

300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR**AP2129****General Description**

The AP2129 is a 300mA, positive Voltage regulator ICs fabricated by CMOS process. The AP2129 provides two kinds of output voltage operation modes for setting the output voltage. Fixed output voltage mode senses the output voltage on V_{OUT} , adjustable output voltage mode needs two resistors as a voltage divider

The AP2129 Series have features of low dropout voltage, low noise, high output voltage accuracy, and low current consumption which make them ideal for use in various battery-powered devices.

AP2129 has 1.0V, 1.2V, 3.3V fixed voltage version and 0.8V to 4.5V adjustable voltage version.

AP2129 series are available in SOT-23-5 Package.

Features

- Wide Operating Voltage: 1.8V to 6V
- High Output Voltage Accuracy: $\pm 2\%$
- High Ripple Rejection: 65dB@ $f=1\text{kHz}$, 45dB@ $f=10\text{kHz}$
- Low Standby Current: $0.1\mu\text{A}$
- Low Quiescent Current: $60\mu\text{A}$ Typical
- Low Output Noise: $60\mu\text{VRms}$
- Short Current Limit: 50mA
- Over Temperature Protection
- Compatible with Low ESR Ceramic Capacitor: $1\mu\text{F}$ for C_{IN} and C_{OUT}
- Excellent Line/Load Regulation
- Soft Start Time: $50\mu\text{s}$
- Auto Discharge Resistance: $R_{DS(ON)}=60\Omega$

Applications

- Datacom
- Notebook Computers
- Mother Board

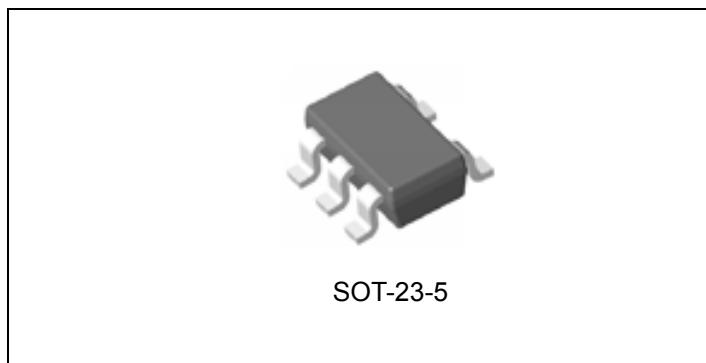


Figure 1. Package Type of AP2129

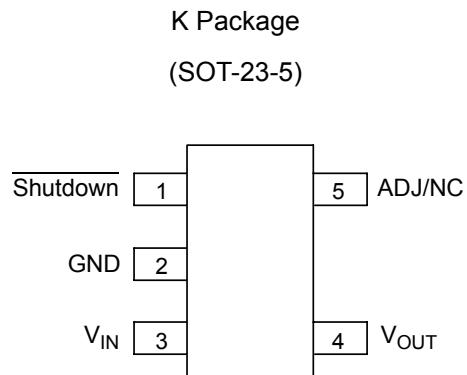
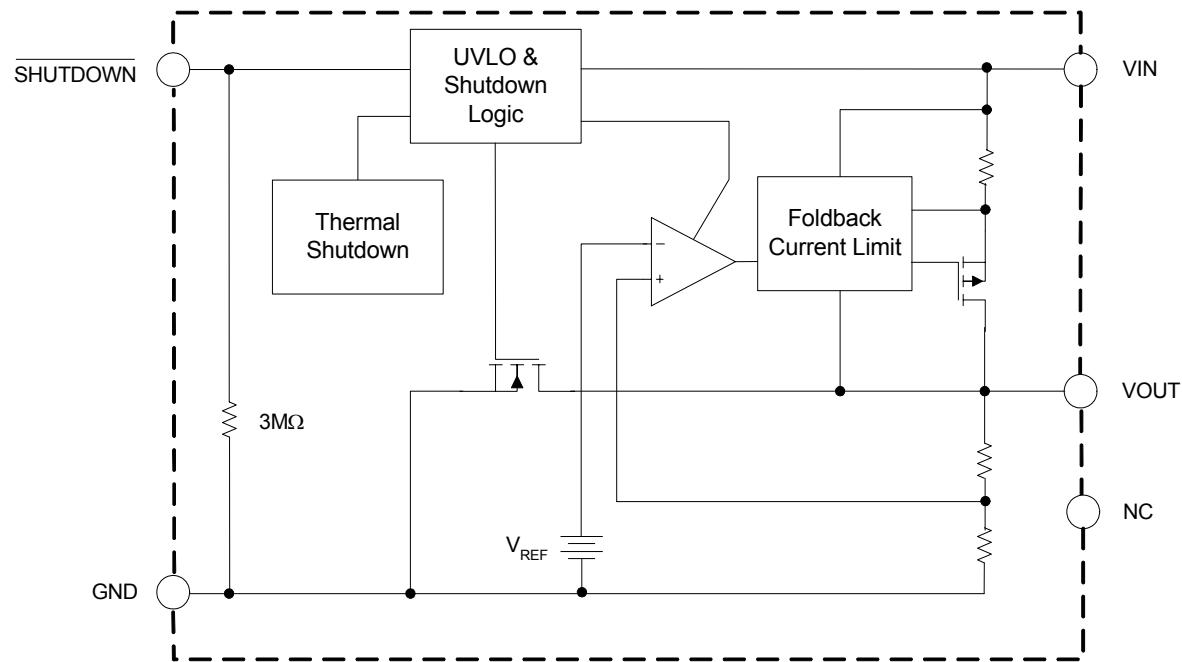
300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR**AP2129****Pin Configuration**

