

Description

The SM62FP series is a group of positive voltage output, three-pin regulators, that provide a high current even when the input/output voltage differential is small. Low power consumption and high accuracy is achieved through CMOS and laser trimming technologies. The SM62FP consists of a high-precision voltage reference, an error amplification circuit, and a current limited output driver. Transient response to load variations have improved in comparison to the existing series.

Features

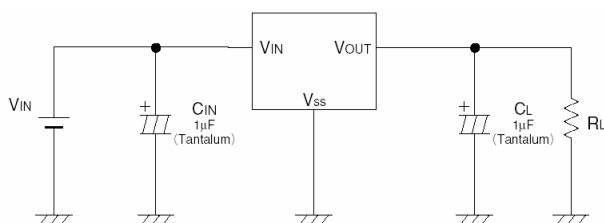
- * Small Input-Output Differential: $I_{OUT}=100mA@V_{OUT}=5V$ with a 0.12V differential
- * Highly Accurate: Output Voltage $\pm 2\%$
- * Low Power Consumption: Typ. $2\mu A@V_{OUT}=5V$
- * Output Voltage Range: 1.5V~6V in 0.1V increments
- * Input Stability: Typ. 0.2%/V
- * Output Voltage Temperature Characteristics: Typ. $\pm 100ppm/^{\circ}C$
- * Max. Output Current: 250mA (Within Max. Power Dissipation, $V_{OUT}=5V$)

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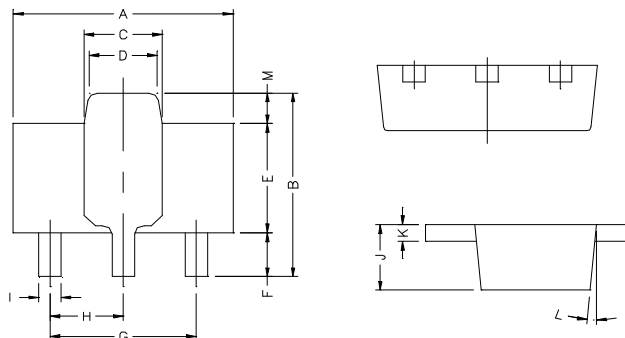
Applications

- * Reference Voltage Source
- * Palmtops
- * Battery Powered Equipment
- * Portable Cameras And Video Recorders

Typical Application Circuit

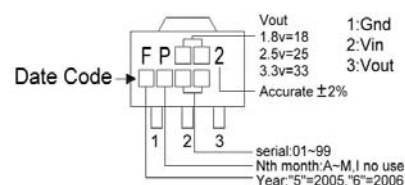


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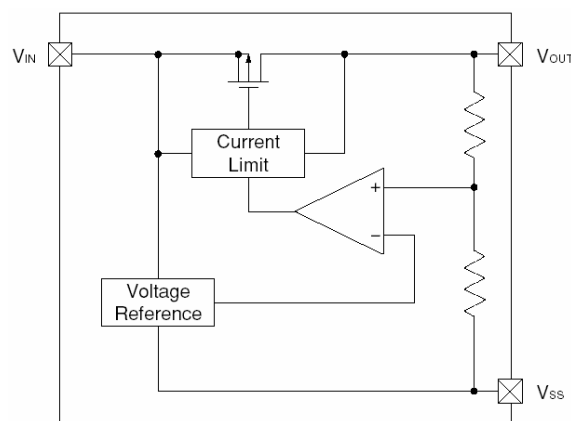


REF.	Millimeter		REF.	Millimeter	
	Min.	Max.		Min.	Max.
A	4.4	4.6	G	3.00	REF.
B	4.05	4.25	H	1.50	REF.
C	1.50	1.70	I	0.40	0.52
D	1.30	1.50	J	1.40	1.60
E	2.40	2.60	K	0.35	0.41
F	0.89	1.20	L	5°	TYP.
			M	0.70	REF.

