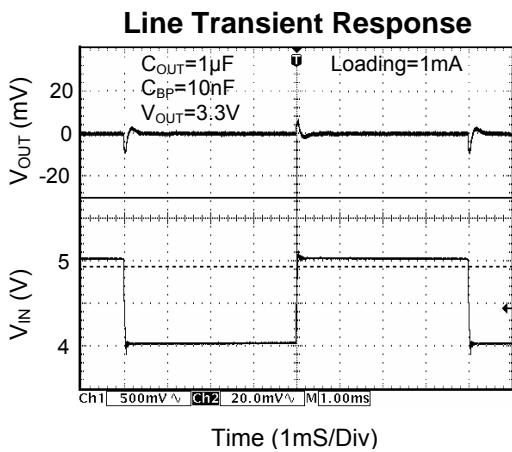
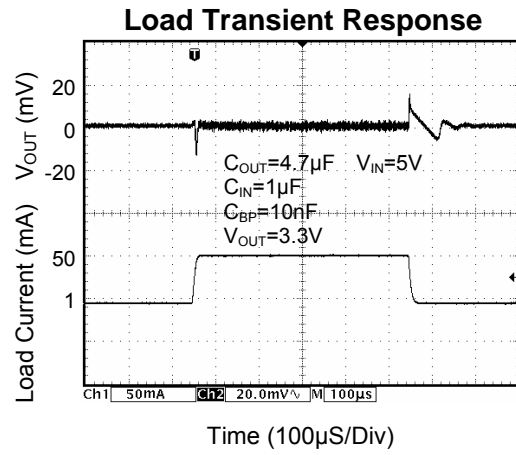
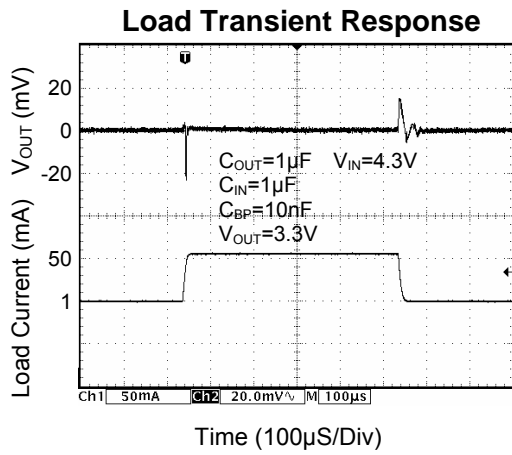
## Current Limit

