2A CMOS LDO REGULATOR AP2132B

General 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.

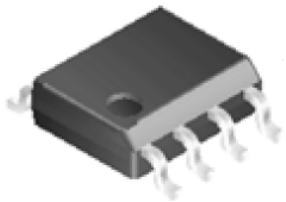
AP2132B series are available in PSOP-8 package.

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

Applications

- Notebook



PSOP-8

Figure 1. Package Type of AP2132B

Pin Configuration

MP Package
(PSOP-8)

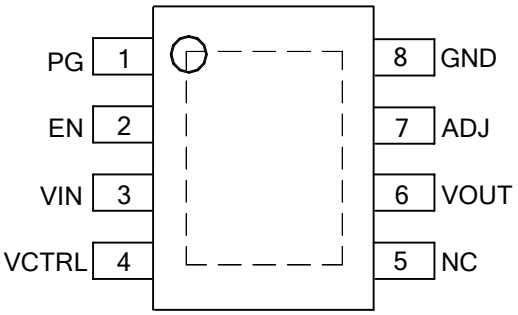


Figure 2. Pin Configuration of AP2132B (Top View)

Pin Description

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

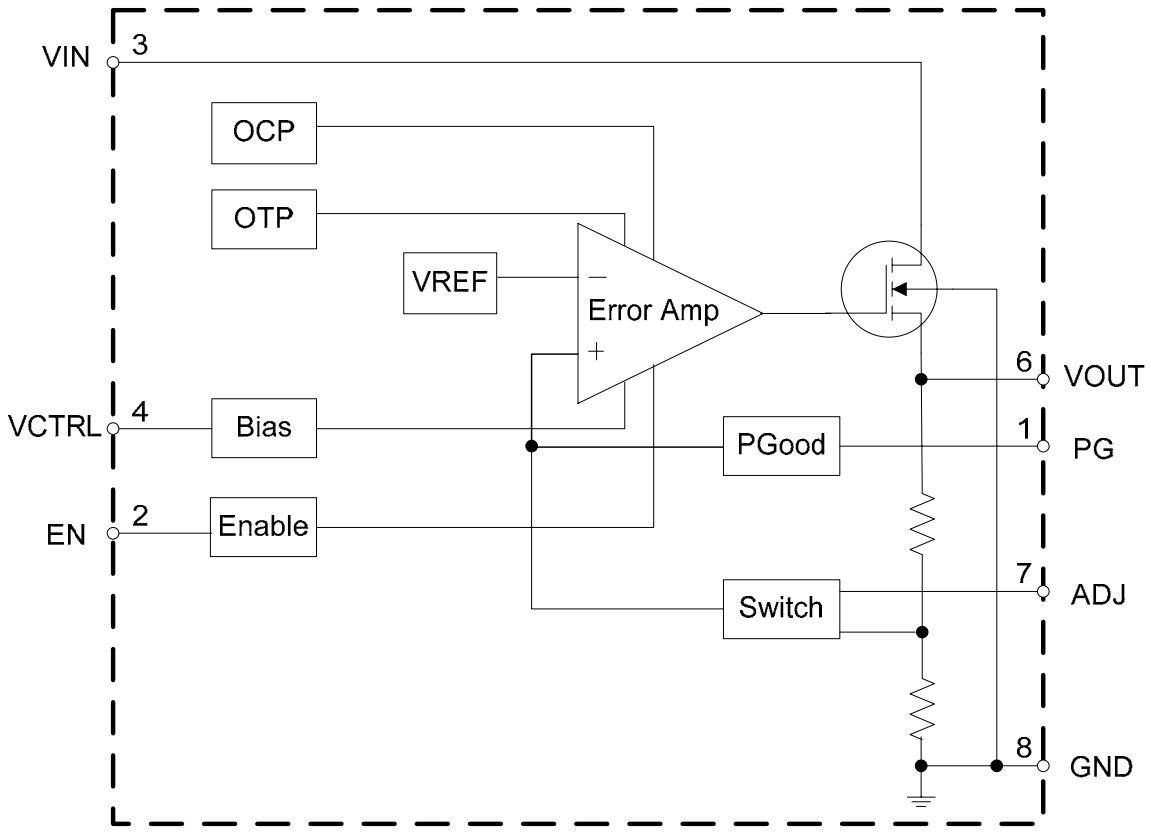
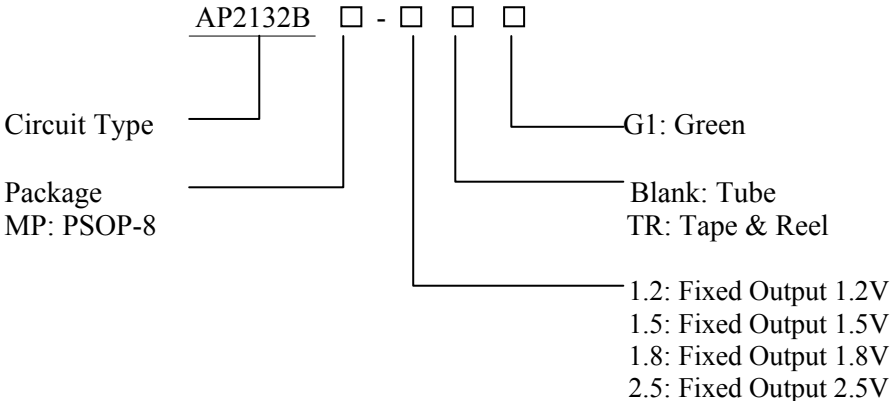


