

## Description

The AP2132B series are positive voltage regulator ICs fabricated by CMOS process. The ICs consist of a voltage reference, an error amplifier, a power transistor, a resistor network for setting output voltage, a current limit circuit for current protection, and a chip enable circuit.

The AP2132B series have features of large current, low dropout voltage, high output voltage accuracy, low input voltage. The AP2132B provides a power good (PG) signal to indicate if the voltage level of  $V_{OUT}$  reaches 92% of its rating value. And it operates with  $V_{IN}$  as low as 1.4V and  $V_{CTRL}$  voltage 5V with output voltage programmable as low as 0.8V.

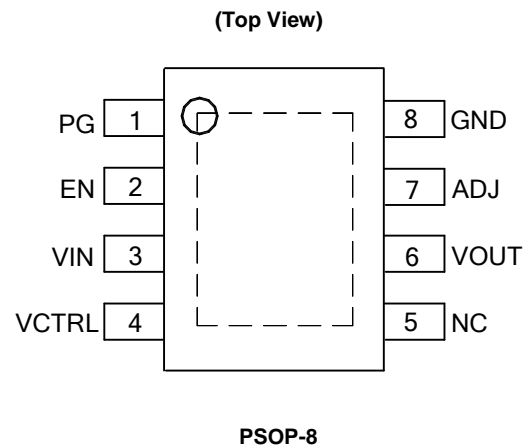
The AP2132B are available in 1.2V, 1.5V, 1.8V, 2.5V fixed output voltage versions and adjustable output voltage version. The fixed versions integrate the adjust resistors. It is also available in an adjustable version, which can set the output voltage with external resistor. If the pin of adjustable output voltage is to ground, it will switch to fixed output voltage.

AP2132B series are available in PSOP-8 package.

## Features

- Adjustable Output: 0.8V to 3.0V
- Low Dropout Voltage: 300mV @  $I_{OUT} = 2A$ ,  $V_{OUT} = 1.2V$
- Over Current and Over Temperature Protection
- Enable Pin
- PSOP-8 Package with Thermal Pad
- Maximum Output Current: 2A
- High Output Voltage Accuracy: 2%
- $V_{OUT}$  Power Good Signal
- Excellent Line/Load Regulation