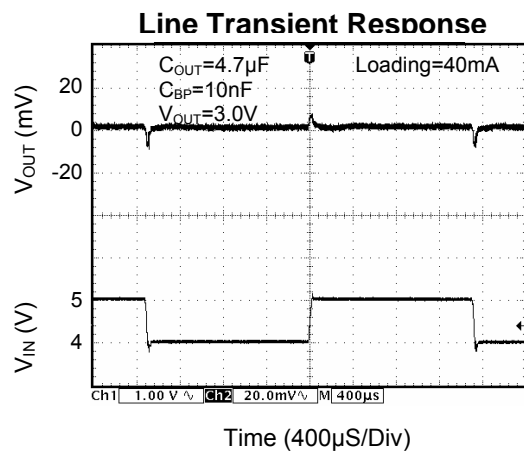
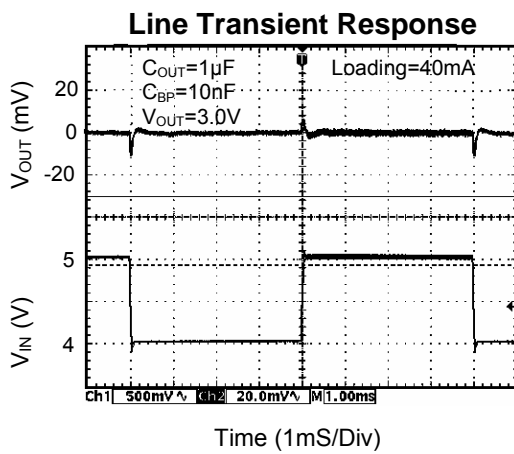
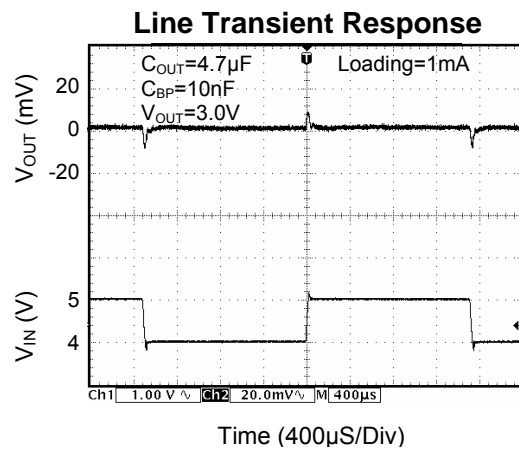
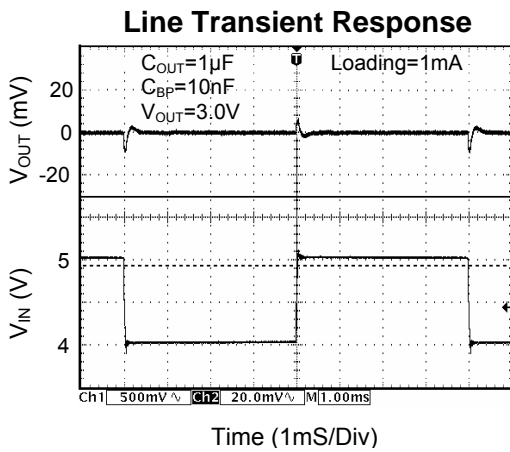
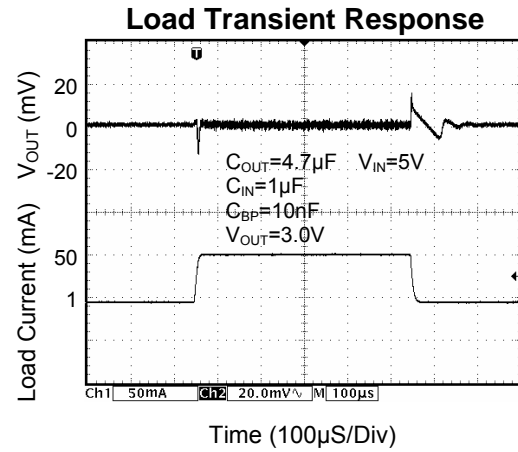
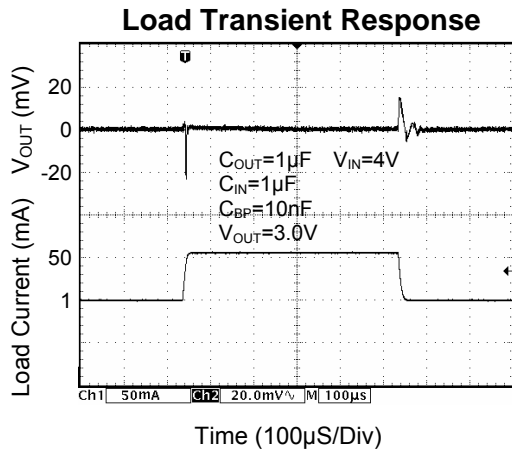
GP1100 built-in with Current Limit protection circuit, which monitors and controls the gate of the pass transistor and limiting the output current to 300mA (Min.).