Figure 3. Functional Block Diagram of AP2132B

Ordering Information



Package	Temperature Range	Version Description	Part Number	Marking ID	Packing Type
PSOP-8	-40 to 85 ºC	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

BCD Semiconductor's Pb-free products, as designated with "G1" suffix in the part number, are RoHS compliant and Green.

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Input Voltage Input Voltage for Controlling Circuit	V_{IN} V_{CTRL}	6.0	V
Enable Input Voltage	V_{EN}	-0.3 to 6.0	V
Output Current	I_{OUT}	2.5	A
Thermal Resistance (No Heatsink)	θ_{JA}	130	ºC/W
Operating Junction Temperature	T_J	150	ºC
Storage Temperature Range	T_{STG}	-65 to 150	ºC
Lead Temperature (Soldering, 10sec)	T_{LEAD}	260	ºC
ESD (Machine Model)		200	V
ESD (Human Body Model)		2000	V

Note 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.

Recommended Operating Conditions

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

Electrical Characteristics

V_{IN} = V_{OUT} +0.5V, V_{CTRL}= V_{EN} =5V, T_A=25°C, C_{IN}=C_{OUT}=10μF, C_{CTRL}=1μF, I_{OUT}=10mA, **Bold** typeface applies -40 °C≤T_A≤85 °C unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V_{OUT}	V_{IN} = V_{OUT}+0.5V, I_{OUT} =10mA	V_{OUT} × 98%		V_{OUT} × 102%	V
Input Voltage	V_{IN}		1.4		5.5	V
Current Limit	I_{Limit}	V_{IN} – V_{OUT} = 1V	3			A
Load Regulation	V_{RLOAD}	V_{IN}=V_{OUT} +0.5V, 10mA≤I_{OUT}≤2A		10		mV
Line Regulation	V_{RLINE}	V_{OUT} + 0.5V≤V_{IN}≤5V , I_{OUT} = 10mA		2		mV
Dropout Voltage	V_{DROP}	I_{OUT} =500mA		80	120	mV
		I_{OUT} =1A		150	200	mV
		I_{OUT} =2A		300	450	mV
Supply Current	I_{SUPPLY}	V_{IN}=V_{OUT}+0.5V, I_{OUT}=0mA		300		μA
V_{CTRL} Current	I_{CTRLH}	V_{IN} = V_{OUT}+0.5V, V_{CTRL}=V_{EN}=5V		250	500	μA
	I_{CTRLL}	V_{IN}=V_{OUT}+0.5V, Vctrl= 5V, V_{EN}=0V		0.1	1.0	μA
Power Supply Rejection Ratio	PSRR	Ripple 0.5Vp-p, V_{IN}=V_{OUT}+1V, f=100Hz		60		dB
		Ripple 0.5Vp-p, V_{IN}=V_{OUT}+1V, f=1kHz		60		dB
Output Voltage Temperature Coefficient	$\frac{\triangle V_{OUT}}{V_{OUT}\times\triangle T}$	I_{OUT}=10mA, -40 °C≤T_A≤85°C		±100		ppm/ °C
Reference Voltage	V_{REF}	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
Thermal Shutdown	OTSD			165		°C
Thermal Shutdown Hysteresis				20		°C
V_{OUT} Power Good Voltage	V_{THPG}			92		%
V_{PG} Hysteresis				7		%
Adjust Pin Threshold				200		mV
Thermal Resistance (Junction to Case)	θ_{JC}	PSOP-8		40		°C/W