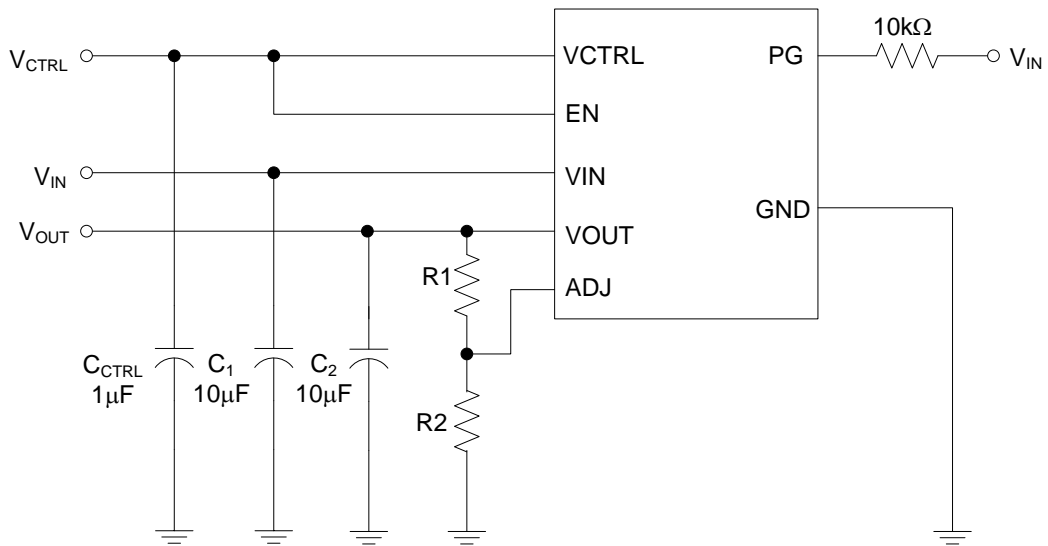
## Pin Assignments



## Applications

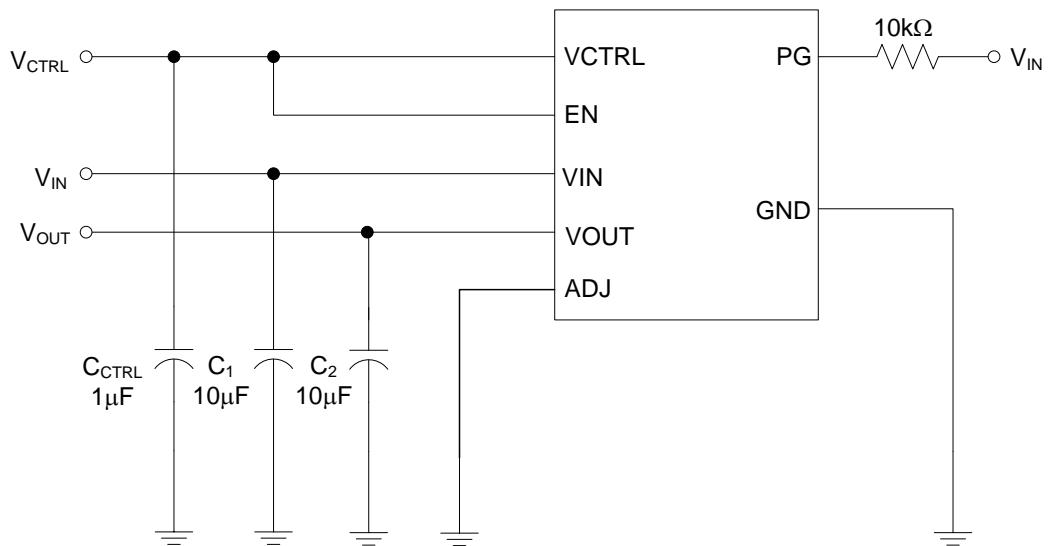
- Notebook

**Typical Applications Circuit**



$$V_{OUT} = \frac{0.8 (R1 + R2)}{R2}$$

For Adjustable Version

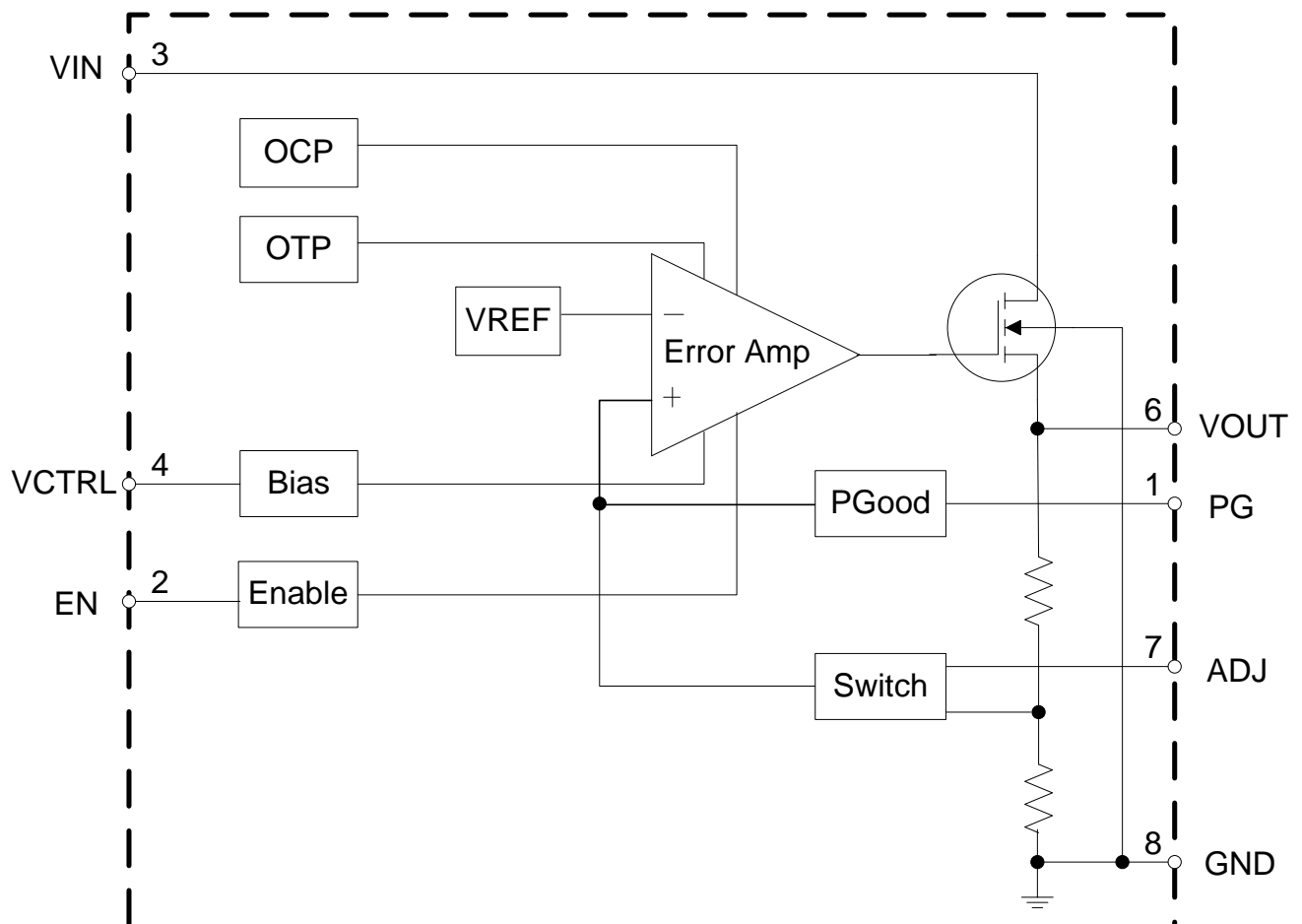


For Fixed Version

## Pin Descriptions

Pin Number	Pin Name	Function
1	PG	Assert high once $V_{OUT}$ reaches 92% of its rating voltage
2	EN	Enable input
3	VIN	Input voltage
4	VCTRL	Input voltage for controlling circuit
5	NC	Not connected
6	VOUT	Regulated output voltage
7	ADJ	Adjust output: when connected to ground, the output voltage is set by internal resistors; when external feedback resistors are connected, the output voltage will be $V_{OUT} = 0.8(R1+R2)/R2$ .
8	GND	Ground

## Functional Block Diagram



## Absolute Maximum Ratings (Note 1)

Symbol	Parameter	Rating	Unit
$V_{IN}$	Input Voltage	6.0	V
$V_{CTRL}$	Input Voltage for Controlling Circuit		
$V_{EN}$	Enable Input Voltage	-0.3 to 6.0	V
$I_{OUT}$	Output Current	2.5	A
