

**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR****AP2127****General Description**

The AP2127 Series are positive voltage regulator ICs fabricated by CMOS process.

The AP2127 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.

AP2127 has 1.0V, 1.2V, 1.5V, 1.8V, 2.5V, 2.8V, 3.0V, 3.3V, 4.2V, 4.75V, 5.2V fixed voltage versions and 0.8V to 5.5V adjustable voltage versions.

AP2127 series are available in SOT-23-5 Package.

Features

- Wide Operating Voltage: 2.5V to 6V
- High Output Voltage Accuracy: $\pm 2\%$
- High Ripple Rejection:
68dB@ f=1kHz, 54dB@ f=10kHz
- Low Standby Current: 0.1 μ A
- Low Dropout Voltage: 170mV@300mA for $V_{OUT}=3.3V$, 140mV@300mA for $V_{OUT}=5.2V$
- Low Quiescent Current: 60 μ A Typical
- Low Output Noise: 60 μ Vrms@ $V_{OUT}=0.8V$
- Short Current Limit: 50mA
- Over Temperature Protection
- Compatible with Low ESR Ceramic Capacitor: 1 μ F for C_{IN} and C_{OUT}
- Excellent Line/Load Regulation
- Soft Start Time: 50 μ s
- Auto Discharge Resistance: $R_{DS(ON)}=60\Omega$

Applications

- Datacom
- Notebook Computers
- Mother Board

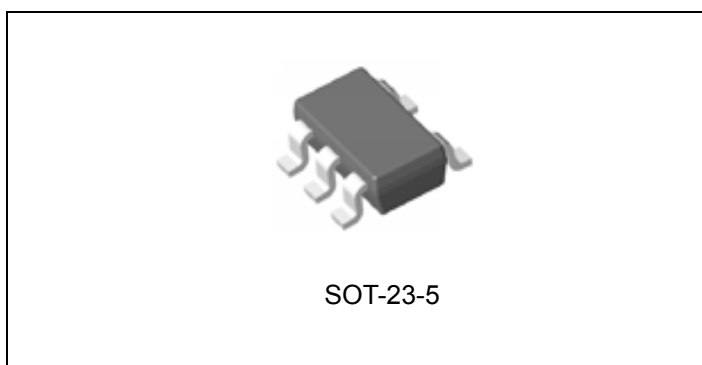


Figure 1. Package Type of AP2127

Pin Configuration

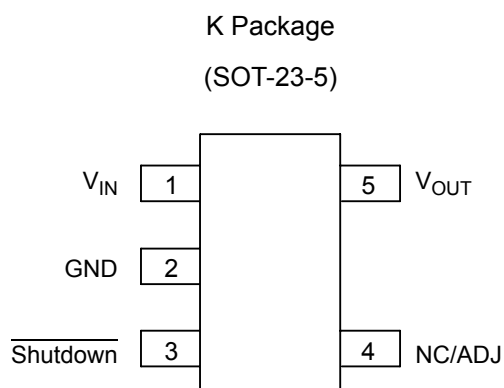


Figure 2. Pin Configuration of AP2127 (Top View)