Typical Performance Characteristics

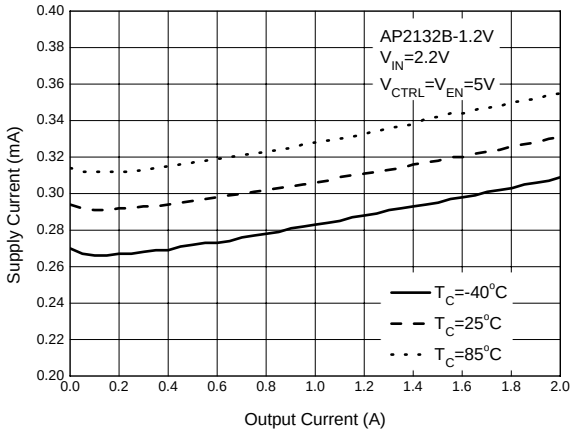


Figure 4. Supply Current vs. Output Current

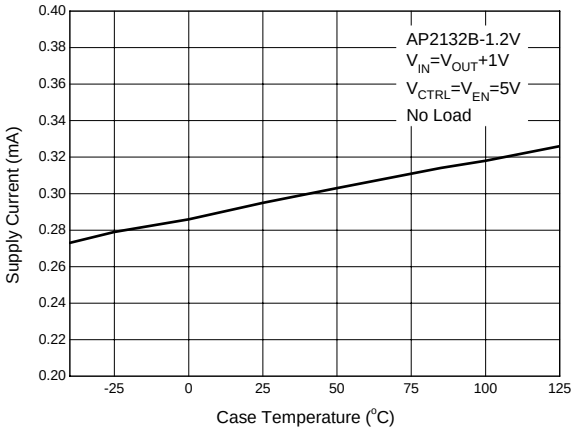


Figure 5. Supply Current vs. Case Temperature

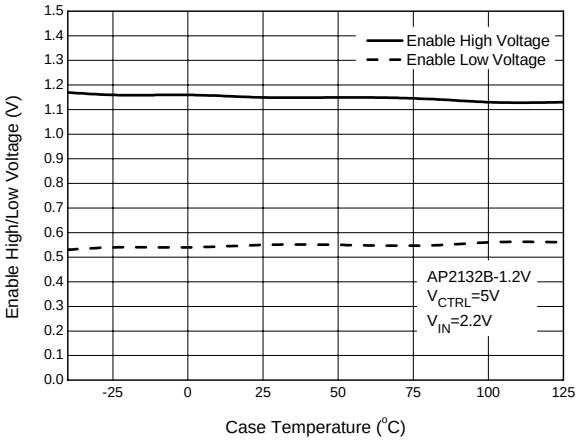


Figure 6. Enable High/Low Voltage vs. Case Temperature

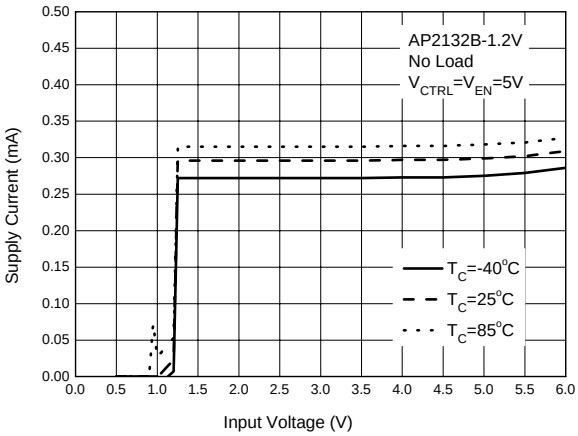


Figure 7. Supply Current vs. Input Voltage

Typical Performance Characteristics (Continued)