$\theta_{JA}$	Thermal Resistance (Note 2)	53	°C/W
$T_J$	Operating Junction Temperature	+150	°C
$T_{STG}$	Storage Temperature Range	-65 to +150	°C
$T_{LEAD}$	Lead Temperature (Soldering, 10sec)	+260	°C
—	ESD (Machine Model)	200	V
—	ESD (Human Body Model)	2000	V

- Notes:
1. Stresses greater than 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 under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.
  2.  $\theta_{JA}$  is measured with the component mounted on 2-Layer FR-4 PCB board with 1.0cm\*1.0cm thermal sink pad in free air.

## Recommended Operating Conditions

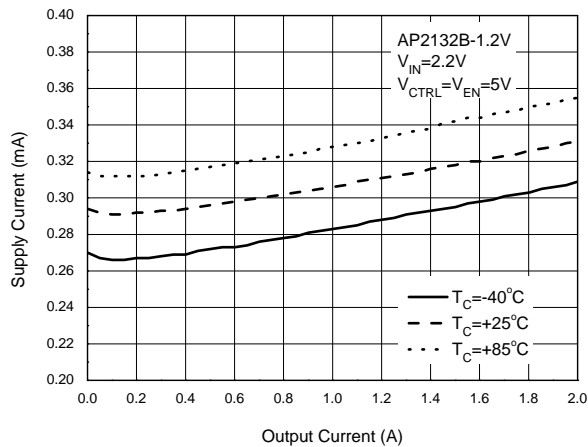
Symbol	Parameter	Min	Max	Unit
$V_{IN}$	Input Voltage	1.4	5.5	V
$V_{CTRL}$	Input Voltage for Controlling Circuit	4.5	5.5	V
$T_A$	Operating Ambient Temperature Range	-40	+85	°C

**Electrical Characteristics** (@ $V_{IN} = V_{OUT} + 0.5V$ ,  $V_{CTRL} = V_{EN} = 5V$ ,  $T_A = +25^\circ C$ ,  $C_{IN} = C_{OUT} = 10\mu F$ ,  $C_{CTRL} = 1\mu F$ ,  $I_{OUT} = 10mA$ , unless otherwise specified.)