Functional Block Diagram

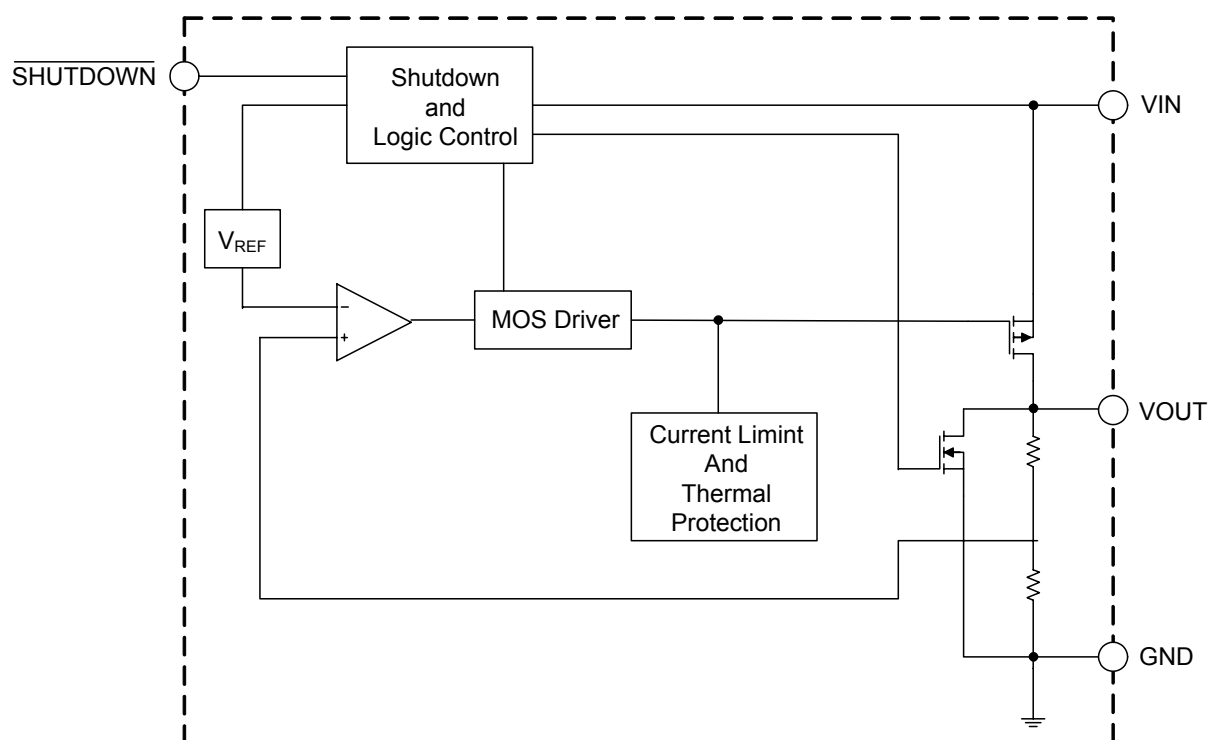


Figure 3. Functional Block Diagram of AP2127 for Fixed Version

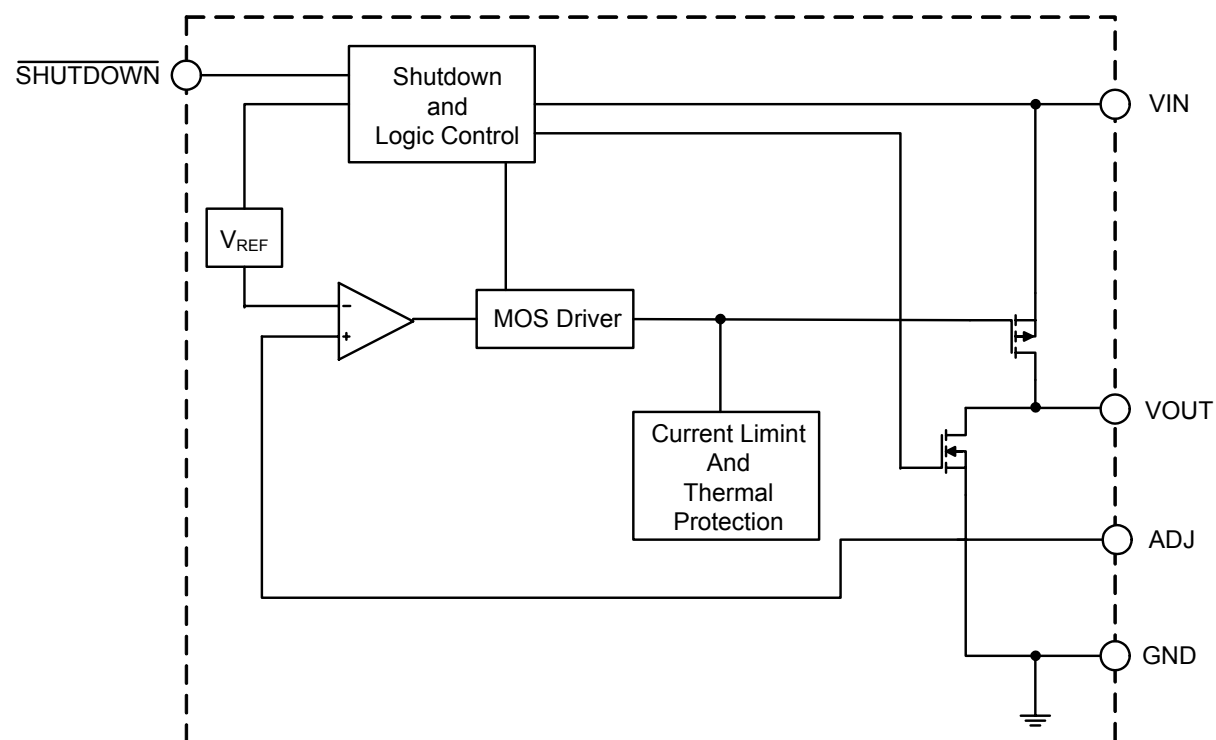
**Functional Block Diagram (Continued)**

Figure 4. Functional Block Diagram of AP2127 for Adjustable Version

**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR****AP2127****Ordering Information**

	AP2127	□ - □ □ □	
Circuit Type			G1: Green
Package			TR: Tape and Reel
K: SOT-23-5			ADJ: ADJ Output 1.0: Fixed Output 1.0V 1.2: Fixed Output 1.2V 1.5: Fixed Output 1.5V 1.8: Fixed Output 1.8V 2.5: Fixed Output 2.5V 2.8: Fixed Output 2.8V 3.0: Fixed Output 3.0V 3.3: Fixed Output 3.3V 4.2: Fixed Output 4.2V 4.75: Fixed Output 4.75V 5.2: Fixed Output 5.2V

Package	Temperature Range	Part Number	Marking ID	Packing Type
SOT-23-5	-40 to 85°C	AP2127K-ADJTRG1	GEH	Tape & Reel
		AP2127K-1.0TRG1	GEG	Tape & Reel
		AP2127K-1.2TRG1	GE1	Tape & Reel
		AP2127K-1.5TRG1	GEP	Tape & Reel
		AP2127K-1.8TRG1	GEQ	Tape & Reel
		AP2127K-2.5TRG1	GER	Tape & Reel
		AP2127K-2.8TRG1	GES	Tape & Reel
		AP2127K-3.0TRG1	GHF	Tape & Reel
		AP2127K-3.3TRG1	GET	Tape & Reel
		AP2127K-4.2TRG1	GEU	Tape & Reel
		AP2127K-4.75TRG1	GEZ	Tape & Reel
		AP2127K-5.2TRG1	GEW	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****AP2127****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_A	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	250	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}	2.5	6	V
Operating Junction Temperature Range	T_A	-40	85	°C



300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR

AP2127

Electrical Characteristics

($V_{IN}=2.5V$ (for 0.8V to 1.8V voltage versions), $V_{IN}=V_{OUT}+1V$ (for 2.5V to 4.75V voltage versions), $V_{IN}=6V@V_{OUT}=5.2V$, $T_A=25^{\circ}C$, $C_{IN}=1\mu F$, $C_{OUT}=1\mu F$, **Bold** typeface applies over $-40^{\circ}C \leq T_A \leq 85^{\circ}C$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Reference Voltage	V_{REF}	$V_{IN}=V_{OUT}+1V$ $1mA \leq I_{OUT} \leq 300mA$	0.784	0.8	0.816	V
Output Voltage	V_{OUT}	$V_{IN}=V_{OUT}+1V$ $1mA \leq I_{OUT} \leq 300mA$	$98\% \times V_{OUT}$		$102\% \times V_{OUT}$	V
Input Voltage	V_{IN}		2.5		6	V
Maximum Output Current	$I_{OUT(MAX)}$	$V_{IN}-V_{OUT}=1V$, $V_{OUT}=0.98 \times V_{OUT}$	300	400		mA
Load Regulation	$\frac{\Delta V_{OUT}}{(\Delta I_{OUT} \times V_{OUT})}$	$V_{IN}-V_{OUT}=1V$, $1mA \leq I_{OUT} \leq 300mA$			0.6	%/A
Line Regulation	$\frac{\Delta V_{OUT}}{(\Delta V_{IN} \times V_{OUT})}$	$V_{OUT}+0.5V \leq V_{IN} \leq 6V$ $I_{OUT}=30mA$			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	
		$V_{OUT}=1.5V$, $I_{OUT}=300mA$		900	1000	
		$V_{OUT}=1.8V$, $I_{OUT}=300mA$		600	700	
		$V_{OUT}=2.5V, 2.8V, 3.0V, 3.3V$, $4.2V$, $I_{OUT}=300mA$		170	300	
		$V_{OUT}=4.75V$ and $5.2V$, $I_{OUT}=300mA$		140	300	
Quiescent Current	I_Q	$V_{IN}=V_{OUT}+1V$, $I_{OUT}=0mA$		60	90	μA
Standby Current	I_{STD}	$V_{IN}=V_{OUT}+1V$, $\overline{V_{SHUTDOWN}}$ in off mode		0.1	1.0	μA
Power Supply Rejection Ratio	PSRR	AP2127-1.0V to 4.2V, Ripple 1Vp-p $V_{IN}=V_{OUT}+1V$	$f=100Hz$	68		dB
			$f=1kHz$	68		dB
			$f=10kHz$	54		dB
		AP2127-4.75V and 5.2V, Ripple 0.5Vp-p $V_{IN}=V_{OUT}+1V$	$f=100Hz$	63		dB
			$f=1kHz$	63		dB
			$f=10kHz$	45		dB
Output Voltage Temperature Coefficient	$(\frac{\Delta V_{OUT}}{V_{OUT}}) / \Delta T$	$I_{OUT}=30mA$, $-40^{\circ}C \leq T_A \leq 85^{\circ}C$		± 100		ppm/ $^{\circ}C$
Short Current Limit	I_{SHORT}	$V_{OUT}=0V$		50		mA