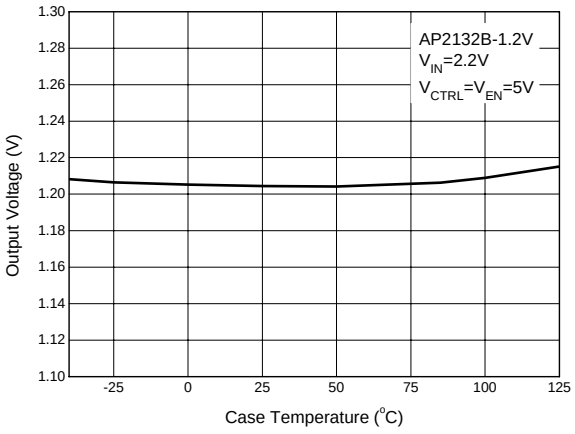


Figure 8. Output Voltage vs. Case Temperature

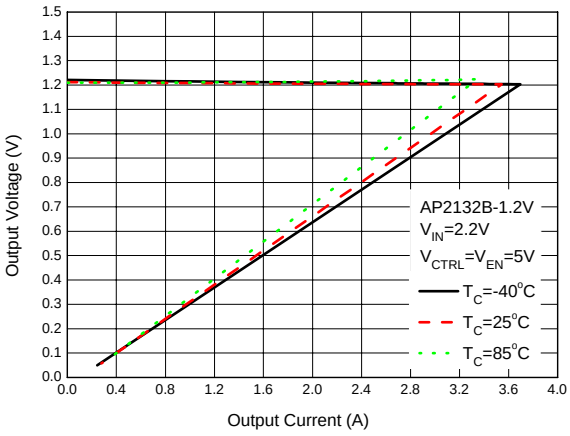


Figure 9. Output Voltage vs. Output Current

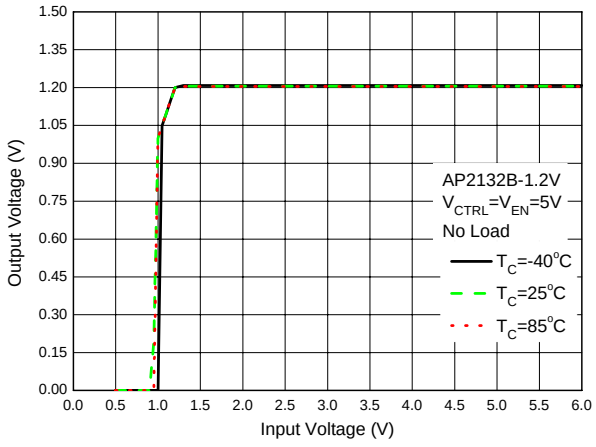


Figure 10. Output Voltage vs. Input Voltage

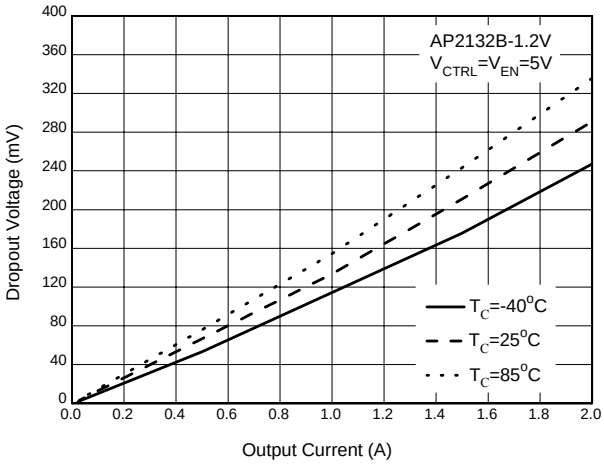


Figure 11. Dropout Voltage vs. Output Current

Typical Performance Characteristics (Continued)