Figure 2. Pin Configuration of AP2129 (Top View)

Functional Block Diagram

300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR

AP2129

Functional Block Diagram (Continued)

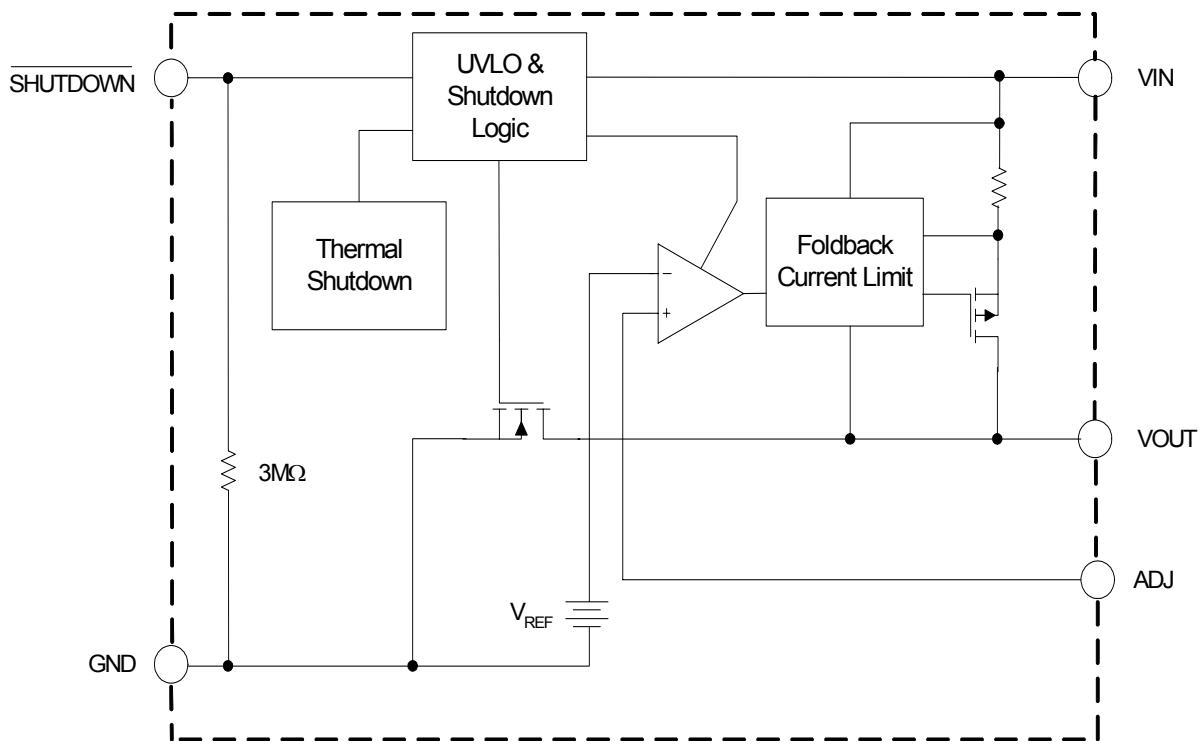


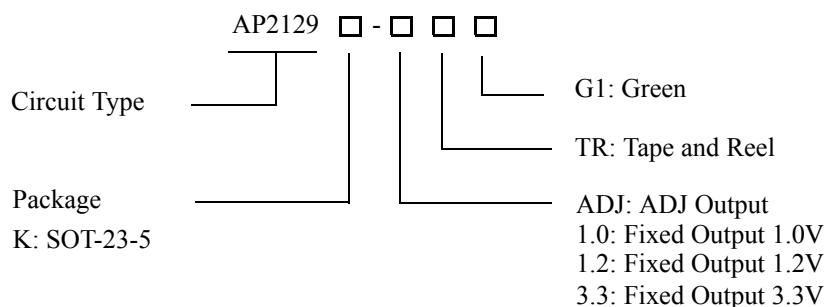
Figure 3. Functional Block Diagram of AP2129



300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR

AP2129

Ordering Information



Product	Package	Temperature Range	Part Number	Marking ID	Packing Type
AP2129	SOT-23-5	-40 to 85°C	AP2129K- ADJTRG1	GEJ	Tape & Reel
			AP2129K-1.0TRG1	GEK	Tape & Reel
			AP2129K-1.2TRG1	GEL	Tape & Reel
			AP2129K-3.3TRG1	GEM	Tape & Reel

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



300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR

AP2129

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Input Voltage	V _{IN}	6.5	V
Shutdown Input Voltage	V _{CE}	-0.3 to V _{IN} +0.3	V
Output Current	I _{OUT}	450	mA
Junction Temperature	T _J	150	°C
Storage Temperature Range	T _{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10sec)	T _{LEAD}	260	°C
Thermal Resistance	θ _{JA}	250	°C/W
ESD (Human Body Model)	ESD	6000	V
ESD (Machine Model)	ESD	200	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}	1.8	6	V
Operating Junction Temperature Range	T _J	-40	85	°C