Marking :



Block Diagram



SM62FP

CMOS Positive
Voltage Regulator

Absolute Maximum Ratings Ta=25°C

Parameter	Symbol	Ratings	Unit
Input Voltage	V _{IN}	12	V
Output Current	I _{OUT}	500	mA
Output Voltage	V _{OUT}	V _{SS} -0.3~V _{IN} +0.3	V
Operating Ambient Temperature	T _{opr}	-40~+85	°C
Storage Temperature	T _{stg}	-40~+125	°C
Continuous Total Power Dissipation	P _D	500	mW

Electrical Characteristics Ta=25°C

SM62FP-50 V_{OUT} (T) =5.0V (Note1)

Parameter	Symbol	Condition	Min	TYP	Max	Unit
Output Voltage	V _{OUT} (E) (Note2)	V _{IN} =6.0V, I _{OUT} =40mA	4.900	5.000	5.100	V
Max. Output Current	I _{OUT max}	V _{IN} =6V, V _{OUT} (E)≥4.5V	250	-	-	mA
Load Stability	ΔV _{OUT}	V _{IN} =6V, I _{OUT} =1mA to 100mA	-	40	80	mV
Input-Output Voltage Differential (Note3)	V _{dif1}	I _{OUT} =100mA	-	120	300	mV
	V _{dif2}	I _{OUT} =200mA	-	380	600	
Supply Current	I _{SS}	V _{IN} =6V	-	2.0	5.0	μA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =40mA V _{IN} =6V to 10V	-	0.2	0.3	%/V
Input Voltage	V _{IN}		-	-	10	V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	I _{OUT} =40mA -40°C ≤ T _{opr} ≤ 85°C	-	±100	-	ppm/°C

Note 1: V_{OUT} (T) =Specified Output Voltage.

2: V_{OUT} (E) =Effective Output Voltage (i.e. the output voltage when "V_{OUT} (T) +1.0V" is provided at the V_{IN} pin while maintaining a certain I_{OUT} value).

3: V_{dif}=V_{IN} (Note4)-V_{OUT} (E)

4: V_{IN1}=The input voltage at the time 98% of V_{OUT} (E) is output (input voltage has been gradually reduced).

SM62FP-40 V_{OUT} (T) =4.0V (Note1)

Parameter	Symbol	Condition	Min	TYP	Max	Unit
Output Voltage	V _{OUT} (E) (Note2)	V _{IN} =5.0V, I _{OUT} =40mA	3.920	4.000	4.080	V
Max. Output Current	I _{OUT max}	V _{IN} =5V, V _{OUT} (E)≥3.6V	200	-	-	mA
Load Stability	ΔV _{OUT}	V _{IN} =5V, I _{OUT} =1mA to 100mA	-	45	90	mV
Input-Output Voltage Differential (Note3)	V _{dif1}	I _{OUT} =100mA	-	170	330	mV
	V _{dif2}	I _{OUT} =200mA	-	400	630	
Supply Current	I _{SS}	V _{IN} =5V	-	2.0	4.5	μA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	I _{OUT} =40mA V _{IN} =5V to 10V	-	0.2	0.3	%/V
Input Voltage	V _{IN}		-	-	10	V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	I _{OUT} =40mA -40°C ≤ T _{opr} ≤ 85°C	-	±100	-	ppm/°C

SM62FP

CMOS Positive
Voltage Regulator

SM62FP-30 $V_{OUT}(T) = 3.0V$ (Note1)

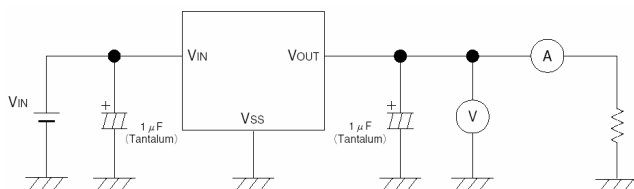
Parameter	Symbol	Condition	Min	TYP	Max	Unit
Output Voltage	$V_{OUT}(E)$ (Note2)	$V_{IN}=4.0V, I_{OUT}=40mA$	2.940	3.000	3.060	V
Max. Output Current	$I_{OUT\ max}$	$V_{IN}=4V, V_{OUT}(E) \geq 2.7V$	150	-	-	mA
Load Stability	ΔV_{OUT}	$V_{IN}=4V, I_{OUT}=1mA$ to 80mA	-	45	90	mV
Input-Output Voltage Differential (Note3)	V_{dif1}	$I_{OUT}=80mA$	-	180	360	mV
	V_{dif2}	$I_{OUT}=160mA$	-	400	700	
Supply Current	I_{SS}	$V_{IN}=4V$	-	2.0	4.5	μA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $V_{IN}=4V$ to 10V	-	0.2	0.3	%/V
Input Voltage	V_{IN}		-	-	10	V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $-40^{\circ}C \leq T_{opr} \leq 85^{\circ}C$	-	± 100	-	ppm/ $^{\circ}C$