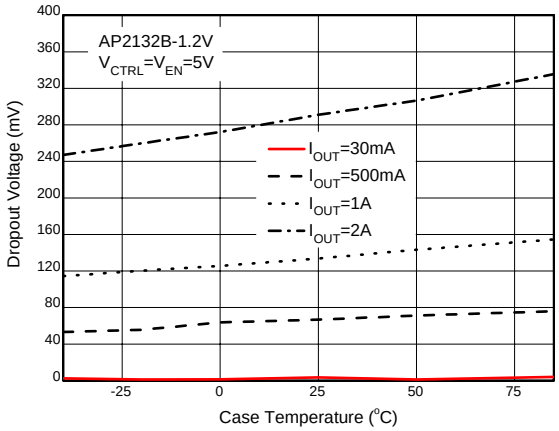


Figure 12. Dropout Voltage vs. Case Temperature

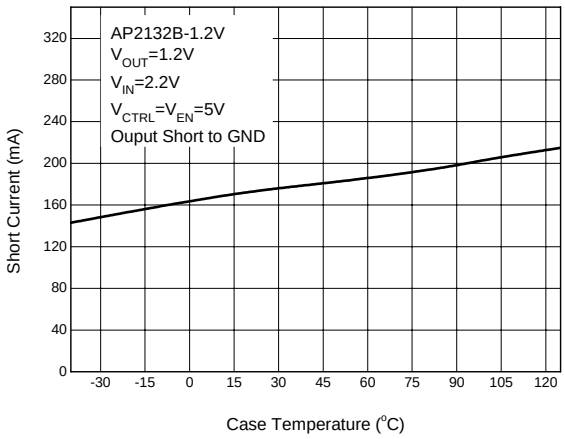


Figure 13. Short Current vs. Case Temperature

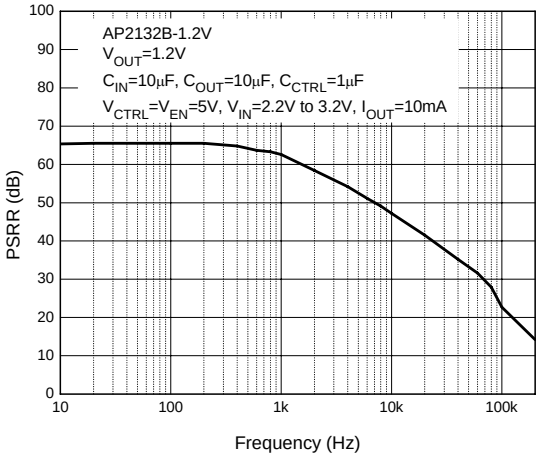


Figure 14. PSRR vs. Frequency

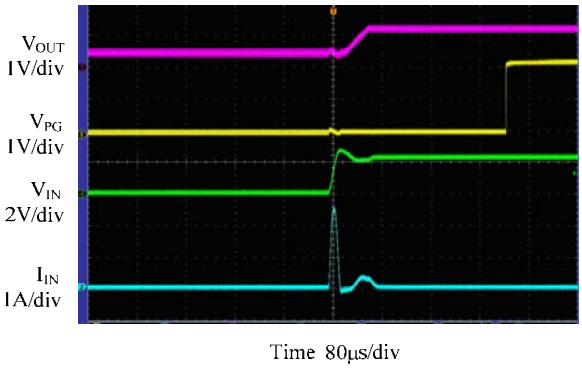


Figure 15. V_{IN} Start up Waveform
(V_{CTRL}=V_{EN}=5V, V_{IN}=0 to 2.2V, No Load)

Typical Performance Characteristics (Continued)

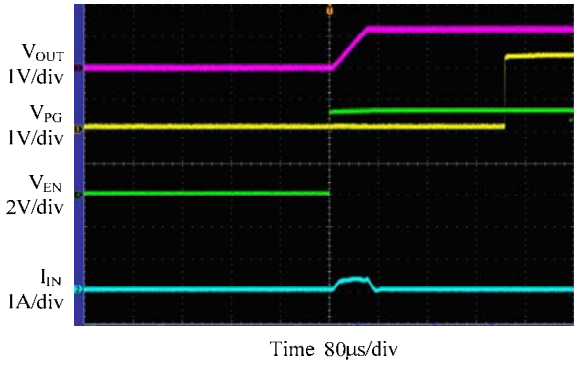


Figure 16. V_{EN} Start up Waveform
(V_{CTRL} =5V, V_{EN} =0 to 5V, V_{IN}=2.2V, No Load)

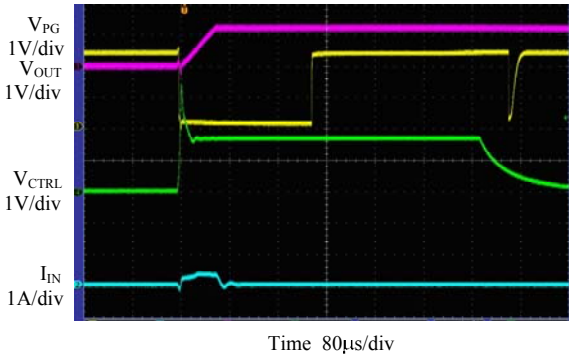


Figure 17. V_{CTRL} Start up and Shut down Waveform
(V_{CTRL} =0 to 5V, V_{EN} =5V, V_{IN}=2.2V, No Load)