300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR

AP2129

Electrical Characteristics

AP2129-1.0/1.2/3.3 Electrical Characteristics

(C_{IN}=1μF, C_{OUT}=1μF, Bold typeface applies over -40°C≤T_J≤85°C, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Output Voltage	V _{OUT}	V _{IN} =V _{OUT} +1V, (Note 2) 1mA≤I _{OUT} ≤300mA	98%* V _{OUT}		102%* V _{OUT}	V
Input Voltage	V _{IN}		1.8		6	V
Maximum Output Current	I _{OUT(MAX)}			450		mA
Load Regulation	ΔV _{OUT} (ΔI _{OUT} *V _{OUT})	V _{IN} -V _{OUT} =1V, (Note 2) 1mA≤I _{OUT} ≤300mA			0.6	%/A
Line Regulation	ΔV _{OUT} (ΔV _{IN} *V _{OUT})	V _{OUT} +0.5V≤V _{IN} ≤6V, (Note 2) I _{OUT} =30mA			0.06	%/V
Dropout Voltage	V _{DROP}	V _{OUT} =1.0V, I _{OUT} =300mA		1400	1500	mV
		V _{OUT} =1.2V, I _{OUT} =300mA		1200	1300	
		V _{OUT} =3.3V, I _{OUT} =300mA		170	300	
Quiescent Current	I _Q	V _{IN} =V _{OUT} +1V, I _{OUT} =0mA		60	90	μA
Standby Current	I _{STD}	V _{IN} =V _{OUT} +1V, V _{SHUTDOWN} in off mode		0.1	1.0	μA
Power Supply Rejection Ratio	PSRR	Ripple 1Vp-p V _{IN} =V _{OUT} +1V	f=100Hz		65	dB
			f=1KHz		65	
			f=10KHz		45	
Output Voltage Temperature Coefficient	(ΔV _{OUT} /V _{OUT}) /ΔT	I _{OUT} =30mA, -40°C≤T _J ≤85°C		±100		ppm/°C
Output Current Limit	I _{LIMIT}	V _{IN} -V _{OUT} =1V, V _{OUT} =0.98*V _{OUT}		400		mA
Short Current Limit	I _{SHORT}	V _{OUT} =0V		50		mA
Soft Start Time	t _{UP}			50		μs
RMS Output Noise	V _{NOISE}	T _A =25°C, 10Hz ≤f≤100kHz		60		μVrms
Shutdown "High" Voltage		Shutdown input voltage "High"	1.5		6	V
Shutdown "Low" Voltage		Shutdown input voltage "Low"	0		0.4	V
V _{OUT} Discharge MOSFET R _{DS(ON)}		Shutdown input voltage "Low"		60		Ω
Shutdown Pull Down Resistance				3		MΩ
Thermal Shutdown				165		°C
Thermal Shutdown Hysteresis				30		°C
Thermal Resistance	θ _{JC}	SOT-23-5		150		°C/W

Note 2: V_{IN}=1.8V for 1.0 and 1.2 version



300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR

AP2129

Electrical Characteristics (Continued)

AP2129-ADJ Electrical Characteristics

(C_{IN}=1μF, C_{OUT}=1μF, Bold typeface applies over -40°C≤T_J≤85°C, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reference Voltage	V _{REF}	V _{IN} =1.8V 1mA≤I _{OUT} ≤300mA	0.748	0.8	0.816	V
Input Voltage	V _{IN}		1.8		6	V
Maximum Output Current	I _{OUT(MAX)}			450		mA
Load Regulation	ΔV _{OUT} /(ΔI _{OUT} *V _{OUT})	V _{IN} -V _{OUT} =1V, 1mA≤I _{OUT} ≤300mA			0.6	%/A
Line Regulation	ΔV _{OUT} /(ΔV _{IN} *V _{OUT})	V _{OUT} +0.5V≤V _{IN} ≤6V I _{OUT} =30mA			0.06	%/V
Quiescent Current	I _Q	V _{IN} =V _{OUT} +1V, I _{OUT} =0mA		60	90	μA
Standby Current	I _{STD}	V _{IN} =V _{OUT} +1V, V _{SHUTDOWN} in off mode		0.1	1.0	μA
Power Supply Rejection Ratio	PSRR	Ripple 1Vp-p V _{IN} =V _{OUT} +1V	f=100Hz f=1KHz f=10KHz	65 65 45		dB
Output Voltage Temperature Coefficient	(ΔV _{OUT} /V _{OUT}) /ΔT	I _{OUT} =30mA, -40°C≤T _J ≤85°C		±100		ppm/°C
Output Current Limit	I _{LIMIT}			400		mA
Short Current Limit	I _{SHORT}	V _{OUT} =0V		50		mA
Soft Start Time	t _{UP}			50		μs
RMS Output Noise	V _{NOISE}	T _A =25°C, 10Hz≤f≤100kHz		60		μVrms
Shutdown "High" Voltage		Shutdown input voltage "High"	1.5		6	V
Shutdown "Low" Voltage		Shutdown input voltage "Low"	0		0.4	V
V _{OUT} Discharge MOSFET R _{DS(ON)}		Shutdown input voltage "Low"		60		Ω
Shutdown Pull Down Resistance				3		MΩ
Thermal Shutdown				165		°C
Thermal Shutdown Hysteresis				30		°C
Thermal Resistance	θ _{JC}	SOT-23-5		150		°C/W