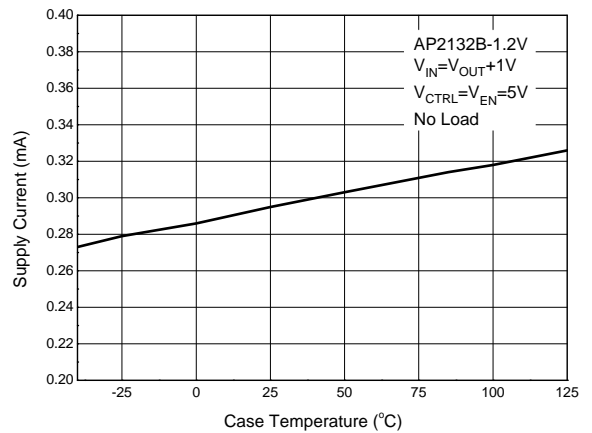
Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$V_{OUT}$	Output Voltage	$V_{IN} = V_{OUT} + 0.5V$ , $I_{OUT} = 10mA$	$V_{OUT} \times 98\%$	—	$V_{OUT} \times 102\%$	V	
$V_{IN}$	Input Voltage	—	1.4	—	5.5	V	
$I_{LIMIT}$	Current Limit	$V_{IN} - V_{OUT} = 1V$	3	—	—	A	
$V_{RLOAD}$	Load Regulation	$V_{IN} = V_{OUT} + 0.5V$ , $10mA \leq I_{OUT} \leq 2A$	—	10	—	mV	
$V_{RLINE}$	Line Regulation	$V_{OUT} + 0.5V \leq V_{IN} \leq 5V$ , $I_{OUT} = 10mA$	—	2	—	mV	
$V_{DROP}$	Dropout Voltage	$I_{OUT} = 500mA$	—	80	120	mV	
		$I_{OUT} = 1A$	—	150	200	mV	
		$I_{OUT} = 2A$	—	300	450	mV	
$I_{SUPPLY}$	Supply Current	$V_{IN} = V_{OUT} + 0.5V$ , $I_{OUT} = 0mA$	—	300	—	$\mu A$	
$I_{CTRLH}$	$V_{CTRL}$ Current	$V_{IN} = V_{OUT} + 0.5V$ , $V_{CTRL} = V_{EN} = 5V$	—	250	500	$\mu A$	
$I_{CTRL L}$		$V_{IN} = V_{OUT} + 0.5V$ , $V_{CTRL} = 5V$ , $V_{EN} = 0V$	—	0.1	1.0	$\mu A$	
PSRR	Power Supply Rejection Ratio	Ripple 0.5Vp-p, $V_{IN} = V_{OUT} + 1V$	f = 100Hz	—	60	—	dB
			f = 1kHz	—	60	—	dB
$\frac{\Delta V_{OUT}}{V_{OUT} \times \Delta T}$	Output Voltage Temperature Coefficient	$I_{OUT} = 10mA$ , $-40^\circ C \leq T_A \leq +85^\circ C$	—	$\pm 100$	—	ppm/ $^\circ C$	
$I_{SHORT}$	Short Circuit Current	—	—	0.3	0.5	A	
$V_{REF}$	Reference Voltage	Adjust Short to $V_{OUT}$	0.784	0.8	0.816	V	
—	Enable "High" Voltage	Enable Input Voltage "High"	1.2	—	—	V	
—	Enable "Low" Voltage	Enable Input Voltage "Low"	—	—	0.4	V	
OTSD	Thermal Shutdown	—	—	+165	—	$^\circ C$	
—	Thermal Shutdown Hysteresis	—	—	+20	—	$^\circ C$	
$V_{THPG}$	$V_{OUT}$ Power Good Voltage	—	—	92	—	%	
—	$V_{PG}$ Hysteresis	—	—	7	—	%	
—	Adjust Pin Threshold	—	—	200	—	mV	
$\theta_{JC}$	Thermal Resistance (Junction to Case)	PSOP-8	—	29	—	$^\circ C/W$	