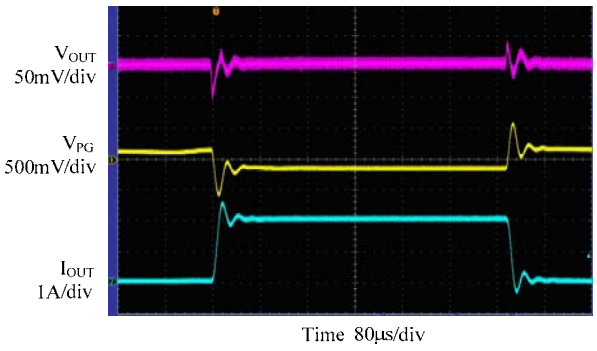


Figure 18. Load Transient
(V_{CTRL} =V_{EN} = 5V, V_{IN}=2.2V, I_{OUT}=0 to 2A)

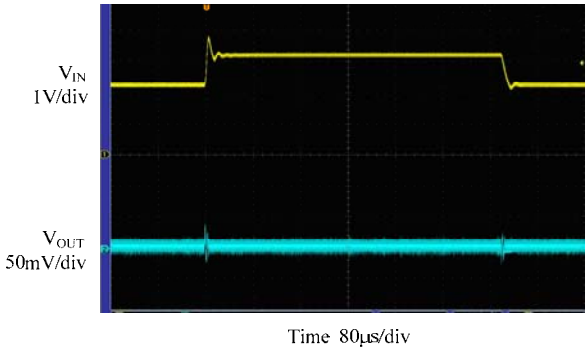
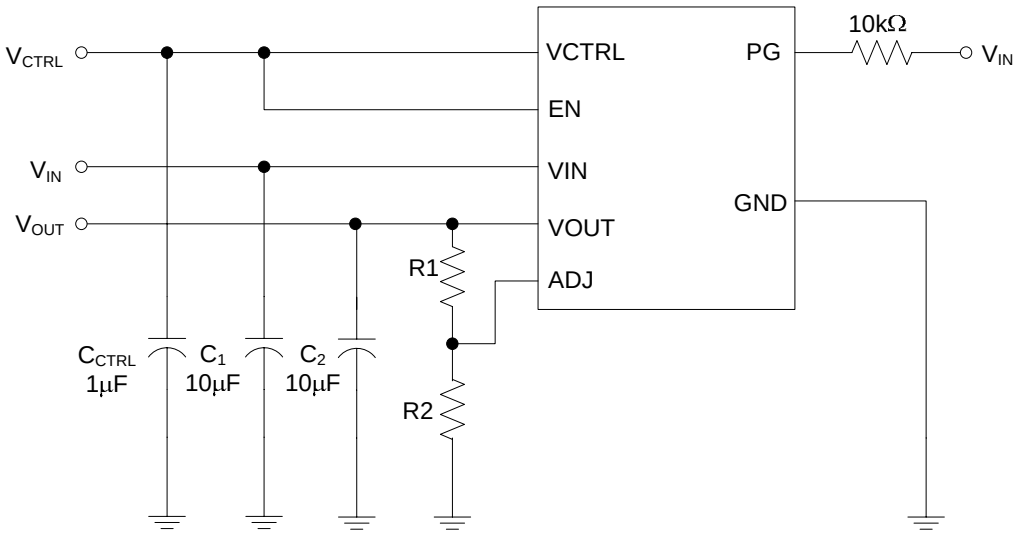


Figure 19. Line Transient
(V_{CTRL} =V_{EN} = 5V, C_{IN}=C_{CTRL}=1μF, C_{OUT}=10μF,
V_{IN}=2.2V to 3.2V, I_{OUT}=10mA)