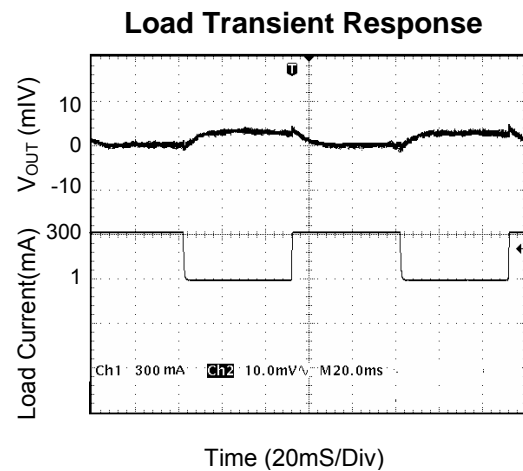
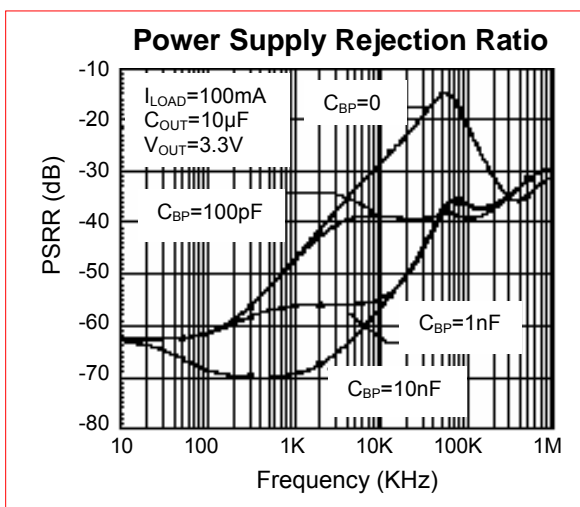
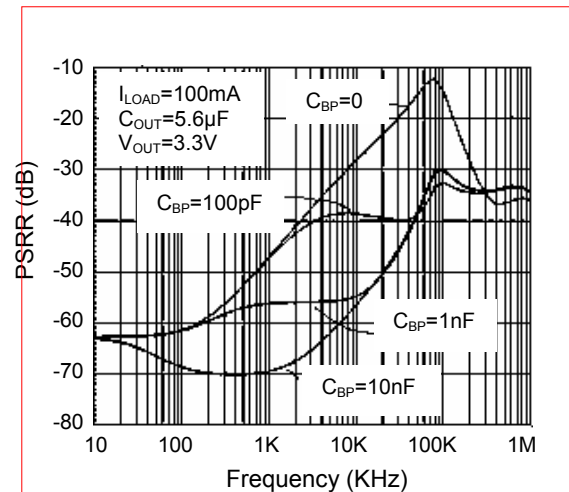
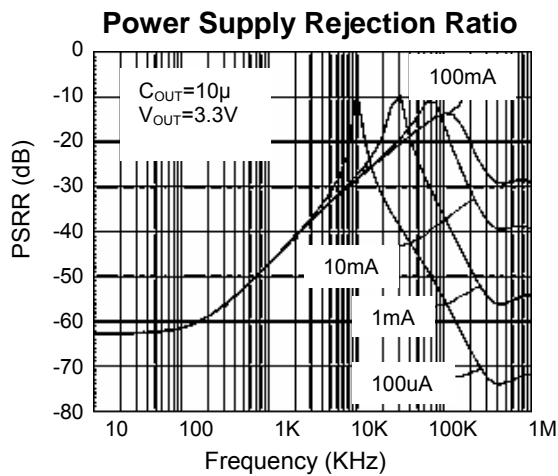
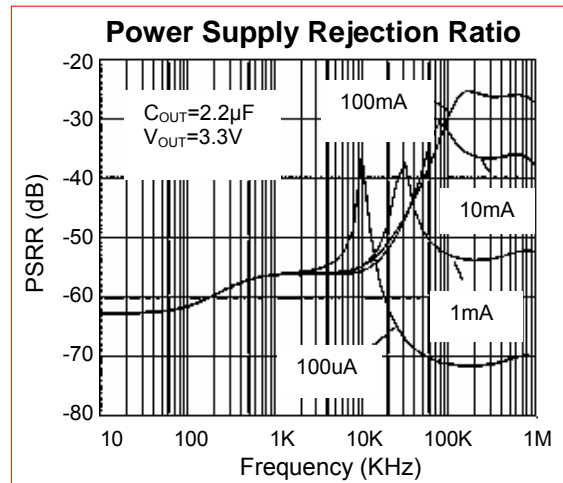
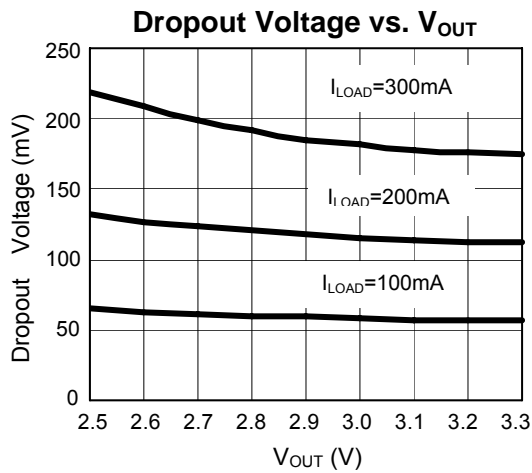
## Dropout Voltage

Current flow through regulator's pass PMOS transistor cause Input-Output voltage drop, it determines the lowest usable supply voltage. The GP1100 PMOS pass switch low  $R_{DS(on)}$  only present 200mV dropout voltage at 100mA lout, it further extend the battery useful end-of-life voltage.