**Performance Characteristics**

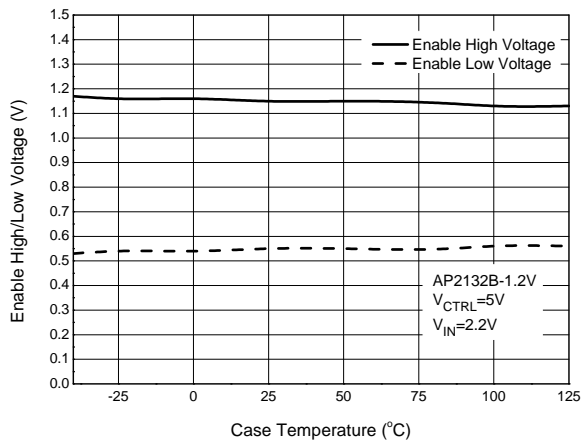
**Supply Current vs. Output Current**



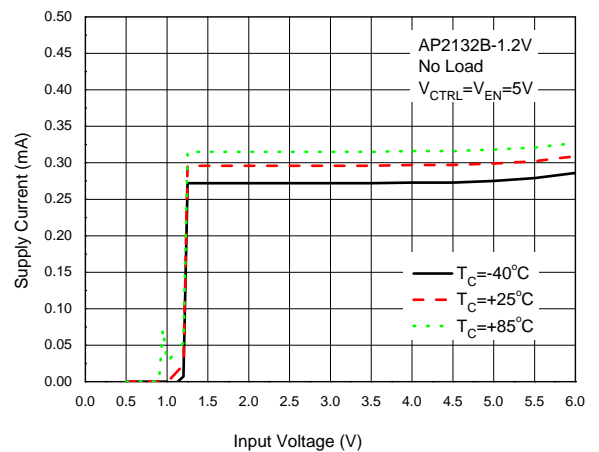
**Supply Current vs. Case Temperature**



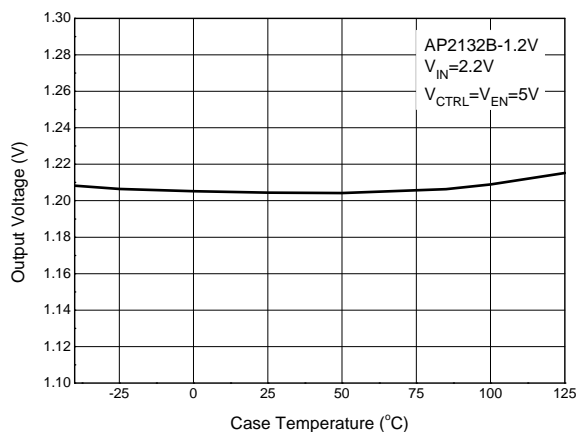
**Enable High/Low Voltage vs. Case Temperature**