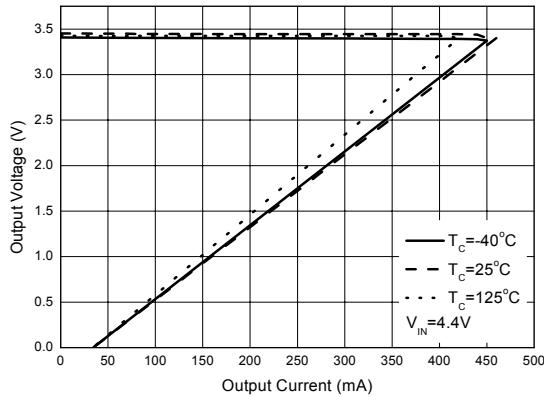
300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR
AP2129
Typical Performance Characteristics


Figure 4. Output Voltage vs. Output Current

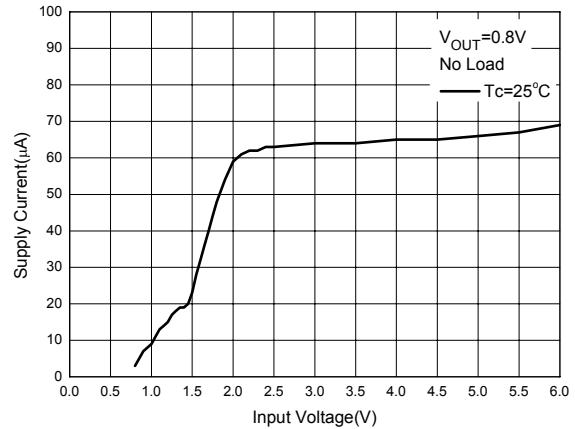


Figure 5. Supply Current vs. input Current

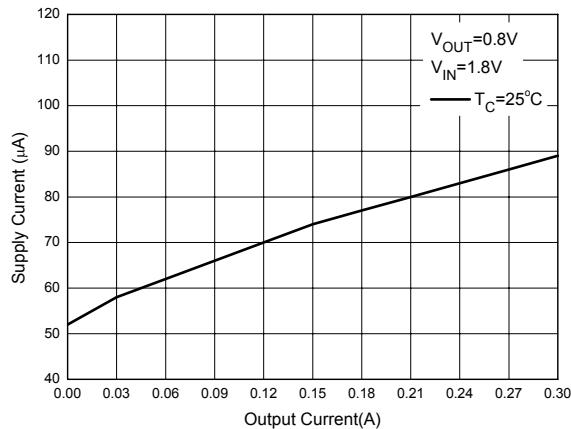


Figure 6. Supply Current vs. Output Current

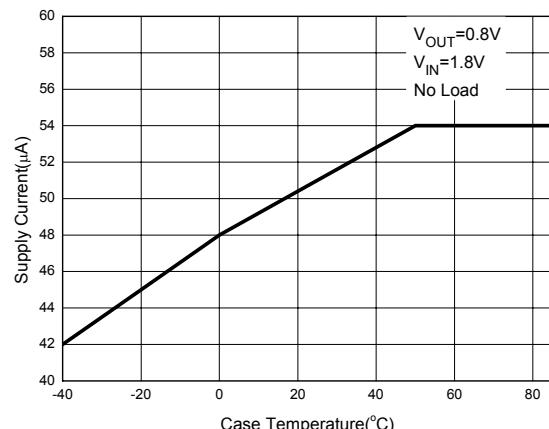


Figure 7. Supply Current vs. Case Temperature

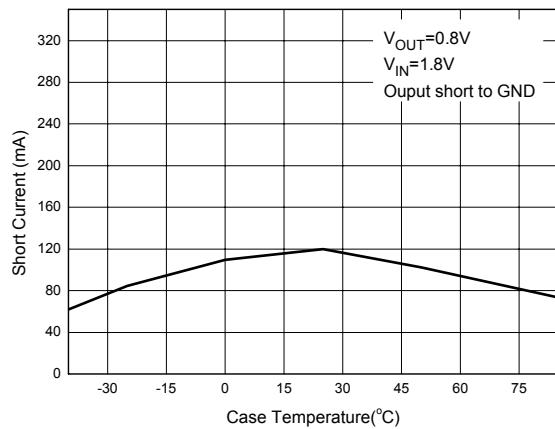
300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR
AP2129
Typical Performance Characteristics (Continued)