Characterization Data



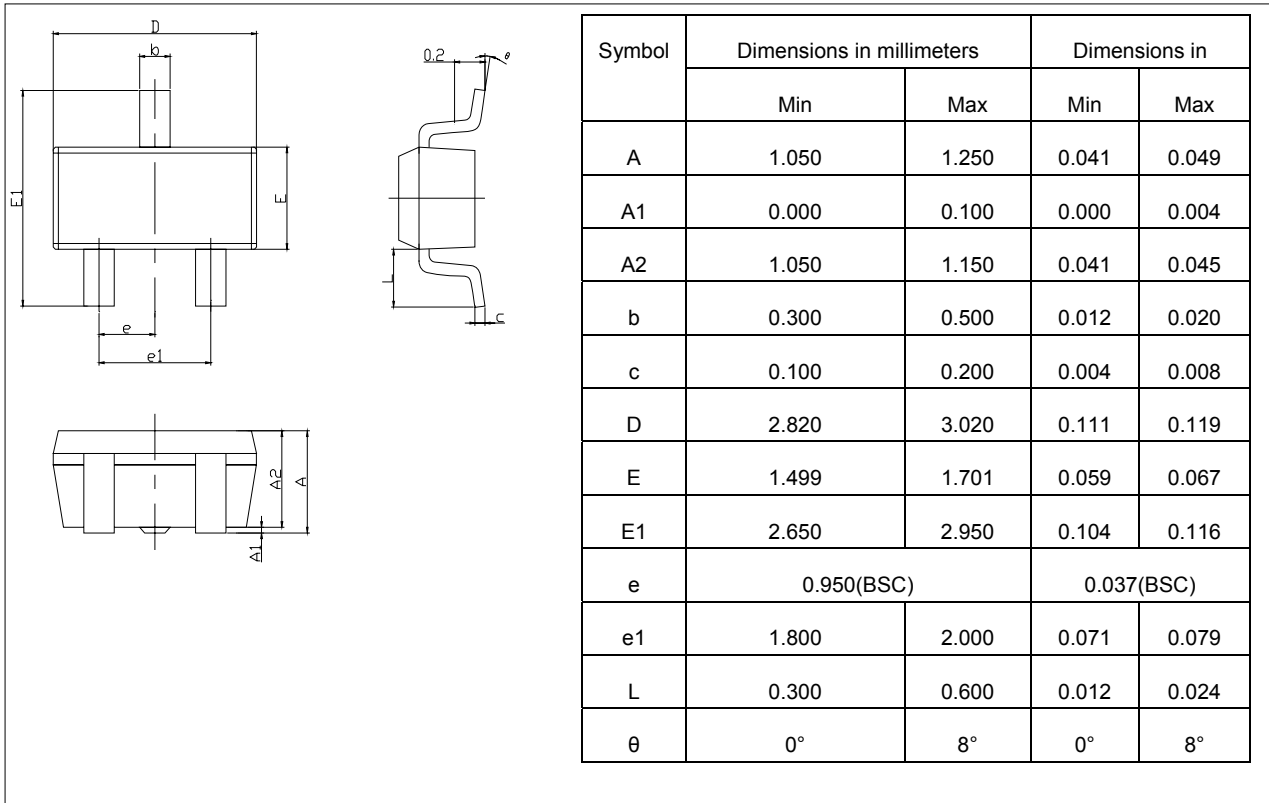






## Package Information

### 3-Pin Surface Mount SOT23



Green Power Semiconductor Inc. (GPS) reserves the right to make changes to its products or to discontinue any integrated circuit product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current.

Some applications using integrated circuit products may involve potential risks of death, personal injury, or severe property or environmental damage. GPS integrated circuit products are not designed, intended, authorized, or warranted to be suitable for use in life-support applications, devices or systems or other critical applications. Use of GPS products in such applications is understood to be fully at the risk of the customer. In order to minimize risks associated with the customer's applications, the customer should provide adequate design and operating safeguards.

GPS assumes no liability to customer product design or application support. GPS warrants the performance of its products to the specifications applicable at the time of sale.