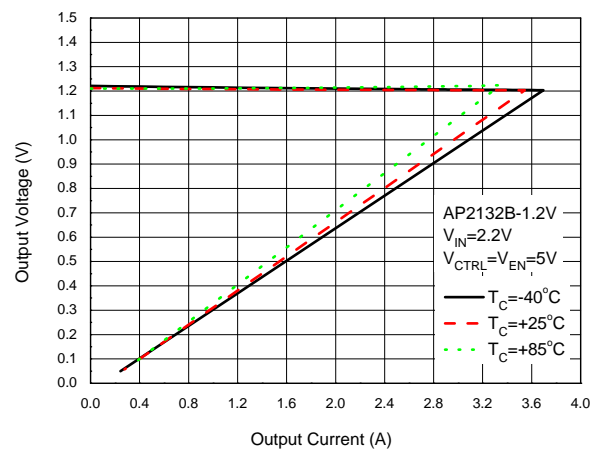
**Supply Current vs. Input Voltage**



**Output Voltage vs. Case Temperature**

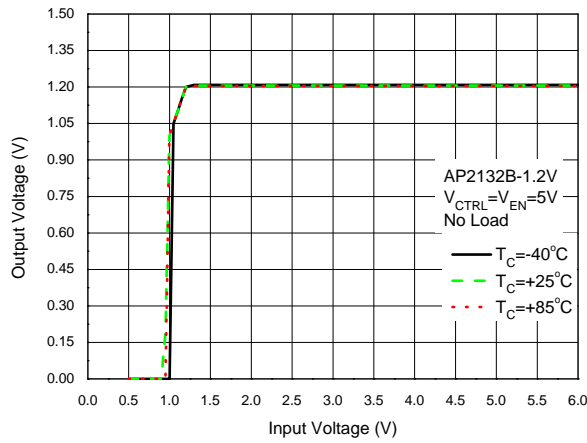


**Output Voltage vs. Output Current**

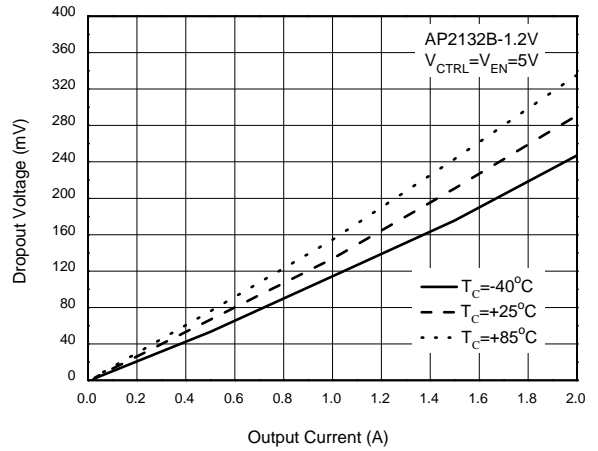


**Performance Characteristics (Cont.)**

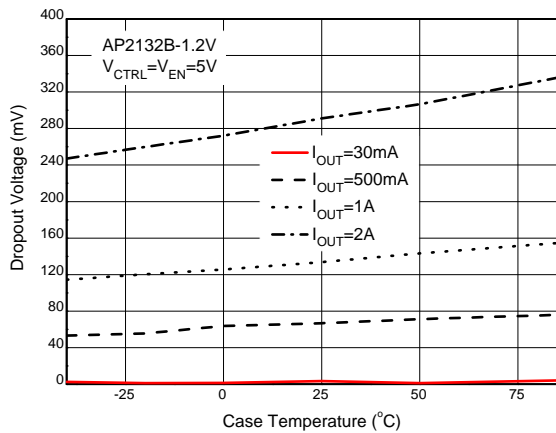
**Output Voltage vs. Input Voltage**



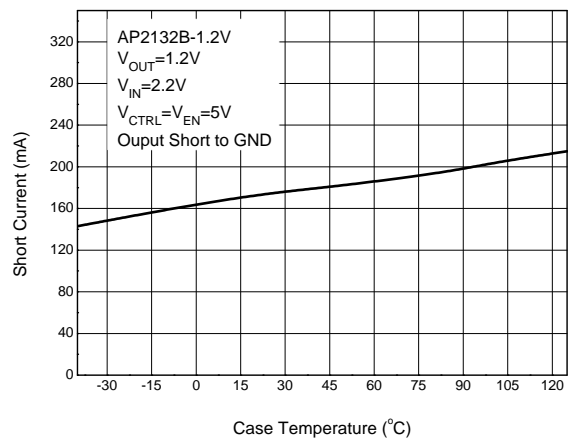
**Dropout Voltage vs. Output Current**



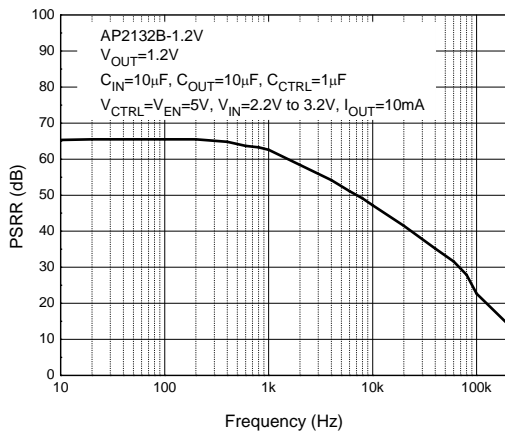
**Dropout Voltage vs. Case Temperature**