**300mA HIGH SPEED, EXTREMELY LOW NOISE CMOS LDO REGULATOR****AP2127****Electrical Characteristics (Continued)**

($V_{IN}=2.5V$ (for 0.8V to 1.8V voltage versions), $V_{IN}=V_{OUT}+1V$ (for 2.5V to 4.75V voltage versions), $V_{IN}=6V@V_{OUT}=5.2V$, $T_A=25^{\circ}C$, $C_{IN}=1\mu F$, $C_{OUT}=1\mu F$, **Bold** typeface applies over $-40^{\circ}C \leq T_A \leq 85^{\circ}C$, unless otherwise specified.)

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Soft Start Time	t_{SS}			50		μs
RMS Output Noise	V_{NOISE}	$T_A=25^{\circ}C$, $10Hz \leq f \leq 100kHz$, $V_{OUT}=0.8V$		60		μV_{rms}
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		$M\Omega$
Thermal Shutdown				165		$^{\circ}C$
Thermal Shutdown Hysteresis				30		$^{\circ}C$
Thermal Resistance	θ_{JC}	SOT-23-5		150		$^{\circ}C/W$

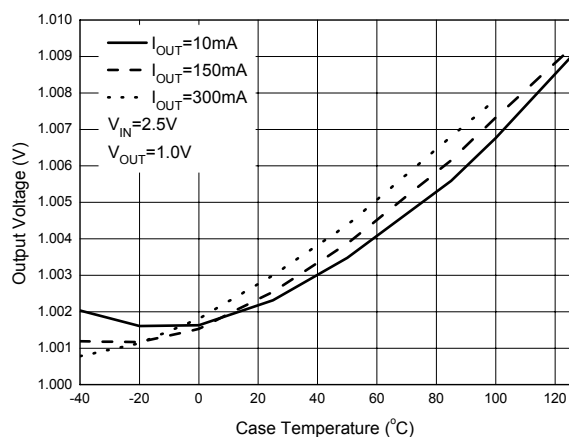
**Typical Performance Characteristics**

Figure 5. Output Voltage vs. Case Temperature

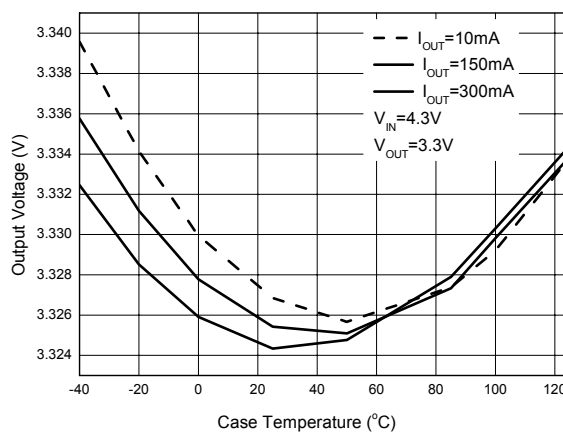


Figure 6. Output Voltage vs. Case Temperature

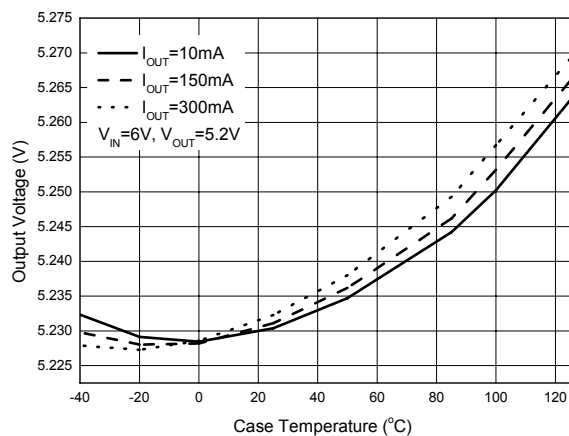


Figure 7. Output Voltage vs. Case Temperature

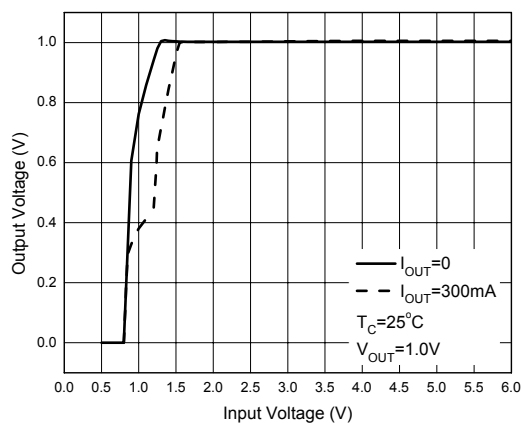


Figure 8. Output Voltage vs. Input Voltage

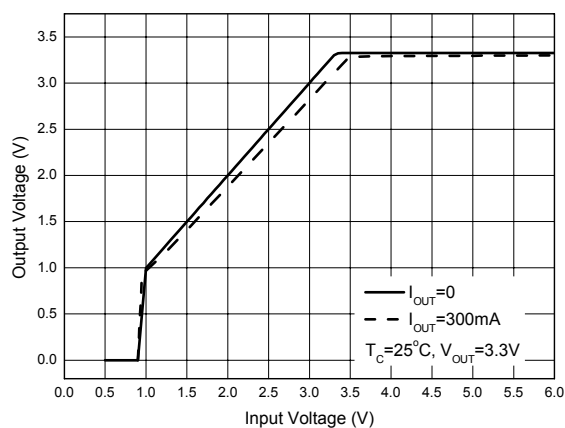
**Typical Performance Characteristics (Continued)**