SM62FP-20 $V_{OUT}(T) = 2.0V$ (Note1)

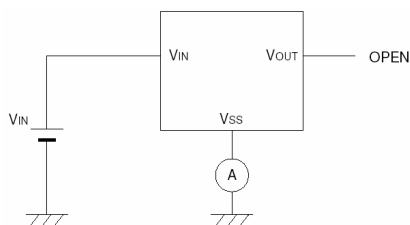
Parameter	Symbol	Condition	Min	TYP	Max	Unit
Output Voltage	$V_{OUT}(E)$ (Note2)	$V_{IN}=3.0V, I_{OUT}=40mA$	1.960	2.000	2.040	V
Max. Output Current	$I_{OUT\ max}$	$V_{IN}=3V, V_{OUT}(E) \geq 1.8V$	100	-	-	mA
Load Stability	ΔV_{OUT}	$V_{IN}=3V, I_{OUT}=1mA$ to 60mA	-	45	90	mV
Input-Output Voltage Differential (Note3)	V_{dif1}	$I_{OUT}=60mA$	-	180	360	mV
	V_{dif2}	$I_{OUT}=120mA$	-	400	700	
Supply Current	I_{SS}	$V_{IN}=3V$	-	2.0	4.5	μA
Input Stability	$\frac{\Delta V_{OUT}}{\Delta V_{IN} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $V_{IN}=3V$ to 10V	-	0.2	0.3	%/V
Input Voltage	V_{IN}		-	-	10	V
Output Voltage Temperature Characteristics	$\frac{\Delta V_{OUT}}{\Delta T_{opr} \cdot V_{OUT}}$	$I_{OUT}=40mA$ $-40^{\circ}C \leq T_{opr} \leq 85^{\circ}C$	-	± 100	-	ppm/ $^{\circ}C$

Test Circuit

Circuit1



Circuit2

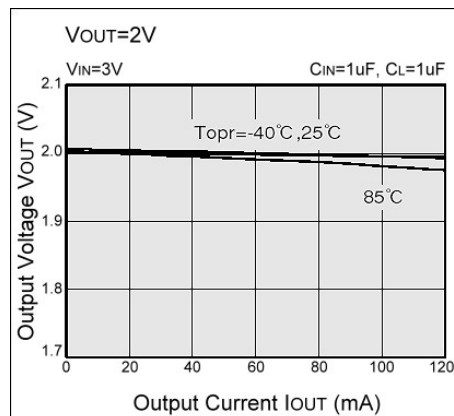
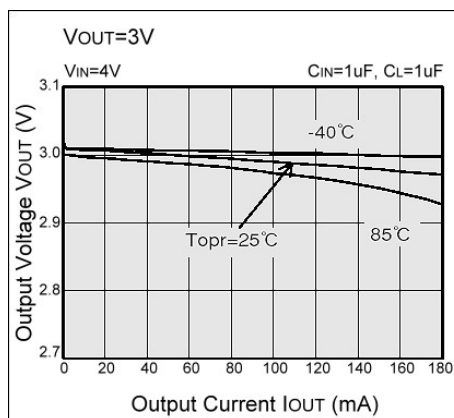
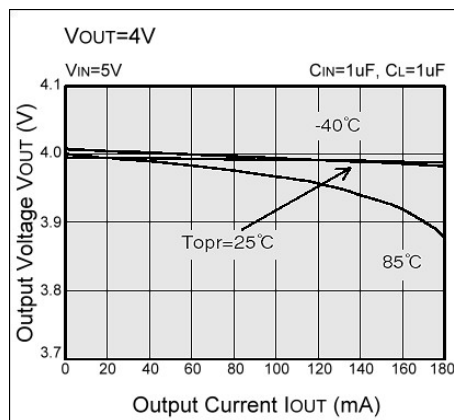
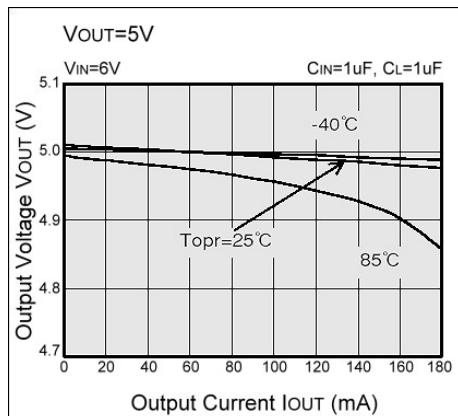