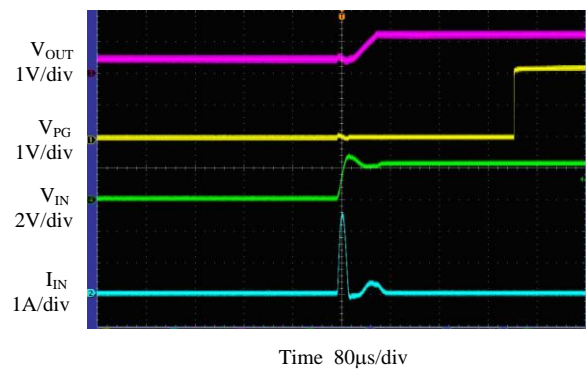
**Short Current vs. Case Temperature**



**PSRR vs. Frequency**

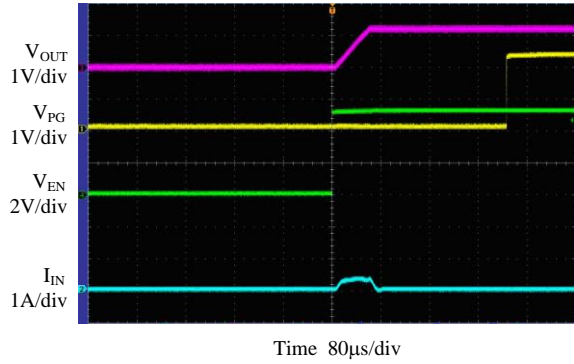


**V<sub>IN</sub> Start up Waveform**  
(V<sub>CTRL</sub>=V<sub>EN</sub>=5V, V<sub>IN</sub>=0 to 2.2V, No Load)

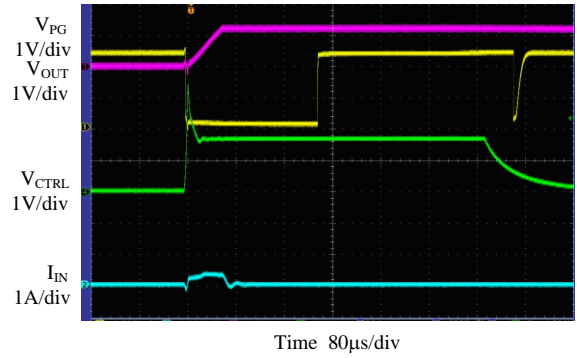


**Performance Characteristics (Cont.)**

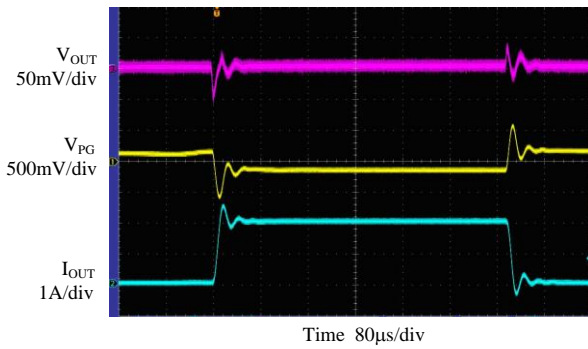
**V<sub>EN</sub> Start up Waveform**  
(V<sub>CTRL</sub>=5V, V<sub>EN</sub>=0 to 5V, V<sub>IN</sub>=2.2V, No Load)



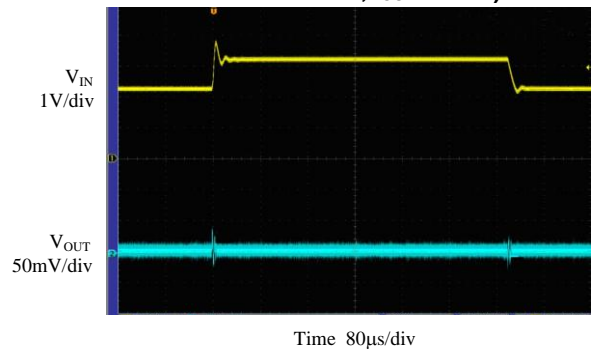
**V<sub>CTRL</sub> Start up and Shut down Waveform**  
(V<sub>CTRL</sub>=0 to 5V, V<sub>EN</sub>=5V, V<sub>IN</sub>=2.2V, No Load)



**Load Transient**  
(V<sub>CTRL</sub>=V<sub>EN</sub>=5V, V<sub>IN</sub>=2.2V, I<sub>OUT</sub>=0 to 2A)

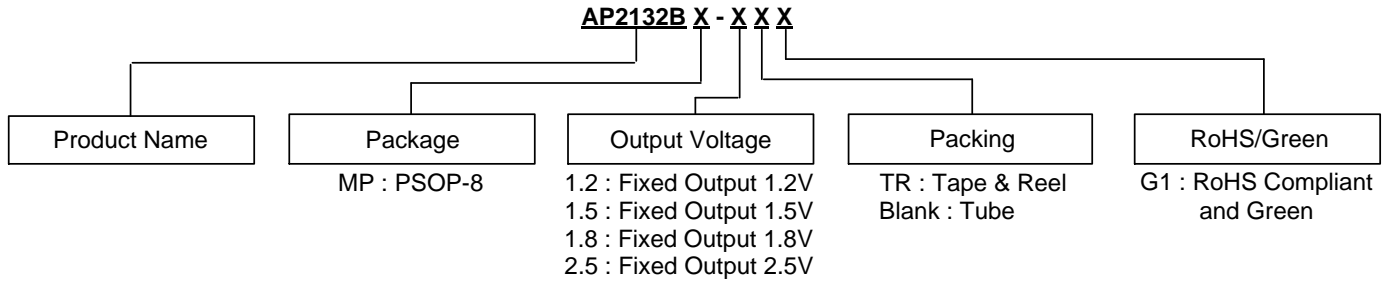


**Line Transient**  
(V<sub>CTRL</sub>=V<sub>EN</sub>=5V, C<sub>IN</sub>=C<sub>CTRL</sub>=1µF, C<sub>OUT</sub>=10µF, V<sub>IN</sub>=2.2V to 3.2V, I<sub>OUT</sub>=10mA)