Figure 8. Shot Output vs. Case Temperature

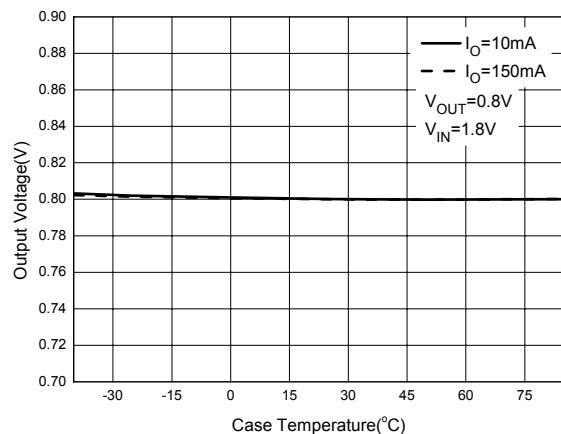


Figure 9. Output Voltage vs. Case Temperature

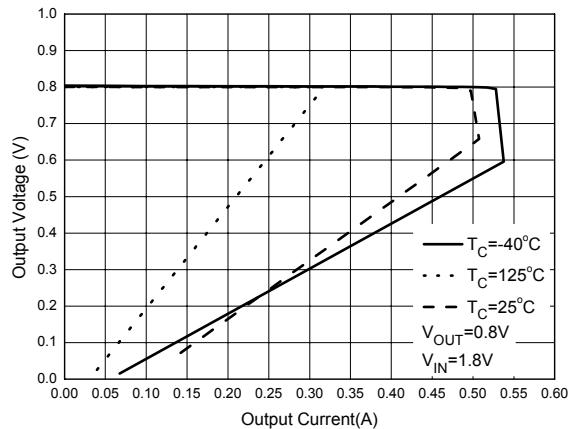


Figure 10. Output Voltage vs. Output Current

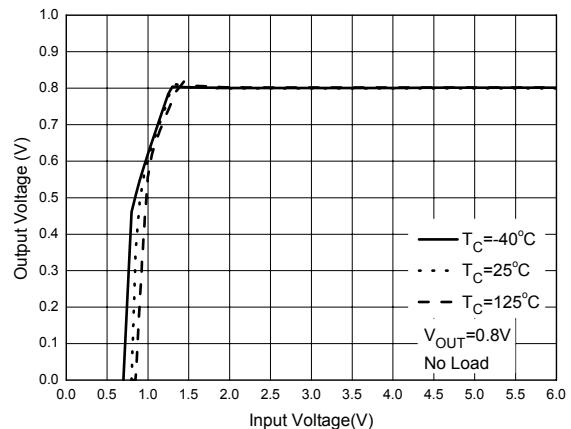


Figure 11. Output Voltage vs. Input Voltage

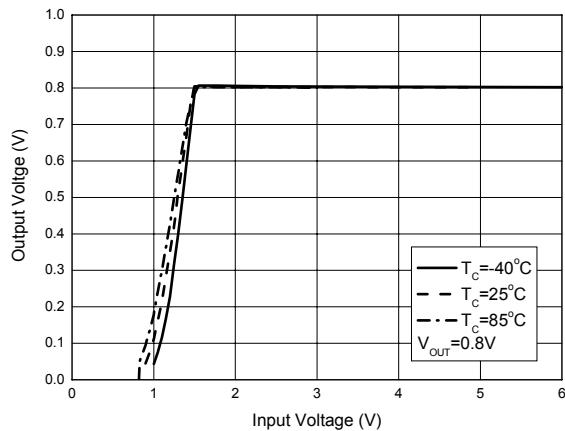
300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR
AP2129
Typical Performance Characteristics (Continued)


Figure 12. Output Voltage vs. Input Voltage
($I_{\text{OUT}}=300\text{mA}$)

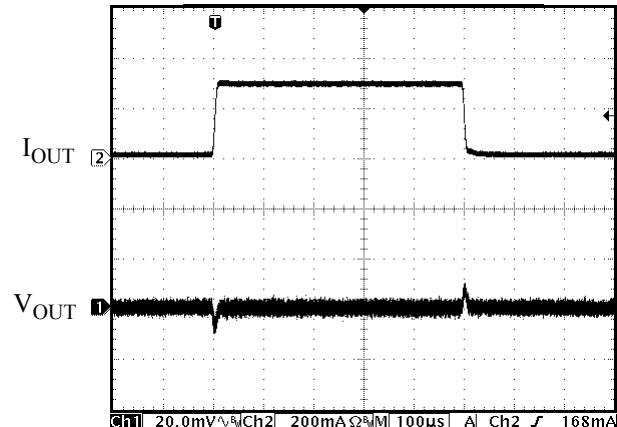


Figure 13. Load Transient
(Conditions: $C_{\text{IN}}=C_{\text{OUT}}=1\mu\text{F}$, $V_{\text{IN}}=2.5\text{V}$, $V_{\text{OUT}}=0.8\text{V}$)

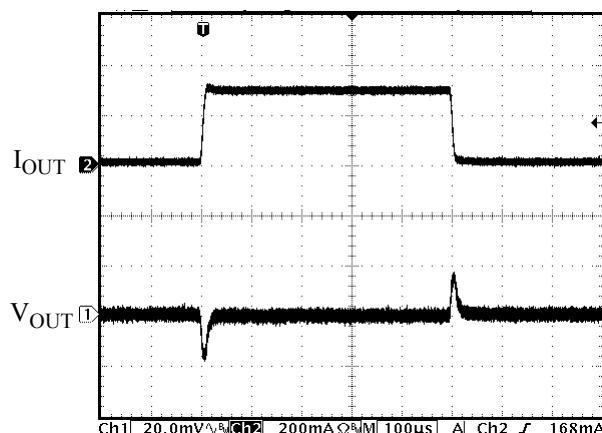


Figure 14. Load Transient
(Conditions: $C_{\text{IN}}=C_{\text{OUT}}=1\mu\text{F}$, $V_{\text{IN}}=4.4\text{V}$, $V_{\text{OUT}}=3.3\text{V}$)