Typical Application



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

Figure 20. Typical Application of AP2132B for Adjustable Version

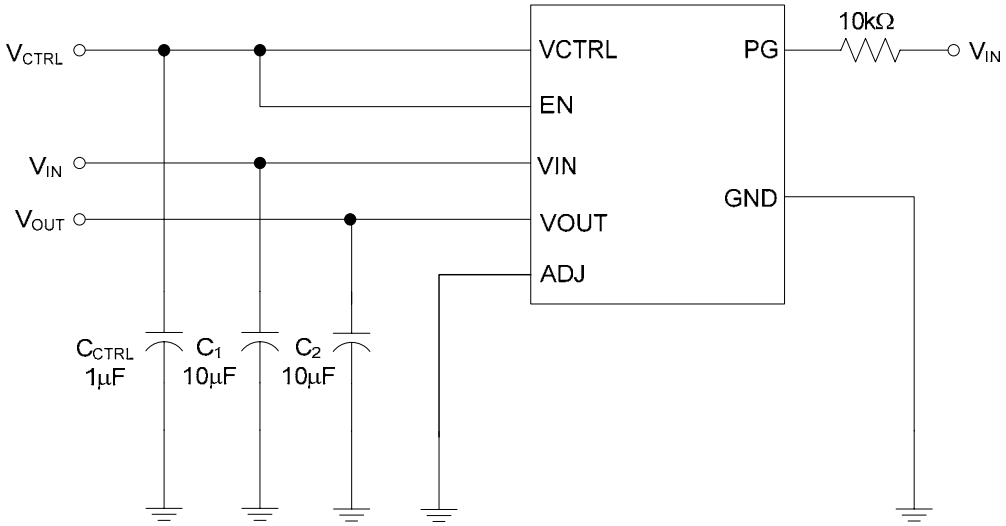
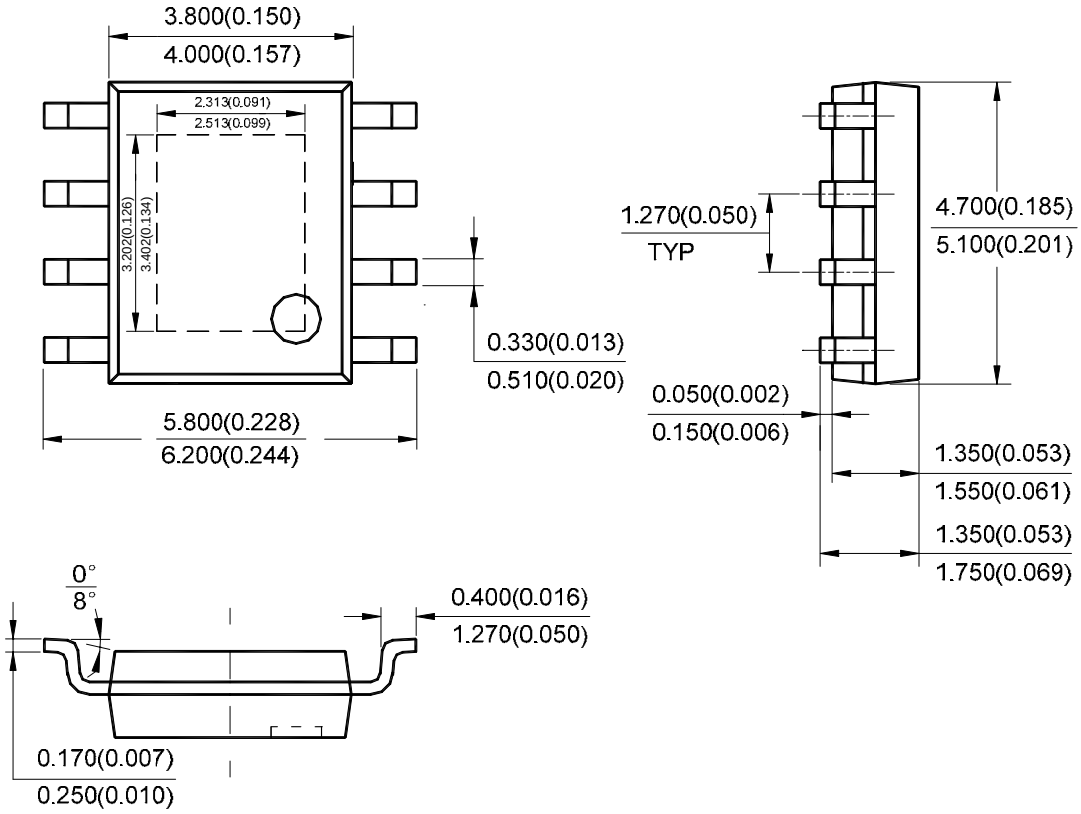


Figure 21. Typical Application of AP2132B for Fixed Version

Mechanical Dimensions

PSOP-8 **Unit: mm(inch)**



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

BCD Semiconductor Manufacturing Limited

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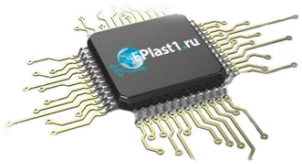
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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