SM62FP

CMOS Positive Voltage Regulator

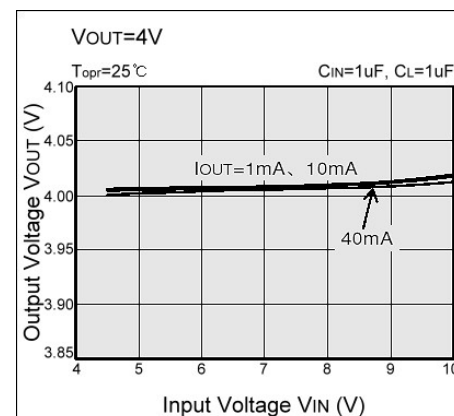
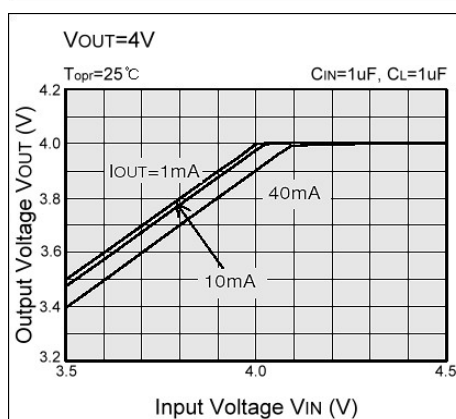
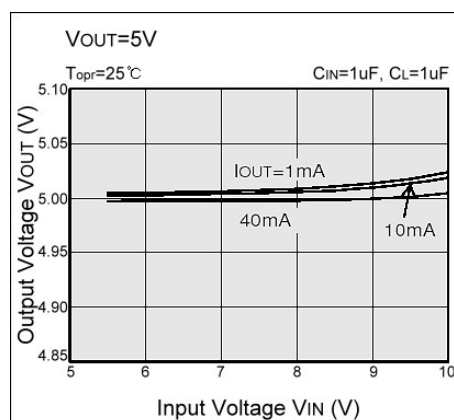
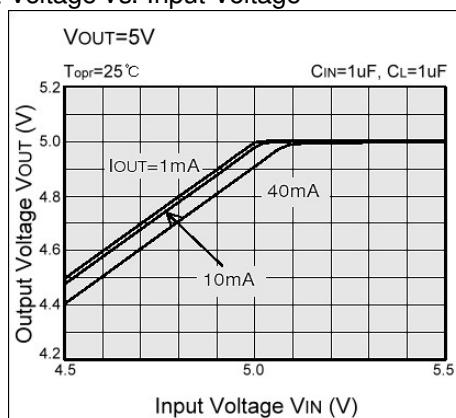
Characteristics Curve