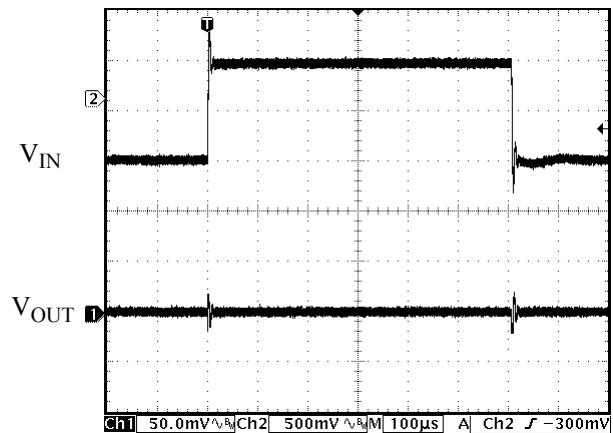


Figure 15. Line Transient
(Conditions: $I_{\text{OUT}}=30\text{mA}$, $C_{\text{IN}}=C_{\text{OUT}}=1\mu\text{F}$,
 $V_{\text{IN}}=2.5$ to 3.5V , $V_{\text{OUT}}=0.8\text{V}$)

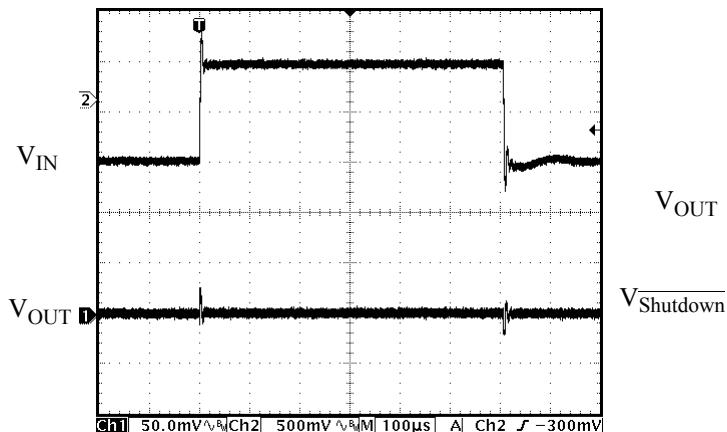
300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR
AP2129
Typical Performance Characteristics (Continued)


Figure 16. Line Transient

(Conditions: $I_{OUT}=30mA$, $C_{IN}=C_{OUT}=1\mu F$,
 $V_{IN}=4$ to $5V$, $V_{OUT}=3.3V$)

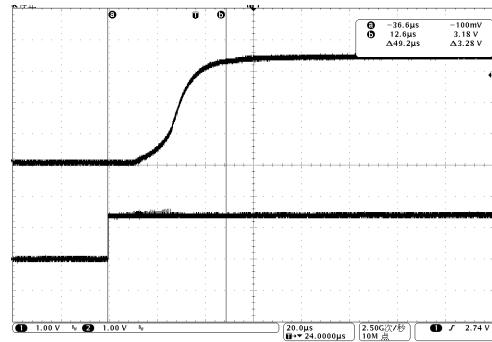


Figure 17. Soft Start Time

(Conditions: $I_{OUT}=0mA$, $C_{IN}=C_{OUT}=1\mu F$,
 $V_{Shutdown}=0$ to $2V$, $V_{OUT}=3.3V$)

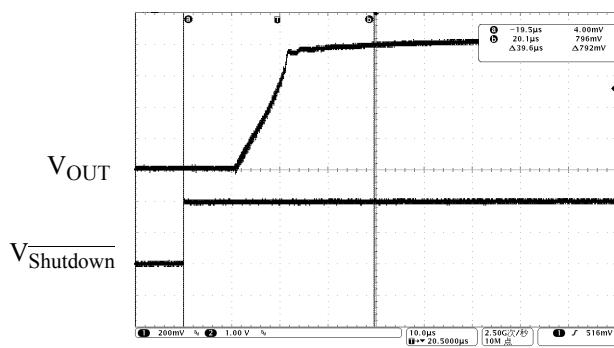


Figure 18. Soft Start Time

(Conditions: $I_{OUT}=0mA$, $C_{IN}=C_{OUT}=1\mu F$,
 $V_{Shutdown}=0$ to $2V$, $V_{OUT}=0.8V$)