Figure 9. Output Voltage vs. Input Voltage

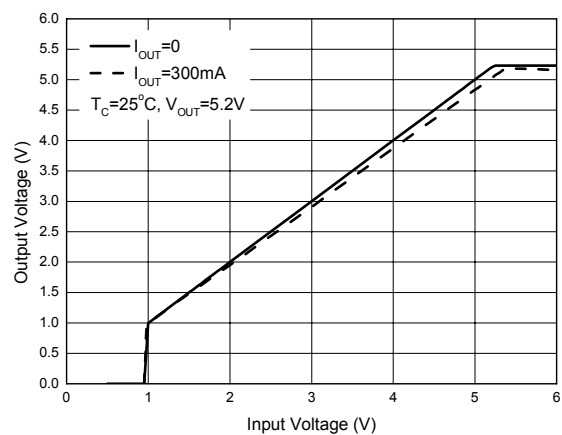


Figure 10. Output Voltage vs. Input Voltage

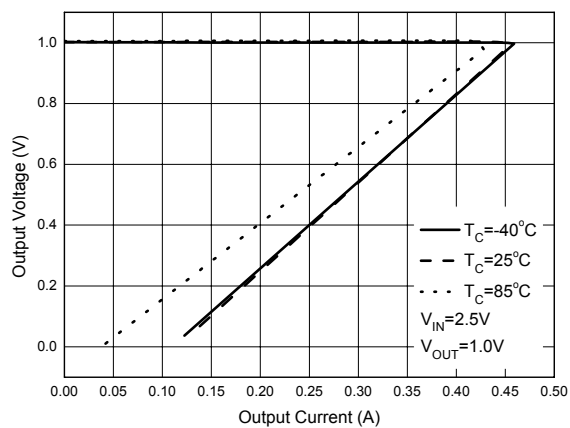


Figure 11. Output Voltage vs. Output Current

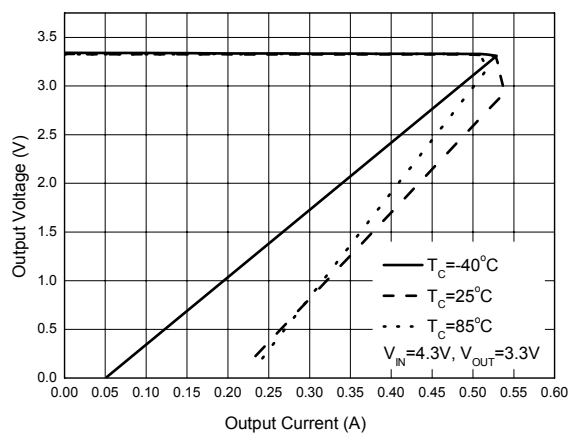


Figure 12. Output Voltage vs. Output Current

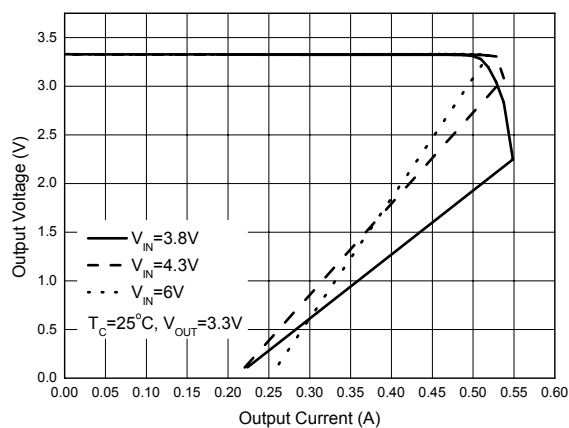
**Typical Performance Characteristics (Continued)**