(1) Output Voltage vs. Output Current



(2) Output Voltage vs. Input Voltage

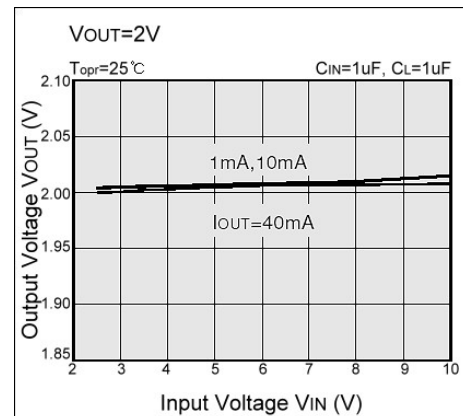
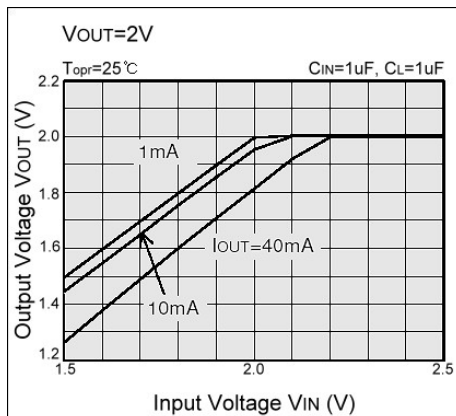
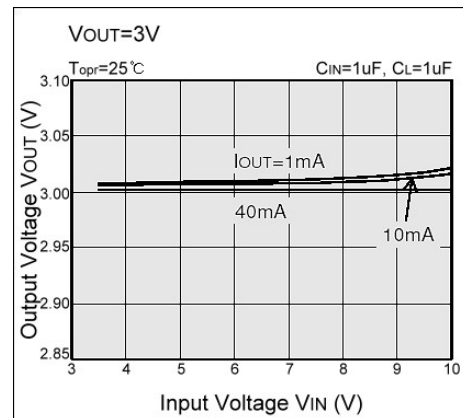
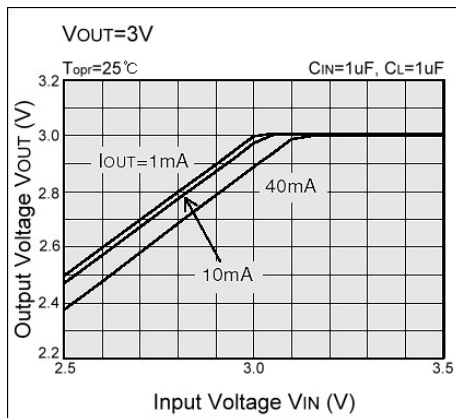
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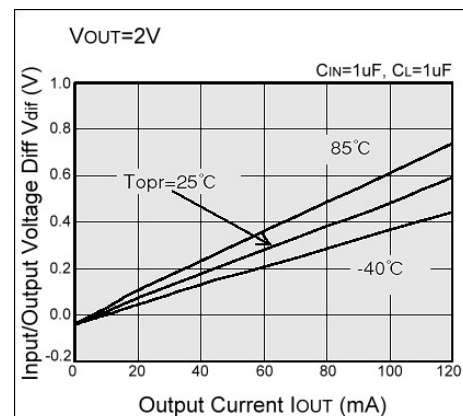
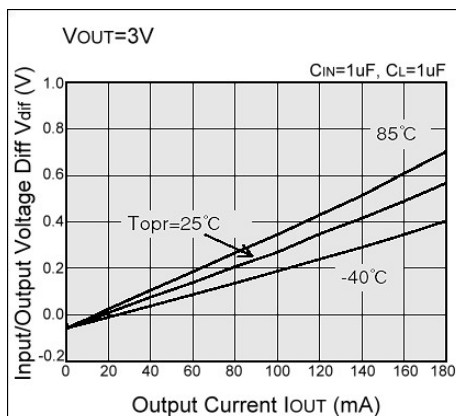
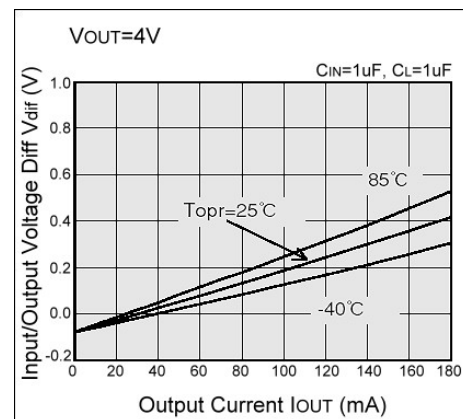
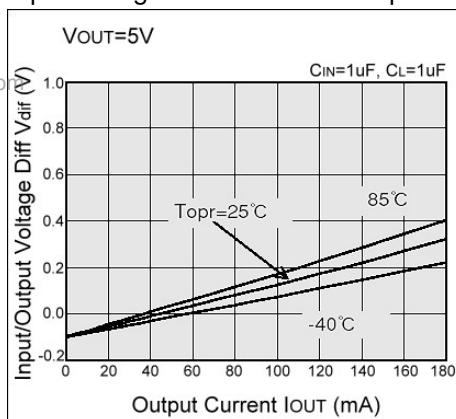
SM62FP