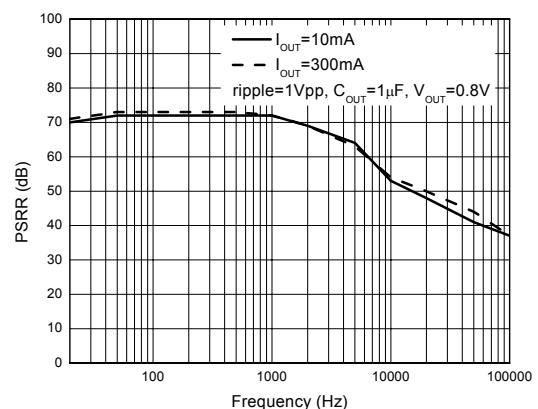


Figure 19. PSSR vs. Frequency

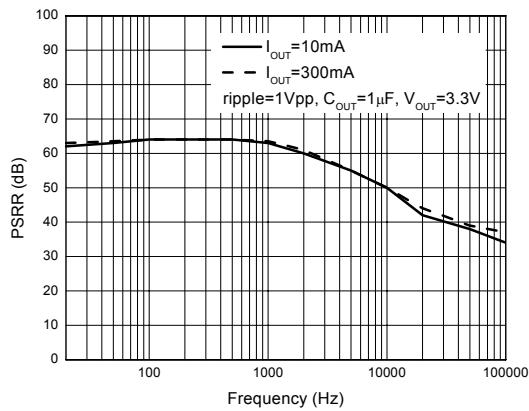
300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR**AP2129****Typical Performance Characteristics (Continued)**

Figure 20. PSRR vs. Frequency

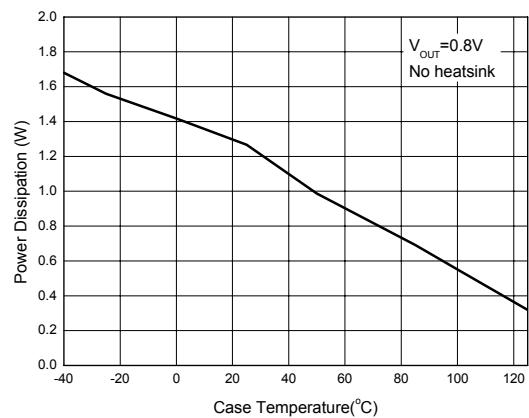
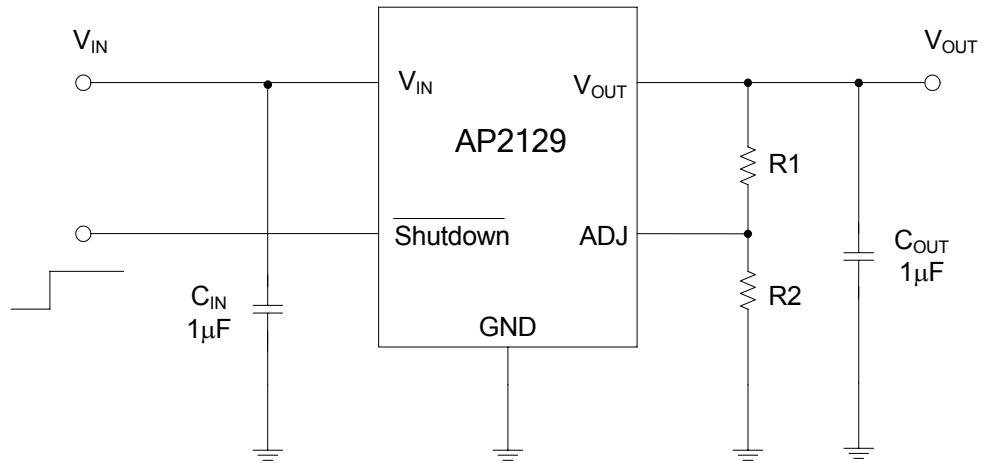
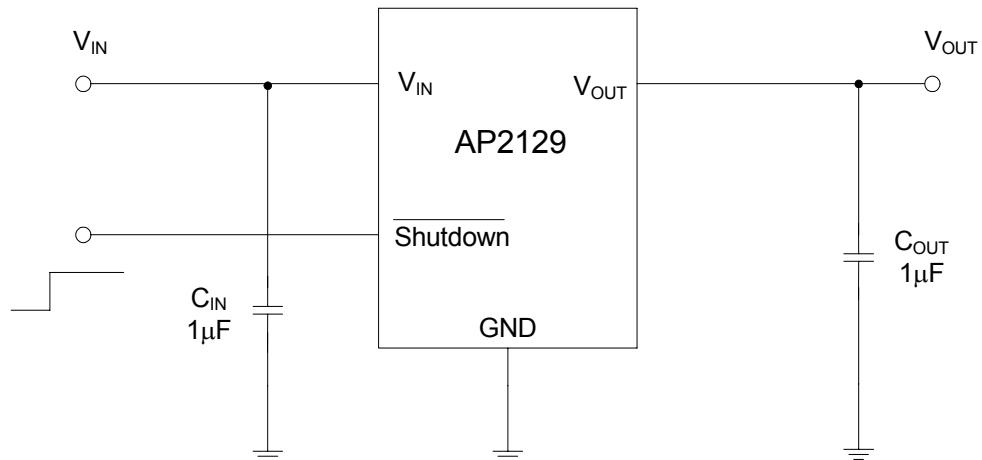