Figure 13. Output Voltage vs. Output Current

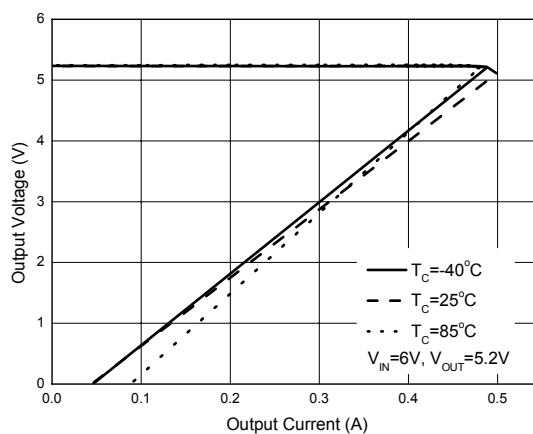


Figure 14. Output Voltage vs. Output Current

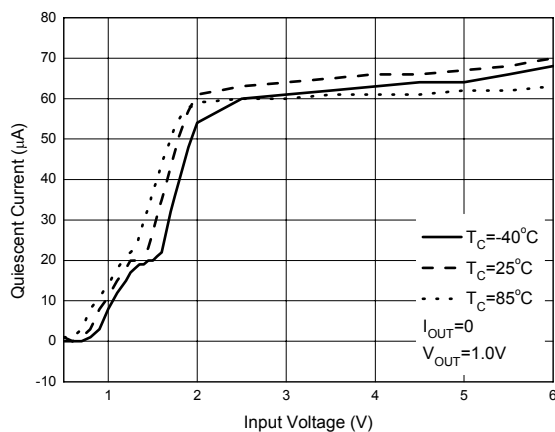


Figure 15. Quiescent Current vs. Input Voltage

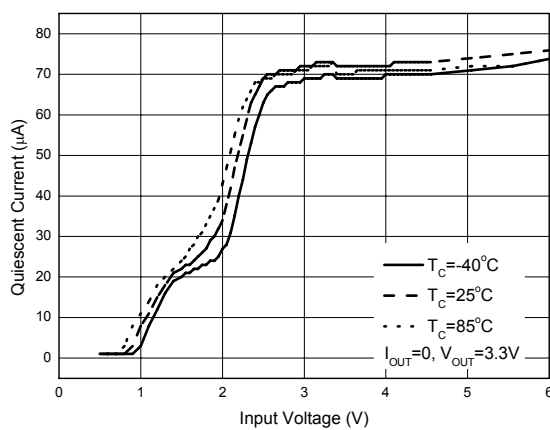


Figure 16. Quiescent Current vs. Input Voltage

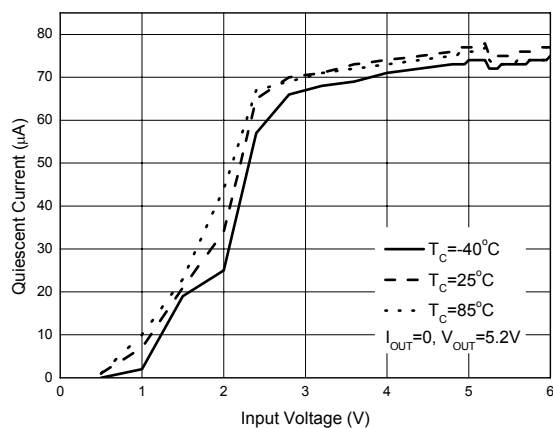
**Typical Performance Characteristics (Continued)**

Figure 17. Quiescent Current vs. Input Voltage

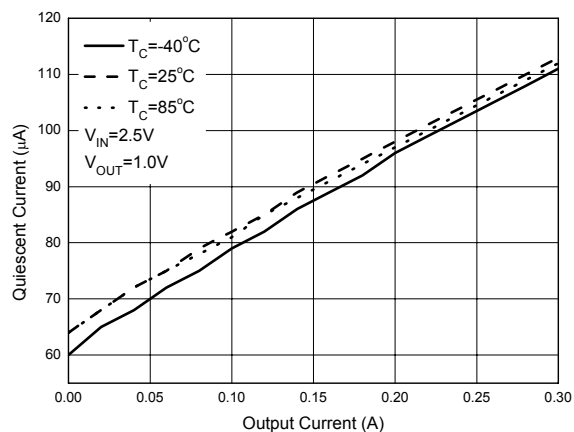


Figure 18. Quiescent Current vs. Output Current

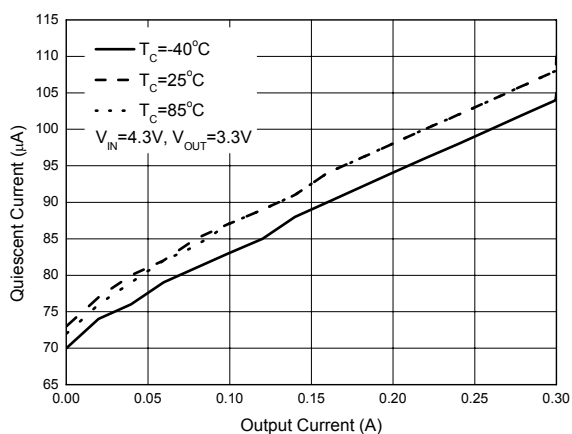


Figure 19. Quiescent Current vs. Output Current

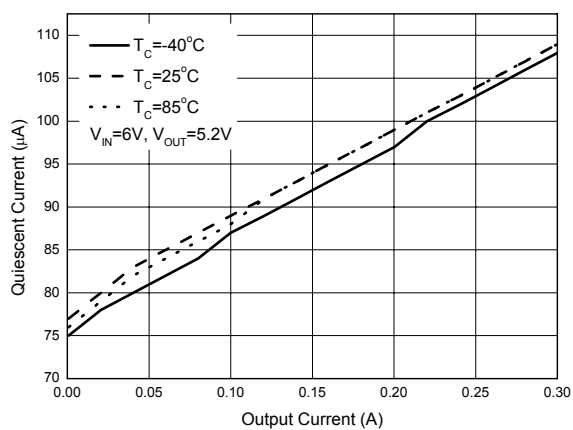


Figure 20. Quiescent Current vs. Output Current

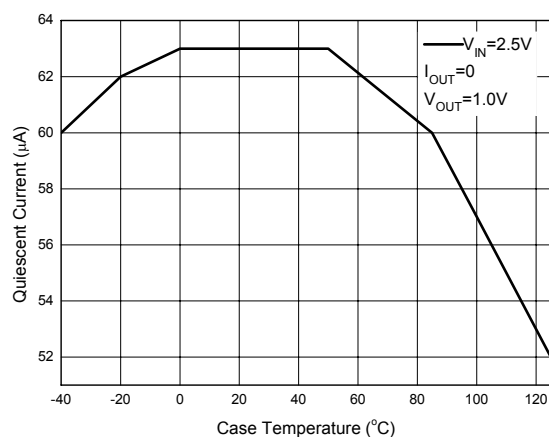
**Typical Performance Characteristics (Continued)**