CMOS Positive Voltage Regulator

(2) Output Voltage vs. Input Voltage



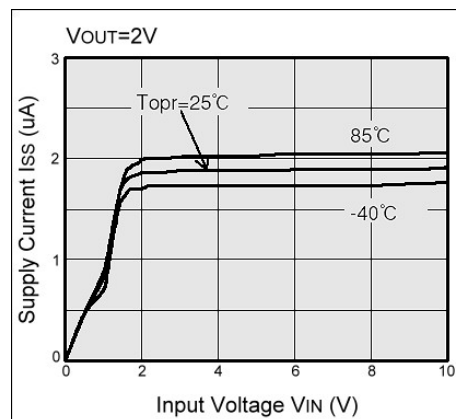
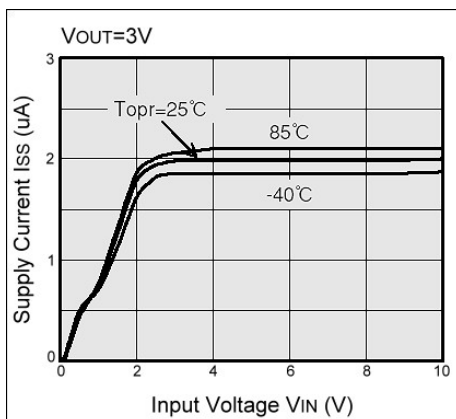
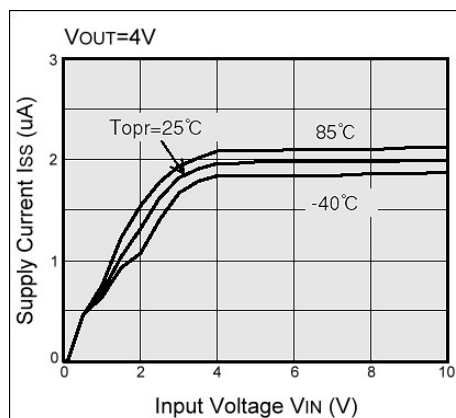
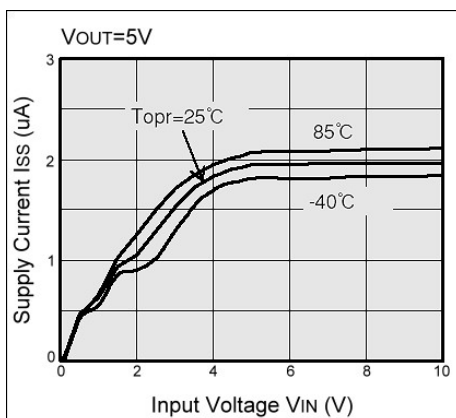
(3) Input/Output Voltage Differential vs. Output Current