Figure 21. Power Dissipation vs. Case Temperature

Typical Application



$$V_{OUT} = 0.8 * (1 + R1/R2) \text{ V}$$



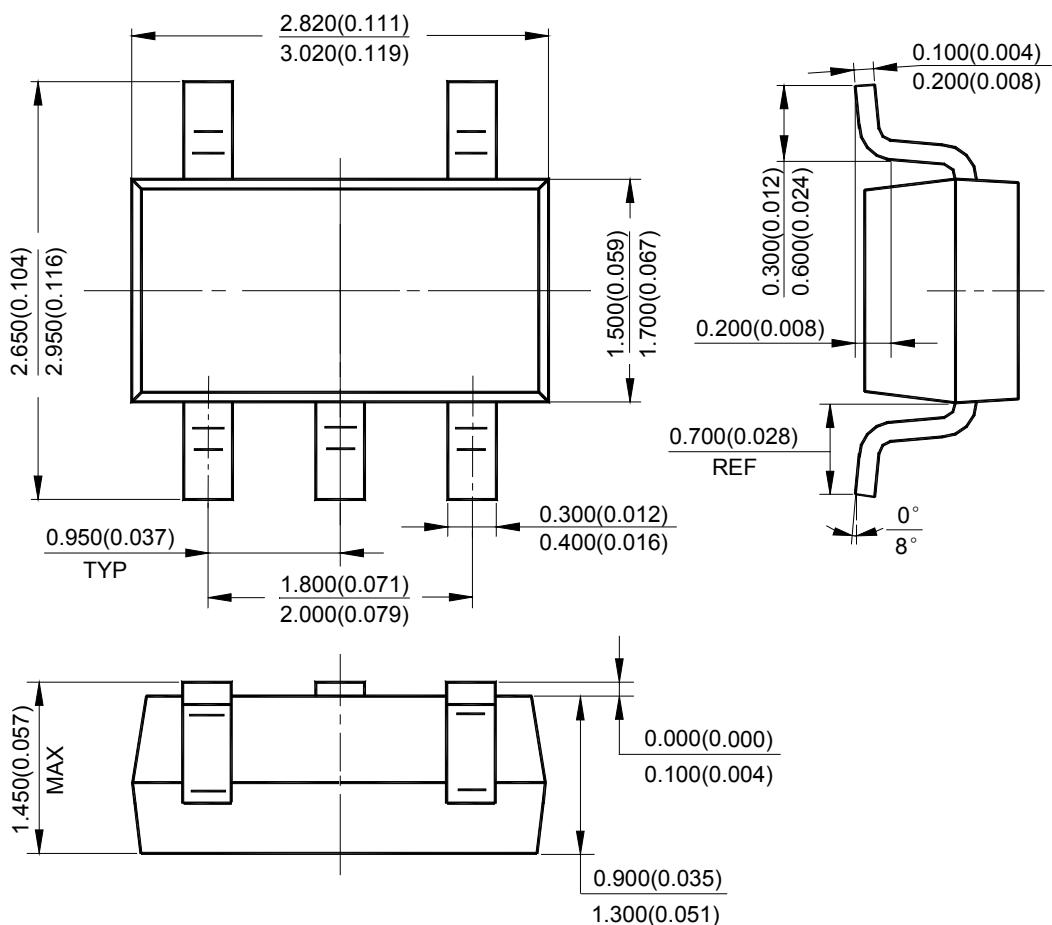
$$V_{OUT} = 1.0V, 1.2V, 3.3V$$

Figure 22. Typical Application of AP2129

Mechanical Dimensions

SOT-23-5

Unit: mm(inch)





BCD Semiconductor Manufacturing Limited

<http://www.bcdsemi.com>

IMPORTANT NOTICE

BCD Semiconductor Manufacturing Limited reserves the right to make changes without further notice to any products or specifications herein. BCD Semiconductor Manufacturing Limited does not assume any responsibility for use of any its products for any particular purpose, nor does BCD Semiconductor Manufacturing Limited assume any liability arising out of the application or use of any its products or circuits. BCD Semiconductor Manufacturing Limited does not convey any license under its patent rights or other rights nor the rights of others.

MAIN SITE

- Headquarters

BCD Semiconductor Manufacturing Limited

No. 1600, Zi Xing Road, Shanghai ZiZhu Science-based Industrial Park, 200241, China
Tel: +86-21-24162266, Fax: +86-21-24162277

- Wafer Fab

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd.

800 Yi Shan Road, Shanghai 200233, China
Tel: +86-21-6485 1491, Fax: +86-21-5450 0008

REGIONAL SALES OFFICE

Shenzhen Office

Shanghai SIM-BCD Semiconductor Manufacturing Co., Ltd., Shenzhen Office
Room E, 5F, Noble Center, No.1006, 3rd Fuzhong Road, Futian District, Shenzhen,
518026, China
Tel: +86-755-8826 7951
Fax: +86-755-8826 7865

Taiwan Office

BCD Semiconductor (Taiwan) Company Limited
4F, 298-1, Rui Guang Road, Nei-Hu District, Taipei,
Taiwan
Tel: +886-2-2656 2808
Fax: +886-2-2656 2806

USA Office

BCD Semiconductor Corp.
30920 Huntwood Ave. Hayward,
CA 94544, USA
Tel : +1-510-324-2988
Fax: +1-510-324-2788



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помошь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помошь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.