Figure 21. Quiescent Current vs. Case Temperature

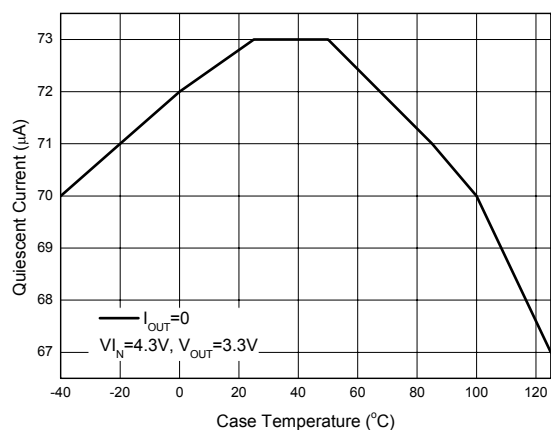


Figure 22. Quiescent Current vs. Case Temperature

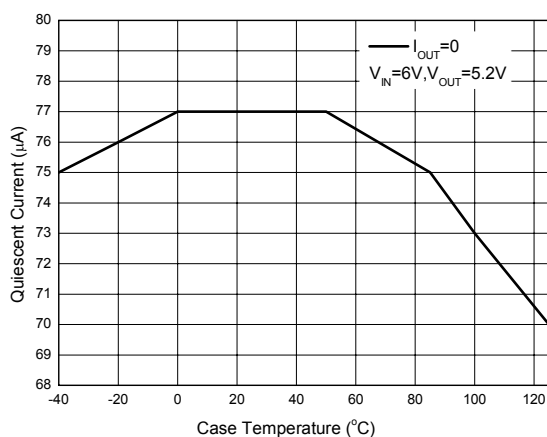


Figure 23. Quiescent Current vs. Case Temperature

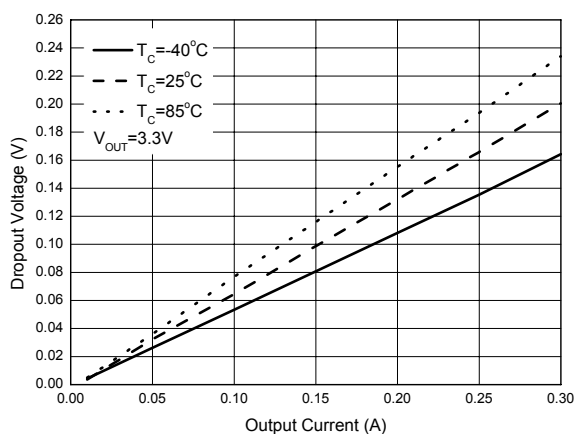


Figure 24. Dropout Voltage vs. Output Current

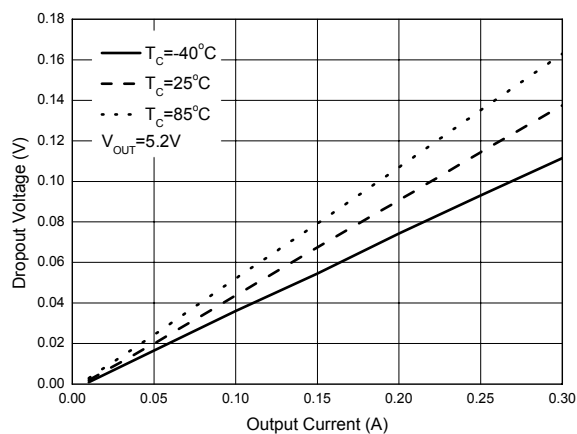
**Typical Performance Characteristics (Continued)**

Figure 25. Dropout Voltage vs. Output Current

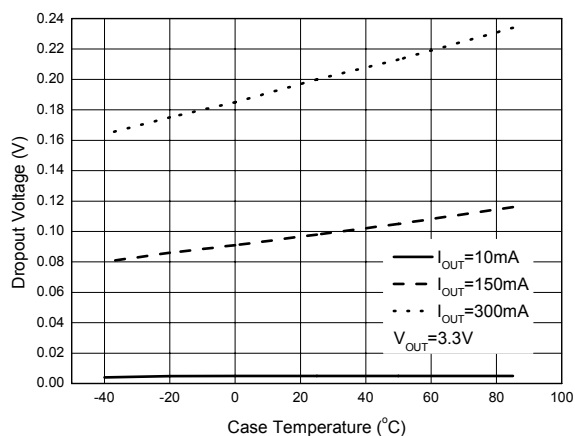


Figure 26. Dropout Voltage vs. Case Temperature

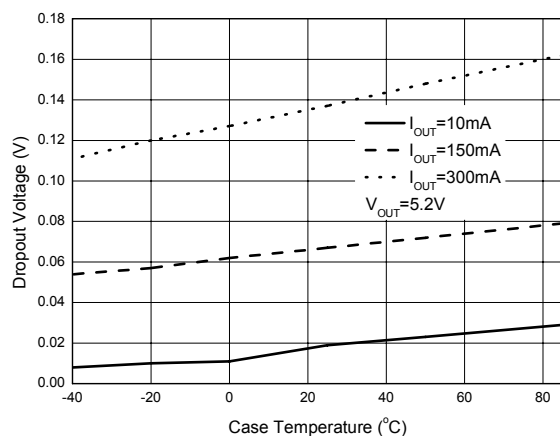


Figure 27. Dropout Voltage vs. Case Temperature

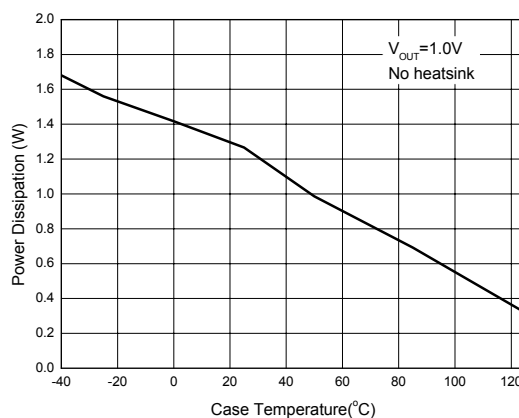


Figure 28. Power Dissipation vs. Case Temperature

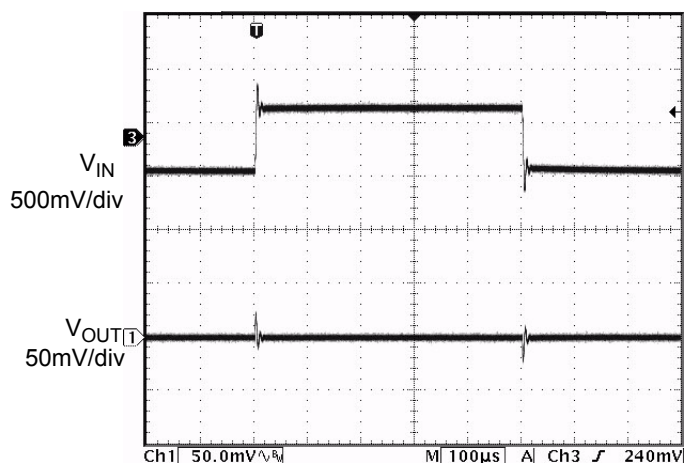
**Typical Performance Characteristics (Continued)**

Figure 29. Line Transient
(Condition: $C_{IN}=C_{OUT}=1\mu F$, $I_{OUT}=10mA$,
 $V_{IN}=2.5V$ to $3.3V$, $V_{OUT}=1V$)

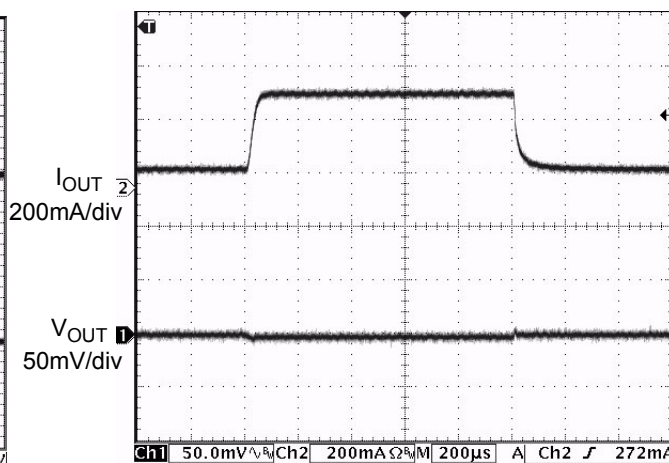


Figure 30. Load Transient
(Condition: $C_{IN}=C_{OUT}=1\mu F$, Sew Rate= $20mA/\mu s$,
 $V_{IN}=2.5V$, $V_{OUT}=1V$, $I_{OUT}=10mA$ to $300mA$)