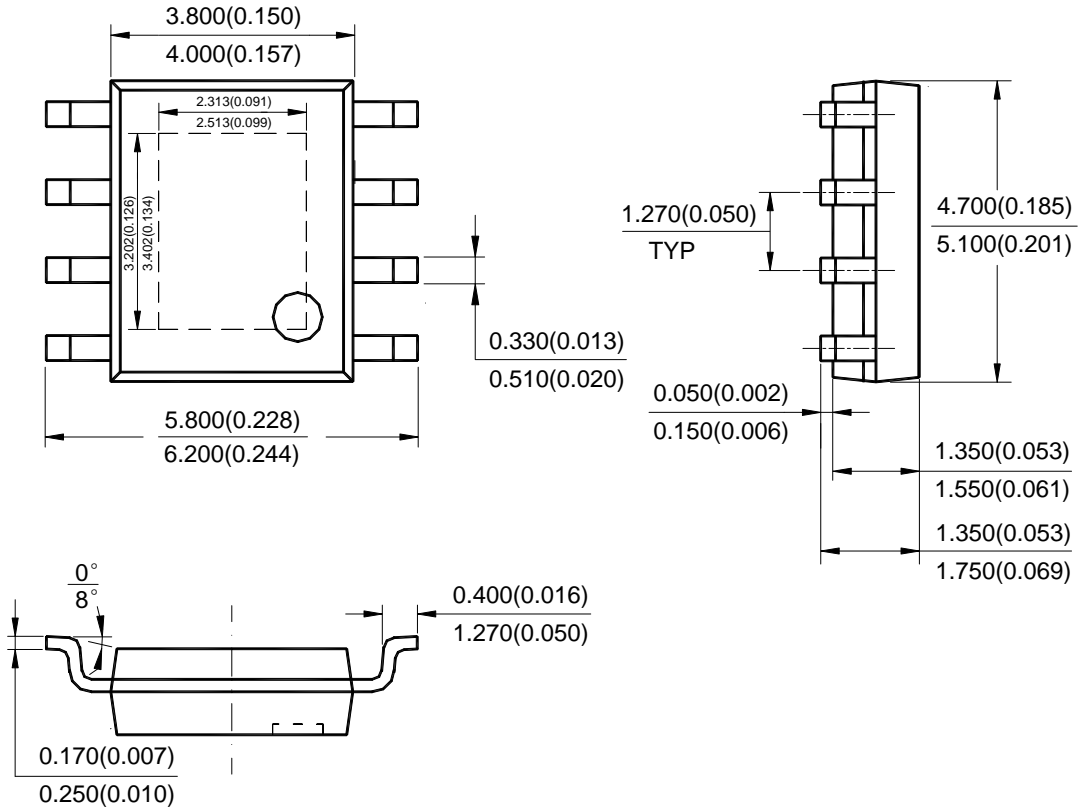
## Ordering Information



Package	Temperature Range	Version Description	Part Number	Marking ID	Packing
PSOP-8	-40 to +85°C	Each fixed output version integrates ADJ version	AP2132BMP-1.2G1	2132B-1.2G1	Tube
			AP2132BMP-1.2TRG1	2132B-1.2G1	Tape & Reel
			AP2132BMP-1.5G1	2132B-1.5G1	Tube
			AP2132BMP-1.5TRG1	2132B-1.5G1	Tape & Reel
			AP2132BMP-1.8G1	2132B-1.8G1	Tube
			AP2132BMP-1.8TRG1	2132B-1.8G1	Tape & Reel
			AP2132BMP-2.5G1	2132B-2.5G1	Tube
			AP2132BMP-2.5TRG1	2132B-2.5G1	Tape & Reel

**Package Outline Dimensions** (All dimensions in mm(inch).)

(1) Package Type: PSOP-8



Note: Eject hole, oriented hole and mold mark is optional.

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