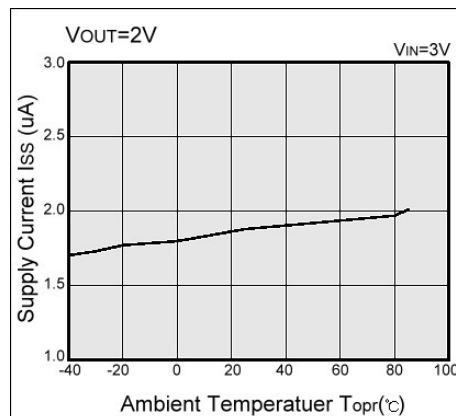
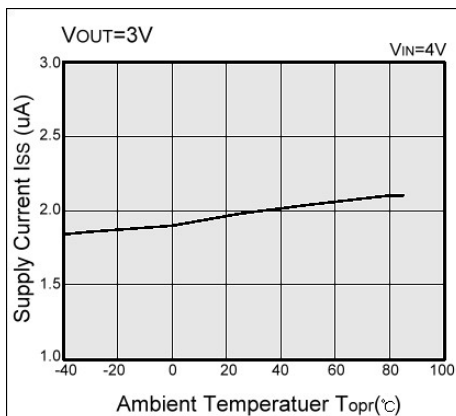
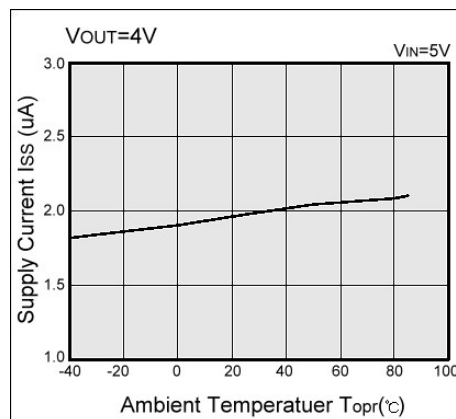
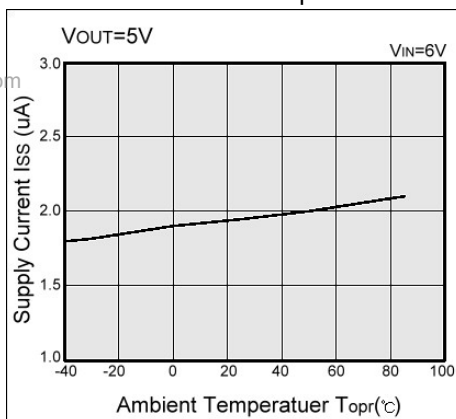
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CMOS Positive
Voltage Regulator

(4) Supply Current vs. Input Voltage



(5) Supply Current vs. Ambient Temperature

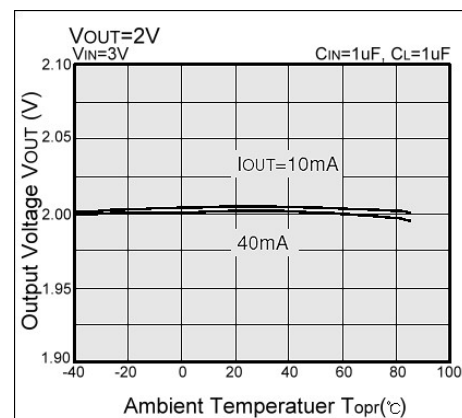
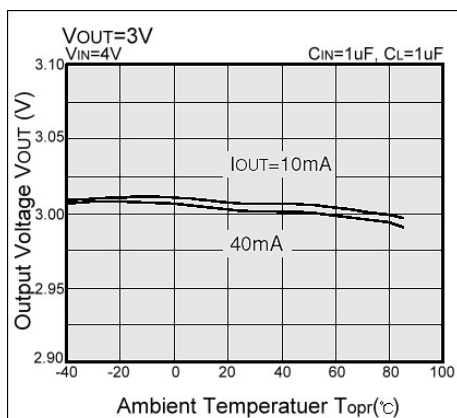
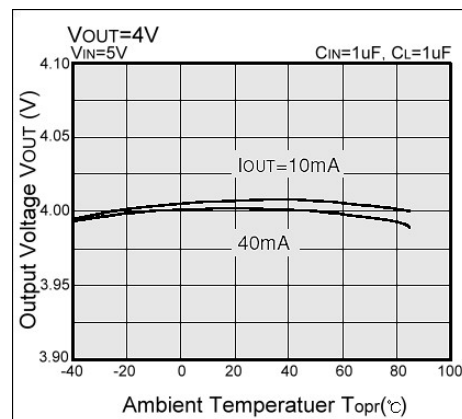
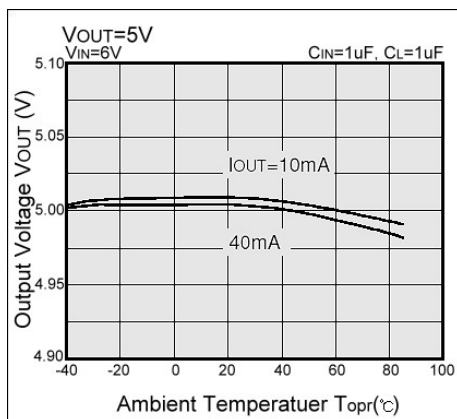


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(6) Output Voltage vs. Ambient Temperature



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