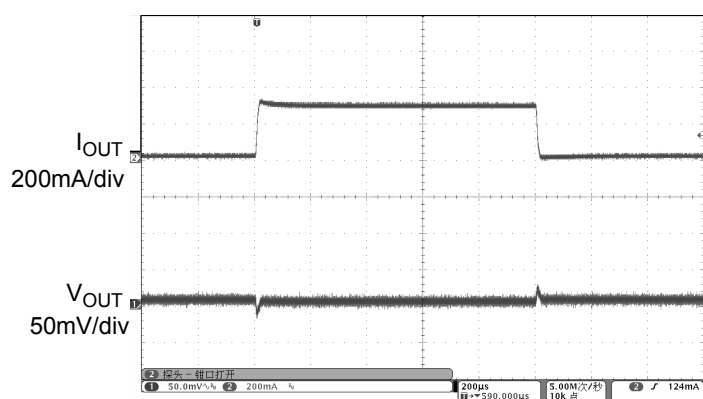


Figure 31. Load Transient
(Condition: $C_{IN}=C_{OUT}=1\mu F$, $I_{OUT}=10mA$ to $300mA$,
 $V_{IN}=4.3V$, $V_{OUT}=3.3V$)

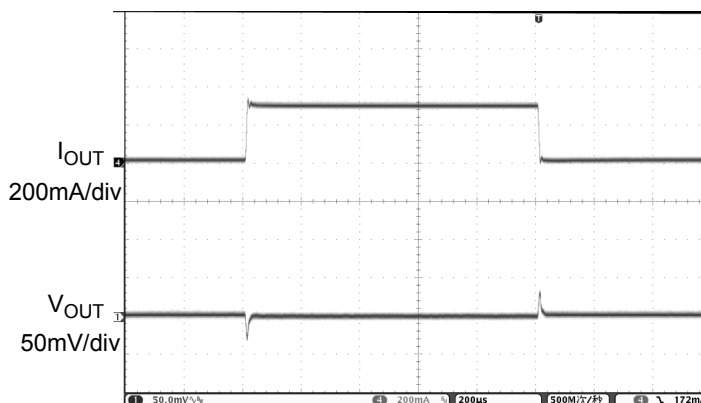


Figure 32. Load Transient
(Condition: $C_{IN}=C_{OUT}=1\mu F$, Sew Rate= $20mA/\mu s$,
 $V_{IN}=6V$, $V_{OUT}=5.2V$, $I_{OUT}=10mA$ to $300mA$)

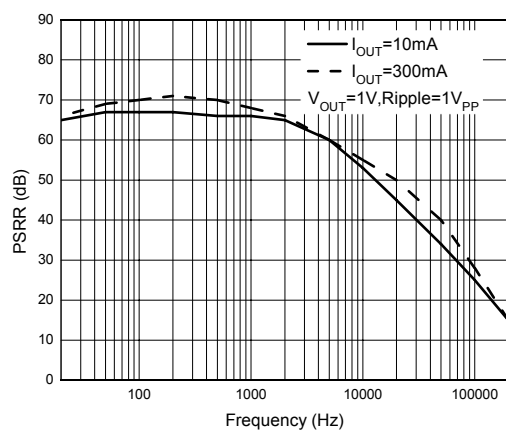
**Typical Performance Characteristics (Continued)**

Figure 33. PSSR vs. Frequency
(Conditions: $C_{IN}=C_{OUT}=1\mu\text{F}$, $V_{IN}=2.5\text{V}$, $V_{OUT}=1\text{V}$
Ripple = $1V_{PP}$)

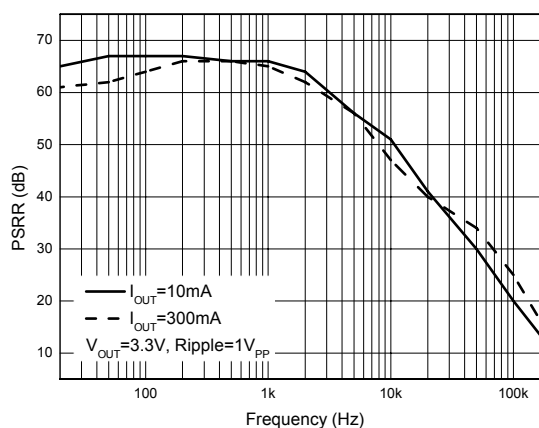


Figure 34. PSSR vs. Frequency
(Conditions: $C_{IN}=C_{OUT}=1\mu\text{F}$, $V_{IN}=4.3\text{V}$, $V_{OUT}=3.3\text{V}$
Ripple = $1V_{PP}$)

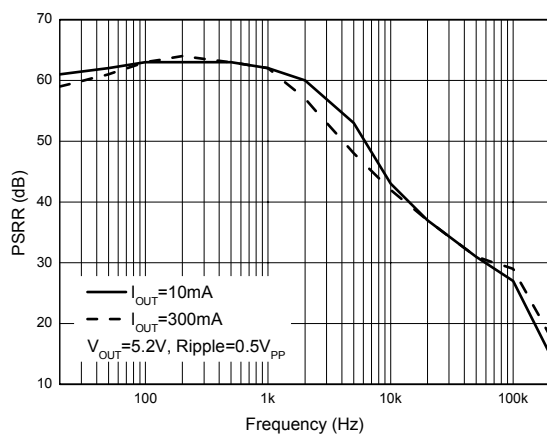
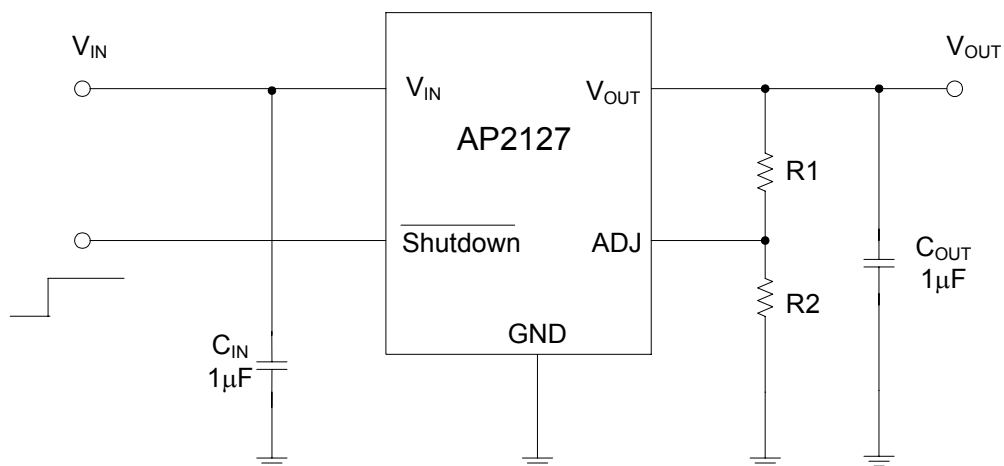
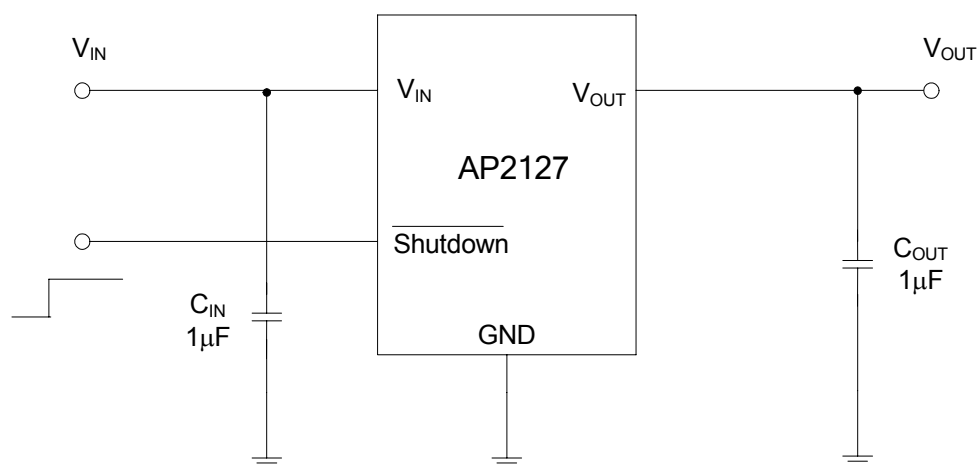


Figure 35. PSSR vs. Frequency
(Conditions: $C_{IN}=C_{OUT}=1\mu\text{F}$, $V_{IN}=6\text{V}$, $V_{OUT}=5.2\text{V}$
Ripple = $0.5V_{PP}$)

Typical Application

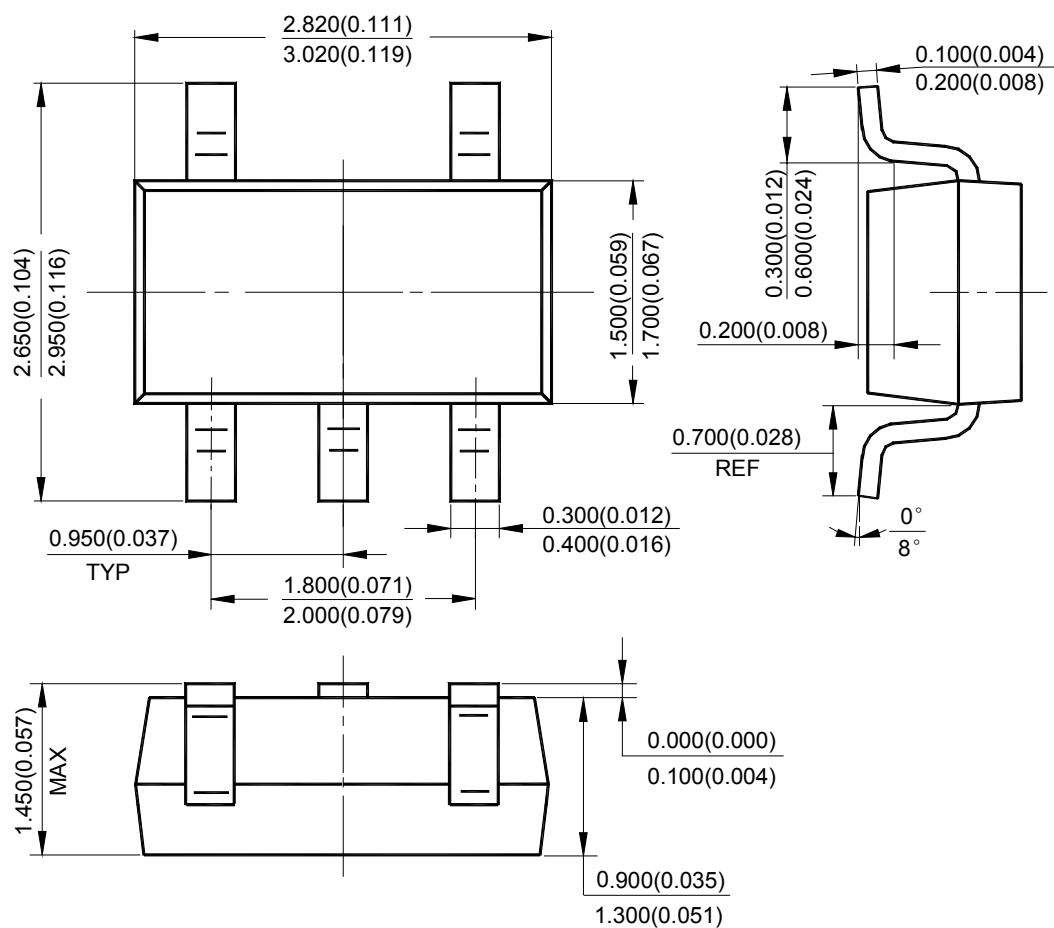


$$V_{OUT} = 0.8 * (1 + R1/R2) V$$



For 1.0V to 5.2V fixed voltage versions

Figure 36. Typical Application of AP2127

**Mechanical Dimensions****SOT-23-5****Unit: mm(inch)**



BCD Semiconductor Manufacturing Limited

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- 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, помощь 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 помощь 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

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